



Outstanding Model Gear

POLARIS
DR-30A

STOCK



使用前必读

感谢您购买 RCOMG 车用电子调速器！POLARIS 系列电调是我们新一代高性能有感无刷电子调速器（竞赛版本）。无刷动力系统功率强大，错误使用可造成人身伤害和设备损坏。强烈建议在使用设备前仔细阅读本说明书，并严格遵守规定操作程序。

我们不承担因使用本产品而引起的任何责任，包括但不限于对间接损失的赔偿责任；同时，我们不承担因擅自对产品进行修改所引起的任何责任。我们有权在不经通知的情况下变更产品设计、外观、性能及使用要求等。

注意事项

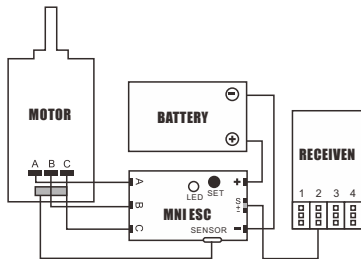
- ◇ 严禁小孩在无成人监管的情况下使用此产品。
- ◇ 需注意电调在使用过程中会变烫
- ◇ 若对电调线及插头焊接时，至少使用60W功率焊接设备。
- ◇ 不使用电调时需要断开电池。
- ◇ 禁止靠近易燃物
- ◇ 电调出现过热，冒烟或者着火，立即停止使用，断电并寻求帮助。

使用前必读

- ◆ 金属外壳，更易散热，耐流更强。
- ◆ 丰富的参数设置，允许设置多数竞赛级参数，（例如ModiPed模式、Stock模式、零进角、漂移等。）
- ◆ 32位处理器提供强大的数据处理及精准的油门输出。
- ◆ 全新软件设计，超流畅的启动与精准的油门线性。
- ◆ 多重保护功能：电池低压保护、过温保护、油门信号丢失保护。
- ◆ 内置蓝牙，通过手机APP对电调进行参数设置及软件升级(支持实时调参，无需重启电调)。
- ◆ 支持实时数据记录功能，可实时查看电调最高温度、马达转速、电压、进角等数据，

产品规格

产品名称	Mini-Z ESC	160A	150A	160A
持续电流A	30A	160A	150A	220A
峰值电流A	80A	760A	950A	1000A
电池Lipo	2-3S	2-3S	2-6S	2-4S
BEC开关稳压输出	6.0V/2A	6.0V,7.4V/4A	6.0V,7.4V/6A	6.0V,7.4V/6A
尺寸mm	23.5x13.7x9.8	37.0x38.2x31.5	55x48x37.5	55x40x36.5
重量g	9.5	96	165	155
编程功能	手机APP	手机APP	手机APP	手机APP
是否支持软件升级	支持	支持	支持	支持
防水特性	不防水	不防水	不防水	不防水
适用车型	1/28th漂移/电越	1/10th电房/电越	1/8th卡车/大脚车	1/8th平路/电越/卡车



电池连接---连接电池时注意正负极位置，错误连接会损坏电调和电池。如上图所示，电调正极线连接电池的正极，负极线连接电池的负极。

电机连接---A:在有感模式下连接有感无刷马达，电调与马达相连有严格的线序要求，电调的#A/#B/#C必须与电机的#A/#B/#C三线对应，用6针感应线把电调与电机的感应口对接。

电机连接---B:在无感模式下连接无感无刷马达,电调与马达相连无严格的线序要求，电调与电机三线随意对接，若出现转向相反，任意交换两条马达线即可。

接收机连接---信号线提供6.0V电压给到接收机、舵机等，所以不需要额外的电池，外接电源到接收机可能会损坏电调。(黑线 ---RX- 负极, 红线---RX+ 正极6.0V 白线 ---RX 信号线)

电调软件功能及设置

- 1.短按电源键电调开机。
- 2.长按电源键至全部LED灯熄灭，电调将关机（油门离开中点10%距离后不能关机）。

校准油门行程

- 1.电调连接好电池及接收机，打开遥控器。
- 2.关机状态下长按电源键，直至蓝灯亮起，同时电机长鸣叫一声，松开电源键，电调将进入油门行程校准。电调进入油门行程校准后，红灯长亮，若没有油门信号，蓝灯一直双闪；油门摇杆在中位，蓝灯熄灭。
- 3.将油门摇杆拉到前进行程最大位置，蓝灯将闪烁3次，然后电机鸣叫一声，表示电调已记录前进油门行程，蓝灯常亮。
- 4.电调记录前进油门行程后，将油门摇杆推到后退行程最大位置，蓝灯将闪烁3次，然后电机鸣叫两声，表示电调已记录后退油门行程，蓝灯常亮。
- 5.电调记录后退油门行程后，松开油门摇杆使其回到中点，蓝灯将闪烁3次，然后电机鸣叫三声，表示油门行程校准完成。
- 6.电调支持反向油门行程校准，即遥控器在油门校准时设置了油门反向，导致油门信号脉宽大小的变化与正常情况相反时（正常情况下拉摇杆油门信号脉

