

LiFePO4 Battery Specification

Model: TB-BL1209F-S110A_00



SHENZHEN TOPBAND NEW ENERGY CO.,LTD

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Registered	Dengzhaowei	Customer	
Checked	Linqiuliang	Customer Model	
Approved	Lili	Customer Reback:	
Issued Date	2017-03-10		
Issued Version	V00		
Document Number	XNY-01-33		

1. General Information

This specification defines the performance of rechargeable LiFePO₄ battery pack TB-BL1209F-S110A_00 manufactured by SHENZHEN TOPBAND NEW ENERGY 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, can read the battery status and information. Especially due to the Android system's openness, different smart phone manufacturer will have their own different Bluetooth hardware version and customized feature Android systems. So the APP 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 the APP.

2. Specification(@Battery initial Temp25±5 °C)

NO.	Items	Criteria	Remarks
2.1	Rated Capacity	9Ah	
	Minimum Capacity	8.5Ah	
2.2	Energy	115Wh	
2.3	Nominal Voltage	12.8V	
2.4	Outgoing Voltage	≥12.8V	
2.5	Internal resistance	≤80mΩ	
2.6	Series parallel application	Series connection is prohibited	
2.7	Limited charge voltage	14.6±0.2V	
2.8	Floating charge voltage	13.8±0.2V	
2.9	Standard charge current	9A	
2.10	Maximum charge current	10A	
2.11	Standard discharge current	9A	
2.12	Maximum discharge current	10A	
2.13	Pulse discharge current	Withstand the 20A/3s	
2.14	Discharge cut-off voltage	8.0V	
2.15	Dimension	Length: 151±2mm	
		Width: 65±2mm	
		Height: 95±2mm	
2.16	Weight	Approx: 1.2±0.2Kg	
2.17	Operating Temperature	Charging: 0~45°C	
		Discharging: -20~60°C	
		Recommended operating temperature: 15°C~35°C	
2.18	Self-discharge rate	Residual capacity: ≤3%/month;≤15%/years	
		Reversible capacity: ≤1.5%/month;≤8%/years	
2.19	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

3. Test Conditions

3.1 Standard Test Conditions

3.1.1 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.

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

3.2 Standard Charge Mode

"Standard Charge" means at $25\pm 2^{\circ}\text{C}$ charge to limit voltage with 0.33C constant current, then charge with constant voltage until current less than 0.02ItA .

3.3 Quick Charge Mode

"Quick Charge" means at $25\pm 2^{\circ}\text{C}$ charge to limit voltage with 0.5 C constant current, then charge with constant voltage until current less than 0.02ItA .

3.4 Standard Discharge Mode

"Standard Discharge" means at $25\pm 2^{\circ}\text{C}$ discharge to the cut-off voltage with 0.33C current.

3.5 Quick Discharge Mode

"Quick Discharge" means discharge to the cut-off voltage with 0.5C current.

4. Product Performance

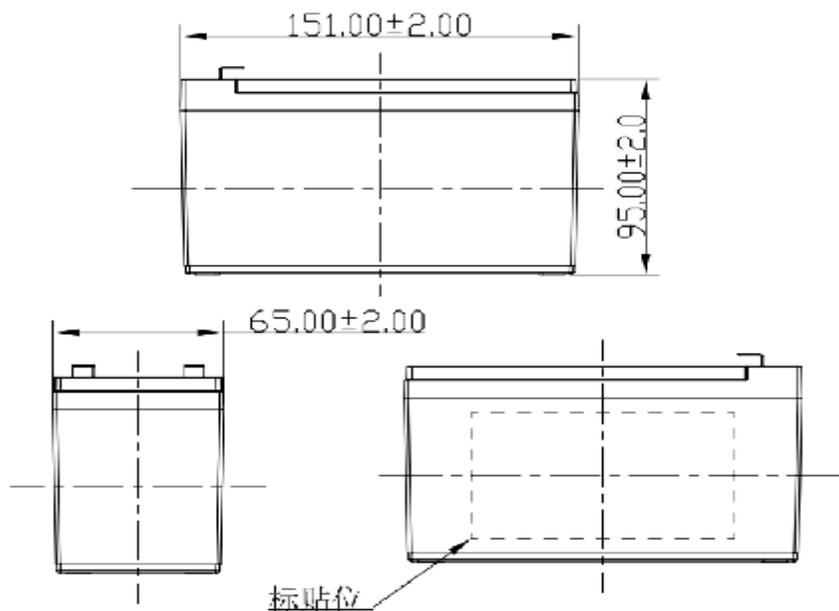
NO.	Items	Criteria	Testing method	
4.1	Rated Capacity	9Ah	Rest for 1 hour after fully charged, then discharge with 0.33C current until the battery reaches the discharge cutoff voltage. Repeat above process for three times, if the discharge time is not less than 120 minutes, you can stop and define the Discharging current*time value (Ah) as battery capacity.	
4.2	Minimum Capacity	8.5Ah		
4.3	Internal resistance	$\leq 80\text{m}\Omega$	50% battery SOC state frequency of 1 KHZ ac resistance tester	
4.4	Cycle life (DOD100%)	$\geq 2000\text{cycle}$	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.	
4.5	Discharge Temperature Characteristics	-20 $^{\circ}\text{C}$	$\geq 70\%$	At $25\pm 5^{\circ}\text{C}$ 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 $^{\circ}\text{C}$	$\geq 80\%$	
		25 $^{\circ}\text{C}$	$\geq 100\%$	
		55 $^{\circ}\text{C}$	$\geq 95\%$	
4.6	Charge Retention ability	Residual capacity $\geq 80\%$	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 $\geq 90\%$		
4.7	Communication Function	Bluetooth	Though ,user can read the battery system information such as voltage, current, SOC, temperature...and so on.	

