Electronic Speed Controller Users' Manual
SUNRISE MODEL for ICE series BOAT

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,

- SBEC :5.5V,6A（None BEC output for HV series）

- Under-voltage detection (can be switched off)
- OPTO Coupler
- Programmable Soft Star-up
- Programmable "Forward/Reverse mode" or "Forward mode"
- Active free-wheel (Automatic rotation)
- Timing: Automatic or 6 steps adjustable
- EMF brake adjustable

- PWM frequency：8-16KHZ

- Max. RPM: 240,000rpm（for 2 Poles Brushless Motor）

- Over-temperature protection and Overload alarm
- Anti Sparking Circuit: reduces connection sparkles(only HV ESC)
- Programming with ProgCard 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.（2 continuous quick beeps with 2S battery，3 continuous quick beeps with

3S battery, 4S, 5S, 6S, and so on）.

When connecting to No.7-14s battery, there will be 2 high pitch beeps and 2 low pitch beeps. In case the transmitter stick is in throttle off, you
hear now 3 ascending tones. The ESC is ready to work.

Motor stops working at 1.5ms by Factory Default setting. This is average for most transmitters. For Gun type transmitters or other transmitters, it must be at standard emission value.

If there is no 3 ascending tones, please correct the throttle off position of the transmitter, or reset by Prog-Card II or transmitter stick. Please refer to the RC set-up operation guidance of brushless ESC. Note: The full range of functions can only be set

by Prog Card II. If the motor turns in the wrong direction, simply exchange 2 of the 3 motor wires.

Only clean and tight metal plug can be used to connect motor and battery. Best option is size 5.5mm or 6mm. Please pay attention to the right polarity of battery plug and socket.
Don't use oxidized or loose plug or socket. Only tight connecting plugs can ensure heavy current and protect the speed controller from the highest risk voltage and interference.

The electric wire should not exceed 20cm (between ESC and battery). It is necessary to weld a high frequency low impedance capacitance between positive line and negative line at every 20cm when using longer wire. In case to prolong motor wires, please twine the 3 wires (between ESC and motor) together to avoid interference of transmitter. Note: Wrong Battery polarity leads to heavy damage and to the loss of warranty!!!

General Set-up

The ESC 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 (±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 so that 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.
Here a listing of the default settings.
- Forward mode
- Timing 18°
- Brake off
- 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 2.9 or 3.0V per cell. If there is still no improvement, then the battery is discharged or too weak, the wires are too long or to small or a connector is out of order.

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 ProgCard II.

There is also the possibility to perform the setup with the RC-Setup.
Please notice that the complete features set can only be reached through the ProgCard II. 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.

Active free-wheel:
ESC can keep obvious cooling and reduce heat.

Over 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 switched off.
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.

Opto coupler:
In the case of the use of an external BEC the galvanic separation of the opto-coupler is bypassed, which can possibly feed disturbances through to the receiver. Here we recommend the use of our ferrite core for additional filtering.

Caution:
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 a later malfunctions or failures.
The ESC may only be powered from batteries, a use from power supplies is not allowed.

Trouble shooting:
2 Beeps/flashes: Under-voltage detection
3 Beeps/flashes: Over Temperature Warning
5 Beeps/flashes: Receiver signals failed
6 Beeps/flashes: start up failed

Any error happens of ESC during flight is signaled by making sounds of motor or flashing of LED. 2 beeps or 3 beeps will occur after motor stops but not stored. In case the ESC is switched off by error, the 5 beeps and 6 beeps will be stored permanently even cut off battery and re-start. To delete these errors, please connect the ESC to the

battery with 100% throttle pre-selection (throttle curve) or with the stick at full power, then disconnect the battery after the interval beeps. You may activate the RC-Setup if not disconnecting the battery.