280Ah 电芯产品规格书

Product specification of 280Ah cell

电芯型号 Cell Model：72174204-280Ah

电芯容量 Cell Capacity：280Ah

编制	梁慧婷
审核	Eva
批准	王浩然

客户确认	客户签名（日期）：
	客户代码：
	公司印章：

变更记录

文件版本 Version	描述 Description	日期 Date	编制人 Author	审核人 Approval
A0	首次发行	2023.06.23	梁慧婷	Eva
A1	根据 GB/T 36276-2023 调整安全性能测试方法等	2024.02.20	梁慧婷	Eva

目录

Contents

0. 术语定义 Terms and definitions....4

1. 适用范围 Scope of application....5

2. 产品性能指标 Cell battery performance specification....5

2.1 产品性能概要 Cell battery performance summary....5

2.2 电芯充电模式 Cell battery Charging mode....8

2.3 电芯放电模式 Cell battery Discharging mode.... 10

3. 电池温升 Cell battery temperature rising....10

4. 产品存储性能 Cell battery storage performance....11

5. 电池安全性能 Cell battery safety performance....12

6. 电池安全与可靠性 Battery safety and reliability.... 14

7. 其他约定 Other Agreement....15

8. 应用须知 Application instruction....16

9. 安全须知 Safety instruction....19

10.紧急情况处理 Emergency situation....20

附件.电芯图纸和电芯包装图 Cell diagram & Cell packaging diagram 21

0. 术语定义 Terms and difinitions

术语 Terms	定义 Difinitions
产品 Product	本技术协议中的"产品"是指埃克森生产的 280Ah 3.2V 储能用磷酸铁锂电池。 Means the 280Ah 3.2V rechargeable lithium ion cells produced by Exencell.
埃克森 Exencell	深圳埃克森新能源科技有限公司 Shenzhen Exencell New Energy Technology Co., Ltd.
环境温度 Ambient temperature	电池所处的周围环境温度。 Means the ambient temperature of the environment which the products are exposed to.
电池温度 Cell battery temperature	由接入电池的温度传感器测量的电芯大面温度。 Means the temperature of the cell measured by the temperature sensor connected to the main part of cell.
电池管理系统 (BMS) Battery Management System	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。 Means an active tracking and control system to be developed and implemented by Exencell cell cell 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
新电池状态 New battery situation	是指客户收货的 7 天以内的状态（仅限国内运输）。 Means the state within 7 days after customer received the product（domestic only）.
充电状态 （SOC） State of charge	电池实际充电量与满充充电量的比值，表征电池的充电状态。100%SOC 的充电状态表示电池满充到 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.
温升 Temperature Rise	在本技术协议规定的条件如充电过程或者放电过程中电芯温度的升高。 Means the temperature of the cell rises during the conditions specified in this document, such as the charging process or the discharging process.
测量单位	"V"，伏特，电压单位 "V" ，Volt，unit of Voltage
	"A"，安培，电流单位 "A"，Ampere，unit of current
	"Ah", 安培-小时，电荷单位 "Ah"，Ampere-Hour，unit of electric charge
	"Wh",瓦特-小时，能量单位

	“Wh”，Watt-Hour，unit of energy
	“Ω”, 欧姆，电阻单位 “Ω”,Ohm,unit of resistance
	“mΩ”, 毫欧姆，电阻单位 “mΩ”,MilliOhm,unit of resistance
	“°C”, 摄氏度，温度单位 “°C”，degree Celsius，unit of temperature
	“mm”, 毫米，长度单位 “mm”，millimeter，unit of length
	“S”, 秒，时间单位 “S”，Second，unit of time
	“Hz”, 赫兹，频率单位 “Hz”，Hertz，unit of frequency

1. 适用范围　Scope of application

本规格书描述了由深圳埃克森新能源科技有限公司生产的 3.2V 280Ah 可充电磷酸铁锂电池的性能指标，技术要求，运输，储存及注意事项。

This product specification defines the 3.2V 280Ah LFP Li-ion battery produced by Exencell，the specification describes the performance specifications，technical requirements、transportation、storage and other safety instruction items。

