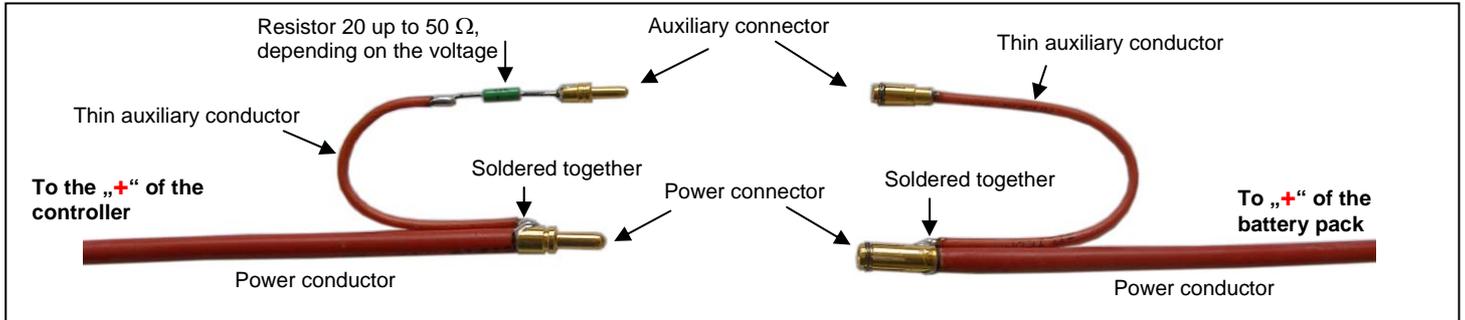


## How to prevent sparking when connecting batteries with higher number of cells

When connecting a Li-xxx pack with more batteries to the controller, strong sparking commonly occurs. Fast charging of controller filter capacitors causes this. The higher the voltage (the more the cells) of the used batteries, the smaller its inner resistance (the better the quality of the pack), the better the capacitors in the controller and the higher the capacity of the capacitors, the bigger spark occurs. Besides the small shock (due to the sparkle and a shot), the charging current of the capacitors may be in extreme cases so big that it may damage or destroy the capacitors.

Simple procedure exists to eliminate sparking when connecting the battery pack. This very cheap modification eliminates sparking and thus protects the filter capacitors.

**How to connect the positive feeding branch** (for clearness, here shown without insulation):



Connectors as well as the resistor are insulated by heat shrink.



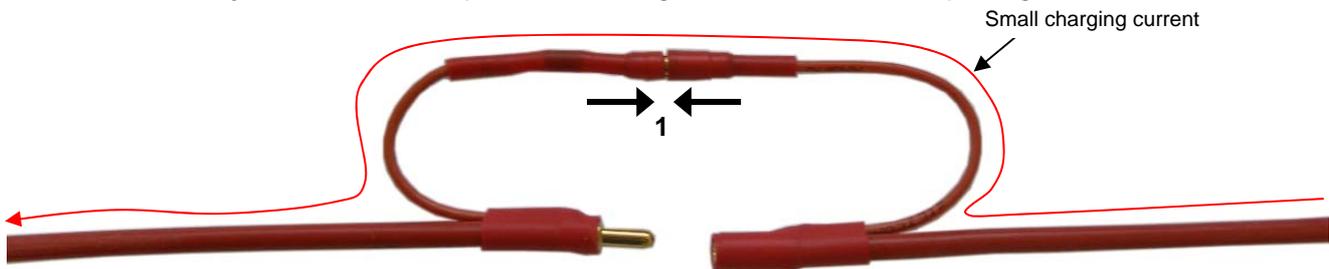
### How to connect the battery:

- 1) connect the "–" pole of the battery to the "–" of the controller.
- 2) in the positive branch, first connect the "+" pole of the controller to the auxiliary connector (to which a resistor with tens of ohms is connected in serial). This will limit the charging current when connecting and will charge the filter capacitors without sparking.
- 3) now connect the power connectors (sparking will not occur). You may start the motor now.

There are no special requirements on the auxiliary connector. The passing current is small (1- 2A) and lasts only for a short time. There are also no requirements on the resistor, any type is sufficient, e.g. metallized 0.6W, size 0207, value between 20 to 50Ω depending on the voltage of the battery pack. E.g. for 4 – 6 Lipol use 20Ω , for 10 Lipol 33Ω, for 12 up to 15 Lipol 51Ω. However, it is not necessary to keep these exact values as they may vary in quite broad limits.

### How to connect the positive feeding branch

Connect the auxiliary connector first. Capacitors are charged with small current. Sparking will not occur.



Now connect the power connectors (sparking will not occur). Main current to the controller and the motor during operation passes through these power connectors and conductors.

