文控

产品规格书

锂离子动力电池 LP44147272-130Ah

天津力神电池股份有限公司

www.lishen.com.cn

产品规格书

1 适用范围

本规格书适用于天津力神电池股份有限公司生产的 LP44147272-130Ah 锂离子电池。

2 常规指标

2.1 符号说明

C_3——3h 率额定容量(A·h)。

I_3——3h 率放电电流，其数值等于 C_3/3(A)。

本规格书中 $3I_3$(A)=130A。

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	LP44147272
3	标称容量☆	130Ah (≥125Ah, $1I_3$ A 放电)
4	标称电压☆	3.2V
5	内阻☆	≤1.0mΩ
6	重量	3425±100g
7	标准充电制式	恒流恒压充电 (CC/CV)
	电流	$1I_3$ A
	恒压电压	3.65V
	截止电流	6.5A
8	最大充电电流	3 I_3（连续）$6I_3$(10s)
	充电截止电压	3.65V
9	标准放电制式	连续放电(CC)
	电流	$1I_3$ A
	截止电压	2.0V
10	最大放电电流	$6I_3$（连续）$12I_3$(30s)
11	循环寿命	容量≥80% 标称容量@2000 次循环
12	最大工作范围	
	充电	0℃ ~45℃

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	放电	-20℃ ~ 60℃
13	最佳工作范围	
	充电	15℃ ~ 35℃
	放电	15℃ ~ 35℃
14	储存温度	
	1 个月	-40℃~ 45℃
	6 个月	-20℃ ~ 35℃
*电池处于 35%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

进货一个月内进行测试，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。

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

4.3 测试过程及其标准

4.3.1 充电制式

在环境温度（25±2）℃条件下，采用先恒流再恒压方式充电。恒流电流为以 $1I_3$(A)，恒压电压为 3.65V，在恒压过程中电流降到 6.5A 即可终止充电，静置 1 小时。

4.3.2 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	无漏液，尺寸见图纸

2	重量	天平	3425±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	标称放电容量☆	按 4.3.1 充电后 1 小时内以 $1I_3$(A)电流放电到放电终止电压 2.0V，并测容量。上述循环可以重复 5 次，当有 1 次循环容量符合要求时，试验即可终止。	$1I_3$(A)容量≥标称容量
5	3 I_3(A)放电容量	按 4.3.1 充电后，1 小时内放电直到放电终止电压，放电电流为 $3I_3$(A)，并记下时间或容量。	$3I_3$(A)容量≥90%标称容量
6	最大充电电流	按 4.3.1 充电后，以 $1I_3$(A)电流放电到放电终止电压 2.0V，并记录容量。以 3n(n 为整数)倍 I_3(A)恒流充至 3.65V，再以 3.65V 恒压充至 6.5A 截止。	$3I_3$(A)(连续); $6I_3$(A)(10s);
7	最大放电电流	按 4.3.1 充电后，以 $1I_3$(A)电流放电到放电终止电压 2.0V，并记录容量。以 $1I_3$(A)充电，以 3n(n 为整数)倍 I_3(A)放电至 2V。	$6I_3$(A)(连续); $12I_3$(A)(30s);
8	充放电循环寿命☆	充电：按 4.3.1 充电 放电：$1I_3$(A)电流恒流放电，80%DOD，每第 25 次放电 100%DOD，循环充放电 2000 次以上，记录容量。	剩余容量≥80%标称容量 或循环寿命≥2000 次
9	荷电保持能力☆	按 4.3.1 充电后，在环境温度（25±2）℃条件下开路搁置 30 天，再以 $1I_3$(A)电流恒流放电到放电终止电压 2.0V。 按 4.3.1 充电后，在温度（60±2）℃的高温箱中放置 7 天，然后以 $1I_3$(A)电流恒流放电至 2.0V，并记下容量。	容量≥90%标称容量
10	高温性能	按 4.3.1 充电后，在温度（60±2）℃的高温箱中放置 5h，然后以 $1I_3$(A)电流恒流放电至 2.0V，并记下容量。	容量≥95%标称容量
11	低温性能	按 4.3.1 充电后，在温度（-20±2）℃的低温箱中放置 20h，然后以 $1I_3$(A)电流恒流放电至 2.0V，并记下容量。	容量≥55%标称容量
12	密封性☆	将电池在进行荷电保持能力试验前和试验后分别用感量为 0.001g 的电子天平称重，计算电池失重量。	失重< 300 mg
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	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，以下面方式充电： 以 $3I_3$(A)电流充电，到电池电压达到 5V 或时间达到 90min(其中一个条件优先达到即停止试验)	电池不起火，不爆炸
15	过放试验★	按 4.3.1 充电后，在（25±2）℃下以 $1I_3$(A)电流放电，直至电池电压达到 0V 结束试验。	电池不起火，不爆炸 不漏液

