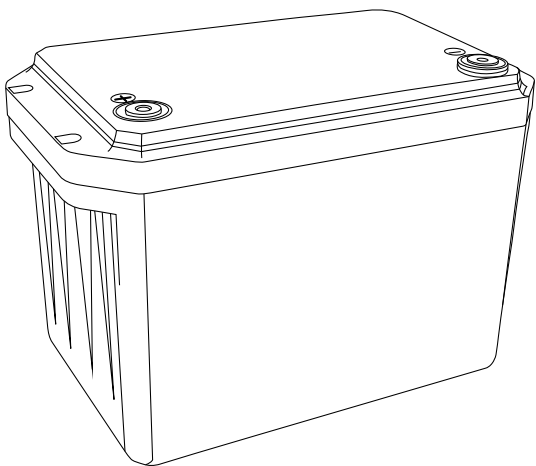


PLEASE READ THIS MANUAL BEFORE USE

LITHIUM BATTERY

**Owner's Manual and
Safety Instructions**



LiFeP04 Deep Cycle

smartbatterytechnologies.com.au

INTRODUCTION

Please be sure to read the following guidelines before installing your new Lithium LiFePO₄ Deep Cycle battery. Misuse may result in damage to the battery and/or cause harm or serious injury. This User Manual explains how to connect and safely operate your Deep Cycle Lithium battery. As with all batteries, please consider the mechanical and environmental conditions the battery will be operated in to maximise performance and achieve long battery life. If you are in any doubt with how to operate your battery contact the retailer where you purchased your battery.

SAFETY INFORMATION

Your Lithium Deep Cycle Battery contains lithium iron phosphate LiFePO₄ cells. While LiFePO₄ cells are the safest Li-Ion chemistry, the stored chemical energy represents a risk of fire, burns or explosion if misused.

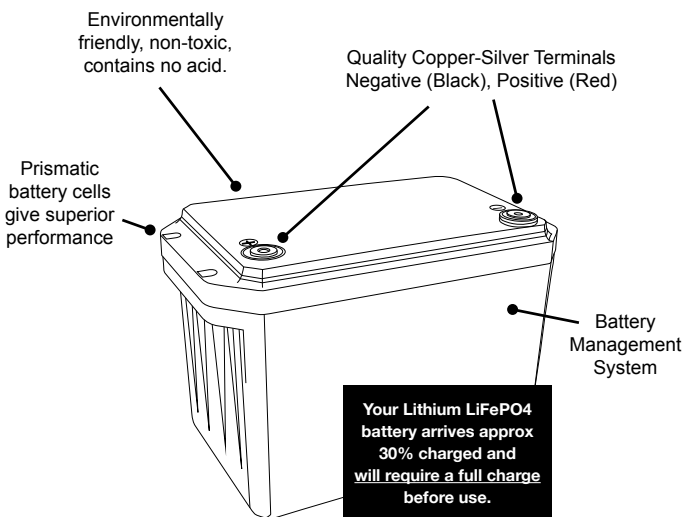
- Do not use or store the battery near high temperatures, sparks or flames.
- Do not short-circuit the battery. For example, do not connect metal objects directly to the battery positive or negative.
- Do not charge batteries in an inverted position.
- Do not damage the battery by dropping, knocking, throwing, trampling, etc.
- Do not pierce the battery or drill into the enclosure.
- Do not apply undue force to the terminals or bend them.
- Avoid applying heat to the terminals through processes such as soldering.
- Do not disassemble or refit.
- Do not expose the battery case and lid to organic solvents or adhesives.
- In case of any battery abnormality, such as unusual odour or deformation, stop using the battery immediately and isolate it.
- Keep children and pets away from batteries.
- Ensure the battery is safely secured before travel.

RECYCLING

Your lithium battery is recyclable at permitted treatment facilities. Discharge the battery before recycling (disposal).



ABOUT YOUR BATTERY



WHAT IS LiFePO4?

Lithium Iron phosphate (LiFePO₄) batteries are a type of lithium ion (Li-Ion) rechargeable battery in which lithium ions move from the negative electrode (anode) to the positive electrode (cathode) during discharge and back again when being charged. LiFePO₄ batteries provide reliable power, are environmental friendly containing no toxic substances, fast charging and long lasting in a compact, lightweight package.

BATTERY CARE

To ensure a long and safe life from your battery, please ensure you consider the following:

- Store where it's dry, clean, shaded and well-ventilated at a temperature between 0°C to 40°C when charging.
- During storage store at approx 50% State of Charge (SOC).
- Charge every 6 months if in an unused situation.
- Keep the top of the battery and its terminals clean.
- Protect the battery from being dropped, turning over and serious stacking during loading.
- Can be mounted on it's side.

The lifespan of a deep cycle battery will vary considerably with how it is used, how it is maintained and charged, temperature, and other factors. With good care, your Lithium battery should have a long lifespan.

