

	兰钧新能源科技有限公司 Batterotech Corporation Limited	文件编号: RI-SPC-PC-0B1-72174L4-AH 版本状态: A2
	文件名称: 280Ah 产品规格书 280Ah Product Specification	第 1 页 共 14 页 发布日期 Issue date 2024 年 4 月 9 日

72174L4-280Ah 产品规格书

72174L4-280Ah Product Specification

型号: PC-0B1-72174L4-AH

Model: PC-0B1-72174L4-AH

变更记录 History of revision						
版本 Version	变更号 ECN.no	变更内容 Event	发行日期 Date	编制部门 Department	编制人 Prepared by	批准人 Approved by
A0	/	首版发行 New Release	2023/1/17	RD	Li Lei	Huang HN
A1	/	1、修订尺寸标准为: T:71.72±0.5; H:206.9±0.5 (含极柱); W:174.0±0.5 2、增加极柱信息 3、增加 EOL 膨胀力信息 4、增加应用海拔信息 5、增加安全测试的夹具信息等	2023/6/27	RD	Li Lei	Huang HN
A2	/	1、修订重量标准为: 5.5±0.15kg	2024/4/9	RD	Li Lei	Huang HN

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0. 术语定义 Terms and definitions

术 语 Terms	定 义 Definition
兰 钧 Batterotech (BTL)	兰钧新能源科技有限公司及其子公司 Batterotech Corporation Limited (BTL) and its subsidiaries.
产 品 Product	本规格书中的“产品”是指兰钧生产的280Ah可充电磷酸铁锂电池 The 280Ah 3.20V rechargeable lithium ion cells produced by BTL.
客 户 Customer	是指购买本规格书所述产品的公司、企业或个人。 "Customer" means the companies, enterprises or individuals who purchase the products described in this specification.
室 温 Room temperature	25±2°C Room temperature RT
电池温度 Cell temperature	由接入电池的温度传感器测量的电芯的温度，温度传感器和测量线路的选择由兰钧和客户共同商定。 The temperature measured by the sensor connected to cell, the choice of the temperature sensor and the measurement circuit is discussed by BTL and the customer jointly.
环境温度 Ambient Temperature	电池所处的周围环境温度。 The ambient temperature of the environment which the products are exposed.
充电倍率 Charge rate	电池在规定的时间内放出其额定容量时所需要的电流值，它在数据值上等于电池SOH的倍数，通常以字母 C 表示（1C最大不超过280A）。 The value of the current required for a battery to discharge its test capacity within a specified period of time, which is a multiple of the SOH (state of healthy) of the battery in the data value, usually denoted by the letter C. (Max current of 1C is equal to 280A)
循环寿命 Cycle life	电池在反复充放电的使用下，电池的容量会逐渐下降，通常以该电池的额定容量作为标准，电池容量降到其指定SOH的充放电次数，称为循环寿命。 Under repeated charge and discharge using of the battery, the capacity of the battery will gradually decline. Cycle life means the cycle numbers that cell battery aged when the remaining capacity rate getting to the specified SOH.
开路电压 OCV	开路电压是指外电路没有电流流过时电池正负极柱之间的电位差。 Open circuit voltage (OCV) is the potential difference between the positive and negative poles of the battery when there is no current flowing through the external circuit.
恒流充电/恒压充电 CC/CV	恒流充电：恒定电流充电；恒压充电：恒定电压充电 CC: Constant current charge, CV: Constant voltage charge
恒流放电 DC	恒流放电：恒定电流放电 DC: Constant current discharge
新鲜电池状态 Fresh cell	客户收货 7 天以内的状态 The state within 7 days after customer received the product.
标准充电 Standard charge	本规格书第 4.2.3 条所述的充电模式。 Means the default charging method set out in paragraph 4.2.3 titled "Standard charge method".
标准放电 Standard discharge	本规格书第 4.3.1 条所述的放电倍率模式。 Means the default discharging method set out in paragraph 4.3.1 titled "Standard discharge rate".
荷电状态	电池实际充电量与满充电量的比值，表征电池的充电状态。100%SOC 的充电状态表

