Operation Manual

BB-12V-20Ah (LiFePO4)

1 Foreword

Overview

This document mainly introduces the product introduction, installation method, use instruction, precautions, fault treatment and maintenance of lithium ion battery, etc., to provide installation instruction, use instruction and technical support for on-site installation personnel, users, maintenance engineers and technical support engineer.

Applicable Readers

This document mainly applies to the following people objects:

- Hardware installation engineer
- Technical support engineer
- Maintenance engineer
- Operator

Symbol Stipulations

The following signs may appear in this article, and they represent the following meanings.

Symbol	Define	Explain
DANGER	Dangerous	Hazards with a high risk of causing death or serious injury if not avoided.
WARNING	Warning	Hazards of moderate risk that, if not avoided, may result in death or serious injury.
ATTENTION	Attention	Hazards with low risk that may result in mild or moderate injury if not avoided.
NOTE	Instructions	Supplementary statements to the main information in the text. “Instruction”: Not a security warning message

Contents

1 Safety Precautions

Before conducting battery operations, you must carefully read the safety precautions and understand the correct installation and connection method of the battery.

- When handling the battery, it should be handled in the direction required by the battery, and it is strictly prohibited to turn it upside down, tilt or collide.
- Batteries should be placed horizontally and fixed.
- During the battery installation, pay attention to the positive and negative terminals. It is strictly prohibited to connect the positive and negative terminals of the battery short, otherwise it will cause a short circuit of the battery.
- Do not place installation tools on the battery during battery installation.
- During installation, maintenance and other operations, the battery circuit should be kept disconnected.
- Do not disassemble, squeeze, bend, deform, pierce, or shred the battery without the authorization of supplier and its authorized dealers.
- Do not exceed the temperature range, otherwise the battery performance and safety will be affected.
- Do not modify the battery, do not immerse the battery in water or other liquids.
- Do not put a battery module into a fire.
- Please check the bolts at the connecting end of the battery regularly to make sure the bolts are tight and not loose.
- When checking the battery, you should wear goggles, rubber gloves and protective clothing to prevent the harm caused by electrolyte spillage.
- After the maintenance is completed, the used batteries should be returned to the maintenance office.

2 Overview

2.1 Product Features

BB-12V-20Ah (LiFePO4) is a new type of lead-acid replacement lithium battery product developed and produced by BestEn according to the market demand, which can provide reliable power supply for 12V electrical equipment.

It adopts integration installation structure, the product is easy to install, reliable connection, and has high strength dustproof and waterproof function.

2.2 Products Structure

2.2.1 Dimentions

Battery appearance and dimentions :

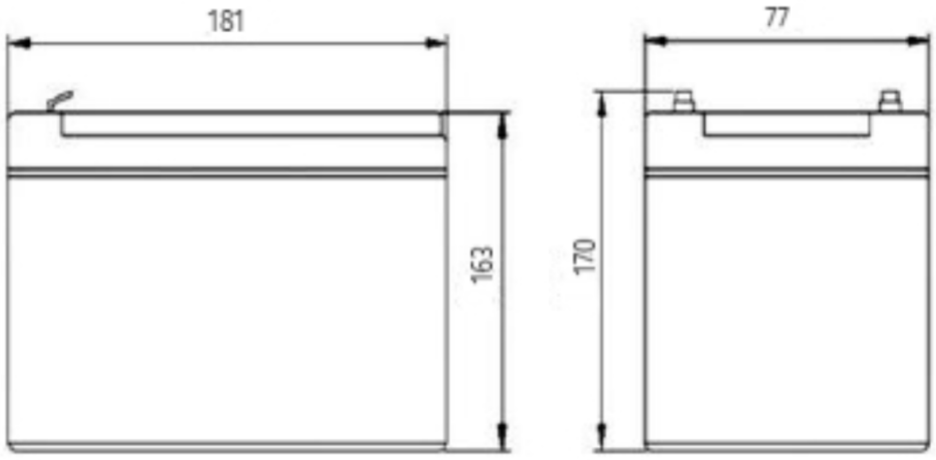
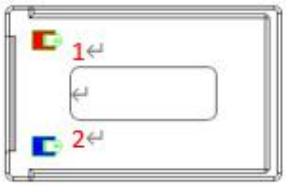


Figure 1 Battery appearance and dimentions （mm）

Length: 181 mm　　Weight: 77 mm　　Height: 170 mm

2.2.2 Operation Panel

Battery operation panel display:



Inserted models

Figure 2 Battery operation panel

Functions of battery operation panel:

