

# Safety instructions for SLS lithium polymer batteries

**SLS lithium polymer batteries are intended for use in RC model making and drones (UAV) only. These safety instructions must BE fully read and followed before using a SLS Lithium Polymer Battery. If improperly handled, Lithium Polymer batteries may explode burn and release toxic gases, causing burns or poisoning. Since we cannot control the proper and correct handling after delivery, we reject any liability for damages and consequential damages of any kind.**

Always store and charge each battery in a fireproof container that will never spread the fire if the battery ignites. Use the battery only for your remote-controlled model, vehicle or ship model. Always store the battery in a dry, dark place in a cool environment. Never expose it to direct sunlight or excessive heat. Keep the battery away from children and unauthorized persons.

Always observe the specifications of the respective battery for the number of cells / voltage, discharge / charge current and nominal / final charge voltage. These parameters must be set correctly in the charger and must never be exceeded.

Use only high quality, approved brand name chargers suitable for charging Lithium Polymer batteries. Be sure to use the right charging program. Set the cell number as well as the charging current and the cut-off voltage on the charger absolute right. The lithium polymer batteries should only be charged and not in the built-in state in RC models, vehicles, boats or drones. Read and understand the instructions of your charger.

Explanation of the information on the battery using the example of a 3S1P rechargeable battery with 3700 mAh and 35C / 60C discharge current and max. 3C charging current:

3S1P means that the battery has been made from 3 cells that are soldered serially (positive pole to negative pole) (that's what the S stands for). The P stands for parallel and comes from earlier times, where the batteries in addition to the serial soldering also parallel (positive pole to positive pole, negative pole to negative pole) were soldered to increase the capacity and the load capacity (the discharge and charging current). Today one uses almost exclusively only serially soldered battery packs, therefore stands here 1P. 3700 mAh means that the capacity of the battery is 3700 milliamp hours or 3.7 ampere hours. This number describes the amount of power the battery has. In the same model you can fly longer with a 3700 mAh battery than with a 2600 mAh battery. 11.1 V means that the battery has a rated voltage of 11.1 V. Each lithium polymer cell has a nominal voltage of 3.7 V. This voltage is multiplied by 3 (since we have 3 cells in the battery). So we get the nominal voltage of 11.1 V. The nominal voltage has the cell about in the delivery state, it here only about 20% fully loaded. A fully charged lithium polymer cell has a voltage of 4.2 V. When multiplied by 3, this results in a total voltage in the fully charged battery of 12.6 V. This is also the cut-off voltage for the charger. 35C / 60C Discharge means that the battery can be discharged for a short time (1 second) with a maximum of 35C (=  $35 \times 3.7\text{Ah} = 129.5\text{A}$ ) and a maximum of 60C (=  $60 \times 3.7\text{Ah} = 222\text{A}$ ). 3C charge (= charge) means that the battery can be charged with a maximum of 3C (=  $3 \times 3.7\text{Ah}$  gives 11.1 ampere) charging current. (Lower charging currents spare the battery).

Since the individual cells can get slightly different voltages through repeated charging and discharging, so-called balancers are used to prevent this. Always use a suitable brand balancer to load. It may need to be set to the cell number of the battery. It is connected to the balancer cables of the battery. Our batteries have XHR balancer connectors. If your balancer has other connections, please use appropriate adapter cables. 6. Always ensure the correct polarity when plugging in the charger, the balancer and also the regulator in the model. The two thick high-current cables of the battery are soldered to the corresponding high-current connectors and connected to the charger or controller in the model. The red cable is the positive pole, the black cable is the negative pole. The balancers are connected to plus and minus each cell. The colors of the balancers may also vary, then you must check the correct polarity with a measuring device and ensure the correct connection of the balancer connector. Each battery has exactly one balancer cable more than it has cells, since it is always tapped between the cells (for example, a 3S battery has 4 balancers). At the balancer connector, you also need to use a simple gauge to measure the voltages of each cell for control by connecting a mating cable and connecting the meter (isolated). This is useful if you are not sure that your balancer is working properly (always make sure not to produce a short circuit).

If you want to use your own plug-in system, use only high-quality systems. The plugs must be designed for the amount of current that the battery may be charged. Use only adequately dimensioned systems and ensure a clean and stable soldering. The subsequent insulation may only be carried out with high-quality shrink tubing. When transporting and storing the battery, ensure that live parts cannot cause a short circuit.

Charge the battery only up to a maximum of 4.2V per cell, this also corresponds to the cut-off voltage of common chargers. Always load on a fireproof base / refractory container and never charge unattended. Never discharge the battery more than 3.3V per cell under load. At rest (measured without load), the voltage per cell should not be below 3.75V. A deeper discharge will destroy the battery. Do not rely on the safety shutdown of the controller, if it shuts off later. With very short flights / rides and then measuring the cell voltage, you should first approach the maximum flight / driving time, and then make sure you have a stopwatch in the transmitter. Leave about 20% remaining capacity in the battery. After use (empty battery), you should be able to charge about 80% of the nominal capacity. The recharged capacity will show your charger at the end of the charging process.

**ATTENTION:** Due to the high performance of the SLS batteries, the voltage level remains stable until the end of the discharge. AN EMPTY BATTERY CAN NOT BE RECOGNIZED BY ABSORPTION PERFORMANCE OR RPM OF THE ENGINE. IF THIS HAPPENS, THE BATTERY IS ALREADY UNLOADED TO DEEP AND WILL BE DESTROYED (ALSO IN ONE UNIQUE DEEP DISCHARGE). PLEASE ALWAYS ENSURE THAT THE ENGINE IS TURNED OFF TIMELY (NEVER LESS THAN 3.75V PER CELL IN REST).

If you do not want to use the battery for a long time, DO NOT store it fully charged, but with approximately 3.8V per cell and cool environment. If you have any questions or uncertainties, we are happy to help.