FLYCOLOR®

航模无刷电子调速器 说明书

感谢您使用本产品！本产品功率强大，错误的使用可能导致人身伤害和设备损坏，强烈建议您在使用设备前仔细阅读本说明书并保存，严格遵守规定的操作程序。我们不承担因使用本产品或擅自对产品进行改造所引起的任何责任，包括但不限于对附带损失或间接损失的赔偿责任。我们有权在不经通知的情况下变更产品的设计、外观、性能及使用要求。

01 主要特性

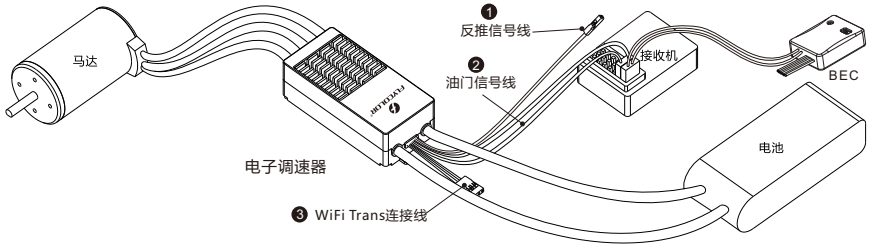
- 采用功能强大、高性能MCU，适用和兼容多种无刷电机。精心的电路设计，抗干扰性超强。
- 支持无刷电机最高210K erpm转速。
- 启动方式可设置，油门响应速度快，并具有非常平稳的调速线性，适用于固定翼飞机及直升飞机。
- 具备多种保护功能，更好保护设备正常安全使用。
- 通电安全性能好：接通电源时无论遥控器油门拉杆在任何位置不会立即启动马达。
- 设置报警音判断通电后工作情况。
- 支持可开启主动续流功能ASCF,当选择开启此功能时，可有效减缓温升。
- 支持无线wifi编程，通过手机APP可进行所有参数设置（需单独购买Flycolor WiFi模块）。
- 支持近距离监测和记录飞行实时数据方便了解飞行状态（需单独购买Flycolor WiFi模块）。
- 反推功能，支持飞行过程中切换电机正反向，达到减速目的。
- 全铝合金外壳，有效散热，减缓温升。

02 产品规格

型号	持续电流 (散热良好)	瞬间电流 (散热良好)	BEC	锂电池	重量 (供参考)	尺寸 (供参考)
WinDragon wifi 130A	130A	160A	NO	5-14S	275g	108.5x46.5x32.6mm
WinDragon wifi 200A	200A	250A	NO	5-14S	285g	108.5x46.5x32.6mm

03 连线示意图

*为避免短路和漏电，请确保连接处绝缘良好



*图片仅供参考，以实物为准

❶ 反推信号线：插入接收机任意的2段开关通道，以实现飞行中电机正反切换；
❷ 油门信号线：插入接收机油门通道。其中白线为传输信号，黑线为地线；
❸ Wi-Fi Trans连接线：通过和Flycolor Wi-Fi Trans相连，支持手机APP编程及近距离检测实时数据。

04 操作说明

1.正常工作模式

开启遥控器，将油门摇杆打到最低点 → 电调接上电池，等待2秒，马达发出N声短鸣音“滴-”表明锂电节数 → 等待1秒，马达鸣叫刹车类型提示音，如果鸣叫先一长后一短音为无刹车设置，如果只鸣叫一长音为有刹车设置 → 此时，系统已经准备就绪，随时可以起飞

2.油门行程设定

开启遥控器，将油门摇杆打到最高点 → 电调接上电池，等待2S,马达发出"滴-滴-"双短鸣音，此时油门最高点校准成功 → 在3秒内将油门摇杆推到最低,等待1秒,此时油门最低点校准成功,接着马达发出N声短鸣音“滴-”,表明锂电节数 → 等待1秒，马达鸣叫刹车类型提示音（无刹车:一长一短音；刹车：一长音）此时，系统已经准备就绪，随时可以起飞