16	热箱试验★	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℃±2℃/min），箱温达到（85±2）℃时保持 120min 后结束试验。	电池不起火，不爆炸
17	针刺试验★	按 4.3.1 充电后，将接有热电耦的电池放入通风厨中，用φ3mm～φ8mm 的耐高温钢针以 10mm/s～40mm/s 的速度，从垂直于电池极组的方向贯穿（钢针停留在电池中）	电池不起火，不爆炸
18	挤压试验★	按 4.3.1 充电后，垂直于电池极组的方向挤压电池至电池电压至 0V。	电池不起火，不爆炸
19	跌落试验★	按 4.3.1 充电后，在（25±2）℃下，从 1.5m 高度处自由跌落到厚度为 20mm 的硬木地板上，每个面一次。	电池不起火，不爆炸 不漏液

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) 建议最佳充电温度为 15℃-35℃，不宜在低于 15℃温度下长期充电。

5.2 放电

a)严禁短路。

b)放电电压不得低于 2.0 V。

c) 建议最佳放电温度为 15℃-35℃，不宜在高于 35℃温度下长期放电。

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 35%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 35%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 严禁加热电池；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 电池极柱连接扭矩严禁超过 15 N·m。

7 质量保证

电池在正常使用期半年内出现质量问题，且确由生产造成的，厂家将予以解决。但是，在此期限内，如果非电池制程原因而是客户的误用造成的电芯质量问题，公司不承诺免费更换。

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，并使电池处于半充满状态。

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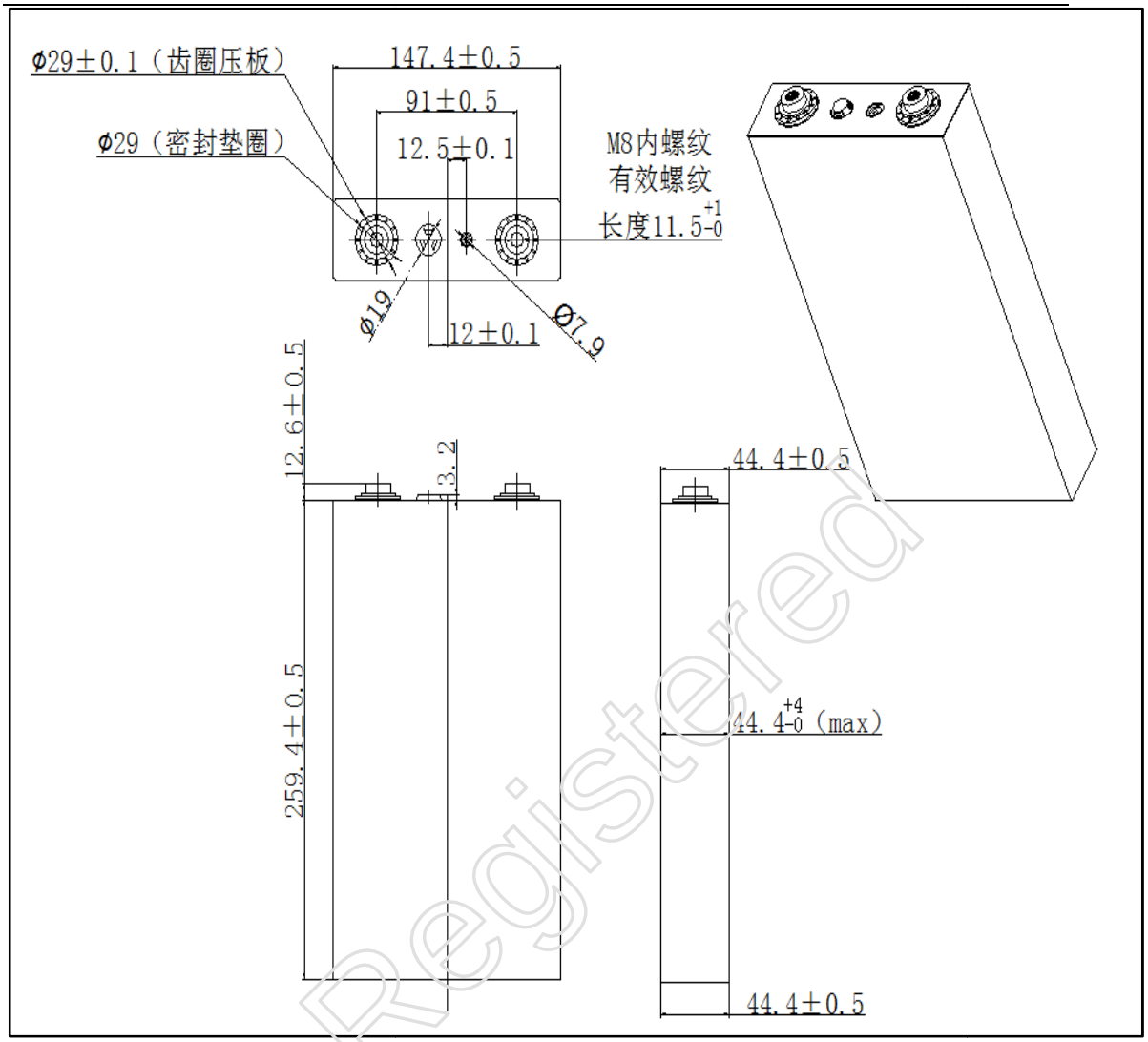


