Product Specification

LP54173210-202Ah

力神动力电池系统有限公司

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1 Scope of application

This specification applies to the LP54173210-202Ah lithium iron phosphate battery produced by Lishen Power Battery System Co., Ltd.

2 conventional indicators

2.1 Explanation of symbols and abbreviations

C1 —— 1h rate rated capacity (Ah);

I1 —— 1h rate discharge current, its value is equal to C1(A);
In this specification, 1 I1 = 202 A.

SOC-state of charge
DOD-depth of discharge
2.2 Conventional indicators of the product

表 1

	Item	specification
1	Battery type	lithium iron phosphate battery
2	Battery model	LP54173210-202Ah
3	Nominal capacity☆	202Ah
4	Nominal voltage☆	3.2 V
5	AC internal resistance☆	≤0.4mΩ
6	Weight	3.9 ±0. 1kg
7	Maximum charge current at room temperature	0.5I1 (continuous) 1 I1 (30s)
8	Maximum charging current at low temperature	
	0℃ ~ - 10℃	0.3 I1
	-20℃ ~ - 10℃	0.2 I1
9	Charging voltage	3.65 V
10	Maximum discharge current at room temperature	0.5I1 (continuous) 1 I1 (30s)
11	Discharge termination voltage	2.5V （＞0℃) 2.0V (≤0℃)
12	Maximum operating temperature range:	Charging -20℃~55℃
		Discharge -30℃~55℃
13	Best working temperature range:	Charging 15℃～35℃
		Discharge 15℃～35℃
14	Storage temperature:	Within 1 month -40℃~45 ℃
		Within 6 months -20℃~35 ℃
*Battery voltage is 3.275V～3.304V, stored under 20%-40%SOC state		

3 Appearance and dimensions

The appearance and dimensions are shown in Figure 1.

4 performance

4.1 Test conditions

The test shall be carried out within one month after the purchase, and the number of cycles of charge and discharge shall not exceed five before the test. Unless otherwise specified, experiments and measurements must be carried out at standard temperature (25±2) ℃ and standard humidity (65±20)%. The room temperature mentioned in this specification refers to (25±2) ℃ .

4.2 Measuring equipment

a) Voltmeter

b) Vernier caliper

c) Internal resistance meter

d) Balance
Internal resistance>1000 Ω/V

The accuracy is 0.02 mm

Measured at AC 1kHz
Accuracy 0.001g

4.3 Test process and standards

4.3.1 Charging mode

At room temperature, when charging with 1/3 I1(A) current constant current to the final voltage of 3.65V, switch to constant voltage charging, the constant voltage is 3.65V, and stop charging when the charge termination current drops to 0.05 I1(A). Then let it stand for 1 hour.

4.3.2 Test items and standards

See Table 2 for specific test items and standards.

No.	Item	Test Procedure	Standard
1	Appearance and size	Visual inspection and vernier caliper	measurement No obvious artificial scratches, no deformation, no leakage, the size is shown in the drawing
2	Weight	electronic balance	3.9 ±0. 1kg
3	Open circuit voltage☆	According to 4.3.1, measure the open circuit voltage within 1 hour after charging	≥ 3.350V
4	Nominal discharge capacity ☆	After charging according to 4.3.1, discharge with 0.5 I1 (A) current to the discharge end voltage of 2.5V within 1 hour, and measure the capacity. The above cycle can be repeated 5 times. When the range of 3 consecutive test results is less than 3% of the rated capacity, the test can be terminated early and the average of the last 3 test results is taken.	0.5 I1 (A)capacity≥202Ah
5	Room temperature Maximum charging current	Continuous: After charging according to 4.3.1, discharge with 0.5 I1 (A) current to the final voltage of 2.5V, and measure the capacity; charge with n I1 (A) constant current to 3.65V, and then charge with 3.65V constant voltage Cut-off to 0.05 I1. 50%SOC: After charging according to 4.3.1, discharge with 0.5 I1 (A) current for 1h, and charge with n I1 (A) constant current. The cut-off voltage is 3.65V.	1 I1 (A)(continuous); 2 I1 (A)(30s， 50%SOC)
6	Low temperature Maximum charging current	After charging according to 4.3.1, discharge with 0.5 I1 (A) current to the final voltage of 2.0V, and measure the capacity; put the battery in a thermostat at the corresponding temperature for 24h, and charge with n I1 (A) constant current To 3.65V, then charge at a constant voltage of 3.65V to 0.05 I1 cut-off.	0℃~- 10℃ 0.3I1 - 10℃~-20℃ 0.2I1
7	Room temperature Maximum discharge current	Continuous: After charging according to 4.3.1, discharge with 0.5 I1 (A) current to the final voltage of 2.5V, and measure the capacity; according to 4.3.1 charge, discharge with n I1 (A) to 2.5V to cut off. 50%SOC: After charging according to 4.3.1, discharge with 0.5 I1 (A) for 1h, discharge with n I1 (A), and the cut-off voltage is 2.5V.	1 I1 (A)(continuous); 2 I1 (A)(30s, 50%SOC)
8	Cycle life☆	After charging according to 4.3.1; put it aside for 1h; discharge to 2.5V with a constant current of 0.5 I1 (A); put it aside for 1h. Cycle charge and discharge more than 2000 times, and measure the discharge capacity. The battery is cyclically tested in the clamped state.	500 cycles, discharge capacity ≥ 187.86Ah (93% of nominal capacity); or 1000 cycles, discharge capacity ≥ 175.74Ah (87% of nominal capacity); or 2000 cycles, discharge capacity ≥161.6Ah (80%)

