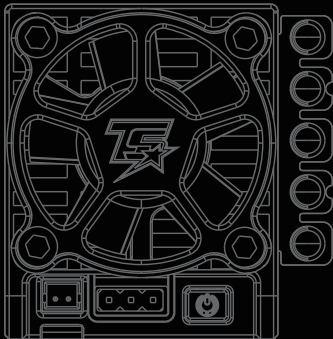




TS 160

使用说明书
User Manual



TURNIGY®
power systems

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01

注意事项

- 1.电调与相关连接部件连接前，请确保所有电线和连接部件绝缘良好，短路会损坏电调。
- 2.请务必仔细连接好各部件，若连接不良，您可能不能正常控制赛车，或出现设备损坏等不可预知的情况。
- 3.使用电调前，请认真查看各动力设备以及车架说明书，确保动力搭配合理，避免因错误的动力搭配导致电机超载，最终损坏电调。
- 4.若需对电调的输入输出线、插头做相关焊接时，为保证焊接牢靠，请使用至少60W功率的焊接设备进行焊接。
- 5.高速运行中，因车子轮胎会“膨胀”到极致，故而请勿将车子腾空后加至全速，否则，轮胎可能爆裂而引起严重伤害。
- 6.请勿将电调或者电机放置外部温度超过90°C/194°F，高温将会损坏电调、电机。
- 7.使用完毕后，切记切开机与电调的连接。如电池未断开，即使电调开关处于关闭状态，电调也会一直消耗电能，长时间连接电池最终也会被完全消耗电能，进而导致电池或电调出现故障。我们不对因此而造成的任何损害负责。

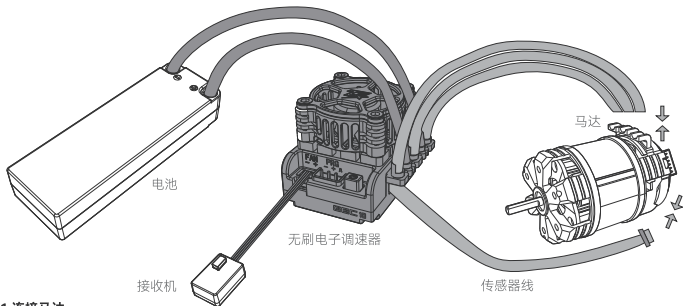
02

产品特色

- 1.顶级竞赛专用：内置三种常用模式，适合所有1/10竞赛，即选即用。
- 2.电调内置34项丰富的可调参数项，方便设置各种动力需求；设定参数可以导入导出，便于车手相互交流和借鉴彼此的设定。
- 3.支持超大64度boost及turbo进角。
- 4.多重保护功能：电压过低保护、电调及电机过热保护。
- 5.内置超强开关模式BEC，持续电流达到5A，瞬间达到8A，且支持6V/7.4V可调，轻松驱动各种强力舵机及高压舵机。
- 6.离线数据记录功能，可以通过LCD设定盒读取电调和电机的最高温度，最高转速等极值数据。
- 7.内置专业倒车关机功能，只在正向带刹车、正反转带刹车模式启用。使用方式为：倒车第一下全油门保持6s，即可关机。

型号	TS 160
持续/峰值电流	160A/1100A
支持电机类型	无感无刷电机、有感无刷电机
主要适用车型	1/10电房/电越/卡车的专业竞赛
电池节数	2S Lipo
BEC输出	超稳定电压6V/7.4V，持续电流5A， 峰值电流8A（开关稳压方式）
风扇取电方式	从内置BEC取得稳定的6V/7.4V供电
尺寸/重量	38.6（长）*37.8（宽）*32.2（高）mm/57.5g
参数设定方式	编程盒

请参照说明及接线图正确接线：



1.连接马达：

连接有感无刷马达与无感无刷马达的方式差异，请务必遵照如下接线方式：

选项一、连接有感无刷马达时：

电调与马达连接有严格的线序要求，电调的#A/#B/#C/必须与电机的#A/#B/#C三线严格——对应，用六针感应线把电调与电机的感应接口对接。

备注：若装上电机后，车子前进与后退反向，请更改参数“电机转动方向”，实现电机转向调整。

选项二、连接无感无刷马达时：

电调与马达相连无严格的线序要求，电调的#A/#B/#C可以与电机的三线随意对接，若出现转向相反，任意交换两条马达线即可。

2.连接接收机：

将电调的油门控制排线插入接收机的油门通道（即THROTTLE通道）。因为排线中的供电线输出6V/7.4V电压给接收机及舵机，所以请勿给接收机额外供电，否则可能损坏电调。

3.连接电池

电调的输入线有极性之分，插入电池时，请确保电调的（+）极与电池的（+）相连，（-）极与（-）极相连，如果电调与电池接反，电调将无法开机。

05

设置电子调速器

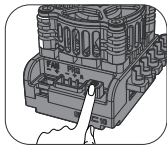


本系统功率强劲，为了您及周边他人的安全，我们强烈建议您在校准及设定该系统前拆下电机小齿，并在车轮悬空的情况下开启电调开关！

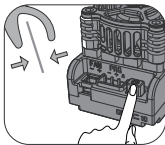
1 设定油门行程

电调第一次使用或遥控器更改过油门“TRIM”微调、D/R、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误动作。另外我们强烈建议同时开启遥控器的失控保护功能，将遥控器油门通道的无信号保护（“F/S”）功能设置为关闭输出方式或将保护值设置为油门中立点位置，使得当接收机无法收到遥控器信号后，电机能够停止运转。

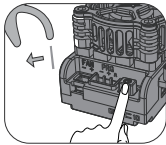
油门校调步骤如下图所示：



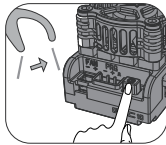
将电调处于关机状态，长按电源键，直至发出滴的一声鸣音后松开。



将油门扳机处于油门中位，短按一下电源键，电调鸣音1声。



将扳机处于正向全油门，短按一下电源键，电调鸣音2声。



将扳机处于反向全油门，短按一下电源键，电调鸣音3声。

将电调处于关机状态，长按电源键，直至发出滴的一声鸣音后松开，这时电调处于遥控待设置状态，将油门扳机处于油门中位，短按一下电源键，电调鸣音1声，将扳机处于正向全油门，短按一下电源键，电调鸣音2声，将扳机处于反向全油门，短按一下电源键，电调鸣音3声。

2 开关机及鸣音说明

1) 开关机说明:

关机状态下短按ON/OFF键开机；开机状态下长按ON/OFF键关机

2) 开机鸣音说明:

在正常情况下开机，电机发出几声“哔”鸣音表示锂电节数。例如：“哔哔”表示2节锂电，“哔哔哔”表示3节锂电。

3 编程项目说明

类别	设定项目名称	设定项值		
一般设置	运行模式	正转带刹车	正反转带刹车	直接正反转
	最大倒车力度	25%-100% (调整量为1%)		
	低压保护阈值	不保护	自动 (3.5V/节)	自定义4.0V-7.4V (可调0.1V)
	电调过热保护	不保护	保护	
	电机过热保护	不保护	保护	
	BEC电压	6.0V	7.4V	
	遥控关机	关闭	开启	
	驱动马达模式	全有感模式	有感/无感混合模式	
	电机转动方向	逆时针	顺时针	
	AC线交换	关闭	开启	

油门控制

正向油门分段点	30% - 70%（调整量为1%）				
油门前段加速度	1~30可调（可调量为1）				
油门后段加速度控制	1~30可调（可调量为1）				
正向油门曲线	线性	自定义			
油门中点范围	6%	8%	10%		
初始启动力度	1%~15%（可调量为1%）				
自动油门/滑行	0%~30%（可调量为1%）				
柔化值	0-30°（可调整量1°）				
柔化行程	0%~75%（可调量为1%）				
运行驱动频率	1K	2K	4K	8K	16K

刹车

刹车模式	缓刹车	重刹车
拖刹力度	0%-100%	
最大刹车力度	0%-150%（可调量为1%）	

设置

初始刹车力度 0%-50% (可调量为1%) =拖刹力度

刹车加速度控制 0-20 (可调量为1)

刹车频率 0.5K 1K 2K

Boost 进角 0-64° (可调整量为1°)

Boost起始转速 1K-20K (调整量为1K)

进角设置

Boost结束转速 8K-50K (调整量为1K)

变进角控制 转速 自动

Turbo 进角 0-64° (可调整量为1°)

Turbo全油门延时 0-1s可调 (调整量为0.05s) 立即

Turbo 释放速度 0-64° (可调整量为1°/0.1秒) 立即

Turbo 关闭速度 0-64° (可调整量为1°/0.1秒) 立即

恢复出厂设置

1、运行模式 (Running Mode) :

选项1: 正转带刹车 此模式下, 车辆仅能前进和刹车, 但不能倒车, 该模式通常用于竞赛。

选项2: 正反转带刹车 此模式则提供了倒车功能, 通常用于训练。“正反转带刹车”模式采用的是智能倒车方式, 当油门扳机第一次从中点区域推至反向区域时, 电机将产生刹车, 当油门扳机回到中点区域并第二次推至反向区域时, 如果此时电机已停转, 则产生倒车动作, 如果电机未停转, 仍是刹车, 需要再次将油门扳机回到中点并推至反向区域。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。

选项3: 直接正反转 此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, 该模式一般用于特种车辆。

2、最大倒车力度(Max. Reverse Force):

指油门摇杆打到反向最大的位置所能产生的最大倒车力度, 选择不同的参数值可以产生不同的倒车速度 (一般情况下推荐使用比较小的倒车速度, 避免因倒车太快而导致失误)。

3、电池低压保护阈值 (Cutoff Voltage) :

这项功能主要是防止锂电池过度放电而造成不可恢复的损坏。电调会时刻监视电池电压, 一旦电压低于设定的阈值, 电调立即将动力降为20%, 当进入电压保护后, 红色 LED 会以“☆☆, ☆☆, ☆☆, ☆☆.....”持续双闪, 若使用NiMH 电池, 请设为“不保护”或自定义保护阈值。

选项1: 不保护 设为不保护时, 电调不会因为低压而切断动力。使用锂电时, 不建议设为“不保护”, 否则电池可能因为放电过度而损坏。比赛时为了避免进入保护状态而导致动力下降, 建议设置为“不保护”(但有可能因为过放而损坏电池)。

选项2: 自动 电调自动根据检测到的锂电节数, 按 $3.5V/Cell$ 算出对应的低压保护阈值, 如检测使用2S时, 低压保护阈值为 $3.5 \times 2 = 7.0V$ 。

选项3: 自定义 自定义设置时, 低压保护阈值范围为 $4V-7.4V$ (调整量 $0.1V$), 这里的电压值是针对整个电池组而言, 即总的输入电压。请根据使用电池的节数算出你需要的低压保护阈值, 自定义值可随意设定值, 最低可设为 $4V$, 最高可设定 $7.4V$ 。注意设定值时不可设定超出供电电压上限值。

4、电调过热保护 (ESC Thermal Protection) :

电调升温达到厂方预设特定值时自动关闭输出, 且红灯闪烁, 直到温度降低才恢复输出。电调过热保护时, 红灯闪烁方式为三闪: ☆☆☆, ☆☆☆, ... 警告! 若非比赛场合, 请勿关闭电调过热保护, 否则可能因为过热而损坏电调, 并且可能导致电机损坏。

5、电机过热保护 (Motor Thermal Protection) :

电机温度上升达到厂方预设特定值时电调自动关闭输出, 且红灯闪烁, 直到电机温度降低才恢复输出。电机过热保护时, 红灯闪烁方式为四闪: ☆☆☆☆, ☆☆☆☆, ... 警告! 若非比赛场合, 请勿关闭电机过热保护, 否则可能毁坏电机并且导致电调损坏。

6、BEC输出电压 (BEC Voltage) :

BEC电压支持6.0/7.4V两档可调, 一般6.0V适用于普通舵机; 若使用高压舵机可设置为更高电压, 具体设置电压请参照舵机电压标识; 警告! 设置的BEC电压请勿超过舵机最高工作电压, 否可能损坏舵机, 甚至损坏电调!

7、遥控关机 (Remote Off) :

设为“Enable”时, 开启使用遥控器端关闭电调功能, 操作方式油门摇杆最大刹车行程维持约6秒, 电调会关闭; 设为“Disable”时, 关闭该功能。

8、驱动马达模式 (Sensor Mode) :

选项1: 纯有感模式若使用配套电机时, 可设为纯有感驱动模式, 整个动力系统全工作于有感模式, 操控手感更好、运行效率更佳, 且可以使用Boost、Turbo进角功能, 在需要时可获得爆发的动力。

选项2: 有感无感混合模式。车子在低速运行时, 电调采用有感方式启动马达, 马达转速增高后, 电调切换为无感方式驱动马达。

9、电机转动方向 (Motor Rotation) :

电机轴正面朝向面部 (即电机尾部远离面部), 遥控器正向加大油门时, 若设置成 CCW, 电机轴逆时针转动; 若设置成 CW, 电机轴顺时针转动。一般电机逆时针转动, 车子前进, 但有可能因车架厂家设计为顺时针转动才是前进, 出现此情况时, 设置成CW即可。

10、AC线交换 (Phase-AC Swap):