05 编程参数值说明

*阴影部分为出厂默认值

项目	1	2	3	4
1.刹车	无刹车	软刹车	重刹车	很重刹车
2.低压保护阈值	2.8V-3.8V(默认3.0V)			
3.进角	0°- 30°(默认15°)			
4.启动模式	普通	柔和	超柔和	
5.定速控制	关	低定速	高定速	
6.PWM频率	8KHz	16KHz	24KHz	
7.低压保护模式	软关断	硬关断		
8.电池节数	自动	5S-14S		
9.电机转向	正常	反向		
10.主动续流	关	开		
11.反推	关	开		

1. 刹车: [1] 无刹车 [2]软刹车 [3]重刹车 [4]很重刹车 (默认值为无刹车)

2.低压保护阈值： 2.8V -3.8V ； 默认值为3.0V。

3.进角： [1]0° -30° (默认值为15°)

4. 启动模式：提供带有线性油门响应的快速加速启动。
(默认值为普通)
[1]普通：从开始到最大速度油门响应无滞后。
[2]柔和：从开始到最大速度油门响应滞后6秒。
[3]超柔和：从开始到最大速度油门响应滞后12秒。

5. 定速控制： [1]关 [2]低定速 [3]高定速 (默认值为关)
定速模式下，启动后不论油门摇杆处于何种位置及负载如何变化，电调都会尽力维持恒定的转速（在定速模式下，遥控发射机中的油门曲线设置为水平直线，通过调整该直线的高度可以预设期望的转速值）。
低速定速模式下，2极马达的定速范围为：10000-20000RPM。
高速定速模式下，2极马达的定速范围为：20000RPM以上。
注意：油门量在60%以下时，禁止使用定速模式（即油门量在60%以下时，电调会自动关闭定速功能）。

6. PWM频率：[1]8KHz [2]16KHz [3]24KHz。(默认值为16KHz)
对于一些极数多且转速高的马达，设置更高PWM频率可以使马达驱动更平滑，但是也同时导致的开关损耗加大，发热更严重。

7. 低压保护模式： （默认值为软关断）
[1]软关断: 当达到预设的低压保护阈值时，电调便会减小马达的输出功率，一段时间后停止输出功率。
[2]硬关断: 当达到预设的低压保护阈值时，电调立即关断输出马达功率。

8.电池节数： [1]自动 [2]5S-14S （ 默认值为自动）；可选择自动计算锂电池节数，也可根据实际手动选择电池节数。

9.电机转向： [1]正常：电机默认旋转方向；[2]反向：将电机旋转方向更改。（默认正常）

10.主动续流： [1]关 ；[2]开 （默认关）。主动续流ASCF（Active Switch Continued Flow）技术，效率更高，显著降低电调发热。

11.反推： [1]关 ；[2]开 （默认关）
将反推信号线插入接收机任意的2段开关通道，以实现飞行中电机正反切换，达到减速目的；
2段开关通道脉宽范围最低点必须小于油门行程的最低点（如油门行程最低点为1000us，那么2段开关通道的脉宽最低点要≤1000us）。
* 反推功能生效条件：1.反推功能-开；2.定速模式-关；3.刹车-开

通过APP进行参数编程设定

使用Flycolor Wifi Trans通过Flycolor App 进行参数编程设定；此产品需使用Flycolor App V1.2版本及以上。
详见Flycolor Wifi Trans 和 Flycolor App 使用说明书。
或者访问www.flycolor.net获取更多信息。

06 保护功能

启动保护	当加大油门时，三秒内未能正常启动马达，电调将会关闭动力输出，油门摇杆需再次置于最低点后才可以重新启动马达（出现这种情况的原因可能有：电调和马 达连线接触不良或有断开、螺旋桨被其他物体阻挡等）。
温度保护	当电调工作温度超过100℃时，ESC将自动降低输出功率进行保护，但不会将输出功率全部关闭，最多降到全功率的40%，以保证马达留有一定动力，避免摔机。当温度下降至80℃后，电调将逐渐恢复到最大动力。
油门信号丢失保护	当ESC检测到油门信号丢失1秒以上即立即关闭输出，以免因螺旋桨继续高速转动而造成更大的损失。如果油门信号恢复，ESC可以立即恢复相应的功率输出。

警报音：设计可通过电机听见的警报音，供使用者判断通电后的异常情况
1. 油门信号丢失警示音：当电调未检测到油门信号时，会发出如下警示：“滴-、滴-、滴-”（每声之间的间隔为2秒）

