

**Technical data:**

- (ICE 45A- 150A) 2-6S LiPo,6-18 NiMH
- (ICE HV60A,HV100A) 4-12s LiPo, 12-36 NiMH
- (ICE HV120,HV180HV) 4-14s LiPo, 5-15s (LiFePO4), 12-42 NiMH,
- ESC with SBEC :5.5V,6A (HV ESC without BEC)
- Under voltage protection.
- Optocoupler
- Governor mode.
- Soft start.
- Active free-wheel (auto rotation).
- Automatic or 6 step adjustable timing.
- Continuously adjustable F3A brake.
- 3 steps adjustable regular back EMF brake.
- Switching rate: 8 to 16 kHz
- Speed limit: 240,000 RPM (2-Pole motors)
- Temperature and overload warning.
- Anti sparking circuit which can reduce the connection sparkle (only for HV ESC).
- Compatible with both airplane and helicopter
- Programming with the Prog Card II

**Initial setup:**

Connect the Motor to the ESC to hear the beeps. After connecting the battery (red = plus, black = minus) you hear 3 descending tones. Subsequently, follows a number of beeps according to the cell number of the connected Lipo battery (two rapid beeps for 2s, three beeps for 3s...and s on...6s). When connecting with 7-14s, you will hear two high pitch beeps and two low pitch beeps; after that the ESC is ready for working when you hear 3 ascending tones.

If the motor turns in the wrong direction, simply exchange 2 of the 3 motor wires.

Use only clean and tight gold connectors for motor and battery. The 5.5mm / 6mm PK connectors have proven to be the best choice. Pay attention for the battery connector to choose a polarity safe system. Exchange low-friction or oxidized plugs and sockets. Because only tight sitting contacts will ensure a high current flow, protect the speed controller against dangerous voltage peaks and avoid disturbances.

The entire wire length, from the controller to the battery, may not exceed 20cm. If longer wires are necessary, a Low ESR switching capacitor of high frequency with low internal resistance should be soldered between plus and minus wires every 20cm. Then please twist the 3 lines, in order to minimize interference emission from the transmitter.

**Note: Inverting the Battery polarity leads to heavy damage and to the loss of warranty!!!**

**General settings:**

The speed controller has a fixed throttle curve setting, so that with all usual transmitters the stop and full power points are linearly connected. With all programmable transmitters, the throttle range should be set to default setting ( $\pm 100\%$ ), the center point set to zero and throttle trim enabled. Nevertheless, with some transmitter types the range needs to be adjusted. For that the throttle endpoints have to be set two notches: one notch before lowest stick position the motor is stopped and that one notch before full power the motor is actually at full power. Full power is

indicated by the LED that is completely turned off.

On delivery the Timing is adjusted to 18°, brake is switched on middle, and the under voltage recognition adjusted to Lipo mode 3.1 V. If during spin up rpm variations (wowing or erratic sound) are experienced, the timing must be increased. If no improvement can be obtained at 30°, then the motor is overloaded. Here a smaller propeller, a one cell smaller battery or a stronger motor will help. If after motor stop you hear 2 beeps repeating, it means that the battery voltage dropped down below the setting value. Eventually try a cutoff voltage of 2.9V/3.0V per cell. If there is still no improvement, then the battery is discharged or too weak, the wires are too long or too small or a connector is out of order.

This is the small range on the throttle stick between brake and motor start. You can reach this position with 2 notches or with a high trim and a short gas start.

If no automatic timing is wished, it can be adjusted according to the following guideline.

Inrunner 0° to 12°

Outrunner 18° to 30°

If your motor manufacturer indicates a timing recommendation, it is of course preferable to use it. Basic rule: the higher the timing the higher the full power rpm.

The easiest to make these changes is the Prog Card II. There is also the possibility to perform the setup with the transmitter; however it will not be explained here. You will find it in the RC-setup manual.

In case you get inadvertently in the programming mode during a normal start-up (throttle stick at full power), simply disconnect the battery, lower the stick to stop, and connect the battery again. Thus you won't modify the adjustments.

#### **Helicopter settings:**

For helicopters in governor mode, the full throttle range (100%) must be calibrated once. For some transmitters, this range is indicated in the helicopter menu (throttle curve 0--100%) and some other transmitters -100...+100. Please refer the RC-Setup especially the Basic Setup or ProgCard.

When activating one of the governor modes, all relevant heli parameters are set to default. This default will fit nearly all setups. **You don't need to program further at a first step.**

Here a listing of the default settings.

- Timing = 18°
- Brake off
- Act. Freew. on
- P-Gain = 0,9
- I-Gain = 0,05
- Startup Speed = Heli middle
- PWM-Frequency = 8 kHz )
- Startup Power = Auto 1-32%
- Under voltage protection = Soft cutoff

You should modify these parameters, only if you don't get the desired success, and if you are sure off all other components.

#### **Active free-wheel:**

The ESC can keep cooled obviously, heating reduced.

#### **Temperature / overload warning:**

If the speed controller's temperature exceeds its limit, because of overloading or lack of cooling, after landing and/or motor stop, a warning signal is issued (3 Beeps in the interval). But the motor is not switched off in flight unless the temperature becomes extremely critical, then the motor is switched off.

In addition the running time becomes longer and longer with the Lipo technology. If it should come to repeated temperature warnings, better cooling should be provided or current should be reduced. These warnings are to be regarded as overload warnings and **not as normal operating condition**. Because at high temperature the components are strongly stressed, this leads to a decreased life time.

You achieve a better cooling not only through sufficiently dimensioned air intake, but even more efficiently through a larger air outtake, in order to avoid a heat accumulation. You achieve smaller currents by using a smaller propeller or a one cell smaller battery.

**Caution:**注意

Fundamentally it is important to make sure that no objects are within the propeller circle when batteries are connected. The use of this speed controller is therefore allowed only in situations where damages and personal injuries are impossible. A damaged governor (e.g. broken, damaged by polarity inversion or humidity) must not be reused under any circumstances. Otherwise it can come to later malfunctions or failures. The ESC may only be powered from batteries, a use from power supplies is not allowed.

**Trouble shooting:**

2 Beeps/ashes: Under-voltage identification

3 Beeps/ashes: Temperature rise warning

5 Beeps/ashes: Receiver signals failed

6 Beeps/ashes: start up failed 6

The ESC stores any error happening during flight and signals it acoustically (motor) and optically (LED). The errors 2 and 3 will happen and not be saved when the motor is off. When a mistake leads to the off of motor, the errors 5 and 6 are not cleared after a tension RESET. The deletion can take place only on purpose by connecting the battery with the stick at full power and/or with 100% throttle pre-selection, and disconnecting it again after the interval beep. If there is still disconnecting after 20 beeps, the RC-Setup will be activated.