

# Controller SMM 50, SMM 50+ („s“ version with switch) / (“hydro”)

**Operating data:** The appearance and operating data may be changed without prior notice.

No. of feeding NiCd/NiMH cells: 6 up to 12  
 Dimensions: 36 × 26 × 6 mm  
 Temperature of the environment: 0°C to 40°C  
 Control signal: positive pulses 1,5 ± 0,5 ms, period 10 ± 30 ms  
 Motor controlling: PWM 1 kHz  
 Max. current: 50 A  
 Nominal load (electric motor) : 0 up to 50 A  
 On-state switch resistance at 25 °C: 0,0017 Ω  
 Power conductors: (90 mm): 2,5 mm<sup>2</sup>  
 Weight incl. all conductors („s“ version): 22 g (26 g)  
 Weight without power conductors: 12 g (16 g)  
**Programmable brake:** ON / OFF  
 Automatically programmed parameters: parameters of control signal, min and full throttle  
**BEC:** 5V / 2,0 A peak, continuous max. ≈ 0,5 A at 8V (≈ 1,5 W) !!!  
**BEC+ (for SMM 50+ version):** 5V / 3,0 A peak, continuous max. ≈ 0,8 A at 8V (≈ 2,5 W) !!!

Table of BEC continuous current

Number of cells	U aku	difference	continuous	loss of	continuous	loss of
	Uaku-Ubec	Uaku-Ubec	current	BEC	current	BEC+
	[V]	[V]	[mA]	[W]	[mA]	[W]
6	7,2	2,2	682	1,5	1 136	2,5
7	8,4	3,4	441	1,5	735	2,5
8	9,6	4,6	326	1,5	543	2,5
9	10,8	5,8	259	1,5	431	2,5
10	12,0	7,0	214	1,5	357	2,5
11	13,2	8,2	183	1,5	305	2,5
12	14,4	9,4	160	1,5	266	2,5



The controller is meant for a **stainless control of electric motor revolutions in aircrafts** controlled by proportional remote control sets with positive control pulses and a pulse period from ≈10 up to 30 ms. It is equipped with a BEC circuit supplying the receiver and servos with the voltage of +5 V and peak current of 2 A (3 A for “+” version). In case of overloading this circuit there occurs a drop in voltage for the receiver and servos. For a long time overload (lasting in seconds) [e.g. power dissipation  $P = (U_{aku} - 5V) \times \text{servos current consumption} > 1,5 W$ , resp. 2,5W], you might damage this circuit. In the table is shown continuous current of the BEC for various number of cells. If you need higher levels of current from the BEC circuit than are those the controller is able to supply (or in any other case when you need to feed the receiver or servos from some other source) carefully take out the central core of the servo cable connector (+5V) (see Fig.). The taken out core of this conductor must be properly insulated. The receiver and servos must be then fed from some other source. Possible switch failure (for “s” version) nowise affects its functioning. **Turning off the switch activates controller.** Type without switch is switched on connection

of accumulator. Due to the use of a processor responses to the controlling are immediate. Parameters of the control signal are constantly monitored. Possible drop-outs or interference up to ca 0,7 sec are suppressed. The value of the last correct value of the control signal is retained for this period of time. In case of longer drop-outs or interference, the motor is stopped. All types feature a very easily programmable brake (switched on/off) given by the position of the throttle stick when starting. Regarding hydro versions no possible damage occurs when in contact with water. After getting in touch with water it is needed to blow the water out of the controller properly, then you may run the controller again. The brake is functional even in hydro versions.

It is recommended to solder cables for the electric motor directly to the motor itself or furnish them with a suitable connector. Solder a suppression capacitor(s) to the motor unless the motor is already equipped with it by the manufacturer. Opposite piece of the connector, which is on your accumulators, should be soldered to the leading-in conductors to the accumulator - **be careful not to reverse poles!** Try to use power conductors as short as possible – it is better for minimum weight and for minimum interference. In case of possible interference you can solder capacitor 33 to 330 μF/25V (The best is „low ESR“ type) on the conductors to the accumulator.

As soon as, during the operation, the accumulator voltage drops to the set limit the controller starts to reduce the motor performance so that the minimum energy for reliable operation of BEC is retained. The controller does not switch the motor suddenly and unexpectedly. Downwards to lower performance the controller responds to steering, upwards to higher performance any movement of the throttle stick is ineffective.

It is recommended to adjust max. difference between minimum and maximum throttle position, the regulation will be smoother.

In case of exceeding current limits for period of time longer than 1 sec. the motor becomes switched off. The operation is resumed after dropping the throttle to zero. The controller temperature is monitored as well. In case of exceeding the temperature of 75°C the motor performance is reduced to ca 60% of PWM, the model may land and is allowed to take off again only after the controller temperature falls. Notice: the controller does not warm up only due to the loss on the switching transistor but also the loss on the BEC circuit. It is necessary to let the controller cool down if operating near the limits. One is warned of overloading or overheating by motor beeping.

**SECURITY WARNING :** Always disconnect the accumulators when not operating the model! Small current consumption occurs even when controller is switched off. Do not leave model with connected accumulators unattended! Do not charge batteries when connected to the controller! If the controller is connected to batteries do not stay in the reach of the propeller even when the controller is switched off! Please notice that running motor with propeller is very dangerous!

## Starting with the brake:

1. switch the transmitter on
2. throttle back (min. throttle)
3. turn the controller on
4. 1 × BEEP 0,5 kHz
5. full throttle (max. throttle)
6. 2 × BEEP 0,5 kHz
7. throttle dropped (min. throttle)
8. 1 × BEEP 0,5 kHz
9. you may start



## Starting without the brake:

1. switch the transmitter on
2. full throttle (max. throttle)
3. turn the controller on
4. 2 × BEEP 0,5 kHz
5. throttle dropped (min. throttle)
6. 1 × BEEP 0,5 kHz
7. you may start



### NOTE :

If in the starting position of the throttle stick, 2 × BEEP 0,5 kHz can be heard, change the norm of deflection of the throttle stick on the transmitter.

If in the starting position of the throttle stick, 1 × BEEP 0,5 kHz can be heard, change the norm of deflection of the throttle stick on the transmitter.



Servoconnector



### WARNING:

- You risk destroying the controller for:
- connect more battery cells to the controller than the max. number specified in the technical data
  - reverse connections to the accumulator
  - change motor and accumulator outlets
  - short-circuit the output wires with the accumulator connected
  - current overload, power overload
  - water in the controller, metal objects in the controller (screwdrivers, wires, etc.)

### Error messages:

(you must switch off / on controller for correction)

### BEEP 500 Hz



- low size of deflection of the throttle stick on the transmitter – you must enlarge the size of deflection
- overstep max. throttle position 0,5 and 2,5 ms – you must shorten the size of deflection
- switching on the controller with turn off the transmitter (for some receiver only)
- for moving the throttle stick to opposite (reverse) side
- for current overload (resumes operation after dropping throttle to zero)
- for starting the overheated controller



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