2. 产品性能指标 Cell battery performance specification

2.1 产品性能概要 Cell battery performance summary

序号 No.	项目 Item	产品规格 Mode	备注 Comment
2.1.1	标称容量 Typical capacity	≥280Ah	N.A
2.1.2	标称能量 Typical Energy	896Wh	参考 2.2 与 2.3 标准充放电模式测试 Refer to standard charge-discharge mode tests 2.2 and 2.3
2.1.3	标称电压	3.2V	N.A

	Typical Voltage		
2.1.4	工作电压范围 Voltage Range	0℃＜T≤60℃：2.5-3.65V -30℃＜T≤0℃：2.0-3.65V	N.A
2.1.5	存储温度 Storage Temperature	-20℃~35℃ ≤3 个月	存储环境湿度≤ 85%RH，无凝露 Storage ambient humidity ≤ 85% RH, no condensation
2.1.6	电池内阻（1KHz） Impedance(1KHz)	0.17±0.05mΩ	新鲜电芯（15~40%SOC），25±2℃ Fresh cell (15~40%SOC)，25±2℃
2.1.7	出货容量 Shipment capacity	40~50Ah	15-17%SOC
2.1.8	工作温度 Working Temperature	充电 Charge: 0℃~60℃ 放电 Discharge: -20℃~60℃	N.A
2.1.9	标准充电功率 Standard Charging Power	0.5P	25±2℃
2.1.10	标准放电功率 Standard Discharging power	0.5P	25±2℃
2.1.11	电池重量 Cell Weight	5.4±0.2kg	N.A
2.1.12	电池尺寸 Cell Size	厚度 Thickness: 72.0±0.5mm 宽度 Width: 174.4±0.5mm 肩　高 Shoulder Height : 204.3±0.5mm 总高 Total Height : 207.0±0. 5mm	300±20Kgf 压力下，新鲜电池(17%SOC) 300±20Kgf，Fresh cell (17%SOC)，25±2℃
2.1.14	静置 SOC Rest SOC	≥5%SOC	无负载或充电时的 SOC 区间 SOC interval without load or charging
2.1.15	应用海拔 Altitude	≤4500m	N.A

2.1.16	循环寿命（25±2℃） Cycle Life（25±2℃）	≥ 6000 Cycles@80%Typical capacity（224Ah） ≥ 8000 Cycles@70%Typical capacity（196Ah）	25±2℃，电芯预紧力 300±20Kgf， 标准充放电循环测试； 循环至 80%标称容量（224Ah），循环周数≥6000 周； 循环至 70%标称容量（196Ah），循环周数≥8000 周； 25±2℃, cell preload 300±20Kgf, Standard charge-discharge cycle test Test to 80% Typical capacity（224Ah）, number of cycles≥ 6000； Test to 70% Typical capacity（196Ah）, number of cycles≥ 8000；
2.1.17	自放电 Self Discharge	≤3.5%/月（首月） ≤3% /月（首月后） Per Month≤3.5% (First Month) Per Month≤3% (After first month)	15-17%SOC，25±2℃储存 15-17%SOC, 25±2℃ storage
2.1.18	标准充放电模式 Standard Charge and Discharge Method	0.5P 恒功率充电至 3.65V，静置 30min；0.5P 恒功率放电至 2.5V，静置 30min； 0.5P constant power charge to 3.65 V, rest 30min；0.5P constant power discharge to 2.5V，rest 30min；	25±2℃
2.1.19	极柱与铝巴焊接参数	激光焊接熔深≤2.0mm Laser Welding Depth≤2.0mm	不漏液 No leakage
		极柱最大承受压力≤500N	不变形 No deformation

		Max Pressure Force on Terminals≤ 500N	
		极柱最大承受扭矩≤6 N•m Max Torque Force on Terminals≤6 N•m	不松动 No loose
		极柱承受最大温度≤130℃ Max Temperature on Terminals ≤ 130℃	不变形 No deformation

2.2 电芯充电模式 Cell battery Charging mode

序号 No.	参数 Parameter	产品规格 Mode	条件 Condition
2.2.1	标准充电功率 Standard charge Power	0.5P	25±2℃
2.2.2	标准充电电压 Standard charge voltage	单体电池最大 3.65V Cell max voltage3.65V	N.A
2.2.3	标准充电模式 Standard charge method	0.5P 恒功率充电至 3.65V 0.5P constant power charge to 3.65 V	N.A
2.2.4	最大可持续充电功率 Maximum continuous charge power	1.0P	25±2℃
2.2.5	标准充电温度 Standard charge temperature	25±2℃	电芯温度 Cell Temperature