Table 1 Description of functions

No.	Name	Description	Note
1	Battery positive output	Positive terminal	
2	Battery negative output	Negative terminal	

2.3 Parameters

Main technical parameters of the battery are shown in the following table:

Table1 Battery Parameters

No.	Parameters	Specification	Note
1	Nominal capacity	20 Ah	
2	Rated voltage	12.8 V	
3	Nominal energy	256Wh	
4	Charging end voltage	14.4 V	External charger/controller setting voltage
5	Limited charging voltage	14.6 V	
6	Max. continue charging current	20A	
7	Discharge end voltage	10.8 V	External charger/controller setting voltage
8	Limited charging voltage	10 V	
9	Max. continue discharge current	20 A	
10	Allowed operation Temp. range	Charge：0℃~55℃	Recommend Temp. range：15℃~35℃
		Discharge：-20℃~60℃	
11	Allowed operation humility range	≤95% RH	Storage
		≤85% RH	Operation
12	Storage Temp. range	15℃～35℃	
13	IP grade	IP65	
14	Weight	2.3kg	
15	Shell material	ABS	

3 Installation

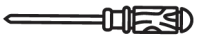
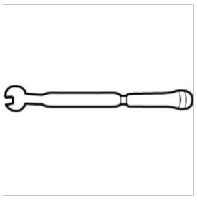
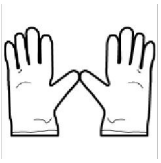
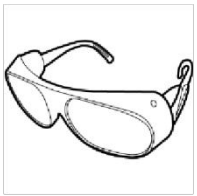
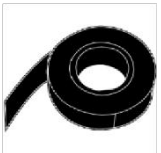
3.1 Tools Preparation

⚠ATTENTION

Use insulated tools to avoid electric shock. If tools without insulation protection are used, it is necessary to wrap the exposed metal parts with insulating tape.

The following table describes the tools and instruments that may be used prior to the install operation

Table 3 Installation tools

Electric screwdriver	Cross screwdriver	Torque spanner	Claw hammer
			
Manual forklift	Multimeter	Protective gloves	Safety helmet
			
Insulated shoes	Anti-static gloves	Goggles	Insulating tape
			

3.2 OOBA (out of box audit)

1 Move the battery to the location where it was installed.

⚠ATTENTION

Battery is heavy, if possible, please use tools to assist handling.

2 Use a claw hammer to open the box and check if the items are complete.

3 Check the appearance of the battery for any breakages or scratches.

说明

If any damage or scratches are found in the battery,please do not proceed to the next installation. Please contact authorized dealer in time.

3.3 Install Battery

⚠ATTENTION

- **Batteries should be installed by professionally trained personnel. Private installation is strictly prohibited.**
- **Insulated tools should be used during installation to avoid electric shock. If tools without insulation protection are used, it is necessary to wrap the exposed metal parts with insulating tape.**

1 Verify that the battery is in the normal voltage range (12V~13.4V)

2 Connect the battery power cable. The output positive pole of the battery is connected to the positive pole of the electrical equipment, and the output negative pole is connected to the negative pole of the electrical equipment (please ensure that the charging equipment is normally powered on before connecting the power cable).

⚠ATTENTION

Pay attention to the polarity of positive and negative battery, do not short/reverse connection.

4 Operation Instructions

4.1 Normal Use

When battery is used for the first time, the default factory capacity is about 30%.

When battery is not used for a long time, it is necessary to recharge the battery and then store it.

4.2 Charging

When the battery power is low, charge it in time. The following requirements should be observed when charging the battery:

- Use the battery only with a standard-conforming charger. The use of substandard charger may damage the battery, serious cases may lead to fire, or even explosion.
- Try to charge in the ventilated situation.
- Before charging, check the appearance of the battery is clean and the cable connection is firm.

4.3 Parallel

When using batteries in parallel, the following requirements should be observed

- Parallel modules need to be in the same state, SOC empty or fully charged.
- When a single module needs to be used in parallel and does not meet the previous requirement, it is necessary to measure whether the voltage of the next module is consistent. It is not recommended to connect in parallel when the voltage difference is greater than 0.5V.
- The number of modules in parallel cannot exceed 4.

5 Maintenance and Storage

5.1 Battery Maintenance

5.1.1 Battery Maintenance Precautions

- Insulating tools or wrapping tools are required for battery maintenance.
- Do not place any debris on the top of the battery.
- Do not use any organic solvent to clean the battery.
- Do not smoke or use an open flame near the battery pack.
- After the battery is discharged, the battery should be charged in time to avoid affecting the service life of the battery.
- All maintenance work must be carried out by professionals.

