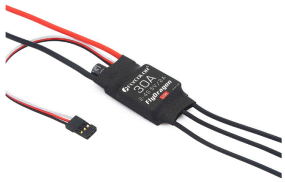

FLYCOLOR FlyDragon Lite 20A Brushless ESC for Airplane User Manual

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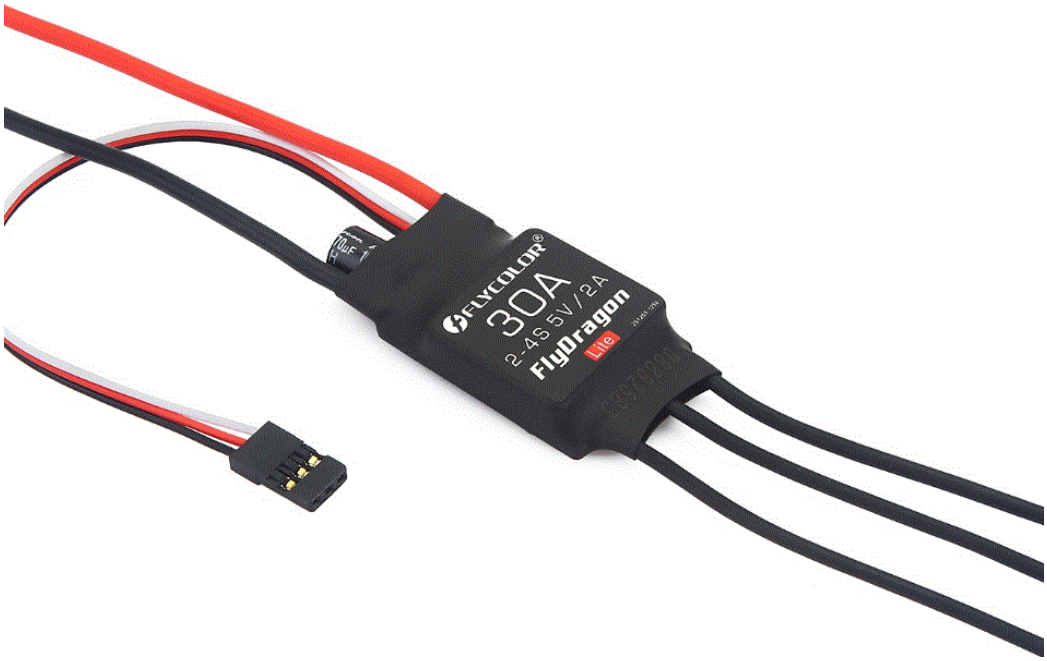


Attention: Thank you for using our product. Any improper operation may cause personal injury or damage to the product and relevant equipment. This high-power system for the RC model can be dangerous, we strongly recommend reading the user manual carefully and completely. We will not assume any responsibility for any losses caused by unauthorized modifications to our product. We have the right to change the design, appearance, performance, and usage requirements of the product without notice.

