Outstanding Model Gear

POLARIS DR-120AX3

STOCK

使用前必读

感谢您购买 POLARIS-DR-120AX3 车用电子调速器！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。

本公司 POLARIS-DR-120AX3电调分为STOCK(专业竞赛版本）及MOD(标准版本）

STOCK版本：适用于真正的机械零进角马达(根据车型，马达，齿比进行Turbo Timing 及 Boost Timing相应参数调整，直到满意为止)

MOD 版本：适用于 1:10 所有漂移车及平跑车(比STOCK版本缺少"变进角起始转速"及"进角加速度"两项功能)

如果在STOCK版本下使用的马达不是专业机械0进角，而是普通马达
需要将Turbo Timing及Boost Timing参数设为0 deg.

警告 1 根据不同的马达调大Turbo Timing参数，直到适应为止，在调大参数的过程中，全油门出现中断情况，则说明参数过大，需要适当回调；Boost Timing 参数无需调整，会根据马达转速自动调整。

产品特点

- ◇ 竞赛级电子调试器，内置3种常用模式，适合各种竞赛，即选即用，可选模式有：
  1 一般练习模式
  2 竞赛模式
  3 攀爬车模式
- ◇ 采用CNC精雕工艺铝制金属壳，三种颜色可选。
- ◇ 独特的导风散热槽设计，散热性能更优，耐流更强。
- ◇ 一体式轻触电子电源开关及设置按键，
- ◇ 增加动态Turbo Timing和Boost timing等技术, 参数设定细腻，适应不同车手。
- ◇ 强大的油门和刹车调节功能。
- ◇ 多重保护功能（电压过低保护、电机及电调过热保护、油门失控保护）。
- ◇ 支持 LCD 参数编程

产品规格

型号:POLARIS-DR-120AX3
持续电流:120A　　峰值电流:760A
支持电机:有感无刷电机
BEC:6-5V@3-5A,动态线性稳压模式
适用车型:1:10漂移车/平跑车/越野
风扇工作电压：5V@0.16A，最高工作电压 13V，
电调风扇插座未经过稳压，为电池输入电压。
尺寸(含风扇):41x39x32mm　重量(含配件):112g
电池节数：2-3 节锂电池。

支持无刷马达T数

2S	3S
≥3.5T(1/10 平跑车)	≥5.5T(1/10 房车)
≥5.5T(1/10 越野)	≥8.5T(1/10 越野)
10.5T(1/10 漂移)	15.5T(1/10 漂移)

使用步骤

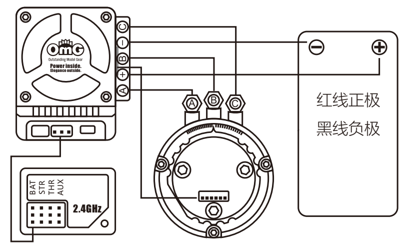
第一步: 根据所使用的电机，按相应的图示接线并复查无误后，进入下一步。

连接有感无刷电机：当使用有霍尔传感器的无刷电机时，需要将电机上的传感器引线接到SENSOR插座，电调通过检测 SENSOR插座的信号自动判别是有感电机还是无感电机。

特别提醒: 配合有感无刷电机使用时，电调输出线 A、B、C 要分别和电机线 A、B、C 相连，绝对不得调换！

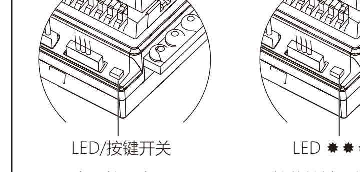
警告 2 电源正负极绝对不能接反，否则电调瞬间损坏。长时间不用时请拔下电池，以免造成意外。

第二步：开机及设定油门行程。
强调：电调第一次使用或遥控器更改过油门中点、ATV、EPA 等参数后,均需重设油门行程, 不然可能会导致无法使用或错误动作。下面以 Futaba 遥控器为例，说明油门行程的设定过程。



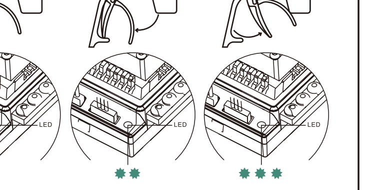
1 电调连接电池后，打开遥控器，将油门通道方向设置为"REV"，油门微调设置为"0"，油门通道的 EPA/ ATV正反向均设置为 100% 。

请务必关闭遥控器自带的ABS 刹车功能。



2 按住开关按键0.5秒后开机，
(1)此时如果松开按键，则电调之间进入工作状态。
(2)如果按键不松开，持续3秒后则进入油门设定选择。此时电调红色LED灯开始闪烁（同时马达鸣叫），立即松开按键。电调进入油门校正模式。(马达鸣叫声音可能较小，在这种情况下，需要观察LED指示灯工作状态。)

3 此时需要设定 A:油门中点, B:正向最高点 C:反向最高点
(1) 油门摇杆留在中点位置，按一下开关按键，红灯熄灭，绿灯闪烁 1 次，马达鸣叫"哔"1 声，声音停止。表示已存储中点位置；
(2) 油门摇杆打到正向最高点，按下开关按键，绿灯闪烁2次，马达鸣叫"哔-哔-"2声，表示已存储油门正向最高点；
(3) 油门摇杆打到反向最低点，按一下开关按键，绿灯闪烁3 次，马达鸣叫"哔-哔-哔-"3 声，表示已存储油门反向最低点；