5.1.2 Routine Maintenance

When the battery is in use, the following operations should be carried out every month to maintain the battery:

- Check the appearance of the battery and make sure the appearance is clean and free of stains. No bruising, breaking or cracking around; No liquid leakage phenomenon; Shell without deformation, bulging phenomenon. If the appearance of the battery is abnormal, contact supplier and authorized dealers in time.
- Check whether the battery bolt is tight. If the battery bolt is loose, tighten it with an insulating tool.
- Check whether the battery cable is in good condition and no aging cracking phenomenon. If there is any abnormality, timely contact supplier and authorized dealers.

5.2 Battery Storage

When the battery is not used for a long time, the battery should be stored in a clean and dry ventilated room, the storage temperature is 10℃ ~ 35℃, and should be fire prevention and heat prevention, avoid contact with corrosive elements.

If the battery is not used for a long time, it should be charged every once in a while. Charging requirements are as follows:

Table 4 Requirements of storage charging

Storage temperature	Charging interval	Charging program
10℃~30℃	Every 1 month	1. Charge at 0.2C to 14.4V. 2. Discharge at 0.2C to 10.8V. 3. Charge at 0.2C for 2~3 hours.
0℃~10℃ or 30℃ ~45℃	Every half month	

6 Fault Handling

6.1 Emergency

6.1.1 Battery Leakage

If the battery leaks, avoid contact with the leaking liquid or gas. If an individual is exposed to a leak and has any of the following conditions, please seek medical advice immediately:

- Inhaled gas: Please evacuate the leaking environment and seek medical advice at the first time.
- Eye contact: flush eyes with running water for 15 minutes and seek medical attention immediately.
- Skin contact: Wash contact area thoroughly with soapy water and seek medical advice immediately.
- Ingestion of liquid: induce vomiting and seek medical advice immediately.

When the battery leaks, it is strictly prohibited to continue to use, please contact supplier or authorized dealers in time.

6.1.2 Battery Fire

If a battery fire occurs, get away from the battery as soon as possible and evacuate people. Use water to extinguish the fire if surrounding conditions are available. And after the fire is extinguished, continue to use a lot of water to water the battery.

After the battery fire, it is strictly prohibited to continue to use, please contact supplier or authorized dealers in time.

6.1.3 Battery Flooding

If the battery becomes wet or flooded, turn off the car key switch and power off the vehicle. When the battery is wet or immersed in water, it is prone to leakage. Do not contact the battery directly.

If the battery is wet or flooded, it is strictly prohibited to continue to use it. Please contact supplier or authorized distributors in time.

6.1.4 Damage Battery

If the battery has been damaged, it is strictly prohibited to continue to use, please contact supplier or authorized dealers in time.

6.2 Troubleshooting

6.2.1 Unable to Wake up from Standby

If the battery is not used for a long time, it will enter standby mode. If the battery stay in this state for a long time and the output voltage is too low, please refer to the following operations for exception elimination:

- Recharge the battery. If the battery can charge normally, it means that the wake-up circuit inside the battery is abnormal. Please contact supplier or authorized dealers for processing.
- Recharge the battery. If the battery cannot be charged normally, please contact supplier or authorized dealers for processing in time.

6.2.2 Charging Abnormal

When the battery cannot be charged, please refer to the following operations for exception exclusion:

- Check whether the charger can work properly and whether the mains voltage is normal.
- Check whether the battery cable is connected firmly, and there is no disconnection.

If reference to the above operations can not locate the problem, please timely contact supplier or authorized dealers for processing.

7 Warranty Explain

In addition to the following and the conditions specified in the contract can be supplier and authorized dealers for reasonable warranty and maintenance.

1 Without the authorization of supplier and authorized dealers, the battery failure caused by disassembly, maintenance and other operations is not within the warranty scope.

2 The battery damage caused by negligence during storage and transportation is not covered by the warranty.

3 The damage to the battery caused by continuous overloading outside the battery's electrical parameters is not covered by the warranty.

4 Without the authorization of supplier and authorized dealers, the battery test without permission causing adverse consequences is not within the scope of warranty.

5 Non-battery problems, due to improper operation and match caused by adverse consequences are not within the warranty scope.

6 The battery damage caused by natural force, force majeure or uncontrollable factors, such as earthquake, typhoon, tornado, volcanic eruption, flood, lightning, snow, war, etc., is not covered by the warranty.

7 The product serial number is changed, blurred or torn, which is not covered by the warranty.

NOTE

The final interpretation right belongs to the manufacturer.