Thanks for purchasing our Electronic Speed Controller (ESC). High power system for RC model can be very dangerous, so we strongly suggest you read this manual carefully. In that we have no control over the correct use, installation, application, or maintenance of our products, no liability shall be assumed nor accepted for any damages, losses or costs resulting from the use of the product. Any claims arising from the operating, failure or malfunctioning etc. will be denied. We assume no liability for personal injury, property damage or consequential damages resulting from our product or our workmanship. As far as is legally permitted, the obligation to compensation is limited to the invoice amount of the affected product.

**[Features]**
1. Use extreme low resistance PCB to make the whole ESC with super current capability endurable.
2. Military quality capacitors with extreme low resistance increase the ability for preventing unwanted RF noise or interference.
3. Anti-spike circuit eliminates sparks when the battery pack is connecting with the ESC.
4. Protection features: Low-voltage cutoff protection / over-heat protection / throttle signal lost protection.
5. 3 start modes: Normal / Soft / Super-Soft, compatible with fixed-wing aircraft and helicopter.
6. Throttle range can be configured, fully compatible with all transmitters.
7. Smooth and accurate speed control, excellent throttle linearity.
9. Pocket-sized program card can be purchased separately for extremely easy programming at the ESC of flying field.

**[Specification]**

<table>
<thead>
<tr>
<th>Class</th>
<th>Model</th>
<th>Cont. Current</th>
<th>Burst Current (10s)</th>
<th>BEC Output</th>
<th>Battery Cell</th>
<th>User Programmable</th>
<th>Weight</th>
<th>Size L/W/H</th>
</tr>
</thead>
<tbody>
<tr>
<td>80A</td>
<td>FLYFUN-80-HV</td>
<td>80A</td>
<td>100A</td>
<td>N/A</td>
<td>5-10</td>
<td>15-30</td>
<td>Yes</td>
<td>125g</td>
</tr>
<tr>
<td>100A</td>
<td>FLYFUN-100-HV</td>
<td>100A</td>
<td>120A</td>
<td>N/A</td>
<td>5-15</td>
<td>15-36</td>
<td>Yes</td>
<td>112g</td>
</tr>
</tbody>
</table>

**[Wiring Diagram]**

Note: There are 2 control wires on the HV controller. The longer one is close to the positive battery wire, which is connected with the receiver, and the shorter one is close to the negative battery wire, which is used to connect the program card to set the programmable parameters of the controller.

**[Anti-Spark Circuit]**
There is a pair of bullet connectors and a thin red wire attached with the positive input wire (red color, thick) of the ESC. They are used to eliminate sparks when the battery pack is connecting with the ESC. Please use it in the following sequence:
1. Disconnect the bullet connectors on the positive input wire (red color, thick) of the ESC.
2. Connect battery wires to the ESC.
3. Connect the bullet connectors on the positive input wire (red color, thick) of the ESC as soon as you hear the special tone “123”.

**[Feature Explanation]**
1. Brake, Brake Enabled / Brake Disabled, default is Brake Disabled.
2. Battery Type, LiPo / Li-ion / Li-Po / Ni-x(NiMH or Nicd). Default is Li-xx.
3. Low Voltage Protection Mode (Cutoff Mode), Soft Cutoff (Gradually reduces the output power) or Hard Cutoff (Immediately stops the output power), default is Soft cutoff.
4. Low Voltage Protection Threshold (Cutoff Threshold), Low / Medium / High, default is Medium.
   - For Li-xx battery, the cut-off voltage of a battery pack is calculated automatically or set manually. Low / Medium / High cutoff voltage for each cell is: 2.6V/2.65V/3.1V. For example: 10 cells LiPo, when “Medium” cutoff voltage is set, the cutoff voltage is: 2.65V×10=26.5V.
   - For Ni-xx battery, battery, low / medium / high cutoff voltages are 0%/45%/60% of the startup voltage (i.e. the initial voltage of the charged battery pack), 0%, 50%, 75% and 100% are the low voltage protection function is disabled. For example:20 cells Ni-MH battery, fully charged voltage is 1.44V×20=28.8V, when “Medium” value is set, the cutoff voltage is: 28.8V×45%=12.96V.
5. Start Mode, Normal / Soft / Super-soft, default is Normal startup.
   Normal is suitable for fixed-wing aircraft. Soft and Super-soft are suitable for helicopter. The initial speed of Soft and Super-soft mode is very slow so it will take 3 seconds (Soft startup) or 6 seconds (Super-soft startup) from zero speed to full speed. But if the startup process is completed (i.e. The motor is running), then the throttle is closed (that means the throttle stick is moved to bottom position at 0% throttle) and opened again (throttle stick is moved upwards) within 3 seconds, the restart will be temporarily changed to normal mode to get rid of the chances of crash caused by slow throttle response in aerodynamic fly.
6. Timing, Low / Medium / High, default is Low.
   In normal cases, Low or Medium timing is suitable for most motors. In order to get higher speed, please try the High timing value.