油门行程校调完毕，三秒钟后，电机即可正常操作。

第三步：接线及基本设置完成, 电机可正常运行。开关的使用及行驶过程中LED指示灯状态说明。

当油门摇杆处于中点区域时，红色和绿色LED指示灯均熄灭。

前进和倒车时，红色LED指示灯恒亮，

当油门处于正向（前进）最高点，绿色LED灯将点亮。

编程设定参数表

类别		设定项名称	设定值									
基础设置	1	运行模式 Runing Mode	正转带刹车,无倒车（竞赛模式）			正反转带刹车（练习模式）			直接正反转（攀爬模式）			
	2	拖刹力度 Drag Brake	0%	5%	10%	15%	20%	25%	30%	100%	=Drag brake	
	3	电池低压保护 Voltage Prot	不保护	2.6V/Cell	2.8V/Cell	3.0V/Cell	3.2V/Cell	3.4V/Cell				
	4	启动加速度 "DRRS" Punch	1级	2级	3级	4级	5级	6级	7级	8级	9级	
	5	最大刹车力度 Brake Force	12.5%	25%	37.5%	50%	62.5%	75%	87.5%	100%		
	6	最大倒车力度 Reverse Force	25%	50%	75%	100%						
	7	初始刹车力度 Initial Brake	=Drag brake	0%	20%	40%						
	8	油门中立点区域宽度 Neutral Range	6%	9%	12%							
高级设置	9	增压进角 Boost Timing	MOD版本0-16 度可调，调整量1度	STOCK版本 0-64 度可调，调整量1度								
	10	激暴进角打开时间 Turbo Slope	3	6	12	18	24	立即全部释放				
	11	过热保护 Over-Heat Prot	启用保护	不保护								
	12	激爆进角 Turbo Timing	MOD版本0-20 度可调，调整量1度	STOCK版本 0-40 度可调，调整量1度								
	13	变进角起始转速 Start RPM	1000-15000 RPM (调整量 1000 RPM)	MOD版本 无								
	14	全油门延迟时间 Turbo Delay	立即	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
	15	进角加速度 Timing Acc	50-750RPM（每档 50RPM）	MOD版本 无								

编程项目说明

1. 运行模式（Running Mode）

"正转带刹车"模式, 车辆仅能前进和刹车，但不能倒车，该模式通常用于竞赛；

"正反转带刹车 " 模式，提供了倒车功能, 通常用于训练。此模式采用双击倒车方式，即油门摇杆在第一次从中点区域推至反向区域时，电机只是刹车，不会产生倒车动作；当油门摇杆快速回到中立点区域并第二次推至反向区域时，如果此时电机已停止，则产生倒车动作，如果电机未停止，则不会倒车，仍是刹车，需要再次将油门回到中点并推向反向区，此时如果电机已经停止才会倒车，这样做的目的是防止车辆行驶过程中因多次点刹而造成误倒车。

" 直接正反转" 模式，采用单击式倒车方式，即油门摇杆从中点区域推至反向区域时，电机立即产生倒车动作，该模式通常用于攀爬车或其他特殊车辆。

2. 拖刹力度（Drag Brake）

拖刹是指当油门摇杆从正向区域转入中点区域内时，对电机产生一个微量的刹车力，这样做可以模拟有刷电机的碳刷对电机转子的阻力，适合减速入弯等场合。（注意拖刹会消耗比较多的电量，选择合适的拖刹力度即可）。

3. 电池低压保护（Voltage Prot）

此功能是防止锂电池过度放电而造成不可恢复的损坏。电调会监视电池电压，电压低于设定阈值，会在 3 秒内动力输出将逐步降为正常功率的 30%，此时车手应立即靠边退出比赛，10 秒后动力将完全关闭。进入电压保护后，红色 LED 指示灯会以"☆ - ☆ - ，☆ - ☆ - ，☆ - ☆ - "方式闪烁。您可以通过专业编程卡（选配件），选择所适用的电池类型。

4. 启动加速度（"DRRS Punch"）

可根据个人习惯、场地、轮胎抓地等特性条件，选择从1级（"非常柔和"）到9级（"非常劲暴"）其中一项。

本功能可防止车子启动时轮胎打滑，并可在竞赛过程中实现弹射追车的效果。此外，使用"7 级"—"9 级"模式时，对电池的放电能力要求较高，若电池放电能力较差，不能提供瞬时大电流，则反而会影响启动效果。当启动时出现停顿或瞬间失去动力时，则可能是电池放电能力不足引起的，这时需要降低启动加速度，或将齿轮减速比增大。

5. 最大刹车力度(Brake Force)

提供比例式刹车功能，刹车力度的大小和油门摇杆的位置相关，最大刹车力是指油门摇杆处于刹车极限位置所产生的刹车力。根据车辆的具体情况及个人的使用习惯，选择合适的最大刹车力参数。

6. 最大倒车力度（Reverse Force）

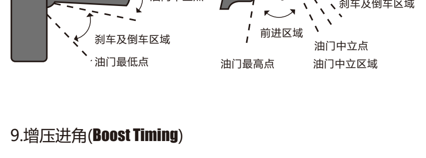
选择不同的参数可产生不同的倒车速度（推荐使用比较小的倒车速度，以免因倒车太快而导致失控撞车）。

7. 初始刹车力度(Initial Brake)

