

3.2V800Ah LiFePO4 Battery Module

Model: BP-LFP-HK3800

Overview

Bestgo Power Co., Ltd. specializes in developing and manufacturing advanced Li-ion batteries which feature both high power and energy densities with a long lifespan and ultra-safe performance. Bestgo Power's unique manufacturing technologies make sure cells have amazing consistency thus battery pack has high reliable quality. With high precision quality control and auto matching system, our products have a better quality than other competitors.

Scope

This specification describes the performance and detail technical requirements of the Li-ion Battery packs supplied by BESTGO POWER COMPANY LIMITED, The product mentioned in the specification accord with GB/T18333.1-2001 Standard.

Parameters

Item	Rating	Note
Battery pack Model	3.2V 800Ah Battery module	LiFePO4 battery type
Cell Type	BPHK10A cell	
Assembly Description	Total 80 cells as 1S80P arrange	First 5 cells in parallel configuration, then 16 of them in parallel configuration.
Battery pack Dimension (L*W*H)	TBD	
Battery pack Weight	TBD	
Operation Voltage of battery pack	3.2 V	Average voltage in usage period
Charging method of battery pack (Type 1, for short time charge)	CC/CV charge method (First constant current charge, then constant voltage charge)	Constant current of no more than 300A current charge till voltage is rise near to 3.65V, then keep no more than 3.65V volt with current taper to 20A for cut-off.
Charging method of battery pack (Type 2, for long time charge)	Float charge method (over 24 hours)	Use a small constant direct current to charge the module all the time, keep the voltage range in 3.35~3.45V.
Over charge Cut-off Voltage	3.85 V \pm 0.05V	
Over discharge Cut-off Voltage	2.5 V \pm 0.05V	
Standard Discharge Current	\leq 300 A (23°C / 77°F)	
Peak Discharge Current (\leq 15 secs)	\leq 450 A (23°C / 77°F)	
Standard Charge Current	\leq 300 A (23°C / 77°F)	
AC Impedance Resistance	\leq 0.1 m Ω	Without the Impedance Resistance of BMS / PCB
Operating Temperature	Charge: 0°C ~ 45°C Discharge: -20°C ~ 55°C	
Storage Temperature	15 ~ 40 °C	

Test Performance and Conditions

Standard Test Conditions

Test should be conducted with new batteries within one month after shipment from our factory and the cells shall not be cycled more than five times before the test. Unless otherwise defined, test and measurement shall be done under temperature of $23\pm 2^{\circ}\text{C}$ and relative humidity of 45~85%. The test results are not affected evidently by such conditions of temperature $23\pm 2^{\circ}\text{C}$ or humidity 40~85%RH.

Mechanical and Electrical Test Performance

Item	Measuring Procedure	Requirements
Vibration test	After standard charge, the battery / battery pack is to be tested as following conditions: Amplitude: 0.8mm Frequency: 10~55Hz(sweep:1Hz/min) Direction: X/Y/Z axis for 90~100min. The battery is to be tested in three mutually perpendicular to each axis.	No fire, no explosion, no smoking is obtained.
Drop Test	Drop the battery in the fully charged condition from 1 m height onto 5cm or Thicker concrete with p-tile on it 6 times each of X, Y, And Z directions at $23\pm 2^{\circ}\text{C}$.	No fire, no explosion, no smoking is obtained.
Short-Circuit Test	After standard charge, the battery / battery pack is to be Short-circuited by connecting the positive and negative Terminals of the battery / battery pack with copper wire having a Maximum resistance load of 0.2Ω	No explosion, no fire. The temperature of the exterior cell casing shall not exceed 160°C .
Heating Test	The battery / battery pack is to be heated in a gravity convection or circulating air oven. The temperature of the oven is to be raised at a rate of $5\pm 2^{\circ}\text{C}/\text{min}$ to a temperature of $130\pm 2^{\circ}\text{C}$ at which temperature the oven's to remain for 10 minutes before the test is discontinued.	No explosion, no fire.
Over Charging Test	After standard charge, the battery / battery pack is subjected to a charging current by connecting it to a DC-power supply. The beginning current is 3C, which is to be obtained by connecting a resistor of specified size and rating in series with the battery / battery pack. The test time is 2.5 hours. This does not require that the initial current be maintained for 2.5 hours.	No explosion, no fire.

Transportation

- Can be transported via Truck, train, airplane and vessel, but to keep out of the sun & raining during transportation.
- To handle the battery pack with care during assembling or dis-assembling, do not arbitrarily throw to avoid collision.
- Do not place any heavy objects on the battery pack during transportation, to avoid crushing or damage caused.
- Do not mix Battery with flammable, explosive, and sharp metal objects in transportation.
- Make sure that the Packaging marked with moisture-proof & waterproof sticker, anti-fire stickers, to avoid dangerous in transportation.
- Battery should be kept under dry and ventilation condition. Do not put the battery close to fire and explosive products.

