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 this product, we will not accept any responsibility 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 manufacturer disclaims all other warranties, expressed or implied, including, but not limited to, warranties of merchantability and fitness for a particular purpose. If anything is wrong, please return the product to us or our authorized distributor.

Features
- Extreme low output resistance, super current endurance.
- Multiple protection features: Low voltage cut-off protection / over-heat protection / throttle signal loss protection.
- 3 start modes: Normal / Soft / Super-Soft, compatible with fixed-wing aircraft and helicopter.
- Throttle range can be configured to be compatible with all transmitters.
- Smooth, linear and precise throttle response.
- Separate voltage regulator IC for microprocessor with good anti-jamming capability.
- Maximum speed: 210000 RPM (2 poles motor), 70000 RPM (6 poles motor), 35000 RPM (12 poles motor).

The pocket-sized Program Card can be purchased separately for easily programming the ESC at flying field.

With a program card, user can activate the music playing function of the ESC, and totally there are 15 rhythms can be selected.

Specifications
- **Firmware Series**
  - Class | Model | Current (Max.) | Burst Current (10s) | BEC Mode (Note 1) | BEC Output | Battery Cell | User Programmable | Weight | Size | L x W x H |
  - 6A | FLYFUN-6A | 6A | 6A | Linear | 5V/0.8A | 2 | 5-6 | Available | 5.5g | 32*12*5.4 |
  - 10A | FLYFUN-10A | 10A | 10A | Linear | 5V/2A | 4-5 | 12 | Available | 9.5g | 38*15*8.7 |
  - 12A | FLYFUN-12A | 12A | 15A | Linear | 5V/2A | 8-12 | Available | 15.9g | 48*22*5.6 |
  - 18A | FLYFUN-18A | 18A | 22A | Linear | 5V/2A | 19 | 12 | Available | 19g | 48*22*5.6 |
  - 25A | FLYFUN-25A | 25A | 35A | Linear | 5V/2A | 5-12 | Available | 24g | 55*25*9 |
  - 30A | FLYFUN-30A | 30A | 40A | Linear | 5V/2A | 5-12 | Available | 26g | 55*25*9 |
  - 40A | FLYFUN-40A | 40A | 55A | Switch | 5V/2A | 6-18 | Available | 39g | 60*24*15 |
  - 60A | FLYFUN-60A-OPTO | 60A | 55A | N/A | 5V/2A | 6-18 | Available | 39g | 60*24*15 |
  - 80A | FLYFUN-80A | 80A | 80A | Switch | 5V/2A | 6-18 | Available | 60g | 83*13*16 |
  - 100A | FLYFUN-100A | 100A | 100A | Switch | 5V/2A | 6-18 | Available | 72g | 83*13*16 |
  - 150A | FLYFUN-150A | 150A | 150A | Switch | 5V/2A | 6-18 | Available | 93g | 83*13*16 |

BEV Output Capability
- **Linear Mode BEC (5V/2A) | Switch Mode BEC (5V/3A)**
  - 28 Lipo | 35 Lipo | 45 Lipo | 55 Lipo | 6S Lipo | 7S Lipo | 120A | 120A | 120A | 120A | 120A | 120A |
  - 28 - 4S Lipo | 55-60 Lipo | Standard micro servos(Max)
  - 5 | 5 | 4 | 4 | 2 | 2

**Notes:**
1. BEC means the "Battery Elimination Circuit". It is a DC-DC voltage regulator to supply the receiver and other equipments from the main battery pack. With the built-in BEC, the receiver needn't to be supplied with an additional battery pack.
2. IMPORTANT! The ESC named "DUL" or "DUL-DOPTO" hasn't a built-in BEC. An external BEC or linear battery pack should be used to power the receiver. And an individual battery pack is needed to power the program card when programming such ESCs, please read the user manual of the Program Card for detail information.

Wiring Diagram

**Programmable Items**
1. **Basic Setting** - Enabled / Disabled, default is Disabled.
2. **Battery Type** - Li Battery / Lipo or N/xx (NiMH or NiCd), default is Li-xx.
3. **Low Voltage Protection Mode (Cut-Off Mode)**
   - Off: Soft Cut-Off (Gradually reduce the output power) or Cut-Off (Immediately stop the output power).
4. **Low Voltage Protection Threshold (Cut-Off Threshold)**
   - Low / Medium / High, default is Medium.
5. **Start Up Failure Protection**
6. **Throttle Range Setting**: The throttle range before flying. Please read the instruction on page 2—"Throttle Range Setting".

**Alert Tone**
1. **Input voltage is abnormal:** The ESC begins to check the voltage when the battery pack is connected, if the voltage is not in the acceptable range, the ESC will automatically "beep", beep, beep, beep-beep-beep (Every beep-beep-beep has a time interval of about 1 second).
2. **Throttle signal is abnormal:** When the ESC can't detect the normal throttle signal, such an alert tone will be emitted: "beep", "beep", "beep".
   - "Every beep" has a time interval of about 2 seconds.
3. **Throttle signal is not in the bottom position:** When the throttle stick is not in the bottom (lowest) position, a very rapid alert tone will be emitted: "beep", "beep", "beep".
   - "Every beep" has a time interval of about 0.25 second.