注：图中电芯尺寸为封装热塑套后尺寸

图 1 电池外形图

Product Specification

Lithium-ion Power Cell of LP44147272-130Ah

Tianjin Lishen Battery Joint-Stock 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 Tianjin Lishen Battery Joint-Stock Co.,Ltd.. Should there be any additional information required by the customer, customer are advised to contact Tianjin Lishen Battery Joint-Stock Co.,Ltd .

2. General Specifications

2.1 Abbreviation Definitions

C_3—— the rated capacity (in ampere-hours) of the cell for a three-hour discharge.

I_3——a current corresponding to the manufacturer's rated capacity (in ampere-hours) for a three-hour discharge.

$I_3 = C_3$ (Ah) / 3h

In below specification 3 I_3 (A)=130A.

2.2 Specification

	Item	Specification
1	Cell Type	Lithium -ion power cell
2	Cell Model	LP44147272
3	Nominal Capacity☆	130Ah (Min capacity:125Ah, Discharge at 1I_3A)
4	Nominal Voltage☆	3.2V
5	AC-impedance☆	≤ 1.0mΩ
6	Weight	3425±100g
7	Standard Charge Method	Constant Current and Constant Voltage (CC/CV)
	Current	1I_3 A
	Voltage	3.65V
	End Current	6.5A
8	Maximum Charge Current	3 I_3（Continuous）6I_3(10s)
	Charging Voltage	3.65V
9	Standard Discharge	Constant Current (CC)
	Current	1I_3 A
	End Voltage	2.0V
10	Maximum Discharge Current	6I_3（Continuous）12I_3(30s)
11	Cycle Life	Capacity≥80% Nominal Capacity @2000th cycles

12	Max Operating TemperatureRange	
	Charge	0℃ ~ 45℃
	Discharge	-20℃ ~ 60℃
13	OptimalOperating TemperatureRange	
	Charge	15℃ ~ 35℃
	Discharge	15℃ ~ 35℃
14	Storage Temperature	
	1 month	-40℃~ 45℃
	6 months	-20℃ ~ 35℃
*Cells should be stored at 35%SOC or the voltage is between 3.275V and 3.305V.		

3. Appearance and Dimension

There shall be no such defect as deep scratch, flaw, crack, rust, leakage, which may adversely affect commercial value of the cell.Dimension refer to the attached drawing 1.

4. Characteristics

4.1 Test Condition

Cells should be tested within a month after purchase 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)%.

4.2 Test Equipment

1) Voltmeter

Inner impedance>1000Ω per volt.

2) Slide caliper

The slide caliper should have a scale of 0.02mm.

3)Impedance meter

The impedance meter should be operated at AC 1kHz.

4.3 Test Process and Specification

4.3.1Charge method:

Cells are charged with Constant Current and Constant Voltage (CC/CV) method at the

environmenttemperature of (25±2)℃.The constant current is $1I_3$（A）and the constant voltage is 3.65V, Charge shall be terminated when the charge current has tapered to 0.15 I_3A, then store cells for 1h.

4.3.2 Test Item and Specification

Test Item and Specification Should refer to table 2.