因车架布线需要，电调A/C线与电机A/C线交换连接（即电调A线与电机C线连接，电调C线与电机A线连接）时，把此项设为开启(Enabled)即可；警告！电调的#A/#B/#C与电机的#A/#B/#C三线——对应连接时，请勿设为开启(Enabled)，否则将损坏电调及电机。

11、正向油门分段点 (Punch Sw Point) :

该参数调整正向油门的前段加速度和后段加速度的区分点。当油门量程小于该分段点时，系统使用前段加速度；油门量程大于该分段点时，系统自动切换使用后段加速度。

12、油门前段加速度 (Punch Rate1 Start) :

此参数用于控制前段油门输出快慢，设置适合的前段油门加速度可以辅助车手在车辆启动时对油门的控制，避免当快速加油时，出现轮胎打滑、启动过于暴力造成弯内不好控制、启动瞬间电流过大而对电机/电调/电池不利等结果。加速度我们分为30个档位可调整，当设为1时，则前段油门加速较慢，对于快速加油门时的输出有较多的限制；设置值越大，则加速越快，对前段油门输出的限制越少。一般情况下，对于能够熟练控制油门的车手，可以设置较高的加速度，以减小电调对油门响应的限制。

13、油门后段加速度 (Punch Rate2 End) :

此参数用于控制后段油门输出快慢，设置适合的后段油门加速度可以辅助车手在车辆启动时对油门的控制，避免当快速加油时，出现轮胎打滑、启动过于暴力造成弯内不好控制、启动瞬间电流过大而对电机/电调/电池不利等结果。加速度我们分为30个档位可调整，当设为1时，则后段油门加速较慢，对于快速加油门时的输出有较多的限制；设置值越大，则加速越快，对后段油门输出的限制越少。一般情况下，对于能够熟练控制油门的车手，可以设置较高的加速度，以减小电调对油门响应的限制。

14、正向油门曲线 (Throttle Curve) :

该参数调整正向油门摇杆和电调实际输出油门值之间的对应关系。默认是为线性的，线性状态下，动力输出跟随油门。

15、油门中点范围 (Neutral Range) :

该参数调整油门中点区域范围以适合不同的遥控器和车手操控习惯。有些品质欠佳的遥控器中点位置容易漂移，导致车子缓慢前进或后退，出现此现象时，请把区域宽度设成更大值。

16、初始启动力度（Initial Throttle Force）：

也叫做最小启动力度，是指在油门初始位置作用于电机上的启动力，可根据轮胎、场地抓地力设置需要的启动力度；如果场地太滑，请设置较小的启动力度，以免打滑。

17、自动油门/滑行（Coast）：

从全油门或近全油门处松开油门扳机时，该功能允许电机自然平滑地降低转速，在扳机松开过程中车子不会出现突然减速。“自动油门”设置的值越大，“滑行”感就越强烈。例如，设置到0%时，无自动油门或滑行功能；设置到20%时，感受到的滑行感最为强烈。自动油门/滑行的优势：当使用齿槽效应很强的电机时，车子容易自主产生一种刹车感，也就是大家所知的“齿轮刹车或自动刹车（GEAR BRAKE）”，这降低了车辆的操控感。**备注：若“拖刹力度”参数值非0%，则自动油门/滑行功能关闭。**

18、柔化值（Softening Value）：

在比赛中，若觉得油门头段动力过于暴力，油门给一点点动力就已经过强，在过弯中很不易操控，可将柔化值设大，将头段的动力特殊柔化处理，可极大的提高车手操控性，“柔化值”是指柔化处理的强度大小，此值设置得越大，则柔化效果越明显。

19、柔化行程（Softening Range）：

是指产生柔化效果的油门行程大小，例如设置为30%，则是指油门从0%--30%这段油门行程将会产生柔化效果。

20、运行驱动频率（PWM Drive Freq）：

驱动频率降低，在油门初段可以提供更强劲的爆发力；驱动频率升高可以使马达驱动更平滑，驱动噪音更小，但同时也导致电调的开关损耗加大，发热量增加。具体使用频率，请以车子在车场实测效果为准。

21、刹车模式（Brake Control）：

刹车模式分为两种：一种为娱乐型缓慢刹车，一种竞赛型手感十足的重刹车。

22、拖刹力度（Drag Brake Force）：

拖刹又名自动刹车，是指当油门摇杆收油后处于中点区域内时，电调对电机产生的刹车力，这样做可以辅助手指去控制刹车，有效降低刹车的控制难度，常用于平跑车减速入弯及出弯等场合。

23、最大刹车力度 (Max. Brake Force) :

本电调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时所产生的刹车力。请根据车辆和赛道具体情况及个人的使用习惯，选择合适的最大刹车力参数。

24、初始刹车力度 (Initial Brake Force) :

也叫做最小刹车力度，是指在刹车初始位置作用于电机上的刹车力，默认值是等于拖刹力度，以便形成柔顺的刹车效果，如果初始刹车力设置得较大，可以达到类似点刹的效果。

25、刹车加速度控制 (Brake Rate Control) :

这个参数用于控制刹车油门输出快慢。设置适合的刹车油门加速度则可以辅助车手对刹车力度的控制，避免刹车过猛。加速度我们分为20个档位可调整，当设为1时，则对刹车响应有较多的限制。设置值越大，对刹车油门的限制越少。一般情况下，对于能够熟练控制刹车的车手，可以设置较高的加速度，以减小电调对刹车油门响应的限制。

26、刹车频率 (Brake Frequency) :

刹车频率降低可以使马达输出更强劲的刹车力度：刹车频率升高可以使马达输出更平滑的刹车力度，具体使用频率，请以车子在车场实测效果为准。

27、Boost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油门量而动态变化的，并非固定的常量。

28、变进角起始转速 (Boost Start RPM) :

此项用于设置开启Boost进角所需的起始转速。例如，设为8000时，转速达到8000以上则会开启相应的进Boost进角，具体开启大小根据所设Boost进角及结束转速动态分配。

29、变进角结束转速 (Boost End RPM) :

此项用手设置开启当前所设Boost进角所需的结束转速。例如。Boost进角设置为10度，结束转速设置为15000时，转速达到15000以上时，Boost则会开启10度，转速低于15000转时，则根据转速动态分配Boost进角大小。

30、变进角控制 (Boost Control) :

选项1: 转速 设为“转速”方式时，Boost进角值根据当前的转速来动态分配。当转速低于起始转速时，则Boost 实际开启值为0，当转速高于起始转速时，则Boost实际开启设置值。

选项2：自动 设为“自动”方式时,Boost进角值根据当前油门量来动态分配,只有全油门时,Boost实际开启值才为Boost设置值。

31、Turbo 进角值 (Turbo Timing) :

