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|--------------------|----------------------|----------------|------|-------------|--------------|
| <b>Document No</b> | CEBA1868130-3.2V10AH | <b>Version</b> | A/00 | <b>Page</b> | <b>1 / 8</b> |
|--------------------|----------------------|----------------|------|-------------|--------------|

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# **Specification**

## **For**

### **LiFePO<sub>4</sub> Rechargeable Cell**

**Cell Type : CEBA1868130-10AH**

|                 |                  |                     |           |
|-----------------|------------------|---------------------|-----------|
|                 | CEBA1868130-10AH | <b>Revised date</b> | 2015-8-12 |
| <b>Version</b>  | A/00             | <b>Pages</b>        | 8         |
| <b>Approved</b> | <b>Checked</b>   | <b>Designed</b>     |           |
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|                    |                      |                |      |             |              |
|--------------------|----------------------|----------------|------|-------------|--------------|
| <b>Document No</b> | CEBA1868130-3.2V10AH | <b>Version</b> | A/00 | <b>Page</b> | <b>2 / 8</b> |
|--------------------|----------------------|----------------|------|-------------|--------------|

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## Contents

|            |                                                                 |
|------------|-----------------------------------------------------------------|
| <b>1</b>   | <b>preface</b>                                                  |
| <b>2</b>   | <b>Definition</b>                                               |
| <b>2.1</b> | <b>Rated capacity</b>                                           |
| <b>2.2</b> | <b>Standard charge method</b>                                   |
| <b>2.3</b> | <b>Standard discharge method</b>                                |
| <b>3</b>   | <b>Cell dimensions</b>                                          |
| <b>4</b>   | <b>Cell characteristics</b>                                     |
| <b>5</b>   | <b>Technical requirements</b>                                   |
| <b>5.1</b> | <b>Cell usage conditions</b>                                    |
| <b>5.2</b> | <b>Cell testing conditions</b>                                  |
| <b>5.3</b> | <b>Requirement of the testing equipment</b>                     |
| <b>5.4</b> | <b>Electrochemical characteristics</b>                          |
| <b>5.5</b> | <b>Environmental characteristics and safety characteristics</b> |
| <b>6</b>   | <b>Shipment</b>                                                 |
| <b>7</b>   | <b>Warranty</b>                                                 |
| <b>8</b>   | <b>Storage and Shipment Requirement</b>                         |
| <b>9</b>   | <b>Warning and cautions in handling the lithium-ion cell</b>    |

| Document No | CEBA1868130-3.2V10AH | Version | A/00 | Page | 3 / 8 |
|-------------|----------------------|---------|------|------|-------|
|-------------|----------------------|---------|------|------|-------|

## 1 preface

This specification describes the type and dimension, performance, technical characteristics, warning and caution of the LiFePO<sub>4</sub> rechargeable cell. The specification only applies to 3.2V CEBA1868130-10AH cell supplied by EnnoPro Group Limited.

## 2 Definition

### 2.1 Rated capacity:

Rated capacity Cap=10Ah. Under  $25 \pm 3^{\circ}\text{C}$ , the capacity obtained when a cell is discharged at 5-hours rate to voltage 2.5 V, which is signed Cap, the unit is Ah.

