产品规格书

锂离子动力电池 LP33200173-125Ah

力神动力电池系统有限公司

www.lishen.com.cn

1 适用范围

本规格书适用于力神动力电池系统有限公司生产的 LP33200173-125Ah 锂离子电池。

2 常规指标

2.1 符号说明

C_1——1h 率额定容量(A ħ)。

I_1——1h 率放电电流，其数值等于 C_1(A)。

SOC——荷点状态

DOD——放电深度

AC——交流电流

OCV——开路电压

本规格书中 $1I_1$(A)=125A。

新电芯状态：指电芯自产品制成日期算起，7 天以内的状态。

2.2 该产品常规指标

表 1

序号	项目		规格
1	电池种类		锂离子动力电芯
2	电池型号		LP33200173-125Ah
3	室温标称容量☆		125Ah，1C 充放，新电芯状态
4	室温标称电压☆		3.2V，1/3C 放电
			3.15V，1C 放电
5	交流内阻☆		≤0.5mΩ
6	重量		2450±100g
7	室温最大充电电流		$1I_1$（连续）$2I_1$(60s)
8	充电截止电压		3.65V
9	室温最大放电电流		$1I_1$（连续）$3I_1$(60s)
10	放电终止电压		2.5V（＞0℃）；2.0V（≤0℃）
11	最大工作范围	充电	0℃～ 60℃
		放电	-30℃～ 60℃
12	最佳工作范围	充电	15℃～35℃
		放电	15℃～35℃
13	储存	1 个月内	-40℃～45℃

	温度	6 个月内	-20℃～ 35℃
*电池处于 20%-40%SOC 或电压为 3.275V～3.305V 状态下保存			

3 外观和尺寸

外观和尺寸见图 1。

4 性能

4.1 测试条件

选择新电芯状态电池进行测试，测试前循环充放电次数不得超过五次。实验和测量须在标准温度（25±2）℃及标准湿度（65±20）%的条件下进行,本规格书所提到的室温是指（25±2）℃。除非特别说明，所有测试均需施加预紧力，夹紧力范围1000~3000N，全寿命周期受力范围1000~20000N。

4.2 测量设备

a) 伏特计内阻>1000 Ω/V
b) 游标卡尺精度为 0.02 mm
c) 内阻表在 AC 1kHz 条件下测量
d) 天平精度 0.1g

4.3 测试过程及其标准

4.3.1 标准充电制式(慢充)

在环境温度（25±2）℃条件下，采用先恒流再恒压方式充电。恒流电流为 0.5I_1(A)，恒压电压为 3.65V，在恒压过程中电流降到 0.05I_1A 即可终止充电，静置 1 小时。

4.3.2 标准充电制式(快充)

在环境温度（25±2）℃条件下，采用先恒流再恒压方式充电。恒流电流为 1.0I_1(A)，恒压电压为 3.65V，在恒压过程中电流降到 0.05I_1A 即可终止充电，静置 1 小时。

4.3.3 其他充电制式

电芯温度/℃		0	5	10	15	20	25	30	40	45	50	55	60
SOC	0～80%	0.0	0.1	0.4	0.5	1.0	1.0	1.0	1.0	1.0	0.5	0.3	0
SOC	＞80%	0.0	0.1	0.4	0.5	0.8	0.8	0.8	0.8	0.8	0.5	0.3	0