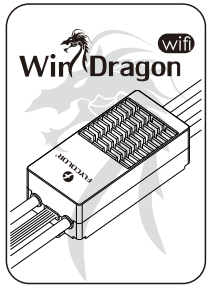
2. 油门未归零（油门摇杆未置于最低位置警示音）：当油门未打到最低时，会发出如下警示：“滴-滴-滴-滴-滴”（很急促的单短音鸣叫）

3. 油门行程过小警示音：当所设定油门总行程过窄时（电调设计时，要求油门总行程不得小于三格油门），会发出警示表明本次行程设定无效，需重新设定。警示方式：“滴-滴-滴-滴-滴”（持续2秒）

FLYCOLOR®

User Manual
Brushless ESC For Airplane

Thank you for using our product. Any improper operation may cause personal injury or damage the product and relevant equipments. This high power system for 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.



01 Main features

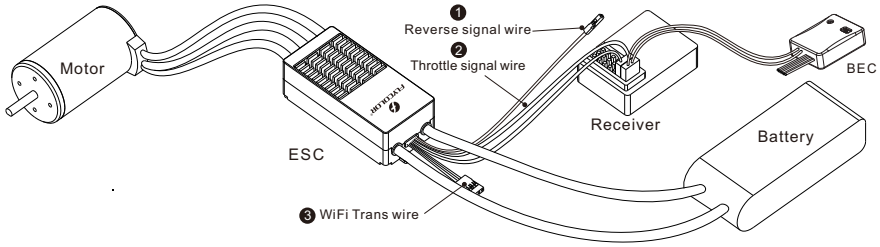
- Use powerful & high performance microprocessor, compatible with various brushless motors. Unique circuit design, strong anti-interference.
- Supporting maximum 210K erpm.
- Start mode can be set, throttle response fast, speed regulation linear stability. Compatible with fixed wing aircraft and helicopters.
- Multiple protections ensure the equipments safety.
- High power safety performance, when power up the motor will not start immediately wherever the throttle stick is.
- Beeping alarm can indicate working condition.
- ASCF (Active Switch Continued Flow)technology, higher efficiency, reduce heat generation massively.
- Wifi Trans for programming, programming via mobile phone APP (extra Flycolor Wi-Fi Trans needed).
- Supporting close-range monitoring and recording of real-time flight data via mobile phone APP (extra Flycolor Wi-Fi Trans needed);
- Reverse function, supports to reverse the motor rotation during the flight to achieve deceleration.
- Aluminum covers, effective heat dissipation, slow down temperature rise.

02 Specifications

Model	Con. Current (Good heat dissipation)	Burst Current (Good heat dissipation)	BEC	LiPo	Weight (For reference)	Size (For reference)
WinDragon wifi 130A	130A	160A	NO	5-14S	275g	108.5x46.5x32.6mm
WinDragon wifi 200A	200A	250A	NO	5-14S	285g	108.5x46.5x32.6mm

03 Wiring Diagram

*Please ensure all solder joints are insulated with heat shrink where necessary.



*Picture for reference only.

1. Reverse signal wire: plug it into an two-stage switch channel on the receiver ,to reverse the motor rotation during the flight.
2. Throttle signal wire: plug it into the throttle channel on the receiver, the white wire is for transmitting throttle signal, the black wire is ground wire.
3. Wi-Fi Trans wire: connect with Flycolor Wi-Fi Trans, supports programming and detection of real-time data at close range via mobile phone APP.

04 Operation instruction

1.Normal start-up

Turn on the transmitter, move the throttle stick to the bottom position. → Connect ESC with battery, wait for 2 seconds,motor emits short "BEEP-" few times, sound times is Lipo battery cells. → Wait for 1 second, It means "No Brake" when motor emit continuously 1 long and 1 short tone. It means "Brake is available" when motor emits a long tone. → ESC is ready for working now

2.Throttle Range calibration

Turn on the transmitter, move the throttle stick to the top position. → Connect ESC with battery. Wait for 2 seconds, after motor emits 2 short "BEEP-BEEP",the full throttle position is memorized. → Move the throttle stick to the bottom position in 3 seconds. Then waits for 1 second, the"zero throttle" position is memorized. Motor emits short "BEEP-" few times, sound times is Lipo battery cells. → Wait for 1 second, It means "No Brake"when motor emit continuously 1 long and 1 short tone. It means "Brake is available" when motor emits a long tone. ESC is ready for working now.

