

感谢您购买本产品！无刷动力系统功率强大，错误的使用可能造成人身伤害和设备损坏。我们强烈建议您在使用设备前仔细阅读本说明书，并严格遵守规定的操作程序。我们不承担因使用本产品而引起的任何责任，包括但不限于对附带损失或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。

### 【产品特色】

- ★ 电调防水级别达到 IP67（可浸泡在水中工作），用户无需再做任何防水处理即可直接使用（注：使用后如果进水后将各插头吹干，以免锈蚀）；
- ★ 采用好盈专利铜片导热技术，水冷模块和内部 MOSFET 热阻极低，使得电调的耐流能力及可靠性大大增强；
- ★ 针对船模而设计的全新程序算法，具有优异的启动效果和加速性能，且对行船过程中船体颠簸跳跃造成的负载突变有出色的适应能力；
- ★ 具备正转（单向）和正反转（双向）两种运转模式；
- ★ 多重保护功能：具有温度保护、电池低压保护、油门失控保护功能。保护动作方式专门针对船模而设计，更加合理和人性化；
- ★ 具有 8 个进角模式，良好匹配所有无刷电机。您可以选择不同的进角实现输出功率的微调。
- ★ 支持简单易用的参数设定卡（备注 1：参数设定卡为选购件）。

### 【产品规格】

型号	持续电流	瞬时电流	BEC 类型	BEC 输出	锂电节数	重量	水冷嘴 (内径/外径)	体积 (含伸出水冷嘴长度)	应用
SEAKING-30A-V3-RTR	30A	180A	线性模式	6V/1A	2-3S	41g	Φ2.0/4.0	54.5*28.3*18.7	船长<45cm
SEAKING-60A-V3-RTR	60A	360A	线性模式	6V/2A	2-3S	93g	Φ2.0/4.0	60.5*38.5*25.6	船长<70cm
SEAKING-60A-V3.1-RTR	60A	360A	开关模式	6V/3A	2-3S	95g	Φ2.0/4.0	60*38.5*25.6	船长<70cm
SEAKING-90A-V3-RTR	90A	540A	开关模式	6V/5A	2-6S	140g	Φ3.0/5.4	68.5*39.4*32	船长<95cm
SEAKING-120A-V3-RTR	120A	720A	开关模式	6V/5A	2-6S	150g	Φ3.0/5.4	68.5*39.4*32	船长<110cm
SEAKING-180A-V3-RTR	180A	1080A	开关模式	6V/5A	3-6S	207g	Φ3.0/5.4	72*48*36.6	船长<130cm
SEAKING-130A-HV-V3-RTR	130A	720A	无 BEC	无输出	5-12S	182g	Φ3.6/5.0	88*58*23	船长<150cm

