



The information in this Instruction Manual relates to X2Power Deep Cycle Lithium Batteries, with Bluetooth communication technology. These batteries are designed for deep cycle use only, and should not be used in starting applications.

Battery Features

Lithium Iron Phosphate (LiFePO₄) batteries offer outstanding power density, high-power output, along with a low self-discharge. They are ideal for deep cycle applications and have unique features including:

- Optimum Safety - A built-in Battery Management System (BMS) controls the performance parameters of the battery, protecting against over-charging and over-discharging
- Bluetooth Connectivity - Connect to the X2Power App for instant access to the battery's state of charge, performance elements, cycles, and more.
- Faster Recharge - Charging can be up to 4x faster than a comparable lead battery.
- Longer Cycle Life - Lithium discharges differently than lead, providing more run time for each discharge cycle.
- More Cycles - Designed for over 2000 battery cycles.
- Lightweight - Designed with easy transport and installation in mind, battery weight is approximately 50% less than a comparable lead battery.
- Internal Thread Design - Makes for a secure connection and clean power flow.

Battery Management System (BMS)

X2Power Lithium Iron Phosphate batteries are considered "smart", as they contain a printed circuit board that controls and optimizes the performance of the battery. This board, or Battery Management System (BMS), can balance cells, monitor state of charge, state of performance, and serve as a protection circuit. X2Power batteries integrate Bluetooth communication with the BMS to receive real-time updates on your battery's condition from our exclusive X2Power app (available in the Apple App Store and the Google Play Store.)



MANAGE YOUR BATTERY WITH THE
X2 MOBILE APP
DOWNLOAD NOW!





X2Power App

The App highlights key performance metrics in the dashboard, when connected to a battery.

- Voltage: the voltage reading of the battery at that point in time.
- Current: the amount of energy leaving the battery, measured in Amps
- Power: the total of voltage and current multiplied together, measured in Watts
- Cycles: one cycle occurs any time the battery is subjected to 80% cumulative discharge
- Charging Time: the time required to achieve full charge, measured in minutes
- FCC: the estimated battery capacity at Full Charge, measured in Ampere Hours
- Temperature: the temperature reading of the battery at that point in time, measured in degrees Fahrenheit.

Protection Mode

The X2Power App will provide notifications related to the battery performance, as recognized by the BMS. The BMS can balance cells, monitor state of charge, state of performance, and serve as a protection circuit. If select criteria are met, the BMS will go into protection, often referred to as Sleep Mode. When a BMS enters Sleep Mode, either or both the charge and discharge circuits will be turned off - this is commonly recognized with Zero Open Circuit Voltage.

Common Scenarios for Protection Mode:

- Over/Under Voltage
- Over/Under Temperature
- Over Current/Short Circuit

Please Note;

- Protection can be triggered due to any of these reasons, and sleep mode acts as an indication of active protection.
- While under protection, either or both charge and discharge circuits of the battery have been 'turned off' to keep the cells safe, and action has to be taken to release the protection.
- It can be as simple as removing the trigger, i.e. bringing external temperature up or down, or disconnecting the battery from the device for a couple of seconds, or applying a short charge. It depends on what triggered the protection.

Troubleshooting

The X2Power App may provide the following notifications regarding battery performance, as part of the Protection Program Start.

- "Cell Over Voltage (COV)" one cell is overcharged – remove the charger and allow the balance circuit to lower the voltage of that cell
- "Cell Under Voltage (CUV)" one cell is over discharged – charge as soon as possible
- "Pack Over Voltage (POV)" battery is overcharged – remove charger and allow balance circuit to lower the voltage of the battery
- "Pack Under Voltage (PUV)" battery is over discharged – charge as soon as possible



Troubleshooting Continued

- "High-Temp Charging (OTC)" battery is over temperature while charging – remove charger and allow battery to cool
- "Low-Temp Charging (UTC)" battery is under temperature while charging – move the battery to a warmer location and charging will resume
- "High-Temp Discharging (OTD)" battery is over temperature while discharging – remove load and allow battery to cool
- "Low-Temp Discharging (UTD)" battery is under temperature while discharging – remove load and move battery to a warmer location
- "Over Current Charging (OCC)" charging current is too high – lower charging current
- "Over Current Discharging (OCD)" discharging current is too high – reduce load
- "Short Circuit (SCD)" short circuit detected – remove short circuit
- "Front-end detection IC error" internal error – possible permanent protection. Please visit a Batteries Plus® retail store, or by calling 800-677-8278 to review status.
- "Software lock MOS" internal error – possible permanent protection. Please visit a Batteries Plus® retail store, or by calling 800-677-8278 to review status.