宽变大，推摇杆油门信号脉宽变小），这种情况下电调仍然可以校准油门行程，电调前进、后退不受遥控器反向的影响。

注：油门行程校准完成后，新油门行程立即生效，无需重启电调。如果在蓝灯闪烁期间油门摇杆离开前进行程一定范围，电调将退出油门行程校准。



油门摇杆推到最高点，
蓝灯闪3次，电机鸣1声



油门摇杆推到最低点，
蓝灯闪3次，电机鸣3声



松开油门摇杆回到中点，
蓝灯闪3次，电机鸣3声

油门行程校准完毕，三秒钟后，电机即可正常操作。

LED灯 指示	油门位置	蓝灯状态	红灯状态
	中立位	蓝灯闪	红灯灭
	最大油门位置 最大刹车位置	蓝灯亮 蓝灯灭	红灯亮 红灯亮

2. 当一些电调保护功能触发时
任何时候按下电源键红灯都会亮起。

红灯每隔一秒闪1次 (●●●)，电压异常。

红灯每隔一秒闪2次 (●● ●● ●●)，温度异常。

红灯每隔一秒交替闪1次，2次 (●●● ●●● ●●●)，
电压和温度异常同时发生。

在开机时没有检测到油门信号，如果此时存在电压异常或者温度异常，红灯不会有相应指示。

蓝灯每隔两秒闪2次 (●● ●● ●●)，油门异常
(无油门，开机油门不在零位)。

油门信号

- 电调最大支持450Hz的PPM油门信号。
- 以下情况电调将开启油门保护，蓝灯双闪：
 - 电调开机时，油门摇杆不在中位；
 - 丢失油门信号。
- 电调正在输出波形驱动电机，如果此时油门信号丢失，电调立即停止输出，同时蓝灯双闪，直到油门信号正常后，电调恢复输出（油门摇杆不需要回中）

有感&无感

1. 任何时候电调正确检测到霍尔感应器信号后，有感模式生效。
2. 任何时候电调没有正确检测到霍尔感应器信号，电调将切换到无感模式运行。
3. 切换模式瞬间电调动力略有下降，但会立即恢复。
4. 无感模式下 PWM 驱动频率由电调自主选择，用户设置无效。
5. 无感模式下低于1KHz的刹车PWM频率设置无效，此时电调强制为1KHz。
6. 无感模式下BOOST和TURBO无效。

Boost & Turbo

1. 开启 BOOST 或者TURBO进角加快电机转速，同时电流增大，电池、电调和电机加剧发热，因此调节适当的进角和进角增加速率，控制进角开启的时间长短等对延长电池、电调和电机使用寿命有影响。
2. BOOST和TURBO 进角的区别是：拉油门还未达到最大处就已经开启的进角是BOOST进角；拉到最大才开启的是TURBO进角。

3. 油门达到最大后最终打开的进角大小为 BOOST 进角+TURBO进角，总进角最大为60度（150A总进角为15度）。

例如BOOST进角设置为45度，TURBO 进角设置为50度，那么在油门达到最大后BOOST会开到45度，TURBO只能再开15度。

4. 在发生了电压保护或者温度保护且对应保护设置为开启的情况下，关闭所有进角。

保护

1. 高压保护：

电调在开机瞬间检测到过高电压时，且电压保护设置不为“OFF”电调将开启电压保护，限制输出油门，输出油门值不会超过50%（高压保护只在开机瞬间起作用，在之后的过程中出现高压电调不会开启保护，高压保护激活后，即使电压降低到正常范围内也不能解除）。

2. 低压保护：

任何时候电调检测到电压低于设置值，并保持一段时间，电调开启低压保护，限制输出油门，输出油门值不会超过50%（低压保护激活后，即使电压回到正常范围内也不能解除）。

有感&无感

1. 任何时候电调正确检测到霍尔感应器信号后，有感模式生效。
2. 任何时候电调没有正确检测到霍尔感应器信号，电调将切换到无感模式运行。
3. 切换模式瞬间电调动力略有下降，但会立即恢复。
4. 无感模式下 PWM 驱动频率由电调自主选择，用户设置无效。
5. 无感模式下低于1KHz的刹车PWM频率设置无效，此时电调强制为1KHz。
6. 无感模式下BOOST和TURBO无效。

Boost & Turbo

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保护

1. 高压保护：

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2. 低压保护：

任何时候电调检测到电压低于设置值，并保持一段时间，电调开启低压保护，限制输出油门，输出油门值不会超过50%（低压保护激活后，即使电压回到正常范围内也不能解除）。

为0 (OFF) , 这种情况也会产生巨大的冲击电流, 因此在电机高速旋转时请尽量避免更改参数项;
 2. 编程的参数存储在电调FLASH存储器内, FLASH有一定的编程寿命 (约1万次) , 所以, 请勿频繁对电调进行编程。

实时数据

1. 实时数据只有在正在正确读到油门信号后才对应数值。
2. 实时数据是一种参考数据, 其精度在±10%范围内, 要得到精度更高的数据, 必须使用专业的设备。
3. 实时数据内容:

项

Input Throttle	输入油门, 接收机发送给电调的油门值。
Output Throttle Voltage	输出油门, 电调输出到电机的油门电压。
Min. Voltage	最小电压, 在本次电调开机过程中, 电调读到的最低电压, 关机后丢失。
Temperature	电调温度。
Max. temperature RPM	最高温度, 在本次电调开机过程中, 电调读到的最高温度, 关机后丢失。
Max. RPM	最高转速, 在本次电调开机过程中, 电调读到的最高转速 (保持超过1秒以上的转速才会被记录), 关机后丢失。
Adv. Timing	Advance timing: 电调当前开启的总进角度数 (Boost&Turbo) 。

说明

输入油门, 接收机发送给电调的油门值。

输出油门, 电调输出到电机的油门电压。

电压, 电调读到的电池电压。

最小电压, 在本次电调开机过程中, 电调读到的最低电压, 关机后丢失。

电调温度。

最高温度, 在本次电调开机过程中, 电调读到的最高温度, 关机后丢失。

转速。

最高转速, 在本次电调开机过程中, 电调读到的最高转速 (保持超过1秒以上的转速才会被记录), 关机后丢失。

Advance timing: 电调当前开启的总进角度数 (Boost&Turbo) 。

固件升级

1. 在固件升级过程中如果发生意外情况导致升级失败, 重启电调后, 电调将一直停留在引导程序区, 此时手机应用连接电调后只能进入固件升级, 不能进行其他操作, 直到成功升级后才能恢复正常功能。
2. 固件升级模式下红灯会一直快速微弱闪烁, 如果有数据在传输, 蓝灯会微弱闪烁。
3. 此时按电源键约5秒电调才会关机, 电调处于升级期间, 请勿随意关机。

可编程项目描述

类别	设定项名称	设定项说明
油门	油门响应 (Throttle Response)	表示电调多长时间进行一次油门调节。
	油门缓降 (Coast)	指当油门值从大到小变化时, 其每0.01秒的减少量。例如: 当前油门摇杆在80%位置, 下一时刻在30%位置, 若未开启油门缓降, 油门值立即从80%减到30%, 若开启, 油门值按80%、70%..30%如此缓慢下降。注意: 若下一时刻油门摇杆在0%位置, 则油门值立即等于0。这一项只在前进油门行程范围内起作用, 30%缓降作用最明显。
	油门中点宽度 (Neutral Range)	油门摇杆处于回中状态的范围大小。油门摇杆处于回中状态的范围大小。
	最小油门值 (Min. Throttle)	限制油门值不能太小, 这一项根据车量配置来调节, 越小越轻的车这一项可以调小, 以使车量获得很低的速度, 越大越重的车调大, 可以消除因启动力量不足造成的抖动。
	油门衰减 (Minus)	例如: 油门摇杆在20%位置, 若未开启衰减, 输出油门值是20%, 设置为1%衰减后, 输出油门值为 $20\% * (1-1\%) = 19.8\%$ 。这一项只在拉油门起作用。
	油门衰减作用范围 (Minus Range)	比如设置为50%, 代表50%以下的油门行程做油门衰减。这一项只拉油门起作用。
	最大前进力度 (Max. Forward force)	若设置为80%, 则拉油门到100%位置时实际油门值是80%。
	最大倒车力度 (Max. Reverse force)	若设置为80%, 则推油门到100%位置时实际油门值是80%。
刹车	刹车响应 (Brake Response)	表示电调多长时间进行一次刹车调节。
	最小刹车力度 (Min. Brake Force)	限制刹车力度的最小值。
	最大刹车力度 (Max. Brake Force)	如果最小刹车力度设置得比最大刹车力度大, 则最大刹车力度等于最小刹车力度。
	前进拖刹力度 (Fwd. Drag Brake Force)	车辆前进后, 油门摇杆从前进行程回到0%位置时的刹车力度, 若开启, 油门摇杆在0%位置处电调开启对应刹车力度。

可编程项目描述

类别	设定项名称	设定项说明
刹车	前进拖刹响应 (Fwd. Drag Brake Response)	表示电调多长时间进行一次拖刹调节。
	倒车拖刹力度 (Rev. Drag Brake Force)	车辆后退后，油门摇杆从后退行程回到0%位置时的刹车力度。
	倒车拖刹响应 (Rev. Drag Brake Response)	表示电调多长时间进行一次拖刹调节。
	刹车PWM频率 (Brake PWM Freq.)	刹车PWM频率
BOOST 进角	Boost进角 (Boost Timing)	开启进角，使电机获得更高转速。
	触发方式 (Trigger)	分为油门触发和转速触发。
	油门触发阈值 (Throttle Threshold)	例如 Boost进角设置为30度，50%油门阈值触发Boost，则油门摇杆达到50%位置处开启Boost进角，在油门摇杆达到100%处开启30度进角，50%到100%油门间进角线性性增加。启30度进角，50%到100%油门间进角线性性增加。
	转速触发阈值 (RPM Threshold)	电机达到转速阈值后，设置的Boost角度将全部开启。
	初始角度 (Initial Angle)	例如设置Boost进角设置为30度，50%油门触发Boost，初始角度为2度，当油门在50%处，Boost实际角度是2度（如果初始角度设置的比Boost进角大，那么最终角度是Boost进角设置值）。
	进角值增加的速度 (Angle Inc. Rate)	例如设置Boost进角设置为30度，油门触发Boost，如果油门值是瞬间增加到100%的，则Boost进角不会立即达到30度，而是以设定的增加速度加到30度；设置为转速触发时同理。
	进角值减小的速度 (Angle Dec. Rate)	当Boost触发条件不再满足时，Boost进角减到0的速率。
TURBO 进角	Turbo进角 (Turbo Timing)	指拉油门达到100%开始开启的进角。
	进角值增加的速度 (Turbo Inc. Rate)	参考“Boost进角值增加的速度”。不同的电机，增加速度设置的过快，会有瞬间大电流，且电机振动剧烈。

