产品规格书
PRODUCT SPECIFICATION

电池型号 Cell Type：LP71173207-314Ah

公司名称：力神（青岛）新能源有限公司

公司地址：山东省青岛市黄岛区岷山路6号

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0. 术语定义 Definitions

术语 Terms	定义 Definitio n
产品 Product	本规格书中的“产品”是指力神（青岛）新能源有限公司生产的314Ah 3.2V储能用磷酸铁锂电芯。 Means the 314Ah 3.2V rechargeable lithium-ion cells produced by Lishen (Qingdao) New Energy Co.,LTD.
客户 Customer	指《314Ah产品销售合同》中的买方。 Means the customer in the 《314Ah product sales contract》.
力神新能源 Lishen New Energy	力神（青岛）新能源有限公司。 Lishen (Qingdao) New Energy Co.,LTD.
PN	为了区别电池应用于不同的使用区域或不同的应用条件下，力神为314Ah 3.2V可充电锂电池定义的物料编号。 Means the unique part number provided by Chuzhou Lishen New Energy Technology Co., Ltd to identify the product supplied by Lishen.
环境温度 Ambient Temperature	电芯所处的环境温度。 Means the ambient temperature of the environment the products exposed to.
电芯管理系统 Battery Management System(BMS）	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规格书的规定。 Means 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.
电芯温度 Cell Temperature	由接入电芯的温度传感器测量的电芯大面温度，或由力神和客户共同商定。 Means the temperature of the cell measured by the temperature sensor connected to the main part of cell,or is determined through mutual agreement between Lishen and the Customer.
新电芯状态 Fresh State	是指客户收货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).
充电倍率 C-Rate	额定充电功率与电芯的初始充电能量保证值的比率。例如：电芯初始充电能量保证值为1004.8Wh，额定充电功率为 502.4W 时，则充电倍率为0.5P； The ratio of rated charging power to the guaranteed initial charging energy of battery. For example, when the guaranteed initial charging energy is 1004.8Wh and the rated charging power is 502.4 W, the C-Rate is 0.5P;
放电倍率 D-Rate	额定放电功率与电芯的初始放电能量保证值的比率。例如：电芯初始放电能量保证值为1004.8Wh，额定放电功率为502.4 W 时，则放电倍率为 0.5P。 The ratio of rated discharging power to the guaranteed initial discharging energy of battery. For example, when the guaranteed initial discharging energy is 640 Wh and therated discharging power is 640 W, the D-Rate is 1P.
循环 Cycle	电芯充放电一次为一个循环。 Means a state when a total of charge and discharge according to the specified charging and discharging standards.
生产日期 Production date	电芯的制造日期，每个相关的电芯的顶端刻码上标示的明确的日期代码为制造日期。 Means the production date of the cell marked on the top of the cell by date code.

标准充电 Standard Charge	本规格书第 2.2.3 条所述的充电模式。 Means the default charging method set out in paragraph 2.2.3 titled “Standard Charging method”.

术语 Terms	**定义 Definition**
标准放电 Standard Discharge	本规格书第 2.3.1 条所述的 0.5P的放电倍率以及本规格书第2.3.3条所述的最小2.5V电压的放电模式（T＞0℃）。 Means the default discharging method set out in paragraph 2.3.1 of 0.5P with a discharge cut-off voltage of 2.5 V as in paragraph 2.3.3 (T ＞ 0 ℃).
荷电状态 (SOC) State of Charge	表征电芯的荷电状态。100%SOC 的荷电状态表示电芯满充到3.65 V，0%SOC 的荷电状态表示电芯完全放电到2.5 V（T ＞ 0 ℃）。 Characterizing the state of charge of the battery. The state of charge of 100% SOC indicates that the battery is fully charged to 3.65 V ,and the state of charge of 0%SOC indicates that the battery is completely discharged to 2.5 V (T ＞ 0 ℃).
温度上升 Temperature Rise	在本规格书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 cell temperature rises during the conditions specified in this product specification, such as the charging process or the discharging process.
测量单位 Units of Measure	“V” (Volt)伏特(V)，电压单位“V” “A” (Ampere)安培(A)，电流单位“A” “W”(Watt)瓦特(W)，功率单位“W” “Ah” (Ampere-Hour)安培-小时(Ah)，负荷单位“Ah” “Wh” (Watt-Hour)瓦特-小时(Wh)，能量单位“Wh” “Ω” (Ohm) 欧姆(Ω)，电阻单位“Ω” “mΩ” (MilliOhm) 毫欧姆(mΩ)，电阻单位“mΩ” “ ℃” (Degree Celsius) 摄氏度(℃)，温度单位“°C” “mm” (Millimeter) 毫米(mm)，长度单位“mm” “s” (Second) 秒(s)，时间单位“s” “Hz” (Hertz)赫兹(Hz)，频率单位“Hz” “Kg”(Kilogram) 质量单位“Kg”