Storage

- When a battery has not be used for more than 2 months, please discharge and charge it to reactive the electricity, so that the battery cycle life will be well kept. We require every 2~3 months battery should be cycled at least 1 time (discharge and charge) then discharge the electricity to 40~60% SOC for long time storage again. If those operations can not be done batteries may lose capacity permanently.
- The cycle life of li-ion battery would be shorted if the battery always be kept as fully charged state. For long time storage, keep the battery as 40 ~ 60% state of charge (SOC) and discharge & charge the battery every 2 or 3 months.
- Cells in battery pack will have its own self-discharge rate, after long term storage, the SOC of cells may not became so identical, the capacity of battery pack may became less. For this case, people can discharge and charge battery packs for several cycles, cycling the battery pack will contain some balancing activities (if BMS support) which will eliminate the SOC difference of Cells in battery pack, the "lost capacity" will come back.

Operation

- When battery pack is fully discharged and turned off automatically, please do not use it any more until it is recharged. Over discharge the battery pack means battery life will be shortened and the battery may become permanently damaged.
- When battery pack is fully discharged and turned off automatically, please recharge it in time (Within 12 hours), even charge 2~5% electricity to the pack will protect the cycle life well.
- We suggest charge up to 90% SOC and discharge no less than 20% SOC when using to prolong the cycle life. When the voltage of single cell drop down to 3.0V or the actual capacity is lower than 20%, please recharge the battery promptly.
- If the battery pack will not be used for a long time (several days or weeks), please disconnect it from the load. (When battery pack connected to the load, the pack is always "waiting for" running, which will consume the electricity and make battery fully discharged and damaged.)
- Some battery packs are equipped with BMS which support balancing function, those packs can be charged over 90%SOC like to 95% SOC or more to start the balancing function. For the cycle life consideration, when a battery pack is well balanced (be fully charged) then the pack should be discharged in a short time (like within 24 hours). Keep Li-ion batteries not in a full SOC state will be helpful for cycle life.
- The battery pack can be used at -15~50°C for discharge, 0~45°C for charge, while the best working temperature for this battery pack is 15~40°C. Please take some necessary procedures, like heating & cooling methods, or use heat insulation materials to stop cold effect battery pack in winter.

- When the temperature is more than 75°C (Internal temperature of the battery), the battery cycle life would be shortened or got explosion. So do not exposure the battery under the sun during summer.
- When the temperature is under -15°C or lower, the battery performance would be effect and the cycle life might be shorted.
- Do not wash the battery shell with organic solvent. If there's fire accident, please do not use CO2 to extinguish the fire but use CCl4 or sand soil.
- Please handle the pack with care and gently to avoid severe vibration, throw or drop.

After-sale Service

In the period of warranty, there is any problem as the following description, we will take responsible for the replacement and repair.

- The whole battery pack can not be charged or discharged.
- Under the standard condition for testing, capacity is less than 80% of rated capacity in the first year.
Or less than 70% of rated capacity in second year.
- There is liquid leakage.
- There is some damage on battery pack's case and accessory because it is caused by the battery.

There is any situation like the following description, we will not take responsible for the warranty and after-sale service.

- Expired warranty period.
- Customer didn't follow the manual instruction, which is resulted in battery damage.
- Customer dismantles and convert the battery pack, which is not guided by the professional people.
- There is some apparent scratches and trace on the case of BMS and charger.
- Customer use a wrong charger, or a low quality charger, or a defective charger damaged the battery pack. (Some chargers are not able to offer very stable DC output so that may damage the DC circuits of BMS in battery pack)

Requirements in operation of Li-ion battery pack (General purpose)

Before operation, please carefully read the data sheet provided by the manufacturer. This is benefit to understand better of the charge and discharge characteristics of lithium ion battery, and the battery management system (or the lithium battery protection board) and the use of lithium battery charger.

To make sure our customer can use our battery effectively, we suggest our customer choose the specialized Li-ion charger in CC/CV mode. Please do not charge and discharge the battery without BMS in case the battery pack be over-charged and over-discharged.

Battery Pack Installation & Maintenance (For Technical Refernece only)

- Please study the related datasheet and user manual before the installation of battery pack, BMS and Charger.
- Fix the battery installation location and install the battery pack under ventilation cooling environment.
- Please be careful and prevent the battery from short circuit.
- All the cables should be the standard match that can resist the related temperature and voltage.
- Please install/change the BMS under the instructions of operation manuals and make sure every part is rightly and tightly connected. BMS install requires the right sequence of parts, please be aware.

Failure		Cause Analysis	Corrective Action
The Battery pack can not work properly		1. Incorrect Wire connection	Make Sure the connection is right.
		2. Energy has exhausted	Please use the charger for charging.
		3. BMS is not working	Replace the BMS.
		4. Some single cell is damaged.	Replace the damaged cell / module.
Battery pack is overheated while working		1. The continuous discharging current is too large.	Do some cooling method, make sure battery pack is not over-discharged.
BMS (Only for Advanced BMS type, for LiFePO4 battery type)	Cannot working	1. No power supply	Make sure the DC power supply for BMS is right.
		2. Incorrect connection	Make sure the wire connection is right.
	Buzzing Alarm	1. Battery pack is in overcharge or over discharge state.	Please check the volt too low ($\leq 3.0V$) or too high ($\geq 4.2V$)
		2. CAN communication is stopped	Check the communication port.
	No display on Screen	No power supply.	Please check the line of power is connected to screen or is loosed?
	The volt is 0 V on CCM	CAN communication is stopped	Please check the communication port is loosed or not?
When discharge, it shows as "charge"	The direction of current sensor is opposite.	Please refer to the current sensor installation manual	