可编程项目描述

类别	设定项名称	设定项说明
TURBO 进角	进角值减小的速度 (Turbo Dec. Rate)	当油门摇杆离开100% 位置处时, Turbo 开启的条件不再满足, 但Turbo 进角不会立即减到 0, 而是以设定的速度减少。Turbo开启时电机转速很快, 如果此时 Turbo 进角值快速减到 0, 则转速下降太快, 电机会有剧烈震动和反向高压, 因此请选择合适的进角减小速度。
	延迟 (Delay)	指拉油门达到100%后延迟一段时间再开启Turbo。
	延时的更新时间点(Delay Reload)	当进角已经触发, 如果油门离开 100%, 又快速回到 100% 时, 是重新延时还是不延时。wait: 等到进角减小到 0 后再更新delay, 然后才重新延时; instant: 油门一离开100%就更新delay, 立即开始重新延时。
	电机旋转方向 (Motor Rotation)	某些车架在默认转向下, 前进、后退都是相反的, 此时设置另一个电机旋转方向可以纠正这种错误。
	电机极对数 (Motor Poles)	设置正确的电机极对数, 才能得到正确的 Boost 转速触发阈值, 同时玩家才可以在手机 APP 实时数据中看到正确的电机转速。
	运行模式 (Running Mode)	分为前进/刹车, 前进/刹车/后退,前进/后退。
	倒车模式 (Reverse Mode)	详细见下图
	驱动PWM频率 (Drive PWM Freq.)	指电调驱动电机旋转时使用的 PWM 的频率。频率低加速快, 但是油门线性变差, 频率越高油门越细腻, 但是会增加电调开关损耗, 导致电调温升过快。
	低压保护 (CutoVoltage)	任何时候电调检测到电压低于设置值,并保持一段时间, 电调开启低压保护, 限制输出油门, 输出油门值不会超过50% (低压保护激活后, 即使电压回到正常范围内也不能解除)。
	高温保护 (CutoThermal)	温度大于设定值时, 电调开启温度保护, 限制输出油门, 输出油门值不会超过50% (温度降低到65度以下, 解除温度保护)。
	BEC输出电压 (BEC Output)	BEC输出电压

可编程项目描述

故障现象	可能原因	处理方法
上电后指示灯不亮，电机无法启动，风扇不转。	<ol style="list-style-type: none">1、电池电压没有输入到电调。2、电调开关损坏。	<ol style="list-style-type: none">1、检查电源输入通路是否有焊接不良情况，并重新焊好。2、更换开关。
电机转动过程中，突然停转或功率输出显著降低。	<ol style="list-style-type: none">1、接收机遇到干扰。2、电调进入电池低压保护状态。3、电调进入过温保护状态。	<ol style="list-style-type: none">1、检查接收机出现干扰的原因，检查发射机电池电量。2、红灯每隔一秒闪1次，电压异常，请更换电池。3、红灯每隔一秒闪2次，温度异常。
电机抖动，无法启动。	<ol style="list-style-type: none">1、电调和电机连接的插头有虚焊。2、电调故障（部分功率管MOSFET烧坏）。	<ol style="list-style-type: none">1、检查各焊接点，必要时重新焊接。2、联系经销商处理维修事宜。
油门在中点时，车子缓慢前进或缓慢后退。	<ol style="list-style-type: none">1、遥控器中位有漂移，导致信号不稳。2、油门行程没校准好。	<ol style="list-style-type: none">1、更换信号稳定的摇控器。2、重新校准油门行程。

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Outstanding Model Gear

**POLARIS
DR-30A**

STOCK



Please read the manual carefully before using

Thanks for purchasing our Electronic Speed Controller (ESC). As brushless systems are with strong power, to avoid equipment damage and personal injury caused by improper use, it is strongly recommended that users should read this manual before using the product, and strictly follow the prescribed operating procedures.

No liability shall be assumed for any equipment damage and personal injury resulting from the improper use of the product, including but not limited to compensation for indirect loss.

At the same time, we assume no liability for any equipment damage and personal injury caused by unauthorized modification of the product.

We reserve the right to change the design, appearance, features, and use requirements without notice.