4.3.4 测试项目及标准

具体测试项目及标准见表 2。

表 2

序号	项目	测试程序	标准
1	外观和尺寸	目测及游标卡尺测量	无明显人为划痕、无变形、无漏液，成品电池质量检验尺寸为厚度、宽度和高度，尺寸见图纸
2	重量	天平	2450±100g
3	开路电压☆	按 4.3.1 充电后 1 小时内测量开路电压	≥3.35V
4	1I_1(A)放电容量☆	电池以 1I_1(A)电流放电至 2.5V，搁置 1h；然后以 1I_1(A)电流充电 3.65Ⅴ，转恒压充电至 0.05I_1(A)时停止充电，充电后搁置 1h，再以 1I_1(A)电流放电至 2.5V，计算放电容量。上述充放电可以重复 5 次，当连续 3 次试验结果的极差小于额定容量的 3%，可提前结束试验，取最后 3 次试验结果平均值。	1I_1(A)容量≥125Ah（新电芯状态）
5	室温最大充电电流	以 1I_1(A)电流充电 3.65Ⅴ，转恒压充电至 0.05I_1(A)时停止充电，充电后搁置 1h，再以 1I_1(A)电流放电到终止电压 2.5V，并计量容量；以 nI_1(A)恒流充至 3.65V，再以 3.65V 恒压充至 0.05I_1 截止。	1I_1(A) (连续); 2I_1(A) (60s);
6	室温最大放电电流	以 1I_1(A)电流充电 3.65Ⅴ，转恒压充电至 0.05I_1(A)时停止充电，充电后搁置 1h，再以 1I_1(A)电流放电到终止电压 2.5V，并计量容量；以 1I_1(A)电流充电 3.65Ⅴ，转恒压充电至 0.05 I_1(A)时停止充电，充电后搁置 1h，以 nI_1(A)放电至 2.5V 截止。	1I_1(A) (连续); 3I_1(A) (60s);
7	室温（25℃）充放电循环寿命☆	以 1 I_1(A)电流充电 3.65Ⅴ，转恒压充电至 0.05 I_1(A)时停止充电，充电后搁置 1h，以 1 I_1(A) 电流恒流放电至 2.5V，搁置 1h；循环充放电 3000 次以上，计量放电容量。电池在夹紧状态下(初始夹紧力 1000~3000N)进行循环测试。	循环 500 次，放电容量≥标称容量的 95%；循环 1000 次≥标称容量的 92%；循环 3000 次，放电容量≥标称容量的 80%.
8	高温（45℃）充放电循环寿命☆	以 1 I_1(A)电流充电 3.65Ⅴ，转恒压充电至 0.05 I_1(A)时停止充电，充电后搁置 1h，以 1 I_1(A) 电流恒流放电至 2.5V，搁置 1h；循环充放电 1500 次以上，计量放电容量。电池在夹紧状态下(初始夹紧力 1000~3000N)进行循环测试。	循环 500 次≥90%标称容量的；1500 次≥标称容量的 80%
9	室温荷电保持	电池以 1 I_1(A)电流充电 3.65Ⅴ，转恒压充电至 0.05 I_1(A)时停	荷电保持率≥96.5%初