激爆进角。这个是进角的大小设置项,只有在全油门时才会开启,通常用于较长的直道上,释放出马达的最大功率。

32、Turbo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。当持续全油门的时间达到此设定值后,才能触发Turbo 开启。

33、Turbo 释放速度 (Turbo Increase Rate (deg/0.1sec)) :

当Turbo 触发条件满足后, Turbo开始以此设定的速度开始释放, 例如, “6度/0.1秒”表示0.1秒内释放6 度的Turbo 进角值。0.1秒内释放的度数越多, 则Turbo释放得越快, 车子加速度也越快, 当然马达的发热量也越高。

34、Turbo 关闭速度 (Turbo Decrease Rate (deg/0.1sec)) :

当Turbo 被开启后, 如果触发条件不满足后, 比如直路尾减速入弯, 这时从全油门变为非全油门, Turbo开启条件不满足, 如果瞬间将Turbo全部关闭, 将会产生一个非常明显的减速, 如同被刹车一样, 导致车子操控性变差。如果以一定的速度关闭Turbo, 则降速会变得比较线性, 车子的操控性得到提升。警告! 开启Boost 进角和Turbo进角能够有效提升马达的输出功率, 通常用于竞赛。请事先仔细查看说明书及参考设定, 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最终齿比, 过激的进角设定及最终齿比会导致电调或马达烧毁。

注意! 与Turbo进角相关的设置项只有在驱动模式设为“纯有感模式”并且Hall连接时才有效。

注意! 与Turbo进角相关的设置项只有在驱动模式设为“纯有感模式”时才有效。

4 预设模式适用场合

为了让一个程序就能快速适用各种应用场合, 该电调内预设了3组常用模式。一般情况下, 客户只需直接调用相关的模式, 然后根据不同马达搭配合适的齿比, 即可满足一般使用要求, 即插即用, 而不必 仔细研究各个参数的实际功能。当然用户也可以根据自己的操控习惯及场地等因素更改各个模式的设置。

预设模式适用场合:

模式编号	模式名称	适用场合
1	Custom Timing	适用于规定电调使用无进角闪灯程序的各类STOCK竞赛
2	1/10 Off-Road	适用于1/10 越野/卡车竞赛
3	1/10 On-Road	适用于1/10平路类竞赛

5 编程方法



注意！ 此电调编程接口为独立编程口；不要使用电调上的油门控制线连接编程盒，否则编程盒无法工作。

LCD编程盒进行参数设置：（详情请参阅LCD参数编程盒说明书）此电调支持使用LCD编程盒设置参数，用3pin排线将电调和编程盒连通后，然后给电调接上电源，LCD 设定盒将显示出开机界面，按LCD设定盒上任意按键，设定盒和电调开始建立通信，并显示“CONNECTING ESC PLEASE WAIT”，等待几秒后，将显示出当前的模式名，随后显示出第一个设置参数。使用“ITEM”和“VALUE”按键即可更改设置参数，按“OK”键可将设置参数存入电调。

6 恢复出厂参数设定

连接LCD盒后，通过“ITEM”选择恢复出厂设置“Restor Default”，然后再按下“OK”保存，等待2s即可恢复出厂设置。

06

电调状态指示灯（LED）说明

1 启动阶段

无控信号，绿灯闪烁1下，同时鸣笛1声

2 行程阶段

低电压， 红灯闪烁2下，同时鸣笛2声
ESC 过温， 红灯闪烁3下，同时鸣笛3声
电机 过温， 红灯闪烁4下，同时鸣笛4声
电机 过流， 红灯闪烁5下，同时鸣笛5声

07

故障快速处理

故障现象

可能原因

解决方法

上电后指示灯不亮，电机无法启动，风扇不转

- 1、电池电压没有输入到电调
- 2、电调开关损坏
- 3、电调正负极接反

- 1、检查连接线是否有不良，焊点是否不良。
- 2、更换开关
- 3、调整正负极

上电后，锂节检测后（绿灯快闪后，绿灯一直单闪，并且电机发出一声鸣音）。

- 1、电调未检测到油门信号
- 2、电调油门中点与遥控器不匹配

- 1、检查油门线是否插反、通道是否插错、控是否有开启。
- 2、油门摇杆归中位，重新校准油门行程。

遥控器正向加大油门，车子反而倒退

该车架同主流车架的电机转向不一致

把电机转向设置设为“CW顺时针”。

电机转动过程中，突然停转或功率输出显著降低

- 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

- 1、检查接收机出现干扰的原因，检查发射器电池电量。
- 2、红灯间隔闪烁2次为电压保护，请更换电池。
- 3、红灯间隔闪烁3次为温度保护，请等电调\电机温度降低后继续使用。

电机抖动，无法启动

- 1、电调和电机连接的插头有虚焊或AC线互换。
- 2、电调故障（部分功率管MOSFET烧坏）

- 1、检查各焊接点，必要时重新焊接，AC线互换。
- 2、联系购货商处理维修事宜。

前进正常，但无法倒车

- 1、遥控器油门通道中点偏离到刹车区域
- 2、参数项“运行模式”设置错误
- 3、电调损坏

- 1、重新校调油门通道中点，使遥控器油门摇杆置于中位时，电调上的指示灯不亮
- 2、参数项“运行模式”需设置为“正反转带刹车”
- 3、联系购货商处理维修事宜。

连接LCD参数设定盒，一直显示
“CONNECTING ESC”

- 1、未正确使用电调编程接口
- 2、电调油门未归零

- 1、使用正确的接口连接LCD设定盒
- 2、将电调重启后重新连接LCD参数盒

设定油门行程时，按下SET键设中点时，绿灯不闪且无“哔”音，或设完中点后，无法设置正向及反向最大点

- 1、电调油门线未插到接收机正确的通道
- 2、电调油门线插反。
- 3、油门正反向行程设定没有设置到100%。

- 1、将油门线插到接收机标示的TH通道。
- 2、查看接收机标示顺序正确插入。
- 3、油门正反向行程设定为100%。

1. Before connecting the ESC to the relevant connection parts, please make sure that all the wires and connection parts are well insulated. A short circuit will damage the ESC.
2. Please be sure to connect all parts carefully. If the connection is not good, you may not be able to control the car normally, or unpredictable situations such as equipment damage may occur.
3. Before using the ESC, please carefully review the power equipment and the manual of the chassis to ensure that the power configuration is reasonable, this to avoid overloading the motor due to wrong power configuration and eventually damage the ESC.
4. If you need to weld the input and output wires and plugs of the ESC, to ensure reliable welding, please use welding equipment with a power of at least 60W.
5. During high-speed operation, the tires of the car will "inflate" to the extreme, so please do not drive the car unnecessarily to full speed, the tires may burst and cause serious injury.
6. Do not place the ESC or motor where the external temperature exceeds 90°C/194°F. High temperature will damage the ESC and motor.
7. After use, remember to cut off the connection between the battery and the ESC. If the battery is not disconnected, the ESC will continue to consume power even if the switch of the ESC is turned off. If the battery is connected for a long time, the left-over energy will eventually be completely consumed, which will cause the battery or the ESC to malfunction. We are not responsible for any damage caused thereby.