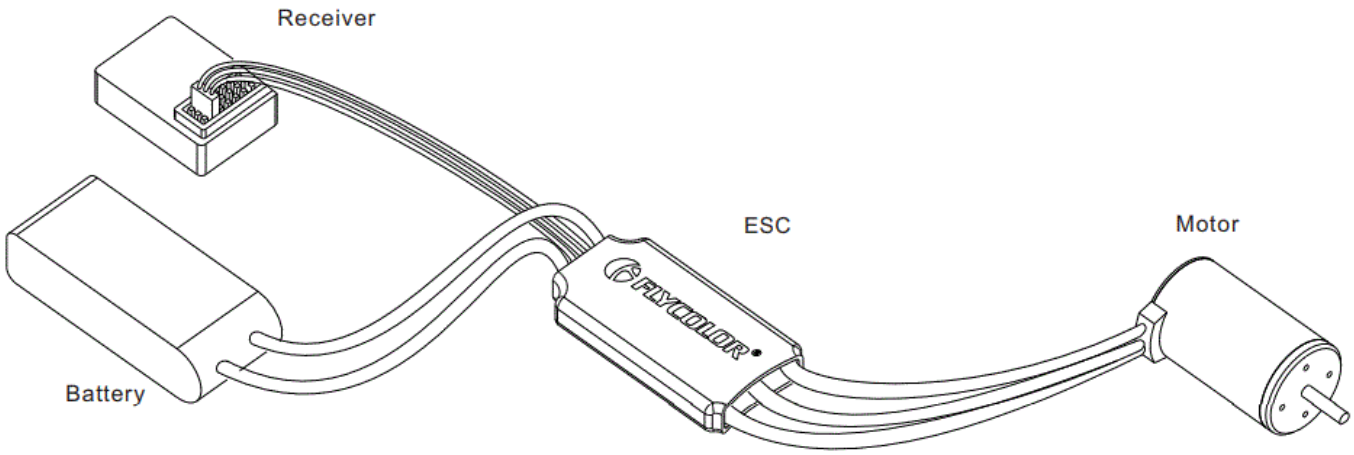
Main Features

- Using C8051F850 MCU ,pipelined 8-bit C8051 core .
- FlyDragon Lite series, small size, and lightweight.
- Unique circuit design, strong anti-interference.
- Start mode can be set, throttle response is fast and speed control is linear and smooth.
- The low-voltage protection threshold value can be set.
- Multiple protection features: Abnormal startup protection, over-heat protection, throttle signal loss protection, low-voltage cut-off protection, etc.
- High power safety performance: wherever the throttle lever is, the motor will not start immediately.
- Judge the working condition via an alarm.
- Users can set functions as their demands, Cycle programming menu which easy to operate.
- Built-in BEC, high output power, less power loss.

Specifications

Model	Con. Current (Good heat dissipation)	Burst Current (Good heat dissipation)	BEC	LiPo	Weight (For reference)	Size (For reference)
FlyDragon Lite 20A	20A	30A	5V / 2A	2-4S	23g	49x25.5x10.5mm
FlyDragon Lite 30A	30A	40A	5V / 2A	2-4S	25g	49x25.5x10.5mm
FlyDragon Lite 40A	40A	50A	5V / 3A	2-4S	51g	65x26x15.5mm
FlyDragon Lite 50A	50A	60A	5V / 3A	2-4S	46.5g	65x26x15.5mm

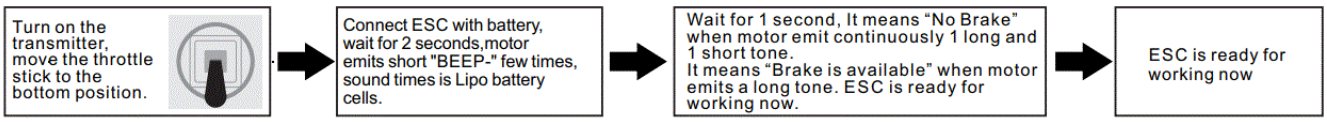
Wiring Diagram



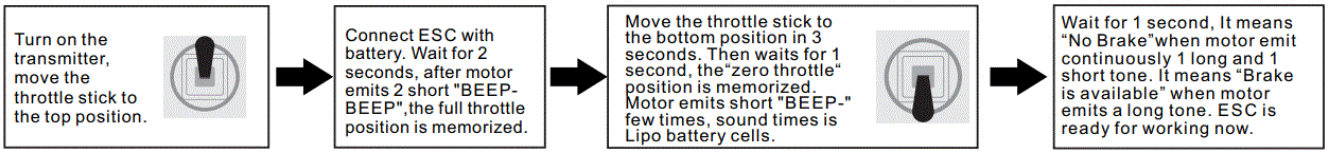
- Please ensure all solder joints are insulated with heat shrinkage where necessary.
- The appearance of each model is different, the picture is a typical model for reference only.