**[Trouble Shooting]**
Note: After you changing the timing setting, please test your RC model on ground before taking off.

**[Begin To Use The New ESC]**
Note: In the following instructions, we use the words of “Top position” and “Bottom position” to represent the position of the throttle stick.
Top Position: The throttle value is 100% at this position.
Bottom Position: The throttle value is 0% at this position.
Before using your new ESC, please check all the connections to make sure that they are reliable, and then start up the ESC in the following sequence:
1. Move the throttle stick to bottom, and then switch on the transmitter.
2. Connect the receiver battery pack (4-6V) to the receiver, and then connect the main power battery pack to ESC, the ESC begins the self-test process, and the motor will emit several “beep” tones to represent the cells quantity of the little battery pack. After 2 seconds a long “beep” tone, which means the self-test is OK, and now the RC model is ready to take off. If a very rapid “beep----beep” sound is happened, please check your battery packs and all the connections.
   - If a special tone “25617” emits after 2 beep tones (beep-beep), means the ESC has entered the program mode, i.e. the throttle channel of your transmitter is reversed, please set the direction of throttle channel correctly.
   - If a very rapid “beep---beep---beep” tone emits (The time interval of each “beep-beep” is 1 second), means the input voltage is too low or too high, please check the battery voltage.
3. **Very Important:**
   Because different transmitter has different throttle range, you need to use the “Throttle Range Setting Function” to calibrate the throttle range. Please read the instructions on page 1-15 “Throttle Range Setting”.

**[Alarm Tones]**
1. Input voltage abnormal alert tone: The ESC begins to check the voltage of battery pack when it is power on, if the voltage is not in the acceptable range, such an alert tone emits: “beep-beep---beep-beep-beep” (Every “beep-beep” has a time interval about 1 second).
2. Throttle signal abnormal alert tone: When the ESC can’t detect the normal throttle signal, such an alert tone emits: “beep---beep---beep” (Every “beep” has a time interval about 2 seconds)
3. Throttle stick is not at it bottom position alert tone: When the throttle stick is not in the bottom (lowest) position, a very rapid alert tone emits: “beep---beep---beep---beep” (Every “beep” has a time interval about 0.25 second)

**[Protection Function]**
1. Start up protection: If the motor failed to start up in 2 seconds, the ESC will cut off the output power. In this case, the throttle stick MUST be moved to bottom again and then to restart the motor. (Such a situation happens in the following cases: The connection between ESC and motor is not reliable, propeller is blocked, gear box is locked, etc.)
2. Over-heat protection: When the temperature of ESC is higher than a factory preset value, the ESC will gradually reduce the output power.
3. Throttle signal loss protection: The ESC will reduce the output power if the throttle signal is lost for 1 second, further lost for totally 2 seconds will cause its output to be completely cut off.

**[Normal Startup Procedure]**
Switch on the transmitter, and then move the throttle stick to bottom position.
Connect the battery pack to ESC, a special tone “j123” will emit, means, the power supply is OK.
Several “beep” tones emit to represent the cells quantity of the lithium battery pack.
When self-test is finished, a long “beep” tone emits.
Ready to go flying now.

Please note that we use a special way to represent the cells quantity of a lithium battery pack: 1 long “beep” = 5 short “beep”. For example, 2 long “beep” = plus 2 short “beep” (Beep—Beep—BB) means a 12 cells lithium battery pack, 1 long “beep” = plus 1 short “beep” (Beep—B) means a 6 cells lithium battery pack, and so on.

**[Throttle Range Setting]**
Throttle range should be reset when a new transmitter is being used.
Switch on the transmitter, and then move the throttle stick to the bottom position.
Connect the battery pack to the ESC, and then wait for about 2 seconds “Beep-beep-beep” tone emits, which means the highest point of the throttle range has been correctly configured.
Move the throttle stick to the bottom position, and then move the throttle stick to the top position, several “beep” tones emits to represent the number of Lipo battery cells.
A long “Beep” tone emits, means the lowest point (bottom) of the throttle range has been correctly configured.

**[Trouble Possible Reason Action]**

<table>
<thead>
<tr>
<th>Trouble</th>
<th>Possible Reason</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>After power on, motor can’t work, no sound is emitted</td>
<td>The connection between battery pack and ESC is not OK</td>
<td>Check the power connection. Replace the controller.</td>
</tr>
<tr>
<td>After power on, motor can’t work, such an alert tone emits</td>
<td>Input voltage is abnormal, too high or too low</td>
<td>Check the voltage of battery pack</td>
</tr>
<tr>
<td>After power on, motor can’t work, such an alert tone emits</td>
<td>Throttle signal is abnormal</td>
<td>Check the receiver and transmitter</td>
</tr>
<tr>
<td>After power on, motor can’t work, such an alert tone emits</td>
<td>Throttle stick is not in its bottom position</td>
<td>Move the throttle stick to bottom</td>
</tr>
</tbody>
</table>

Manual of Sensorless Brushlessless Speed Controller

HW-SM002DUL-20130610

page 1
After power on, motor can’t work, a special tone “*jisi*” emits after 2 beep tones (beep-beep). The direction of throttle channel is reversed, so the ESC has entered the program mode.

