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|  | 杭州力奥科技有限公司                        | DOC No.       |
|   | Hangzhou LIAO Technology Co., LTD | LA-WI-TD-5005 |

# Lithium-ion Rechargeable Battery Pack Product Specification

**Product Name:** LiFePO<sub>4</sub> Li-ion Battery Pack

**Model No.:** LAXpower-12105

**Specification No.:** 12V/105Ah

**Issue Date:** 2021-07-21

|             |               |             |
|-------------|---------------|-------------|
| Prepared By | Checked by    | Approved by |
| Di Wan      | Xingqian Shen | Zen Huang   |

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### 1、Scope

This specification describes the performance, testing method, warning and caution of the LiFePO<sub>4</sub> Li-ion battery pack supplied by Hangzhou LIAO Technology Co., LTD.

### 2、Battery Module Structure



| Item                       | Specification (mm)         |
|----------------------------|----------------------------|
| L                          | 330                        |
| W                          | 173                        |
| H1                         | 220                        |
| Charge/Discharge port type | M8                         |
| Communication mode         | Bluetooth App              |
| Serial Module numbers      | Max. 4                     |
| Parallel Module numbers    | Max. 6 (Voltage range 1V ) |

### 3、Single Battery Module Performance

| Item  | Specification | Remark       |
|---|---------------|--------------|
| 3-1 Nominal Capacity                                | 105±5%Ah      | 0.2C, 25±3℃. |
| 3-2 Nominal Voltage                                 | 12.8V         |              |
| 3-3 Cycle Life(DOD-80% under controlled conditions) | >2000         |              |
| 3-4 Battery Charge Temperature                      | 0~45℃         |              |
| 3-5 Normal Charge Voltage CV/CC                     | 14.6V         |              |



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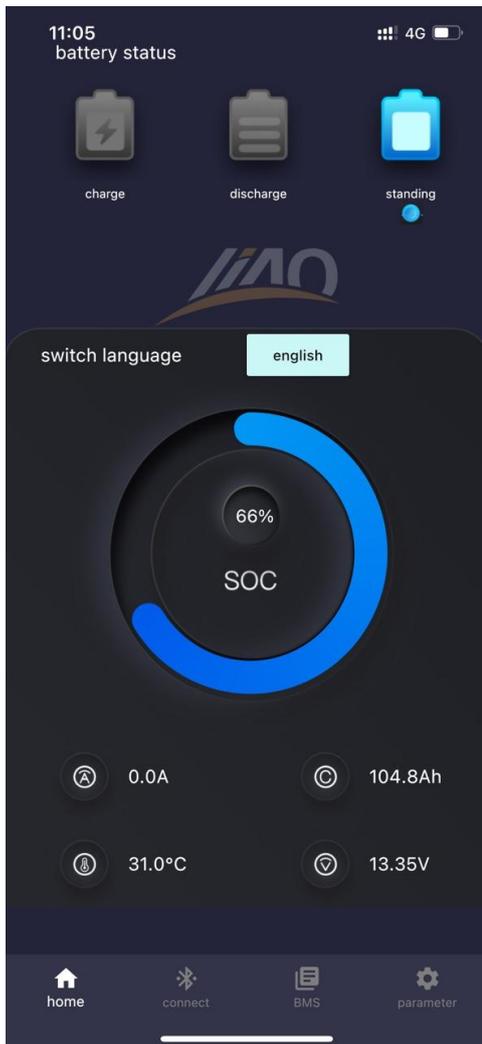
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|---|---------------------|----|
| 3-6 Standby(Float) Voltage                            | 13.8V               |    |
| 3-7 Maximum Charge Current                            | 50A                 |    |
| 3-8 Recommended Charge Current for Maximum Life       | 20A                 |    |
| 3-9 Battery Discharge Temperature                     | -20~60℃             |    |
| 3-10 Battery Output Voltage Range                     | 10~14.6V            |    |
| 3-11 Maximum Discharge Current                        | 100A                |    |
| 3-12 Pulse Discharge Current                          | 120A                | 2S |
| 3-13 Discharge Cut-off Voltage                        | 10V                 |    |
| 3-14 Over-charge Protection Per Cell                  | 3700mv              |    |
| 3-15 Over-charge Release Per Cell                     | 3350mv              |    |
| 3-16 Over-charge Release Method                       | Discharge           |    |
| 3-17 Over-Discharge Protection Per Cell               | 2500mv              |    |
| 3-18 Over-Discharge Release Per Cell                  | 3000mv              |    |
| 3-19 Over-Discharge Release Method                    | Charge              |    |
| 3-20 Discharge Over Current Protection                | 102A                |    |
| 3-21 Discharge Over Current Protection Response Time  | 2S                  |    |
| 3-22 Discharge Over Current Protection Release Method | Disconnect the load |    |
| 3-23 Battery Discharge Over Temperature Protection    | 60℃                 |    |
| 3-24 Battery Discharge Low Temperature Protection     | -20℃                |    |
| 3-25 Battery Charge Over Temperature Protection       | 50℃                 |    |
| 3-26 Battery Charge Low Temperature Protection        | -10℃                |    |

