	<b>Prismatic LiFePO4 Battery</b>	
	<b>Model</b>	<b>Specifications</b>
	<b>IFpP40130200-100</b>	<b>LFP 100Ah Grade A</b>

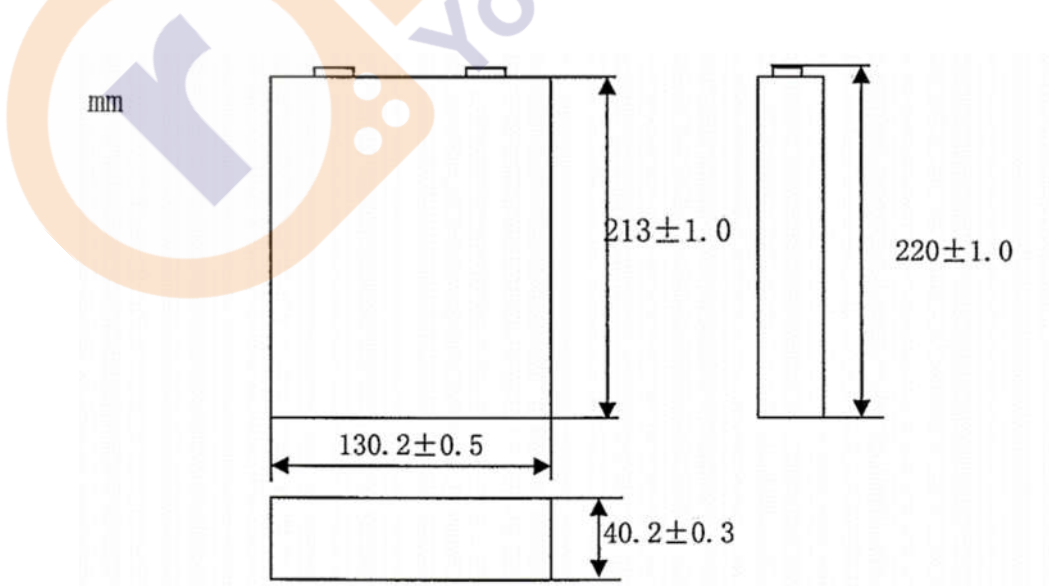
### 1. Scope


This document describes the product specification of the Lithium-ion Phosphate rechargeable cell mentioned above.

### 2. Specifications:

No.	Items	Specifications
1	Charge Voltage	3.65V
2	Nominal Voltage	3.2V
3	Rated Capacity (discharge at 0.5C to voltage of 2.5V at 23°C±5°C)	100Ah
4	Rated Charge-discharge Energy	300Wh
5	Standard Charge-discharge Power	150W
6	Max. Charge Power	300W
7	Max. Discharge Power	Under the conditions of 25°C±2°C, Discharging at 600W for 30s at 100% SOC
8	Discharge cut-off voltage	2.5V
9	Operating Temperature Relative Humidity%	Charging: 0°C-45°C, 65%±20%RH Discharging: -20°C-60°C, 65%±20%RH
10	Recommended Storage Temperature	15°C-35°C
11	Cell Weight	Approx. 2.25 Kg
12	Impedance	≤0.6 mΩ
13	Cell Dimension	Thick: 40.2 mm ± 0.3 mm Width: 130.2 mm ± 0.5 mm Length: 220.0 mm ± 1.0 mm

### 3. Batter Cell Drawing (All units in mm, not in scale) :



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	<b>IFpP40130200-100</b>	<b>LFP 100Ah Grade A</b>

#### 4. Battery Cell Performance Criteria and Test Conditions:

##### 4.1 Standard environmental test conditions

Unless otherwise specified, all tests stated in this datasheet are conducted at below conditions:

Temperature: 23°C±5°C,

Relative Humidity: 65%±20%.

