

## Technical Instructions

### Batteryguard **M-SAVERplus** [0775] and **M-SAVERflash** [0780]

Please read carefully before operating the device!

#### Voltage Monitors for R/C Batteries NiMh/LiFe/LiPo (4.8 V / 6 V / 7.2V)

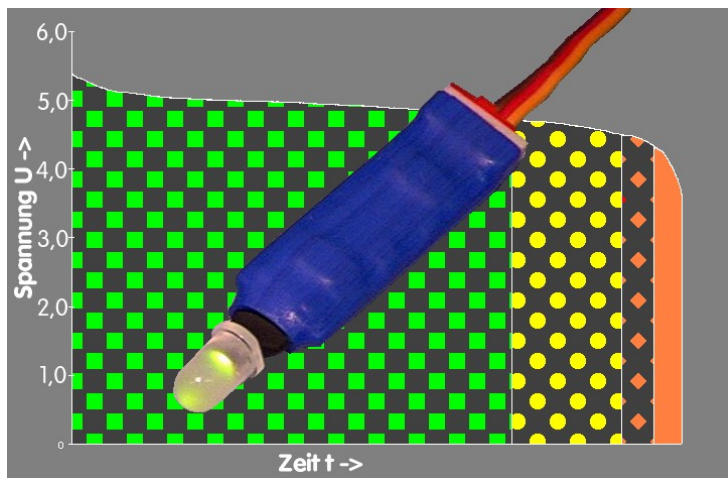
The **M-SAVERplus** and **M-SAVERflash** are optical voltage monitors for 4-, 5- or 6-cell NiMh or 2s LiFe/LiPo rechargeable batteries. They inform the user quick and ease about the voltage level of his model power supply.

**M-SAVERplus:** A LED flashes green, yellow, or red, depending on the battery voltage;

**M-SAVERflash:** a very bright red LED flashes once, twice, or three times per interval, depending on the voltage.

If the red light or the triple flash is displayed when the battery is under load, the model should no longer be started. Any undervoltage that occurs once (e.g. during a flight) is later reported to the user by a signal alternating between the red flashing (**M-SAVERplus**) or triple flash (**M-SAVERflash**) and the signal indicating the current battery voltage. A +12V DC programming voltage selects the desired number of battery cells / voltage range.

The **M-SAVERplus/-flash** is simply connected to an unused servo output of the receiver.



#### Full battery voltage

**M-SAVERplus:** green light  
**M-SAVERflash:** single flash

#### Voltage dropping

**M-SAVERplus:** yellow light  
**M-SAVERflash:** double flash

#### Discharged/weak

**M-SAVERplus:** red light; very low voltage (flashing red) to deep-discharged (permanent red),  
**M-SAVERflash:** triple flash to permanent red

The discharge curve clearly shows when the battery voltage starts to decrease and finally drops completely.

#### **Battery voltage in the different ranges**

##### **M-SAVERplus / -flash**

Mode	4 cells NiMh
green / single flash	> 4.72 V
yellow / double flash	4.72 V – 4.50 V
red / triple flash	4.50 V – 4.34 V
permanent red	< 4.34 V deep-discharged

##### **M-SAVERplus / -flash**

5 cells (2s LiFe)	6 cells (2s LiPo)
> 5.90 V	> 7.6 V
5.90 V – 5.63 V	7.6 V – 6.8 V
5.63 V – 5.43 V	6.8 V – 6.0 V
< 5.43 V deep-discharged	< 6.0 V deep-discharged

## Installation

1. The factory setting is 4 NiMh cells (=4.8V). For 5 or 6 cells (2s LiFe/LiPo) use programming as described on the right.
2. Fix the **M-Saver** in the model. For this purpose, you may bend the LED by 90° (please do this only once!) and e.g. put it through a hole in the fuselage.
3. Now plug the servo cable into an unused servo output of the receiver.
4. Now, before each start, you can check the R/C receiver battery voltage under load by moving the rudders several times.
5. After the flight a low voltage drop is displayed (if occurred) due to the memory function.

## Programming the voltage range

The voltage range for 4-, 5- or 6- ( 2s Lithium ) cells can be selected by applying a +12V DC voltage to the MSAVER. After power on with 12V the MSAVER displays the actual setting blinking-red followed by the next higher setting:

e.g. 4 =>5 =>6 =>4 =>5 and so on.

Attention: The programming voltage may be in the range on 11V – 14V. Watch the right polarity !