Caution

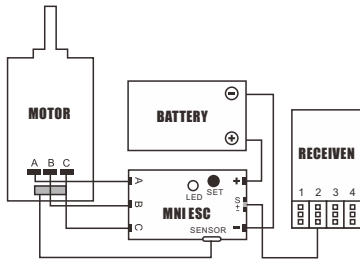
- ◇ Do not let children use this product without the supervision of an adult.
- ◇ The ESC might get hot during use, be careful when handling it.
- ◇ When soldering input / output wires and connections, set the iron to 60W minimum.
- ◇ Always disconnect the battery after use, do not store with the battery connected.
- ◇ Do not use near flammable materials.
- ◇ If the ESC overheats, emits smokes or burns, immediately discontinue use, disconnect the battery and seek assistance.

Features

- ◆ Full aluminum case and heat sink design, with highly efficient heat dissipation system.
- ◆ Plenty of adjustable parameters allows adjusting the settings for most of racing, such as Modified, stock, zero timing, drifting etc.
- ◆ 32-bit microprocessor can support more powerful processing capability and more accurate motor output.
- ◆ Enhanced throttle response, excellent acceleration, linearity and drive ability.
- ◆ Multiple protection features: Low voltage cut-off protection, over-heat protection and throttle signal loss protection.
- ◆ Built-in Bluetooth allows programming the parameter settings and firmware upgrades via app (support real time programming, no need restart the ESC).
- ◆ Data logging for real-time maximum ESC temperature, motor RPM, Voltage and Adv. Timing and so on.

Specification

Product Name	Mini-Z ESC	160A	150A	160A
Cont. Current	30A	160A	150A	220A
Burst Current	80A	760A	950A	1000A
Input Voltage	2-3S	2-3S	2-6S	2-4S
BEC Output	6.0V/2A	6.0V,7.4V/4A	6.0V,7.4V/6A	6.0V,7.4V/6A
Size(L*W*H)	23.5x13.7x9.8	37.0x38.2x31.5	55x48x37.5	55x40x36.5
Weight	9.5	96	165	155
ESC Programming Via	Mobile Phone APP	Mobile Phone APP	Mobile Phone APP	Mobile Phone APP
Firmware Upgrade	Supported	Supported	Supported	Supported
Waterproof	NO	NO	NO	NO
Car Applicable	1/28th	1/10th	1/8th	1/8th



Battery Wire Connection---When connecting the battery, pay attention to polarity: incorrect connection will damage the ESC and Battery. As shown in the figure above, connect the positive (+) wire is connected to (+) battery port, and the negative (-) wire is connected to the (-) battery port.

Motor Wire Connection ---1. **Sensored Mode** :When using a sensored brushless motor, the three A/B/C ESC wires must connect to the three A/B/C motor wires correspondingly. It is necessary to connect the Sensor wire to the "Sensor" socket on the ESC. Don't change the wires sequence optionally. 2. **Sensorless Mode**: When using a sensoreless brushless motor, the #A, #B, #C wires of the ESC can be connected with the motor wires freely (without any sequence). If the motor runs in the opposite direction, please swap any two wire connections.

Receiver Wire Connection---The signal wire supplies 6.0V to the receiver, servo, etc. So there is no need to connect an additional battery. External power connected to the receiver may damage the ESC.

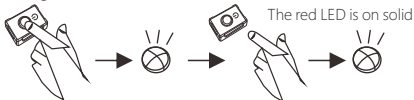
Software Functions and Settings

Power On/Off ESC---1. Press the power button then the ESC will be powered on. 2. Press and holding the power button until the all LEDs died out, then the ESC will be powered off. (Note: Please place the throttle trigger on the neutral position: within 10%, otherwise the ESC can not be powered off.)

Throttle Calibration

1. Connect the ESC with the battery and receiver well, then turn on the transmitter.
2. Press and holding the power button until the blue LED is on solid, the motor have a long beep at the same time, then release the power button, the red led will be on solid, the ESC enters to the calibration mode.
3. Pull the throttle trigger to the full throttle position, the blue led blinks three times and the motor beeps once, the full throttle position is saved.
4. Push the throttle trigger to the full brake position, the blue led blinks three times and the motor beeps twice, the full brake position is saved.
5. Release the throttle trigger to the neutral position, the blue led blinks three times and the motor beeps three times, the throttle calibration is completed.
6. The ESC can support reverse throttle calibration, if the transmitter throttle set reverse (it means pull the throttle will go to 1000 throttle position/normally is 2000, and push the throttle will go to 2000 throttle position/normally is 1000), then you do the throttle calibration the same way as usual (as above), it will not have any effects on the ESC forward and reverse way even if the transmitter throttle set

reverse. Remark: No need to restart the ESC again after throttle calibration finished. Do not move the throttle during the time of the blue led blinks.



Press and hold the power button → Until blue LED is on solid → Release the power button → The ESC enters to the calibration mode



Pull the throttle trigger to the full throttle position, Blue LED blink three times, motor one beep



Push the throttle trigger to the full brake position, Blue LED blink three times, motor two beeps



Release the throttle trigger to neutral position, Blue LED blink three times, motor three beeps, throttle calibration done

Note: When you pull the throttle from neutral position to full throttle position, the Blue LED will blink, and the blink frequency will go faster when the throttle goes higher.