05 Programming parameter

*Shadow parts are factory default value

Iterm	1	2	3	4
1. Brake	NO	Soft	Heavy	Very Heavy
2.Cutoff voltage	2.8V-3.8V (Default 3.0V)			
3.Timing	0°- 30° (Default 15°)			
4.Startup mode	Normal	Soft	Very Soft	
5.Governor mode	OFF	Low	High	
6.PWM frequency	8KHz	16KHz	24KHz	
7.Voltage cutoff option	Reduce cutoff	Cut off		
8.Battery cells	Auto	5S-14S		
9.Motor rotation	Normal	Reversed		
10.ASCF	OFF	ON		
11.Reverse function	OFF	ON		

1. Brake: [1]NO(Default) [2]Soft [3]Heavy [4]Very heavy.

2. Cutoff voltage: 2.8V - 3.8V (Default 3.0V).

3. Timing: 0° - 30° (Default 15°).

4. Startup Mode : Start up with linear accelerator.
[1] Normal: No delay in throttle response. (Default).
[2] Soft: It will take 6 seconds from 0% to 100% throttle.
[3] Very soft: It will take 12 seconds from 0% to 100% throttle.

5.Governor mode :
If the Governor mode is activated, ESC will try to keep the motor in a fixed speed (usually the throttle curve is a horizontal line, you can change the preset motor speed by changing the height of the line).
[1] OFF (Default)
[2] Low , "Low constant speed" mode , 10000-20000RPM for two poles brushless motor .
[3] High, "High constant speed" mode , above 20000RPM for two poles brushless motor .
Note: Governor mode function is automatically disabled if the throttle value less than 60%.

6. PWM frequency: [1]8KHz [2]16KHz(Default) [3]24KHz
For some motors with many poles and high speed, the higher PWM frequency can make motor run smoother, but at the same time, the switch loss is increased and the temperature rise is higher .

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 , ESC will cut off the motor output immediately.

8.Battery cells: [1] Automatic calculate(Default) [2]5S -14S .
You select automatic calculate, and also can select the options according to your battery cells.

9.Motor rotation:
[1]Normal(Default): Default direction of motor rotation;
[2]Reversed: Change the motor rotation.

10.Active Switch Continued Flow: [1]Off (Default) [2]On
ASCF (Active Switch Continued Flow) technology, higher efficiency, reduce heat generation massively.

11.Reverse function : [1]Off (default) [2]On
Plug reverse signal wire into an two-stage switch channel on the receiver ,to reverse the motor rotation during the flight to decelerate. The lowest point of the pulse width range of the 2-stage switch channel must be less than the lowest point of throttle. (e.g. the lowest point of throttle is 1000, then the lowest point of pulse width of 2-stage switch channel should be less than 1000).
Effective conditions : 1. Reverse function - on; 2. Governor mode - off; 3. Brake - on.

Parameter programming via APP

Flycolor Wifi Trans is used for programming via Flycolor App; Flycolor App V1.2 version or higher is required for this product.
Please see Flycolor Wifi Trans and Flycolor App instructions for details.
Or visit www.flycolor.net for more information.

06 Protections

Start-up Protection	ESC will cut off output if it fails to start the motor within 3 seconds by accelerating 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)
Over heat 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 motor to land , when the temperature Reduced to 80℃ , ESC recover to normal running mode.
Throttle Signal Loss Protection	When ESC detects the loss of throttle signal for over 1 seconds, 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 , motor will emit the alarm tone "Beep-、Beep、-Beep-"(alarm tone emits every 2 seconds).
2.Alarm tone of throttle not in the zero throttle position: throttle not in the zero throttle position, motor will emit "Beep-Beep-Beep-Beep-Beep-" (urgent single short tone).
3. Alert tone of narrower throttle range: when throttle range is set too narrow, motor emits "Beep-Beep-Beep"(harried alarm tone emits last for 2 seconds). You must calibrate throttle range again.