



## **Bakcou Lithium-Ion Battery Maintenance Manual**

This document describes the detailed maintenance operations for the Li-Ion battery packs supplied by Bakcou, LLC.

### **Transportation:**

- Batteries can be transported (with proper paperwork) via truck, train, and vessel, NOT by airplane. Keep out of sun & rain during transportation.
- Keep dry, well ventilated, and out of direct sunlight
- Handle with care during assembly
- Do not throw
- Do not place under heavy objects
- Do not transport or store near flammable, explosive, or sharp objects
- Package should be labeled with Moisture Proof/Water Proof, Anti-Fire and Fragile stickers

### **Storage:**

- Do not store a fully charged battery pack; discharge or charge the battery to 40% or 60% state of charge (SOC).
- Do not leave battery pack on the ground, or on concrete. If needed, use a piece of insulation to remove contact with the ground.
- To ensure a longer battery life cycle, it is recommended to check the SOC every 2-3 months using a multimeter. If voltage drops below storage charge (49v for a 48v battery) then charge back to nominal storage charge. For 4-6-month storage, you may charge to full, but discharge to nominal storage State of Charge.
- Deep cycling is not necessary for lithium and can harm the overall life-cycle of the Lithium-Ion cells. This is the case for any battery pack that utilizes a BMS (Battery Management System). Strenuous cycling will cause a buildup on the anode side of the battery which will result in early degradation.
- After storage time, simply recharge the battery to full SOC and allow it to sit on the charger for an extra 30mins to 1hr after completed charge to ensure proper cell balance.
- Do not leave the battery connected to a charger during its storage period or prolonged periods of time. Lithium-Ion does not utilize a float or trickle charge. And this will result in the charger constantly topping off the charge and decaying the Anode (negative side) within the individual battery cells.

- Do not store the battery in temperatures exceeding 25°C (77°F). Lithium-Ion can be stored in cool or cold environments (0°C or 32°F) but must always be warmed up to room temperature before charging.
- When your Bakcou ebike is not in use, disconnect the Anderson cable connection from the battery & Bakcou ebike (unplug battery from the unit).

## Operation:

- If the battery fully discharges and turns off automatically, re-charge the battery pack within 12 hours. Failure to do so could shorten the battery life cycle. A rule of thumb to consider is to not allow the battery to fall below 5%. To retain the most battery life cycle, recharge the battery between 15% and 20% SOC, and try not to drain the battery entirely.
- Do not try to utilize a battery pack that has turned off automatically until it has been recharged.
- The recommended rate of charge is up to 90% SOC and discharge is no less than 20% when the battery is in use to prolong the battery life cycle. 100% is fine if it will be used within a short time from full charge completion.
- The battery pack performance is best under the following conditions:
  1. -15°C to 50°C (5°F to 122°F) for discharging.
  2. Room temperature always for charging, 20°C (68°F).
  3. Best working conditions are 15°C to 40°C (59°F to 104°F) Anything too cold will interfere with the battery capacity and will cause a severe loss in overall mileage per charge. And anything too hot will also affect the mileage in a poor manner, but the heat will cause permanent damage to the battery cells.

## Operations (continued):

- Use heat insulation materials in the winter to keep the battery protected from extreme cold. When the internal temperature of the battery is lower than -15°C (5°F) there will be a reduction within the batteries ability to hold a charge, permanent damage can occur, but is far more likely to occur in extreme heat.
- Keep out of direct sunlight. When the internal temperature of the battery pack is in excess of 75°C (167°F) there will be damage to the battery's capacity and a reduction in battery life cycle. With a much greater risk of a fire or explosion.
- Do not wash the battery shell with organic solvent.
- **In case of fire, do NOT use CO2 to extinguish fire.** Use CCI4 or Class D extinguisher to extinguish the fire. You can use sand or soil to help extinguish the fire as well, only use water to ensure the fire doesn't spread to surrounding areas.
- Handle the battery pack with care. Do not throw, drop or expose to heavy vibration.
- Do not submerge the battery pack in water. The battery pack should always remain dry.

## **Warranty:**

We will repair or replace any battery pack during the warranty period for the below issues:

- The battery pack cannot be charged or discharged.
- The battery capacity is less than 80% of rated capacity in the first year, under the standard conditions for testing.
- There is liquid leakage.
- The battery pack casing or wires have damage caused by the battery.

The following will void all warranty on the battery pack:

- Manual instructions were not followed which resulted in battery damage.
- The battery pack is dismantled or converted in any way by the user or representative of the user.
- The battery is charged with the incorrect charger for the battery pack, and damage is caused to the unit.
- There is damage to the battery, the battery case, the battery pack wires, or the battery charger that was caused by the user or representative of the user.