2.2.6	绝对充电温度 （电芯温度） Absolute charge temperature （Cell temperature）	0~ 60℃	电芯充电的温度限制范围，超过该范围，应立即停止充电。 The temperature limit of cell charge. charging must be stopped immediately if this temperature range is exceeded
2.2.7	绝对充电电压 Absolute charge Voltage	最大 3.65V Max 3.65V	电芯充电的电压限制范围，超过该限制范围，应立即停止充电。 The voltage limit of cell charge Charging must be stopped immediately if this max voltage is exceeded

2.2.8 其他充电条件　Other charge Condition

2.2.8.1 恒功率充电 constant power charge

电芯温度 Cell Temperature/℃		0	5	10	15	20	25	45	50	55	60
最大充电功率（P）Max charge power (P)	0%~100% SOC	0.05	0.12	0.33	0.5	0.5	1.0	0.5	0.5	0.5	0

2.2.8.2 分阶段恒功率充电 step power charge

电芯温度 Cell Temperature/℃		0	5	10	15	20	25	45	50	55	60
最大充电功率（P）Max charge power (P)	0%~70% SOC	0.05	0.2	0.4	0.5	0.5	1.0	0.5	0.5	0.5	0
	70%~100% SOC	0.05	0.1	0.2	0.4	0.5	1.0	0.5	0.25	0.2	0

2.3 电芯放电模式 Cell battery Discharging mode

序号 No.	参数 Parameter	产品规格 Mode	条件 Condition
2.3.1	标准放电功率 Standard discharge power	0.5P	25±2℃

2.3.2	最大持续放电功率 Maximum continuous discharge power	1.0P	25±2℃
2.3.3	放电截止电压 End of Discharge Voltage	2.5V 2.0V	温度（Temperature）T>0℃ 温度（Temperature）T≤0℃
2.3.4	标准放电温度 Standard discharge temperature	25±2℃	电芯温度 Cell Temperature
2.3.5	绝对放电温度 Absolute discharge temperature	-30~60℃	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 limit of cell charge. discharging must be stopped immediately if this temperature range is exceeded

2.3.6 其他放电条件(模式)　Other discharge Condition

电芯温度 Cell Temperature/℃		-20	0	5	10	15	20	25	45	50	55	60
最大放电功率（P） Max discharge power (P)	0~100 %SOC	0.5	0.5	0.5	0.5	0.5	0.5	1.0	0.5	0.5	0.5	0

3. 电池温升

本规格书所指的温升是指放电前电池表面温度与放电后电池表面温度之差，温度的测量需使用经过校正的具备时间记录的温度传感器，感应器放置于电池的大面中心位置，同时，测量电池温升时，需将电池放置在环境温度比较稳定且空间足够大的房间里。In this specification，the temperature rise refers to the difference of the surface temperature before and after the cell battery discharge，the temperature measurement of battery must choose the corrected temperature sensor that can record time date,the sensor is placed in the center of the large surface of the battery,at the same time,the battery should placed in a room with stable temperature and large enough space when measuring the temperature rise.

序号 No.	参数 Parameter	产品规格 Specification	条件 Condition
3.1	持续放电温升 Continuous discharge temperature rise	≤10°C	电池以标准放电模式进行放电 The cell is discharged in the standard discharge method.

