

Battery Management and Safety Practices

for Zebra Mobile Devices Using Lithium-Ion Batteries

Lithium-ion (Li-Ion) technology provides state-of-the-art DC energy storage and has been widely adopted to meet user demand for more power and longer operating times. No other Battery technology available at this time allows Zebra to meet market and competitive requirements for mobile device operating times.

It is important to understand and follow proper and safe practices for the use, storage, disposal, handling and charging of Li-Ion Batteries. While Battery manufacturers have made advancements in design and manufacturing process, we strongly recommend that users implement the following Battery management practices:

Definitions:

- A “Device” is a piece of equipment that can both charge and discharge a Battery.
- A “Cradle” is a piece of equipment capable of providing power to a Device to enable it to charge a Battery. Cradles do not directly charge Batteries.
- A “Charger” is a piece of equipment that is capable of charging a Battery but is not powered by a Battery.
- A “Battery” is a Li-Ion Battery.

I. Use, Storage and Disposal of Batteries

1. Zebra Batteries are charged in manufacturing to 30% of their full capacity; this is a good capacity for long term storage.
2. Batteries should not be stored in a fully charged or a fully depleted state. Ideally, Batteries should be stored between 30% and 50% state of charge for the duration of storage.
 - Current Battery state of charge can be determined when installed in a Device.
3. Batteries should be stored separate from Devices and Chargers.
4. Batteries should be stored in a cool, dry environment at less than 70% relative humidity non-condensing and within temperature ranges of 5°C to 30°C (41°F to 86°F)
5. Do not store Batteries in temperatures exceeding 60°C/140°F.
6. Do not store Batteries in direct sunlight.
7. Batteries are designed to discharge and be charged optimally at room temperature.
8. Batteries have a limited life time which is affected by several factors including:
 - a. the number of charge/discharge cycles to which they have been subjected,
 - b. the environments in which they are used and stored,
 - c. the levels of charge they are stored at; and
 - d. the demands they are subjected to
9. Degradation in performance may increase with battery service life due to the stresses of daily charging and discharging. Li-Ion batteries are typically replaced after 300 to 500 charge cycles (full charge-discharge cycles) or when the battery capacity has reached 70% to 80%. The actual number of cycles will vary depending on usage patterns, temperature, age, and other variables.



10. Prolonged Battery usage will lead to impaired Device performance.
11. Batteries may be subject to discharging even when not installed in a Device. Batteries should not be discharged below 5% in order to prevent permanent deterioration of capacity due to self-discharge.

II. Handling of Batteries:

1. If there is a significant reduction in Device operating time, the Battery is past its useful life and should be replaced.
2. Dropping, crushing or other mistreatment of a Battery, or a Device containing a Battery, may cause a fire or a chemical burn hazard.
3. Do not stack objects or materials on top of Batteries.
4. Keep Batteries away from conductive or combustible materials.
5. Keep Batteries away from children.
6. Use only genuine Zebra Batteries with a Zebra Device.
7. Charge Batteries with genuine Zebra Devices or Chargers only.
8. Promptly and properly dispose of used Batteries according to local regulations for the disposal of Batteries. Before disposal, you should insulate the Battery terminals with tape. Please follow local Battery recycling guidelines
9. Care should be taken to avoid “shorting” a Battery across the terminals or across other Batteries. This includes, but is not limited to, carrying Batteries in a pocket that may contain loose change, paper clips, other Batteries or other conductive (metal) materials.
10. Do not expose Batteries to water and do not incinerate or expose Batteries to temperatures above 60°C/140°F.
11. Do not put Devices or Batteries in a microwave.
12. Do not attempt to disassemble or pierce the Battery with a sharp object.
13. Do not attempt to remove a Battery from a Device with a sharp object.
14. Damaged or leaking Batteries should be handled with extreme care. Personal injury may result from the mishandling of a damaged or leaking Battery.

III. Charging of Batteries

1. Charge Zebra Batteries only with a genuine Zebra Charger. Do not attempt to charge other types of Batteries in the Charger.
2. Be sure to follow *all* safety guidelines supplied with a Device and Charger.
3. Do not charge Batteries near combustible or conductive (metal) materials.
4. For optimal life, charge Batteries in a well-ventilated room that does not exceed room temperature of 30°C/86°F. For specific charge ranges, reference Device User Guide.
5. Do not charge Batteries in direct sunlight.

As with any electrical Device, if overheating or burning odors are noticed during charging, leave the area immediately and contact safety personnel to handle the situation.