	能力☆	止充电，在环境温度（25±2）℃条件下开路搁置 30 天，再以 1 I_1(A)电流恒流放电到终止电压 2.5V，并计量荷电保持容量。	始容量
10	高温荷电保持能力☆	电池以 1 I_1(A)电流充电 3.65Ⅴ，转恒压充电至 0.05 I_1(A)时停止充电，在环境温度（60±2）℃条件下开路搁置 7 天，再以 1 I_1(A)电流恒流放电到终止电压 2.5V，并计量荷电保持容量。	荷电保持率≥95%初始容量
11	高温性能	以 1 I_1(A)电流充电 3.65Ⅴ，转恒压充电至 0.05 I_1(A)时停止充电，充电后搁置 1h，在温度（60±2）℃的高温箱中放置 5h，然后以 1 I_1(A)电流恒流放电至 2.5V，并计量放电容量。	容量≥99%初始容量
12	低温性能	以 1 I_1(A)电流充电 3.65Ⅴ，转恒压充电至 0.05 I_1(A)时停止充电，充电后搁置 1h，在温度（-20±2）℃的低温箱中放置 24h，然后以 1 I_1(A)电流恒流放电至 2.0V，并计量放电容量。	容量≥70%初始容量
13	短路试验★	按 4.3.1 充电后，将接有热电耦的电池放入通风厨中短路，电池经线路电阻小于 5mΩ 的外部电路短路 10min；观察 1h。	电池不起火，不爆炸
14	过充试验★	按 4.3.1 充电后，将接有热电偶的电池进行过充电试验，以下面任一种方式充电： a）以 1 I_1 (A)电流充电，到电池电压达到充电终止电压的 1.5 倍后停止实验，观察 1h。 b） 1 I_1(A)电流充电，充电时间到达 1h 后停止试验，观察 1h。	电池不起火，不爆炸
15	过放试验★	按 4.3.1 充电后，以 1 I_1(A)电流放电 90min；观察 1h	电池不起火，不爆炸 不漏液
16	热箱试验★	按 4.3.1 充电后，将接有热电耦的电池放入恒温箱中，关闭箱门后，开启恒温箱加热，监视恒温箱内温度变化(温箱升温速度为 5℃/min)，箱温达到(130±2)℃时保持 30min 后结束试验；观察 1h。	电池不起火，不爆炸
17	挤压试验★	按 4.3.1 充电后，垂直于电池极板的方向以(5±1)mm/s 的速度挤压电池，挤压板形式为半圆柱体（半径 75mm，长度大于被挤压电池的尺寸），电池电压到达 0V 或变形量达到 30%或挤压力达到 200kN 后停止挤压；观察 1h。	电池不起火，不爆炸
18	跌落试验★	按 4.3.1 充电后，在(25±2)℃下，将电池的正负极端子向下从 1.5m 高度处自由跌落到水泥地面上。	电池不起火，不爆炸 不漏液
19	温度循环	按 4.3.1 充电后，将电池放入温箱中，按照表 3 调节时间与温度，循环 5 次，观察 1h	电池不起火，不爆炸 不漏液

表 3

温度 ℃	时间增量 min	累计时间 min	温度变化率 ℃/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

5 注意事项

5.1 充电

a) 严禁过充，充电电压不得高于 3.65V。

b) 严禁反向充电。

c）充电温度范围：0～60℃，电池任一部位达到 60℃即停止充电。

d) 建议最佳充电温度为 15℃～35℃，不宜在最佳温度范围之外长期充电。

5.2 放电

a)严禁短路。

b)放电电压不得低于 2.0 V。

c）放电温度范围：-30～60℃，电池任一部位达到 60℃即停止放电。

d) 建议最佳放电温度为 15℃～35℃，不宜在最佳温度范围之外长期放电。

5.3 将电芯放置在远离儿童的地方

5.4 储存及使用

短时储存（1 个月内）要将电池放置于清洁、湿度低于 65%RH、温度-40℃～45℃的环境及 20～40%SOC 状态。

长期储存（6 个月内）要将电池放置于清洁、湿度低于 65%RH、温度-20℃～35℃的环境及 20～40%SOC 状态。

电池在储存和使用过程中，保持电池盖向上的直立状态。

6 警示

6.1 严禁电池过热；严禁改装、拆解电池；这些行为非常危险，可能会引起电池起火、过热、

漏液、爆炸。

6.2 严禁将电芯暴露在极热环境或投入火中，不要将电池放置在太阳直射的地方。

6.3 严禁将电池正负极柱用金属或其他导线直接连在一起，这样将导致电池短路，可能引起电池起火甚至爆炸。

6.4 严禁将正负极柱颠倒使用。

6.5 严禁将电芯浸入海水或水中，或者使其吸湿

6.6 严禁使电芯承受过重的机械冲击.