也叫最小刹车力度，是指在刹车初始位置作用于电机上的刹车力，在它的作用下可以达到类似点刹效果，默认值是等于拖刹力度，以便形成柔顺的刹车效果。

8. 油门中立点区域宽度（Neutral Range）

油门中立点区域如下图，根据个人习惯进行调整。



9.增压进角(Boost Timing)

此进角在整个油门行程范围内有效，直接影响弯路和直路的速度。(当设定了此值后，电调在运行过程中的实际进角是根据马达转速大小而动态变化，并非固定的常量 。

10.激爆进角打开时间（Turbo Slope）

指开启 Turbo 的延迟。只有当全油门持续时间达到预定延时后，Turbo 才会开启。

Turbo Slope Rate：激暴进角（Turbo Timing）递增率，指每 0.1秒打开的激暴进角（Turbo Timing）度数。此值越大，则 Turbo Timing 增速越高，加速越快，当然，马达也会更热。

11.过热保护（Over-Heat Prot）

启用该功能后，电调或有感无刷电机温升达到厂方预设特定值时自动关闭输出，而且绿灯会闪烁，直到温度降低才恢复输出。如果是电机温度保护，绿灯闪烁方式为双闪，即"☆ - ☆ - ，☆ - ☆ - ，☆ - ☆ - "；如果是电调过热保护时，绿灯闪烁方式为单闪："☆ - ，☆ - ，☆ - "。

（注：电机温度保护功能仅适用于本品牌配套的有感无刷电机，其它品牌可能因为电机内没有温度传感器而无此功能，或因内置温度传感器参数不一样而导致保护点不一致，如果电机过早保护，请关闭温度保护功能。）

12.激爆进角(Turbo Timing)

也是进角大小设置项 。但是此进角只在全油门后才会开启，使马达在较长的直路赛道上获得更快的速度。

13.变进角起始转速（Start RPM）

因为 Boost值是根据马达转速来动态分配，所以当马达转速低于起始转速时Boost 实际开启值为 0，在转速处于起始转速和结束转速之间时，Boost 是根据当时马达转速的大小来动态变化的。

如果设置项 "Boost 随 RPM 变化方式"设置为线性时,则Boost 值在这段范围内是线性分配的。

例如，假设Boost Timing 设置为5 度，起始转速为10000，则各个转速下的Boost进角值如下表所示。如果转速高于结束转速时，则Boost实际开启值则为 Boost 设置值。stock 版本则是随速度0-64度全范围变化，

(所以在STOKC 版本下，普通马达进角不为0度，手动设置boost timing 的话，马达运行进角会超出极限的 64 度，因此必须遵循警告1处设置）。

MOD 版本示范表

转速(RPM)	Boost 实际开启值
<10000	0 度
10001-11000	1 度
11001-12000	2 度
12001-13000	3 度
13001-14000	4 度
14001-15000	5 度
>15000	5 度

14.全油门延迟时间（Turbo Delay）

是指触发 Turbo 所需要的持续全油门时长。当 Turbo 触发方式选为"全油门时间"触发时，而且持续全油门的时间达到此设定值后，才能触发 Turbo 开启。

15.进角加速度（Timing Acc）

Boost Timing加速度，RPM/度。表示马达每增加多少转速，电调就相应增大 1 度的 Boost Timing。此值设定得越低，则电调的Boost Timing 递增速率越快，马达启动越暴，同时马达温度也越高。

警告 3 开启 Boost 进角和 Turbo 进角能够有效提升马达输出功率，通常用于竞赛模式。

使用前务必仔细阅读说明书内的参考设定，并在试车时监控马达及电调的温度，调整合适的进角设定及选择正确的齿比。

过激的进角设定和选择不正确的齿比很有可能会导致电调或者马达烧毁！

一般情况下各种T数马达所建议的Boost及Turbo进角范围
MOD 版本示范表

马达T数	3.5T 4.0T	4.5T 5.5T	6.5T 7.5T	8.5T 9.5T	10.5T 11.5T	≥13.5T
能开启Boost进角最大值	0度	0度	5度	10度	16度	16度
能开启Turbo进角最大值	5度	10度	10度	15度	20度	20度

因为进角越大，则马达的功率也会相应更大，马达的发热量也越高，如果在马达转速较低时就开启过多的进角，则会导致马达发热严重，甚至烧毁马达。

所以我们采用了动态进角的方法，在低转速时，开启较小一些的进角，待转速提升后，进角再随转速的增加而增加。通过调整起始转速及进角加速度，就可以实现马达运行过程中，低转速对应低进角，高转速对应高进角 。

STOCK 版本示范表 (转速和进角对应关系)

表格中进角（度）一栏是指编程参数表第9项 Boost Timing（非机械可调0进角的普通马达必须 Boost timing 调为 0 度，电调会跟随马达转速自行递增进角。）