1. 适用范围 Scope of application

本规格书详细描述了力神（青岛）新能源有限公司生产的 3.2V 314Ah 储能用磷酸铁锂电芯的产品性能指标以及产品使用条件及风险警示。

The purpose of this document is to specify the specifications of 314Ah 3.2V lithium iron cells for energy storage system with LP71173207-314Ah (“Product”) to be supplied by Lishen (Qingdao) New Energy Co.,Ltd.

2. 产品电性能指标 Electrical specification

2.1. 概要 General

No.	参数 Parameter	规格 Specificion	条件 Condition
2.1.1	标称容量 Typical capacity	314Ah	参考 2.2 与 2.3 标准充放电模式测试/其他模式 Refer to 2.2&2.3 standard charge and discharge procedure / other modes
2.1.2	初始能量保证值 Guaranteed initial energy	1004.8Wh	
2.1.3	额定能量 Rated energy	703.36Wh	
2.1.4	工作电压 Operating Voltage	（2.5~3.65）V	电芯温度 T＞0 ℃ Cell temperature T＞0 ℃
		（2.0~3.65）V	电芯温度T ≤ 0 ℃ Cell temperature T ≤ 0 ℃
2.1.5	交流内阻 Impedance (1KHz, (25±2) ℃)	0.17±0.05 mΩ	新电芯状态（35%SOC） Fresh cell (35% SOC)
2.1.6	出货容量 Shipping capacity	109.9±2Ah	35% SOC
2.1.7	月自放电 Residual capacity loss	≤3 %/月 Per month ≤3 %	出货三个月以后的电芯，标准充电到35%SOC，(25±2) ℃储存 Fresh cell after 3 month, 35%SOC, (25±2) ℃ storage
2.1.8	工作温度(充电) Operating temperature (charging)	0 ℃ ~60 ℃	参考第2.2 节 Refer to paragraph 2.2
2.1.9	工作温度(放电) Operating temperature (discharge)	-20 ℃ ~60 ℃	参考第2.3 节 Refer to paragraph 2.3
2.1.10	电芯重量 Cell Weight	(5.6±0.3) Kg	含蓝膜
2.1.11	存储温度 Storage Temperature	1 个月内：-30℃～45 ℃ 6 个月内：-20℃～35 ℃	存储环境湿度≤65%RH，无凝露 Storage ambient humidity <65% RH, no condensation
2.1.12	电芯尺寸 Typical dimension （W*H*T）	宽度(Width)： (173.8±0.5) mm 高度(Height)： (207.2±0.5) mm 厚度(Thickness)： (71.5±0.8) mm	(300±20) kgf 压力下，新鲜电芯 （详见本规格书第8 条） Thickness with compression force (300±20) kgf (Refer to item 8)
2.1.13	应用海拔 Altitude	≤5000m	N.A.
2.1.14	电次数@70%标称容量 Cycle performance@70% Typical Capacity	≥8000Cycles	(25±2) ℃ 初始夹紧力(300±20)kgf，0.5CP充放电，2.5V~3.65V (25±2) ℃, cycle test by 0.5CP, 2.5V~3.65V charge and discharge under (300±20) kgf preload