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SOC	示电池满充到 3.65V, 0%SOC 的充电状态表示电池完全放电到 2.5V。 Means the ratio of the actual battery charge to the full charge, characterizing the state of charge of the battery. The state of charge of 100% SOC indicates that the battery is fully charged to 3.65V, and the state of charge of 0% SOC indicates that the battery is completely discharged to 2.5V.
电池管理系统 BMS	客户用于监测和记录产品在整个服务期限内的运行参数的一种有效的追踪和控制系统。其追踪和记录的参数包括但不限于电压、电流、温度等, 以控制产品的运行并确保产品运行环境及运行条件符合本技术协议的规定。 An active tracking and control system to be developed and implemented to monitor and record the operating parameters, including but not limited to voltage, current and temperature, of each product in its entire service life, and to control the operation of each product to ensure a safe operation of product.
测量单位 Units of measurement	“V” (Volt) 伏特, 电压单位 “V” (Volt), Unit of voltage
	“A” (Ampere) 安培, 电流单位 “A” (Ampere) Unit of current
	“P” (Power) 功率, 充放电功率 “P” (Power), charge/discharge power
	“Ah” (Ampere-Hour) 安培-小时, 电荷单位 “Ah” (Ampere-Hour) ,Unit of electric charge
	“Wh” (Watt-Hour) 瓦特-小时, 能量单位 “Wh” (Watt-Hour) ,Unit of energy
	“mΩ” (MilliOhm) 毫欧姆, 电阻单位 “mΩ” (MilliOhm) ,Unit of resistance
	“°C” (degree Celsius) 摄氏度, 温度单位 “°C” (degree Celsius) ,Unit of temperature
	“mm” (millimeter) 毫米, 长度单位 “mm” (millimeter) ,Unit of length
	“s” (second) 秒, 时间单位 “s” (second) ,Unit of time
	“Hz” (Hertz) 赫兹, 频率单位 “Hz” (Hertz) ,Unit of frequency

1. 适用范围 Scope of application

本产品规格书描述了兰钧生产的 280Ah 可充电磷酸铁锂电池的产品性能指标、技术要求及其他安全注意事项。

The product specification defines 280Ah Li-ion battery produced by BTL. This document covers performance specifications, technical requirements and other safety instruction items need to notice.