4. 电池存储性能 Cell battery storage performance

序号 No.	参数 Parameter	产品规格 Specification	条件 Condition
4.1.1	可恢复能量（短期） Recoverable capacity(short-term)	剩余能量≥95%*初始能量; Remaining energy ≥95%* initial energy 恢复能量≥97%*初始能量 Recovery energy≥97%* Initial energy	1) 测试温度: 25±2°C. Temperature:25±2°C. 2) 根据标准充电模式将电池充满电. Full charge cell according to Standard Charging Method 3) 将电池在 25±2°C存储 28 天. Storage cell battery at temperature of 25±2°C for 28 days. 4) 将电池以 0.5P 放电至 2.5V，并记录剩余能量(Wh). Discharge with a current at 0.5P to 2.5V and record as remaining energy. 5) 根据标准充电模式将电池充满电. Full charge cell according to Standard Charging Method. 5)将电池以 0.5P 放电至 2.5V，并记录恢复能量(Wh). Discharge the battery at 0.5P current to 2.5V and record the recovery energy (Wh).
4.1.3	高温可恢复能量 High temperature Recover able capacity	剩余能量≥92%*初始能量; Remaining energy ≥ 92%* initial energy;	1) 根据标准充电模式将电池充满电. Full charge cell according to Standard Charging Method.

		恢复能量≥95%*初始能量; Recovery Capacity≥95%* Initial capacity	2) 将电池在 55±2℃下存储 7 天,无变形、膨胀、漏液。 Storage cell battery at temperature of 55±2℃ for 7 days. No apparent deformation and leak-out 3) 将电池以 0.5P 放电至 2.5V，并记录剩余能量(Wh). Discharge with a current at 0.5P to 2.5V and record as remaining energy. 4) 根据标准充电模式将电池充满电； Full charge cell according to Standard Charging Method. 5)将电池以 0.5P 电流放电至 2.5V，并记录恢复能量(Wh)。Discharge with a current at 0.5P to 2.5V and record as recovery energy.

5. 电池安全性能 Cell battery safety performance

序号 No.	项目 Items	测试方法 Test method	技术要求 Technical requirement
5.1.1	过充电 Over-charge	1) 测试温度: 25±2℃. Test temperature: 25±2℃. 2) 完成初始化充电后的电池与充放电装置连接；After the initial charge is completed, the battery is connected to the charging and discharging device. 3）将电池以 $I=P_{re}/U_{nom}$ 恒流充电达到截止电压的 1.5 倍或者充电时间达到 1h 时停止充电，记录电流、时间、电压、温度；Stop charging when the battery is charged at $I=P_{re}/U_{nom}$ constant current to 1.5 times of the cut-off voltage or the charging time reaches 1h, and record the current, time, voltage, and temperature. 5) 观察电池 1h. Observe the cell for 1h.	不爆炸，不起火，无防爆阀外的位置发生破裂 No explosion, No fire, No rupture outside the explosion-proof valve

5.1.2	过放电 Over-discharge	1) 测试温度: 25±2℃. Test temperature: 25±2℃. 2) 完成初始化放电后的电池与充放电装置连接；After the initial discharge is completed, the battery is connected to the charging and discharging device. 3)将电池以 $I=P_{re}/U_{nom}$ 恒流放电到 0V 或者放电时间达到 1h，记录电流、时间、电压、温度；Discharge the battery to 0V or discharge time to 1h at $I=P_{re}/U_{nom}$ constant current, and record the current, time, voltage, and temperature. 4) 观察电池. 1h. Observe the cell for 1h	不冒烟，不爆炸，不起火，无防爆阀外的位置发生破裂 No smoke, No explosion, No fire, No rupture outside the explosion-proof valve
5.1.3	短路 Short-circuit	1) 测试温度 25±2℃. Test temperature: 25±2℃. 2) 根据标准充电模式将电池充满电. Full charge cell according to Standard Charging Method. 3) 以 1mΩ外部线短路 10min 后断开电流回路，记录电流、时间、电压、温度； Disconnect the current loop after short-circuiting with 1mΩ external wire for 10min, and record current, time, voltage and temperature; 4) 观察 1 小时. Observe the cell for 1h.	不爆炸，不起火，无防爆阀外的位置发生破裂 No explosion, No fire, No rupture outside the explosion-proof valve
5.1.4	跌落 Dropping	1) 根据标准充电模式将电池充满电. Full charge cell according to Standard Charging Method 2) 将电池正负极端子向下从 1.5m 高度处自由跌落 到水泥地面上； Drop the cell (free drop) from 1.5 meters onto a hard flat surface, with terminal-side down. 3)观察电池 1h. Observe the cell for 1h.	不冒烟，不爆炸，不起火，无防爆阀外的位置发生破裂 No smoke, No explosion, No fire, No rupture outside the explosion-proof valve
5.1.5	挤压 Extrusion	1) 测试温度 25±2℃. Test temperature: 25±2℃. 2) 根据标准充电模式将电池充满电. Full charge cell according to Standard Charging Method.	不漏液，不冒烟，不起火，不爆炸，无防爆阀外的位置发生破裂