6.7 严禁直接焊接电池，过热可能会引起电池零部件（如垫片）变形，这将导致电池鼓胀、漏液、起火甚至爆炸。

6.8 严禁使用运输中发生挤压、跌落、短路、漏液及其他不正常问题的电池。

6.9 在使用过程中严禁各电池之间外壳直接接触或通过导体连接在一起形成通路。

6.10 电池应该远离静电的场所进行存储、使用。

6.11 禁止把电池同其他一次电池或二次电池一起使用，也不要同不同包装、不同型号或其他品牌的电池一起使用。

6.12 在使用、充放电或者存储过程中发现电池急剧变热、散发气味、变色、变形或者其他反应，应立即停止使用，并进行相应的处理。

6.13 如电池漏液到皮肤或衣物上，请立即用清水冲洗，以免造成皮肤不适等。

7 免责声明

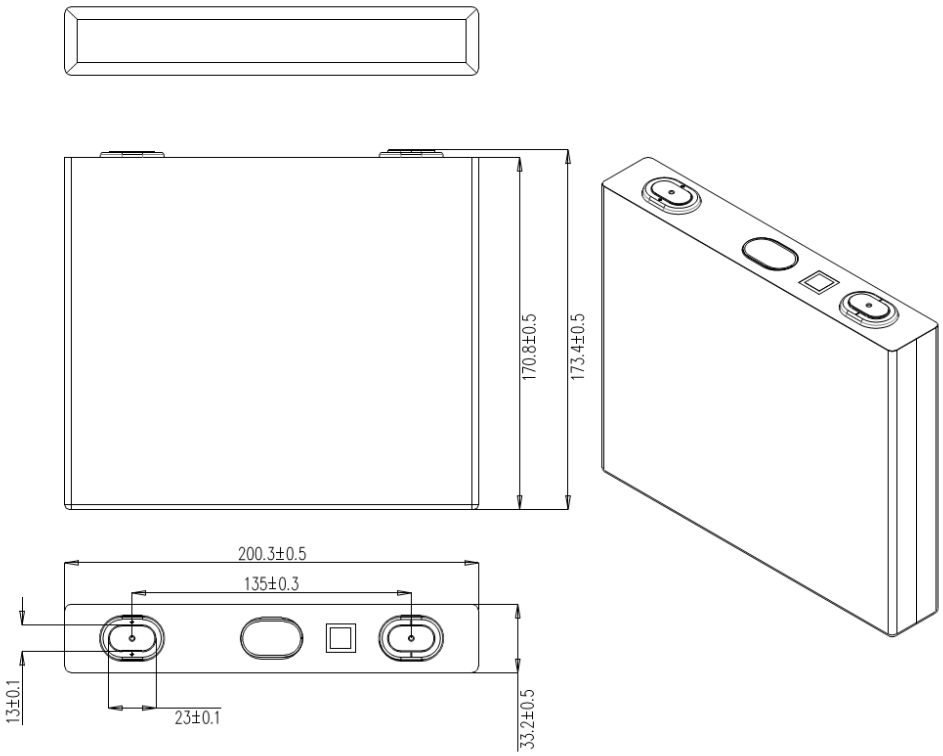
如果客户需要将电芯在该文件之外的条件下操作或应用，请先咨询力神公司相关事宜。在该文件说明的条件之外使用该电芯而产生的事故，公司不承担任何责任。

对单体电池与电路，电池组，充电器搭配使用不当所产生的问题公司不承担任何责任。

出货后客户在电芯组装过程中，因加工产生的不良电芯不在质量保证的范围之列。

8 运输

运输过程中应防止剧烈振动、冲击、日晒雨淋，并使电池处于 20%～40%SOC 状态。



注：电芯尺寸包含外垫片和蓝膜；电芯厚度在 3000N 压力下

图 1

Product Specification

Lithium-ion Power Cell of LP33200173-125Ah

Lishen Power Battery System Co., Ltd

www.lishen.com.cn

1. Scope

The product specification describes the requirement of the Prismatic Lithium Ion Power Cell to be supplied to the customer by Lishen Power Battery System Co., Ltd. If there be any additional information required by the customer, customer are advised to contact Lishen Power Battery System Co., Ltd.

2. General Specifications

2.1 Abbreviation Definitions

C_1—— the rated capacity (in ampere-hours) of the cell for a one-hour discharge.

I_1 —— a current corresponding to the manufacturer's rated capacity (in ampere-hours) for a one-hour discharge. which is equal to, in numeral, the C_1

SOC —— the state of charge.

