

Technical Bulletin - Battery Management

Objective: This document provides instructions for attempting to recover Tempest Lithium-Polymer batteries that may exhibit characteristics of being in a deep discharge state.

Battery Discharge

Lithium-Polymer batteries that have gone unused, or been in storage for an extended period of time, can enter into a deep discharge state due to internal self-discharge. The rate of discharge is dependent on temperature and the charge level of the battery at the time it was last used.

The longer a battery remains unused, the more likely it will enter into deep discharge. Once a battery has gone into deep discharge, its onboard circuit protections inhibit the charger from initiating the charge cycle.

Battery Capacity

Under normal operating conditions, the Tempest Lithium-Polymer battery should last, in excess, nine hours. The total capacity of a rechargeable battery gradually decreases with each charge/discharge cycle until it is small and unusable. A full charge cycle is one in which the battery is completely discharged and then charged back up to full capacity (The expected cycle life is approximately 500 cycles to 70% of initial capacity).

The Tempest Lithium-Polymer battery is equipped with onboard charge level indicator technology to ensure the battery indication on the BeltStation is as accurate as possible at all times. It may be necessary to occasionally fully discharge and then fully charge a Tempest Lithium-Polymer battery to reset the charge level indicator and ensure an accurate reading.

Also, the battery comes with onboard protection circuitry to ensure against over-charge and over-discharge conditions.

Battery Recovery (from Deep Discharge)

In the event a battery is not accepting a charge and its LED displays red in the charger, it may be in deep discharge. An attempt to revive the battery can be made by placing it into the Tempest 5-Bay Charger (TMA-BAT-05A). More information on this process is provided below.

The following are a series of steps (using the 5-Bay Charger) to determine the status of a Lithium-Polymer battery and possibly revive a battery in deep discharge:

1. Place the battery in one of the charger's bays and note the status of the indicator LED:
 - If the LED displays green, the battery is fully charged and can be removed and used or set aside for future use.
 - If the LED displays Amber (Orange), the battery has begun a charge cycle; leave this battery in the charger until it has charged fully. Tempest batteries will charge in less than 3 hours.
 - If the LED displays red, the battery may be in deep discharge and not currently good for use.
2. To attempt to revive a battery in deep discharge, insert the battery (or batteries if more than one needs to be revived) into the charger bay until the LED lights up. If and when the LED lights red, remove the battery and immediately drop it back into the same charger bay. Repeat this process at a consistent pace until the LED lights up Amber (Orange) indicating the charge cycle has begun.



Battery Recovery, cont.

- The level of deep discharge in each battery varies; therefore, there is not a set number of insertions required before the deep discharge is reversed.
- It may take one or two dozen attempts before the battery begins to accept a charge, and in some cases the battery may not be recoverable.

3. Once the battery has recovered and initiated a charge cycle, leave it in the charger until fully charged (green LED.) It may take more than one full charge cycle for the battery to regain full capacity.

Battery Maintenance and Storage

1. When storing Lithium-Polymer batteries for more than two weeks, charge or discharge them to a charge level of 40–50%.

- Do NOT store batteries fully charged or fully discharged.

2. Attempt to store batteries in a properly ventilated and temperature controlled environment. The rate of degradation is strongly temperature dependent, and batteries will degrade much faster in higher temperatures.

3. Lithium-Polymer batteries may tend to swell as they age. This is an indication that the battery is beyond its useful life and should be replaced.

- Do not attempt to use any batteries that appear to be swollen or deformed.
- In addition, any battery that does not fit properly into the battery compartment or that has had its housing damaged should not be used.
- Always dispose of batteries properly.

Contact Information

If you have any additional questions regarding the Tempest Lithium-Polymer Battery or other Tempest products, contact CoachComm Support specialists at 1.800.749.2761 or customer.service@coachcomm.com.

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