



User manual GM5120 lithium battery

How to use and maintain a Green Marine lithium battery for a lifetime of boating

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1. Introduction

Thank you for purchasing a lithium battery system from Green Marine. With the help of this manual, you can use the lithium battery for as long and as safely as possible. The battery is specifically designed for marine applications, and can be used for both leisure yachts and professional use. To ensure correct use of the battery, we recommend that you read this manual completely before working with the batteries. If there are any questions regarding the manual, or if you miss things, please contact Green Marine immediately. You can contact us via email or phone.

2. Safety

Our systems are designed to be safe to use. Even though we do everything we can to ensure that safety is not an issue, there are risks associated with working with batteries and electronics. It is therefore important to be aware of the safety guidelines of the battery system.

2.1 Safety symbols



CAUTION

This symbol indicates the risk of possible injury to the user/installer, extensive material damage if the user or installer does not avoid this risk, or void of warranty if this step is not followed.



TIP

With this, Green Marine emphasizes the importance of a certain action for the use of the battery system.

2.2 Safety of Use

- Keep these instructions at hand when working with the lithium batteries.
- Make sure you wear protective clothing and safety goggles when working with the battery.
- Never attempt to open or disassemble the battery. The electrolyte is very corrosive. In normal working conditions, contact with the electrolyte is impossible. If the battery casing is damaged, do not touch the exposed electrolyte or powder.
- Discharges that are too deep will seriously damage the battery and can even be dangerous.
- Ensure sufficient and safe assembly and always use suitable material for transport.
- Lithium batteries are susceptible to mechanical shocks. If the battery is charged after being discharged below the discharge threshold voltage, or

when the lithium battery is damaged or overcharged, the lithium battery may release a harmful mixture of gases such as phosphate.

- Any uncovered battery material such as electrolyte or powder on the skin or in the eyes should be rinsed immediately with plenty of clean water. Next, seek medical attention. Spills on clothes should be rinsed out with water.
- Explosion and fire hazard. The terminals of the battery are always active; Therefore, do not place any objects or tools on top of the lithium battery. Avoid short circuits, too deep discharges and too high charge currents. Use insulated tools. Do not wear metal objects such as watches, bracelets, etc. In case of fire, you should use a special type of fire extinguisher that is suitable for lithium fires.



CAUTION

Failure to comply with the instructions, repairs carried out with other than original parts, or repairs carried out without authorization will void the warranty.

3. Transport

3.1 Loading

- The batteries should never be fully charged during transport. It is recommended to have the lithium batteries charged between 30% and 50%.
- Check the condition of the battery system.



CAUTION

Never transport damaged lithium batteries, batteries that have been submerged in water or batteries that have been short-circuited.

3.2 Packaging

- Make sure that the batteries are properly packaged in sturdy and protective packaging to prevent damage during transport. It is preferable to use the original packaging, or similar.
- Make sure the packaging is clearly labeled as "lithium iron phosphate batteries" to indicate that these batteries are being transported.
- Transport the batteries in an upright position.
- Always lift the batteries using the handles.

3.3 Documentation and regulations

- Make sure that all necessary documentation for transporting lithium batteries is on hand and that it is filled out correctly.

- Always follow the regulations and guidelines of the transport authorities regarding the transportation of lithium batteries.

3.4 Temperature

- Avoid exposure to extreme temperatures during transport (see product specifications at the end of the manual), as this may affect the performance and safety of the batteries.

3.5 Short circuit protection

- Make sure the batteries are well insulated and protected from short circuits during transport to avoid accidents.

3.6 Suitable means of transport and safety equipment

- Choose a means of transport that is suitable for transporting lithium batteries and that complies with all relevant safety regulations. Use soft tie-down straps when securing the batteries for transport to avoid damage to the battery box.
- Make sure that all necessary safety equipment, such as fire extinguishers, is available for emergencies during transport.



CAUTION

Never allow the battery terminals to come into direct contact with each other during transport.

4. Installation

4.1 Placement

- Make sure the batteries are installed in a well-ventilated location away from direct sunlight, moisture, and extreme temperatures.
- Make sure the batteries are securely and securely attached to prevent movement and damage during use.

4.2 Wiring & insulation

- Ensure correct connection of the batteries, with the correct polarity, and use only high-quality cabling and connectors that are suitable for the power of the batteries and the type of battery terminal.
- Insulation of the batteries may be necessary to prevent them from coming into contact with metal parts or other electrical components.
- Make sure the battery terminals are covered during installation.

4.3 Connecting in parallel

- The batteries may only be connected in parallel (see specifications). When connecting in parallel, make sure that each battery is secured.
- Connecting is best done with the use of a busbar or a similar component such as Victron's Lynx Distributor (see connection diagram).
- Only connect the batteries with the same type of batteries from Green Marine, not with other types of batteries from different suppliers.
- Only connect with batteries with the same lifespan.



CAUTION

Install safety switches such as fuses to protect the batteries from overload, short circuits, and other electrical problems.

4.5 Safety Equipment

- Ensure that appropriate safety equipment such as fire extinguishers and personal protective equipment is provided near the battery installation.

4.6 Charging

- Charge the batteries after installation, preferably with a low charging current (e.g. C/20) so that all batteries and the individual cells in the batteries can be optimally balanced before use.



TIP

Perform a test after installation to ensure that the batteries are functioning properly and that all electrical systems are working properly.