Operation Instruction

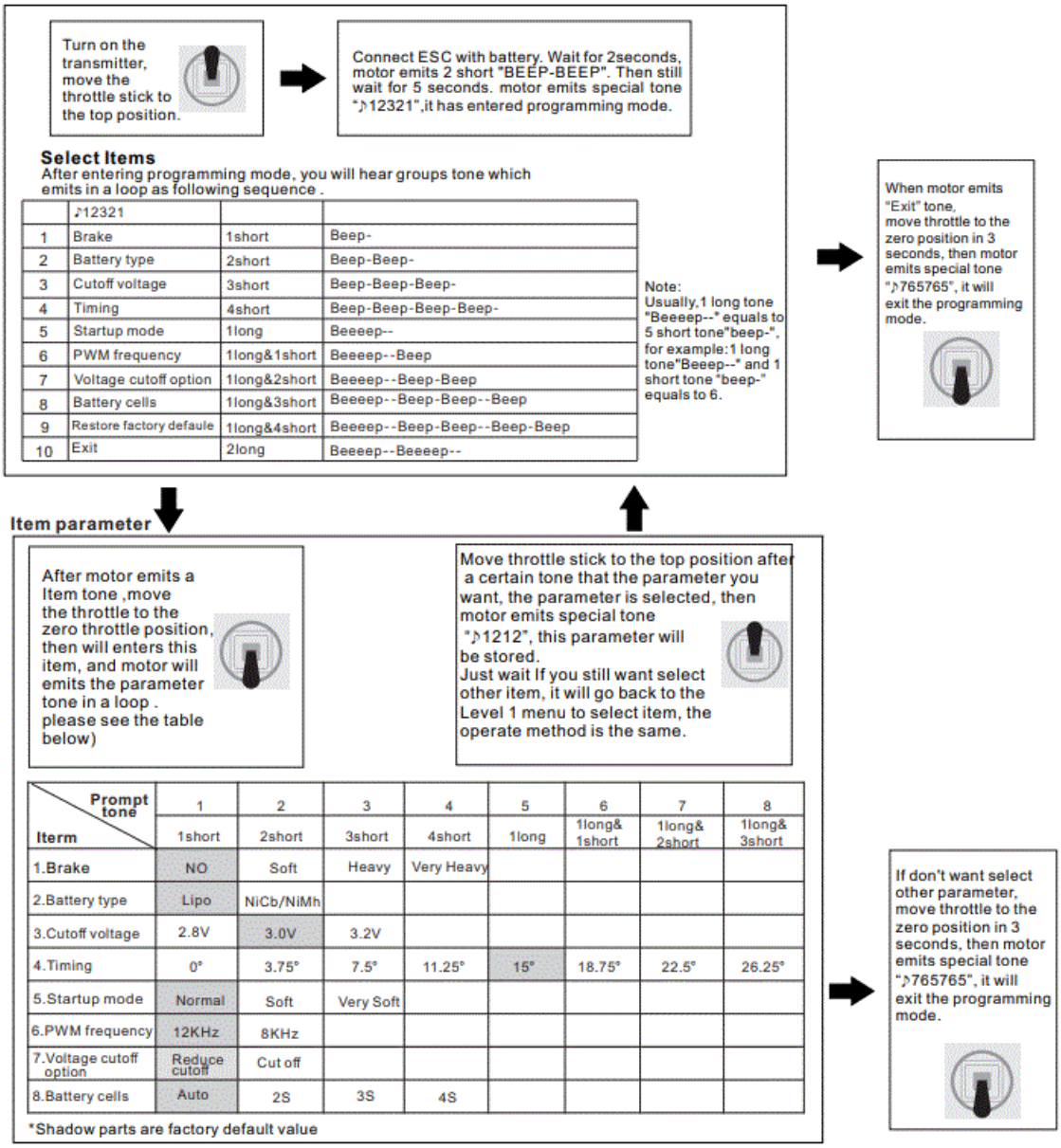
1. **Normal start-up**



2. **Throttle Range Calibration**



3. **Programming**



Programming Parameter

1. **Brake:**
    1. NO(default)
    2. Soft
    3. Heavy
    4. Very heavy
2. **Battery type:**
    1. LiPo(default)
    2. NiCb/NiMh
3. **Cutoff voltage:** Low-voltage protection threshold,
    1. Low
    2. Medium (default)
    3. High
    4. **For Ni-xx battery packs:** Low/Medium/High cut off voltage is 50%/65%/75% of the battery packs' initial voltage.
    5. **For LiPo battery:** can count battery cells automatically.