起始转速=4000 进角加速度=200/度		起始转速=9000 进角加速度=400/度		起始转速=4000 进角加速度=200/度		起始转速=9000 进角加速度=400/度	
转速（RPM）	进角 (度)	转速（RPM）	进角 (度)	转速（RPM）	进角 (度)	转速（RPM）	进角 (度)
<4000	0	<9000	0	8800	24	18600	24
4200	1	9400	1	9000	25	19000	25
4400	2	9800	2	9200	26	19400	26
4600	3	10200	3	9400	27	19800	27
4800	4	10600	4	9600	28	20200	28
5000	5	11000	5	9800	29	20600	29
5200	6	11400	6	10000	30	21000	30
5400	7	11800	7	10200	31	21400	31
5600	8	12200	8	10400	32	21800	32
5800	9	12600	9	10600	33	22200	33
6000	10	13000	10	10800	34	22600	34
6200	11	13400	11	11000	35	23000	35
6400	12	13800	12	11200	36	23400	36
6600	13	14200	13	11400	37	23800	37
6800	14	14600	14	11600	38	24200	38
7000	15	15000	15	11800	39	24600	39
7200	16	15400	16	12000	40	25000	40
7400	17	15800	17	12200	41	25400	41
7600	18	16200	18	12400	42	25800	42
7800	19	16600	19	12600	43	26200	43
8000	20	17000	20	12800	44	26600	44
8200	21	17400	21	13000	45	27000	45
8400	22	17800	22	13200	46	27400	46
8600	23	18200	23	13400	47	27800	47

有一点需要注意，假设设置的 Boost 进角没有到最大，只设置为 20 度，那么当转速大于 20 度进角所对应的转速后，则一直还是 20 度进角。

MOD 版动力示范表

1.参考齿比：均为1/10车模在2S锂电下的最终齿比值(FDR)
2.程序使用零进角, 未开启 Boost 和 Turbo 进角, 当开启Boost 和Turbo进角后, 齿比一般需要相应增大30%以上。

T 数	KV 值	参考齿比(1/10 房车)	参考齿比(1/10 越野)	主要应用
3.5T	9100KV	9.0 - 11.0		1/10 房车、越野车公开组竞赛、日常练习
4.5T	7300KV	8.4 - 10.0		
5.5T	6000KV	8.0 - 9.4	9.5 - 11.0	1/10 房车、越野车 STOCK竞 赛、日常练习
6.5T	5200KV	7.4 - 8.4	9.0 - 11.0	
8.5T	4000KV	6.0 - 7.0	8.0 - 9.6	广泛应用于 1/10 漂移车、F1、 M 车等
10.5T	3300KV	5.0 - 6.0	7.0 - 8.5	
13.5T	2500KV	4.0 - 5.0	6.5 - 7.5	
17.5T	1900KV	3.8 - 4.5	5.5 - 7.0	
21.5T	1600KV			1/10 攀爬车、F1

(2S 锂电，马达自身进角为0 - 5 度（ Endbell Timing）。
(非机械可调0进角的普通马达必须Boost timing调为0度，
电调会跟随马达转速自行递增进角。）

STOCK 版动力示范表

车型	马达	最终齿比	#9 Boost Timing	#10 Turbo Ramp	#11 Turbo Timing	#12 Boost Start RPM	#13 Turbo Delay	#14 Timing ACC
1:10 房车	10.5T	6.0-7.5	30°-40°	18°/0.1s	15°-24°	4000	0.5s	350-500
	13.5T	5.0-7.0	34°-50°	18°/0.1s	20°-30°	3000	0.4s	200-300
	17.5T	5.0-7.0	34°-55°	18°/0.1s	20°-30°	3000	0.2s	150-300
1：10 越野 (原则上不推荐越野使用带turbo程序)	11.5T	7.5-9.5	12°	6°/0.1s	4°	6000	Off	400-500
	13.5T	7.0-9.0	16°	6°/0.1s	8°	5000	Off	200-350
	17.5T	7.0-8.5	20°	6°/0.1s	12°	3000	Off	200-350

齿比的大小，要看具体的赛道情况而定。如果赛道直路长，弯道少，则齿比可以小一点，以得到更多的尾速；如果赛道短小，则齿比应大一些，以得到更多的加速度，使出弯速度更快。

故障快速处理

开机后指示灯不亮，电机无法启动，风扇不转	1、电调无输入电压 2、电调开关损坏	检查电源输入通路是否有焊接不良情况，并重新焊好。
上电后红色 LED 恒亮，电机无法启动	电调油门线插反或通道插错	将电调的油门排线按正确方向插到接收机的"油门（Throttle）" 通道（通常为 Ch2）。
遥控器正向加大油门，车子反而倒退	1、电调及马达线连接的线序错误 2、该车架同主流车架的电机转向不一致	1、如果是无感电机，将电机三条线中任意两条互换即可。 2、如果是有感电机，则无法通过更换线序实现电机反转，电调默认程序无法适配此特殊车架。
电机转动过程中，突然停转	1、接收机遇到干扰 2、电调进入电池低压保护或温度保护	红灯持续闪烁为电压保护，请更换电池； 绿灯持续闪烁为过热保护，请等电调温度降低后继续使用；
电机启动时快速加大油门，电机有卡住或停顿的现象	1、电池放电能力不够 2、电机转速过高，减速比过小 3、电调启动加速度设置过高	1、更换放电能力强的电池。 2、更换为低速电机，或使用更柔和的减速比。 3、将电调启动加速度（Punch）设置得柔和一些。
油门在中点时，红绿灯同时快速闪烁	接有感电机时，电调检测到霍尔传感器信号有错误，已自动切换至无感模式	1、查看感应线是否有松动或接触不良。 2、马达内部的霍尔（HALL）感应器损坏。
电机抖动，无法启动	1、电调与电机之间接线错误。 2、电调故障	1、查看接线是否正确，应确保为 A-A，B-B，C-C。 2、联系经销商处理维修事宜。

Outstanding Model Gear

POLARIS DR-120AX3

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.