Set the direction of throttle channel correctly

The motor runs in opposite direction

The motor stop running while in working state

Throttle signal is lost

Check the receiver and transmitter

Check the cable of throttle channel

Some Connections are not reliable

ESC has entered Low Voltage Protection mode

Land RC model as soon as possible, and then replace the battery pack.

【Program The ESC With Transmitter Stick (4 Steps)】

1. Enter program mode
2. Select programmable items
3. Set item value (Programmable value)
4. Exit program mode

【1. Enter program mode】

1. Switch on transmitter, move throttle stick to top position, and then connect the battery pack to ESC.
2. Wait for 2 seconds, the motor will emit special tone like “beep-beep.”
3. Wait for another 5 seconds, special tone “*jisi*” emits, which means program mode is entered.

【2. Select programmable items】

After entering program mode, you can hear 9 tones in a loop in the following sequence. If you move the throttle stick to bottom within 3 seconds after one kind of tones, then this item will be selected.

1. “beep” — Brake (1 short tone)
2. “beep-beep” — Battery type (2 short tone)
3. “beep-beep-beep” — Cutoff mode (3 short tone)
5. “beep—” — Startup mode (1 long tone)
6. “beep—” — Timing (1 long 1 short)
7. “beep—beep” — Lipo battery cells (1 long 2 short)
8. “beep—beep-beep” — Set all to default (1 long 3 short)
9. “beep—” — Exit (2 long tones)

Remark: 1 long “beep—” = 5 short “beep—”

【3. Set item value】

You will hear tones in loop. Set the value matching to a tone by moving the throttle stick to top when you hear the tone, then a special tone “*jisi*” emits which means the value is set and saved. (Keeping the stick at top, you will go back to step 2 and you can select other items. Moving the stick to bottom within 2 seconds, you will exit the programming mode directly.)

1. “beep” — Brake (1 short tone)
2. “beep-beep” — Battery type (2 short tone)
3. “beep-beep-beep” — Cutoff mode (3 short tone)
5. “beep—” — Startup mode (1 long tone)
6. “beep—” — Timing (1 long 1 short)
7. “beep—beep” — Lipo battery cells (1 long 2 short)
8. “beep—beep-beep” — Set all to default (1 long 3 short)
9. “beep—” — Exit (2 long tones)

【4. Exit program mode】

There are 2 ways to exit program mode.

1. In the step 3, after special tone “*jisi*,” move throttle stick to the bottom within 2 seconds.
2. In step 2, after the tone “beep—” (item #9), move throttle stick to the bottom within 3 seconds.

【How To Use The Program Card】

1. Connect the battery (4.8Vto 6V) to the port marked with “BATT.”
2. Connect the programming lead (shorter control wire) to the port marked with “BEC.”
3. Connect the main battery pack to the ESC.

Please note the above connection sequence cannot be reversed.

Now the “Music/Lipo” cell item only means the cells quantity of the lithium battery pack. (LED is lighting)

<table>
<thead>
<tr>
<th>LED</th>
<th>Lipo Cells</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>C</td>
</tr>
<tr>
<td>9</td>
<td>CELLS</td>
</tr>
<tr>
<td>11</td>
<td>CELLS</td>
</tr>
<tr>
<td>5</td>
<td>CELLS</td>
</tr>
<tr>
<td>6</td>
<td>CELLS</td>
</tr>
<tr>
<td>7</td>
<td>CELLS</td>
</tr>
<tr>
<td>8</td>
<td>CELLS</td>
</tr>
</tbody>
</table>

【Accessory: RPM Sensor】

The RPM sensor is an accessory of the high voltage speed controller.

Function

It detects the voltage changes at the wires of brushless motor, and then outputs the RPM signal. This RPM sensor can work with some speed control systems for helicopters. And one of its typical applications is to work as the RPM sensor for VBar system made by Mikado (www.mikado-hel.de).

Specifications

1. Size: 23mm(L)*10mm(w)*2mm(h)
2. Weight: 8g (Input and output wires are included)
3. Working voltage: 3.5V to 8.4V(15 to 2S Lipo)
4. Current: 1 to 5mA
5. Voltage range of the motor wires: 2 to 14S Lipo
6. RPM range (for 2 poles brushless motor): 1000rpm to 300000rpm
7. Working temperature: 0 to 50 Celsius degree or 32 to 122 Fahrenheit degree

How to Use

The lead A and lead B is connected to any 2 wires of the brushless motor (Do not need to consider about the polarity). The lead C is a three color wires with a connector at the end, the black wire is the ground wire, the red wire is connected to 3.3V or 5V to supply the sensor, and the white wire outputs RPM signal.