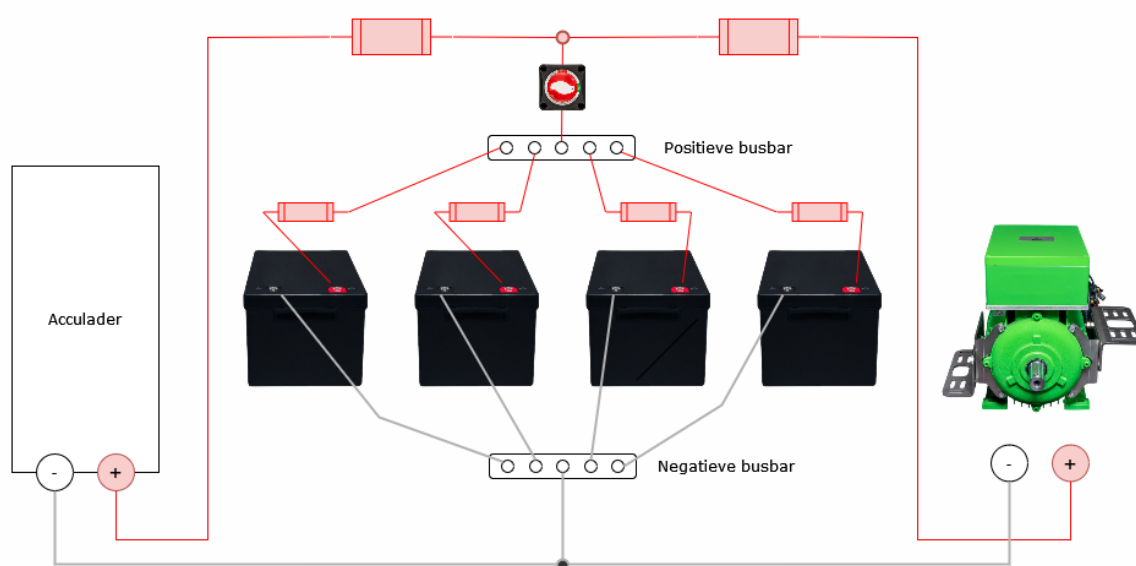


Figure 1. Diagram for parallel connection

5. Usage

5.1 Protection

- The batteries are equipped with an internal battery management system (BMS) that protects the battery from overcharging, deep discharging, and excessive charging and discharging currents. The BMS also ensures that the individual cells in the battery are balanced and that the battery is switched off if the temperature is too high.
- In addition to this built-in protection, the battery must also be protected by the user. Make sure that the battery terminals are protected and cannot come into contact with conductive objects.
- Make sure the batteries are in a well-ventilated, clean and dry area.
- Protect the batteries as much as possible against vibration and make sure that they cannot move in the boat.

5.2 Loading

- Make sure that a charger is used with a correct charging regime, both in terms of charging current, voltage, and charging characteristics. To ensure that the individual cells in the battery remain well balanced, it is advisable to fully charge the batteries regularly and keep them on the charger for a few hours longer.
- Do not charge in extreme temperatures (see specifications).



CAUTION

Do not charge the battery if it (or any other battery in parallel) is damaged, has been submerged, or has been short-circuited.

- When the battery is fully discharged, charge the battery fully or at least for more than 3 hours for proper balancing of the battery cells.
- Make sure that the charger is connected correctly to the battery in terms of polarity.



TIP

It is recommended to use Green Marine's standard lithium charger, or a charger recommended by Green Marine in combination with the lithium batteries.

5.3 Discharging

- Temperature can have a negative effect on the discharge current. Use the batteries only with devices compatible with the voltage and discharge current of the battery.

5.4 Maintenance

- The lithium batteries are maintenance-free. During operation, the batteries must be sufficiently charged so that the individual cells in the battery remain sufficiently balanced.

5.5 Storage

- Store the batteries in a clean, dry and well-ventilated area. Make sure the temperature remains within the indicated range during storage (see specifications).
- Store lithium batteries with a state of charge between 30% and 50% and it is recommended to charge every 3 months but at least every 6 months.
- The batteries have a very low self-discharge but still need to be protected against too deep discharge.
- Disconnect the battery pack from the rest of the electrical system during winter storage to prevent self-discharge.

5.6 Recycling

- At the end of their service life, the batteries must be disposed of via an approved recycling facility. In consultation, they can be returned to the manufacturer.
- Batteries should not be mixed with household or industrial waste.

6. Contact

Do you have questions about the use of the battery systems or do you need our help with installation, during use, or for recycling the batteries? Please contact us by phone or e-mail. It is better to ask one question too many than to create an unsafe environment while using the batteries.

7. Technical specifications

Parameter	Value
Battery chemistry	Lithium Iron Phosphate (LiFePO ₄)
Cell configuration	16S1P
Nominal capacity	105 Ah
Nominal voltage	51.2 V
Lifespan	6000 cycles
Measurements	520 x 269 x 220 mm
Weight	39.8 kg
Internal resistance	≤ 50 mΩ
Temperature (charging)	0 – 50 °C
Temperature (discharging)	-20 – 50 °C
Temperature (storage)	10 – 30 °C
Maximum charging current	100 A (20A recommended)
Maximum discharge current	150 A
Battery management	Intern BMS
Connecting in parallel	Maximum of 10
Serial connecting	Not allowed
Accuterminal (torque)	M8 (9-11 N.m)