2.2. 充电模式/参数 Charging/Parameter

No.	参数 Parameter	规格 Specification	条件 Condition
2.2.1	额定充电功率 Rated charging power	0.5P	(25±2) ℃
2.2.2	充电截止电压 Charge cut-off voltage	单体电芯最大3.65 V Cell max voltage 3.65 V	N.A.
2.2.3	标准充电模式 Standard charge method	0.5P恒功率充电至3.65 V 0.5P constant power charge to 3.65 V	
2.2.4	标准充电温度 Standard charge temperature	(25±2) ℃	电芯温度 Cell Temperature
2.2.5	绝对充电温度（电芯温度） Absolute charging temperature（Cell Temperature）	0℃~60℃	无论电芯处在何种充电模式，一旦发现电芯温度超过绝对充电温度范围即停止充电 No matter what charge mode the battery is in, stop charging once the cell temperature exceeds absolute charge temperature range.
2.2.6	绝对充电电压 Absolute charging voltage	最大3.65 V Max 3.65 V	无论电芯处在何种充电模式，一旦发现电芯电压超过绝对充电电压范围即停止充电 No matter what charge mode the battery is in, stop charging once the cell voltage exceeds absolute charge voltage.

2.2.7 其他充电条件(模式) C-Rate Other charge Condition(C-Rate)（表格仅供参考，可根据需求调整）

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	0.05	0.2	0.4	0.5	0.5	0.5	0.5	0.5	0

2.3. 放电模式/参数 Discharging/Parameter

No.	参数 Parameter	规格 Specification	条件 Condition
2.3.1	额定放电功率 Rated discharging power	0.5P	(25±2) ℃
2.3.2	最大持续放电功率 Maximum discharge power (continuous)	1.0P	(25±2) ℃

No.	参数 Parameter	规格 Specification	条件 Condition
2.3.3	放电截止电压 Discharge cut-off voltage	2.5 V 2.0 V	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	-20℃~60℃	无论电芯处在持续放电模式或脉冲放电模式，若电芯温度超过绝对放电温度，则停止放电 Stop discharging once the cell temperature is above the range of whether continuous discharge condition or pulse discharge condition.

2.3.6 其他放电条件(模式) C-Rate Other discharge Condition(C-Rate)（表格仅供参考，可根据需求调整）

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

注：表格仅供参考，可根据需求调整

2.4. 高低温能量 High/ Low temperature energy

No.	参数 Parameter	规格 Specification	条件 Condition
2.4.1	45℃的能量 Energy@45℃	≥1004.8Wh	新电芯状态，45℃，0.5P，2.5 V~3.65 V Fresh cell，45℃，0.5P，2.5 V~3.65 V
2.4.2	5℃的能量 Energy@5℃	≥803.4Wh	新电芯状态，5℃，0.5P，2.5 V~3.65 V Fresh cell，5℃，0.5P，2.5 V~3.65 V

2.5. 电芯温升 Cell temperature rise

本规格书中温升是指放电后的电芯表面温度减去放电前的电芯表面温度。电芯温升的测量应在环境温度较为稳定且空间足够大的房间里进行。每个电芯温度测量应选取经过校正的可以记录时间数据的温度感应器。

The temperature rise refers to the surface temperature of the cell after discharge minus the surface temperature of the cell before discharge. The measurement of the temperature rise of the cell should be carried out in a room where the ambient temperature is relatively stable and the space is large enough. For each cell temperature measurement, a calibrated temperature sensor that records time data should be selected.

No.	参数 Parameter	规格 Specification	条件 Condition
2.5.1	持续放电温升 Continuous discharge temperature rise	≤10 ℃	电芯以标准放电模式进行放电 The cell is discharged in the standard discharge method.

2.6. 安全与可靠性 Safety and reliability

2.6.1 使用条件说明：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1000N~3000N，建议的预紧力控制公差为±200N。

Description of service conditions: safety test，cycle life test and pack design need to add preload force, and the range of preload force of fresh cell is 1000N~3000N, and the recommended preload tolerance is ±200N.

2.6.2 产品在使用过程中会产生膨胀力，电芯在17mm钢板测试条件下容量衰减至80%时膨胀力约为40000N，客户在产品设计过程中需要考虑结构强度可靠性。

The cell will generate swelling force during attenuation. Under the test condition of 17 mm steel plate, the swelling force of the cell may reach 40000 N when it's capacity decay to 80% SOH. The customer needs to consider the reliability of structural strength in the product design process.

