

Lithium-Ion Battery Safety Manual

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IMPORTANT: This manual contains important safety, performance and service information regarding lithium-ion batteries used to power low-speed electric bicycles (also called “e-bikes”). Read it and all manufacturer information before you charge your battery or take the first ride on your new electric bicycle. Keep this manual for future reference.



Additional safety, performance and service information for your e-bike and battery may also be available. Make sure that your authorized retailer has given you all the manufacturers’ literature that was included with your e-bike. In case of a conflict between the instructions in this manual and information provided by a manufacturer, always follow the manufacturer’s instructions.

If you have any questions or do not understand something, take responsibility for your safety and consult with your authorized retailer or the e-bike’s manufacturer.

NOTE: This manual is not intended as a comprehensive use, service, repair or maintenance manual. Please see your authorized retailer for all service, repairs, maintenance or questions about your e-bike, its battery or drive system.

Know the Risks


Like any activity, owning and using an electric bicycle with a lithium-ion battery involves risk of injury and damage. By choosing to own and ride an e-bike equipped with a lithium-ion battery, you assume the responsibility for that risk. You need to know and practice the rules of safe use of the battery. This Manual contains many “Warnings” and “Cautions” concerning the consequences of failure to properly charge, use, maintain or inspect your battery and of failure to follow safe practices.

- The combination of the  safety alert symbol and the word **WARNING** indicate a potentially hazardous situation which, if not avoided, could result in serious injury or death.
- The combination of the  safety alert symbol and the word **CAUTION** indicate a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or is an alert against unsafe practices.
- The word **CAUTION** used without the safety alert symbol indicates a situation which, if not avoided, could result in serious damage to the battery or the voiding of your warranty.


What Is A Lithium-Ion Battery?


An e-bike battery consists of a series of Lithium-Ion cells designed to contain electric energy. The charge and release of energy in the cells is managed and controlled by internal circuitry. The cells and circuitry are contained in a housing or shell, also known as a battery pack, which is designed to protect the cells and internal circuitry and interface with a mounting mechanism on your e-bike.


Lithium-Ion batteries are powerful and store a tremendous amount of energy. While they are generally designed with safety features to protect the battery and the user, they must be handled with special care. When damaged, improperly charged or misused, Lithium-Ion batteries are susceptible to an uncontrollable energy release called thermal runaway, which can result in a sudden and severe fire. Proper use, charging, discharging, care, maintenance, storage and transportation are all critical to the long-term use of the battery and the safety of the user and others.


 **WARNING:** Batteries and chargers are designed to be safe and reliable for their intended use. Failure to read and follow these instructions and use your battery as intended by the manufacturer can result in thermal runaway, resulting in a sudden and severe fire and serious personal injury or death, as well as significant property damage.

Safety Must Always Be First

 **WARNING:** Do not leave a battery unattended while charging, especially overnight. If a battery fails while left to charge unattended, the failure can get progressively worse and can result in fire or explosion resulting in serious personal injury, death, or property damage.

 **WARNING:** Once the charge cycle is complete, immediately disconnect the charger plug from the battery. Do not leave the battery connected to the charger for an extended period of time after it is charged.

 **WARNING:** NEVER open a Lithium-Ion battery pack or modify the wiring or any electrical components of any product powered by a Lithium-Ion battery. Opening the battery or modifying the wiring or components can result in electric shock and can cause a fire leading to serious personal injury, death, or property damage.

 **WARNING:** NEVER loan your e-bike to another person or let another person operate your e-bike or charge its battery unless they are familiar with the instructions and warnings in this Manual and competent to follow them. Allowing a person to charge a battery who lacks the knowledge or ability to safely do so may result in electric shock or fire, resulting in serious

personal injury or death.

Lithium-Ion Battery Safety Summary


- ALWAYS:** Purchase batteries certified by an accredited testing laboratory.
- ALWAYS:** Follow manufacturer's instructions for charging and storage.
- ALWAYS:** Use the correct battery, charger and cord.
- ALWAYS:** Plug directly into an electrical outlet for charging.
- ALWAYS:** Keep batteries and devices at room temperature.
- ALWAYS:** Store and charge batteries away from anything flammable.
- ALWAYS:** Keep batteries away from heat sources.
- ALWAYS:** Use proper methods for recycling old or damaged batteries.

- NEVER:** Use aftermarket or generic batteries or chargers.
- NEVER:** Plug into a power strip or overload an outlet.
- NEVER:** Overcharge or leave a battery charging overnight.
- NEVER:** Charge a battery or device on or close to any flammable material.
- NEVER:** Leave an e-bike or battery unattended while charging.
- NEVER:** Block your primary way in or out of a room or space.
- NEVER:** Place batteries in a trash or recycling bin.