DOD —— the depth of discharge.

In the below specification I_1(A) = 125A.

Room Temperature——25℃ ±2℃

The New Battery——the battery since the date of the product is made, the state of temperature within 7 days

2.2 Specification

	Item	Specification
1	Cell Type	Lithium -ion power cell
2	Cell Model	LP33200173-125Ah
3	Nominal Capacity☆	125Ah(1C Charge and Discharge of the New Battery)
4	Nominal Voltage☆	3.2V , 1/3C Discharge
		3.15V , 1C Discharge
5	AC-impedance(1000Hz)☆	≤ 0.5mΩ
6	Weight	2450±100g
7	Maximum Charge Current at Room Temperature	1I_1（Continuous）2I_1 (60s)
	Charging Voltage	3.65V
8	Maximum Discharge Current at Room Temperature	1I_1（Continuous）3I_1 (60s)
	Discharge End Voltage	2.5V（＞0℃）、2.0V(≤0℃)
9	Max Operating TemperatureRange	
	Charge	0℃ ~ 60℃
	Discharge	-30℃ ~ 60℃
10	Optimal Operating TemperatureRange	
	Charge	15℃ ~ 35℃
	Discharge	15℃ ~ 35℃
11	Storage Temperature	
	1 month	-40℃~ 45℃

	6 months	-20℃ ~ 35℃
*Cells should be stored at 20%SOC-40%SOC or the voltage is between 3.275V and 3.305V.		

3. Appearance and Dimension

Appearance and Dimension refer to the attached drawing 1.

4. Characteristics

4.1 Test Condition

Cells should be tested within a month after the product is made and the charge-discharge times of the test cells should be less than 5.Unless noted otherwise, all tests are to be conducted at standard temperature which is(25±2)℃ and standard humidity which is (65±2)%. The room temperature mentioned in this specification means (25±2)℃.Unless otherwise specified, all tests shall apply pre-tightening force, with the clamping force ranging from 1000~3000N and the stress range of the whole life cycle 1000~20000N.

4.2 Test Equipment

a) Voltmeter Inner impedance>1000Ω per volt.

b) Slide caliper The slide caliper should have a scale of 0.02mm.

c)Impedance meter The impedance meter should be operated at AC 1kHz.

d) Electronic Scale The electronic scale should have a minimum scale of 0.001g.

4.3 Test Process and Specification

4.3.1 The room temperature charge method: (slow charging)

Cells are charged with Constant Current and Constant Voltage (CC/CV) method at the environment temperature of (25±2)℃.The constant current is 0.5I_1（A ）and the constant voltage is 3.65V, Charge shall be terminated when the charge current has tapered to 0.05 I_1（A ）, then store cells for 1h.

4.3.2 The room temperature charge method: (fast charging)

Cells are charged with Constant Current and Constant Voltage (CC/CV) method at the environment temperature of (25±2)℃.The constant current is 1I_1（A ）and the constant voltage is 3.65V, Charge shall be terminated when the charge current has tapered to 0.05 I_1（A ）, then store cells for 1h.

4.3.3 Other charging modes

Temperature/℃		0	5	10	15	20	25	30	40	45	50	55	60
SOC	0～80%	0.0	0.1	0.4	0.5	1.0	1.0	1.0	1.0	1.0	0.5	0.3	0
SOC	＞80%	0.0	0.1	0.4	0.5	0.8	0.8	0.8	0.8	0.8	0.5	0.3	0

4.3.4 Test Item and Specification

Test Item and Specification Should refer to table 2.

