



FAQ: Akku

EIMod FusionX, EIMod 4WD

This document collects frequently asked questions (FAQ) about batteries

Question: which battery types are supported?

Answer:

- NiMh/NiCd with 6 to 9 cells (6.0V, 7.2V, 8.4V, 9.6V and 10.8V)
- Lilon with 2 or 3 cells (7.2V and 10.8V)
- LiPo with 2 or 3 (7.4V and 11,1V)

These voltages are so-called nominal voltages. End-of-charge charge voltages are higher, so that fully charged batteries have a higher voltage.

For this reason, batteries with a nominal voltage higher than 12V must not be used. Their end-of-charge voltage can be higher than 14V. A battery voltage of 14V or more can lead to the destruction of the electronics of the EIMod FusionX/ EIMod 4WD.

Although EIMod FusionX/EIMod 4WD switches off all functions from a voltage of 13.5V, as long as the circuit board is under too high a voltage, it can be damaged.

Question: why is it important that the battery type is set correctly?

Answer:

This voltage is only for the battery protection when the battery is nearly empty. LiPo batteries in particular will be irrevocably destroyed if they are operated outside the voltage window of 3.0V to 4.2V per cell. If the cut-off voltage set for the specific battery type is underrun, all motors will be stopped and the announcement "Low Battery" will be heard from the loudspeaker.

The exact shutdown voltages are listed in the table below. They are slightly higher than the permitted minimum cell voltage. There are two reasons for this:

- The voltage is measured over the entire battery, not per cell. Thus, it is possible that the voltage of one cell is still within the allowed range, while another cell is already below.
- at the preset shutdown voltages, the battery is already 90-95% empty. Further operation would only be possible for a very short period of time.

Battery type	Shut down voltage
NiCd/NiMh 6 Cells	5.7V
NiCd/NiMh 7 Cells, Lilon 2 Cells	7.0V
NiCd/NiMh 8 Cells	8.0V
NiCd/NiMh 9 Cells	9.0V
NiCd/NiMh 10 Cells, Lilon 3 Cells	10.0V
LiPo 2 Cells	6.4V
LiPo 3 Cells	9.6V

A lower shutdown voltage than 5.7V is not possible. The battery voltage is also used to generate other voltages for the operation of the board and the components connected to it (e.g. receiver). For the corresponding voltage regulators to work correctly, 5.7V is the minimum.

Question: I use my own voltage monitor. Can I deactivate the monitoring of the EIMod boards?

Answer:

The monitoring cannot be deactivated, because at a voltage of less than 5.7V the board and other components such as the receiver can no longer be supplied safely. However, you can set the battery type to "NiMH/NiCd 6 cells, Lilon 2 cells". This switches off the board as the last fuse instance at 5.7V. The battery, on your responsibility, is protected by your external voltage monitor.

Question: How is the measurement done and how is it possible that sometimes after a short time the undervoltage is recovered?

Answer:

The undervoltage is detected when the value falls below the shutdown value for approx. 1 second. This prevents shorter load peaks from immediately leading to shutdown. The voltage is measured accurately to 0.001V. The battery usually "recovers" after a short time without load. If the voltage then rises above the shutdown value again, EIMod FusionX/EIMod 4WD returns to normal operation. However, the battery voltage will certainly drop again at the next higher load. It is recommended to replace or charge the battery at the first undervoltage cutoff.

Question: The battery is full, but the EIMod FusionX/EIMod 4WD still switches off after a short drive. Is the electronics damaged?

Answer:

First, check that the battery type is set correctly and that the EIMod App displays reasonable values for the current battery voltage that correspond to a fully charged battery. The display is in mV (millivolts). For the voltage in volts, the displayed value must therefore be divided by 1000 (example: display 7200 corresponds to 7.2V).

If the battery type and voltage are correct, the cause of the shutdown due to undervoltage will be an insufficiently dimensioned battery for your model. When driving on hills or driving in heavy terrain, considerable forces are generated. Especially with heavy models, wide tracks, certain types of gearboxes and so-called "racing motors" with "few revs", the currents demanded by the motors are very high. The battery must be able to meet these demands in a very short time. Many batteries, especially inexpensive ones, are not able to do this, which leads to a voltage drop at the battery.

EIMod FusionX/EIMod 4WD has no influence on this behavior. An external battery monitor would also become active and give an alarm. The voltage measurement of the EIMod FusionX/EIMod 4WD is very accurate and already prevents very short load peaks from activating the protection by a delay of 1 second. The algorithm is chosen so that the protection of the battery is given in all conditions.

Since firmware version 1.08, the highest and lowest measured battery voltage is displayed in the EIMod app (since the board was last switched on). This information also shows whether the battery has enough power reserves to supply enough current in the short term.

Question: What are the options to prevent early shutdown under high load?

Answer:

Use high-quality batteries that can deliver enough energy fast enough. Unfortunately, it is not easy to recognize such batteries, as there is no mandatory designation for the speed of energy delivery. The battery charger's specifications are not helpful either. However, there are certain clues:

- the capacity of the battery. A battery with a higher capacity (for example, 5000mAh versus 2400mAh) is usually capable of delivering more current. Especially when comparing batteries from the same manufacturer or product family, it is recommended to choose a battery with a higher capacity.
- the "C" specification. On some batteries it is printed how much current they can deliver at maximum, e.g. on a 5000mAh battery it reads 10C. This means that this battery can deliver 10 times its capacity in current. In the example it would be 50A (5000mA equals 5A, 10 times is 50A). Unfortunately, you often find unrealistic specifications like 50C or 100C, which physically cannot be met at all. The specification is also missing, in which time this current is reached.
- the price. It is not to be expected that a 3S battery for 20 or 30 euros will be able to power a high-performance tank model in full metal construction. From experience, a good battery costs 50 to 80 euros. As a brand Kokam and Yuki Model or Brainergy are to be mentioned as high quality.

attention: Only implement the following note if you are sure of your abilities! Incorrect implementation may cause explosion and/or fire hazard and/or damage your electronics!

If you already have several batteries that do not meet the high requirements, you can help yourself by connecting them in parallel. To do this, take two or three batteries of the same type, connect them in parallel with the help of suitable Y-cables and thus form a battery pack that has 2 or 3 times the energy delivery capacity. Important: the batteries must have the same charge level (fully charged) and they must be connected in parallel, not in series!

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