

Battery Pack Care

PLEASE NOTE: Lithium-Ion Batteries store large amounts of energy. If not used and handled properly, Lithium-Ion batteries may cause fire or explode and result in SERIOUS INJURY or DEATH.

- **NEVER charge your battery and leave it unattended.**
- **DO NOT DROP your battery.**
- **DO NOT Expose your battery to high temperatures. above 40 degrees Celsius (see below).**
- **DO NOT Charge your battery when the temperature is below 0 degrees Celsius (see below).**
- **NEVER expose your battery to water.**
- **ALWAYS make sure your battery is supported and secured to prevent movement when it is being used.**
- **PERIODICALLY CHECK your battery for any signs of rubbing against any external object which may cause damage.**

Your new battery will have been charged and discharged for testing purposes before being dispatched. You will need to charge it fully before use (see charging procedure below). **If we did not supply a motor controller with your battery then check the battery connector matches your controller 's connector and the wiring colours match up, red (+) to red and black (-) to black. Failing to do so will damage the battery or controller and may cause a fire, explode or result in serious injury. IF IN ANY DOUBT THEN PLEASE CONTACT US BEFORE MAKING ANY CONNECTIONS TO THE BATTERY.**

The battery will require several charge and discharge cycles to optimize its efficiency fully. Battery status information can be shown using the Bluetooth application which can be downloaded from [here](#). When connecting to the battery using the Bluetooth application, the blue light on the Bluetooth module will turn on. When you have finished using the application remember to close it on your mobile device otherwise the Bluetooth will stay connected (blue light remains on). However, you may leave it connected for as long as you like to monitor battery stats while it is being used.

Best Practices

Do I charge the battery after each use? Yes and No.

First of all, let the battery cool down for 30 minutes after use. The battery will be warm and charging a warm battery is a no go. Secondly, decide when you are going to use the battery next. If you are aiming to use it again within the next 24 hours then by all means charge it fully. If not then don't be tempted to charge it up and then leave it for an extended period in this state. **A fully charged battery which is not going to be used for a period of time is not good practice.**

If you are unable to use it again for a period of time after use, charging it to approximately 40–60% of its capacity can be beneficial. You can do this by stopping the charging process when the battery voltage is between 3.6 and 3.8v. Using the Bluetooth BMS application, you

are able to see the charge state of the battery. Once the voltage is between the two voltages stated you can turn off the charge port in the App which will stop the charger or simply unplug the charger. The battery can be left in this state until you are ready to use it again and then it can be fully charged.

Charging

WARNING: Do Not leave your battery unattended while it is being charged.

Switch your charger on first and then plug it in to the battery charge connector. This will be a female version of the connector on the charger. If the battery does not have a separate charge socket then you will need to use the battery power lead. The charge light will go red while charging takes place and will go green when it has completed. If the charger was supplied by ourselves then you cannot plug the XLR connector into the wrong socket or the wrong way around. If we added a charge socket for your own charger then make sure it is the same type and it matches exactly.

If red and black Anderson connectors are being used then make sure these are the correct way around – black to black, red to red. If not, they can be changed by sliding them apart, swapping them about and then slide them back together.

As you plug your charger in to the charge port you may experience a loud 'crack' sound. This is normal as the charger and battery are equalizing voltages with each other. To prevent this, you can use the mobile App to turn off the charge / discharge ports of the BMS first. Then connect the charger to the battery and then turn on the charge/discharge ports of the BMS. The charger led will now turn red and start charging the battery. Live charging data can be seen using the Bluetooth App if required.

Once charging has completed (the charger led will go green), disconnect the charger from the battery and turn it off. Do not leave the charger connected to the battery for long periods of time after it has been charged. A completely discharged battery will take several hours to charge and balance so please make sure you have enough time to charge it before the next use.

Limit Total Charge Voltage

When you purchased your battery, you will have been given the choice to extend its life by reducing the total charge voltage for each cell from 4.2 volts to 4.15 volts. This increases the total number of cycles a battery can be charged before it starts to lose efficiency. This can be many hundreds of cycles more than the manufacturer has stated for the model of cell used. If you are technically minded then this can be done after receiving your battery with our guidance using the programming application for the battery BMS and changing the output voltage of the charger.

Temperature

Do not expose your battery to very high temperatures (above 40 degrees Celsius) for prolonged periods of time. High temperatures promote parasitic reactions within the battery and cause capacity loss. Leaving the battery in the boot of your car on a hot summer day is one such example. Repeated high temperature exposures will lead to premature aging of the battery.

Do not charge your battery when it has been exposed to an air temperature below 0 degrees Celsius for a long period of time for example in a cold garage or shed. Move the battery to a warmer environment and wait until it reaches a temperature above freezing before charging.

Water

Battery packs are NOT waterproof and should be protected from water ingress. Placing the battery in a waterproof bag is best. If it is subject to any volume of water then it should be left to dry in a well-ventilated area and kept under close observation. **Lithium-Ion batteries and water don't mix and can be very dangerous.**

Charging Current

Charge your battery using the recommend charge rate on our [battery specifications page](#). Using a high rate 'fast charger' will damage the battery pack and shorten its life span. If you require a faster charger then please contact us so we can recommend one which will not shorten the life of your battery.

Storing

It is best to store your battery between 10 and 20 degrees Celsius (cool, less humid conditions) and between 40 - 60% (3.6 - 3.8v) charge. If that's not possible, just avoid storing it at 100 percent charged. Every battery degrades over time. It is something called "calendar aging," which is the natural process of electrochemical degradation, and there is also "capacity fade," which occurs because of repeated charge/discharge cycles. Degradation is minimal in the 30 – 60% charge zone which is between 3.6 and 3.8 volts approximately.

If storing your battery unused for a long period of time, use the Bluetooth app to check the battery voltage every 3 months or so to make sure it has not gone below 3.6 volts. If it has, charge it back up to 3.8 volts or thereabouts. Any BMS will slowly drain a battery over a long period and will kill the battery totally if left unchecked if it drops below the manufacturers cut-off voltage.

Winter Battery Care

Electric cars can lose up to 30-percent range in cold climates? This is because of the increased resistance in the cell electrolytes, but come spring, the range is regained. For this exact reason, cars like Tesla have an advanced battery cooling/heating system that always keeps their pack at approximately 21 degrees centigrade. **You don't have this option so only use it above 0 degrees centigrade**

Summary

- Charge your battery to 98 percent to get maximum cycle life.
- Get the largest battery possible for your E-Bike, so you can still get decent range and a very high cycle life by limiting the charge voltage.
- Avoid exposing your batteries to high temperatures. Store your batteries in a cool, dry place at 40–60% charge
- Do not charge in very cold or very hot temperatures.
- Time spent at a high temperature and high voltage = BAD for the cells.
- Batteries degrade either way, and we all come with an expiration date, so make sure to ride your E-Bike as much as possible.