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# BST-LRG BATTERY SPECIFICATION

Product type: LRG Battery

product model: BST-LRG-12.8V35Ah



Guangzhou Best Electronic Technology Co. ,Ltd

Amendment Records

Note: The company's electronic documents and printed documents with the red "Controlled Document" seal are controlled documents, and other printed documents are non-controlled documents



## **1.Scope of application**

This specification describes the technical index requirements of 12.8V35Ah lithium iron phosphate battery.

## **2. Model: 12.8V35Ah**

2.1 The battery uses a cylindrical cell model of 32700 lithium iron phosphate 3.2V6Ah;

2.2 The entire battery pack is composed of 6PCS cells in parallel to form a battery string, and 4 strings of cells are connected in series to form a battery module, a total of 24PCS cells;

## **3. Reference standards and test requirements**

3.1 UN38.3 "Recommendation on the Transport of Dangerous Goods: Manual of Tests and Standards" Part III, Section 38.3

3.2 GB4208-2008/IEC60529:2001 Enclosure protection class (IP code)

3.3 GB/T 1804-2000 General tolerances Tolerances of linear and angular dimensions without tolerances

3.4 Standard test environment

Unless otherwise specified, all tests in this specification are carried out under the following environmental conditions:

Temperature:  $(25\pm 2)^{\circ}\text{C}$

Humidity:  $(65\pm 20)\%RH$

Standard charging current: 0.3C

Standard discharging current: 35A

## 4. Technical Parameters

### 4.1 System parameters

Project		Specification	Remarks
1	Rated voltage	12V	
2	Nominal capacity	35Ah	
3	Nominal voltage	12.8V	
4	Maximum continuous charging current	35A	
5	Maximum continuous discharge current	35A	
6	Maximum pulse discharge current	70A	Duration5S
7	Cycle life	2000 cycles	25°C±2°C、1.0C 80%DOD
8	Upper charging voltage	(14.6±0.05)V	@(20-45)°C
9	Discharge termination voltage	8.8V	Determining discharge cutoff voltage of capacity, single series cutoff voltage 2.2V
10	Charge-discharge efficiency	≥95%	Volumetric efficiency
11	Cooling way	Natural cooling	
12	Water dust protection grade	IP54	
13	Operating Temperature	charging	(0-60)°C
		discharge	(-20-60)°C
14	Relative humidity	(65±20)%	
15	Battery pack composition	6 parallel and 4 series	A total of 24PCS battery cells
16	Battery Pack Weight	≤5Kg	

### 4.2 Protection board performance

#### 4.2.1 Working principle

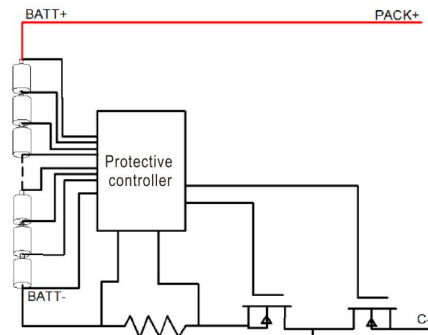


Figure4-1 Schematic diagram

#### 4.2.2 External dimensions of the protection board

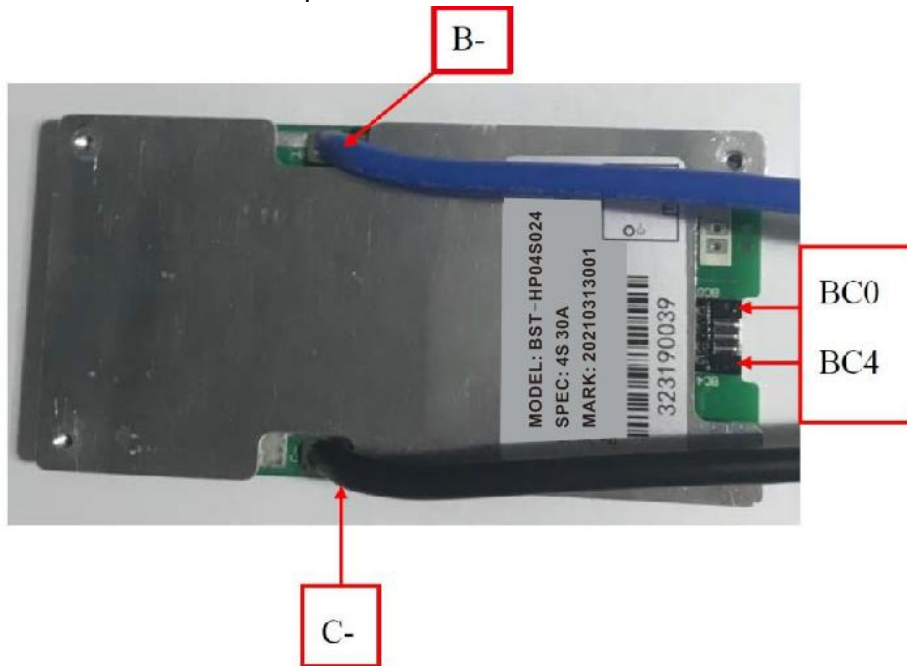


Figure 4-2 BMS outline size drawing size drawing(for reference only)