3. 产品寿命终止管理 Product end of life management

3.1 电芯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芯的内阻和能量。内阻以及能量的测量方法和计算方法需要客户和力神（青岛）新能源有限公司共同讨论和双方同意。当使用中的电芯的能量小于等于标称能量70% (703Wh @ 25 ℃)，不建议继续使用电芯。违反该项要求，将免除力神（青岛）新能源有限公司依据产品销售协议以及本规格书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 internal impedance of every Product in its entire service life. Chuzhou Lishen New Energy Technology Co., Ltd and its customer shall come into agreement about internal resistance and energy measurement methods, Chuzhou Lishen New Energy Technology Co., Ltd and/or its customer shall stop using any of the products when it capacity fading to 70% of typical energy (703Wh @ 25 ℃). Failure to comply with this requirement shall render Lishen (Qingdao) New Energy Co.,Ltd.'s under the Contract inapplicable, thereby releasing Lishen (Qingdao) New Energy Co.,Ltd. from any liability in connection therewith.

3.2 电芯寿命判定条件参考2.1.14循环寿命。

The cell life determination conditions can refer to paragraph 2.1.14cycle life.

4. 应用条件 Application conditions

客户应当确保严格遵守以下与电芯相关的应用条件：

Customer shall ensure to strictly observe all the following application conditions in connection with the products.

4.1 客户应配置电芯管理系统，严密监控、管理与保护每个电芯。电芯初次必须按照标准充放电制式激活，以保证后续使用中容量的充分发挥。

Customer shall procure every product shall be used under the strict monitor, control and protection by the BMS. When the cell is firstly used, it must be activated according to the standard charging and discharging method in order to ensure the full use of capacity in subsequent use.

4.2 客户应保存完整的电芯运转的监测数据，用作产品质量责任划分的参考。不具备完整的电芯系统使用期限内的监测数据的，力神（青岛）新能源有限公司不承担产品质量保证责任。

Customer shall keep relevant records of the BMS monitoring data throughout the entire service life of every product, including keeping record of number of occurrence of rush charge, which could be used in the determination and judgment of any product warranty and liability claim entitlement. Lishen (Qingdao) New Energy Co.,Ltd. will not be responsible for product quality assurance if it does not have complete BMS diagnosis records (at a regular basis, esp. during maintenance) of the relevant product.

4.3 电芯管理系统需满足以下最基本的检测和控制要求

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

No.	**参数 Parameter**	**规格 Specification**	**保护动作 Action**
4.3.1	充电终止 Stop charging	3.65 V	电芯的电压达到3.65 V 时，BMS 申请终止充电 Stop charging when cell voltage reaches 3.65 V
4.3.2	第一级过充电保护 First overcharge protection	3.69 V	当电芯电压达到3.69V，BMS强制终止充电 Stop charging when cell voltage reaches 3.69V
4.3.3	第二级过充电保护 Second overcharge protection	3.80 V	当电芯电压达到3.80V，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 3.80V, the BMS is forced to terminate charging, and the BMS should be locked until technicians solve the problem.
4.3.4	放电终止 Stop discharge	最小2.5V Minimum 2.5V	当电芯的电压到达2.5V，BMS 申请终止放电 Minimize the discharging current when cell voltage reaches 2.5V.
No.	**参数 Parameter**	**规格 Specification**	**保护动作 Action**

4.3.5	第一级过放保护 First over discharge protection	最小2.5V Minimum 2.5V	当电芯的电压到达2.5V，BMS 强制终止放电 Stop discharging when cell voltage reaches 2.5V
4.3.6	第二级过放保护 Second over discharge protection	最小2.0V Minimum 2.0V	当电芯电压低于2.0V时，BMS强制终止放电，应及时以0.1C充电至30%~50% SOC，且BMS 应锁定直到技术人员解决问题 When the cell voltage is less than 2.0V, the cell should be charged back to30%-50% SOC at 0.1C in time, and the BMS should be locked until technicians solve the problem.
4.3.7	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(电池) When a short circuit occurs, the battery (cell) is disconnected by the overcurrent protection device.
4.3.8	过流保护 Over current protection	参考第2.2 和2.3 条 Refer to paragraph 2.2&2.3	电芯管理系统控制充放电电流符合规格 Control discharge current by BMS to values within specification
4.3.9	过热保护 Over temperature protection	参考第2.2 和2.3 条 Refer to paragraph 2.2&2.3	当温度超过本规格书规定时，终止充电/放电 Stop charging and discharging when temperature exceeds specification

