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**Version
Number: A/1**

Shenzhen Polinovel Technology Co., Ltd

NOVEL Series LiFePO4 Battery Specification (12V 200Ah)



Model: _____ NOVEL12200

Customer Name: _____

Customer Confirmation: _____

Date: _____ 2017.12.22

Formulate	Proof	Verify	Authorize
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1. General Information

This specification defines the performance of rechargeable LiFePO4 battery pack NOVEL12200 manufactured by SHENZHEN POLINOVEL TECHNOLOGY CO., LTD, describes the type, performance, technical characteristics, warning and caution of the battery pack.

The battery pack support Bluetooth communication function. Through Android and IOS APP, users can read the battery status and information. Due to the Android system’s openness, different smart phone manufacturers will have their own different Bluetooth hardware version and customized feature Android systems. So, the APP of this battery may not work well on some smart phones with Android system due to compatible issue. It is necessary for the customer to confirm whether the phone is compatible for our APP.

2. Product

2.1 Product Name: LiFePO4 Battery Pack

2.2 Cell specification and configuration: Prismatic LiFePo4 battery cell IFR3.2V-25Ah, 4S8P.

The hole battery system USES a total of 32pcs 3.2V 25Ah battery cells, total 4 strings of 8 for 12.8V 200Ah, with built-in BMS and other components, with Bluetooth Communication

2.3 Model: NOVEL12200

3. Product Specifications

NO.	Items	Criteria	Remarks
3.1	Rated Capacity	200Ah	
3.2	Energy	2.56KWh	
3.3	Nominal Voltage	12.8V	
3.4	Outgoing Voltage	≥12.8V	
3.5	Internal resistance	≤15mΩ	
3.6	Series parallel application	up to 4 series-connected applications	
3.7	Limited charge voltage	14.6±0.2V	
3.8	Floating charge voltage	13.8±0.2V	
3.9	Charge Method	CC/CV	
3.10	Standard charge current	60A	
3.11	Maximum charge current	80A	
3.12	Standard discharge current	80A	(Continuous discharge)
3.13	Maximum discharge current	200A	(Continuous discharge)
3.14	Pulse discharge current	400A	(<5s)
3.15	Discharge cut-off voltage	10.0V	
3.16	Cycle Life	>2,000 cycles	@80% DOD
3.17	Dimension	L485 x W170 x H245 mm	
3.18	Weight	Approx: 25.5 ±0.2 Kg	
3.19	Operating Temperature	Charging: 0~45°C	
		Discharging: -20~60°C	
		Recommended operating temperature: 15°C~35°C	
3.20	Self-discharge rate	Residual capacity: ≤3%/month; ≤15%/years	
		Reversible capacity: ≤1.5%/month; ≤8%/years	

3.21	Storage Temperature & Humidity Range	Less than 1 month: -20°C ~ 35°C, 45%RH ~ 75%RH
		Less than 3 months: -10°C ~ 35°C, 45%RH ~ 75%RH
		Recommended storage environment: 15°C ~ 35°C, 45%RH ~ 75%RH

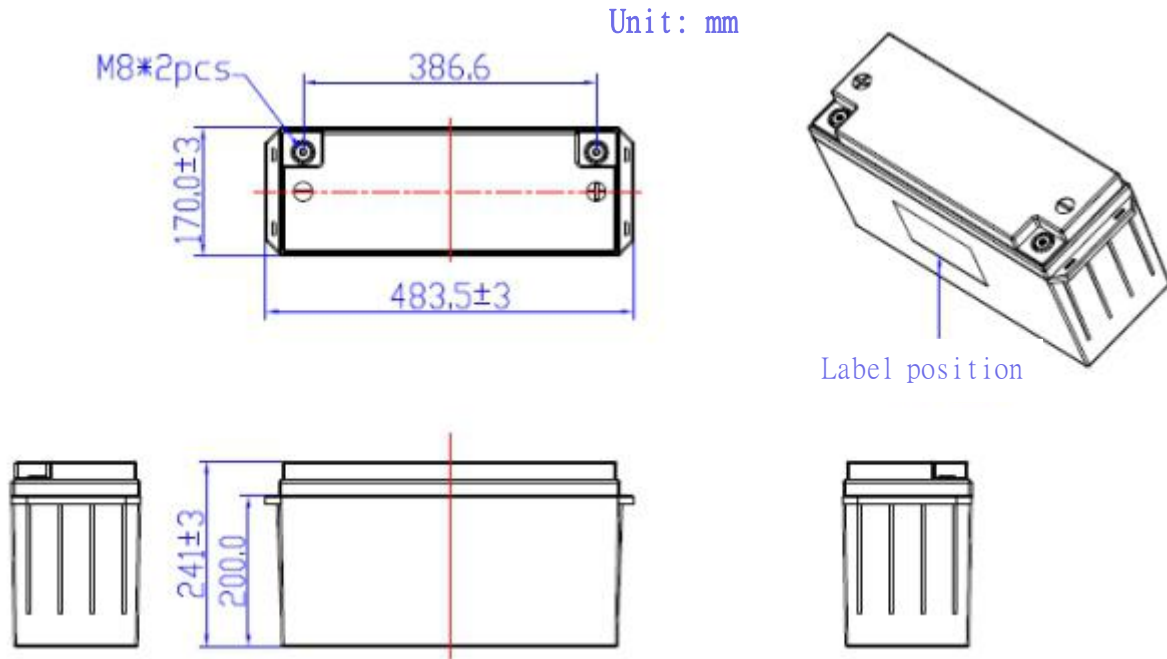
Long time storage:
If the battery need be stored for a long time, the voltage should be 13.2V (50%SOC), and stored in the condition as storage proposal. It need, at least one charge & discharge cycle every six months.

