



Charging, storing and handling lithium-ion batteries

Very important!

Please treat these batteries very careful, as they are classified as "Dangerous Goods".

If the Lithium batteries fail to operate safely or are damaged, they may present a fire and/or explosion hazard.

Read the battery label and do not remove it. Keep this documentation for later reference.

Transporting Lithium Batteries

- Ensure that lithium batteries are individually packaged in fully enclosed inner packaging such as plastic bubble wrap or foam pads to provide protection for each battery.
- Shield and protect lithium batteries to prevent short circuits or contact with conductive materials within the packaging that could cause short circuits.
- Place contents in a sturdy outer container.
- In the transportation process, pay attention to avoid squeezing, collision, falling, etc., to avoid battery damage.

Charging Lithium Batteries

Lithium ion (Li-ion) batteries offer an excellent level of performance. To gain the best from them, they must be charged correctly.

Charging the battery must be done in a lithium fireproof bag, in a safe area, away from flammable materials.

Do not keep charger connected once the battery has been fully charged.

Do not charge overnight or unsupervised.

Always use a good quality lithium-ion battery charger compatible with your Li-ion battery pack. Never try with a lead-acid or any other type of charger.

Read the battery label and set the charger to the correct current (Amps) and voltage (V). Set the "Cut-off time" and "Cut-off capacity" charger functions accordingly, if available.

If Li-ion battery charging is not undertaken in the proper manner, the battery operation can be impaired and they can even be destroyed - extra care must be taken.

It is important to note that trickle charging is not acceptable for lithium batteries.

Li-ion **cannot** absorb overcharge. When fully charged, the charge current must be cut off. A continuous trickle charge would cause plating of metallic lithium and compromise safety. To minimize the stress keep the lithium-ion battery at the peak cut-off voltage as short as possible.

Do not connect the battery directly to a wall socket, car cigarette lighter socket or solar panel without the right battery controller.

Over-discharged lithium batteries cannot be recovered, they are permanently damaged, and is not covered by the warranty.

Charging Lithium Batteries in parallel

Only charge in parallel batteries of the same type, chemistry, voltage and capacity.

Voltage tolerance: before connecting lithium battery packs in parallel, make sure that each battery pack has maximum 0.2V difference from the other.

ex: if one battery pack is 7.4V the second one can be between 7.2V and 7.6V.

Reason: The battery pack with higher voltage will discharge into the one with lower voltage causing both packs to heat up. The higher the voltage difference the higher the current (amps) will flow from one battery into the other, until they are equally balanced.

Use a multimeter or a voltage indicator to make sure battery packs are in the safe voltage range.

Connecting multiple batteries in parallel: ensure that you connect the positive terminal (+) from the first battery to the positive terminal (+) of the second battery. Then, in the same way, connect the negative terminal (-) from the first battery to the negative terminal (-) of the second battery.

Dangerous level:

- voltage difference when connecting battery packs in parallel is over 2V.

ex: when one battery pack is completely discharged and the other is fully charged,
risk of leakage, overheating and possible fire.

Storing Lithium Batteries

- Disconnect the battery from any device.
- Charge or discharge the battery to the Nominal voltage (see battery label), if necessary use a multimeter to check the voltage.
- Store or charge the batteries in a fireproof bag/container in a safe area, away from flammable materials or heat sources.
- We recommend that the batteries be charged about once per year to prevent over-discharge.
- They should be stored away from direct sunlight, moisture/damp, water or other liquids.
- Batteries should be placed in such way that won't be bumped, knocked over or otherwise damaged.



Short-term storage: Store the battery in a dry place with no corrosive gases and a wet/moist environment, with temperature between 15°C - 25°C, higher or lower temperature will cause the metal parts of the battery to rust or the battery to leak.

Long-term storage: As long-term storage will cause the battery to accelerate the self-discharge rate, the ambient temperature should preferably be between 10°C 25°C, in addition, it is recommended to do a charge/discharge cycle every 3 months to maintain its activity and recovery performance.

If the battery has been physically damaged, it heats up, shows signs of discoloration, deformation, it leaks or emits a peculiar smell, immediately move it away from any flammable materials, preferably in open space and stop using it. As soon as possible take the battery to the local recycling centre that accepts lithium batteries. Do not reuse it.

For more information, please contact info@altbatteries.co.uk

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