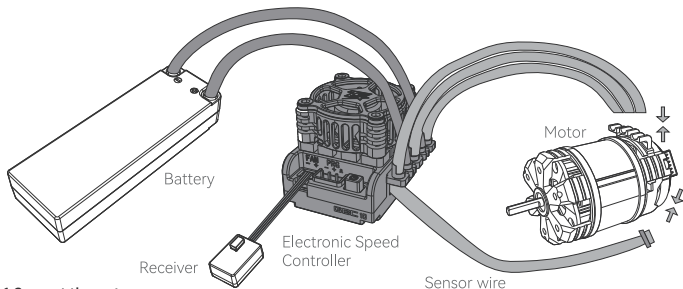
1. Dedicated to the top competition levels: three built-in commonly used modes, suitable for all 1/10 competitions, ready to use.
2. The ESC has built-in 34 adjustable parameters, which are convenient for setting various power requirements; the setting parameters can be imported and exported, which is convenient for drivers to communicate with each other and learn from each other's settings.
3. Support super large 64-degree boost and turbo timing.
4. Multiple protection functions: low voltage protection, ESC and motor overheat protection.
5. Built-in super switching mode BEC; the continuous current reaches 5A, and the peak current reaches 8A, as well 6V/7.4V adjustable BEC output to adapt to various high power servo and high-voltage/speed servo.
6. With the offline data recording function, you can save the recorded operational value data such as the maximum temperature and maximum speed of the ESC and motor through the LCD setting box.
7. Built-in professional reversing shutdown function, which is only enabled in forward with brake and forward and reverse with brake modes. The user method: when reversing the first time, hold to full brake for 6s, then the ESC will turn off.

Model	TS 160
Continuous/Peak Current	160A/1100A
Support motor type	Sensored and sensorless brushless motor
Suggested application	1/10 electric buggy 2WD/4WD, professional competition touring cars
Number of battery cells	2S Lipo
BEC output	Ultra-stable switch V regulation 6V/7.4V; cont. current 5A/8A peak
Fan power	6V/7.4V from the built-in BEC
Size/weight	38.6 (L) * 37.8 (W) * 32.2 (H) mm / 57.5g
Parameter setting method	Programming box

04

Sensor less brushless motor, sensored brushless motor

Please refer to the instructions and wiring diagram for correct wiring::



1.Connect the motor:

There are differences in the way to connect the sensor brushless motor and the sensorless motor, please be sure to follow the wiring method as follows:

Option 1. When connecting a sensor brushless motor:

The ESC and the motor have strict wire sequence requirements. The #A/#B/#C/ of the ESC must be in strict one-to-one correspondence with the #A/#B/#C/ of the motor. Use a six-pin sensor wire to connect the ESC sensor connector with the sensor interface of the motor.

Remarks: If the car moves forward and backward after the motor is installed, please change the parameter "rotation direction of the motor" to adjust the direction of the motor.

Option 2. When connecting a sensorless brushless motor:

There is no strict wire sequence requirement for connecting the ESC to the motor. The #A/#B/#C of the ESC can be freely connected to the three wires of the motor. If the direction of rotation is reversed, just exchange position of two of the three motor wires (AB to BA, AC to CA, BC to CB)

2.Connect the receiver:

Insert the throttle control cable of the ESC into the throttle channel of the receiver. Because the red wire in the cable outputs 6V/7.4V voltage to the receiver and steering gear, please do not provide additional power to the receiver, otherwise it may damage the ESC.

3.Connect the battery

The input wire of the ESC has polarity. When inserting the battery, please make sure that the (+) pole of the ESC is connected to the (+) pole of the battery, and the (-) pole is connected with the (-) pole. If the ESC is connected to the battery cross connected, the ESC will not be able to power on.

05

Setting up the ESC

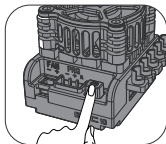


The power of this system is very high. For the safety of you and others around you, we strongly recommend that you remove the small gear of the motor before calibrating and setting the system, and turn on the ESC switch with the wheels suspended!

1 Calibration

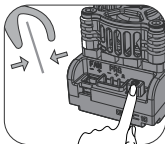
Switch on ESC: Push button short time and release = 2 beeps; ESC is switched on and ready Calibrate ESC in 4 steps:

Throttle calibration steps are shown in the figures below:



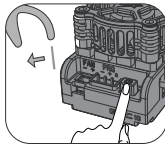
Step 1

Push button more than 5 seconds and release = one large beep followed by multiple short beeps; ESC is ready to start calibration.



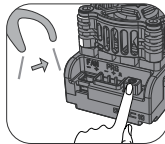
Step 2

Neutral Point calibration = short press the power on button; esc confirms with 1 short beep.



Step 3

Throttle High point calibration = pull and hold the throttle lever on full power, then short press power on button; esc confirms with 2 short beep.



Step 4

Brake High point full calibration = push and hold the brake lever on full brake, then short press power on button; esc confirms with 3 short beeps, and 2 normal beeps.

With the ESC turned off, press and hold the power button until there is a beep and release it. At this time, the ESC is in the state of remote control waiting to be set. Put the throttle trigger in the middle position of the throttle, short press the power button, and the ESC beeps. 1 beep, put the trigger at full throttle in the forward direction, short press the power button, the ESC beeps 2 times, put the trigger at full throttle in the reverse direction, short press the power button, and the ESC beeps 3 times.

2 Instructions for switching on and off and beeping

1) Instructions switch on and off:

Short press the ON/OFF button to turn it on when it is off; press and hold the ON/OFF button to turn it off when it is on.

2) Instructions for beeps when starting up:

When starting up under normal conditions, the motor will emit a few beeps to indicate the number of lithium battery cells (S). For example: "beep beep" means 2S lithium cells, "beep beep beep" means 3S lithium cell.