Other areas to evaluate for performance:

- Has there been prolonged exposure to high temperatures? Prolonged use in high temperature (113°F) may permanently damage the BMS
- Has there been prolonged exposure to ultra low temperatures? Prolonged use in ultra-low temperature (- 4°F) may permanently damage the BMS.
- Has there been prolonged exposure to high humidity or moisture impact to the internal components of the battery? Prolonged use at high humidity (80%) may permanently damage the BMS.
- Is there physical damage to the case or terminals of the battery? Housing damage causing water to enter the battery will result in BMS corrosion and permanent damage.
- Has the battery sat in a discharged state for an extended period? After the battery is protected for low voltage, if the battery is not charged for a long time, this will lead to cell damage and eventual failure to reactivate the battery.
- Has the battery been exposed to the maximum current charge or discharge in repeated succession? Long-term max current full charge and discharge may permanently damage the BMS.
- Has the battery been fully charged before connecting in Series or Parallel? Using the battery in series or in parallel without balancing before use or after 3 months of use may permanently damage the BMS.

Temperature and Storage

Temperatures can have an effect on a battery's performance. Lithium Iron Phosphate (LiFePO₄) batteries have specific operating temperature ranges. Operation outside of these ranges may trigger the protection mode of the BMS, or may cause permanent damage.



Operating Temperature Range

- Charge 32°F (0°C) to 131°F (55°C)
- Discharge -22°F (-30°C) to 140°F (60°C)

Recommended Temperature Range for Extended Storage

- 50°F (10°C) to 77°F (25°C)

Do not store the battery in high temperatures or a humid environment for long periods of time. A battery's life will be reduced if kept in high temperatures for long periods of time (i.e. more than 30 days), and the battery can be permanently damaged if stored in temperatures above 55°C (131°F). Damaged batteries caused by incorrect storage are not covered by warranty. For seasonal storage we would recommend either removing the battery from the application or disconnecting the negative battery cable to eliminate any off-key current draw on the battery. Be sure to insulate the cable for storage.

Series & Parallel Connection Instruction

LiFePO₄ batteries can be connected in series or parallel to obtain larger capacity or higher voltage. The maximum configuration is 4 in series or 4 in parallel.

When connecting batteries in series or parallel, three conditions must be met:

- Batteries must have the same chemistry, voltage, capacity, and identical BMS.
- Batteries must be the same brand.
- Batteries must all be no more than three months apart in age.

Batteries connected in Series or Parallel must be charged using an appropriate charger designed for multiple batteries (voltage managed) or a multi-bank charger. Ensure that the best connection method is being used across the battery string, for optimal and efficient charging to each individual battery. The charger used must be suitable for the lithium battery.

Charging

The new battery can be used directly if the voltage is at least 3.35V/cell, although we do recommend that you charge your new battery until it is fully charged with a lithium compatible charger. The charging voltage should NEVER be higher than 3.75V/cell. Charge the battery with a lower current than the Recommended Max Charging Current found in the charging specifications.

If the battery seems abnormally hot to the touch, stop charging immediately. After charging, leave the battery for 1 to 2 hours before checking the voltage. If the battery's voltage is less than 3.25V/cell, double check the charger's functionality. Please check the battery's state of health before installation, using the App, and test it if necessary.

Note: The LiFePO₄ battery's cell has a nominal voltage of 3.2V (12V = 4 cells, 24V = 8 cells, 36V = 12 cells, 48V = 16 cells).



Charging Recommendations - Charging Temperature Range: 32°F (0°C) to 131°F (55°C)

Model	Recommended Max Charge Current	Max Continuous Discharge Current
X2P-31MLI-150-BT	75A	125A
X2P-31MLI-125-BT	62.5A	100A
X2P-27MLI-125-BT	62.5A	125A
X2P-27MLI-100-BT	50A	100A
X2P-24MLI-100-BT	50A	100A
X2P-24MLI-75-BT	37.5A	75A
X2P-12-50MLI-BT	25A	50A
X2P-12-20MLI-BT	10A	25A
X2P-24VMLI-60-BT	30A	60A
X2P-36VMLI-40-BT	20A	40A

Warranty

A new battery under regular use comes with a limited warranty against defective workmanship and materials. Please review the [X2Power Lithium Batteries with Bluetooth Limited Warranty](#) document or contact 1-888-9 ASCENT for full details.

Caution

- Insulate all terminal connections to avoid battery damage.
- Do not charge the battery using a lead acid charger with an automatic desulfation mode.
- Do not short-circuit the battery or reverse its polarity.
- Do not disassemble, deform, or modify the battery.
- Do not directly connect the battery to an electrical outlet.
- Do not over-charge or over-discharge the battery.
- Keep the battery out of reach of children and pets.
- Make sure the battery is fully discharged before proper disposal.
- Do not open or attempt to take apart the battery.
- Charge battery at least every 6 months or when voltage is less than 3.2V/cell.
- For best performance and longer life, we recommend using a charger designed for lithium.
- Do not use the battery in combination with batteries of different chemistry, capacity, type or brand.
- Failure to follow instructions may cause permanent damage to the battery, endanger personal safety, and nullify warranty coverage.

**X2Power Lithium Deep Cycle Batteries
Instruction Manual**



batteriesplus.com

Replacement and recycling at Batteries Plus®

Distributed by Ascent Battery Supply, LLC.

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