



LiFePO4 ENERGY

Apply to energy-storage systems of solar and wind power, wind-solar hybrid power, and small UPS, etc.

PRODUCT MANUAL

MATTERS NEEDING ATTENTION



No harmful
heavy metals



No fireworks



Caution



No children
come near



The reference
manual

- Please read the manual carefully before using the battery. If any problems caused by the failure to operate according to the instructions, the company will not be responsible.
- Avoid putting any heavy strength on the battery LCD screen and keep it clean and dry. Pay attention to whether there is an alarm sound, if there is, please maintain the battery as required.
- Please do not short-circuit the battery, such as do not connect the positive and negative of the battery directly with metal objects.
- Please do not knock, throw or trample on the battery.
- Do not put the battery in water or soak it.
- Do not charge or use or store the battery near fire or under an extremely hot condition!
- Do not pierce the battery case with nails or other sharp objects.
- Do not disassemble the battery in any way.
- In order to maintain the battery life with less to go wrong, the fact that batteries are not allowed to be used in series or in parallel. You may as well contact us for a single battery pack when higher voltage or capacity is required. If it is necessary to use temporary series or parallel connection, the following principles should be

followed:

- ① Batteries can be used in series or in parallel respectively, with no more than 4 ones in series or 2 ones in parallel for 12V batteries, and with no more than 2 ones in series or 2 ones in parallel for 24V batteries.
 - ② Batteries in series or in parallel should be the ones of the same batch.
 - ③ Batteries in series or in parallel should be in the same charge condition, for example, they are all in full charge.
 - ④ Do not mix new batteries with old ones for using in series or in parallel at the same time.
- Please stop using deformed batteries or the ones giving off odor.
 - Isolate them and contact our professional and technical people in time.
 - If electrolyte splashes into eyes after battery leakage, please don't wipe. Rinse with water immediately and seek medical assistance in time when it is serious;
 - The ambient temperature will affect the discharge capacity.
 - When the temperature over the standard one ($25^{\circ}\text{C} \pm 5^{\circ}\text{C}$), the discharge capacity will decrease slightly;
 - When the voltage of 12V battery is lower than 13.00V and the voltage of 24V battery is lower than 26.00V, do not discharge and charge it as soon as possible.
 - When charging the battery, the charging voltage of 12V battery should not be higher than 14.60V, and the charging voltage of 24V battery should not be higher than 29.20V.
 - After continuous use, the battery should be allowed to stand for more than 10 minutes before it can be tested and disassembled.

INSTALLATION TO USE AND MAINTENANCE

- Avoid the contact with battery by the children and pets.
- Please fully discharge the power of battery before recycling (or disposing of) the battery.
- Select the fit battery model according to the demand. Before choosing the right battery type, please be fully aware of the charging and discharging parameters of your power system. If the relevant battery parameters (such as BMS parameters) do not match the power system, it will not only cause the system unable to use normally, but also damage it and the battery.
- Check the battery voltage before installation; if the voltage of 12V battery is lower than 13.00V and the voltage of 24V battery is lower than 26.00V, please charge the battery before use.
- Special LiFePO4 chargers or charging cabinets should be used for charging. The charging voltage is limited to 14.40~14.60V for 12V battery and 28.80~29.20V for 24V battery, and the charging current should be lower than the max one of the corresponding model in the reference specification table, and the ambient temperature is 0~45 °C.
- Please remove the battery from the appliance when charging it with the charger. Some LiFePO4 chargers have the limit of the minimum starting voltage (generally 3-5V). After the BMS triggers the over-discharge protection, remove the load and measure the voltage nearly close to 0V. At this moment, the battery cannot be charged with this kind of charger, but it is a good way to use the charging cabinet for charging or charge directly in the equipment with charging system.
- The empty battery shall be charged for 10 hours at the standard current (0.1 C) in the specification and model table and shall be charged for 5 hours at the maximum current (0.2 C) in the specification and model table, with limit voltage 14.40~14.60V for 12V battery and limit voltage 28.80~29.20V for 24V battery, and then the battery can be used; please do not charge the battery for a longer time.
- The battery terminals showing “+”, “-” should be respectively connected with the positive and negative connecting wires of the energy storage system. Please connect the positive one first and ensure that the connection is firm, if not, the terminal position may be quite warm or even hot, or even there is plastic deformation and melting at the terminal position. Reverse connection is strictly prohibited, otherwise the electrical equipment will be damaged!
- Due to different usage divides, it is normal that the recording function of the battery used days is not activated. It will be activated after 2-3 times of use.
- Some batteries go with EVA foam and double-sided adhesive. Users can cut, paste and fill the battery by themselves to facilitate the installation.
- Please check the battery regularly every month during use to make sure that the battery terminals are clean and firmly connected. If the voltage of 12V battery is lower than 13.00V and the voltage of 24V battery is lower than 26.00V, please charge it in time.