4. Battery Picture



Item	Description	Dimension
L	Length	485mm±2mm
W	Width	170mm±2mm
H	Height	245mm±2mm

5. Dimensional Drawing



6. Test Conditions

6.1 Standard Test Conditions

6.1.1 Unless otherwise specified, all performance tests is required conducted at temperature $25^{\circ}\text{C}\pm 2^{\circ}\text{C}$, Humidity less than 45%~75%RH.

6.1.2 Unless otherwise specified, the tested product is required unused within two month after outgoing.

6.2 Measuring Instrument or Apparatus

All of the measuring instruments and facilities (include the equipment which monitor the test parameters) should be verified and calibrated qualified by relevant Chinese Calibration Regulation or certain standards within the valid date. All the test instruments and equipment should have the properties of adequate precision and stability, and the precision should be an order higher than the tested indicators or the tolerance should be less than one third of the tested parameters.

6.3 Standard Charging

Charging shall consist of charging at a 0.33C constant current rate until the battery reaches 14.6V. The battery shall then be charged at constant voltage of 14.6 volts while tapering the charge current. Charging shall be terminated when the charging current has tapered to 0.02ItA. Charge time: Approx 5.5h, The battery shall demonstrate no permanent degradation when charged between 0 °C and 45 °C.

6.4 Standard Discharging

The battery should be discharged at a constant current of 0.33C to 10.0 volt @ $25^{\circ}\text{C}\pm 2^{\circ}\text{C}$

6.5 Others

If no otherwise specified, the rest time between Charge and Discharge amount to 30mins.

7. Product Performance

NO.	Items	Criteria		Testing method
4.1	Rated Capacity	200Ah		Rest for 1 hour after fully charged, then discharge with 0.33C current until the battery reaches the discharge cutoff voltage. Repeat above process for three times, if the discharge time is not less than 120 minutes, you can stop and define the Discharging current*time value (Ah) as battery capacity.
4.2	Minimum Capacity	190Ah		
4.3	Internal resistance	≤15mΩ		50% battery SOC state frequency of 1 KHZ ac resistance tester
4.5	Cycle life (DOD100%)	≥2000cycle		Discharge with the current of 0.33C until it can't discharge, and then rest it for 1h. Charge the battery following CC(0.33C)/CV(14.6V) mode to full capacity, and then rest it for 1h. Repeat above process until full charged capacity is no more than 80% of normal value. Accumulated times is defined as cycle life.
4.6	Discharge Temperature Characteristics	-20℃	≥70%	At 25±5℃ discharge the battery with the current of 0.33C to the cut-off voltage and record charge capacity. Store the battery at various temperatures for 2h and discharge the battery with 0.33C to the cut-off voltage.
		-0℃	≥80%	
		25℃	≥100%	
		55℃	≥95%	
4.7	Charge Retention ability	Residual capacity≥80%		Charge the battery to full capacity and store it for 28days, and then discharge it with 0.33C to the cut-off voltage.
		Recovery capacity≥90%		
	Communication Function	Bluetooth		Through APP, user can read the battery system information such as voltage, current, SOC, temperature and so on.