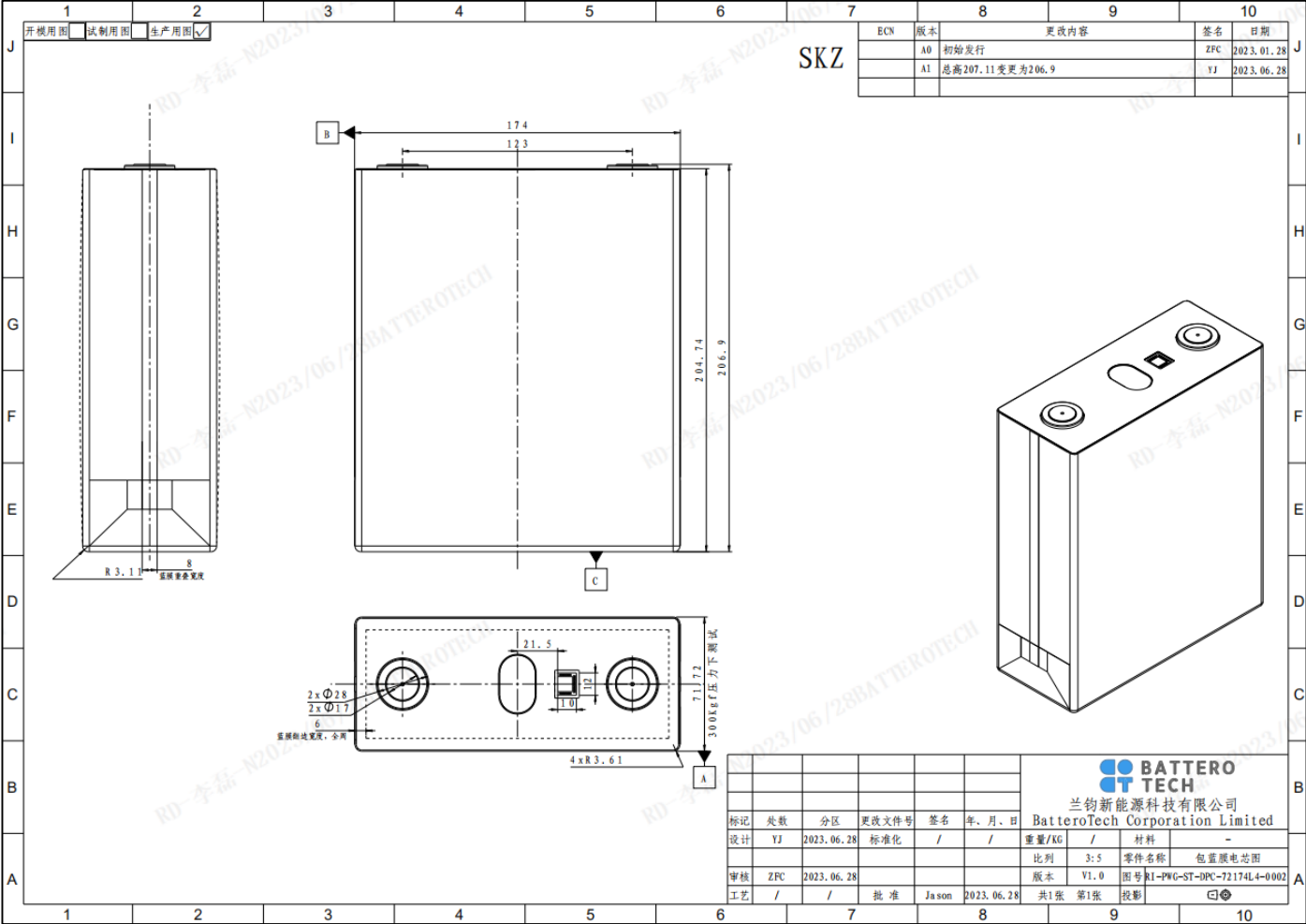
2. 产品类型 Product type

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2.1 产品名称: 280Ah 磷酸铁锂电池 Product: 280Ah LFP battery.

2.2 型号规格: PC-0B1-72174L4-AH Model: PC-0B1-72174L4-AH.

3. 电池尺寸 Cell dimension



项目 Items	描述 Description	尺寸 Dimensions (mm)
W	宽度 Width	174.0±0.5
T	厚度 Thickness	71.72±0.50 (300±20kgf)
H	高度 Height	204.7±0.8 (肩高 Shoulder Height) 206.9±0.5 (总高 Total Height)
可焊接区域	极柱直径 Diameter	φ17±0.5mm
焊接熔深	深度 Depth	≤2.0mm
极柱中心距	距离 Length	123±0.3mm

4. 产品性能 Performance specification

4.1 基本参数 General parameter

序号 No.	项目 Item	规格 Specification	条件 Condition
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4.1.1	标称容量 Nominal Capacity	280 Ah	标准充放电模式测试 Standard charge and discharge procedure
4.1.2	标称能量 Nominal Energy	896 Wh	标准充放电模式测试 Standard charge and discharge procedure
4.1.3	工作电压范围 Voltage Range	2.5-3.65V 2.0-3.65V	电芯温度 $T > 0^{\circ}\text{C}$ Cell temperature $T > 0^{\circ}\text{C}$ 电芯温度 $T \leq 0^{\circ}\text{C}$ Cell temperature $T \leq 0^{\circ}\text{C}$
4.1.4	电池内阻 Impedance(1KHz)	$\leq 0.25\text{ m}\Omega$	新鲜电芯 (20~40%SOC) Fresh cell (20~40%SOC)
4.1.5	出货容量 Shipping capacity	56~112 $\pm$ 2Ah	20~40%SOC
4.1.6	自放电 Residual capacity loss	$\leq 3\%$ /月 Per month $\leq 3\%$	30%SOC, 25 $\pm$ 2 $^{\circ}\text{C}$ 储存 30%SOC, 25 $\pm$ 2 $^{\circ}\text{C}$ storage
4.1.7	工作温度 Working Temperature	充电 Charge: $0^{\circ}\text{C}\sim 60^{\circ}\text{C}$ 放电 Discharge: $-30^{\circ}\text{C}\sim 60^{\circ}\text{C}$	
4.1.8	存储温度 Storage Temperature	$-40^{\circ}\text{C}\sim 60^{\circ}\text{C}$	存储环境湿度 $\leq 90\%\text{RH}$, 无凝露 Storage ambient humidity $\leq 90\%\text{ RH}$, no condensation
4.1.9	电池尺寸 Cell dimension	厚度 Thickness: 71.72 $\pm$ 0.5mm 宽度 Width: 174.0 $\pm$ 0.5mm 高度 Height: 206.9 $\pm$ 0.5mm	参考第 3 条 See paragraph 3
4.1.10	Recommended SOC Range 建议 SOC 使用范围	5~95%SOC	
4.1.11	电池重量 Cell Weight	5.50 $\pm$ 0.15Kg	
4.1.12	能量密度 Energy Density	170 Wh/kg 355 Wh/L	25 $\pm$ 2 $^{\circ}\text{C}$, 1/3C 放电 25 $\pm$ 2 $^{\circ}\text{C}$, 1/3 C discharge
4.1.13	循环寿命@25 $^{\circ}\text{C}$ Cycle Life@25 $^{\circ}\text{C}$	$\geq 8000\text{ Cycles}$	25 $\pm$ 2 $^{\circ}\text{C}$ 初始夹紧力 300 $\pm$ 20Kgf , Gap0.5~1.0mm, 标准充放电测试 25 $\pm$ 2 $^{\circ}\text{C}$ @70% EOL cycle test by the standard charge and discharge method under 300 $\pm$ 20Kgf preload with 0.5~1.0mm Gap@70% EOL
4.1.14	EOL 膨胀力 EOL expansion force	~30000N@80%SOH ~35000N@70%SOH ~40000N@60%SOH	
4.1.15	应用海拔 Application altitude	$\leq 4500\text{m}$	