		3) 电池在 50KN 的挤压力下保持 10min；The battery is kept for 10min under the extrusion force of 50KN. 4) 观察 1 小时. Observe the cell for 1h.	No leakage, no smoke, no fire, no explosion, no rupture outside the explosion-proof valve
5.1.6	过载 Over-load	1) 测试温度 25±2℃. Test temperature: 25±2℃. 2) 电池以 2P 恒功率充电至 3.65V，静置 10min，2P 恒功率放电至 2.5V，记录功率，时间、电压、温度；The battery is charged to 3.65V with 2P constant power, let stand for 10min, discharged to 2.5V with 2P constant power, and record power, time, voltage and temperature; 3) 观察 1 小时. Observe the cell for 1h.	不漏液，不冒烟，不起火，不爆炸，无防爆阀外的位置发生破裂 No leakage, no smoke, no fire, no explosion, no rupture outside the explosion-proof valve

6. 电池安全与可靠性 Battery safety and reliability

6.1 使用条件说明 Description of the condition of use.

安全测试、寿命测试、系统成组设计需要施加预紧力，新鲜电芯的预紧力范围为 500N~5000N，建议大面的预紧力控制公差为±200N。Safety test, life test, system group design need to apply preload, fresh cell preload range of 500N~5000N, recommended large surface preload control tolerance of ±200N.

6.2 电池在使用过程中会产生膨胀力，电芯在 15mm 钢板(可供电芯膨胀的空间)测试条件下衰减至 70%时膨胀力约为 25000N，客户在设计过程中需要考虑结构强度可靠性，建议电芯成组预留 2.0~2.5mm 的膨胀空间。 The battery will generate expansion force during use, the expansion force of the battery cell is about 25000N when it is attenuated to 70% under the test conditions of 15mm steel plate (the space that can supply the expansion of the core), and the customer needs to consider the structural strength reliability in the design process, and it is recommended that the cell be set up to reserve 2.0~2.5mm expansion space.

6.3 电池的使用期限是有限的。客户应该建立有效的跟踪系统监测并记录每个使用期限内电池的内阻和容量。内阻以及容量的测量方法和计算方法需要客户和 Exencell 共同讨论和双方同意。当使用中的电池的内阻超过这个电池最初内阻的 150%或容量小于等于标称容量 70%（196Ah）@25±2℃，应停止使用电池。违反该项要求，将

免除依据产品销售协议以及本技术协议所应承担的产品质量保证责任。This cell is designed to service with a finite life time. The customer shall develop and implement an active tracking system to monitor and record impedance of each Product in its entire service life. Exencell and its customer shall come into agreement about internal resistance and capacity measurement methods, Exencell and/or its customer shall stop using any of the products when its resistance exceeds 150% of its internal resistance or it capacity fading to 70% of typical capacity（196Ah） @25±2℃. Failure to comply with this requirement shall render Exencell's warranties under the Contract inapplicable, thereby releasing Exencell a from any liability in connection therewith.

6.4 电芯寿命判定条件参考 2.1.16 循环寿命。The cell life determination conditions can refer to paragraph 2.1.16 cycle life.

7. 其它约定 Other Agreements

7.1 电池出货报告包含电芯的容量，电压，内阻，尺寸数据等；The cell shipment report contains the capacity, voltage, internal resistance, size data, and so on.

7.2 运输 Transportation

应根据运输的目的地和运输方式，选定合适的电池包装方式。在运输过程中应防止剧烈振动、外力冲击或挤压，防止日晒雨淋，可使用车、火车、轮船、飞机 等交通工具进行运输，在运输过程中应保持 10-30%的电量。 Transport the battery in forms of package by truck, railway, ship or airplane. Severe vibration, impact, crush, exposure to the sun and rain during transportation should be avoided. The SOC of battery should be kept between 10-30%.

