

Balancing versus Discharging.

LiPo batteries do not benefit from repeated cycling, the discharge function is used as a safe storage method. The capacity and charge voltage of a LiPo cell is directly related to its temperature. For example at 30°C the cell may hold 99.5% charge at 4.2V, if the cell temperature falls below -5 °C the cell will become overcharged and may 'puff'. To prevent this cells are discharged to a storage voltage (typically 3.8V to 4.0V per LiPo cell)

The Battery Doctor has a discharge facility that is user defined with a low voltage cut off between 2.0V and 4.0V and will discharge the cells at a rate of 450mAh until this low setting is reached. If a 5 cell pack starts discharging with each of the cells at 4.2V (21.0V pack) and the cut off set at 3.9V ALL of the cells will discharge until the pack reaches 3.9Vper cell (19.5v pack).

The balance function can be utilised during storage, during charging or after charging to bring all cells in the pack to within 0.01V of each other. The Battery Doctor balance facility is user defined with a starting voltage between 2.5V and 4.2V. Pressing the balance button will apply a load to the highest voltage cells until they are balanced within 0.01V. If a 5 cell pack starts balancing with four of the cells at 4.2V and one at 4.15V (20.95V pack) the cells will discharge until the pack balances on the lowest voltage (4.15V) cell (20.75V pack). The balance function ceases when the cell values are within +/- 0.01V of each other. If balanced during charging, the cells will typically balance at 4.19V to 4.20V.

It is important to remember that the Battery doctor is loop powered and will continue to consume a small amount of current when connected to the battery. Over time this can have the effect of producing voltage deviations between cells, and in a worst case situation a completely discharged battery. The Battery Doctor must be disconnected from the battery on completion of the balance or Discharge function.

Summary

Balancing discharges the High Voltage cells until they are matched within +/- 0.01V then terminates.

Discharging takes ALL cells down to set minimum value, matched within +/- 0.01V then terminates

The technology of rechargeable cells is continually changing and we recommend that the cell manufacturer's guidelines are followed. The chart below gives typical characteristics for most types of rechargeable cell.

Standard battery parameters

	LiPo	LiIo	LiFe	NiCd	NiMH	Pb
Nominal voltage	3.7 V/cell	3.6 V/cell	3.3 V/cell	1.20 V/cell	1.20 V/cell	2.0 V/cell
Max. charge voltage	4.2 V/cell	4.1 V/cell	3.6 V/cell	1.60 V/cell	1.60 V/cell	2.45 V/cell
Storage voltage	3.85 V/cell	3.75 V/cell	3.3 V/cell	n/a	n/a	n/a
Allowable fast charge	$\leq 1C$	$\leq 1C$	$\leq 4C$	1C – 2C	1C – 2C	$\leq 0.4C$
Min. discharge voltage cut-off level	≥ 3.0 V/cell	≥ 2.5 V/cell	≥ 2.0 V/cell	≥ 0.85 V/cell	≥ 1.0 V/cell	≥ 1.75 V/cell