Number	Item	Test profile	Specification
1	Appearance and Dimension	Look and test with slide caliper	No deep scratch, No leakage, dimension should refer to the attached drawing 1
2	Weight	Electronic Scale	3425±100g
3	Open Circuit Voltage☆	Measure the open circuit voltage within 1h after charge cells per 4.3.1.	OCV≥3.35V
4	Nominal capacity☆	Discharge cells at $1I_3$(A) to 2.0V within 1h after charge cells per 4.3.1. Andmeasure the capacity. The cycle can repeat 5 times, when the capacity of one cycle meet the requirement, the test can be terminated.	$1I_3$ capacity ≥ Nominal capacity
5	Discharge capacity at $3I_3$(A)	Discharge cells at $3I_3$(A) to 2.0V within 1h after charge cells per 4.3.1. And record the time or capacity.	$3I_3$ capacity ≥ 90% of ratedcapacity.
6	Maximum charge current	1、Discharge cells at $1I_3$(A) to 2.0V within 1h after charge cells per 4.3.1. And record the capacity； 2、Charge cells to 3.65V,charge shall be terminated when the charge current has tapered to 0.15I_3 A, the charge current is 3nI_3 (“n” is an integer).	$3I_3$ (A)(continuous); $6I_3$ (A)(10s);
7	Maximum discharge current	1、Discharge cells at $1I_3$(A) to 2.0V after charge cells per 4.3.1. And record the capacity； 2、Charge cells at $1I_3$ (A)，and discharge to 2V at 3nI_3 (“n” is an integer).	$6I_3$ (A)(continuous); $12I_3$ (A)(30s);
8	Cycle Life☆	Charge cells per 4.3.1. then Cells shall be discharged at $1I_3$ A to 80%DOD @ 25°C±2°C.	Discharge capacity (2000th Cycle) ≥80% of Nominal

		A cycle is defined as one charge and one discharge. Cells shall be discharged at a constant current of $1I_3$ A to 100% DOD @ 25°C±2°C every 25 cycles. Discharge capacity shall be measured after 2000 cycles.	Capacity
9	Charge Retention☆	1、After charge per 4.3.1. store the testing cells for 30 days at the environment temperature of （25±2）℃,then discharge to 2.0V at a $1I_3$(A) . 2、After charge per 4.3.1. store the testing cells at （60±2）℃ for 7 days, then discharge to 2.0V at $1I_3$(A) and measure the capacity.	Residual capacity≥90% of Nominal capacity
10	Characteristics at high temperature	Cells shall be charged per 4.3.1 and store for 5h at （60±2）℃, then discharge to 2.0V at $1I_3$(A) and measure the capacity.	Residual capacity≥95% of Nominal capacity
11	Characteristics at low temperature	Cells shall be charged per 4.3.1 and store for 20h at （-20±2）℃, then discharge to 2.0V at $1I_3$(A) and measure the capacity。	Residual capacity≥55% of Nominal capacity
12	Airproof Characteristics☆	Weighed the testing cells before and after the storage test with an electronic scale which has a minimum scale of 0.001g, and thencalculate the weight loss.	Loss of weight< 300 mg
13	Short-circuit Test★	Cell, charged per 4.3.1, shall be short circuited by connecting the positive and negative terminals of the cell with a copper wire having a maximum resistance≤5 mΩ for 10min.	No Explosion, No Fire
14	Overcharge Test★	After charged per 4.3.1, testcells (with thermocouple) shall be overcharged with the method below: Charge test cellsat $3I_3$(A), end test when the voltage reached 5V or the charge time reached 90min (test can be stopped when one of the conditions above reached first).	No Explosion, No Fire
15	Over Discharge test★	Discharge test cells at $1I_3$(A) to 0V after charge cells per 4.3.1.	No Explosion, No Fire, Noleakage

16	Thermal Test★	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 （85±2）℃, the cells shall remain at this temperature for 120min before the test is discontinued.	No Explosion, No Fire
17	Nail penetration Test★	After charged test cells per 4.3.1, put the cells with thermocouple into the fume hood,then penetrate completely the center of the largestside at the speed of 10-40mm per second by a Φ3.0-Φ8.0mmstainless steel nail.	No Explosion, No Fire
18	Crush Test★	After charged test cells per 4.3.1,crush the cells vertically untilthe voltage tapered to 0V。	No Explosion, No Fire
19	Drop Test★	A cell is charged in accordance with 4.3.1,then droppedfrom a height of 1500mm to a wooden board(20mmthick) which is placed on the concrete ground.Cells shall be dropped in each of three mutuallyperpendicular directions.	No Explosion, No Fire, Noleakage

5.Caution

5.1 Charge

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

b) NO reverse charging

c) Optimal chargetemperature range is 15℃ ~ 35℃。Do not charge for a long time in the temperature less than 15℃.