#### 4.2.3 BMS function introduction:

- Discharge over current protection function;
- Over voltage, under voltage, temperature and overload protection functions;
- Using an integrated solution, the performance of the protection board is more stable;
- Using contactor control, low internal resistance, high current, high precision;

#### 4.2.4 BMS electrical parameters

Discharge	Maximum discharge current	60A
Recharge	Charging voltage	14.4V
	Maximum charging current	60A
Overcharge protection	Protection voltage	3.7V
	Recovery conditions	Charge or disconnect
	Over voltage protection delay	2S
	Charge over current protection release conditions	Restart the system

Over discharge protection	Protection voltage	2.20V
	Recovery voltage	2.40V
	Guard interval	0.5s
Discharge over current protection	Discharge over current protection value	260A
	Discharge over current protection delay	0.2S
	Discharge over current protection release conditions	Disconnect load or charge
Charge balance	Charge equalization start voltage	3.5±0.050V
Operating temperature	-20°C~70°C	
Storage temperature	-40°C~80°C	

4.3 Battery pack structure size

4.3.1 Battery size drawing ( 195\*130\*154mm ; tolerance class: GB/T1804-M )



Figure 4-3 Battery size diagram

12V35Ah Battery outside picture

( Picture only for you reference,result depends on production )

**6. Battery performance**

6.1 Cycle performance

Project		Standard	Test Conditions
1	Cycle life	After 2000 cycles, the remaining capacity is $\geq 80\%$ of the rated capacity	In a $25^{\circ}\text{C}$ environment, charge and discharge with 1.0C current 80% DOD

6.2 High and low temperature performance

Project		Standard	Test Conditions
1	$-20^{\circ}\text{C}$ low temperature discharge	Discharge capacity $\geq 70\%*$ rated capacity	After standard charging, let it stand for 20h in an environment of $-20^{\circ}\text{C} \pm 2^{\circ}\text{C}$ , and discharge to the cut-off voltage at a constant current of 1.0C;
2	$55^{\circ}\text{C}$ High temperature discharge	Discharge capacity $\geq 95%*$ rated capacity	After standard charging, let stand for 5h at $55^{\circ}\text{C} \pm 2^{\circ}\text{C}$ , discharge to cut-off voltage at 1.0C constant current

6.3 Storage performance

Project		Initial SOC	Standard	Condition	
1	Capacity retention rate	$25^{\circ}\text{C}$ 1month	100%	90%	The percentage of the discharge capacity after storage to the capacity before storage, test condition: standard charge and discharge
		$60^{\circ}\text{C}$ 7day	100%		
2	Capacity recovery rate	$25^{\circ}\text{C}$ 1month	100%	95%	After testing the remaining capacity after storage, charge and discharge as standard Power cycle 3 times, the highest capacity is the recovery capacity, the percentage of the recovery capacity and the capacity before storage is the recovery rate
		$60^{\circ}\text{C}$ 7day	100%		



## **7. Storage and transportation**

7.1 According to the characteristics of the battery, the lithium iron phosphate battery pack should meet its storage environmental conditions during storage and transportation, so as to protect the battery performance to the utmost.

7.2 Appropriate protection should be provided during storage and transportation of lithium iron phosphate batteries; Maintain a SOC level of about 50%; ensure that no short circuit and liquid enter the lithium iron phosphate battery or soak in liquid (such as water, oil, etc.);

7.3 If not in use temporarily, the battery should be stored in a dry, clean and well-ventilated warehouse at 0°C ~ 45°C.

7.4 During the process of loading and unloading, the battery should be handled with care, and avoid dropping, rolling, and heavy pressure.

## **8. Safety rules**

Misuse of lithium-ion rechargeable batteries may cause battery damage or personal injury. Before using the lithium-ion rechargeable battery, please read the following safety rules carefully

### **8.1 Battery precautions**

8.1.1 Do not expose the battery to extreme heat or fire.

8.1.2 Do not short-circuit, overcharge or over-discharge the battery.

8.1.3 Do not subject the battery to excessive mechanical shock.

8.1.4 Do not immerse the battery in sea water or water, or make it damp.

8.1.5 Do not disassemble or repair the battery.

8.1.6 Do not put the battery and metal objects such as necklaces, coins or hairpins together.

8.1.7 Do not cause obvious damage or deformation of the battery.

8.1.8 Do not connect the battery directly to the socket.

8.1.9 Do not mix lithium-ion batteries.

8.1.10 Do not place the battery in direct sunlight.

8.1.11 Keep the battery away from children.

8.1.12 Do not puncture, beat or trample the battery.

### **8.2 Battery instructions**

#### **8.2.1 Charging**

1) The battery charging temperature range is (0-60)°C.

2) Use a constant current and constant voltage lithium-ion battery charger.



- 3) Correctly connect the positive and negative poles of the battery, and reverse charging is strictly prohibited. If the positive and negative poles of the battery are reversed, there is a risk of arcing and short circuit.

#### 8.2.2 Discharge

- 1) The discharge temperature range of the battery is (-20-60)°C.
- 2) During the long period of non-use of the battery, the battery may be in a certain over-discharged state due to its self-discharge characteristics. In order to prevent the occurrence of over-discharge, the battery should be charged regularly to maintain its cell voltage between (3.3-3.5)V. Over discharge will cause the loss of battery performance and function.