7.3 长期存储 Long-term Storage

电池进行充电后，需尽快使用，以免因自放电而造成可用容量损失。若需存储，则电池需要在低 SOC 态下进行存储。推荐的存储条件为：30~40%SOC，0~25℃，60%RH。After the battery is charged, it should be used as soon as possible to avoid loss of usable capacity due to self-discharge. If storage is required, the battery needs to be stored in a low SOC state. The recommended storage conditions are 30%~40%SOC, 0~25℃, ≤60%RH.

7.4 质量保证 Quality Assurance

电池的保质期限依商务合同而定。在此期限内，如果非制造厂商的制程和品质原因，而是用户误用造成的电池问题，埃克森可提供技术指导意见，不承诺免费更换服务。 The warranty period follows the contract. However, even though the problem occurs within warranty period, Exencell won't replace a new cell for free as long as the problem is

not due to the failure of Exencell's manufacturing/shipping process, but due to customer's misusage.

埃克森对以下几种情况产生的问题及安全事故不承担任何责任。Exencell will not undertake responsibility under the following situation.

1) 违反安全使用指南所产生的问题及安全事故； Issues and safety accidents caused due to the violation of safety instruction.

2) 出货后用户在电池组装过程中产生的不良电池； Bad battery cell during assembling by customer after delivery.

3) 电池与电路、电池组和充电器搭配使用所产生的问题。 为了安全起见，如有配套设备设计、锂离子电池系统保护电路或大电流等其它方面的特殊应用，请先咨询埃克森公司相关事宜。 Issues caused due to the connection of battery, circuit and battery charger. For safety consideration, the customer should contact Exencell in advance if other special applications are needed, especially equipment design, Li-ion cell system circuit protection, high current and so on.

8. 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.

8.1 电池使用寿命管理：客户应当有效建立电池容量、内阻监控及记录系统，对在有效使用期限内的电池进行跟踪记录。电池容量、电压的测量及方法需与埃克森共同商定。当电池内阻超过内阻的 150%或者容量低于标称容量的 70%（196Ah）@25±2℃，应停止使用电池。若违反此项要求，将免除埃克森产品质量保证责任。

Battery life management：customers should effectively establish battery capacity, internal resistance monitoring and recording system, and track and record the battery within the effective service life. The measurement and method of battery capacity and voltage must be agreed with Exencell. When the internal resistance of the battery exceeds 150% of the internal resistance or the capacity is less than 70% of the nominal capacity（196Ah） @25±2℃， the battery should be stopped. Violation of this requirement will exempt Exencell from product quality assurance liability.

8.2 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.

8.3 电压，温度等参数的测量方式需要客户与埃克森商议，共同决定。 The measurement methods of voltage, temperature and other parameters need to be discussed by customer and Exencell jointly.

8.4 客户应向埃克森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，以供埃克森对该系统进行设计评估，并建立电池管理档案。 The customer should provide Exencell with detailed system design characteristics, framework, system data, and other relevant information of the battery management system, so as to enable Exencell to evaluate of the system design and establish battery management system file.

8.5 客户修改或者改变电池管理系统的设计和框架时需告知埃克森，经埃克森同意后进行变更。未经埃克森同意擅自修改造成损失时，埃克森不承担产品质量保证责任，且不予赔偿。 Customers are required to notify Exencell when modifying or changing the design and framework of the battery management system, and the changes will be made with Exencell's consent. In the event of any loss caused by unauthorized modification without the consent of Exencell, Exencell shall not be responsible for product quality assurance and shall not compensate for the loss.

8.6 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，埃克森不承担产品质量保证责任，且不予赔偿。Customers should save complete monitoring data of battery operation for reference in the division of product quality responsibilities. If the complete monitoring data of the battery system is not available, Exencell shall not be liable for product quality assurance and will not compensate.