4.2 充电模式 Charging model

序号 No.	项目 Item	规格 Specification	条件 Condition
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4.2.1	标准充电倍率 Standard charge rate	0.5C	25±2℃
4.2.2	充电截止电压 Charge cut-off voltage	单体电池最大 3.65V Cell max charging voltage	
4.2.3	标准充电模式 Standard charge method	0.5C 恒流充电至 3.65V 然后恒压充电至截至电流 0.05C; 0.5C CC to 3.65V and CV to 0.05C	
4.2.4	标准充电温度 Standard charge temperature	25±2℃	电芯温度 Cell Temperature
4.2.5	绝对充电温度 Absolute charging temperature	0~ 60℃	电芯充电的温度限制范围。超过该温度范围, 应立即停止充电。 The temperature range of cell charging, if exceed this temperature range, charging should be stopped immediately.
4.2.6	绝对充电电压 Absolute charging voltage	3.65 V	超过该电压上限值应立即停止充电。The voltage range of cell charging, if exceed this charge upper limit, charging should be stopped immediately.

4.2.7 其他充电模式 Other charging method

4.2.7.1 恒功率充电模式 Constant power charge rate

电芯温度 Cell temperature /℃		0<T	0≤T<10	10≤T<15	15≤T<20	20≤T<25	25≤T<45	45≤T<50	50≤T<55	55≤T<60	T≥60
最大充电倍率(C) Max charge rate (C)	0-100% SOC	0	0.15	0.3	0.5	1.0	1.0	0.6	0.4	0.25	0

4.2.7.2 阶梯充电模式 Step charge power rate

电芯温度 Cell temperature /℃		0<T	0≤T<10	10≤T<15	15≤T<20	20≤T<25	25≤T<45	45≤T<50	50≤T<55	55≤T<60	T≥60
最大充电倍率(C) Max charge rate (C)	0-70% SOC	0	0.2	0.4	0.6	1.0	1.0	0.8	0.5	0.33	0
	70-100% SOC	0	0.12	0.2	0.4	0.5	0.5	0.4	0.33	0.2	0

4.3 放电模式 Discharging model

序号 No.	项目 Item	规格 Specification	条件 Condition
4.3.1	标准放电倍率 Standard discharge rate	0.5C 140A	25±2℃
4.3.2	最大持续放电倍率 Maximum discharge rate (continuous)	1.2C 336A	25±2℃
4.3.3	最大脉冲放电倍率 Maximum discharge rate (peak)	3C 840A	25±2℃ 10s
4.3.4	放电截止电压	2.5V	温度 (Temperature) T>0℃

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	Discharge cut-off voltage	2.0V	温度 (Temperature) $T \leq 0^{\circ}\text{C}$
4.3.5	标准放电温度 Standard charge temperature	$25 \pm 2^{\circ}\text{C}$	电芯温度 Cell Temperature
4.3.6	绝对放电温度 Absolute charging temperature	$-30 \sim 60^{\circ}\text{C}$	电芯放电的温度限制范围。超过该温度范围, 应立即停止放电。 The temperature range of cell discharging, if exceed this temperature range, discharging should be stopped immediately.