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|   |                 |  |
|---|-----------------|--|
| 3-27 Short Circuit Protection Current       | 700A            |  |
| 3-28 Short Circuit Protection Response Time | 300us           |  |
| 3-28 Enter to Sleep                         | Standby for 24h |  |
| 3-29 Sleep wake up method                   | Charge          |  |
| 3-28 Self-discharge Rate                    | 10%/month       |  |
| 3-29 Weight                                 | 10.7±0.2kg      |  |
| 3-30 Storage Temperature & Humidity range   | -10~45℃         |  |

#### 4、Bluetooth APP



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## 5、Performance Data

### 5.1 Environment Characteristics

| NO. | Item  | Criterion  | Test Methods   |
|-----|---|--|--|
| 1   | Constant temperature and constant humidity test | No fire, no explosion, no leakage. discharge capacity is not less than 60% nominal capacity. | After standard charge, test condition as follows:<br>Temperature: 40±5℃<br>Relative Humidity: 90-95%RH<br>Storage Time:48Hours<br>Then return to room temperature for 2 hours, discharge to cut-off Voltage at 15A.  |
| 2   | Vibration test                                  | No fire, no explosion, no leakage.   | After standard charged, fix the cell to vibration table, then subjected to vibration test for 30 minutes per axis of XYZ axes.<br>Frequency rate: 1oct/min<br>Vibration frequency: 10Hz-30Hz<br>Excursion (single amplitude): 0.38mm<br>Vibration frequency: 30Hz-55Hz<br>Excursion (single amplitude): 0.19mm |
| 3   | Shock test                                      | No fire, no explosion, no leakage.   | After standard charged, test condition:<br>Acceleration:100m/s <sup>2</sup><br>Pulse lasting time: <16ms<br>Shock times: 1000±10 times   |
| 4   | Drop test                                       | No fire, no explosion e, no leakage.   | Drop the battery in the shipment condition from 1m height onto 5cm or thicker concrete with p-tile on it 3 times each of X, Y and Z directions.  |

### 5.2 Safety Performance

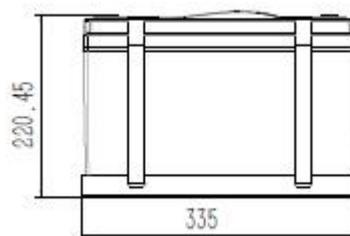
| No | Item             | Criterion             | Test Method   |
|----|------------------|-----------------------|---|
| 1  | Over-charge test | No fire, no explosion | Charge in accordance with the following two ways(Choosing one between the two).<br>(1)Charge at 1C current for 90min or until voltage of certain single battery reaches 5.0V(stop test when fulfills either condition).<br>(2)Charge at 3C current until the voltage of certain single battery reaches 10.0V, then stop the test. |
| 2  | Over-discharge   | No fire, no explosion | Charge the battery. Place at 20±5℃ for 1h, then discharge in 1/3C current at the same temperature   |