8.7 电池管理系统需满足以下最基本的检测和控制要求

The BMS shall include the following monitoring and control features as a minimum requirement

序号 No.	参数 Parameter	产品规格 Mode	保护动作 Action
8.6.1	充电终止 Stop charging	3.65V	电池的电压达到 3.65V，BMS 申请终止充电 Stop charging when cell voltage reaches 3.65V
8.6.2	第一级过充电保护 First overcharge protection	≥3.8V	当电池电压达到3.8V，BMS强制终止充电 Stop charging when cell voltage reaches 3.8V
8.6.3	第二级过充电保护 Sceond overcharge protection	≥4.0V	当电池电压达到4.0V，BMS强制终止充电， 且BMS应锁定直到技术人员解决问题 When the battery voltage reaches 4.0V, the BMS is forced to terminate charging, and the BMS should be locked until technicians solve the problem.
8.6.4	放电终止	2.50V（T＞0℃）	当电池的电压达到终止电压， BMS申请终止放电

	Stop discharge	2.0V（T≤0℃）	Minimize the discharging current when cell voltage reaches limited voltage.
8.6.5	第一级过放保护 Frist over discharge protection	最小 2.0V Minimum 2.0V	当电池的电压到达2.0V， BMS强制终止放电 Stop discharging when cell voltage reaches 2.0V
8.6.6	第二级过放保护 Second over discharge protection	最小 1.8V Minimum 1.8 V	当电池电压低于1.8V时，BMS强制终止放电，应及时以0.1C回充至50% SOC，且BMS应锁定直到技术人员解决问题 When the cell voltage is less than 1.8V, the cell should be charged back to 50% SOC at 0.1C in time, and the BMS should be locked until technicians solve the problem.
8.6.7	短路保护 Short circuit protection	不允许短路 No short circuit allowed	发生短路时，由过流保护装置断开电池 When a short circuit occurs, the battery (cell) is disconnected by the overcurrent protection device.
8.6.8	过流保护 Over current protection	参考第2.2和2.3条 See paragraph 2.2&2.3	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
8.6.9	过热保护 Over temperature protection	参考第2.2和2.3条 See paragraph 2.2&2.3	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
8.6.10	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 changing time exceeds specification

备注：以上 No.8.6.2、8.6.3、8.6.5、8.6.6 为警示条款，提请客户注意：当电池达到上述任何一项条款描述的指标和参数状态时，意味着电池已超出本技术协议规定的使用条件，客户需依“保护动作”及本技术协议其他相关规定对电池采取保护措施，同时，埃克森声明对上述使用状态的电池质量不承担任何保证责任，并对因此而导致的客户及第三方的任何损失不予赔偿。

Note: The above No. 8.6.2, 8.6.3, 8.6.5, 8.6.6 are the warning clause, draw the attention of customers: When the battery reaches any of the terms described in the above, means that the battery has been used beyond the specifications, the customer shall take protective measures on the battery in accordance with the "protection action" and other relevant provisions of this specification. At the same time, the Exencell shall not take any responsibility for the damage in connection therewith.

8.8 避免电池到达过放状态。电池电压低于 1.8V 时，电池内部可能会遭到永久性的损坏，此时 Exencell 的产品质量保证责任失效。根据本技术协议第 2.3.3 条，当实际放电截止电压低于标准放电截止电压时，系统内部能耗降低到最小，并在重新充电之前延长休眠时间。客户需要培训使用者在最短的时间内重新充电，防止电池进入过放状态。Prevent draining any product down to over discharge state. A product may be permanently damaged internally when the cell voltage is lower than 1.8V and which shall be strictly prohibited, failing what Exencell's warranties under the contract shall cease to apply, thereby releasing the Exencell from any liability in connection therewith. After discharge cut-off inaccordance with paragraph 2.3.3, internal power consumption of the system should be reduced to a minimum to prolong the idle time before recharge. Customer undertakes to educate the users of the products or other parties who may come to handle the products to recharge the cells at minimum time intervals to prevent reaching the over-discharge state.

9. 安全须知 Safety instruction

9.1 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.

9.2 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.

9.3 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

9.4 禁止短路电池（包含正、负极柱直接短接；负极柱、壳体直接短接；电池外绝缘零件损伤、破坏），以免发生危险，电池严重损坏。Forbid short-circuit the battery (Including positive and negative; The negative and the shell are directly shorted; Battery external insulation parts damage), in order to avoid danger and serious damage to the battery.

9.5 废弃电池请安全妥当处理，不要投入火中。 Dispose of discarded batteries safely and properly. Do not throw them into fire.

9.6 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.

