

## Sichuan Yingnengji Technology Co., Ltd.

### Sodium ion battery specifications

Cell model: Na-032205 - 8.0Ah

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## Specification revision record

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1. Basic InformationEssential Information

1.1 Scope of application

This specification stipulates the technical requirements, test methods and precautions of the cylindrical sodium ion battery produced by Sichuan Yingnengji Technology Co., Ltd.

If you need to obtain technical requirements other than this specification, please contact our company for relevant matters.

1.2 Product Type

Cylindrical rechargeable sodium-ion cells.

1.3 Model name

32 205 8.0 Ah

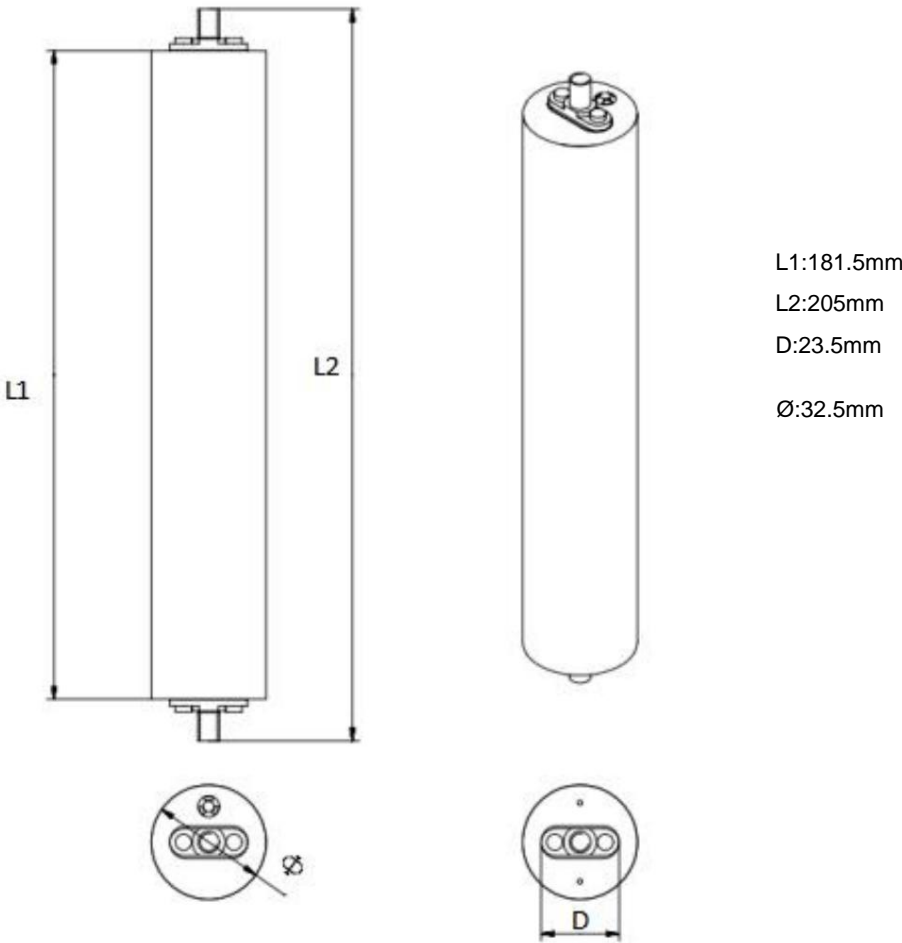
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ÿ: Cell diameter: 32.5±0.5mm

ÿ: Cell length: 205±0.5mm

ÿ: Capacity: 8Ah

1.4 Dimensions



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1.5 battery features

Compression-resistant aluminum shell, excellent high and low temperature performance, stable voltage output, small self-discharge, double safety protection, high anti-vibration and impact resistance, safe and stable

Qualitative analogy to lead-acid batteries.

1.6 Main application

- Electric vehicles (in line with national certification standards: GB/T31485-2015)
- Dedicated energy storage battery.

1.7 Battery Assembly

A single battery cell is assembled into a battery pack of a certain specification according to the specific application, and the battery pack and the battery management system jointly participate in the performance management of the battery pack,

thermal management and safety management.

