APISQUEEN®

鸿毛电调

感谢您购买本产品！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。在保证品质相等前提下，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

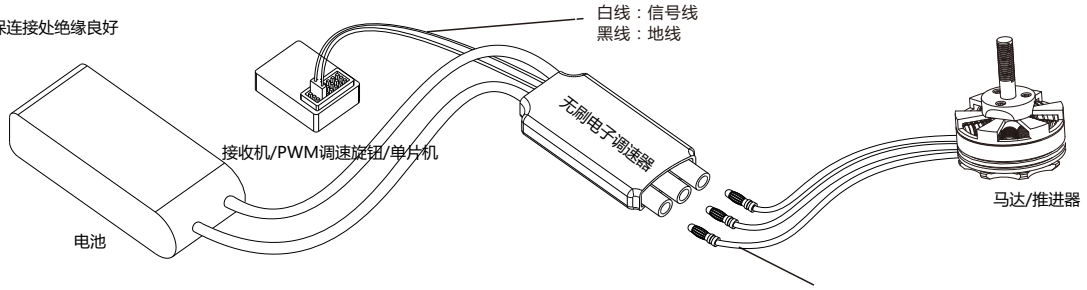
- 支持 OneShot 125； ● 采用功能强大、高性能MCU；
- 尺寸更小，重量更轻的设计；
- 专门针对水下推进器优化的固件，兼容性非常出色；
- 专门针对推进器的程序，使用过程中油门调整响应迅速；
- 固件自适应能力强，使用极为简单, 同时兼顾稳定性和电池使用寿命；
- 最高可支持刷新率高达500Hz的油门信号（注：>=500Hz的油门信号皆为非标准油门信号）；

02 Feather电调产品规格

型号	制造型号	持续电流	瞬时电流(10S)	BEC	锂电池节数	重量	尺寸(不包括插头)	典型应用
Feather-45A	Feather-45A	45A	50A	NO	2-6S	11g	28x15x6m m	300W内推进器

03 连线示意图

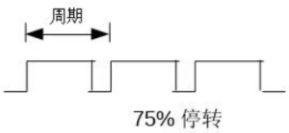
*为避免短路和漏电，请确保连接处绝缘良好

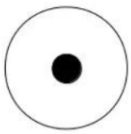


电机ABC三相线，与电调ABC连接，如果转向不是预期转向，可将ABC中任意两根互换连接

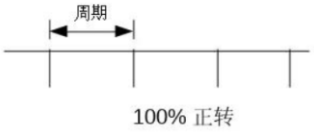
04 PWM信号控制

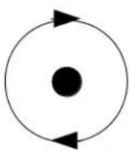
PWM英文全称为（Pulse-width modulation）。也称占空比信号，它表示高电平时长占整个信号周期的比例。PWM的整个周期为2ms，1.5ms停转，1.5-2ms正转，1.5-1ms反转。





从上图中我们可以清楚的看到当PWM为75%(1.5ms)时，电机停止转动，当PWM为50%(1ms）时，电机反向转动，而当PWM为100%(2ms)时电机正向转动。当然电调不仅仅会让电机正反转，而是可以通过PWM的占空比大小来调节电机转动的速度。当PWM由75%逐渐变化到50%时，电机就会由停转不断反向加速转动，直到反向转动达到最大值。而PWM由75%逐渐变化到100%时，电机由停转不断正向加速，直到正转达到最大值。就是说PWM是一个可以连续变化的信号，有效范围是50%到100%.





PWM信号的频率是50hz、100hz、200hz或500hz等。控制频率越高，其周期越短，控制间隔也就越短，电调和电机响应速度也就越快。反之，控制频率越低，其周期就越长，控制间隔就越长，电调和电机的响应速度就越慢。

05 保护功能说明

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）。
过负荷保护	当负载突然变得极大时，电调会切断动力，须油门归零后才可正常操作。当马达和电调失步时，电调会自动尝试重新启动。
油门信号丢失保护	当电调检测到油门遥控信号丢失0.32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。信号恢复后，电调也随即恢复相应的功率输出。

APISQUEEN®

FEATHER ESC

Thank you for purchasing our brushless electronic speed controller (ESC) . Any Improper operation may cause personal injury damage to the product and related 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