7	Room temperature Maximum discharge current	Continuous: After charging according to 4.3.1, discharge with 0.5 I1 (A) current to the final voltage of 2.5V, and measure the capacity; according to 4.3.1 charge, discharge with n I1 (A) to 2.5V to cut off. 50%SOC: After charging according to 4.3.1, discharge with 0.5 I1 (A) for 1h, discharge with n I1 (A), and the cut-off voltage is 2.5V.	1 I_1 (A)(continuous); 2 I_1 (A)(30s， 50%SOC)
8	Cycle life☆	After charging according to 4.3.1; put it aside for 1h; discharge to 2.5V with a constant current of 0.5 I1 (A); put it aside for 1h. Cycle charge and discharge more than 2000 times, and measure the discharge capacity. The battery is cyclically tested in the clamped state.	500 cycles, discharge capacity ≥ 187.86Ah (93% of nominal capacity); or 1000 cycles, discharge capacity ≥ 175.74Ah (87% of nominal capacity); or 2000 cycles, discharge capacity ≥161.6Ah （80%）。

9	Room temperature charge retention and capacity recovery ☆	After charging according to 4.3.1, leave it open for 28 days at ambient temperature (25±2) ℃, and then discharge at a constant current of 0.5 I1 (A) to the final voltage of 2.5V, and Measure the charge retention capacity.Charge according to 4.3.1, discharge at a constant current of 0.5 I1 (A) to the discharge termination voltage of 2.5V, and measure the recovery capacity.	Charge retention rate ≥ 92% 容量 Capacity recovery rate ≥ 95%
10	High temperature charge retention and capacity recovery ☆	After charging according to 4.3.1, leave it open for 7 days at ambient temperature (60±2) ℃, and then discharge at a constant current of 0.5 I1 (A) to the final discharge voltage of 2.5V, And measure the charge retention capacity. Charge according to 4.3.1, discharge at a constant current of 0.5 I1 (A) to the discharge termination voltage of 2.5V, and measure the recovery capacity.	Charge retention rate ≥ 92% Capacity recovery rate ≥ 95%
11	High temperature performance	After charging according to 4.3.1, place it in a high temperature box at (60±2)℃ for 5h, then discharge to 2.5V at a constant current of 0.5 I1 (A), and measure the discharge capacity.	capacity≥95% initial capacity
12	Low temperature performance	After charging according to 4.3.1, place it in a low-temperature box at (-20±2)℃ for 24h, then discharge to 2.0V at a constant current of 0.5 I1 (A), and measure the discharge capacity.	capacity ≥ 75% initial capacity
13	Short circuit test ★	After charging according to 4.3.1, put the battery connected with the thermocouple into a short circuit in the hood, and the battery will be short-circuited through an external circuit with a circuit resistance of less than 5mΩ for 10 minutes ; observe for 1 hour.	The battery does not catch fire or explode
14	Overcharge test★	After charging according to 4.3.1, perform an overcharge test on the battery connected to the thermocouple, and charge it in any of the following ways: a) Charge with a current of 1 I1 (A), stop the experiment when the battery voltage reaches 1.5 times the end-of-charge voltage, and observe for 1 hour. b) Charge with 1 I1 (A) current, stop the test after the charging time reaches 1h, and observe for 1h.	The battery does not catch fire or explode