Warning Signs for Lithium-Ion Batteries


The following is a list of signs of battery damage, which can result in electric shock, short-circuit, fire and/or explosion:


- External battery casing damage (chips, cracks)
- Battery casing deformation (bulging)
- Battery casing or terminal discoloration
- Signs of corrosive (rust) damage from water entering the battery
- Plug connector damage or deformation
- Sounds, odors, smoke and/or flames emanating from the battery • Battery fluid leak

 **WARNING:** A battery should not exhibit any heat, flames, noises, odors, smoke, swelling, leaks, discoloration, deformation or other abnormalities. If a battery exhibit any of these symptoms and is failing catastrophically:


1. Evacuate all people from the area immediately
2. Close the door and leave the building
3. Summon fire authorities (in the United States, call 911)
4. Do not try to extinguish the fire or move the battery or electric bicycle outdoors unless it is safe to do so.

 **WARNING:** If the battery is leaking, do not touch this liquid. Battery liquid can cause irritation or burns. If there is contact with battery liquid, rinse immediately with water. If the contact is with the eyes, seek medical attention immediately after rinsing.

 **WARNING:** If the battery is emitting any smoke or fumes, move to a place with proper ventilation. Fumes can irritate the respiratory system. If anyone is exposed to any smoke or fumes and experiencing negative effects, seek medical attention.


 **WARNING:** If your battery experiences a fault or error during use, charge or discharge, immediately stop using or charging the battery, check the manual provided by your manufacturer, and have the battery inspected and if necessary, replaced by your authorized retailer.

Safe Battery Charging and Storage

 **WARNING:** Carefully read, understand and follow all warnings and manufacturer instructions for charging your battery. Failure to do so can lead to an electrical shock or sudden and severe fire, resulting in serious personal injury or death.

Before using your e-bike or charging your battery for the first time, read all the instructions in this Manual and any product documentation included with your e-bike. Turn the battery power on according to the manufacturer's instructions.

This will help determine if the battery is charged, needs charging or is damaged. Batteries are generally shipped from the manufacturer with a partial charge. It is recommended to charge the battery to full capacity before your first use.

 **WARNING:** Only use Original Equipment (OE) batteries and chargers that are compatible with each other and have been specified and approved by the manufacturer for use with each other and with your e-bike. Use of an unapproved or counterfeit battery or charger can result in serious damage to the battery and/or components and can result in a sudden and severe fire or explosion resulting in serious bodily injury or death.



USING A GENERIC CHARGER IS DANGEROUS

Make Sure Conditions Are Right for Charging:

- The battery and charger are compatible with each other and the e-bike.
- The battery is being charged during daylight hours and where it can be observed in case of any indication of odor, smoke, fumes or fire.
- The charging area is protected from the elements, dry, well-ventilated, and has a smoke detector. There must be clear egress from the area.
- A battery should not be charged in a bedroom or sleeping area.
- A charging battery cannot be left unattended and must be observed at all times while charging.
- The battery is on a clean, dry and flat, non-flammable surface, preferably metal, ceramic or glass.
- The battery and charger have no items covering or placed on top impeding airflow around these components.
- The battery and charger are not exposed to flammable materials or an open flame.
- The ambient temperature around the battery and charger is in the charging temperature range specified by the manufacturer.
- The charger is plugged directly into an electrical outlet and the rated voltage capacity from the outlet matches the charger.



ALWAYS PLUG THE CHARGER INTO A WALL SOCKET



WARNING: Do not leave a battery unattended while charging, especially overnight. Once the charge cycle is complete, immediately disconnect the charger plug from the battery. Do not leave the battery connected to the charger for an extended period of time after it has reached full charge. If a battery fails while left to charge unattended, the failure can get progressively worse and can result in fire or explosion resulting in serious personal injury, death, or property damage.



WARNING: Keep the battery and charger away from children and animals. Unless supervised or instructed on proper/responsible use, children or people who lack the necessary experience or understanding to operate the battery and charger safely should not be left unattended with the battery and charger. There is a significant risk of personal injury and/or damage.

How To Charge Your Battery:

Follow the general order of operations for connecting the charger and charging the battery as shown below or as recommended by your e-bike manufacturer.

- Remove the charge port cover (if present).
- Connect the charger to the battery and the power outlet, in the order specified by the manufacturer.
- Once charging begins, periodically refer to the indicator lights on the charger and e-bike's charge level display for power level information.
- Once the indicator lights indicate a full charge, immediately disconnect the charger from the power outlet and the battery, in the order specified by the manufacturer.
- Replace the charge port cover (if present).
- If the battery will not be used right away, store the battery as outlined below.