- In order to make you have a better use of OUTDO LiFePO₄ energy storage batteries that produced by our company, please read this manual carefully before use.
- This manual is applicable to OUTDO intelligent digital display LiFePO₄ energy storage lithium battery and LiFePO₄ energy storage lithium battery

OPEN-BOX INSPECTION

Each battery box is equipped with an OUTDO LiFePO₄ energy storage battery and a manual.

APPLICATIONS

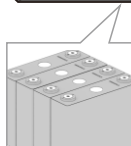
Apply to energy-storage systems of solar and wind power, wind-solar hybrid power, and small UPS, etc.

PRODUCT FEATURES

- 100% pre-delivery inspection with stable, reliable and long-term quality assurance.
- Rated above IP65, the full-waterproof design enables the battery to be used normally in rainy or outdoors.
- Safe and reliable with the LiFePO₄ cell and laser-welding.
- Long service life even reaching more than 8 years with proper use.
- Low self-discharge rate without frequent maintenance.
- Easy to use without any leakage and completely maintenance free.
- No corrosive liquid or harmful heavy metals, environmentally friendly.
- The intelligent e-chip monitors the status of the battery in real time, gives an alarm when the capacity is insufficient or the voltage is abnormal, and automatically records the battery service days.

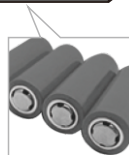
INSTRUCTIONS

LiFePO₄ energy storage battery is a kind of intelligent lithium-ion battery with high water resistance and LCD screen touching functions, which can monitor the battery status and battery service days in real time. When abnormal voltage and insufficient capacity are detected, the battery will remind users to carry out maintenance in time for a longer life.



Square LiFePO₄ Cell

or



Cylindrical LiFePO₄ Cell

USAGE

- The battery is usually at the power-saving mode.
- Press the key to enter the normal mode (the LCD screen will display), and 5 seconds into the power-saving mode.
- After the battery gets started, the day-recording function will be activated.
- The battery will end up at the power-saving mode. When the voltage is abnormal, the alarm will sound and the screen will display "Maintain".
- The battery has four modes: normal, power-saving, prompt and alarm.

NORMAL MODE

If the LCD is on for a long time, press the key within 5 seconds to switch between the voltage and days display. If there is no key operation within 5 seconds, it will enter the power-saving mode.

POWER-SAVING MODE

No LCD displays and no alarm sounds.

PROMPT MODE

The LCD screen flashes to prompt the user for maintenance. Press the key within 5 seconds to switch between the voltage and days display. If there is no key operation within 5 seconds, it will enter the power-saving mode.

ALARM MODE

When the battery is abnormal, the LCD will flash and the alarm will sound for 5 minutes to warn the user to carry out maintenance. After the warning, if the user does not deal with maintenance, it will enter the prompt mode. The above warning, every 4 hours for a cycle, lasting 48 hours, finally enters the prompt mode.

EXIT OF ALARM MODE

In the alarm mode, press and hold the key for 3S to exit the alarm mode.



The day-recording function will be started automatically when the battery is used initially.

Two interfaces for voltage and days display are on the battery screen, and both of them can be switched by touching the PUSH button. The 24V voltage battery is shown in the above picture as an example.

Intelligently set off the alarm when the battery voltage is abnormal. $12V \geq 15.00V$, $24V \geq 30.00V$. The 24V voltage battery is shown in the above picture as an example.



24V voltage battery shown in the above picture as an example.

LCD SCREEN

The battery has two states: activation or non-activation:

- Batteries are not activated when delivered from the factory. "000" is displayed for the day recording, which is in the forbidden state. The display functions of the voltage, power and the alarm are normal.
- Generally, the battery can be activated when firstly used. However, batteries may have an activation delay due to the different applications. It is normal for the battery to have 2% deviation on the used days.
- The recorded days begin to accumulate after the battery is activated, and when the battery is abnormal, the buzzer will give an alarm so as to prompt the users to maintain the battery timely.