15	Over-discharge test★	After charging according to 4.3.1, discharge at 1 I1 (A) for 90 minutes; observe for 1 hour.	The battery does not fire, does not explode, does not leak
16	Hot box test ★	Put the battery connected with the thermocouple in the thermostat, close the door, turn on the thermostat to heat, and monitor the temperature change in the thermostat (the heating rate of the thermocouple is 5℃ /min), and the box temperature reaches (130 ±2) End the test after keeping it at ℃ for 30min; observe for 1h.	The battery does not catch fire or explode
17	Squeeze test	After charging according to 4.3.1, squeeze the battery at a speed of (5±1)mm/s perpendicular to the battery pole plate. The squeeze plate is in the form of a semi-cylindrical body (radius 75mm, longer than the squeezed The size of the battery), the battery voltage reaches 0V, the deformation reaches 30%, or the squeezing force reaches 200kN, stop squeezing; observe for 1h.	The battery does not catch fire or explode
18	Drop test★	After charging according to 4.3.1, at (25±2)℃, drop the positive and negative terminals of the battery freely from a height of 1.5m to the concrete floor.	The battery does not fire, does not explode, does not leak

5 matters needing attention

5.1 Charging

a) Overcharging is strictly prohibited, and the charging voltage shall not be higher than 3.65V.

b) Reverse charging is strictly prohibited.

c) The charging temperature range is -20℃~55℃.

d) It is recommended that the best charging temperature is 15℃~35℃.

5.2 Discharge

a) Short circuit is strictly prohibited.

b) The discharge voltage must not be lower than 2.0 V.

c) The discharge temperature range is -30℃~60℃.

d) It is recommended that the best discharge temperature is 15℃~35℃.

5.3 Keep batteries away from children

5.4 Storage

Short-term storage (within 1 month) The battery should be placed in a clean environment with a humidity lower than 65%RH, a temperature of -40℃~45℃, and a charged state of 20-40% SOC.
Long-term storage (within 6 months) The battery should be placed in a clean environment with a humidity lower than 65%RH, a temperature of -20℃~35℃, and a charged state of 20-40% SOC.

6 Warning

6.1 Before use, you should read the specification in detail and have a sufficiently deep understanding of the warnings and precautions in it.

6.2 It is strictly forbidden for the battery to overheat; it is strictly forbidden to modify or disassemble the battery; these actions are very dangerous and may cause the battery to catch fire, leak or explode.
6.3 It is strictly forbidden to expose the battery cell to extremely hot environment or throw it into fire, and do not place the battery in direct sunlight.

6.4 It is strictly forbidden to directly connect the positive and negative poles of the battery with metal or other wires to form a path. This will cause the battery to short-circuit, which may cause the battery to catch fire or even explode.

6.5 It is strictly forbidden to use the positive and negative poles upside down.

6.6 It is strictly forbidden to immerse the battery cell in water or other conductive liquid, or make it absorb moisture.

6.7 It is strictly forbidden to subject the battery cell to excessive mechanical shock.

6.8 It is strictly forbidden to weld the battery directly. Overheating may cause deformation of battery components (such as gaskets), which will cause the battery to swell, leak, catch fire or even explode.
6.9 It is strictly forbidden to use batteries that are squeezed, dropped, short-circuited, leaked and other abnormal problems during transportation.

6.10 The battery case is positively charged. It is strictly forbidden to connect the negative pole of the battery and the battery case directly to form a path during use. This will cause the battery to short circuit, which may cause the battery to catch fire or even explode.

6.11 The battery should be stored and used in a place away from static electricity.

6.12 It is forbidden to use the battery with other primary or secondary batteries, and do not use it with batteries of different packages, different models or other brands.

6.13 If the battery suddenly becomes hot, emits an odor, discolors, deforms, or other reactions during use, charging, discharging, or storage, the battery should be stopped immediately and treated accordingly.

6.14 If the battery leaks on the skin or clothing, please rinse it with clean water immediately to avoid skin discomfort.

7 Transport

During transportation, avoid severe vibration, shock, sun and rain.
During transportation, the battery should be charged at 10~50% SOC.

8 other

If the customer needs to operate or apply the battery cell under the conditions outside of this document, please consult Lishen Company for related matters. The company does not assume any responsibility for accidents caused by using the battery cell outside the conditions stated in this document.
The company does not assume any responsibility for problems caused by improper use of single cells with circuits, battery packs, and chargers.
In the process of cell assembly after shipment, the defective cells caused by processing are not included in the scope of quality assurance.

Figure 1 Simple outline drawing ofthe battery