6. **Low voltage protection threshold:** Low 2.8V/Medium 3.0V/High 3.2V. **Eg:** For 4S/14.8V Lipo battery packs, the low voltage protection threshold is 11.2V low/12.0V medium/12.8V high.

4. **Timing:**
    1. 0°
    2. 3.75°
    3. 7.5°
    4. 11.25°
    5. 15°(default)
    6. 18.75°
    7. 22.5°
    8. 26.25° Low (0°/ 3.75°/ 11.25°/15°/ 18.75°) for most inner rotor motors High (22.5°/ 26.25°) For 6 poles or higher poles outer rotor motors As usual, 15° applies to all the outer rotor motors, but for improving efficiency, recommend that set low timing for 2 poles motor(most inner rotor motors), set high timing for 6 poles and high poles motors(most outer rotor motors). If need a high-speed motor, you can set high timing. Some motors should set special timing, if not sure, you'd better to set timing as the motor manufacturer recommended, or set 15°.

       Note: After changing the timing, please test on the ground before flying.
5. **Startup Mode:** Startup with a linear accelerator
    1. **Normal:** No latency from 0% throttle to 100% throttle. (default)
    2. **Soft:** It takes 6 seconds from 0% throttle to 100% throttle.
    3. **Very soft:** It takes 12 seconds from 0% throttle to 100% throttle.
6. **PWM frequency:**
    1. 12KHz (default)
    2. 8KHz For high poles and high-speed motors, the higher PWM frequency can make the motor drive smoothly, but the higher PWM frequency will make ESC hotter.
7. **Voltage cutoff option:**
    1. **Reduce cutoff(default):** the voltage drops to the set low-voltage protection threshold, ESC will reduce the power then cut off the motor output
    2. **Cut off:** the voltage drops to the set low-voltage protection threshold, and ESC will cut off the motor output immediately.
8. **Battery cells:** Available for Lipo battery only.
    1. Automatic judgment(default) [2]2S [3]3S [4]4S. You also can select the options according to your battery cells.
9. **Restore default settings**

   When the beeping indicates the mode of "Restore default settings", move the throttle stick to zero position in 5 seconds after the beeping can activate the mode. There is no sub-menu under this mode. Then the motors make indication tones of "♪765765" which means default settings are restored.
10. **Exit program mode**

    After a sound "Beep-", move the throttle stick to the bottom position, enters the item of exit program mode, motor emits sound "♪ 765765" the same time, it represents ESC enters normal operation mode.

Protections

Start-up Protection	ESC will cut off output if it fails to start the motor within 3 seconds by accelerating the throttle. you need to move the throttle stick back to the bottom position and restart the motor. (The possible causes: Bad connection or disconnection between ESC & motor, propellers are blocked, etc)
Overheat protection	When ESC temperature is higher than 100 ℃,it will reduce output power (throttle will be limited below 40%) for protection, leave some power for the motor to land, when the temperature is reduced to 80℃, ESC recovers to normal running mode.
Throttle Signal Loss Protection	When ESC detects the loss of throttle signal for over 1 second, it will cut off power or output immediately to avoid an even greater loss caused by the continuous high-speed rotation of propellers. ESC will resume the corresponding output after the normal signal is restored.

Alarm tone: (To judge the abnormal cases via alarm tone)

1. **Alarm tone of signal loss:** when ESC detects no signal, the motor will emit the alarm tone “Beep- Beep - Beep-”(alarm tone emits every 2 seconds).
2. Alarm tone of the throttle not in the zero throttle position: throttle not in the zero throttle position, the motor will emit “Beep-Beep-Beep-Beep-Beep-” (urgent single short tone).
3. The alert tone of narrower throttle range: when the throttle range is set too narrow, the motor emits “Beep-Beep-Beep”(harried alarm tone emits last for 2 seconds). You must set the throttle range again.