8. Protective circuit specification

The batteries are supplied with a LiFePO4 Battery Management System (BMS) that can monitor and optimized each single prismatic cell during charge & discharge, to protect the battery pack overcharge, over discharge, short circuit. Overall, the BMS helps to ensure safe and accurate running.

NO.	Items	Content	Specification
5.1	Over charge	Over-charge protection for each cell	3.9±0.03V
		Over-charge release for each cell	3.60±0.05V

		Over-charge release method	Under the release voltage
5.2	Over discharge	Over-discharge protection for each cell	2.0±0.05V
		Over-discharge release for each cell	2.5±0.05V
		Over-discharge release method	Charge to recovery
5.3	Over current	Discharge over current protection	300~500A
		Protection delay time	50-400ms
		Over current release method	Delay about 8S after recovery.
5.4	Short circuit	Do not short-circuit the electrodes	Designed for 600A/1ms
5.5	Battery temperature	Charge over temperature	Protection @65±5℃
			Release @50±5℃
		Discharge over temperature	Protection @65±5℃
			Release @50±5℃
		Charge over temperature protection MOS	Protection @103±10℃
			Release @75±10℃
Discharge over temperature Protection MOS	Protection @103±10℃		
	Release @75±10℃		

9. Transportation

- * Based on the character of cell, proper environment for transportation of LiFePO4 battery pack need to be created to protect the battery.
- * The battery should be packed in boxes for delivery, and be delivered under the state of half charged.
- * The battery should be prevented from vibration, shock , extrusion, sun-scorched and rain-drenched.
- * It could be delivered by car, train, boat, airplane, etc.
- * Keep the battery against dropping, turning over and serious stacking during loading.

10. Storage

Battery should be stayed in the warehouse 15℃~35℃ where it's dry, clean, shade, and well-ventilated.

Long time storage:

If the battery need be stored for a long time, the voltage should be 13.2V (50%SOC), and stored in the condition as storage proposal. It need, at least one charge & discharge cycle every six months.

11. Battery Operation Instruction

11.1 Charge and discharge

11.1.1 Charging current: Do not surpass the largest charging current that specification stipulated.

11.1.2 Charging voltage: Do not surpass the highest limited voltage that specification stipulated.

11.1.3 Charging temperature: within temperature scope that specification stipulated.

11.1.4 Charge with constant current, then with the constant voltage, no reverse charge, which is dangerous

11.1.5 Special note:

Short time doesn't affect the use of the battery overcharge too, but for a long period of time over discharge or



over charge can affect the function of the battery failure, or the battery can't use permanently, appear serious safety hazards, need long time floating please use the recommended floating model specification. Battery when not in use for a long time, because of its own self-discharge characteristics can also cause discharge, to prevent the occurrence of a discharge, battery should maintain a certain capacity, maintain the voltage at 50% state of SOC.

12. Warning & Tips

- Please read and follow the specification and caution remarks on battery surface before use the battery. Improper use may cause heat, fire, rupture, damage or capacity deterioration of the battery. SHENZHEN POLINOVEL TECHNOLOGY CO., LTD. describes not responsible for any accidents caused by the usage without following our specification.
- The battery must be far away from heat source, high voltage, and avoid to be exposed in sunshine for long time.
- Never throw the battery into water.
- Do not put the battery in a charger or equipment with wrong terminals connected.
- Never connect the positive and negative of battery with metal.
- Avoid excessive physical shock or vibration. Don't hit, fall, stamp on the battery.
- Without the permission of the manufacturer and guidance, don't remove or assemble the battery.
- Do not use the battery mixed with other different manufacturers', types, or models of batteries.
- Keep the battery against high temperature. Otherwise it will cause battery heat, get into fire or lose some function and reduce the life.
- When battery run out of power, please charge your battery timely (≤ 15 day).
- Please use the matched or suggested charger for this battery.
- If battery emit peculiar smell, heating, distortion or appear any abnormality during working or storage, please stop using and take it out from device.
- If the battery leaks and get into the eyes or skin, do not wipe, instead, rinse it with clean water and see a doctor immediately.
- Please keep it far away from children or pets.
- Do not put disuse battery into a fire or water.
- The battery pack supports up to 4 series-connected applications
- Parallel connection of this battery pack is allowed under condition that voltage difference $\leq 0.2V$, parallel numbers ≤ 4 groups, and operated by professionals.

Notes: Any other items which are not covered in this specification shall be agreed by both parties.

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