Our company POLARIS-DR-120Ax3 Electronic Speed Controller (ESC) have been divided into STOCK version (professional competition version) and MOD version (standard version).
STOCK version: suitable for true mechanical zero-timing motor (parameters for Turbo Timing and Boost Timing can be adjusted according to vehicle type, motor, gear ratio until satisfied)
MOD version: suitable for all 1/10 drift cars and on-road cars (Lack of two functions: the Boost Start RPM and Boost Timing Acceleration, than the STOCK version)

If the motor used in STOCK version is not professional mechanical zero-timing motor but is a normal motor, Turbo Timing and Boost Timing parameters should be set to 0 deg.

WARNING1 Raise the parameters of Turbo Timing according to different motors until appropriate. During adjusting Turbo Timing parameters, if the full throttle is interrupted, indicating that the parameters is too high and readjusting is required. Parameters of Boost Timing do not need to be adjusted. They are automatically adjusted according to the motor speed.

Product features

- ◇ Specially for top competitions, built-in 3 common modes, suitable for all competitions Modes available:
  General practicing mode
  Competition mode
  Crawlers mode
- ◇ Alumimum metal case with CNC precise engraving. Three colour for choose.
- ◇ Unique heat sink slot design, better heat dissipation performance.
- ◇ One-piece touch electronic power switch and setting button.
- ◇ With world - leading technologies such as dynamic Turbo Timing and Boost timing, and the settable timing parameters are very detail, adapting to the different demands of different drivers.
- ◇ Powerful throttle and brake adjustment functions
- ◇ Multiple protection functions: low voltage protection, motor and ESC overheat protection, and throttle out of control protection.
- ◇ Support LCD parameter programming

SPECIFICATIONS

Model:OMG-POLARIS-DR-120Ax3
Continuous Current: 120A　Burst Current: 760A
Motor Type Supported: Sensored Brushless Motors
BEC output: 6-5V@3-5 Linear regulator mode
Cars Applicable: Drifts/on-road cars/off-raod cars
Fan: 5V@0.16A, Max: 13V
(Direct voltage from battery without DC regulating)
Dimenson (fan indluded): 41x39x32mm
Weight (accessories included): 112g
Battery cell qty: 2-3S lithium battery

Brushless Motor Limit

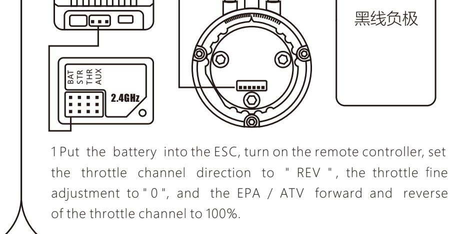
2S	3S
≥3.5T(1/10 Touring)	≥5.5T(1/10 Touring)
≥5.5T(1/10 Buggy)	≥8.5T(1/10 Buggy)
10.5T(1/10 Dfift)	15.5T(1/10 Dfift)

Step 1: According to the motor used, connect according to the following pictures and check to make sure there is no error, then go to the next step.
Sensored brushless motor wiring：When using Hall Sensor brushless motor, it is necessary to connect the sensor cable of motor to the "SENSOR" socket on the ESC.
The ESC can automatically identify the motor type (sensored or sensorless) by detecting the signal coming from the "SENSOR" socket.

WARNING! For sensored brushless motor, the #A, #B, #C wires of the ESC MUST be connected with the motor wire #A, #B, #C respectively. Do not change the wires sequence!

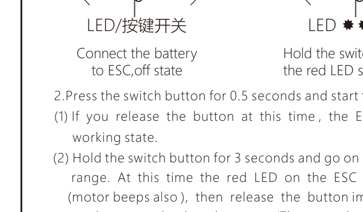
WARNING2 The positive and negative poles of the power supply must not be reversed, otherwise the ESC will be damaged instantly. Please unplug the battery when not in use for a long time to avoid accidents.

Step 2: Start the ESC and set throttle range
Note: The throttle range must be reset when the first time the ESC used or the remote control has changed the throttle midpoint, ATV, EPA and other parameters. Otherwise, it may become unusable or malfunction. Take Futaba remote as example as following to show the process of setting the throttle range:

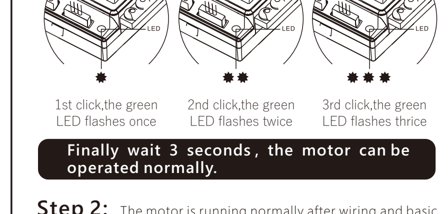


1 Put the battery into the ESC, turn on the remote controller, set the throttle channel direction to " REV ", the throttle fine adjustment to " 0 ", and the EPA / ATV forward and reverse of the throttle channel to 100%.

Be sure to turn off the ABS brake function that comes with the remote control.



2.Press the switch button for 0.5 seconds and start the ESC.
(1) If you release the button at this time, the ESC enters the working state.
(2) Hold the switch button for 3 seconds and go on setting throttle range. At this time the red LED on the ESC starts to flash (motor beeps also), then release the button immediately and ready to set the throttle range. (The motor beep sounds may be small, in this case, just watching the LED status.)
3 Set the 3 points as follow:
A.Throttle stick at neutral position
B.full throttle position
C.full brake throttle position
(1) Keep the throttle stick at the neutral position, press the switch button, the red light goes out, the green LED flashes once, and the motor beeps once, indicating that the neutral position has been stored;
(2) Move the throttle stick to the full throttle position, press the switch button once, the green LED flashes twice, and the motor sounds " Beep Beep " twice, indicating that the full throttle has been stored;
(3) Move the throttle stick to the full brake throttle position, press the switch button, the green LED flashes 3 times, and the motor beeps 3 times "beep-beep-beep-", indicating that the full brake throttle position has been stored;



Finally wait 3 seconds, the motor can be operated normally.