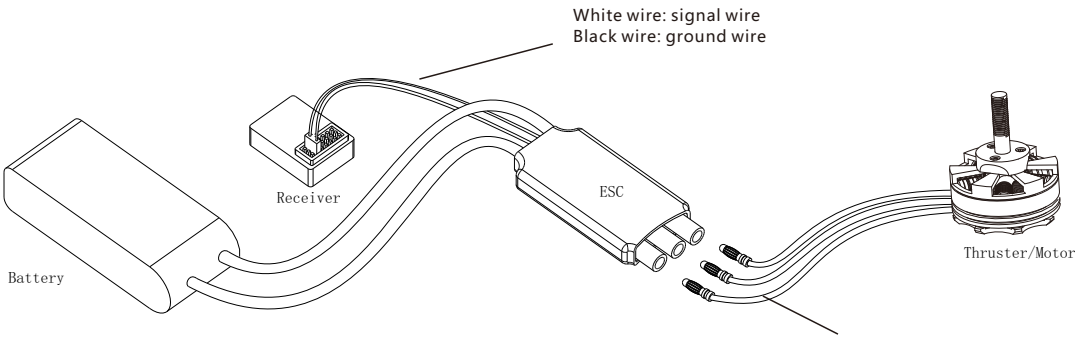
- Support for OneShot 125; ● Use of powerful, high-performance MCU.
- Smaller size and lighter weight design.
- firmware optimized specifically for underwater thrusters, with excellent compatibility.
- A program specifically for thrusters, with rapid throttle adjustment response during use.
- The firmware is highly adaptive and extremely simple to use; it balances system stability and battery life.
- Throttle signals with refresh rates up to 500Hz (note: all throttle signals >=500Hz are non-standard throttle signals).

02 Specfications

Model	Manufacture Model	Con. Current	Burst Current (10S)	BEC	LiPo cells	Weight	Size (Excluding Plugs)	Typical Applications (For reference)
Feather-45A	Feather-45A	45A	50A	NO	2-6S	11g	28x15x6m	Thrusters

03 Wiring diagram

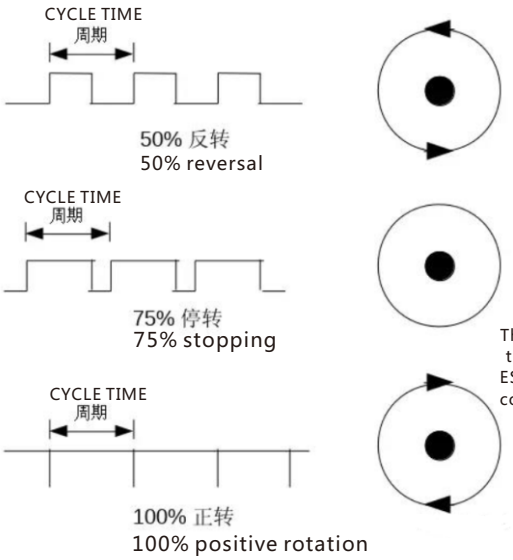
*To avoid short circuit and leakage, please make sure the connection is well insulated



Motor ABC three-phase line, connected to ESC ABC, if the steering is not the expected steering, any two lines in ABC can be connected interchangeably to achieve the opposite of the original steering.

04 PWM

PWM full name is (Pulse-width modulation). It is also called duty cycle signal, which indicates the proportion of the high level duration to the whole signal period. 2ms for the whole period of PWM, 1.5ms stop, 1.5-2ms forward, 1.5-1ms reverse.



From the diagram, we can clearly see that when PWM is 75% (1.5ms), the motor stops rotating, when PWM is 50% (1ms), the motor rotates in reverse, and when PWM is 100% (2ms) the motor rotates in forward. Of course ESC will not only make the motor turn forward and reverse, but can adjust the speed of motor rotation by the duty cycle size of PWM. When the PWM is gradually changed from 75% to 50%, the motor will keep reversing and accelerating from stop until the reverse rotation reaches the maximum. And when PWM is gradually changed from 75% to 100%, the motor is continuously accelerated from stop to forward until the forward rotation reaches the maximum value. That is, PWM is a signal that can be continuously varied, and the effective range is from 50% to 100%.

The frequency of PWM signal is 50hz, 100hz, 200hz or 500hz, etc. The higher the control frequency, the shorter the period, the shorter the control interval, and the faster the ESC and motor response speed The faster the ESC and motor response. Conversely, the lower the control frequency, the longer the period, the longer the control interval, and the slower the ESC and motor response.

05 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-load Protection	ESC will cut off power or output when the load suddenly increases to a very high value, normal operation will resume after moving the throttle stick to the bottom position. ESC will automatically try to restart when ESC and motor are out-of-step.
Throttle Signal Loss Protection	When ESC detects the loss of throttle signal for over 0.32 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.