备注：以上No.4.3.2、4.3.3、4.3.5、4.3.6为警示条款，提请客户注意：当电芯达到上述任何一项条款描述的指标和参数状态时，意味着电芯已超出本规格书规定的使用条件，客户需依“保护动作”及本规格书其他相关规定对电芯采取保护措施，同时，力神（青岛）新能源有限公司声明对上述使用状态的电芯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.4.3.2、4.3.3、4.3.5、4.3.6 are the warning clause, to 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 Lishen (Qingdao) New Energy Co.,Ltd. shall not take any responsibility for the damage in connection therewith.

4.4 避免电芯到达过放状态。电芯电压低于2.0V 时，电芯内部可能会遭到永久性的损坏，此时力神（青岛）新能源有限公司的产品质量保证责任失效。根据本规格书第 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，防止电芯进入过放状态。

Prevent draining any product down to over discharge state. A product may be permanently damaged internally when the cell voltage is lower than 2.0 V and which shall be strictly prohibited, failing what Lishen (Qingdao) New Energy Co.,Ltd.'s warranties under the contract shall cease to apply, thereby releasing the Lishen (Qingdao) New Energy Co.,Ltd. from any liability in connection therewith. After discharge cut-off in accordance 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.

4.5 若预计将电芯存放30天以上的，应定期（建议每隔3个月）将SOC调整为30%~50%左右

When the Products are intended to be stored for a prolonged period of time (more than one month), the SOC of cells should be adjusted to around 30%~50% periodically (every 3 months is recommended).

4.6 电芯避免在本规格书禁止的低温条件下充电(包括标准充电，快充，紧急情况充电)，否则可能出现意外的容量降低现象。电芯管理系统应依照最小的充电温度进行控制。禁止在低于本规格书规定的温度条件下充电，否则力神（青岛）新能源有限公司不承担质量保证责任。

Batteries should avoid charging at low temperatures prohibited by this Product Specification (including standard charging, fast charging and emergency charging), otherwise accidental capacity reduction may occur. Battery management system should be controlled according to the minimum charging temperature. It is forbidden to charge under the temperature stipulated in this Product Specification. Otherwise, Lishen (Qingdao) New Energy Co.,Ltd. will not undertake the responsibility of quality assurance.

4.7 电箱设计中应充分考虑电芯的散热问题，由于电箱散热设计问题导致的电芯或电芯过热损坏，力神（青岛）新能源有限公司不承担质量保证责任。

The design of the electric box must fully consider the heat dissipation problem of the cell. Lishen (Qingdao) New Energy Co.,Ltd. shall not take the responsibility due to the overheating of the cell or batteries caused by the thermal design problem of the electric box.

4.8 电箱设计中应充分考虑电芯的防水、防尘问题，电箱必须满足UL和IEC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芯的损坏（如腐蚀、生锈等），力神（青岛）新能源有限公司不承担质量保证责任。

The design of the electric box must fully consider the waterproof and dustproof problems of the cells. The electric box must meet the waterproof and dustproof grade specified in UL and IEC standards. Lishen (Qingdao) New Energy Co.,Ltd. shall not take the responsibility due to damage to the cell or batteries (such as corrosion, rust, etc.) caused by water and dust.

4.9 禁止不同P/N料号电芯在同一电芯系统中混用。否则，力神（青岛）新能源有限公司不承担质量保证责任。

It is forbidden to mix different P/N batteries in the same battery system, otherwise, Lishen (Qingdao) New Energy Co.,Ltd. shall not be responsible for quality assurance.

5. 安全防范 Safety Precautions

5.1 禁止将电芯浸入水中

Do not immerse cells into water.