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|   |                    |                       |   |
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|   | test               |                       | until certain cell's voltage is 0V (if there are electronic protection circuit, remove it temporarily).   |
| 3 | Heating test       | No fire, no explosion | After standard charged, the battery is to be heated in a gravity convection or circulating air oven. The temperature of the oven is to be raised at a rate of $(5\pm 2)^{\circ}\text{C}/\text{min}$ to a temperature of $150^{\circ}\text{C} \pm 2^{\circ}\text{C}$ , keep that temperature for 30 minutes before the test is discontinued. |
| 4 | Short circuit test | No fire, no explosion | After standard charged, the battery shall be subjected to a short-circuit condition with a wire of resistance less than $3\text{m}\Omega$ for 1 hour. Temperature less than $115^{\circ}\text{C}$ .   |
| 5 | Prick test         | No fire, no explosion | After standard charged, hitting from the direction perpendicular to the series batteries with a nail of 3~8mm diameter and more than 90 mm in length, nail pierces through at least three parallel batteries. Keep the nail in the batteries for at least 1h.   |
| 6 | Impact test        | No fire, no explosion | After standard charged, the battery is to be placed on a flat surface, A 10Kg weight is to be dropped from a height of 1m onto the battery.   |
| 7 | Squeeze test       | No fire, no explosion | After standard charged, Put the battery between two squeeze plates of the Extrusion equipment, then increase pressure to 13kN, hold on for 1 min. The squeeze direction is on the direction perpendicular to arranged battery.  |

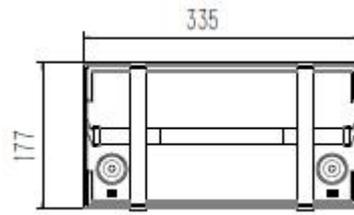
## 6. Outside View

SIDE

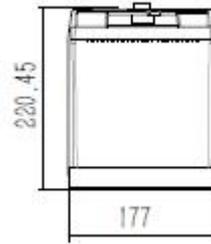


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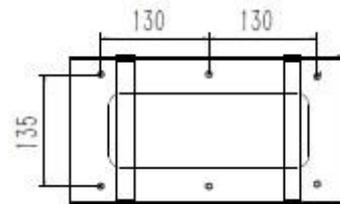
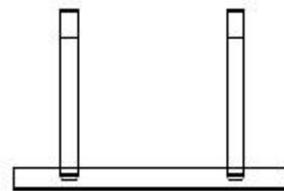
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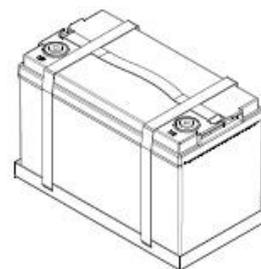


TRAY &  
STRAP



12V105Ah with

Tray & strap



## 7.Storage and Transportation

### 7.1 Storage

When the battery pack to be long-term stored, charge the battery pack to about 50% capacity,store in dry and ventilated place, charge and discharge once for every 3 months.

### 7.2 Transportation

The battery pack and charger should be packaged for transport, prevent excessive vibration, shock or extrusion in transport process and prevent the sun and rain. The battery pack can be transported by cars, trains, ships, aircraft and other vehicles etc.

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## 8、Battery Handling Precautions

- \* Forbid to immerse battery in water or get wet!
- \* Don't charge, use and store battery near a heat source such as fire and heater! If the battery leaks or releases strange odor, please remove it from place near fire place immediately. Fully charge the battery before first-time using.
- \* Forbid to reverse the positive and negative pole!
- \* Forbid to throw the battery pack into fire or heat it!
- \* Forbid to short-circuit battery with wire or other metal objects!
- \* Forbid to nail, knock or trample battery!
- \* Forbid to disassemble the battery and battery pack in any way!
- \* Forbid to put the battery into microwave oven or pressure vessel!
- \* If the battery pack gives off odor, gets heat, deformation, discoloration or appears any abnormal phenomenon, stop using it; please remove the battery from electrical appliances and stop using it, when the battery is being used or charged!
- \* Forbid to use battery pack in a very hot environment, such as under direct sunlight or in car on hot day. Otherwise, the battery pack will overheat, which will affect battery performance and shorten battery life!
- \* If the battery leaks and electrolyte leakage enters into the eyes, do not rub, rinse with water immediately and seek immediate medical assistance. If not in time, eyes will be hurt!
- \* Ambient temperature will affect the discharge capacity, if the ambient temperature is beyond the standard environment (25±5),°C the discharge capacity will drop!

### **Special Considerations:**

- \* During charging, if there is odor and unusual noise, immediately stop charging.
- \* During discharging, if there is odor, unusual noise, immediately stop discharging.
- \* If there are above phenomenon, please contact the manufacturer, do not disassemble by yourself.

## 9、Product Liability

- 9.1 The warranty term of the battery pack is according to the contract.
- 9.2 We assume no responsibility for the accident of not operating in accordance with the specification.
- 9.3 If the contents of this specification changed because of improving product quality or upgrading technical parameters, we will not give notice. For the latest product information, please feel free to contact us as following:

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