Number	Item	Test profile	Specification
1	Appearance and Dimension	1.Eyeballing` 2.Test cells' dimension with slide caliper	No Deep Scratch, No Transformation, No leakage
2	Weight	Electronic Scale	2450±100g
3	Open Circuit Voltage☆	Measure the open circuit voltage within 1h after charging cells per 4.3.2.	OCV≥3.35V
4	Nominal discharge capacity☆	Discharge cells at a 1I_1(A) current to 2.5V within 1h after charging cells per 4.3.2. Record the capacity. The cycle can repeat 5 times, when the capacity difference of 3 times continuously are less than 3%, the test can be terminated. Tack the average of last 3 discharge capacity.	1 I_1 Capacity ≥125Ah （The NEW BATTERY）
5	Maximum charge current at Room Temperature	Continuous: Charge cells per 4.3.2. Discharge cells to 2.5V at a 1I_1 (A) current. And record the capacity. Charge cells to 3.65V at a n I_1 (A) current, and then charge cells at constant voltage (3.65V) until the current has tapered to 0.05 I_1 (A). ("n" is an integer) 50%SOC: Charge cells per 4.3.2. Discharge cells 0.5h at a 1 I_1 (A) current. Charge cells to 3.65V in a n I_1 (A) current. ("n" is an integer)	1I_1 (A)(Continuous); 2 I_1 (A)(60s,50%SOC);
6	Maximum discharge current at Room Temperature	Continuous: Discharge cells at a 1 I_1 (A) current to 2.5V after charge cells per 4.3.2. And record the capacity. Charge cells per 4.3.2. Discharge cells in a n I_1 (A) current to 2.5V. ("n" is an integer). 50%SOC: Discharge cells at a 1 I_1 (A) current for 0.5h after charging cells per 4.3.2. Discharge cells to 2.5 V at a n I_1 (A) current. ("n" is an integer)	1 I_1 (A)(Continuous); 3 I_1 (A)(60s,50%SOC);
7	Cycle Life at Room Temperature☆	Charge cells per 4.3.2. Discharge cells to 2.5V at a constant current of 1I_1 (A). Discharge capacity shall be measured after 3000 cycles. Cells should be clamping (1000~3000N)during cycling.	500th Discharge Capacity ≥95% Nominal Capacity or 1000th Discharge Capacity ≥92% Nominal Capacity or 3000th Discharge Capacity ≥80% Nominal Capacity

8	Cycle Life at High Temperature☆	Charge cells per 4.3.2. Discharge cells to 2.5V at a constant current of $1I_1$ (A). Discharge capacity shall be measured after 1500 cycles. Cells should be clamping (1000~3000N) during cycling.	1500th Discharge Capacity ≥80% Nominal Capacity (500th Discharge Capacity ≥90% Nominal Capacity ）
9	Charge Retention☆	After charging per 4.3.2, store the testing cells for 30 days at the environment temperature of (25±2) ℃, then discharge the cells to 2.5V at a 1 I_1 (A) current. Record the discharge capacity. Charge cells per 4.3.2. Discharge the cells to 2.5V at a $1I_1$ (A)current. Record the recovery capacity.	Capacity Retention ≥96.5%（25℃）
10	Charge Retention☆	After charging per 4.3.2, store the testing cells at (60±2)℃ for 7 days, then discharge the cells to 2.5V at a 1 I_1 (A) current. Record the discharge capacity. Charge cells per 4.3.2. Discharge the cells to 2.5V at a $1I_1$ (A)current. Record the recovery capacity.	Capacity Recovery ≥95%（60℃）
11	Characteristics at high temperature	Cells shall be charged per 4.3.2 and store for 5h at （60±2）℃, then discharge to 2.5V at $1I_1$(A) and measure the capacity.	Residual capacity≥99% of Nominal capacity
12	Characteristics at low temperature	Cells shall be charged per 4.3.2 and store for 24h at （-20±2）℃, then discharge to 2.0V at $1I_1$(A) and measure the capacity。	Residual capacity≥70% of Nominal capacity
13	Short-circuit Test★	Cells, charged per 4.3.1, with thermocouples，shall be short circuited 10 minutes in fuming cupboard by connecting the positive and negative terminals through the external wires. And the resistance of external wires will be less than 5mΩ. Observe 1h.	No Explosion, No Fire
14	Overcharge Test★	After charged per 4.3.1, test cells (with thermocouple) shall be overcharged with a sort of method below: 1st Method: Charge test cells at 1 I_1 (A), and stop test when the voltage reached 1.5 times of end voltage. Observe 1h. 2nd Method: Charge test cells at 1 I_1 (A), then stop the test when the charge time reached 1h. Observe 1h.	No Explosion, No Fire
15	Over Discharge test★	Cell shall be charged per 4.3.1. Discharge cells at a 1 I_1 (A) current for and stop the test when the discharge time reached 90 min. Observe 1h.	No Explosion, No Fire, No leakage