CYCLES VS LIFE

The lifespan of a Lithium LiFePO₄ Deep Cycle battery is directly related to how deep the battery is cycled each time. A cycle is what percentage of the battery capacity is being used each time, when discharging from fully charged to a percentage Depth of Discharge (DOD) and then charging to full again. The DOD describes the percentage of the battery capacity used each time.

Check your battery specifications for the expected life cycle.

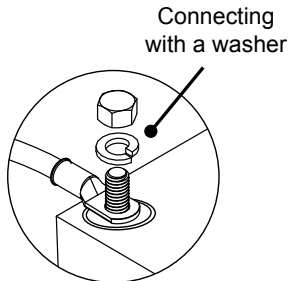
INSTALLATION

Your Lithium LiFePO₄ Deep Cycle Battery is designed for single, series or parallel use. Only connect batteries of the same type, model, capacity, and age.

This battery is not designed for, nor should it be fitted into an engine bay or other area subject to high heat.

To install your battery:

- Before making any electrical connections to or from your battery, secure the battery in place. Fasten tightly and make provisions for shock absorption if exposure to shock or vibration is likely.
- Once secured in place, unscrew the metal nut from the terminals with a spanner or adjustable wrench, red (+) positive, and black (-) negative. Be careful not to short-circuit the battery with any metal objects across the terminals.
- Ensure the charging source cables have M8 ring terminals suitable size to match the battery M8 terminals.
- **NOTE:** Do not place anything such as a washer between the battery terminal and the cables.
- Connect the charging and load cables to the battery, red (+) positive, and black (-) negative. Fastening the nut for each tightly without excessive torque or over-tightening.
- It is good practice to ensure that the connections are re-torqued and the batteries are cleaned periodically.



BATTERY MANAGEMENT

Your Lithium LiFePO₄ Deep Cycle battery is equipped with an internal Battery Management System (BMS). The BMS monitors the battery's state and ensures the safety of operation.

INTERNAL BATTERY MANAGEMENT SYSTEM

For Lithium Deep Cycle batteries equipped with an internal BMS, the BMS will control the charging flow and ensure your lithium battery is safely charged under the correct charging parameter. There are 2 temperature sensors (1 for prismatic cells and 1 for the BMS itself) to protect against over-charging, over-discharge and short-circuiting. The BMS will limit discharge, manage cut-off voltage and protect the inner cells. It also contains a circuit that handles cell balancing, low voltage cutoff, high voltage cutoff, short circuit protection and high temperature protection improving performance and increasing the longevity of the battery.

BLUETOOTH MONITORING

Lithium Deep Cycle batteries equipped with a Bluetooth enabled BMS can be monitored via Bluetooth with a Smartphone and the SMART BMS App.

Use the app to access accurate data from your battery including current cycles, current state of charge, minimum/maximum voltages and view individual voltages of each battery cell.



To connect to your Smartphone

1. Download the SMART BMS App from the Apple App Store or Google Play for Android
2. Connect to your battery with Bluetooth
3. Monitor your battery

Note: Parameters are not user accessible.

CHARGING YOUR BATTERY

Your Lithium LiFePO₄ battery arrives approx 30% charged and will require a full charge before use.

CHARGE THE BATTERY

- When the voltage is lower than 12.8V, the battery should be charged as soon as possible rather than discharging again.
- The charging voltage should be lower than 15V during charging the battery.

Pending the BMS inside the battery, capacity of the battery and size of the charger used, a Lithium battery can take anywhere from 3 to 12 hours to fully charge.

This chart shows the resting voltage of a lithium battery compared to its state of charge in percentage, this is only a guide and accuracy may vary depending on what you are using to measure the voltage. The voltage should be measured while the battery is resting, not while charging or discharging as that will skew the results. 13.4V or above resting can be considered fully charged.

Voltage	Capacity
14.4V	100%
13.6V	100%
13.4V	99%
13.3V	90%
13.2V	70%
13.1V	40%
13.0V	30%
12.9V	20%
12.8V	17%
12.5V	14%
12.0V	9%
10.0V	0%

CHARGING WITH A BATTERY CHARGER

To ensure that your battery can charge fully and in a reasonable amount of time, the charger:

- does not have to have a lithium profile to work.
- does need to be the right size for your battery and output power in the correct voltage range.
- with a Lithium profile, should be at least 10 Amps.
- without a Lithium profile, should be at least 15 Amps, set to AGM as this tends to be the closest in voltage to what the lithium batteries want to charge at.

If you have a large battery over 200AH or multiple batteries totaling more than 200AH then we recommend using a charger at least 10% of the size of the battery, so a 300AH battery bank would need at least a 30 Amp charger.

If your charger does not meet the requirements, it won't damage the lithium battery due to the inbuilt safety measures, but it may not charge the battery or only charge to a low level. If this is the case contact the retailer for a range of Ardent Lithium Battery Chargers.

CHARGING WITH A SOLAR CHARGER SOURCE

Your Lithium Deep Cycle battery can be charged with solar panels. Make sure to use a Maximum Power Point Tracking (MPPT) Regulator to regulate the voltage and current output of your solar panels to efficiently charge your lithium battery.

