Lithium Batteries Instruction Manual

Lithium batteries use the LiFePO4 (LFP) technology due to its very high safety and improved durability compared to other Lithium technologies.

Please read the instructions and warnings carefully to ensure you get the most out of your battery.

Warnings

- Avoid exposing the battery to heat, high voltage, or direct sunlight.
- Never short circuit the positive and negative terminals.
- Never ship or store the battery along with metal as that may short out the terminals.
- Never disassemble the battery.
- Ensure your battery is protected from knocks or other mechanical impacts.
- Ensure the battery is never immersed in water.
- Never install in under bonnet applications or where temperatures may exceed 55°C.
- Do not use in a starting application unless explicitly designated for such use.
- Always use a Lithium or AGM charger setting with upper voltage limits of between 14.2V and 14.6V. Do not use a Calcium or Flooded charger setting.
- If using an inverter, ensure that it does not exceed the maximum current specifications of the battery. NOTE: The in-rush current on connection for some inverters may trip the surge protection.

Storage Tips

- Ideal storage temperature is between 0°C - 35°C.
- At the ideal storage temperature, the battery should be charged every 6 months.
- Do not leave the battery in a low state of charge for long periods of time.
- Keep the battery away from high temperatures
- Do not store the battery at a temperature above 60°C.

- If battery shows signs of deformation, heat or emits a smell, immediately discontinue use.

Charging

- Always use a battery charger with a Lithium or AGM profile that does not exceed the charging specifications of the battery and does not have a Sulphation/ Equalisation mode used by some lead acid batteries.
- The charging table below should be followed when charging.

Battery Voltage	12V
Max Charge Voltage	14.6V
Float Charge Voltage	13.6V

- Do not leave Lithium Batteries on float charge for an extended period if not in use.
- Please ensure your charger is matched to the current rating of your battery and take note of the recommended charge current in the batteries specification sheet – normally half the batteries rated capacity.

Note - your warranty will be void if the battery is not charged within the above charging guidelines.

Discharging

- A low voltage cut off device is strongly recommended and set to above the over discharge voltage threshold as shown in the specification table.
- If the over-discharge protection is activated, charge battery within 15 days.

Waking up a battery from over-discharge

If the battery is over-discharged this will cause it to drop below its operational voltage and the BMS will activate, putting the battery into protection mode.

To identify whether your battery is in protection mode you can check the voltage using a multimeter, if the battery is below 10.5V then the BMS is in protection mode. In Bluetooth models, the mobile application can be used to check the status of the battery.

To wake the battery up, use a charger with a Lithium profile and an in-built wake up function or connect a 12V power supply such as another 12V battery to the terminals.

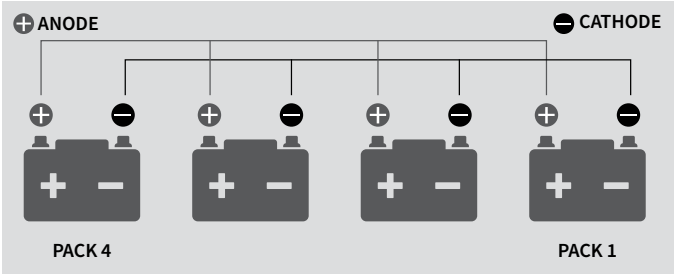
A low-voltage cut-off device is recommended and set to the below voltages to avoid the battery going into protection mode. If you continue to experience issues, please contact our support team.

Battery Voltage	12V
BMS Over-discharge Protection Voltage	10.5V
Low-Voltage cut-off device setting	11.2V

Parallel Configuration

Batteries can be configured up to 4 units in parallel under the conditions outlined in this section.

FIG 1

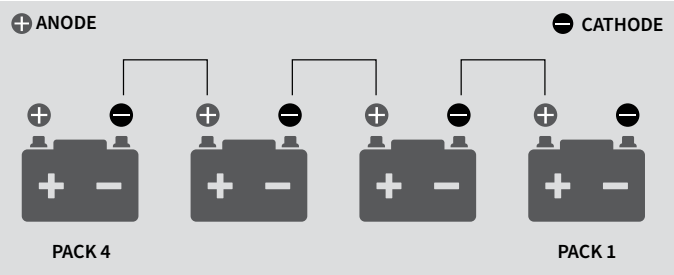


1. Ensure all batteries have been fully charged individually by suitable chargers before installing them in a parallel configuration.
2. Ensure Open-Circuit Voltage (OCV) of each battery is less than 0.2V of each other.
3. Utilising cables with a circumference large enough to carry the required total current of the system, connect the batteries in the below (fig. 1) configuration. Ensure all connecting cable lengths are the same length.
4. Be careful not to reverse connect the positive and negative terminals.
5. Ensure correct charge voltage and current is utilised for the battery type (e.g. 14.6V for 12V batteries).
6. Once in parallel configuration, ensure a full charge is completed at least once every 3 months.
7. Once in parallel configuration, the system must be charged and discharged as a system.

Series Configuration

Batteries can be configured up to 4 units in series under the conditions outlined in this section.

FIG 2



1. Ensure all batteries to be in the series configuration have been fully charged individually by matched chargers.
2. Ensure Open-Circuit Voltage (OCV) of each battery is less than 0.2V of each other.
3. Utilising cables with a circumference large enough to carry the required total current of the system, connect the batteries in the below (fig. 2) configuration.
4. Be careful not to reverse connect the positive and negative terminals.
5. Ensure correct charge voltage and current is utilised for configuration:
    a. Two batteries in series – 29.2V
    b. Three batteries in series – 43.8V
    c. Four batteries in series – 58.4V
    d. The current ratings are as per a single battery
6. Once in series configuration, ensure a full charge is completed at least once every 3 months.
7. Once in series configuration, the system must be charged and discharged as a system. If one battery needs to be replaced, the whole system will require replacing.

Troubleshooting

Battery Voltage is low or absent.

Possible Causes:

1. Over-discharge protection is activated.
   Solution: Connect to a lithium-compatible charger with a wake-up function, or apply a 12V power source directly to the battery terminals. For more details, see the discharging section of this manual.

2. Over-temperature protection is activated.
   Solution: Allow the battery to cool to its normal operating temperature. It will automatically recover.

3. Short circuit protection is activated.
   Solution: Inspect all connections. Remove short circuit.

4. The battery is left discharged for long periods of time.
   Solution: Charge promptly after over-discharge protection triggers. Delayed charging may lead to irreversible battery damage.

Battery does not accept charge.

Possible Cause:

1. Over-charge protection is activated.
   Solution: Check the status of charge of the battery to ensure the battery is not fully charged. Check the voltage/current of the charger and ensure that it is within the charging voltage and current limit of the battery.

2. Over-temperature protection is activated.
   Solution: Allow the battery to cool to its normal operating temperature.

3. Short circuit protection is activated.
   Solution: Inspect all connections. Remove short circuit.

Bluetooth App can't find the battery.

Possible Causes:

1. The battery is in sleep mode.
   Solution: The battery is in a sleep mode. Apply a load or charge to activate the Bluetooth.

Warranty Claim Procedure

To initiate a warranty claim, please reach out to the location where you made this purchase. You will be required to provide the battery along with proof of purchase.

Your battery will be subject to assessment and testing following the manufacturers guidelines and recommendations before your claim is processed.

Please note that this warranty excludes batteries that malfunction due to improper charging, incorrect installation, a damaged container or cover, fire-related damage, excessive heat, wreckage, explosion, freezing, abuse, neglect, or the introduction of additives after the battery has been sold to you.