4.3.7 其他放电条件 Other discharge condition (D-Rate)

电芯温度 Cell temperature / $^{\circ}\text{C}$		$T < -30$	$-30 \leq T < -10$	$-10 \leq T < 0$	$0 \leq T < 10$	$10 \leq T < 20$	$20 \leq T < 30$	$30 \leq T < 40$	$40 \leq T < 50$	$50 \leq T < 60$	$T \geq 60$
最大放电倍率(C) Max discharge rate (C)	0-100% SOC	0	0.33	0.6	1.0	1.2	1.2	1.0	0.8	0.5	0

4.4 高低温容量 High/Low discharging capacity

序号 No.	参数 Parameter	产品规格 Specification	条件 Condition
4.4.1	25°C放电容量 Capacity@25°C	$\geq 280 \text{ Ah}$	Temperature $25 \pm 2^{\circ}\text{C}$ 0.5C CC 3.65V CV 0.05C; Rest 30min 0.5C DC to 2.5V
4.4.2	55°C放电容量 Capacity@55°C	$\geq 280 \text{ Ah}$	Temperature $25 \pm 2^{\circ}\text{C}$ 0.5C CC 3.65V CV 0.05C; Temperature $55 \pm 2^{\circ}\text{C}$ Rest 120min 0.5C DC to 2.5V
4.4.3	-20°C放电容量 Capacity@-20°C	$\geq 224 \text{ Ah}$	Temperature $25 \pm 2^{\circ}\text{C}$ 0.5C CC 3.65V CV 0.05C; Temperature $-20 \pm 2^{\circ}\text{C}$ Rest 120min 0.5C DC to 2.0V

4.5 安全性能 Safety performance

序号 No.	项目 Items	技术要求 Technical requirement	测试方法及步骤 Test method and procedure
4.5.1	过放电 Over-discharge	不爆炸, 不起火, 不漏液 No explosion. No fire. No leakage.	温度 $25 \pm 2^{\circ}\text{C}$ 。根据 4.2.3 将电池充满电。将电池以 1C (280A) 电流放电 90min。观察电池 1 小时。 Temperature: $25 \pm 2^{\circ}\text{C}$. Charge cell according to No.4.2.3. Discharge cell at 1C(280A) for 90min. Observe the cell for 1h.
4.5.2	过充电 Overcharge	不爆炸, 不起火 No explosion. No fire. No leakage.	温度 $25 \pm 2^{\circ}\text{C}$ 。根据 4.2.3 将电池充满电。将电池以不小于 0.5C (140A) 电流充电至电压达到终止电压的 1.5 倍或者时间达到 1h。观察电池 1 小时。 Temperature: $25 \pm 2^{\circ}\text{C}$. Charge cell according to No. 4.2.3. Charge cell at current $\geq 0.5\text{C}$ (140A) until 1.5 times of terminal voltage or test duration for 1h. Observe the cell for 1h.