Safe Battery Storage:

If the battery will be in storage for an extended period of time, it is recommended the battery be stored with a partial charge, and the state of charge should be checked periodically in accordance with the manufacturer's specifications. If the state of charge has dropped below the manufacturer's recommended range, charge it back to within the range. Please refer to the manufacturer specifications for additional information.

CAUTION: A battery that is stored while functionally depleted, if left in that state for an extended period of time, will naturally lose more power while not being used, which can lead to a state of deep discharge and damage to the battery.

Lithium-ion batteries should be stored indoors in a temperature and climate-controlled environment whenever possible. If possible, remove the battery from the e-bike (if possible). If the battery is not removable, store the e-bike indoors. The storage area must be protected from the elements, dry, well-ventilated, and have a smoke detector. Do not store a battery or e-bike in a bedroom or block egress. The battery should be stored on a clean, dry and flat, non-flammable surface, preferably metal, ceramic or glass. Do not cover the battery or store it near flammable materials.



WARNING: Avoid exposing your e-bike to conditions that can result in excessive heat or a short circuit. A short circuit may lead to a thermal runaway, sudden and severe fire or explosion, resulting in serious personal injury, death or property damage.

Avoid these conditions:

- If possible, do not store your e-bike outdoors. Exposure to the elements can quickly

deteriorate the e-bike and its components.

- Do not store a battery in direct sunlight or in a hot car.
- Do not store your e-bike under a cover as this can trap moisture.
- Do not store a battery near a space heater or other heat sources.
- Do not leave a battery connected to the charger after charging or while in storage.

Transporting Your E-bike and Battery

Lithium-Ion batteries are regulated by transportation authorities as “Dangerous Goods” because of the inherent risk of a fire if they are damaged during transport. Check your local laws for details about shipping batteries.



WARNING: Do not ship or transport a damaged battery or attempt to circumvent laws regarding shipping of Lithium-Ion batteries. Improperly shipping a battery may lead to a fire during the transportation process, resulting in serious personal injury or death to transportation workers or the public, and property damage for which you may be held responsible.

1. Transporting on public transit:

Familiarize yourself with any relevant rules regarding transporting your e-bike on public transit, such as weight, battery restrictions and tire widths. Some public transit options require that a space is booked; others specify off-peak hours or the need to cover the e-bike.

2. Transporting on an airplane:

Check with your airline for any information about transporting a battery on an airplane before traveling. The battery may need to be shipped separately by a shipper who is trained and authorized to ship Dangerous Goods.

3. Shipping a battery:

Check your local laws for details about shipping and transporting an e-bike battery. Many bicycle retailers are trained in the proper methods for shipping e-bikes and batteries. Please consult your local retailer if you need to ship your e-bike.



WARNING: Do not ship or transport a damaged battery or attempt to circumvent laws regarding shipping of Lithium-Ion batteries. Failure to follow this warning may lead to a fire during the transportation process, resulting in serious personal injury or death to transportation workers or the public, and damage to vehicles or transportation facilities for which you may be held civilly and criminally responsible.

Replacing and Disposing of Your Battery

Lithium-Ion batteries do not last forever. Batteries have a lifespan which is subject to use and conditions. Over time and with each charge and discharge cycle, their capacity to store energy gradually decreases. Please refer to the manufacturer's battery specifications for information regarding the number of charge/discharge cycles a battery is expected to provide. When a battery is worn out it needs to be replaced and responsibly recycled.



WARNING: Only replace the battery with an original equipment (OE) e-bike battery from your e-bike manufacturer. Do not attempt to have your original battery “refurbished” or replace it with a reconditioned or an unauthorized/third-party battery. Refurbished batteries may lack important electrical safety features and use of a refurbished battery may lead to a fire resulting in serious personal injury, death, and property damage.



**ALWAYS REPLACE A BATTERY WITH A NEW CERTIFIED BATTERY
RECOMMENDED BY THE MANUFACTURER**



WARNING: Do not dispose of an e-bike battery or any other Lithium-Ion battery in your regular household trash or a public trash receptacle. It may be illegal to do so. Batteries that enter the regular waste stream can be damaged, leading to a fire resulting in serious personal injury, death, property damage and environmental contamination.

Dispose of all batteries and chargers that have reached their end of life in an environmentally conscious manner, in accordance with regulations in effect in your country, state or region. Please contact your e-bike retailer or manufacturer for additional information. In the United States Call2Recycle has partnered with a network of manufacturers and retailers to offer a national battery recycling program.