##### 4.2 Electrical characteristics:

No.	Items	Test Methods and conditions	Criteria
1	Initial Charging Method	Rest for 5 hours under the conditions of 25°C ± 5°C, 150W constant power discharge to 2.5V; then rest for 30min, 150W constant charge to 3.65V; rest for 30min.	Charge Power = 150W
2	Initial Discharging Method	Rest for 5 hours under the conditions of 25°C ± 5°C, 150W constant power discharge to 3.65V; then rest for 30min, 150W constant charge to 2.5V; rest for 30min.	Discharge Power = 150W
3	Initial Impedance	Internal resistance is measured at AC 1KHz within 1 hour after standard charge.	≤0.6mΩ
4	Cell Voltage	Battery state upon shipment	≥3.0V
5	CC-CV Charging method	Under the conditions of 25°C ± 5°C, 0.5C Constant current charge of 3.65V, then Constant voltage 3.65V charge till charge current decline to ≤ 0.05C	Charge Current = 50A
6	Initial charge-discharge Energy	1) After initial discharge, the cell shall be charged at a constant power of 150W to the cutoff charge voltage 3.65V, rest for 30 minutes. 2) The cell shall be discharged at a constant power of 150W to the cutoff discharge voltage 2.5V, rest for 30 minutes. 3) Repeat steps 1 & 2 three times, record the average value of charge-discharge energy.	≥300Wh Energy Efficiency ≥ 93%
7	High Temperature Charge-discharge performance	1) After initial discharge, the cell shall be stanced for 5h at the temperature (45 ± 2)°C, then the cell shall be charged at a constant power of 150W to the cutoff charge voltage 3.65V at the temperature (45 ± 2)°C, rest for 30 minutes. 2) The cell shall be discharged at a constant power of 150W to the cutoff discharge voltage 2.5V under the temperature of (45 ± 2)°C, rest for 30 minutes.	Charge-discharge Energy≥99% Initial Charge-discharge Energy Energy Efficiency ≥ 90%
7	Low Temperature Charge-discharge performance	1) After initial discharge, the cell shall be stanced for 5h at the temperature (5 ± 2)°C, then the cell shall be charged at a constant power of 150W to the cutoff charge voltage 3.65V at the temperature (5 ± 2)°C, rest for 30 minutes.	Charge Energy≥80% Initial Charge Energy Discharge Energy ≥ 75% Initial Discharge Energy Energy Efficiency ≥ 75%



### Prismatic LiFePO4 Battery

**Model**  
**IFpP40130200-100**

**Specifications**  
**LFP 100Ah Grade A**

		2) The cell shall be discharged at a constant power of 150W to the cutoff discharge voltage 2.5V under the temperature of $(5 \pm 2)^\circ\text{C}$ , rest for 30 minutes.	
8	Energy Retention and Recovery at Room Temperature	After initial discharge, the cell shall be stored at the temperature $25 \pm 5^\circ\text{C}$ for 28 days. Discharge at the constant power of 150W to 2.5V at the room temperature. This discharge energy is energy retention. The cell shall be charged at Charge the constant power of 150W to 3.65V at the room temperature, then rest for 30min; This charge energy is charge energy recovery. Discharge at the constant power 150 to 2.5V. This discharge energy is discharge energy recovery.	Energy Retention $\geq 90\%$ Charge-discharge Energy Recovery $\geq 92\%$ Initial Charge-discharge Energy $\geq 92\%$
9	Energy Retention and Recovery at High Temperature	After initial discharge, the cell shall be stored at the temperature $45^\circ\text{C} \pm 2^\circ\text{C}$ for 7 days. Then rest for 5h at the temperature of $25\text{C} \pm 2^\circ\text{C}$ Discharge at the constant power of 150W to 2.5V at the room temperature. This discharge energy is energy retention. The cell shall be charged at Charge the constant power of 150W to 3.65V at the room temperature, then rest for 30min; This charge energy is charge energy recovery. Discharge at the constant power 150 to 2.5V. This discharge energy is discharge energy recovery.	Energy Retention $\geq 90\%$ Initial Discharge Energy $\geq 90\%$ Charge-discharge Energy Recovery $\geq 92\%$ Initial Charge-discharge Energy $\geq 92\%$
10	Storage Performance	After initial charge, energy discharged at a constant power of 150W reaches to 50% initial discharge energy; The cell shall be stored for 28 days at the temperature of $(45 \pm 2)^\circ\text{C}$ ; The rest for 5h, charged at a constant power of 150W to cutoff charge voltage 3.65V; Rest for 30min, discharged at a constant power of 150W to cutoff discharge voltage 2.5V at the room temperature.	Charge-discharge Energy Recovery $\geq 90\%$ Initial Charge-discharge Energy $\geq 90\%$
11	Cycle Life	Charge: The cell shall be charged at Charge the constant power of 150W to 3.65V, rest for 30 mins. Discharge: 150W discharge to 2.5V, one cycle is finished, then rest for 30 mins. Then repeat above steps, when capacity is less than 80% of initial capacity, the battery life is over.	$\geq 5000$ cycles
12	Rate charge-discharge Performance	1) After initial discharge, the cell shall be charge at constant power (150W) to cutoff charge voltage 3.65V, then rest for 30min; 2) The cell shall be discharge at constant power(150W) to cutoff discharge voltage 2.5V, then rest for 30min; 3) The cell shall be charge at constant power(300W) to cutoff charge voltage 3.65V, then rest for 30min;	1) Charge Energy at constant power (300W) $\geq 95\%$ of Charge Energy at constant power (150W); 2) Discharge Energy at constant power (300W) $\geq 95\%$ of Discharge