5.2 禁止将电芯投入火中或长时间暴露在超过本规格书第2.1.7条，第2.1.8条和第2.1.10条规定的温度条件的高温环境中，否则可能会导致火灾。在任何正常的充放电使用情况下，电芯温度不能超过60 ℃，如果电芯温度超过60 ℃，电芯管理系统需关闭电芯，停止电芯运行

Do not drop cells into fire or expose them to any high temperature environment exceeding operation temperature as set out in paragraphs 2.1.7、2.1.8&2.1.10, otherwise it may cause fire. At all use time, cell temperature should not exceed 60 ℃, shut down system by BMS when it occurs.

5.3 禁止电芯正负极短路，否则强电流和高温可能导致人身伤害或者火灾。在电芯系统组装和连接时，应有足够的安全保护，以避免短路。

Do not short circuit cell terminals, otherwise high current and temperature may cause body injury or fire hazards. Metallic cell terminals exposed from plastic packaging and ample safety precautions should be implemented to avoid short circuiting them during system integration or connections.

5.4 严格按照标示和说明连接电芯正负极，禁止反向充电。

Always connect cell terminals according to its label(s) in right polarity. Reverse charging is strictly prohibited.

5.5 禁止超过最大功率进行电芯充电、禁止电芯过充。否则，可能引起电芯过热和火灾事故的发生。在电芯安装和使用中，硬件和软件需实行多重过充失效安全保护。最低保护要求见本规格书第4.3.1、4.3.2、4.3.3、4.3.9条。

It is extremely dangerous to overcharge a cell which may cause overheating and fire hazards. Multiple level offail-safe overcharge protection should be implemented by hardware and software. See paragraph 4.3.1、4.3.2、4.3.3、4.3.9 for minimum requirement to be adopted by the BMS for protection.

5.6 根据本规格书第4.3.9条充电后，应结束正常充电。当持续充电时间超过合理的时间限制，电芯会出现过热现象可能会引起热失控和火灾。应安装上一个定时器加以保护。一旦充电电流达到过充状态而不能终止，定时器将会起作用从而终止充电，见本规格书第5.11条。

After charging according to paragraph 4.3.9 of this technical agreement, normal charging shall be terminated. When the continuous charging time exceeds the reasonable time limit, the battery will overheat, which may cause thermal runaway and fire. A timer should be implemented in the charger circuit and set up properly. In case charging does not terminate normally with in charging time out limit, ensure that the timer will intervene and stop the charging. Refer to paragraph 5.11.

5.7 客户应将电芯安全地固定在固体平面上，并将电源线安全地束缚在合适的位置，以避免摩擦而引起电弧和火花。

Products should be securely fixed to solid platform, and power cables should be securely attached by fastener to avoid intermittent contact which may cause arcing and sparks.

5.8 严禁用塑料封装电芯或用塑料进行电气连接。不正确的电气连接方式可能会造成电芯使用过程中发生过热现象。

Do not service cells and electrical connections within plastic package of cell. Improper electrical connection within a

cell may cause overheating in service.

5.9 当电解液泄露时，应避免皮肤和眼睛接触电解液。如有接触，应使用大量的清水清洗接触到的区域并向医生寻求帮助。禁止任何人或动物吞食电芯的任何部件或电芯所含物质。

When the electrolyte leaks, skin and eye contact with the electrolyte should be avoided. In case of contact, a large amount of clean water should be used to clean the contact area and seek help from the doctor. It is forbidden for any person or animal to swallow any part or substance contained in the battery.

5.10 尽力保护电芯，使其免受机械震动、碰撞及压力冲击，否则电芯内部可能短路，产生高温和火灾。

Protect cells from mechanical shock, impact and pressure. Internal electrical circuit may short circuit to generate high temperature and fire hazards.

5.11 电芯充电过程中可能发生不适当的终止充电现象。如:超出允许的充电时间充电，充电电压过高而终止充电或充电电流过强而终止充电。上述现象被定义为“不适当的终止充电”。当发生以上现象时，可能意味着电芯系统出现漏电或某些部件出现故障。在没有找到根本原因并彻底解决之前继续对该电芯充电可能会引起电芯过热或发生火灾。当发生以上现象时，电芯管理系统应该通过自动锁定功能，禁止后续的充电，并提醒使用者将装载有该电芯的交通工具退回到经销商处进行系统维护。该电芯只有经过有认证资格的技术人员全面检查，确定根本原因并彻底解决、改善后方可恢复充电。