3 Programming options

Type	Items	Setting Options		
General Settings	Running Mode	Fwd/Brk	Fwd/Rev/Brk	Fwd/Rev
	Max.Reverse Force	25%~100% (Adjust Step 1%)		
	Cutoff Voltage	Disable	Auto (3.5V/cell)	Customized 4.0V~7.4V (Adjust Step 0.1V)
	ESC Thermal Protection	Disable	Enable	
	Motor Thermal Protection	Disable	Enable	
	BEC Voltage	6.0V	7.4V	
	Remote off	Disable	Enable	
	Sensor Mode	Full Sensored	Hybrid	
	Motor Rotation	CCW	CW	
	Phase-AC Swap	Disable	Enable	
	Punch Sw Point	30%~70% (Adjust Step 1%)		
	Punch Rate1 Start	1~30 (Adjust Step 1)		
	Punch Rate2 End	1~30 (Adjust Step 1)		

Throttle Control

Throttle Curve	Linear		Customized		
Neutral Range	6%		8%	10%	
Init Throttle Force	1%-15% (Adjust Step 1%)				
Coast	0%-30% (Adjust Step 1%)				
Softening Value	0-30° (Adjust Step 1°)				
Softening Range	0%-75% (Adjust Step 1%)				
PWM Drive Freq	1K	2K	4K	8K	16K

Brake Setting

Brake Control	Slowly	Heavy	
Drag Brake	0%-100% (Adjust Step 1%)		
Max. Brake Force	0%-150% (Adjust Step 1%)		
Init Brake Force	0%-50% (Adjust Step 1%)	Drag Brake	
Brake add Rate	0-20 (Adjust Step 1)		
Brake Frequency	0.5K	1K	2K

Timing Setting

Boost Timing	0-64° (Adjust Step 1°)	
Boost Start RPM	1K-20K (Adjust Step 1K)	
Boost End RPM	8K-50K (Adjust Step 1K)	
Boost Control	RPM	Automatic
Turbo Timing	0-64° (Adjust Step 1°)	
Turbo Delay	0-1s (Adjust Step 0.05s)	Instant
Turbo Increase Rate	0-64° (Adjust Step 1deg/0.1s)	Instant
Turbo Decrease Rate	0-64° (Adjust Step 1deg/0.1s)	Instant

Restore Default

1、Running Mode:

Option 1: Forward with Brake Racing mode. It has only forward and brake functions, as used in professional competition racing. Reverse mode is disabled.

Option 2: Forward/ Reverse with Brake This mode provides a reverse function and is usually used for training. The "forward and reverse with brake" mode adopts the intelligent reverse mode. When the accelerator trigger is pushed from the midpoint area to the reverse area for the first time, the motor will brake. When the

accelerator trigger returns to the midpoint area and is pushed to the In the reverse zone, if the motor has stopped at this time, a reverse action will occur. If the motor has not stopped, it is still braking, and the accelerator trigger needs to be returned to the midpoint and pushed to the reverse zone. The purpose of doing this is to prevent accidental reversing due to multiple point brakes during vehicle driving.

Option 3: Direct forward and reverse This mode adopts single-click reverse mode, that is, when the throttle stick is pushed from the midpoint area to the reverse area, the motor will immediately generate a reverse action. This mode is generally used for special vehicles like crawler.

2、Max. Reverse Force:

It refers to the maximum reverse force that can be produced when the throttle stick is pushed to the maximum reverse position. Different parameter values can be selected to produce different reverse speeds (generally, it is recommended to use a relatively small reverse speed to avoid mistakes due to too fast reverse).

3、Cutoff Voltage:

This function is mainly to prevent irreversible damage caused by excessive discharge of lithium batteries. The ESC will monitor the battery voltage at all times, once the voltage is lower than the set threshold, the ESC will immediately reduce the power to 20%. After entering the voltage protection, the red LED will continue to flash with "☆, ☆, ☆, ☆...". If you use NiMH batteries, please set it to "no protection" or customize the protection threshold.

Option 1: No protection When set to no protection, the ESC will not cut off the power due to low voltage. When using a lithium battery, it is not recommended to set it to "Unprotected", otherwise the battery may be damaged due to excessive discharge. In order to avoid the power drop caused by entering the protection state during the competition, it is recommended to set it to "no protection" (but the battery may be damaged due to over-discharge, which will lead to cell inflation).

Option 2: Auto detection The ESC automatically calculates the corresponding low-voltage protection threshold according to 3.5V/Cell according to the detected number of lithium cells. For example, when the detection uses 2S, the low-voltage protection threshold is $3.5 \times 2 = 7.0V$.

Option 3: Custom When customizing Settings, the low voltage protection threshold ranges from 4V to 7.4V (adjusted value 0.1V), where the voltage value is for the entire battery pack, that is, the total input voltage.

Please calculate the low voltage protection threshold you need according to the number of batteries used. The custom value can be set at will. The minimum value can be set to 4V, the maximum value can be set to 7.4V.

4、**ESC Thermal Protection:**

When the temperature rise of the ESC reaches a specific value preset by the factory, the output will be automatically turned off, and the red light will flash, and the output will not resume until the temperature drops. When the ESC is under overheating protection, the red light flashes three times: ☆☆☆, ☆☆☆, ... Warning! Do not turn off the overheating protection of the ESC unless it is a competition occasion, otherwise the ESC may be damaged due to overheating, and the motor may be damaged.

5、**Motor Thermal Protection:**

When the motor temperature rises to a certain value preset by the factory, the ESC will automatically turn off the output, and the red light will flash, and the output will not resume until the motor temperature drops. When the motor is overheated, the red light flashes in quads flashes: ☆☆☆☆, ☆☆☆☆, ... Warning! Do not turn off the motor overheating protection unless it is a competition occasion, otherwise the motor may be damaged and the ESC may be damaged.

6、**BEC Voltage:**

BEC voltage support 6.0V/7.4V adjustable, generally 6.0V is suitable for ordinary steering gear; If the high voltage steering gear is used, it can be set to a higher voltage. For details, please refer to the steering gear voltage label; Warning! The BEC voltage set should not exceed the maximum operating voltage of the steering gear, or it may damage the steering gear and even damage the electrical regulation!

7、**Remote Shutdown:**

The radio throttle can shut down the ESC, by holding the throttle stick at full brake for approximately 6 seconds. This function can be enabled/disabled in the APP.

8、**Sensor Mode:**

Option 1: Pure sensor mode. If you use the matching motor, you can set it as a pure sensor drive mode. The entire power system works in the sensor mode throughout the whole process, with better control feel and better operating efficiency. And you can use the Boost and Turbo timing functions to get more explosive power when needed.

Option 2: Sensor and sensorless Hybrid Mode. When the car is running at a low speed,

the ESC uses the sensor mode to start the motor. When the motor speed increases, the electric regulator switches to the sensorless mode to drive the motor.

9、Motor Rotation:

The front of the motor shaft is facing the face (that is, the tail of the motor is away from the face). When the remote controller increases the throttle in the forward direction, if it is set to CCW, the motor shaft will rotate counterclockwise; if it is set to CW, the motor shaft will rotate clockwise. Generally, the motor rotates counterclockwise and the car moves forward, but it may be because the frame manufacturer designed that it rotates clockwise to move forward. When this happens, just set it to CW.