**Prismatic LiFePO4 Battery**

Model	Specifications
<b>IFpP40130200-100</b>	<b>LFP 100Ah Grade A</b>

		<p>4) The cell shall be charge at constant power(150W) to cutoff charge voltage 3.65V, then rest for 30min;</p> <p>5) The cell shall be discharge at constant power(300W) to cutoff discharge voltage 2.5V, then rest for 30min;</p> <p>6) The cell shall be discharge at constant power(150W) to cutoff discharge voltage 2.5V, then rest for 30min;</p> <p>7) The cell shall be charge at constant power(600W) to cutoff charge voltage 3.65V, then rest for 30min;</p> <p>8) The cell shall be charge at constant power(150W) to cutoff charge voltage 3.65V, then rest for 30min;</p> <p>9) The cell shall be discharge at constant power(600W) to cutoff discharge voltage 2.5V, then rest for 30min;</p> <p>10) The cell shall be discharge at constant power(150W) to cutoff discharge voltage 2.5V, then rest for 30min;</p> <p>11) The cell shall be charge at constant power(300W) to cutoff charge voltage 3.65V, then rest for 30min;</p> <p>12) The cell shall be discharge at constant power(300W) to cutoff discharge voltage 2.5V, then rest for 30min;</p> <p>13) The cell shall be discharge at constant power(150W) to cutoff discharge voltage 2.5V, then rest for 30min;</p> <p>14) The cell shall be charge at constant power(600W) to cutoff charge voltage 3.65V, then rest for 30min;</p> <p>15) The cell shall be discharge at constant power(600W) to cutoff charge voltage 2.5V, then rest for 30min;</p>	<p>Energy at constant power (150W);</p> <p>3) Charge Energy at constant power (600W) <math>\geq 90\%</math> of Charge Energy at constant power (150W);</p> <p>4) Discharge Energy at constant power (600W) <math>\geq 90\%</math> of Discharge Energy at constant power (150W);</p> <p>5) Energy Efficiency at constant power (150W) <math>\geq 90\%</math></p> <p>6) Energy Efficiency at constant power (300W) <math>\geq 86\%</math></p> <p>7) Energy Efficiency at constant power (600W) <math>\geq 80\%</math></p>
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	<b>Prismatic LiFePO4 Battery</b>	
	<b>Model</b>	<b>Specifications</b>
	<b>IFpP40130200-100</b>	<b>LFP 100Ah Grade A</b>

### 4.3. Safety Performance:

#### 4.3.1. Battery Cell Safety Performance:

No.	Items	Test Methods & Conditions	Criteria
1	Overcharge	Full charge cell shall be charged at constant current of 1C to 5.5V, or suspend the test after one hour.	No Fire, No Explosion.
2	Overfall	<p>Cell – Discharged cell shall be discharged at constant current of 1C to -3.65V, or suspend the test after 90min.</p> <p>Battery – One full discharged battery is connected in series with four fully charged cells forming the battery pack. The battery pack is to be short circuited with a resistance load of <math>80 \pm 20 \text{ m}\Omega</math>, until it has reached completely discharge state of less than 0.2V and the battery case temperature has returned to <math>\pm 10^\circ\text{C}</math> of ambient temperature.</p>	No Fire, No Explosion.
3	Short Circuit Test	<p>Cell – Fully charge cell be stored in an ambient temperature of <math>55^\circ\text{C} \pm 5^\circ\text{C}</math> for 4h. While still in an ambient temperature of <math>55^\circ\text{C} \pm 5^\circ\text{C}</math>, the cell is short-circuited with a total external resistance of <math>80 \pm 20 \text{ m}\Omega</math>. The cell remains on test for 24 h or until the surface temperature declines by 20% of the maximum temperature rise, whichever is sooner.</p> <p>Battery – A fully discharged battery is then short-circuited with a total external resistance of <math>80 \pm 20 \text{ m}\Omega</math> in the room temperature. The battery remains on test for 24h or until the case temperature of battery declines by 20% of the maximum temperature rise, whichever is the sooner.</p>	No Fire, No Explosion.
4	Continuous Charging at constant voltage	Fully charged cells shall be charged using CC (constant current)-CV(constant voltage) to 4V for 7 days.	No Fire, No Explosion.
5	Crush Test	The cells wide and narrow surface shall be crushed at speed of $(5 \pm 1) \text{ mm/s}$ and the crushing is to be continued until an applied force of $13 \pm 0.78 \text{ kN}$ . Once the maximum force has been obtained it is to be kept for 10min.	No Fire, No Explosion, No leakage.
6	Vibration Test	Cells, fully charged, shall be firmly secured to the platform of the vibration machine. Test batteries shall be subjected to sinusoidal vibration according to Table 1. This cycle shall be repeated 12 times for a total of	No leakage, No venting, No disassembly, No rupture and No fire during the test and after