2. Standard Specifications

Item 2.1		condition	Specification	Remark
Nominal Capacity 2.2		1C discharge capacity	ȳ8.0Ah	
AC Internal Resistance		measured at 1000 Hz	ȳ5mȳ	
2.3 Nominal Voltage			3.2 V	
2.4 Cell size		Cell diameter	32.5±0.5 mm	
		Cell height	205±0.5mm	
2.5 Cell weight 2.6			283± 5 g	Including inner and outer packaging
Charging cut-off voltage 2.7		Constant current charging	3.8V	
Charging cut-off current		Constant voltage charging	0.03C	
2.8 Charging method		standard charge	0.5C at CC/CV	0.5C Normal charging for 130 minutes can charge 100% of the rated capacity, within 60 minutes of temperature
		fast charging	1C at CC/CV	rise within 10°C, can charge 98% of the rated capacity, within 10°C of temperature rise
2.9 Discharge cut-off voltage		Constant current discharge	2.0V	
2.10 Continuous discharge current		Constant current discharge	1C	1C Normal discharge for 60min can discharge 100% of the rated capacity, temperature rise within
2.11 Maximum instantaneous discharge current			4C	10°C for 30s, temperature rise within 5°C
2.12 Cycle performance		0.5C charge, 0.5C discharge	2000 cycle capacity retention ȳ 80%	
2.13 Temperature range	charging temperature	0.5C charging	0–60 °C	Discharge capacity ratioȳ98%
	discharge temperature	1C discharge	-20°C	Discharge capacity ratioȳ65%
	Storage temperature	In environments with low humidity and no corrosive gases	-20–60°C	
2.14 Appearance		No cracks, scratches, deformation, stains, electrolyte leakage, etc.		
2.15 Warranty period		36 months		

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### 3. Test Condition Test Condition

#### 3.1 Standard Test Conditions

If there is no special requirement, the room temperature in this specification is 25 °C ±2 °C, and the product test conditions are: temperature 25 °C ±5 °C, humidity 15~90 %RH, maximum

The air pressure is 86 kPa~106 kPa.

#### 3.2 Standard charging

"Standard charging" means that under standard test conditions, the cell is first charged to 3.8V with a constant current of 0.3C, and then charged with a constant voltage of 3.8V until the current is less than

0.03 C, set aside for 1h.

#### 3.3 Standard discharge

"Standard discharge" means that under standard test conditions, the cell is discharged to 2.0V with a constant current of 1C.

## 4. Electrical Characteristics

Test items	Test Methods	Inspection standards
4.1 AC internal resistance	The battery is measured at 1000 Hz after charging according to the regulations in 3.2.	± 5mΩ
4.2 Initial capacity	After the batteries are charged according to the regulations in 3.2, they should be completely	Initial capacity ± 8.0Ah
4.3 Cycle life  Cycle Life	discharged according to the regulations in 3.3. The cell is charged at 0.5C CC/CV and left for 5 minutes, then discharged at a constant current of 0.5C to 2.0V, left for 5 minutes, and then the next cycle is performed, 2000 times in a row. After the cell is charged	Capacity retention rate±80%
4.4 Rate discharge performance	according to the regulations in 3.2, discharge at room temperature with a current of 2C for 60 seconds. After the battery cell is charged according to the	
4.5 Low temperature performance	regulations in 3.2 within the temperature rise of 5°C, the cell is placed in a low-temperature box at -20°C for 4 hours, and then discharged with a current of 1 C to the cut-off voltage. After the cell is	Discharge capacity: ± 65%
4.4 Storage at room temperature	charged according to the regulations in 3.2, it should be stored at 25 °C ±2 °C for 28 days, and then discharged at a constant current of 0.5C to the cut-off voltage. After the battery	Capacity retention ± 98 %
4.5 High temperature storage	cell is charged according to the regulations in 3.2, it should be stored at 60 °C ±2 °C for 7 days, then stored at room temperature for 5 hours, and then discharged according to the regulations in 3.3.	Capacity retention ± 95 %

## 5.Environment Characteristic \_

Test Item Test Item	Test methodTest Method	Inspection standard Criteria
5.1 Constant temperature and humidity performance	After charging the battery according to 3.2, put the battery in a constant temperature and humidity box at 45 °C ±2 °C (90~95% RH) for 48 hours, then take it out, leave it at room temperature for 2 hours, and observe for 1 hour.	The battery has no deformation, no rust, no smoke, no explosion

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5.2 Temperature Shock Performance	After the battery is charged according to 3.2, put it into the temperature box, drop to -20°C within 60 minutes, keep it for 90 minutes, then rise to 25°C within 60 minutes, and then rise to 85°C within 90 minutes. Hold for 110 min, then cool down to 25 °C over 70 min. Repeat the above steps 5 times and observe for 1h. After charging the cell according to 3.2, put it into a low-pressure box, adjust the air pressure to 11.6 kPa, and keep the temperature	The battery core does not explode, does not catch fire, and does not leak
5.3 Low air pressure test	at room temperature. After standing still for 6 hours, observe for 1 hour.	The battery core does not explode, does not catch fire, and does not leak
5.4 Drop Test	After the battery cell is charged according to 3.2, the positive and negative terminals are freely dropped from a height of 1.5 m onto the concrete floor, and observed for 1 hour. After the	The battery core does not explode and does not catch fire
5.5 Soak test	cell is charged according to 3.2, it is completely immersed in 3.5 wt% NaCl solution for 2 hours and observed for 1 hour.	The battery core does not explode and does not catch fire