### 2.2 Standard charge method

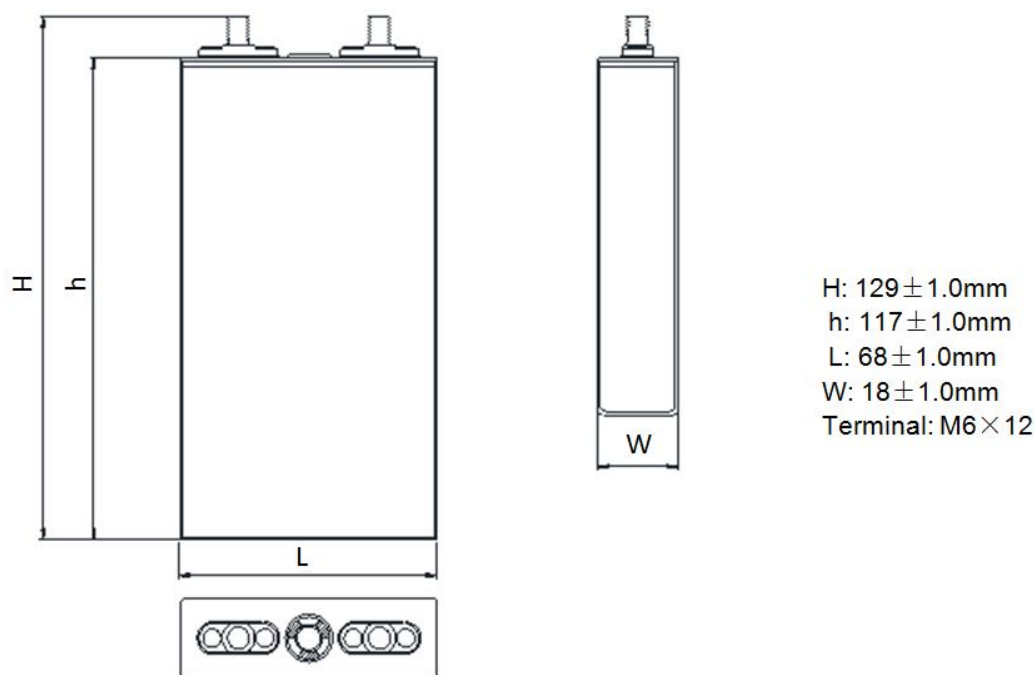
Under  $25 \pm 3^{\circ}\text{C}$ , it can be charged to 3.65V with constant current of 0.5C, and then, charged continuously with constant voltage of 3.65V until the charged current is 0.01C.

### 2.3 Standard discharge method:

Under  $25 \pm 3^{\circ}\text{C}$ , it can be discharged to 2.5 V with constant current of 0.2C .

## 3 Cell dimension

Cell physical dimension (unit: mm).