5.2 Discharge

a) No short circuit

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

c) Optimal dischargetemperature range is 15℃~ 35℃. Do not discharge for a long time in the temperature more than 35℃

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 35%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 35%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 overheatcircumstancesor 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 Don't twist the terminal post with the torque which is more than 15N • m.

7. Shipping

7.1 During transportation, keep the battery from acutely vibration, impacting, insolation,

drenching.

7.2 The delivery battery should be at a half charged state.

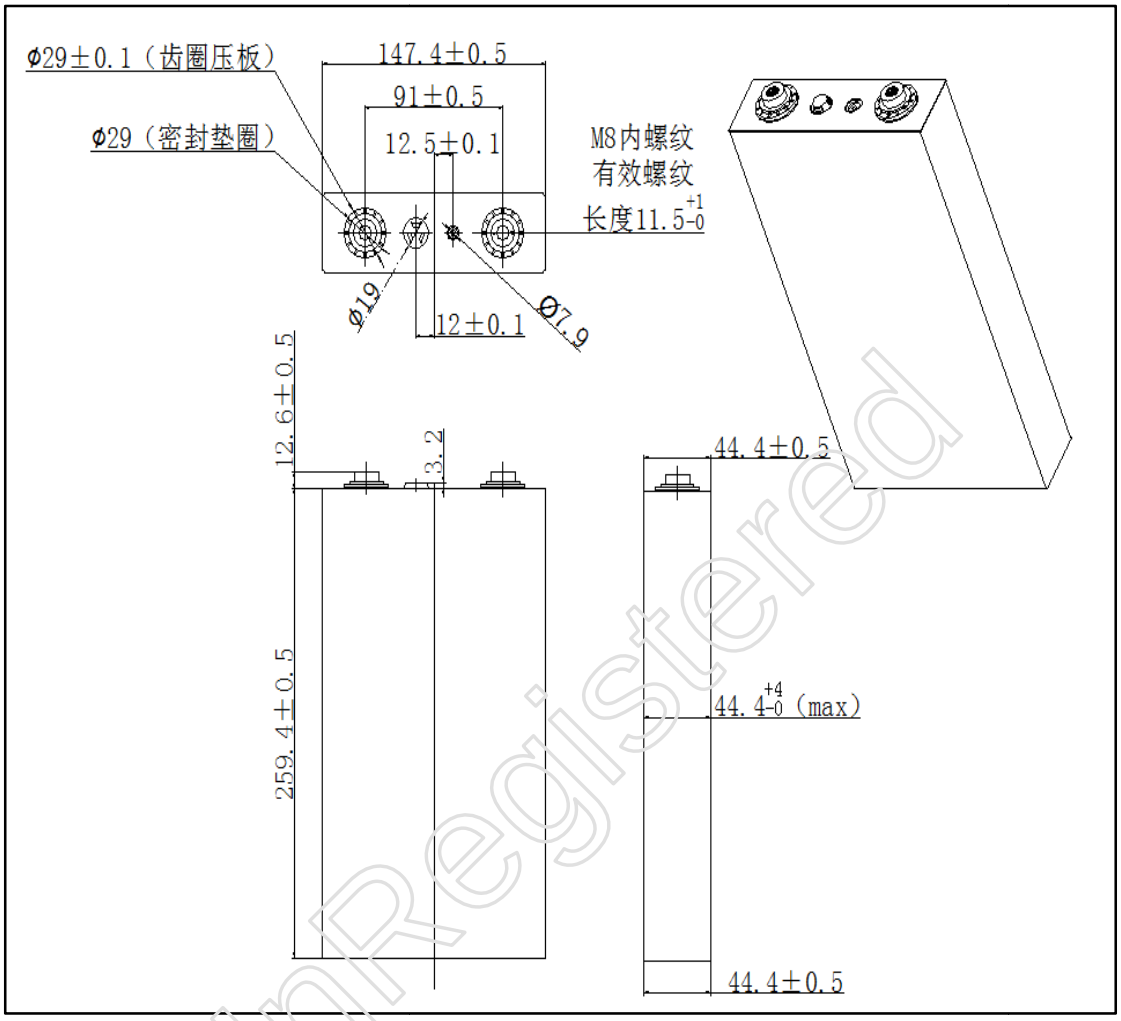
8. Others

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.

Attached drawing 1



Remarks： The size of drawing is the cell which in insulation sleeve