

Power Tool Battery Specification

工具电池说明书

Model 型号	LI-ION-POR-20V-4.0A
Nominal Capacity 标称容量	4000mAh
Customer 客户	
Total Page 文件页数	8

Registered By 编制	Checked By 审核	Approved By 批准
Livian	Leeway	Leeway
2018.7.23	2018.7.23	2018.7.23

Customer Approval 客户确认		
Department 部门	Signature 签名	Date 日期
QA Dept 品质		
R&D Dept 研发		
Approved By 批准		

1. REVISION LIST 修订履历Product Revision Record List
产品变更履历表

Revision 版本	Date 日期	Mark 标记	Modified content 变更内容	Approved by 批准
A1	2018-7-23			Leeway

2. Scope 适用范围

This specification describes the basic performance, technical requirements, testing methods, warnings and cautions of the given Li-ion rechargeable battery. The specifications are applicable to EnnoTool products only.

本标准规定了锂离子可充电电池的基本性能、技术要求、测试方法及注意事项，本标准只适用于深圳恩浦诺科技有限公司。

3. Product Image 产品图片



4. Compatible Models 兼容型号

This battery is compatible with following Porter power tools:

此电池兼容以下卜派系列电动工具：

PCC685L, PCC680L, PCC681L, PCC600, PCC640, PCC690L, PCC601, PCC670

5. Specifications 产品规格

NO. 序号	Item 项目	Specifications 规格要求
5.1	Compatibility 替代原始型号	PCC685L, PCC680L, PCC681L
5.2	Typical Capacity 典型容量	4000mAh @ 1C Discharge (1C 放电)
	Minimum Capacity 最小容量	3800mAh @ 1C Discharge (1C 放电)
5.3	Nominal Voltage 标称电压	20.0V
5.4	Standard Charge 标准充电	CC/CV, 800mA, 21.0V
5.5	Standard Discharge 标准放电	CC, 1C, 15.0V
5.6	End-of-charge Voltage 充电截止电压	21.0V ± 0.3V
5.7	End-of-charge Current 充电截止电流	0.02C (At CV mode)
5.8	End-of-discharge Voltage 放电截止电压	12.5V
5.9	Charging Time 充电时间	6 hours (standard charge) 6 小时
5.10	Standard Discharge Current 标准放电电流	4000mA (1.0C ₅ rate) 1C 放电
5.11	Max Discharge Current 最大持续放电电流	30.0A
5.12	Initial Impedance 初始内阻	Max: 150mΩ
5.13	Weight 重量	Approx (约): 700±10g
5.14	Operating Temperature 工作温度	Charging (充电): 0°C~45°C Discharging (放电): -20°C~60°C
5.15	Storage Temperature 适宜储存温度	-5°C~35°C
5.16	Max Storage Temperature 最高短期储存温度	65°C ≤ 30d
5.17	Storage Humidity 储存湿度	≤ 75% RH
5.18	Standard Environmental Condition 标准环境	Temperature (温度): 23±5°C Humidity (湿度): 45-75%RH Atmospheric Pressure (大气压): 86-106 Kpa

6. General Performance 常规性能

No.	Item 项目	Test Methods and Condition 测试方法和条件	Criteria 标准
6.1	1C Capacity 1C 容量	After standard charging, rest the battery for 10min, then discharge at 1C to voltage 12.5V, and record the discharging time. 标准充电后, 搁置 10 分钟, 然后用 1C 电流放电至 12.5V, 所记录放电时间	≥57min
6.2	Cycle Life 循环寿命	First charge with a constant current of 1C to 21.0V, then charge with a constant voltage of 21.0V until 0.02C. Rest the battery for 10min, then discharge with constant current of 0.5C to 12.5V, rest another 10min. Repeat the steps above until the discharging capacity is 80% higher than the initial cell capacity. 先用 1 C 恒流充电至 21.0V, 再恒压 21.0V 充电直至充电电流 ≤0.02C, 搁置 10 分钟, 再用 0.5C 电流放电至 12.5V; 又搁置 10 分钟, 重复以上步骤, 直到放电容量是初始容量的 80%。	≥300 times(次)
6.3	Charge Retention 荷电保持能力	After standard charging at 20±5°C, rest the battery 28 days, then discharge at 0.2C until 12.5V and record the discharging time. 在 20±5°C 状态下, 标准充电后, 电芯搁置 28 天, 然后用 0.2C 放电至 12.5V, 所记录放电时间.	≥240min

7. Environment Performance 环境性能

No.	Item 项目	Test Methods and Conditions 测试方法和条件	Criteria 标准
7.1	Discharging at High Temperature 高温放电	After standard charging, store the cells for 4h at 60±2°C, then discharge at 1C until voltage is 12.5V, and record the discharging time. 标准充电后, 在 60 ± 2°C 条件下贮存 4h, 然后用 1C 放电至 12.5V, 所记录放电时间。	≥54min
7.2	Discharging at Low Temperature 低温放电	After standard charging, store the cells for 16h at -20±2°C, then discharge at 0.2C until voltage is 12.5V, and record the discharging time. 标准充电后, 在 -20 ± 2 °C 条件下贮存 16h, 然后用 0.2C 放电至 12.5V, 所记录放电时间。	≥210min
7.3	Thermal Shock 热冲击	Put the cells in the oven and raise the temperature to 5±2°C per minute until it reaches 130±2°C and keep this temperature for 30 minutes. 将电池放进烘箱内, 以 5±2°C/min 速度升高烘箱内温度至 130 ± 2°C 后, 恒温 30min。	No fire, no smoke 不起火, 不冒烟。