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4.5.3	短路 Short-circuit	不爆炸, 不起火 No explosion. No fire. No leakage.	温度 25±3℃。根据 4.2.3 将电池充满电。用一个小于 5mΩ 的电阻将正负极短路保持 10min。观察 1 小时。 Temperature: 25±3℃. Charge cell according to No. 4.2.3. Use a conductor ≤5mΩ between the positive and negative terminals of cell for 10min. Observe the cell for 1h.																																		
4.5.4	跌落 Drop	不爆炸, 不起火, 不漏液 No explosion. No fire. No leakage.	温度 25±3℃。根据 4.2.3 将电池充满电。将电池从 1.5 米高度处自由跌落到水泥地面上。观察 1 小时。 Temperature: 25±3℃. Charge cell according to No. 4.2.3. The cell should free drop from the height of 1.5m on to the coment floor. Observe the cell for 1h.																																		
4.5.5	热箱 Hotbox	不爆炸, 不起火, 不漏液 No explosion. No fire. No leakage.	根据 4.2.3 将电池充满电。将电池放入烘箱。电池温度以 5℃/min 达到 130±2℃并保持 30min。观察电池 1 小时。 Charge cell according to No. 4.2.3. Put the cell into an oven. The temperature of the oven is raised at a rate of 5℃/min to 130±2℃ and remain for 30min. Observe the cell for 1h.																																		
4.5.6	挤压 Crush	不爆炸, 不起火 No explosion. No fire.	根据 4.2.3 将电池充满电。挤压方向: 垂直于电池单体极板方向施压。挤压板形式: 半径 75 mm 的半圆柱体, 半圆柱体的长度 (L) 大于被挤压电池单体的尺寸; 挤压速度: (5±1) mm/s; 挤压程度: 电压达到 0V 或变形量达到 30%或挤压力达到(13±0.78) kN 停止挤压; 保持 10 分钟。观察电池 1h。 Full charge cell according to No. 4.2.3. Crush direction: perpendicular to the direction of the battery monomer plate. Form of crush plate: semi-cylinder with a radius of 75mm, the length (L) of the semi-cylinder is greater than the size of the extruded battery monomer; speed: (5±1) mm/s; terminal condition: voltage reaches 0V or the deformation reaches30% or force reaches (13±0.78) kN. Hold for 10 minutes. Observe the cell for 1h.																																		
4.5.7	温度循环 Temperature Cycle	不爆炸, 不起火, 不漏液 No explosion. No fire. No leakage.	根据 4.2.3 将电池充满电, 将电池放入烘箱.烘箱温度根据下表变化 5 次。观察电池 1 小时。 Charge cell according to No. 4.2.3. Put the cell into an oven. Set temperature curve as shown in the following book for 5 cycles. Observe the cell for 1h. <table><tr><th>Temperature (°C)</th><th>Time interval (min)</th><th>Total time (min)</th><th>Temperature rate (°C/min)</th></tr><tr><td>25</td><td>0</td><td>0</td><td>0</td></tr><tr><td>-40</td><td>60</td><td>60</td><td>13/12</td></tr><tr><td>-40</td><td>90</td><td>150</td><td>0</td></tr><tr><td>25</td><td>60</td><td>210</td><td>13/12</td></tr><tr><td>85</td><td>90</td><td>300</td><td>2/3</td></tr><tr><td>85</td><td>110</td><td>410</td><td>0</td></tr><tr><td>25</td><td>70</td><td>480</td><td>6/7</td></tr></table>			Temperature (°C)	Time interval (min)	Total time (min)	Temperature rate (°C/min)	25	0	0	0	-40	60	60	13/12	-40	90	150	0	25	60	210	13/12	85	90	300	2/3	85	110	410	0	25	70	480	6/7
Temperature (°C)	Time interval (min)	Total time (min)	Temperature rate (°C/min)																																		
25	0	0	0																																		
-40	60	60	13/12																																		
-40	90	150	0																																		
25	60	210	13/12																																		
85	90	300	2/3																																		
85	110	410	0																																		
25	70	480	6/7																																		

注: 1、上表未列安全试验项目按 GB/T 36276-2018 标准进行试验, 并通过。 2、过充、热箱、热失控测试需带夹具

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进行。

Note: 1. The safety test items not reflected in the above table shall be tested according to GB/T 36276-2018 standard and passed. 2. Overcharge、hotbox、thermal-abuse should test with fixtures.

4.6 储存性能 Storage performance

序号 No.	参数 Parameter	产品规格 Specification	条 件 Condition
4.6.1	可恢复容量（短期） Reversible capacity (short term)	≥97%	25±2°C 初始夹紧力 300Kgf, 标准充电至 100%SOC 存储 1 个月 25±2°C, standard charging to 100% SOC storage under 300±20Kgf preload for one month.
4.6.2	可恢复容量（长期） Reversible capacity (long term)	≥95%	25±2°C 初始夹紧力 300Kgf, 标准充电至 100%SOC 存储 6 个月 25±2°C, standard charging to 100% SOC storage under 300±20Kgf preload for six month.

5. 应用须知 Application instruction

客户应当严格遵守以下电池的应用条件，以保证电池正常和安全使用。

The customer should follow the following application instructions for safety application of batteries.

5.1 客户应当配置电池管理系统，跟踪、监测并记录每个使用期限内电池的电压，温度等参数，用于管理和保护电池。

The customer should configure the BMS to track, monitor and record the battery voltage, temperature and other parameters during each service life for the management and protection of the battery.

5.2 电压，温度等参数的测量方式需要客户与兰钧商议，共同决定。

The measurement methods of voltage, temperature and other parameters need to be discussed by customer and BTL jointly.

5.3 客户应向兰钧提供电池管理系统详细的设计方案、系统特点、框架、系统数据、格式等相关信息，以供兰钧对该系统进行设计评估，并建立电池管理档案。

The customer should provide BTL with detailed system design characteristics, framework, system data, and other relevant information of the battery management system, so as to enable BTL to evaluate of the system design and establish battery management system file.