10、Phase-AC Swap:

Due to the wiring requirements of the frame, when the A/C line of the ESC is connected with the A/C line of the motor (that is, the A line of the ESC is connected with the C line of the motor, and the C line of the ESC is connected with the A line of the motor), set this item to ON (Enabled) will do; WARNING! When the #A/#B/#C of the ESC is connected to the #A/#B/#C of the motor in one-to-one correspondence, do not set it to Enabled, otherwise the ESC and the motor will be damaged.

11、Punch Sw Point:

This parameter adjusts the distinction point between the forward acceleration and the rear acceleration of the forward throttle. When the throttle range is less than the segment point, the system uses the acceleration of the front segment; When the throttle range is greater than the segment point, the system automatically switches to the rear acceleration.

12、Punch Rate1 Start:

This parameter is used to control the output speed of the front throttle. Setting a suitable front throttle acceleration can assist the driver to control the throttle when the vehicle is started, and avoid tire slippage when the vehicle is refueled quickly, and the start is too violent to cause poor control in the corner and instant start. If the current is too large, it will be unfavorable to the motor/ESC/battery. The acceleration is divided into 30 gears and can be adjusted. When it is set to 1, the acceleration of the front throttle will be slower, and there will be more restrictions on the output when the accelerator is fast; the larger the value is, the faster the acceleration will be. The output is less restricted. In general, for a driver who can control the throttle proficiently, a higher acceleration can be set to reduce the limitation of the ESC on the throttle response.

13、Punch Rate2 End:

This parameter is used to control the output speed of the rear throttle. Setting a suitable rear throttle acceleration can assist the driver to control the throttle when the vehicle is started, and avoid tire slippage when the vehicle is refueled quickly, and the start is too violent to cause poor control in the corner. The current is too large at the moment of starting, which is unfavorable to the motor/ESC/battery. The acceleration is divided into 30 sectors and can be adjusted. When it is set to 1, the acceleration of the rear throttle will be slower, and there will be more restrictions on the output when the accelerator is fast; the larger the value is, the faster the acceleration will be. The lower the limit of throttle output is. Generally, for drivers who can skillfully control the accelerator, a higher acceleration can be set to reduce the ESC's restriction on throttle response.

14、Throttle Curve:

This parameter adjusts the correspondence between the forward throttle movement and the actual output throttle value. The default is linear, in which case the power output follows the throttle.

15、Neutral Range:

This parameter adjusts the range of the midpoint of the throttle to suit different remote controllers and drivers' control habits. Some poor-quality remote controllers tend to drift in the midpoint position, causing the car to move forward or backward slowly. When this phenomenon occurs, please set the area width to a larger value.

16、Initial Throttle Force:

Also called the minimum starting force, it refers to the starting force acting on the motor at the initial position of the accelerator. The required starting force can be set according to the grip of the tires and the ground; if the ground is too slippery, please set a smaller starting force to avoid slipping.

17、Coast:

When the throttle trigger is released from the full throttle or near the full throttle, this feature allows the motor to reduce speed naturally and smoothly without sudden deceleration during the trigger release. The higher the value of the "auto throttle" setting, the stronger the "coasting" feeling. For example, when set to 0%, there is no auto-throttle or coasting function; When the setting is set to 20%, the sliding feeling is most intense. Advantages of auto-throttle/coasting: When using a motor with a strong slotting effect, the car is prone to autonomously produce a sense of braking, which is known as the "GEAR BRAKE or automatic brake", which reduces the sense of handling of the vehicle. **Note: If the "drag brake force" parameter value is not 0%, the auto throttle/coasting function is turned off.**

18、Softening Value:

During the race, if you feel that the power of the first section of the throttle is too violent, a little power from the accelerator is already too strong, and it is difficult to control when cornering. For this reason, the softening value can be set to a higher value, which softens the initial stage. It can greatly improve the driver's controllability. "Softening value" refers to the intensity of softening processing. The larger the value is set, the more obvious the softening effect will be.

19、Softening Range:

It refers to the size of the throttle stroke that produces the softening effect. For example, if it is set to 30%, it means that the throttle stroke from 0% to 30% will produce a softening effect.

20、PWM Drive Freq:

Lowering the driving frequency can provide more powerful explosive force at the initial stage of the throttle: increasing the driving frequency can make the motor drive smoother and the driving noise smaller, but at the same time, it will also increase the switching loss of the ESC and increase the heat generation. For the specific use rate, please refer to the actual test results of the car in the parking lot.

21、Brake Control:

There are two braking modes: slow braking for hobby and heavy braking for competition.

22、Drag Brake Force:

Drag brake, also known as automatic brake, refers to the braking force generated by the ESC on the motor when the throttle stick is in the midpoint area after the oil is collected. This can assist fingers to control the brake and effectively reduce the difficulty of brake control. It is often used in Flat sports cars decelerate into and out of corners and other occasions.

23、Max. Brake Force:

This 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 at the brake limit position. Please select the appropriate maximum braking force parameter according to the specific conditions of the vehicle and the track and your personal habits.

24、Initial Brake Force:

Also known as the minimum braking force, refers to the braking force acting on the motor at the initial position of the brake. If the initial braking force is set to a larger, you can achieve a similar effect of the spot brake.

25、Brake Rate Control:

This parameter is used to control the brake accelerator output speed. Setting an appropriate brake accelerator acceleration can assist the driver to control the brake force and avoid excessive braking. The acceleration is divided into 20 gears and can be adjusted. When it is set to 1, there are more restrictions on the braking response. The larger the setting value, the less restriction on the brake throttle. In general, for drivers who can control the brakes proficiently, a higher acceleration can be set to reduce the limitation of the ESC on the response of the brake and accelerator.

26、Brake Frequency:

Decreasing the braking frequency can make the motor output stronger braking force: increasing the braking frequency can make the motor output more slippery braking force. The specific frequency of use is subject to the measured effect of the car in the garage.

27、Boost Timing:

This timing is valid within the entire range of throttle travel, and directly affects the speed on curved roads and straight roads. When this value is set, the actual timing of the ESC during operation is dynamically changed according to the throttle, not a fixed constant.

28、Boost Start RPM:

This item is used to set the starting speed required to turn on the Boost timing. For example, when it is set to 8000, the corresponding boost timing will be turned on when the speed reaches above 8000, and the specific opening size will be dynamically allocated according to the set Boost timing and the end speed.

29、Boost End RPM:

This item is used to manually set the end speed required to open the currently set Boost timing. For example, Boost timing is set to 10 degrees, when the end speed is set to 15000, when the speed reaches above 15000, Boost will be turned on by 10 degrees, and when the speed is lower than 15000 rpm. The Boost timing is dynamically allocated according to the rotational speed.