16	Thermal Test★	After charged per 4.3.1,Put cells (with thermocouple) into the oven, then close the door of it The oven temperature shall be raised at a rate of 5℃ ±2℃/min to a temperature of （130±2）℃, the cells shall remain at this temperature for 30min. Then, stop the test and observe 1h.	No Explosion, No Fire
17	Crush Test★	After charged per 4.3.1, crush the cells vertically at the speed of (5±1) mm/s until cells'deformation reach to 30% or the voltage tapered to 0V, or the press reach to 200kN. Observe 1h.	No Explosion, No Fire
18	Drop Test★	Charge cells per 4.3.1. Then drop cells from a height of 1.5m to the concrete ground. Cells shall be dropped with the terminals down.	No Explosion, No Fire, No leakage
19	Temperature cycling	Charge cells per 4.3.1.put the cell into the temperature box, adjust the time and temperature according to Table 3, circulate for 5 times and observe 1h.	No Explosion, No Fire, No leakage

Table 3

Temperature ℃	Time increment min	Cumulative time min	Rate of Temperature change ℃/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

5.Caution

5.1 Charge

a) NO over-charge， the charge voltage should not be over 3.65V.

b) NO reverse charging

c) The charge temperature range is 0℃~ 60℃.Charging will stop when any part of the battery reaches 60℃.

d) Optimal charge temperature range is 15℃ ~ 35℃。Do not charge for a long time in outsidethe optimal temperature range.

5.2 Discharge

a) No short circuit

b) The end of discharge voltage must be over 2.0V.

c) The discharge temperature range is -30℃~ 60℃.Charging will stop when any part of the battery reaches 60℃.

d) Optimal discharge temperature range is 15 ℃~ 35℃. Do not discharge for a long time in outsidethe optimal temperature range.

5.3 Put cells away from children.

5.4 Storage and Usage

a) For any short time storage (in one month), cell should be in a clean and dry area（humidity ≤65% RH） and at -40℃ ~+45℃ at 20~40%SOC .

b) For any long time storage (in 6 month), cell should be in a clean and dry area（humidity ≤65% RH） and at -20℃ ~+35℃ at 20~40%SOC.

c）During the course of storage or usage, keep the cells upright .

6. Warning

6.1 Avoid overheat in any circumstances.Don’t modify or disassemble the battery. It will be dangerous, and may cause ignition, heating, leakage or explosion.

6.2 Don’t put cells in overheat circumstances or disposed in fire ,don’t put cells under the sunshine.

6.3 Don’t short-circuit positive(+) and negative(-) terminals. Keep away from metal or other conductive materials. Jumbling the batteries of direct contact with positive(+) and negative(-) terminals or other conductive materials may cause short-circuit and may even cause fire and explosion.

6.4 Don’t reverse the positive (+) and negative (-) terminals.

6.5 Don’t put cells in water or other conductive liquids or let cells absorb amoisture.

6.6 Don’t impact cells excessively.

6.7 Don’t solder the battery directly. Excessive heating may cause deformation of the battery components such as the gasket, which may lead to the battery swelling,leakage, explosion,or ignition.

6.8 Don’t use abnormal cell which has damages by shipping stress, drop, short or something else, and which gives off electrolyte odor.

6.9 Don’t contact cans directly or with other conductive materails during the using process.

6.10 Keep away form static circumstances during storage and using.

6.11 Don’t use cells together with other one-shot batteries and secondary batteries. Don’t use cells together with different packages, types and brands.

