Rechargeable LiFePO4 Battery Pack

12V and 24V models LFP series

INSTRUCTION MANUAL

Dear Customer,

Thank you very much for choosing our product. This manual contains important information about the installation, operation, and safety of the Photonic Universe LiFePO4 battery. Please read this manual carefully before installing the product. Failure to follow any instructions, warnings, as well as commonly accepted safety principles may result in an electric shock, injury or damage to the battery.

Overview

This lithium iron phosphate (LiFePO4) battery is a high-cycle energy storage product that provides a power source for various equipment and systems. This LiFePO4 battery features a built-in electronic Battery Management System (BMS), which manages the battery charging and discharging processes and monitors the battery voltage, current and temperature, ensuring it operates safely and efficiently.

Due to the BMS, the behaviour of this battery in various conditions may differ from other batteries without a BMS, especially if you are used to operating lead-acid batteries. In particular, the BMS may automatically disconnect the battery from your equipment in critical situations, such when your equipment is drawing too much power, including at the start or at peak times (for example inverters) or the battery is being discharged too deeply. The range of BMS protection functions which safeguard the battery from potential damage includes:

- Over charging
- Over discharging
- Over current
- Over temperature

The battery features a low self-discharge rate, which minimises the power loss when the battery is not in use. This ensures that energy is conserved and available when needed.

Instructions for use

Recommended tools

Wire cutter

Crimping modular plier

Screwdriver

Use appropriately insulated tools to prevent accidental electric shock or short circuits. If insulated tools are not available, cover all exposed metal on the tool, except the tips, with electrical tape or use insulated gloves.

Recommended safety gear

Insulated gloves

Safety goggles

Safety shoes

It is strongly recommended that you use personal safety gear when working with batteries, such as gloves, goggles, appropriate clothing, and safety shoes with toe caps.

Choosing a suitable installation location

Make sure that the installation location meets the following conditions:

- The area is completely dry, waterproof and clean.
- The floor is flat and level.
- There are no flammable, explosive or corrosive materials present.
- The ambient temperature is between 0°C and 45°C.
- The distance from any heat source is more than 2 meters.

- The distance from the air outlet of an inverter is more than 0.5 meters.
- The battery is not installed in direct sunlight.
- Avoid installing the battery in confined areas.
- Do not install the battery outdoors and keep all connectors / contacts indoors.

Caution: if the ambient temperature is outside of the operating range, the battery pack will stop operating to protect itself. Frequent exposure to harsh temperatures may deteriorate the performance and shorten the lifetime of the battery pack.

Series or parallel battery connection

It is generally not recommended to connect the battery in parallel or in series with other batteries. If such connection is required, please ensure it meets the following requirements:

1) For 12V batteries, either up to 4 in parallel, or up to 4 in series can be installed
2) For 24V batteries, either up to 4 in parallel, or up to 2 in series can be installed
3) Only identical models of the batteries with the same product code and age can be used. Do not connect different types, brands or sizes of batteries together and do not use old and new batteries in the same bank.
4) The voltage difference between the batteries before connection must be less than 0.5V

Series and parallel connection in the same bank at the same time is not allowed.

Before connecting the battery

- After unpacking, please check the product first. If you find any damage, please contact your supplier.
- Thoroughly check polarity of the cables, to ensure you do not accidentally connect the battery with reverse polarity, which may damage your battery.
- Examine the connecting cables to avoid any short circuits. Use a suitable fuse, automatic overcurrent circuit breaker or another current protection device on the connecting cable within 15cm of the battery terminal.
- Ensure that the electrical parameters of the battery system are compatible with any connected system and equipment. In particular, match the nominal voltage of the battery with the nominal voltage of any charging equipment or loads. Do not connect sources of power like AC or solar panels directly to the battery terminals.
- Keep the battery away from liquids, chemicals and sources of heat. Avoid painting the battery or its components or contacts.
- Do not open, repair, or disassemble the battery or insert anything inside the case.

Maintenance and storage

- If you need to move the battery or perform any maintenance on the system, disconnect the battery from your equipment completely.
- Charge the battery at least once every 6 months. When performing a maintenance charge, ensure the state of charge (SOC) is higher than 30%.