**Protection Function**
1. **Start up failure protection:** If the motor fails to start within 2 seconds, then the ESC will cut-off the output power. In this case, the throttle stick MUST be moved to the bottom position (zero throttle) again to restart the motor. (Such a situation happens in the following cases: The controller and ESC are not reliable, the propeller or the motor is blocked, etc.)
2. **Over-heat protection:** When the temperature of the ESC is over 110 Celsius degrees, the ESC will reduce the output power.
3. **Throttle signal loss protection:** The ESC will reduce the output power if throttle signal is lost for 1 second, further loss for 2 seconds will cause the output to be cut off completely.

**Program Example**
1. **Enter Program Mode**
   - Switch on transmitter, move throttle stick to top position, connect battery pack to ESC, wait for 2 seconds, "beep-beep" tone should be emitted. Then wait for 10 seconds, special tone (Every "beep" has a time interval of about 1 second). After that, the ESC is ready to be programmed. Press "beep-beep-beep-beep-beep" for 2 seconds, the ESC will enter the "Program Mode".
2. **Select Programmable Items**
   - Now you'll hear 8 tones in a loop. When a long "beep" tone emits, move throttle stick to bottom to enter the "Start Mode".
3. **Set Item Value (Voltage Options)**
   - "beep", wait for 3 seconds; "beep", wait for another 3 seconds; then you'll hear "beep-beep-beep", move throttle stick to the top position, then a special tone (Every "beep" has a time interval of about 1 second), that means you have set the "Start Mode" item to the value of "Super-Soft".
4. **Exit Program Mode**
   - After the special tone "beep" is listened, move throttle stick to the bottom within 2 seconds.

**Trouble Shooting**

<table>
<thead>
<tr>
<th>Trouble</th>
<th>Possible Reason</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>After power on, motor does not work, no sound is emitted</td>
<td>The connection between battery pack and ESC is not correct</td>
<td>Check the power connection, replace the connectors.</td>
</tr>
<tr>
<td>After power on, motor does not 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 does not work, such an alert tone emits</td>
<td>Throttle signal is irregular</td>
<td>Check the receiver and transmitter, check the cable of throttle channel.</td>
</tr>
</tbody>
</table>
After power on, motor does not work, such as an alert tone emits: “beep”, “beep-beep”, “beep” (Every “beep” has a time interval of about 0.25 second)

After power on, motor does not work, a special tone “?????” emits after 2 beep tone (“beep-beep”):
The throttle stick is not in the bottom (lowest) position

The motor runs in the opposite direction
Direction of the throttle channel is reversed, so the ESC has entered the program mode

The motor stops running while in working state
The connection between ESC and the motor need to be changed.

Throttle signal is lost
Beep alert tone emit

Normal startup procedure

Move throttle stick to bottom and then switch on transmitter.
Connect battery pack to ESC, special tone like “?????” means power supply is OK

Several “beep” tones emits, which means the quantity of the lithium battery cells
When the self-test is finished, a long “beep—-” tone emits

Move throttle stick upwards to go flying

Throttle range setting (Throttle range should be reset whenever a new transmitter is being used)

Switch on transmitter, move throttle stick to top
Connect battery pack to ESC, and wait for about 2 seconds
“beep-beep” tone emits, which means the throttle range highest point has been correctly confirmed
Move throttle stick to the bottom, several “beep” tones presents the quantity of battery cells

A long “beep” tone emits, means throttle range lowest point has been correctly confirmed

Program the ESC with your transmitter (4 Steps)

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

1. Enter program mode
   1) Switch on transmitter, move throttle stick to top, connect the battery pack to ESC
   2) Wait for 2 seconds, the motor should emit special tone like “beep-beep.”
   3) Wait for another 5 seconds, special tone like “?????” emits, which means program mode is entered

2. Select programmable item
   After entering program mode, you will hear 8 tones in a loop with the following sequence. If you move the throttle stick to bottom within 3 seconds after one kind of tones, this item will be selected:
   1. “beep” brake (1 short beep)
   2. “beep-beep” battery type (2 short beeps)
   3. “beep-beep-beep” cutoff mode (3 short beeps)
   4. “beep-beep-beep-beep” cutoff threshold (4 short beeps)
   5. “beep—-” start up mode (1 long beep)
   6. “beep—-beep—-” timing (1 long 1 short)
   7. “beep—-beep-beep” set all to default (1 long 2 short)
   8. “beep—-beep—-” exit (2 long beeps)

   Note: 1 long “beep—-” = 5 short “beep—-”

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

4. Exit program mode
   There are 2 ways to exit program mode:
   1. In step 3, after special tone “?????” emits, move the throttle stick to the bottom position within 2 seconds.
   2. In step 2, after hearing “beep—-” tone (that means the item #8), move the throttle stick to the bottom within 3 seconds.

<table>
<thead>
<tr>
<th>Items</th>
<th>“beep”</th>
<th>“beep-beep”</th>
<th>“beep-beep-beep”</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 short tone</td>
<td>2 short tones</td>
<td>3 short tones</td>
</tr>
<tr>
<td>Brake</td>
<td>Off</td>
<td>On</td>
<td></td>
</tr>
<tr>
<td>Battery type</td>
<td>Li-ion / Lipo</td>
<td>NiMH / NiCd</td>
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<tr>
<td>Cutoff mode</td>
<td>Soft-Cut</td>
<td>Cut-Off</td>
<td></td>
</tr>
<tr>
<td>Cutoff threshold</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
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<tr>
<td>Start mode</td>
<td>Normal</td>
<td>Soft</td>
<td>Super soft</td>
</tr>
<tr>
<td>Timing</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
</tr>
</tbody>
</table>

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