LED Status	Throttle Position	Blue LED	Red LED
	Neutral	Blinking	OFF
Full Throttle	ON	ON	
Full Brake	OFF	ON	

2. When some protection is activated

The RED LED is always on solid once the power button is pressed.

The RED LED blinks, single flash between every one second. Repeat like " □ □ □ " indicates that the voltage is abnormal.

The RED LED blinks, double flash between every one second. Repeat like " □□ □□ □□ " indicates that the temperature is abnormal.

The RED LED blinks, single and double flash alternately between every one second. Repeat like " □ □□ □ □□ □ □□ " indicates that both of the voltage and temperature is abnormal at the same time.

The RED LED will not have any responds even the voltage or temperature is abnormal if not detect the signal.

The BLUE LED blinks, double flash between every two seconds. Repeat like " □□ □□ □□ " indicates that the throttle is abnormal. (No throttle, or the throttle is not on the neutral position)

Throttle Signal

1. The ESC can support the 450Hz maximum PPM throttle signal.

2. The ESC throttle protection will be activated under the following situation, and the BLUE LED blinks double flash:

The throttle trigger do not place on the neutral position when the ESC turns on.

Lost the throttle signal.

3. If the ESC lost throttle signal during the operation, the BLUE LED will blink double flash, and the ESC will start to work again until the throttle signal is back to normal.

Sensored & Sensorless

1. The sensored mode is activated once the ESC detected the hall sensor signal at any time.
2. The ESC will work on sensorless mode once the ESC didn't detect the hall sensor signal at any time.
3. The ESC will have a slight power drop and restored soon during the moment of sensored and sensorless mode switching.
4. The PWM driving frequency will be selected automatically by the ESC on sensorless mode, and the manual setting is invalid.
5. It is invalid to set the brake PWM frequency less than 1KHz and forced recognized as 1KHz, if the ESC is on sensorless mode.
6. Boost and turbo functions are out available on sensorless mode.

Boost & Turbo

1. After the boost or turbo timing triggered, the RPM and current will be increased, and the battery/ESC/motor will be heating, so setting the proper timing and timing increased rate, and control the time of timing will effect the battery/ESC/motor service life.
2. The difference of the Boost and Turbo Timing:
The Boost timing will be triggered even though you do not pull the throttle trigger to the full throttle position.
The Turbo timing will be triggered only when you pull the throttle trigger to the full throttle position.
3. The Boost timing plus the Turbo timing is equal to the final opened timing when the throttle reaches its maximum position, and the final total timing is 60 degree (for Beast

Pro 150A total timing is 15 degree). For example: If Boost timing set at 45 degree, and Turbo Timing set at 50 degree, so when the throttle reaches its maximum position, the Boost timing will be 45 degree, and Turbo Timing only can be opened at 15 degree.

4. If set the low voltage or over temperature protection, and the protection is activated, then all the timing will be closed.

Protection

1. High Voltage Protection:

If the ESC detected the voltage too high(Higher than the esc standard voltage), when the ESC turns on, and the voltage protection was not set "OFF", then the voltage protection will be activated, and the maximum throttle output will be limited within 50%. (The high voltage protection only worked on the moment of the ESC turns on, and it will not work on the other stages even it detected the high voltage, once the high voltage protection opened, even though the voltage comes down to the normal voltage, the protection will not be relieved.)

2. Low Voltage Protection:

If the ESC detected the voltage less than the set value at anytime, and this voltage keep for a while, then the low voltage protection is activated, and the maximum throttle output will be limited within 50%.(Once the low voltage protection activated, even though the voltage comes back to normal, the protection can not be relieved.)

3. Thermal Protection:

The output throttle from the ESC will be limited (not over 50%) with the thermal value you have preset. (The Thermal protection will be dismissed when the ESC temperature drop to 65°C)

4. If the voltage protection and temperature protection set off, and when the voltage and temperature become abnormal, the LED status will indicate the problems correspondingly, but will not limit the throttle output and will not close all ESC timing.

5. If the ESC detected the motor has the driving problem (like motor rotor locked or motor phase lost problem) which can cause the motor not run smoothly, and when the throttle trigger leaves neutral position for a while, then the ESC driving abnormal protection will be activated, and the motor will emit special tone like beep-beep-beep (note: some motors can not beep or beep with a low sound if motor has phase loss problem), and the protection will be closed until you released the throttle trigger to neutral position for 0.2 seconds. If this problem occurs three times continuously, then you have to solve the motor driving problem first, or the protection will exist all the time.

Bluetooth

1. Reset password: When the ESC turns on, press and holding the power button around 10 seconds, the ESC will restore the Bluetooth password to default setting 0000.

2. With RCOMG Bluetooth, connected the RCOMG app to the ESC, the user can program parameters, upgrade firmware and check the real-time data of the ESC on the APP.