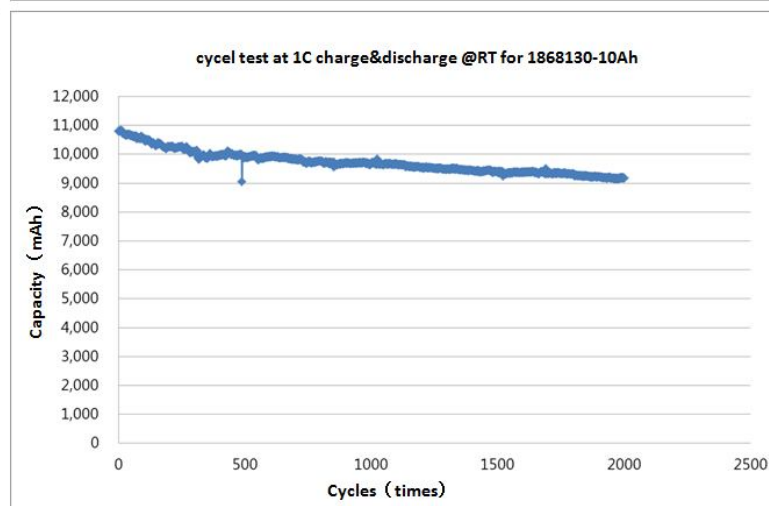
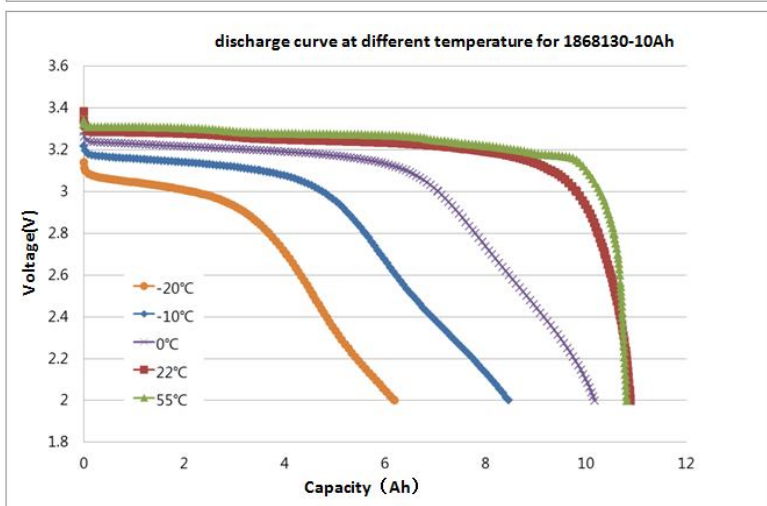
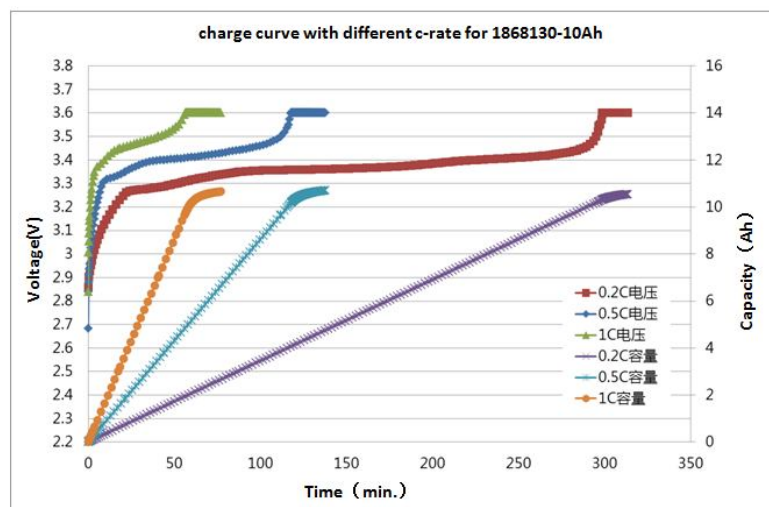
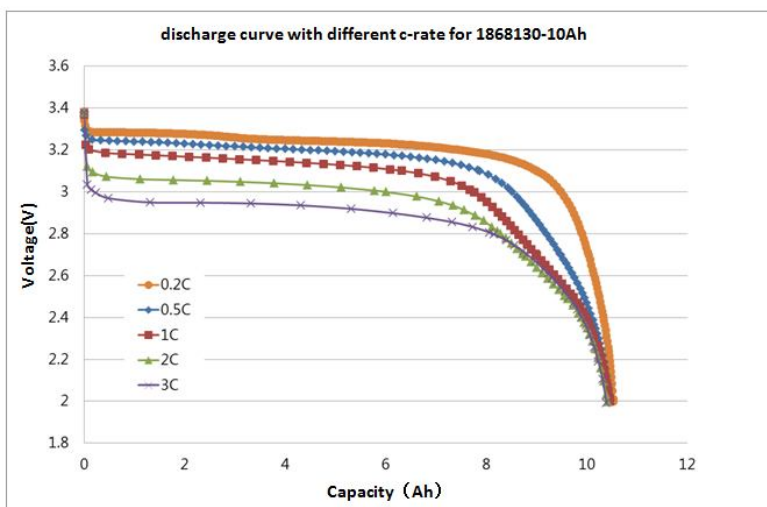
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|--------------------|----------------------|----------------|------|-------------|--------------|
| <b>Document No</b> | CEBA1868130-3.2V10AH | <b>Version</b> | A/00 | <b>Page</b> | <b>4 / 8</b> |
|--------------------|----------------------|----------------|------|-------------|--------------|

#### 4 Cell characteristics

Fresh cell tested at  $25\pm3^{\circ}\text{C}$ , standard charge and discharge unless otherwise specified

| ITEM                          | SPECIFICATION                                                                                                                               |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Nominal capacity              | 10Ah@0.2C                                                                                                                                   |
| Minimum capacity              | 10Ah@0.2C                                                                                                                                   |
| Nominal voltage               | 3.2 V                                                                                                                                       |
| Charge voltage ( End current) | 3.65 V (0.05C)                                                                                                                              |
| Energy density                | 107Wh/Kg                                                                                                                                    |
| Discharge ending voltage      | 2.5 V                                                                                                                                       |
| Max charge current            | 1C $45^{\circ}\text{C} > T \geq 0^{\circ}\text{C}$                                                                                          |
| Max discharge current         | 3C $60^{\circ}\text{C} > T \geq -20^{\circ}\text{C}$                                                                                        |
| Storage temperature and time  | 1month ( 1 个月): $-20\sim60^{\circ}\text{C}$<br>3month ( 3 个月): $-20\sim45^{\circ}\text{C}$<br>12month ( 12 个月): $-20\sim25^{\circ}\text{C}$ |
| Internal resistance           | $\leq 15\text{ m}\Omega$ (AC Impedance, at 1000 Hz)                                                                                         |
| Cell dimension                | Height : 130.0 mm Max<br>Width : 69.0mm Max<br>Thickness: 19.0mm Max                                                                        |
| Weight                        | Approx. 310g                                                                                                                                |