Step 2: The motor is running normally after wiring and basic settings are completed.
The use of the switch and the description of the status of the indicator light (LED) during driving: When the throttle stick is in the midpoint position, both the red and green LEDs are off.
When forwarding and reversing, the red LED is always on.
When the throttle is at the highest point in the forward direction, the green LED will also be on.

编程设定参数表

		Name of Items	Set Value									
General Setting	1	Runing Mode	FORWARD/BRAKE (Competition Mode)			FORWARD/BRAKE/REVERSE (Practice Mode)			FORWARD/REVERSE (Crawler Mode)			
	2	Drag Brake	0%	5%	10%	15%	20%	25%	30%	100%	=Drag brake	
	3	Voltage Prot	No protection	2.6V/Cell	2.8V/Cell	3.0V/Cell	3.2V/Cell	3.4V/Cell				
	4	"DRRS" Punch	Level1	Level12	Level3	Level14	Level5	Level6	Level17	Level8	Level19	
	5	Brake Force	12.5%	25%	37.5%	50%	62.5%	75%	87.5%	100%		
	6	Reverse Force	25%	50%	75%	100%						
	7	Initial Brake	=Drag brake	0%	20%	40%						
	8	Neutral Range	6%	9%	12%							
Advanced Setting	9	Boost Timing	MOD Version: 0-16° adjustable, 1°/time	Stock Version:0-64° adjustable, 1 °/time								
	10	Turbo Slope	3	6	12	18	24	Release all				
	11	Over-Heat Prot	Protection	No Protection								
	12	Turbo Timing	MOD Version:0-20° adjustable,1° /time	STOCK Version:0-40° adjustable,1° /tim								
	13	Start RPM	1000-15000 RPM (1000 RPM/time)	No MOD version								
	14	Turbo Delay	Instant	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
	15	Timing Acc	50-750RPM (50RPM/time)	NO MOD version								

PROGRAMMING INSTRUCTION

1. Running Mode

"Forward Only with Brake" Mode. The car will only go forward and have brakes, but reverse is disabled. This mode is suitable for competition purposes.
"Forward / Reverse with Brake" Mode. This provides a reverse function, which is suitable for practice. The reverse function is engaged by a Double click method. On the first application of backwards throttle, only brakes are applied. On returning to the neutral point, and then applying the backwards throttle for a second time, if the motor stop now, the reverse function will be engaged. However, if at this time the motor is still moving forward the ESC will not go into reverse and just brake. The motor must be at 0 rpm to engage reverse. This is a protection function to prevent vehicle from back up by mistake when users just try to brake and click several times.
"Forward / Reverse" Mode. The reverse function is engaged by one click method. When moving from the forward zone to the backward zone, the ESC will engage reverse immediately. This mode is intended for crawlers or other special vehicles.

2. Drag Brake Strength

Drag brake refers to the generation of a small amount of braking force on the motor when the throttle stick is turned from the forward area to the neutral area. This can simulate the resistance of the brushed motor's carbon brush to the motor rotor, suitable for slowing down into corners, etc. occasion. (It is worth noting that the drag brake will consume more power, just choose the appropriate drag brake strength).

3. Low Voltage Protection

This function is to prevent the lipo from excessive discharge and irreparable damage. The ESC will always monitor the battery voltage. Once the voltage is lower than the set threshold, the power output will gradually drop to 30% of the normal power within 3 seconds. At this time, the driver should pull over and withdraw from the race immediately.
The power will be completely shut off after 10 seconds. When entering the voltage protection, the red LED will flash like "☆-☆-, ☆-☆-, ☆-☆-". You can select the battery type by using a professional programming card (choosing accessories).

4. Start Mode / Punch"

According to personal habits, grounds, tire grip characteristics and other conditions, you can choose from 9 starting accelerations from level 1 ("very soft") to level 9 ("very aggressive"). This function can prevent the tire from slipping when starting, and can achieve the effect of ejecting and chasing the car during the competition. In addition, when using the " Level 7 "-" Level 9 " mode, the discharge capacity of the battery required high. If the battery discharge capacity is poor and cannot provide instantaneous high current, it will affect the startup effect. A pause or instantaneous loss of power during startup, it may be caused by insufficient battery discharge capacity. At this time, it is necessary to reduce the startup acceleration or increase the gear reduction ratio.

5. Brake Force

The ESC provides a proportional braking function. The braking force is related to the position of the throttle stick. The maximum braking force refers to the braking force generated when the throttle stick is in the braking limit position.
Please select the appropriate maximum braking force parameters according to the specific conditions of the vehicle and personal usage habits.

6. Reverse Force

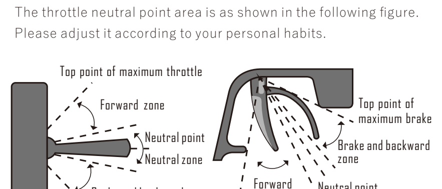
Choosing different parameter can produce different reversing speeds. (In general, it is recommended to use a lower reversing speed to avoid running out of control due to reversing too fast).

7. Initial Brake Force:

Also called the minimum braking force. It refers to the braking force acting on the motor at the initial position of the brake. Under its action, it can achieve an effect similar to a point brake. The default value is equal to the drag brake strength, to form a soft brake effect.