8. Safe Performance 安全性能

No.	Item 项目	Test Methods and Conditions 测试方法和条件	Criteria 标准
8.1	Overcharge testing 过充测试	At 23±5°C, charge the cells with a constant current 3C until voltage is 25.0V, then with a constant voltage of 25.0V until current declines to 0A. Stop the test when temperature of the cells drops 10°C lower than max temperature. 在 23±5°C 状态下, 电池用 3C 电流充电至 25.0V, 然后恒压 25.0V 让电流下降接近为 0A, 监视电池温度变化, 当电池温度下降一峰值低约 10°C 时, 停止实验。	No fire, no smoke. 不起火, 不冒烟
8.2	Overdischarge testing 过放测试	At 23±5°C, according to the standard charge requirements, the cells should be discharged to cut-off voltage, then external load of 180 ohm is discharged for 24 hours. 在 23±5°C 状态下, 按标准放电的要求放电至终止电压后, 外接 180Ω 负载放电 24 小时。	No fire, no smoke, no leakage. 无起火, 无冒烟, 无泄液
8.3	Short-circuit testing 短路测试	At 23±5°C, after the standard charging, connect cells anode and cathode by wire which impedance is less than 50mΩ, and keep 6h. 在 23 ± 5°C 状态下, 标准充电后, 将电池的正负极用一根小于 50mΩ 的导线连接, 放置 6 小时。	No smoke or fire 不起火, 不冒烟

9. CAUTIONS FOR USE 使用警告

To ensure proper use of these battery products please read the manual carefully before.

为了使电池安全的使用及处理请在使用前认真的阅读操作说明。

- Do not expose to or dispose the battery in fire.
- 不能把电池曝晒或丢在火中
- Do not put the battery in a charger or equipment with wrong terminals connected.
- 电池充电时不能把正负极性装反
- Avoid short circuits of the battery
- 避免短路电池
- Avoid excessive physical shock or vibration.
- 避免过分的物理震动和冲击电池
- Do not disassemble or deform the battery.
- 不能拆解或使电池变形
- Do not immerse in water.
- 不能将电池浸入水中
- Do not use the battery with other type and models if batteries as well as made from other chemicals.

- 不能将其它不同厂家, 类型, 型号的电池混合使用
- Keep out of the reach of children.
- 禁止小孩接触电池

9.1 Charge and Discharge 充放电

- Battery must be charged in appropriate charger only.
- 电池必须在合适的条件下充电
- Never use a modified or damaged charger.
- 决不能用故障的充电器给电池充电
- Do not leave battery in charger over 24 hours.
- 电池持续充电不能超过 24 小时

9.2 Storage 贮存

- Store the battery in a cool, dry and well-ventilated area.
- 电池贮藏在通风干燥的环境中

9.3 Disposal 处理

- Regulations vary for different countries. Dispose the battery of according to the local regulations.
- 不同国家法规的不同, 处理时根据当地的法规。

10. Battery Operation Instructions 电池操作说明

10.1 Charging 充电

Charging current: Do not exceed the maximum charging current specified on this document.

充电电流: 不能超过规格书规定的最大的充电电流。

Charging voltage: Do not exceed the maximum voltage limit specified on this document.

充电电压: 不能超过规格书规定的最高的限制电压。

Charge temperature: The battery charging temperature must be performed according to the specifications given on this document.

充电温度: 电池充电温度必须按照规格书的温度范围执行。

After constant current and constant voltage charge, do not change the positive and negative. It can be dangerous if these are reversed.

先恒流后恒压方式充电, 禁止颠倒的方式充电。如果电池正负极颠倒充电会带来危险。

10.2 Discharging current 放电电流

The battery discharge current should not exceed the maximum discharge current specified in the specification. Excessive current discharge will cause battery heat and capacity degradation.

电池放电电流不能超过规格书规定的最大放电电流, 过大的电流放电会造成电池发热和容量衰减。

10.3 Discharge temperature 放电温度

The battery discharge temperature must be performed in accordance with the temperature range of the specification.

电池放电温度必须按照规格书的温度范围执行。

10.4 Over-discharges 过放电

Short-time over-charging does not affect the use of the battery, but long-term over-discharge will affect the function of the battery. If the battery will not be used, then it may be over-discharged. Also it may cause excessive discharge. To prevent battery over-discharge always keep a certain amount of power in the battery.

短时间的过充过放不影响电池的使用，但是长时间的过放电会影响到电池的功能失效，电池永久性不能适用，电池可能过放还有一个原因是自动能量的消失。预防电池过放的出现方法是电池应保持一定的电量。

10.5 Storing the Batteries 贮存电池。

Store the batteries according to the temperature requirements specified on this document. If the battery is stored for more than six months, it is recommended to charge the battery.

电池贮存在规格书规定的温度范围内，如果电池贮存超过六个月，建议您开始给电池充电。

11. Warranty Period 保质期

The warranty period is one year after the shipment date. EnnoPro Group Limited guarantees to replace the products if it is proven that the defects were caused during manufacturing process and not by misuse and user abuse.

电池的保质期从出货之日算起为 1 年。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. Other Chemical Reactions 其它化学反应

Since batteries use a chemical reaction, even if it is stored for a long time without being used, the performance of the battery decreases in time. If conditions such as charging, discharging, and ambient temperature are not within the specified range of use, the battery life will be shortened or the leakage may result in equipment damage. If the battery cannot be charged for a long period of time, even if the charging method is correct, the battery needs to be replaced.

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，也会缩短电池的使用寿命，或者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。

13. Note: 备注

The items which are not included in this manual shall be determined by agreement between the parties.

本说明书未包括事项应由双方协议确定。