POWER LEVEL	BATTERY STATES		Voltage States
	Screen Flash	Alarm	
	-	-	(12V) 12.70V~13.00 (24V) 25.40V~26.00V
	-	-	(12V) 13.00V~13.20 (24V) 26.00V~26.40V
	-	-	(12V) 13.20V~15.00 (24V) 26.40V~30.00V
	The space flashes showing Maintain	-	If the voltage of 12V battery is less than 12.7V, and the voltage of 24V battery is less than 25.40V, the battery must be charged or maintained.
	The full flashes showing Maintain	"tick...tick..."	If the voltage of 12V battery is $\geq 15.00V$, and the voltage of 24V battery is $\geq 30.00V$, the battery has already got overcharged. Stop charging immediately and let the professional maintain it.

SPECIAL STATEMENTS

- LiFePO4 energy storage batteries have a built-in BMS system with the protecting functions of over-charging, over-discharging, over-temperature and so on. In the case of abnormal or extreme use, the battery will automatically cut off the protection so as to avoid causing safety accidents and ensure the service life of the product. The following are the common situations that will cause the cut-off protection:
- The use of improper chargers or the failure of charging devices may result in an overcharged battery, which can trigger the overcharge protection function of BMS to cut off the charging circuit of the battery. At this time, the measured voltage of the battery is close to 0V. Please disconnect the charger or charging device from the battery in time and replace a proper and normal charger. When the internal voltage of the battery drops back to the normal, the BMS will cancel the protection function. And then the external measured voltage returns to normal and the battery can be used again;
- The battery is discharged continuously out of the battery being long-time used or a switch being connected all the time, which then results in insufficient voltage and over discharge. And the battery BMS will automatically cut off the discharge, at this time, the battery voltage is close to 0V. Please turn off the power-consuming device in time and remove all the battery load (such as switching off the air

switch of inverters). Meanwhile, due to the different BMS equipped, the following two situations will occur: ① Some battery BMS will cancel the protection function and the voltage will return to normal. Please recharge the battery in time; ② Some battery BMS will continue to maintain the over-discharging protection state. At this time, the battery needs to be charged to remove the protection state and then returns to normal.

- If the battery is used in a high temperature environment (over 35°C) and the load reaches the max. value of the specified current causing the temperature inside the battery to rise continuously, the BMS will automatically cut off the discharge after reaching a certain temperature. And currently, the measured voltage of the battery is close to 0V. Please disconnect the load timely, and wait for a cooling time(15 to 30 minutes) of the battery internal temperature to return to normal, and the battery can be used again when the voltage also being normal again.
- Other abnormal conditions that are not mentioned may also lead to the battery BMS triggering cut-off protection due to various factors. If it is not used properly or there are other situations that do not sink in, please contact our company or find professionals to deal with them in time.

STORAGE AND TRANSPORTATION

- When the battery needs to be stored for a long time, please charge the battery pack to a power level of 30%~70% (discharge the battery with 0.5C current to 10.00V for 12V battery and 20.00V for 24V battery, charge with 0.2C constant current for 15~3.5 hours, limit the voltage from 14.40V to 14.60V for 12V battery and from 28.80 to 29.20V for 24V battery, and the LCD will display two to three grids of power), and place it in a dry and ventilated place, and maintain it once every three months.
- Battery storage should avoid contact with corrosive substances and be away from fire and heat sources.
- The battery should be stored in a dry and ventilated environment with the temperature of 0~40°C and humidity below 70%. If the battery is stored for a long time, the best temperature for storage is 0~25°C and the humidity is below 50%. Store the battery in a high temperature will accelerate it self-consumption.
- When the battery is transported, it should be ensured that the battery has 30% ~ 70% power (two to three grids).
- Please use insulating and shockproof materials for the packaging of batteries during transportation.
- In the process of battery transportation, avoid violent bumping or collision. And when loading and unloading, please handle with care to avoid throwing and collision.
- Please do not transport batteries with inflammable, explosive and sharp metal articles.

WARRANTY TERMS

The new batteries should be used according to the manual, but not under the following circumstances:

- After purchase, the package is damaged or the sticker on the battery is torn.
- The battery is damaged due to overcharge or overdischarge.
- The battery is damaged due to improper use, such as short circuit, over-current, bump, drop, immersion, use of mismatched charger, etc.
- The appearance of the battery is damaged, or the battery is disassembled artificially.
- The battery is damaged by natural or man-made disasters, such as earthquake, rainstorm, fire, traffic accident, etc.
- Battery damage is caused by the failure of electrical equipment, inverter, etc.
- The batteries are used in series and in parallel.
- The battery is damaged due to other non-specified uses.
- The company shall not be responsible for any accident caused by operation in violation of the manual;
- This manual is subject to change without prior notice due to improvement of product quality or upgrading of relevant technical parameters. For the latest product information, please contact us.