| Document No | CEBA1868130-3.2V10AH | Version | A/00 | Page | 5 / 8 |
|-------------|----------------------|---------|------|------|-------|
|-------------|----------------------|---------|------|------|-------|



## 5 Technical requirements

### 5.1 Cell usage conditions

Temperature of charge: 0~45℃

Temperature of discharge 放电温: -20~60℃

### 5.2 Cell testing conditions

Unless otherwise specified, all tests stated according to following:

Temperature: 25±3℃

### 5.3 Requirement of the testing equipment:

Voltage meter: The voltage tester internal resistance is  $\geq 10\text{ K}\Omega$

Temperature meter: The precision is  $\leq 0.5^\circ\text{C}$

| Document No | CEBA1868130-3.2V10AH | Version | A/00 | Page | 6 / 8 |
|-------------|----------------------|---------|------|------|-------|
|-------------|----------------------|---------|------|------|-------|

#### 5.4 Electrochemical Characteristics

Fresh cells, tested at  $25 \pm 3^{\circ}\text{C}$ , standard charge and discharge unless otherwise specified.

| NO. | ITEM                                       | CRITERION                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | Discharge rate capability                  | Test condition:<br>Temperature : $25 \pm 3^{\circ}\text{C}$<br>Charge: CC/CV at 0.5C to 3.65V, cut off current: 0.05C<br>Discharge: CC at different rate; End-of-discharge Voltage: 2.5V<br>discharge capacity at 0.5C/discharge capacity at 0.2C $\geq 95\%$<br>discharge capacity at 1.0C/discharge capacity at 0.2C $\geq 90\%$<br>discharge capacity at 2.0C/discharge capacity at 0.2C $\geq 80\%$                                        |
|     | Cycle life                                 | Test condition:<br>Temperature : $25 \pm 3^{\circ}\text{C}$<br>Charge: CC/CV at 0.5C to 3.65V, cut off current: 0.05C, Discharge: CC 0.5C;<br>End-of-discharge Voltage: 2.5V, till 2000th Cycle, Discharge capacity $\geq 80\%$ initial capacity                                                                                                                                                                                               |
|     | High-Low temperature discharge performance | Test condition:<br>Charge: CC/CV at 0.5C to 3.65V, cut off current: 0.05C<br>Discharge: CC at 0.5C; End-of-discharge Voltage: 2.5V<br>Discharge Capacity at $-10^{\circ}\text{C}$ /discharge Capacity at $25^{\circ}\text{C} \geq 55\%$<br>Discharge Capacity at $0^{\circ}\text{C}$ /discharge Capacity at $25^{\circ}\text{C} \geq 75\%$<br>Discharge Capacity at $60^{\circ}\text{C}$ /discharge Capacity at $25^{\circ}\text{C} \geq 95\%$ |
|     | Storage performance                        | Test condition:<br>Charge: CC/CV at 0.5C to 3.65V, cut off current: 0.01C; stored at $25^{\circ}\text{C}$ for 30 days<br>Discharge: CC at 0.5C; End-of-discharge Voltage: 2.5V,<br>Residual capacity after 30 days storage/ initial capacity $\geq 90\%$<br>Recover capacity after 30 days storage/ initial capacity $\geq 95\%$                                                                                                               |

#### 5.5 Environmental characteristics and safety characteristics

Comply with ROHS standard

#### 6 Shipment

The cell voltage should not be less than 3.2V when shipped or in accordance with customers' requirement. The remaining capacity before charging will depend on the storage time and conditions.

|                    |                      |                |      |             |              |
|--------------------|----------------------|----------------|------|-------------|--------------|
| <b>Document No</b> | CEBA1868130-3.2V10AH | <b>Version</b> | A/00 | <b>Page</b> | <b>7 / 8</b> |
|--------------------|----------------------|----------------|------|-------------|--------------|

## 7 Warranty

The Warranty period of cell is made according to business contract. However, even though the problem occurs within this period, Legend won't replace a new cell for free as long as the problem is not due to the failure of Legend manufacturing process or is due to customer's abuse or misuse.