When cells charging is terminated improperly for reasons such as exceeding allowable charging time, cut-off due to exceeding charging voltage or cut-off due to exceeding charging current, all these events are defined as “improper charge termination”. Such event may indicate that there is current leaking within a cell system or some components have started to malfunction and subsequent charging of such cell system without finding and fixing root cause of problem may cause potential overheat or fire hazards. When such event occurs, the BMS should lock itself up to prevent subsequent charging and notice should be given to the user to return the vehicle to dealer for servicing. Subsequent charging should only be resumed after the system has been thoroughly checked by qualified technician who can identify and fix root cause attributed to the “improper charge termination”.

5.12 在进行滥用测试实验时如操作不当可能会引起电芯起火或者爆炸。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 maylead to serious personal injury and property loss.

6. 免责声明 Disclaimer

6.1 如果由于产品需求单位不按本说明书中的规定进行使用，造成社会性影响，并对力神（青岛）新能源有限公司的声誉造成影响的，力神（青岛）新能源有限公司将会追究产品需求单位的责任。根据对力神（青岛）新能源有限公司造成的影响程度，产品需求单位需向力神（青岛）新能源有限公司提供赔偿。

If the product demand unit does not use the product according to the provisions of this specification, causing social impact and affecting the reputation of Lishen (Qingdao) New Energy Co.,Ltd., Lishen (Qingdao) New Energy Co.,Ltd. will investigate the responsibility of the product demand unit. According to the degree of impact on Lishen (Qingdao) New Energy Co.,Ltd., the product demander should provide compensation to Lishen (Qingdao) New Energy Co.,Ltd.

6.2力神（青岛）新能源有限公司保留对产品的规格及性能参数修改的权利。买方在订购力神（青岛）新能源有限公司产品前，需要与力神（青岛）新能源有限公司提前确认产品的最新状态。

Lishen (Qingdao) New Energy Co.,Ltd. reserves the right to modify the specifications and performance parameters of the product. Before ordering Lishen (Qingdao) New Energy Co.,Ltd. products, the buyer needs to confirm the latest status of the products in advance with Lishen (Qingdao) New Energy Co.,Ltd.

6.3 英文规格释义仅供参考，请以中文版技术规格要求为准。

English specifications are for reference only. Please refer to the technical specifications of the Chinese version.

7. 风险警告 Risk Warning

7.1 警示声明Waring statement

警告

电芯存在潜在的危险，在操作和维护时必须采取适当的防护措施！不正确地滥用测试实验，可能导致严重的人身伤害和财产损失！必须使用正确的工具和防护装备操作电芯。

电芯的维护必须由具有电芯专业知识并经过安全培训的人士执行。不遵守上述警告可能造成多种灾难。

CELLS ARE POTENTIALLY DANGEROUS AND PROPER PRECAUTIONS MUST BE OBSERVED IN HANDLING AND MAINTENANCE.

RUNNING TESTS ON THE CELLS IMPROPERLY MAY RESULT IN SEVERE PERSONAL BODY INJURY OR PROPERTY DAMAGES. WORK ON CELLS MUST BE PERFORMED ONLY WITH PROPER TOOLS AND PROTECTIVE EQUIPMENT MUST BEUSED.

CELL MAINTENANCE MUST BE CARRIED OUT BY PERSONNEL KNOWLEDGEABLE OF CELLS AND TRAINED IN THE SAFETY PRECAUTIONS INVOLVED.

FAILURE TO OBSERVE THE ABOVE MAY CAUSE VARIOUS HAZARDS.

7.2 **危险类型**:Types of Hazards

客户知悉在电芯使用和操作过程中存在以下潜在的危险:

Customer acknowledges the following potential hazards in connection with the usage and handling of the Products:

7.2.1 操作者在操作时可能会受到化学品、电击或者电弧的伤害。尽管人体对遭受直流电与交流电的反应不同，但是高于50V 的直流电压与交流电对人体的伤害是同样严重的，因此客户必须在操作中采取保守的姿势以避免电流的伤害。

Working with battery can expose the handler to chemical, shock and/or arcing hazards. Although a person’s body might react to contact with direct current voltage differently than from contact with alternate current voltage, Customer shall take a conservative position and consider the risk of shock or electrocution to be the same for both alternate current and direct current exposures greater than 50 V

7.2.2 存在来自电芯中的电解液的化学风险。

Cells expose its handler to chemical hazards associated with the electrolyte used in the cell.