3. Due to the range limit of Bluetooth, the operational distance is around 10 meters. (If there are many metals or other strong interference signals or obstacles around will shorten the operational distance)

4. The Bluetooth name can not be changed.

5. The Bluetooth connecting will be failed during the ESC throttle calibration process.

Programmable Items

1. The user can program parameters at any status if the ESC turns on, and new programmed parameters will be took effect immediately, no need to restart the ESC, it means the programming parameters can be completed online, so it can provide a very intuitive feeling between the before programming and after programming. There will be some impacts on the battery/ESC/motor if you program some parameters when the motor in a high-speed rotation. For example, if you changed the motor rotation when the motor in a high-speed rotation, then the ESC will drive the motor reverse immediately, but the motor can not be reverse immediately because of its inertia, then it will cause a big current and vibration. Or when the Boost or Turbo timing opened, but you set

it off when the motor in a high-speed rotation, it also will cause a big current, so we would like to recommend not programming parameters when the motor in a high-speed rotation.

2. The programming parameters are saved in the ESC embedded flash memory, and the flashed card have a limited programming life (around 10K times), so don't program the ESC very often.

Real-time Data

1. The real - time data can be read only when the ESC have the throttle signal.
2. The real- time data is just a reference data with $\pm 10\%$ accuracy . if you want to get the more accurate real - time data , you need to use the more professional equipment.
3. The description of the real -time data items:

Item Description

Input Throttle	The throttle from the Receiver to the ESC
Output Throttle	The throttle from the ESC to the Motor
Voltage	The battery voltage is being read by the ESC
Min. Voltage	The minimum voltage was read by the ESC
Temperature	The ESC temperature
Max. Temperature	The maximum temperature was read by the ESC
RPM	Revolutions per minutes
Max. RPM	The maximum RPM was read by the ESC
Adv. Timing	Advance Timing, The ESC total timing (Boost & Turbo)

Firmware Upgrade

1. If the ESC firmware upgrade failed during the upgrading process, please restart the ESC again, and must upgrade the ESC firmware via the APP again (all the other functions are not available), the ESC will get right after the firmware upgraded successfully.
2. The Red Led will blink a faint light when the ESC in the firmware upgrade mode, and the Blue Led will blink a faint light when the ESC have data transmission.
3. Please do not turn off the ESC during the time of the ESC firmware upgrading process. (And the ESC only can be switched off after pressing the power button around 5 seconds)

Programmable Items Description-A

SECTION	PROGRAMMABLE ITEMS	PROGRAMMABLE ITEMS DESCRIPTION
THROTTLE	Throttle Response	It indicates how often the ESC performs throttle adjustment.
	Coast	When the throttle value changes from high to low, it will decrease every 0.01 second. For example: the current throttle stick is at 80%, and the next moment is at 30%. If the throttle coast is not turned on, the throttle value will be immediately reduced from 80% to 30%. If it is turned on, the throttle value will be 80%, 70%... 30% dropped so slowly. Note: If the throttle stick is at 0% at the next moment, the throttle value will be equal to 0 immediately. This item only works within the forward throttle range, and has the most obvious effect at 30% throttle.
	Neutral Range	Throttle midpoint width, the range of the throttle stick in the centered state.
	Min. Throttle	The minimum throttle, limit the throttle value can not be too small, this item can be adjusted according to the RC car configuration, the smaller the lighter car, this item can be adjusted down, so that the RC car can get a very low speed, the larger the heavier car, this item can be adjusted large, it can eliminate the jitter caused by insufficient starting power.
	Minus	Throttle minus, decay the throttle value. For example, if the throttle stick is at 20%, if the decay is not turned on, the throttle value is 20%. After setting it to 1% decay, the output throttle value is $20\% * (1-1\%) = 19.8\%$. This item only works within the forward throttle range.
	Minus Range	For example, if it is set to 50%, it means that the throttle below 50% will be used for throttle Minus. This item only works within the forward throttle range.
	Max. Forward force	If it is set to 80%, the actual throttle value is 80% when the throttle stick is at 100% of the forward throttle.
	Max. Reverse force	If it is set to 80%, the actual throttle value is 80% when the throttle stick is at the 100% position of the throttle in the reverse direction.
BRAKE	Brake Response	It indicates how often the ESC will perform the brake adjustment.
	Min. Brake Force	It limits the minimum braking force.
	Max. Brake Force	If the minimum braking force is set larger than the maximum braking force, the maximum braking force is equal to the minimum braking force.
	Fwd. Drag Brake Force	It refers to the braking force when the throttle stick returns to the 0% position from the forward stroke after the RC car moves forward. If it is turned on, the ESC will turn on correspond brake force when the throttle stick at the 0% position.