5.4 未经兰钧同意，客户不可擅自修改或者改变电池管理系统的设计和框架，以免影响电池的使用性能。

Without the consent of BTL, the customer should not modify or change the design and framework of the battery management system to avoid affecting the performance of the battery.

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5.5 客户应保存完整的电池运转的监测数据，用作产品质量责任划分的参考。不具备完整的电池系统使用期限内的监测数据的，兰钧不承担产品质量保证责任，且不予赔偿。

The customer should keep complete monitoring data of battery operation for the reference of product quality. If the battery system does not have complete monitoring data during the service life, BTL will not undertake the responsibility of product quality assurance and will not compensate for the loss.

5.6 电池管理系统需满足以下最基本的检测和控制要求。

The BMS should meet the following basic detection and control requirements.

序号 No.	参数 Parameter	产品规格 Specification	保护动作 Action
5.6.1	充电终止 Stopping charging	3.65V	电池的电压达到 3.65V 时，终止充电。 Stop charging when cell voltage reaches 3.65 V.
5.6.2	一级过充保护 First overcharge protection	3.75V	当电池电压达到 3.75V，强制终止充电。 Stop charging when cell voltage reaches 3.75 V compulsively.
5.6.3	二级过充保护 Second overcharge protection	3.90V	当电池电压达到 3.90V，强制终止充电，且应锁定直到技术人员解决问题。 When the battery voltage reaches 3.9V, the BMS is forced to terminate charging, and the BMS should be locked until technicians solve the problem.
5.6.4	放电终止 Stopping discharging	2.50 V (T > 0°C) 2.00 V (T ≤ 0°C)	电池达到限制电压，终止放电。 Stop discharging when cell reaches the limited voltage.
5.6.5	一级过放保护 First over-discharge protection	2.30 V (T > 0°C) 1.70 V (T ≤ 0°C)	当电池达到限制电压，强制终止放电。 Stop discharging when cell reaches the limited voltage compulsively.
5.6.6	二级过放保护 Second over-discharge protection	2.00V (T > 0°C) 1.50 V (T ≤ 0°C)	当电池达到限制电压，强制终止放电，并且及时以 10A 回充电至 3.25V，且 BMS 应锁定直到技术人员解决问题。 When the cell reaches the limited voltage , it should be charged back to 3.25V at 10A in time. The BMS should be locked until technicians solve the problem.
5.6.7	短路保护 Short circuit protection	不允许短路 No short circuit allowed	发生短路时，由短路保护装置断开电池。 When a short circuit occurs, the battery (cell) is disconnected by the short protection device.
5.6.8	过流保护 Over current protection	参考第 4.2 和 4.3 条 See paragraph 4.2&4.3	电池管理系统控制充放电电流符合规格。 Control discharge current by BMS to values

			within specification.
5.6.9	过热保护 Over temperature protection	参考第 4.1.7 条 See paragraph 4.1.7.	当温度超过本技术协议规定时, 终止充电/放电。 Stop charging and discharging when temperature exceeds specification.
5.6.10	充电时间过长保护 Charging time out limit	充电时间在 8 小时内 Charging completes within 8 hours	充电时间长于 8 小时, 则终止充电。 Stop charging if charging time exceeds specification.

6. 注意事项 Notes

6.1 使用电池前, 请仔细阅读本规格书和注意电池表面标识。

Before using the battery, please read this specification carefully and pay attention to the battery surface identification.

6.2 长期不用时, 每个月对电池进行一次标准充放电维护, 电池在 10%~50%荷电状态下贮存。

If battery is not in sate of usage for a long time, maintain the battery once a month with standard charge and discharge, and store the battery in the state of 10%~50% SOC.

6.3 充电电流和充电电压不得超过本规格书中规定的允许最大充电电流和最大充电电压。使用高于推荐值电流充电将可能引起电池的充放电性能、机械性能和安全性能的问题, 并可能会导致发热或漏液。

The charging current and voltage should not exceed the maximum charging current and voltage in this specification. Charging the battery with current above the recommended value may cause problems with the battery's charge and discharge performance, mechanical and safety performance, and may lead to heat or leakage.

6.4 放电电流不得超过本规格书规定的最大放电电流, 大电流放电会导致电池容量快速衰减并可能导致过热, 甚至会出现电池冒烟并喷出黑色物质等极端情况。

The discharging current should not exceed the maximum discharge current in this specification. Larger discharge current will lead to rapid battery capacity loss and may lead to overheating, and even emit smoke and other black material in some extreme cases.