5. 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	3.75±0.05V
		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/ Protection delay time	8A~40A/25s~35s 40A~60A/5ms~20ms
		Over current release method	Delay about 8S after recovery
5.4	Short circuit	Do not short-circuit the electrodes	Designed For 80A~120A /200us
5.5	Battery temperature	Charge over temperature	Protection @65±5℃
			Release @50±5℃
		Discharge over temperature	Protection @65±5℃
			Release @50±5℃
		Charge low temperature protection	Protection @-10±5℃
			Release @0±5℃
MOSFET over temperature protection	Protection @103±10℃		
	Release @75±10℃		

6. Dimensional Drawing



7. Transportation

- * Based on the character of cell, proper environment for transportation of LiFePO₄ battery pack need to be created to protect the battery.
- * Battery should be stayed in the warehouse 15°C ~ 35°C where it's dry, clean, shade, and well-ventilated.
- * The battery should be stored in 50% SOC during transportation.
- * The battery need to be charged every 6 months if out of use
- * Keep the battery against dropping, turning over and serious stacking during loading.

8. 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 TOPBAND NEW ENERGY CO.,LTD. Describes is not responsible for any accidents caused by the usage without following our specification.

- 2 The battery must be far away from heat source, high voltage, and avoid to be exposed in sunshine for long time.
- 2 Never throw the battery into water.
- 2 Do not put the battery in a charger or equipment with wrong terminals connected.
- 2 Never connect the positive and negative of battery with metal.
- 2 Avoid excessive physical shock or vibration. don't hit, fall, stamp on the battery
- 2 Without the permission of the manufacturer and guidance, forbidden to remove or to assemble the battery
- 2 Do not use the battery mixed with other different manufacturer, type, or model batteries.
- 2 Keep the battery against high temperature. Otherwise it will cause battery heat, get into fire or lose some function and reduce the life.
- 2 When battery run out of power, please charge your battery timely (≤ 15 day).
- 2 Please use the matched or suggested charger for this battery.
- 2 If battery emit peculiar smell, heating, distortion or appear any abnormality during working or storage, please stop using and take it out from device.
- 2 If the battery leaks and get into the eyes or skin, do not wipe, instead, rinse it with clean water and see doctor immediately.
- 2 Please far away from children or pets.
- 2 Do not put disuse battery into a fire or water.
- 2 Series connection of this battery pack is prohibited
- 2 Parallel connection of this battery pack is allowed under condition that voltage difference $\leq 0.2V$, parallel numbers ≤ 4 groups, and operated by professionals.

9. Battery operation instruction

9.1 Charge and discharge

9.1.1 Charging current: Do not surpass the largest charging current that specification stipulated。

9.1.2 Charging voltage: Do not surpass the highest limited voltage that specification stipulated。

9.1.3 Charging temperature: within temperature scope that specification stipulated。

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

9.1.5 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 permanent, 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.

10. Other Chemical Reaction

Because batteries utilize a chemical reaction, battery performance will deteriorate over time even if stored for a long period of time without being used. In addition, if the various usage conditions such as charge, discharge, ambient temperature, etc. are not maintained within the specified ranges, the life expectancy of the battery may be shortened or the device in which the battery is used may be damaged by electrolyte leakage. If the discharge time is much shorter than the normal after full charged, even battery is charged correctly, and this may indicate it is time to change the battery.