### 【首次使用船用无刷电子调速器】

**警告！** 使用前请将船模架起，确保船桨不会碰到人或其他物体，以免发生安全事故！

**第一步：**按下图接线并复查无误后，进入下一步（若转向不对，任意对调转其中两条马达线即可）。

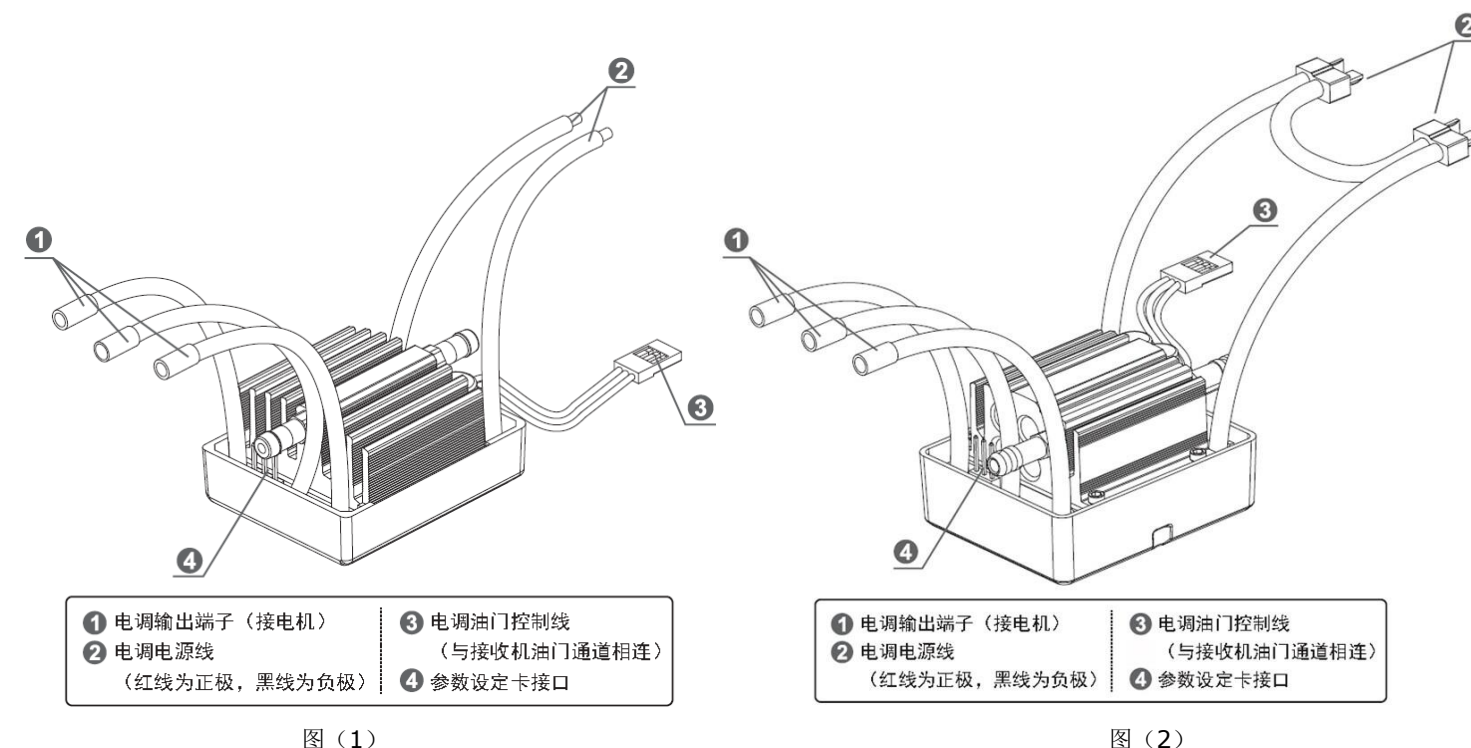


图 (1)

图 (2)

图(1)为 Seaking-30A-V3-RTR / Seaking-60A-V3-RTR 等型号使用单个电池对应接线图；

图(2)为 Seaking-90A-V3-RTR / Seaking-120A-V3-RTR / Seaking-180A-V3-RTR 等型号使用双电池的接线图；

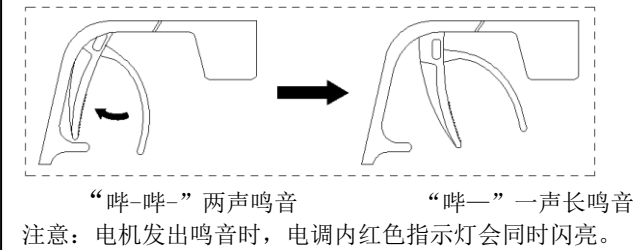
### 第二步：设定油门行程。

**强调！**第一次使用电调或遥控器更改过油门中点、ATV、EPA 等参数时，均需重设油门行程，不然可能会导致无法使用或误动作！

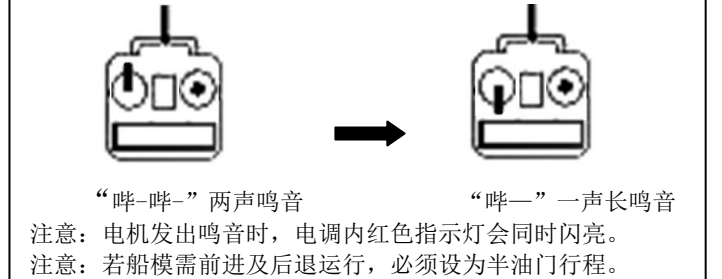
请参照以下步骤，设定油门行程。完成设定后，即可正常使用。

2.1 打开遥控器，将油门通道的“D/R”、“EPA”、“ATL”等参数调到 100%（如遥控器无显示屏，则将对旋钮调到最大位置），油门通道的中点微调“TRIM”调为 0（如遥控器无显示屏，则将对旋钮调到中间位置）。FUTABA 及类似的遥控器需要将油门通道方向设为“REV”，其它品牌遥控器的油门通道方向应设为“NOR”。（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线信号保护“F/S”设置为关闭输出方式或将保护值设置为中点位置，使得当接收机无法收到遥控器信号后，船能够立即停止。）注意：**若遥控器自有 ABS 功能，必须设置为 Off 或者 Disable。**

2.2 使用**枪式遥控器**时，油门行程校调方法如下：  
将油门摇杆推至正向顶点（最大油门点），然后给电调接上电源，等待 2 秒，电机发出“啵-啵-”两声鸣音，表示油门最高点已经被确认。这时松开油门，让油门回到中位，电机发出“啵-”一声长鸣音，此时油门行程已设定完成。



2.2 使用**板式遥控器**时，油门行程校调方法如下：  
将油门摇杆推至最高点，然后给电调接上电源，等待 2 秒，电机发出“啵-啵-”两声鸣音，表示油门最高点已经被确认。如果要设定为半油门行程，则将油门摇杆置回中立点；如果要设定为全油门行程，则将油门摇杆推至最低点，随后电机发出“啵-”一声长鸣音，表示油门行程已设定完成。