7.2.3在操作电芯和选择个人防护装备时，客户及其雇员必须考虑到以上潜在的风险，防止发生意外短路造成电弧、爆炸或热失控。

When selecting work practices and personal protective equipment, customer and its employees should consider potential exposure to these hazards and therefore prevent accidental short-circuit that can result in electrical arcing, explosion, and/or “thermal runaway” of the cells.

8. 电芯图纸 Mechanical Drawing

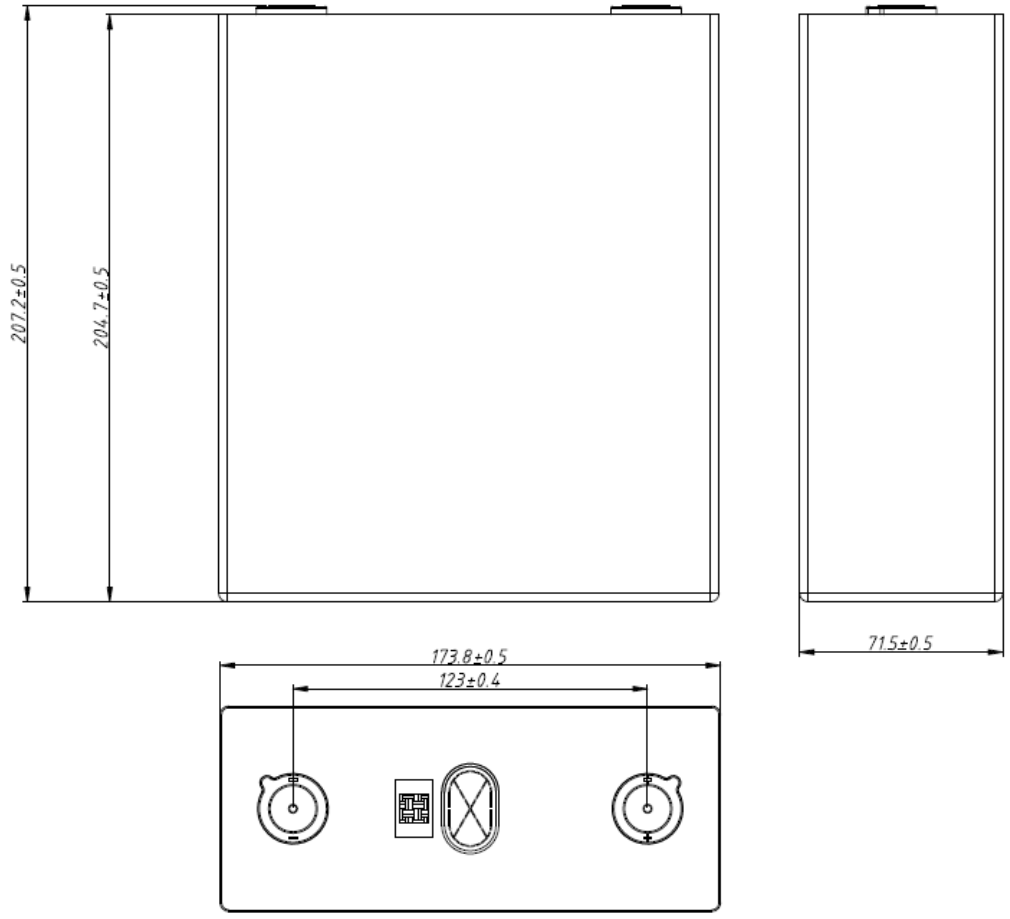

图1 Drawing 1

电池外形图（以上尺寸含六个方向的蓝膜及上垫片厚度，无下垫片；底部蓝膜包裹两层，顶部包裹一层，电池厚度为3KN压力厚度数值）

Cell Size consists of upper spacer, six direction of blue filmand which is wrapped with two layers at the bottom and one layer at the top, without spacer at the bottom of cell. Cell Thickness is under the pressure of 3KN