- If the battery was fully discharged, recharge it within 12 hours after that.
- All terminals, connectors, grounding points, cables and screws must be checked at least once a year. Ensure there are no loose, broken, or corroded connectors or parts. Check the installation environment for dust, water, insects etc.
- When cleaning, wipe down the product's surface using a soft, dry cloth. Do not use harsh or abrasive cleaning chemicals or materials on the product, such as detergent, as doing so may damage or scratch the finish.
- In case of any abnormal situations with the battery, especially mechanical damage, please contact your supplier within 24 hours.
- The optimal storage temperature range for the battery pack is -5°C to 35°C. Do not store the battery in temperatures above 45°C.

Note: if you are planning to keep the battery in storage without use for a long time, it is best to keep the level of charge of the battery at **approximately 60%**. Storing the battery with full 100% charge for a prolonged period of time may negatively affect its performance and lifetime.

Environmentally friendly disposal

At the end of its useful life the battery must be disposed of at a local authority specialist waste collection centre or at a recycling company providing this service. **Do not put the battery into the general waste** as it contains toxic substances. Recycling is environmentally friendly and enables the materials of the battery to be recovered to obtain significant savings in energy and resources. As a reminder of the need to dispose of this battery properly, the product is marked with a crossed-out wheeled bin.

Troubleshooting

- **Leakage**. In an unlikely event if the battery pack leaks chemical substances, avoid contact with it. If you have accidentally been exposed to the leaked substance, immediately perform the actions described below depending on the type of contact:
    a. In case of inhalation: leave the contaminated area and seek medical attention.
    b. Contact with eyes: rinse eyes with flowing water for 15 minutes and seek medical attention.
    c. Contact with skin: wash the affected area thoroughly with soap and water and seek medical attention.
    d. Ingestion: induce vomiting and seek medical attention.
- **Contact with water**. If the battery pack has come into contact with water or has been submerged, keep people away from it and contact your supplier for technical support. If applicable, also contact emergency services.
- **Damages**. Damaged batteries are dangerous and must be handled with the utmost care. If damaged, the battery must not be used and may pose a danger to people or property. If the battery pack seems damaged, pack it in its original container and contact your supplier.

Specifications

Model		LFP12-50	LFP12-100	LFP12-200	LFP24-100	LFP24-120	LFP24-200
Nominal voltage		12.8V			25.6V		
Nominal capacity		50Ah	100Ah	200Ah	100Ah	120Ah	200Ah
Nominal energy		640Wh	1280Wh	2560Wh	2560Wh	3072Wh	5120Wh
Life cycles		6000 cycles @ 80% depth of discharge, at 25°C					
Operating voltage		10.8 - 14.6V			21.6 - 29.2V		
End of discharge voltage		10V			20V		
Recommended charging voltage		14.6V			29.2V		
Recommended charging current		20A					
Standard continuous current	Charging	10A	20A	40A	20A	24A	40A
	Discharging	25A	50A	100A	50A	60A	100A
Maximum continuous current	Charging	25A	50A	100A	50A	60A	100A
	Discharging	50A	100A	100A	100A	100A	100A
BMS cut-off voltage	Charging	15.4V (3.85V/cell)			30.8V (3.85V/cell)		
	Discharging	9.2V (2s) (2.3V/cell)			18.4V (2s) (2.3V/cell)		
Operating temperature	Charging	0°C ~ 45°C					
	Discharging	-20°C ~ 55°C					
Storage temperature		-5°C ~ 35°C					
Shipment voltage		≥12.8V			≥25.6		
Case material		ABS + PC					
Dimensions (L x W x H)		260 x 167 x 210 mm	339 x 185 x 218 mm	502 x 186 x 243 mm	502 x 186 x 243 mm	522 x 240 x 218 mm	522 x 240 x 218 mm
Weight		7.5kg	12kg	23kg	22.5kg	27kg	45kg
IP degree		IP 21					
Humidity		5 ~ 95% (RH)					
Altitude		< 4000m					

CB and CBR circuit breakers (optional)

Optional surface mounted (CB series) and recess mounted (CBR series) DC circuit breakers can be purchased from Photonic Universe and used instead of fuses when connecting this battery to your system. A breaker will act as an On/Off isolator switch for the battery and will also provide additional over-current protection to supplement the BMS function. The range of circuit breakers includes 50A, 100A, 120A, 150A and 200A circuit breakers rated for 12V / 24V systems.

Disclaimer

Working with electricity and batteries can be dangerous. The information provided in this manual is for general guidance only. All work should follow the safety standards and should be carried out by an appropriately qualified person.

Photonic Universe Ltd is not responsible for any damage or injury caused by inappropriate installation or use of the product.