

Important information regarding Lithium Ion (Li-Ion) ESR models.

## Li-Ion polymer powered ESR User Manual Addendum

The internal Li-Ion polymer battery packs are 14 cells each 7S2P (configured 7 series 2 parallel). Each individual pack weighs 3 lbs and is 25.9V nominal, 8Ah capacity and capable of 90Amp continuous current draw. They are wired in parallel providing 25.9V at 16Ah from two packs, 24Ah from three packs or 32 AH from the four pack model.

### General Safety:

The Go-Ped Li-Ion polymer cells and pack manufacturing experience used in Li-On ESR Go-Ped units have gone through several years of extensive and severe testing. As a result there are several safety controls, parameters, and electronics designed into this Li-ion polymer chemistry, dedicated chargers, controller, and balancing and BMS (Battery Management System PC boards). The well proven, low vibration enclosure/aluminum heat sink on the GoPed scooter supported by a 4130 chromoly steel tubing backbone frame on shock absorbing tires protects the batteries from unlikely high impacts or punctures further raising the physical safety factor.

Though the battery pan has been designed for and tested in wet weather conditions and is weather resistant, it must be made very clear that it is not weather proof, and wet conditions should always be avoided. The Li-Ion cells, their electronics the electronic controller and on board electronic charger can be severely damaged, and potentially cause fire should any of these components get wet.

The well proven and very reliable ESR controller is preset through an erasable programmable read only memory chip (EEPROM) to limit the maximum current draw to approx 130A. This safety measure also reduces ultimate stress on the motor, brushes and electronics as well as helps to maximize battery cycle life.

The well proven and reliable standard ESR on board electronic step charger progressively steps to 29.4 volts max, the ideal voltage for safe max charging of the cells, and at a safe current flow of slightly less than 3A. The on-board charger does not balance the cells at the end of charge however. Using the on-board charger can take 6-8 hours to recharge a depleted pack. The on-board charger is intended for convenient charging cycles whenever the owner wishes to charge at remote locations wherever the off-board charger/conditioner is not located. Use the provided charging chord, or computer power chord for that purpose. The on board charging sequence LED indications on the Flux Capacitor are covered elsewhere in the user manual.

The provided off-board CC/CV (constant current, constant voltage) charger/battery conditioner operates at 29.2V with 6A current flow capacity, and can recharge the depleted pack in less than half the time as the on-board charger as outlined in the charging time table below. The off-board charger/conditioner will balance the cells for optimum range and should be used to charge the Li-ion polymer batteries at least every third our fourth charge cycle. The off-board charger/conditioner can be used for each charge cycle if desired, and connects to the four pin outlet on the left side of the battery pan. The Off-board charger/conditioner will display a red LED while charging, and a green LED when full. As the balancing function takes approx 30 minute after full, it is recommended to wait at least 30 minutes to disconnect the off-board charger after the green LED illuminates. **DO NOT USE BOTH OFF-BOARD AND ON-BOARD CHARGERS AT THE SAME TIME OR SERIOUS DAMAGE OR POSSIBLE FIRE CAN RESULT!**

### Charging Safety:

Though we anticipate none, and have encountered no safety problems while charging the GoPed Li-ion polymer packs, there is always a remote possibility that unanticipated electrical or electronic discrepancies due to unintended uses and conditions could possibly cause a malfunction in the future without notice.

Please do all charging in a safe location where, should any unlikely safety issue arise in the form of smoke or fire, it will not be possible to burn property or injury to people, i.e. outside, away from flammable structures.

**! DO NOT charge using both charging systems SIMULTANEOUSLY (at the same time)**

**! DO NOT charge the packs with any charging system other than what is provided.**

To minimize any and all safety concerns, it is recommended not to leave either charger on (plugged in) longer than after the optimum charge has been reached.

To optimize Li-ion battery charging cycle life it is not recommended to store batteries longer than 30 days without a fresh recharge each stored month.

To protect the packs from over discharging and damaging cell(s), the pack BMS will open a circuit (shut down) if the voltage sensor detects < 22.5V. Should that happen turning off all power to the ESR, the off board charger/conditioner will be needed to reset the circuit for recharge. As long as the lights on the "flux capacitor" can be turned on, the on board charger will be able to recharge the batteries.

Model	Battery Module	Weight	Top Speed	Range (Econo) <sub>1</sub>	Range (Turbo) <sub>1</sub>	Max Time to Recharge	Battery Cycle Life <sub>2</sub>
ESR750EX (24v 18 Ah)	W/4 AGM SLA Batteries	59 lbs.	20mph	8 Miles	5 Miles	7 hours (int* only)	>200
ESR750 Lion 16 Ah	W/2 Lithium Ion Packs	40 lbs	20mph	14 Miles	8 Miles	6.5 hr (int*) 3 hr (ext**)	>300
ESR750 Lion 24 Ah	W/3 Lithium Ion Packs	43 lbs	20mph	21 Miles	12 Miles	9.8 hr (int*) 4.5 hr (ext**)	>400
ESR750 Lion 32 Ah	W/4 Lithium Ion Packs	46 lbs	20mph	28 Miles	16 Miles	13 hr (int*) 5.8 hr (ext**)	>500
ESR750H (Hoverboard)	W/4 AGM SLA Batteries	62 lbs.	20mph	8 Miles	5 Miles	7 hours (int* only)	>200
ESR750H Lion 16 Ah	W/2 Lithium Ion Packs	43 lbs	20mph	14 Miles	8 Miles	6.5 hr (int*) 3 hr (ext**)	>300
ESR750H Lion 24 Ah	W/3 Lithium Ion Packs	46 lbs	20mph	21 Miles	12 Miles	9.8 hr (int*) 4.5 hr (ext**)	>400
ESR750H Lion 32 Ah	W/4 Lithium Ion Packs	49 lbs	20mph	28 Miles	16 Miles	13 hr (int*) 5.8 hr (ext**)	>500

\* = Internal charger. \*\* = External charger

1= For comparison purpose only; with 170 lb rider, full speed, non stop, no wind, no hills, smooth surface, max tire pressure.

2 =Battery cycle life greatly depends on DOD (depth of discharge), state of charge storage, temperature and other variable battery stress factors.

Please note: Design and specifications are approximate and subject to change without notice.