First time to Use ESC

1. When first time to use ESC, you must set throttle range. You just need to calibrate the throttle range only once, but you must set it again if you change the transmitter.
2. Before connecting battery packs, please check if all the connector’s polarities are correct to avoid ESC damage for false connection or short circuit.
3. If the motor stops suddenly during flying, please move the throttle stick to the zero position immediately, then push the throttle stick to make the motor restart, then move the throttle stick to a small range to land the aircraft immediately.

Safety Cautions

- Please don’t remove or modify any components on ESC, or it may cause permanent damage or data loss.
- First time to test ESC and motor, please don’t install propeller and driving gear before the receiver is set correct.
- Please don’t use broken, short-circuited, and over-heated battery packs.
- Please don’t use substandard cables and cords and connectors.
- Battery cells and servo numbers can’t exceed ESC’s requirement.
- Please pay attention to the polarity of the battery, wrong polarity connection will damage ESC.
- Please don’t put ESC in a moist and highlighted place.
- Please don’t remove the battery when the motor is rotating, it will cause a huge peak current and ESC burning.
- Please install ESC in a ventilated place, don’t wrap anything around the ESC.

Troubleshooting

Troubles	Possible causes	Solutions
After powering up, the motor doesn't run and doesn't emit any sound.	Bad connection between ESC and battery.	Clean the connectors or replace them, and check the connection polarity.
	Bad soldering causes bad contact.	Solder the wires again.
	Low voltage of the battery.	Check the battery pack, and use a fully-charged battery.
	The quality problem of ESC.	Change ESC.
After powering up, ESC emits the sound of battery cells, but the motor can't run.	ESC doesn't set the throttle range.	Set throttle range again.
After powering up, ESC works, but the motor can't run and doesn't emit any sound.	Bad connection between ESC and motor, or bad soldering.	Check the connectors or replace the connectors or solder the motor wire again.
	Bad motor.	Change motor.
After powering up ESC, the motor doesn't run and emits a warning tone"Beep-Beep".(a short stop after "Beep-Beep")	Battery voltage out of range	Check the battery voltage is within the range of ESC.
After powering up, the motor doesn't work and emits a warning tone"Beep-, Beep-, Beep-"(emits every 2 seconds).	No output throttle signal from the receiver.	Check if right connection between the signal wire and the receiver throttle channel. Check transmitter and receiver, and make sure there are signal outputs.
After powering up, the motor doesn't work and emits a continuous warning tone"Beep-"	The throttle doesn't in the zero position.	Push the throttle to the zero position, or set the throttle range again.
After powering up, the motor doesn't work.ESC emits 2 long "Beep" and 2 short "Beep".	The positive and negative of the throttle channel is wrong. So ESC enters programming mode.	Refer to the user instruction of the transmitter, and adjust the setting of the throttle channel.
The motor rotates in the opposite direction.	The wrong sequence of connection wires between the motor and ESC.	1. Exchange random 2 of the 3 connection wires between ESC and motor. 2. Change the motor rotation direction via the transmitter.

Motor stops during running	Battery voltage is lower than the low-voltage protection threshold and low-voltage protection mode is cut output.	1. Set the right low-voltage protection threshold. Run with a full-charged battery pack. Choose to reduce power as Low-voltage protection. If power is decreasing during running, please fly back soon. 2. Make sure your aircraft is in the range available to control with your transmitter. 3. Attention to the voltage of the transmitter, if it will run out of the battery, please fly back soon.
	Loss throttle signal	1. Check if the transmitter operation is correct. 2. Check if the transmitter match with the receiver. 3. Strong electromagnetic interference around the used environment, try to turn off and power up again, to see if it recovers normal work, if the problem come up again and again, please change to another field.
	Bad connection between wires	Check the connectors of the battery pack, battery wires, and motor wires connections are good.

Documents / Resources

	FLYCOLOR FlyDragon Lite 20A Brushless ESC for Airplane [pdf] User Manual FlyDragon Lite 20A Brushless ESC for Airplane, FlyDragon Lite 20A, Brushless ESC for Airplane, ESC for Airplane

References

- Flycolor,Shenzhen Flycolor Electronic Co., LTD,Flycolor ESC,Brushless ESC,

Manuals+,