Conversely, add an Ardent Battery Box with Anderson Plug Connections. An Anderson style plug is a moulded, heavy-duty connector designed for high current 12V circuits. They are commonly used to create a safe and secure power connection between a battery and the solar panels. Most modern caravans and campers have an Anderson style plugs installed from factory.

CHARGING TOO HIGH

If you charge your Lithium Deep Cycle battery above 15V for a 12V battery, the BMS inside the battery terminal will turn off. The cut-off voltage settings will vary slightly depending on current levels, temperature and part tolerances.

To turn ON the battery again, disconnect the charging source and let the battery rest for several seconds (~30 sec). It should come on.

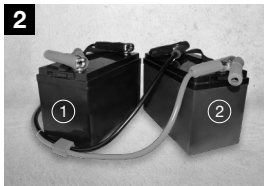
If the 12V battery has voltages higher than 18V, the internal BMS is damaged and will not turn ON. Battery life for a lithium battery can be enhanced by not discharging the battery to 1Ah capacity or BMS lower voltage cut-off settings. Discharging down to BMS lower voltage cut-off settings can quickly decrease the life of the battery. Discharge down to 20% capacity remaining then re-charging the battery.

CHARGING A LITHIUM DEEP CYCLE BATTERY IN SAFE MODE (LOW VOLTAGE)



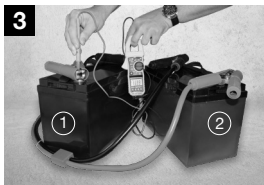
WITH A CHARGED BATTERY

If you have a charged battery (E.G. car battery) and jumper cables, follow the below steps in sequence to bring your Lithium battery out of safe mode.

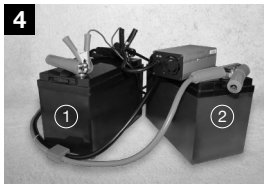


1. Disconnect all loads/inputs from the Lithium battery.

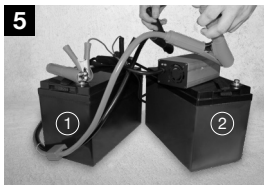
2. Connect the Lithium battery in parallel to a different battery (battery number 2).



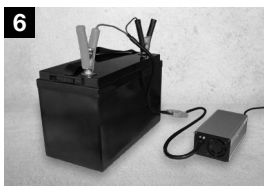
3. Cross reference the voltage on each battery now they are in parallel – they should both now read a similar voltage.



4. Connect an AC to DC charger to the Lithium battery and allow it to begin charging. We recommend a 20 amp or higher charger.



5. When the charger begins to charge the Lithium battery, disconnect battery number 2.



6. The charger should continue to charge the Lithium battery, bringing it out of safe mode.



7. Allow the charger to fully charge the battery.

CHARGING A LITHIUM DEEP CYCLE BATTERY IN SAFE MODE (LOW VOLTAGE)



WITH A JUMP STARTER

If you have a portable Jump Starter, follow the below steps in sequence to bring your Lithium battery out of safe (low voltage) mode.



1. Disconnect all loads/inputs from the Lithium battery.



2. Connect the Jump Starter cables to the battery (Positive to Positive, Negative to Negative)



3. Connect an AC to DC charger to the Lithium battery. We recommend a 20 amp or higher charger.



4. Activate the jump starter to supply power to the Lithium battery. The charger will now detect the battery and begin to charge.



5. When the charger begins to charge the Lithium battery, disconnect the Jump Starter from the battery.



6. The charger should continue to charge the Lithium battery, bringing it out of safe mode.

7. Allow the charger to fully charge the battery.

WARRANTY

Full warranty information for your Lithium Deep Cycle battery is available at the retailer you purchased your battery through.



Register a warranty

WARRANTY CONDITIONS

- The warranty period is not renewed or extended as a result of a warranty repair or replacement.
- The sales receipt for the product must be provided as a proof of purchase when a warranty claim is made
- The warranty is not transferable and is only offered to the original end user of the product.
- The warranty only applies to products purchased through authorised resellers.
- To the extent that any conditions or warranty implied by law is excludable, such a condition or warranty is excluded.

WARRANTY EXCLUSIONS

Warranty is void if the defect or fault is caused by:

- Failure to follow proper installation, operation or maintenance of the product.
- Inappropriate or improper use of product for purposes other than that for which it was designed.
- Neglect, lack of care, poor handling or accidental damage.
- Repairs, alterations or modifications performed by a third party or without explicit consent.
- Tampering or alterations to the product markings or labelling.
- Contamination of product by foreign material.
- Incorrect charging, including overcharging and/or undercharging.
- Use of batteries in golf buggies or mobile scooters.

If in doubt about the warranty period on your product, please contact the retailer you purchased your battery through.

Manufactured in Australia by



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Australia's leading lithium manufacturer offering locally made lithium batteries, supporting local residents and workers and ultimately delivering premium Australian made lithium batteries nation-wide.

**AUSTRALIAN OWNED
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