6.Safety Characteristic \_

Test Item Test Item	Test methodTest Method	Inspection standard Criteria
6.1 Short circuit test	After charging the cell according to 3.2, short-circuit the positive and negative poles externally for 10 minutes, and the resistance of the external circuit should be less than 5 mΩ; stand still for 1 hour.	The battery core does not explode and does not catch fire
6.2 Overcharge	After the cell is charged according to the regulations in 3.2, charge it to 5.0V with 1C current or stop charging after charging for 1h, and observe for 1h.	The battery core does not explode and does not catch fire
6.3 Overdischarge	After the cell is charged according to 3.2, it is discharged at 1C for 90 minutes and observed for 1 hour.	The battery core does not explode, does not catch fire, and does not leak
6.4 Extrusion test	After the battery is charged according to the regulations in 3.2, squeeze it with a semi-cylinder with a radius of 75 mm perpendicular to the direction of the battery plate at a speed of (5±1) mm/s. When the voltage is 0 V or the deformation reaches 30% or the extrusion Stop extrusion after the force reaches 200 kN, and observe for 1h. After the battery cell is	No explosion, no fire, consistent with the safety performance of lead-acid batteries
6.6 Thermal Shock Test (130 °C)	charged according to the regulations in 3.2, place it in a temperature box, raise it from room temperature to 130 °C at a rate of 5 °C/min, keep it for 30 minutes, stop heating, and observe for 1 hour.	No explosion, no fire, consistent with the safety performance of lead-acid batteries

7. Low temperature power test

- 8.1 Fully charge the battery with the procedure in 7.1, connect the discharge wire, put the battery cell in a low-temperature box at -20°C for 24 hours, and prepare for discharge.
- 8.2 Discharge cut-off voltage 2V, discharge current 1C, test the discharge curve and discharge capacity, and calculate the percentage of discharge capacity and rated capacity.

8. Storage Transportation

- 9.1 Due to the characteristics of the battery cell, the battery cell needs to be properly packaged for protection.
- 9.2 During transportation, it is necessary to ensure that the battery charge is 50% SOC to ensure that it is not damaged by short circuit and liquid.
- 9.3 The batteries should be stored in a dry, clean and ventilated environment at -20 °C-45 °C.
- 9.4 Pay attention to avoid dropping, flipping and stacking when loading and unloading the battery.

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## 9. Safety Regulations

- 10.1 Do not throw the battery into water. When not in use, the battery should be stored in a dry and cool place.
- 10.2 Do not reverse the positive and negative poles.
- 10.3 Do not directly connect the positive and negative poles with metal to avoid short circuit.
- 10.4 Do not store or transport batteries together with metal.
- 10.5 Do not knock, throw or step on the battery.
- 10.6 Do not damage the battery with nails or other sharp objects.
- 10.7 Do not use or store the battery at an excessively high temperature, otherwise it will cause the battery to overheat, resulting in shortened life and performance, or even fire. long time storage
- The recommended storage temperature range is 10~45 °C.
- 10.8 Do not throw the battery into fire or other heat sources to avoid fire, explosion and environmental pollution. Waste batteries need to be recycled to the supplier and handed over to the recycling station for disposal.
- 10.9 Do not place the battery in a strong electrostatic field or strong magnetic field, otherwise the protection device will be damaged.
- 10.10 If the electrolyte leaks and enters the eyes, do not knead, and seek medical attention as soon as possible after washing with water.
- 10.11 If the battery emits a strange smell, overheats, deforms or has other unusual conditions during use, storage or charging, please stop using it and remove the device.
- 10.12 Do not directly plug or unplug the battery during charging, and use the specified charging equipment for charging.
- 10.13 Please check the battery voltage and related connectors before use; if there is any abnormality, please do not use it.
- 10.14 Please check the insulation, physical condition and aging of related equipment before charging. The battery voltage must be higher than the cut-off voltage. If there is any abnormality, mark it and do not
- Change the status quo, and then notify our after-sales service department, and wait for our staff to arrive for repairs.
- 10.15 The battery should be stored at 70 %SOC, if not used for half a year, it needs to be recharged.
- 10.16 If the electrode terminals are contaminated, wipe them with a clean and dry cotton cloth, otherwise it will lead to poor contact and operation.