6.12 Stop using and process the cells accordingly when the following circumstances happened：getting hot sharply, smelling, changing colors, deformation or others.

6.13 If there is leaked electrolyte from batteries, please scrub it away with fresh water to avoid any skin discomfort.

7. Disclaimer

If customers need to use or operating cells beyond the specified range of this file, please contact Tianjin Lishen Battery Joint-Stock Co., Ltd. Manufacturer will not be responsible for trouble caused by using cells beyond the specified range of this file.

Manufacturer will not be responsible for trouble occurred by matching electric circuit, cell pack and charger.

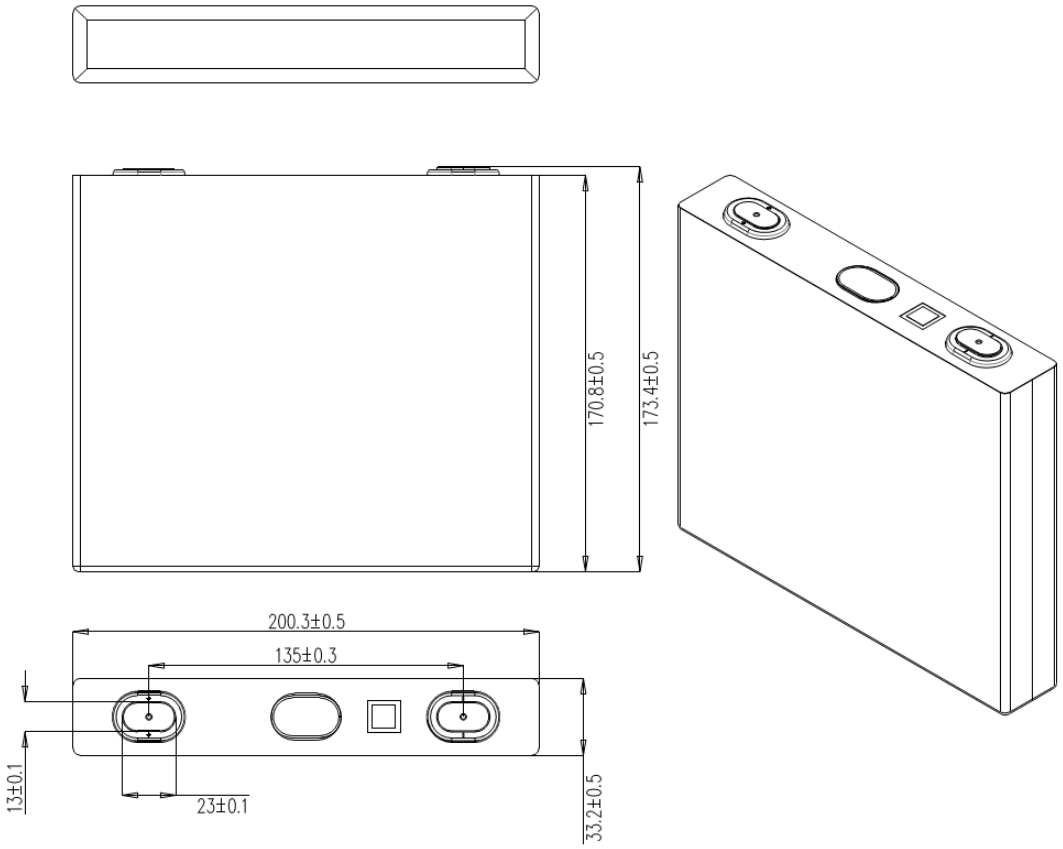
Manufacturer will be exempt from warrantee any defect cells during assembling after acceptance.

8. Shipping

8.1 During transportation, keep the battery from acutely vibration, impacting, insolation, drenching.

8.2 The delivery battery should be at a 20%～40% charged state.

Attached drawing 1



Remarks：The size（Measurement under 3000N）of the cell includes outer gasket and blue film.