9.7 在进行滥用测试实验时如操作不当可能会引起电池起火或者爆炸。该测试实验只能由配备适当的防护装备的专业人员在专业的实验室进行。否则，可能会导致严重的人身伤害和财产损失。Battery fire or explosion may be caused by improper operation during abuse test. The test can only be carried out in a professional laboratory by professionals equipped with appropriate protective equipment. Otherwise, it may lead to serious personal injury and property loss.

10. 紧急情况处理 Emergency situation

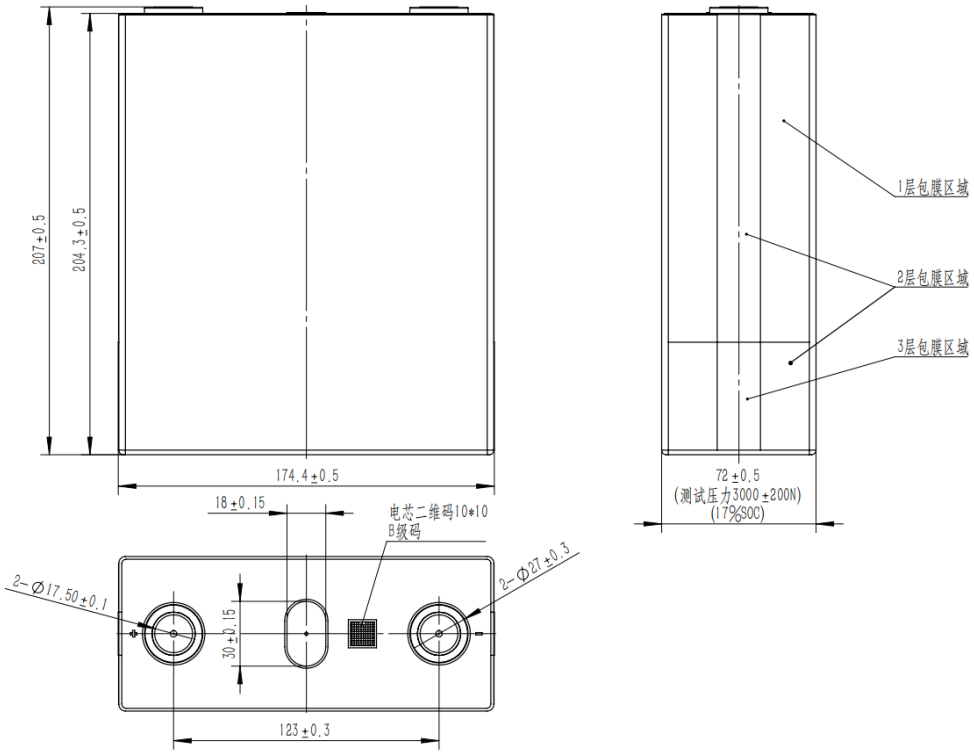
10.1 如果电池发生泄露，电解液进入眼睛，请不要揉擦，应用清水冲洗眼睛，并立即送医治疗，否则会伤害眼睛。 If battery leak and electrolyte enter into eyes, do not rub. Rinse with clean water, and seek medical assistance immediately.

10.2 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 it if battery gives off peculiar smell, temperature increase, deform, color change or any other abnormal phenomena.

10.3 如果电池起火，需用水、干粉、泡沫灭火器、沙子等熄灭，待烟雾散去后再进行处理。电池在极端条件下，可能会有冒烟、起火的现象发生，遇到该情况可采取如下的措施：掩盖沙土、使用二氧化碳灭火器、干粉灭火器、水剂灭火器，待烟雾散去后再进行处理。 If the battery catches fire, extinguish it with water, dry powder, foam fire extinguisher, sand, etc., and wait for the smoke to dissipate before disposing of it. Under extreme conditions, the battery may smoke and catch fire, and the following measures can be taken in this situation: cover the sand, use carbon dioxide fire extinguishers, dry powder fire extinguishers, and water agent fire extinguishers, and then treat them after the smoke dissipates.

附图：

1）电芯结构图纸 Cell Drawing



2）电芯包装图 Cell Packing Drawing

尺寸 Size：1100*1100*1208mm.

数量 Quantity：200 pcs per carton.