Programmable Items Description-B

SECTION	PROGRAMMABLE ITEMS	PROGRAMMABLE ITEMS DESCRIPTION
BRAKE	Fwd. Drag Brake Response	It indicates how often the ESC performs drag brake adjustment.
	Rev. Drag Brake Force	Rev drag braking force refers to the braking force when the throttle stick returns to the 0% position from the reverse stroke after the RC car moves backward.
	Rev. Drag Brake Response	It indicates how often the ESC performs drag brake adjustment.
	Brake PWM Freq.	Brake PWM frequency.
BOOST	Boost Timing	Turn on the timing to make the motor get a higher speed.
	Trigger	Boost trigger mode includes throttle trigger and RPM trigger.
	Throttle Threshold	For example, Boost timing is set to 30 degrees, 50% throttle threshold triggers Boost, then the throttle stick reaches 50% position to enable Boost timing, and when the throttle stick reaches 100%, 30 degree timing is enabled. The timing value increases linearly from 50% to 100% throttle.
	RPM Threshold	The Boost RPM triggers the threshold. When the motor reaches the RPM threshold, the set boost timing will be fully turned on.
	Initial Angle	For example, set the boost timing to 30 degrees, 50% of the throttle triggers Boost, the initial angle is 2 degrees, when the throttle is at 50%, the actual boost angle is 2 degrees (if the initial angle higher than the boost timing, then the final angle is the Boost timing initial value).
	Angle Inc. Rate	For example: set the Boost timing to 30 degrees, and the throttle triggers Boost. If the throttle value is instantly increased to 100%, the Boost timing will not reach 30 degrees immediately, but will increase to 30 degrees at the set increasing speed; It is the same when it is set to RPM trigger.
	Angle Dec. Rate	The rate at which the boost timing is reduced to 0 when the boost trigger condition is no longer met.
TURBO	Turbo Timing	Turbo timing is the timing that starts when the throttle stick reaches 100%.
	Turbo Inc. Rate	The speed with the Turbo timing increasing. For different motors, if the speed is set too fast, there will be large burst current and the motor will vibrate violently.

Programmable Items Description-C

SECTION	PROGRAMMABLE ITEMS	PROGRAMMABLE ITEMS DESCRIPTION
TURBO	Turbo Dec. Rate	The speed with the turbo timing decreasing. When the throttle stick leaves the 100% position, the conditions for turning on Turbo are no longer met, but the Turbo timing will not be immediately reduced to 0, but will decrease at the set speed. When the Turbo is turned on, the motor speed is very fast. If the Turbo timing value quickly decreases to 0 at this time, the speed decreases too fast, the motor will vibrate severely and reverse high voltage, so please choose the appropriate timing to reduce the speed.
	Delay	Turbo delay refers to a delay after the throttle stick reaches 100% before turning on Turbo.
	Delay Reload	The update time point of the delay. When the timing has been triggered, if the throttle leaves 100% and quickly returns to 100%, whether to delay again or not. Wait: wait until the timing is reduced to 0, then update the delay, and then re-delay; Instant: update the delay as soon as the throttle leaves 100%, and start the re-delay immediately.
GENERAL	Motor Rotation	In some RC cars, under the default rotation, forward and backward are reversed. At this time, setting another motor rotation can correct this error.
	Motor Poles	Set the correct number of motor poles to get the correct Boost RPM trigger threshold. At the same time, players can see the correct motor RPM in the real-time data of the mobile phone APP.
	Running Mode	Running mode includes Forward/Brake, Forward/Brake/Reverse, Forward/Reverse.
	Reverse Mode	Check the below diagram for details
	Drive PWM Freq.	The drive PWM frequency refers to the PWM frequency used when the ESC drives the motor. The lower frequency, the higher acceleration, but the linearity of the throttle becomes worse and feel aggressive throttle feeling. The Higher frequency ,the smoother throttle feeling, but it will cause the temperature of the ESC to rise too fast.
	CutoVoltage	If the ESC detected the voltage less than the set value at anytime, and this voltage keep for a while, then the low voltage protection is activated, and the maximum throttle output will be limited within 50%.(Once the low voltage protection activated, even though the voltage comes back to normal, the protection can not be relieved.)
	CutoThermal	The output throttle from the ESC will be limited (not over 50%) with the thermal value you have preset.(The Thermal protection will be dismissed when the ESC temperature drop to 65°C)
	BEC Output	BEC Output

Trouble Shooting

Trouble Shooting	Possible causes	Solutions
The ESC was unable to start the status LED, the motor, and the cooling fan after it was powered on.	<ol style="list-style-type: none">1. No power was supplied to the ESC.2. The ESC switch was damaged.	<ol style="list-style-type: none">1. Check if all ESC & battery connectors have been well soldered or firmly connected.2. Replace the broken switch.
The motor suddenly stopped or significantly reduced the output in operation.	<ol style="list-style-type: none">1. The receiver was influenced by some foreign interference.2. The ESC entered the battery LVC (Low Voltage Cut off) protection.3. The ESC entered the thermal (over-heat) protection.	<ol style="list-style-type: none">1. Check all devices and try to find out all possible causes, and check the transmitter's battery voltage.2. The RED LED blinks, single flash between every one second.3. The RED LED blinks, double flash between every one second.
The motor stuttered but couldn't start.	<ol style="list-style-type: none">1. Some soldering between the motor and the ESC was not good.2. The ESC was damaged (some MOSFETs were burnt).	<ol style="list-style-type: none">1. Check all soldering points, please re-solder if necessary.2. Contact the distributor for repair or other customer services.
The car ran forward/backward slowly when the throttle trigger was at the neutral position.	<ol style="list-style-type: none">1. The neutral position on the transmitter was not stable, so signals were not stable either.2. The ESC calibration was not proper.	<ol style="list-style-type: none">1. Replace your transmitter2. Re-calibrate the throttle range or tune the neutral position on the transmitter.

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