8. Neutral Range

The throttle neutral point area is as shown in the following figure. Please adjust it according to your personal habits.



9. Boost Timing

This timing is effective in the entire throttle range and directly affects the speed of curved roads and straight roads. (When this value is set, the actual timing of the ESC during operation changes dynamically according to the motor speed, not a fixed constant.)

10. Turbo Slope Rate

This setting relates to the rate of engagement when the activation conditions are met. This is defined in points added per 0.1s. A higher value means faster addition of Turbo timing.

11. Over-Heat Protection

After this function is enabled, the output will be automatically turned off when the temperature rise of the ESC or the sensored brushless motor reaches a specific value preset by the factory, and the green LED will flash. The output will not be restored until the temperature reduction. If it is motor temperature protection, the green flashing mode is double flashing, namely "☆-☆-, ☆-☆-, ☆-☆-". If it is ESC overheating protection, the green LED flashes in a single flash: "☆-, ☆-, ☆-". (Note: The motor temperature protection function is only applicable to the inductive brushless motors of our factory. Other brands may not have this function because there is no temperature sensor in the motor, or the protection points are inconsistent due to the different built-in temperature sensor parameters. If Motor premature protection, please turn off the temperature protection function.)

12. Turbo Timing

This is also the size setting item of the timing. However, this one is only activated after full throttle started, allowing the motor to achieve faster speeds on long straight tracks.

13. Boost Start RPM

Because the Boost value is dynamically allocated according to the motor speed, the actual opening value of Boost is 0 when the motor speed is lower than the start speed. When the speed is between the start speed and the end speed, Boost changes dynamically according to the current speed. If the setting item "Boost varies with RPM" is set to be linear, the Boost value is distributed linearly within this range.

For example, assuming that Boost Timing is set to 5 degrees and the starting speed is 10000, the Boost timing values are shown in the table below. If the speed is higher than the end speed, the actual start value of Boost is the Boost setting value. The stock version changes with the full range of speed 0-64 degrees.

(so in the STOCK version, the timing of ordinary motors is not 0 degree. If you manually set the boost timing, the motor timing will exceed the limit of 64 degrees. Therefore, you must follow the warning setting showed above).

MOD Version Demo.

RPM	Boost actual value
<10000	0deg
10001-11000	1deg
11001-12000	2deg
12001-13000	3deg
13001-14000	4deg
14001-15000	5deg
>15000	5deg

14. Full Throttle Delay

Refers to the delay of the turbo starting. Turbo will be started only when the full throttle duration reaches the preset delay.

15. Boost Timing Acceleration

Boost Timing, RPM, indicates how much speed the motor increases, the ESC will increase by 1 degree Boost Timing. Accordingly, the lower the value is set, the faster the Boost Timing increment rate of the ESC, the more violent the motor starts, and the higher the temperature of the motor.

WARNING3 Turning on Boost timing and Turbo timing can effectively increase the output power of the motor, which is usually used in competitions.
Please check the manual and reference setting carefully in advance. Monitor the temperature of the motor and ESC during the testing run, and adjust the appropriate timing setting and correct gear ratio.
Excessive timing setting and incorrect gear ratio will cause the ESC or motor burned. The following table lists the recommended Boost and Turbo timing ranges for various motor turns.

MOD Version Demo.

Motor Turns	3.5T 4.0T	4.5T 5.5T	6.5T 7.5T	8.5T 9.5T	10.5T 11.5T	≥13.5T
Max. Boost Timing	0deg	0deg	5deg	10deg	16deg	16deg
Max. Turbo Timing	5deg	10deg	10deg	15deg	20deg	20deg

Because the greater the timing, the greater the power of the motor, and also the higher the heat generation of the motor. If you turn on too much timing at a lower motor speed, the motor will overheat severely and even burned.

Therefore, we adopted a dynamic timing method. At low speeds, a smaller timing is turned on. After the speed is increased, the timing will increase with the increase of the speed. By adjusting the initial speed and the acceleration of the timing, it can be realized that during the motor operation, the low speed corresponds to the low timing, and the high speed corresponds to the high timing.

STOCK Version Demo.

Correspondence table of speed and timing

The Timing(degree) in the table refers to item 9 in the programming parameter table. (Normal motors with non-mechanically adjustable 0 timing must have Boost timing set to 0 degrees, and the ESC will automatically increase the timing following the motor speed.)

Initial RPM=4000 Timing=200/deg.		Initial RPM=9000 Timing=200/deg.		Initial RPM=4000 Timing=200/deg.		Initial RPM=9000 Timing=400/deg.	
RPM	The Timing(deg.)	RPM	The Timing(deg.)	RPM	The Timing(deg.)	RPM	The Timing(deg.)
<4000	0	<9000	0	8800	24	18600	24
4200	1	9400	1	9000	25	19000	25
4400	2	9800	2	9200	26	19400	26
4600	3	10200	3	9400	27	19800	27
4800	4	10600	4	9600	28	20200	28
5000	5	11000	5	9800	29	20600	29
5200	6	11400	6	10000	30	21000	30
5400	7	11800	7	10200	31	21400	31
5600	8	12200	8	10400	32	21800	32
5800	9	12600	9	10600	33	22200	33
6000	10	13000	10	10800	34	22600	34
6200	11	13400	11	11000	35	23000	35
6400	12	13800	12	11200	36	23400	36
6600	13	14200	13	11400	37	23800	37
6800	14	14600	14	11600	38	24200	38
7000	15	15000	15	11800	39	24600	39
7200	16	15400	16	12000	40	25000	40
7400	17	15800	17	12200	41	25400	41
7600	18	16200	18	12400	42	25800	42
7800	19	16600	19	12600	43	26200	43
8000	20	17000	20	12800	44	26600	44
8200	21	17400	21	13000	45	27000	45
8400	22	17800	22	13200	46	27400	46
8600	23	18200	23	13400	47	27800	47

Please Note: For example, it is only set to 20 degrees if the set Boost timing is not to the maximum; When the speed is greater than the speed corresponding to the 20 degree timing, the timing is still 20 degrees.