30、Boost Control:

Option 1: speed When set to "speed" mode, the Boost timing value is dynamically allocated according to the current speed. When the rotational speed is lower than the initial rotational speed, the Boost actual opening value is 0; when the rotational speed is higher than the initial rotational speed, the Boost actual opening value is set.

Option 2: Auto When it is set to "Auto", the Boost timing value is dynamically distributed according to the current throttle amount. Only when the throttle is full, the actual opening value of Boost is the setting value of Boost.

31、Turbo Timing:

Turbo Timing. This is an item to adjust the timing, it will only be turned on when the throttle is full, and it is usually used on a long straight road to release the maximum power of the motor. Its optimal functionality can be achieved in combination with Turbo delay settings.

32、Turbo Delay:

It refers to the continuous full throttle duration required to trigger Turbo. When the continuous full throttle time reaches this set value, Turbo can be triggered to start.

33、Turbo Increase Rate (deg/0.1sec):

When the conditions for triggering a Turbo are met, the Turbo starts to release at the specified speed. For example, 6 degrees /0.1 seconds indicates the Turbo advance Angle of 6 degrees in 0.1 seconds. The more degrees released within 0.1 seconds, the faster the Turbo is released, the faster the car acceleration, of course, the higher the heat of the motor.

34、Turbo Decrease Rate (deg/0.1sec):

When the Turbo is turned on, if the trigger conditions are not met, such as the straight end deceleration into a corner, then from full throttle to non-full throttle, Turbo opening conditions are not met, if the Turbo is turned off all at once, it will produce a very obvious slowdown, just like the brake, resulting in poor car handling. If the Turbo is turned off at a certain speed, the deceleration becomes more linear and the car's handling improves.

Warning! Turning on the Boost Angle of advance and the Turbo Angle of advance can effectively increase the output power of the motor and is usually used for racing. Please carefully check the manual and

reference Settings in advance, and monitor the temperature of the motor and electric regulator during the test, adjust the appropriate Angle setting and final gear ratio, Excessive timing settings and final gear ratios will cause the ESC or motor to burn out.

Notice! The setting items related to turbo timing are only valid when the drive mode is set to "pure sensory mode" and Hall is connected.

4 Default mode

The ESC can be quickly preset to minimum 3 different drive/default modes. The driver only needs to set the appropriate mode while adjusting motor/gear ratios to quickly reach the desired results. Any modes can also be fine-tuned by the driver via programming box.

Preset Mode Applicable Occasions:

No	Items	Applications
1	Custom Timing	Applicable to all kinds of STOCK competitions that require ESCs to use flash programs without timing
2	1/10 Off-Road	Suitable for 1/10 off-road/truck racing
3	1/10 On-Road	Suitable for 1/10 on-road racing

5 Programming method



Notice! The ESC programming interface is an independent programming port; do not use the throttle control cable on the ESC to connect the programming box, otherwise the programming box will not work.

LCD programming box for parameter setting: (For details, please refer to the manual of the LCD parameter programming box) This ESC supports using the LCD programming box to set parameters. After connecting the ESC and the programming box with a 3pin cable, and then connecting the power to the ESC, the LCD setting box will display the startup interface. Use the "ITEM" and "VALUE" buttons to change the setting parameters, and press the "OK" button to save the setting parameters into the ESC.

6 Restore factory parameter settings

After connecting the LCD box, select "Restore Default" through "ITEM", then press "OK" to save, and wait for 2 seconds to restore the factory settings.

06 Description of the ESC Status Indicator (LED)

Start-up phase

No control signal, the green light flashes 1 time, and the whistle sounds 1 short time at the same time

Itinerary stage

Low voltage, the red light flashes 2 times and beeps 2 times at the same time

ESC is overheated, the red light flashes 3 times and beeps 3 times at the same time

The motor is overheated, the red light flashes 4 times and beeps 4 times at the same time

The motor is over-current, the red light flashes 5 times and beeps 5 times at the same time

07

Troubleshoot guide

Symptom	Possible cause	Solution
After power on, the indicator light is off, the motor cannot be started, and the fan does not turn	1. The battery voltage is not input to the ESC 2. The ESC switch is damaged 3. The positive and negative poles of the ESC are reversed	1. Check whether the connecting wire is defective or not, and whether the solder joint is defective. 2. Replace the switch 3. Adjust the positive and negative poles
After power-on, lithium cell detection (after the green light flashes quickly, the green light flashes continuously, and the motor beeps once).	1. The ESC does not detect the throttle signal 2. The midpoint of the ESC throttle does not match the remote control	1. Check whether the BEC/throttle cable is inserted backwards, whether the channel is inserted incorrectly, and whether the controller is turned on. 2. Return the throttle stick to the neutral position and recalibrate the throttle stroke.

The remote control increases the accelerator, but the car reverses

The frame is inconsistent with the motor steering of the mainstream frame

Set the motor rotation setting to "CW clockwise".

During the rotation of the motor, it suddenly stops or the power output is significantly reduced

1. The receiver encounters interference
2. The ESC enters the battery low voltage protection state
3. The ESC enters the over-temperature protection state

1. Check the cause of interference in the receiver and check the battery power of the transmitting machine.
2. The red light blinks twice at intervals for voltage protection. Please replace the battery.
3. The red light flashes 3 times at intervals for temperature protection, please continue to use after the electric regulator \ motor temperature decreases.

The motor shakes and cannot be started

1. The plug of the electric harmonic motor connection has virtual welding or AC line interchange.
2. Electrical failure (part of the power tube MOSFET burned out)

1. Check each welding point, re-weld if necessary, and swap AC lines.
2. Contact the seller to deal with maintenance matters.

Moving forward normally, but unable to reverse

1. The midpoint of the accelerator channel of the remote control deviates from the braking area
2. The parameter item "Run Mode" is set incorrectly
3. The ESC is damaged

1. Readjust the midpoint of the throttle channel so that when the throttle stick of the remote controller is in the middle position, the indicator light on the ESC will not light up
2. The parameter item "running mode" needs to be set to "forward and reverse with brake"
3. Contact the buyer to deal with maintenance matters.

Connect the LCD parameter setting box, always display "CONNECTING ESC"

1. Improper use of ESC programming interface
2. ESC throttle is not reset to zero

1. Use the correct interface to connect the LCD setting box
2. Restart the ESC and reconnect the LCD parameter box

When setting the throttle range, when pressing the SET button to set the midpoint, the green light does not flash and there is no "beep" sound, or after the midpoint is set, the forward and reverse maximum points cannot be set

1. The ESC throttle cable is not inserted into the correct channel of the receiver
2. The ESC throttle cable is inserted backwards
3. The forward and reverse travel setting of the throttle is not set to 100%.

1. Insert the throttle cable into the TH channel marked on the receiver.
2. Check that the sequence of the receiver markings is inserted correctly.
3. Throttle forward and backward travel is set to 100%.



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