**Prismatic LiFePO4 Battery**

Model	Specifications
<b>IFpP40130200-100</b>	<b>LFP 100Ah Grade A</b>

		approximately 3h for each of three mutually perpendicular mounting positions. One of the directions shall be perpendicular to the terminal face.	the test and if the open circuit voltage of each test cell after testing in its perpendicular mounting position is not less than 90% of its voltage immediately prior to this procedure
7	Mechanical Shock	Cells, fully charged, shall be subjected to three shocks in each direction of three mutually perpendicular mounting positions of the battery for a total of 18 shocks. For each shock, the parameters given in Table 2 shall be applied.	No leakage, No venting, No disassembly, No rupture and No fire during the test and after the test and if the open circuit voltage of each test cell after testing in its perpendicular mounting position is not less than 90% of its voltage immediately prior to this procedure
8	Impact Test	A cell is to be placed on a flat surface. A 15.8±0.1 mm diameter bar is to be placed across the center of the sample. A 9.1±0.46 kg weight is to be dropped from a height of 610±25mm onto the sample (wide and narrow planes both shall be tested).	No Fire, No Explosion
9	Burning Test	Each cell is to be placed on a screen that covers a 102-mm (4 in) diameter hole in the center of a platform table. The screen is to be constructed of steel wire mesh having 20 openings per inch (25.4 mm) and a wire diameter of 0.017 in (0.43 mm). An eight-sided covered wire cage, 610-mm (2-ft) across and 305-mm (1-ft) high, made from metal screening is to be placed over the test sample. The metal screening is to be constructed from 0.25-mm (0.010-in) diameter aluminum wire 16-18 wires per inch (25.4 mm) in each direction. The cell is to be heated and shall remain on the screen until it explodes or the cell or battery has ignited and burned out.	No part of an exploding cell shall penetrate the wire screen such that some or all of the cell protrudes through the screen
10	Temperature Cycling Test	Fully charged cells are to be stored for at least 12 h at a test temperature equal to 75±2°C, followed by storage for at least 12 h at a test temperature extreme in 30 minutes. This procedure is to be repeated until 10 total cycles are complete after which all test cells and batteries are to be stored for 24h at ambient temperature (20 ± 5°C)	No leakage, No venting, No disassembly, No rupture and No fire during the test and after the test and if the open circuit voltage of each test cell after testing in its perpendicular mounting position is not less than 90% of its



## Prismatic LiFePO4 Battery

**Model**

**Specifications**

**IFpP40130200-100**

**LFP 100Ah Grade A**

			voltage immediately prior to this procedure.
11	Thermal abuse	Each fully charged cell is placed in a gravity or circulating air-convection oven, in an ambient temperature of $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ , for 1h. The oven temperature is raised at a rate of $5^{\circ}\text{C}/\text{min} \pm 2^{\circ}\text{C}/\text{min}$ to a temperature of $130^{\circ}\text{C} \pm 2^{\circ}\text{C}$ . The cell remains at this temperature for 30 min before the test is terminated.	No Fire, No Explosion
12	Free Fall	Each full-charged cell is dropped three times from a height of 1,0 m onto a flat concrete floor or metal floor. After the test, the cell shall be put on rest for a minimum of 1 h and then a visual inspection shall be performed.	No Fire, No Explosion
13	Low Pressure Test	The cells are to be stored for 6 h at an absolute pressure of 11.6 kPa and a temperature of $20^{\circ}\text{C} \pm 3^{\circ}\text{C}$ .	No leakage, No venting, No disassembly, No rupture and No fire during the test and after the test and if the open circuit voltage of each test cell after testing in its perpendicular mounting position is not less than 90% of its voltage immediately prior to this procedure.

### 4.4 Visual Inspection:

There shall be no such defect as scratch, flaw, crack and leakage which may adversely affect commercial value of the cell.

### 5. Storage and others:

#### 5.1 Storage

The best storage temperature:  $15^{\circ}\text{C} - 35^{\circ}\text{C}$ .



### Prismatic LiFePO4 Battery

Model	Specifications
IFpP40130200-100	LFP 100Ah Grade A

#### 6. Appendix (For reference only)