6.5 正确连接电池的正负极, 严禁反向充电。若电池正负极接反, 将导致电池报废并产生安全隐患。

Connect the positive and negative poles correctly. Reverse charging is strictly prohibited. If the positive and negative poles of the battery are connected to each other, safety risks will be generated.

6.6 电池正常使用过程中, 应安装电池管理系统防止电池过放电的发生, 若电池过放电, 将导致电池

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报废并产生安全隐患。

During the normal use of the battery, the battery management system should be installed to prevent overdischarge of the battery. If the battery is over-discharged, it may cause safety hazards.

6.7 电池箱应有足够的机械强度以保证其内部电池免受机械撞击。

The battery box should be of sufficient mechanical strength to protect the internal batteries from mechanical impact.

6.8 电池箱的设计应充分考虑单体电池的散热问题，由于电池箱散热设计问题导致的电芯或电池过热损坏，兰钧不承担质量保证责任。

The design of the battery box should fully consider the heat dissipation of cell battery. BTL will not undertake the responsibility of quality assurance if the battery cell or battery overheat is damaged due to the failure of battery box.

6.9 电池箱设计中应充分考虑电池的防水、防尘问题，电池箱必须满足国家有关标准规定的防水、防尘等级。由于防水、防尘问题而导致的电芯或电池的损坏（如腐蚀、生锈等），兰钧不承担质量保证责任。

The design of the battery box should consider the waterproof and dustproof problems of the batteries. BTL will not be liable for any damage (such as corrosion, rust, etc.) to the cells caused by waterproof and dustproof problems of battery box.

6.10 测试时，如使用螺栓形式连接铝连接片和充放电设备的动力线，应确保连接阻值小于 0.05mΩ，正负极导线间的总阻值相比正负极铝连接片间的阻值增加小于 0.1mΩ。

During the test, if bolts are used to connect the busbar and the power line of the charging & discharging device, ensure that the connection resistance is less than 0.05mΩ, the total resistance between the positive and negative wires increases should be less than 0.1mΩ compared to the resistance between the positive and negative busbar.

7. 安全须知 Safety instruction

7.1 在使用过程中，应远离热源、火源，切勿摔打电池，禁止坠落、冲击电池。

During use, keep away from heat source and fire source. Do not beat the battery. Do not fall or impact the battery.

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7.2 禁止直接焊接电池和用钉子或其它利器刺穿电池。

Direct welding of the battery and puncture of the battery with nails or other sharp objects are prohibited.

7.3 禁止将电池倒置，并避免敲击、抛掷、踩踏和弯折电池等。

It is forbidden to turn the battery upside down, and avoid hitting, throwing, trampling and bending the battery.

7.4 禁止短路电池，以免发生危险，电池严重损坏。

Do not short-circuit the battery to avoid danger and serious damage to the battery.

7.5 废弃电池请安全妥当处理，不要投入火中或水中。

Dispose of discarded batteries safely and properly. Do not throw them into fire or water.

7.6 本电池只能使用锂离子电池专用充电器充电。

This battery can only be charged by special charger for lithium ion battery.

8. 紧急情况处理 Emergency situation

8.1 如果电池发生泄露，电解液进入眼睛，请不要揉擦，应用清水冲洗眼睛，并立即送医治疗，否则会伤害眼睛。

If battery leak and electrolyte enter into eyes, do not rub. Rinse with clean water, and seek medical assistance immediately.

8.2 如果电池使用以及贮存过程中发出异味、发热、变色、变形等异常，应立即切断电源，若电池表面温度较高，待电池冷却后，将电池从装置或充电器中移离。

Stop use battery and relocate the battery to a safe place if battery gives off peculiar smell, temperature increase, deform, color change or any other abnormal phenomena.

8.3 电池在极端条件下不会发生爆炸，但可能会有冒烟现象发生，遇到该情况可采取将电池隔绝空气的措施，如掩盖沙土，或使用二氧化碳灭火器、干粉灭火器，切忌用水，待烟雾散去后再进行处理。

If battery catch fire, use dry powder, foam fire extinguisher or sand to extinguish flames and remove it from the operating environment.

9. 其它事项 Others

任何本规格书中未提及的事项，请咨询本公司。当本规格书版本更新时，本公司不做另行通知。

If there are any items not mentioned in this specification, please contact BTL. When the version of the specification is updated, the BTL will not issue a separate notice.