MOD Version Power Demo.

1. Reference FDR: Both are the final gear ratio (FDR) of 1/10 car model under 2S lithium battery.
2. The program uses zero timing, and Boost and Turbo timing are not turned on. When the Boost and Turbo timing are turned on, the gear ratio generally needs to be increased accordingly.

Turns	KV	FDR (1/10 Touring)	FDR (1/10 Off-road)	Application
3.5T	9100KV	9.0 - 11.0		1/10 Touring Competition, Daily Practice
4.5T	7300KV	8.4 - 10.0		
5.5T	6000KV	8.0 - 9.4	9.5 - 11.0	1/10 Touring, Off-road Competition, Daily Practice
6.5T	5200KV	7.4 - 8.4	9.0 - 11.0	
8.5T	4000KV	6.0 - 7.0	8.0 - 9.6	1/10 Touring, Off-road STOCK Competition, Daily Practice
10.5T	3300KV	5.0 - 6.0	7.0 - 8.5	
13.5T	2500KV	4.0 - 5.0	6.5 - 7.5	
17.5T	1900KV	3.8 - 4.5	5.5 - 7.0	
21.5T	1600KV			Also apply to 1/10 Drift car, F1, M car etc.

2S Lipo, Motor Timing is 0-5 Deg.(Endbell Timing)
(Normal motors with non-mechanically adjustable 0 timing must have Boost timing set to 0 degrees, and the ESC will automatically increase the timing following the motor speed.)

STOCK Version Power Demo.

Car Type	Motor Turns	FDR	#9 Boost Timing	#10 Turbo Ramp	#11 Turbo Timing	#12 Boost Start RPM	#13 Turbo Delay	#14 Timing ACC
1:10 Touring	10.5T	6.0-7.5	30°-40°	18°/0.1s	15°-24°	4000	0.5s	350-500
	13.5T	5.0-7.0	34°-50°	18°/0.1s	20°-30°	3000	0.4s	200-300
	17.5T	5.0-7.0	34°-55°	18°/0.1s	20°-30°	3000	0.2s	150-300
1: 10 off-road (turbo is not recommended for off-road use)	11.5T	7.5-9.5	12°	6°/0.1s	4°	6000	Off	400-500
	13.5T	7.0-9.0	16°	6°/0.1s	8°	5000	Off	200-350
	17.5T	7.0-8.5	20°	6°/0.1s	12°	3000	Off	200-350

The size of the gear ratio depends on the specific track conditions. If the track is long straight and there are few corners, the gear ratio can be smaller to get more tail speed; if the track is short, the gear ratio should be larger to get more acceleration and make the cornering speed faster.

Fault Handles

Fault Phenomenon	Reason May Caused	Solution
The indicator light does not light up, the motor can't start, and the fan does not run	1. The ESC has no input voltage. 2. The ESC switch is damaged.	Check the power input path if in good welding conditions, and re-soldering.
Red LED light when motor connect to the power, the motor can't be started	The throttle cable of the ESC is plugged in the wrong way or the channel is plugged in the wrong way.	Plug the throttle cable into the "Throttle" channel (usually CH2) of the receiver in the correct direction.
The remote control increases the throttle in the forward direction, but the car reverses	1. The ESC output cable and the motor cable connection is wrong. 2. The motor steering of the frame is inconsistent with that of the mainstream frame	1. If it is a sensorless motor, just interchange any two of the three wires in the motor. 2. If it is a sensored motor, it can't be reversed by changing the wiring sequence, and the default program of the ESC can't be adapted to this special frame.
Suddenly stop when motor running	1. The receiver is interference with other signal. 2. The ESC enters the battery low voltage protection or temperature protection	The red LED flashes continuously for voltage protection, please replace the battery; The green LED flashes continuously for overheating protection, please wait for the ESC cool down and continue using it.
The motor is stuck or stopped when it is started and the throttle is increased quickly	1. Insufficient battery discharge capacity 2. The motor speed is too high and the reduction ratio is too small. 3. The setting of ESC start acceleration is too high	1. Replace the battery with strong discharge capacity. 2. Replace with a low-speed motor, or use a softer reduction ratio. 3. Set the ESC start acceleration (Punch) to be softer.
The red & green LED flash rapidly at the same time when the throttle at neutral position	When sensored motor is connected, the ESC detects an error in the hall sensor signal and has automatically switched to the sensorless mode	1. Check whether the induction wire is loose or has poor contact. 2. The Hall sensor inside the motor is damaged.
Motor shake and can't be started	1. The wiring between the ESC and the motor is wrong. 2. ESC failure	1. Check whether the wiring is correct, make sure it is A-A, B-B, C-C. 2. Contact the agent to deal with maintenance matters.