Legend will not be responsible for trouble occurred by handling outside of the precautions in instructions.

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

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

## 8 Storage and Shipment Requirement

| Item                                                                                                                                                                      |                                | Requirement                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-------------------------------|
| Storage environment                                                                                                                                                       | Short period less than 1 month | -20°C ~ +60°C , 90%RH<br>Max  |
|                                                                                                                                                                           | Long period more than 3 month  | -10°C ~ + 45°C , 90%RH<br>Max |
|                                                                                                                                                                           | Recommend storage              | -10°C ~ + 25°C , 85%RH<br>Max |
| Long time storage :<br>If the cell is stored for a long time, the cell's storage voltage should be 3.3-3.4V .Also, it is recommended to charge the cell every six months. |                                |                               |

## 9 Warning and cautions in handling the lithium-ion cell

Lithium-Ion rechargeable batteries subject to abusive conditions can cause damage to the cell and/or personal injury. Please read and observe the standard cell precautions below before using utilization.

Note 1. The customer is required to contact Legend in advance, if and when the customer needs other applications or operating conditions than those described in this document.

Note 2. Legend will take no responsibility for any accident when the cell is used under other conditions than those described in this Document.

### Warning

Danger warning (it should be described in manual or instruction for users, indicated especially) to prevent the possibility of the battery from leaking, heating, explosion. Please observe the following precautions:

Don't immerse the battery in water and seawater. Please put it in cool and dry environment if no using.

Don't use and leave the cell near a heat source such as fire or heater.

Do not use or leave the cell under the blazing sun (or in heated car by sunshine).

| Document No | CEBA1868130-3.2V10AH | Version | A/00 | Page | 8 / 8 |
|-------------|----------------------|---------|------|------|-------|
|-------------|----------------------|---------|------|------|-------|

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Being charged, using the battery charger specifically for that purpose.

Don't reverse the positive and negative terminals

Do not disassemble or modify the cell.

Do not use the cell with conspicuous damage or deformation..

Don't connect the cell to an electrical outlet directly.

Don't discard the cell in fire or heater.

Do not short circuit, over-charge or over-discharge the cell.

Don't transport and store the cell together with metal objects such as necklaces, hairpins.

Do not use lithium ion battery and others different lithium battery model in mixture.

Keep the battery away from babies.

Don't strike, throw or trample the cell.

Prohibition of use of damaged cells.

Battery pack designing and packing Prohibition injury batteries.

The battery replacement shall be done only by either cells supplier or device supplier and never be done by the user.

Be aware discharged batteries may cause fire; tape the terminals to insulate them.

Do not use it in a location where is electrostatic and magnetic greatly, otherwise, the safety devices may be damaged, causing hidden trouble of safety.

Do not directly solder the battery and pierce the battery with a nail or other sharp object.

Do not recommend series and parallel connection (not cylinder battery), Otherwise, do that after grouping.

When disposing of secondary cells, keep cells of different electrochemical systems separate from each other.

### **Caution**

Do not use or leave the battery at very high temperature conditions (for example, strong direct sunlight or a vehicle in extremely hot conditions). Otherwise, it can overheat or fire or its performance will be degenerate and its service life will be decreased.

If the cell leaks and the electrolyte get into the eyes, don't wipe eyes, instead, thoroughly rinse the eyes with clean running water for at least 15 minutes, and immediately seek medical attention. Otherwise, eyes injury can result.

If the cell gives off an odor, generates heat, becomes discolored or deformed, or in any way appear abnormal during usage, recharging or storage, immediately remove it from the device or cell charger and stop using it.

In case the battery terminals are dirt, clean the terminals with a dry cloth before use. Otherwise power failure or charge failure may occur due to the poor connection with the instrument.