NOTICE: BATTERY MAINTENANCE REQUIREMENTS

Manufacturer Important Note:

Lithium ion batteries (rechargeable) must be stored at a state-of-charge that is between 40 and 60%. This ensures that the battery will have enough charge to allow for an adequate amount of storage prior to becoming severely depleted and precludes any breakdown of electrolyte that begins to occur whenever a cell's voltage is within its upper voltage range.

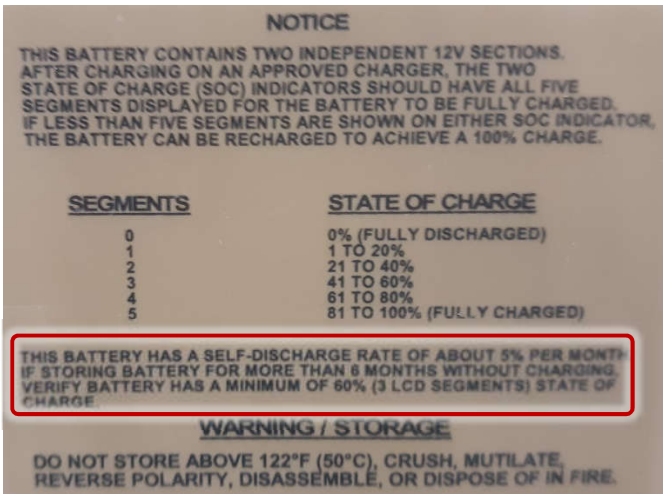
As indicated on the battery case, the battery has a self-discharge rate of 5% per month. If storing the battery for more than 6 months without charging, verify battery has a minimum of 60% (3 LCD segments) state of charge.

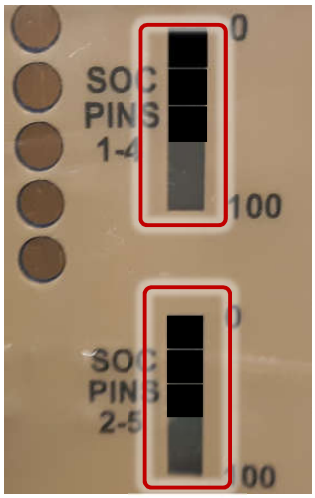
Lithium ion batteries should be recharged back to a 40-60% state-of-charge once every 4-6 months following the charging recommendations of the manufacturer. Customers SHOULD NOT allow their lithium ion batteries to become *deeply* discharged.

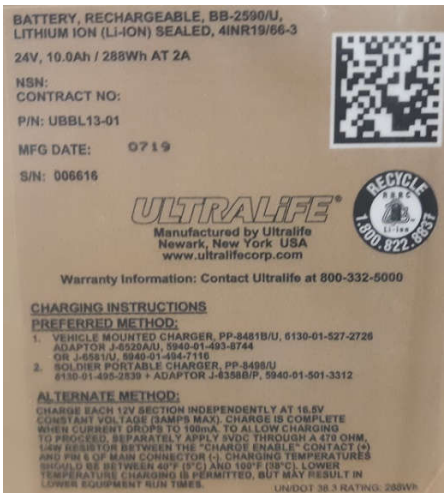
Improper storage of a battery includes:

- Storage at fully discharged state
- Extending the duration of storage without performing a maintenance charge
- Exposing the battery to excessively high temperatures during storage
- Any combination of the above

Lithium ion batteries which have been deeply discharged begin to dissolve copper out of the electrodes. This by itself is not a problem (cells can be safely discharged to zero volts), however, subsequent rechargeability depends on length of time the battery is stored at zero charge.







MANUFACTURER RECOMMENDED BATTERY STORAGE PROCEDURE

How do I properly store a battery?

All Ultralife lithium batteries, regardless of type, must be stored in a cool, dry environment in as close as possible to room temperature. This is the best practice to assure battery charge retention and shelf-life. While in many cases the specified storage temperature range is wider than just close to room temperature, best practice is to stay between 15 and 25 centigrade (59 to 77 Fahrenheit). Storing lithium batteries at significantly hotter temperatures, especially above 65°C (149°F), has the unwanted effect of breaking down the solvent, dissolving cathode atoms into the electrolyte, and any moisture present in the cells begins to react with the lithium – all of which degrade both the shelf-life of the battery and, in the case of rechargeable batteries, their charge retention.

While storing the battery at significantly colder temperatures has the benefit of reducing the battery's rate of self-discharge, it has the unintended effect of raising the relative humidity of the air increasing potential of condensation and possibly corrosion. While lithium metal batteries (primary) can be stored at any state-of-charge, lithium ion batteries (rechargeable) must be stored at a state-of-charge that is between 40 and 60%. This ensures that the battery will have enough charge to allow for an adequate amount of storage prior to becoming severely depleted and precludes any breakdown of electrolyte that begins to occur whenever a cell's voltage is within its upper voltage range.

Lithium ion batteries should be recharged back to a 40-60% state-of-charge once every four to six months following the charging recommendations of the manufacturer.

Is it safe to charge a Lithium Ion battery that is deeply discharged?

Many times, customers allow their lithium ion batteries to become deeply discharged. This is a result of improperly storing the battery from a fully discharged state, extending the duration of storage without performing a maintenance charge, exposing the battery to excessively high temperatures during storage, or any combination of the above. Lithium ion batteries which have been deeply discharged begin to dissolve copper out of the electrodes. This by itself is not a problem (cells can be safely discharged to zero volts), however, the issue is in the subsequent recharge of the battery.