### 【开机过程说明】

1. 将油门摇杆置于零速位置，打开遥控器；
2. 给电调接上电池；
3. 电机发出 N 声“啵-”鸣音，表示电池组有 N 节锂电，请确认鸣报的锂电池节数是正确。如果只发出一声“啵-”鸣音，表示电调不做电池低压保护，这种情况仅适用于镍氢（NiMH）电池；
4. 等待 1 秒，电机发出“啵-”一声长鸣音，表示确认了零速的油门位置。如果油门不在零速位置，电机发出连续“啵-啵-啵-.....”短促鸣音，并且一直等待油门归位到零速位置；
5. 加大油门，电机启动并加速。

**【编程设定说明】** 备注 2：下表中斜体字表示出厂默认值。

设定项目名称	选项 1	选项 2	选项 3	选项 4	选项 5	选项 6	选项 7	选项 8
1. 运行模式	正转（单向）	<i>正反转（双向）</i>						
2. 锂电节数	<i>自动判断</i>	2S	3S	4S	5S	6S		
3. 电池低压保护阈值	不保护	2.8V/Cell	3.0V/Cell	<b>3.2V/Cell</b>	3.4V/Cell			
4. 进角	0.00 度	3.75 度	7.50 度	11.25 度	<b>15.00 度</b>	18.75 度	22.50 度	26.25 度

\*锂电节数第二行为 SEAKING-130A-HV-RTR 电调参数 1 至参数 6 所代表的锂电节数

1. **运行模式（Running Mode）：**“正转（单向）”模式下，船模仅能前进，不能倒退，该模式适用竞赛。“正反转（双向）”模式则提供了倒车功能，适用于需要后退功能的应用（使用此模式时，请确认船模的传动系统是否可以反转，因为软轴传动只能是单向的，反向旋转可能损坏软轴）。
2. **锂电节数（Lipo Cells）：**电调上电时会检测电池组电压，并根据电压值来自动判断锂电节数。若上电时电压低于 8.8V，判断成 2 节锂电；在 8.8 至 13.2V 之间，判断成 3 节锂电，以此类推。如果该电池组接上电调时未充满电，则容易出现误判（比如将未充满电的 6 节锂电误判为 5 节），这样有可能造成锂电低压保护功能无法正常工作。所以使用自动判断时，一定要使用充满电且还没有使用过的锂电池，并在上电时仔细辨认电机的鸣叫音，以确认所鸣报的锂电节数是否正确。如果您长期只是使用固定节数的锂电池，我们强烈建议将锂电节数固定设置，不要使用自动判断，以确保锂电池低压保护功能运作正常。
3. **电池低压保护阈值（Low Voltage Cut-Off）：**这项功能是设立锂电池放电时的低压保护门限值（也称为阈值）。在使用锂电池时，请根据电池的放电 C 数及负载大小，设置合适的保护阈值。电调会时刻监视电池电压，一旦电压低于阈值则进入保护状态，输出动力明显减弱。
  - a) **电池组低压保护点的计算：**电池组低压保护点=单节锂电保护电压×锂电节数。如：当单节锂电保护电压阈值设置为 3.2V/Cell 时，若使用 3 节锂电，则此电池组的低压保护点是 3.2×3=9.6V。
  - b) **进入低压保护时的现象：**当进入锂电电压保护后，输出动力会被切断，且红灯慢闪。油门归零后，再加大油门，电调以半功率的方式重新启动和运行，即便全油门也只有正常情况下一半的动力输出。保护后请立即将船靠岸，更换电池再使用。  
**警告！**如果漠视保护现象而继续使用，则很容易对锂电池造成永久性的损坏。

c) 使用镍氢 (NiMH) 电池时: 因为这种电池不需要做低电压保护, 所以将低压保护阈值设为“不保护”即可。行船过程中, 感觉动力明显减弱时, 收油靠岸即可。

4. 进角 (Timing): 此功能有几个作用:

- 兼容不同的电机。某些电机无法适配默认进角, 需要调整为合适的进角方可正常工作。
- 通过调整进角, 可以微调电机的最大转速。一般情况下, 进角越高, 则最大转速也越高, 同时消耗的功率也越大。
- 通过调整进角, 可使电机工作在最佳效率点。

### 【编程方法】

1. 使用遥控器摇杆进行编程设定

使用遥控器油门摇杆设定参数分为四个步骤: 进入编程模式 → 选择设定项 → 改变设定项下的参数值 → 退出

#### 第一步: 进入编程模式

- 开启遥控器, 将油门置于最高点
- 将电调接通电池, 等待2秒, 电机鸣叫“啵-啵-”提示音
- 再等待5秒, 电机鸣叫“♪ 567i2 ”特殊提示音, 表示已经进入编程模式。

#### 第二步: 选择设定项

进入编程模式后, 会听到4种鸣音, 按如下顺序循环鸣叫, 在鸣叫某个提示音后, 3秒内将油门推至最低点, 则进入该设定项。

- |               |          |       |
|---------------|----------|-------|
| 1. “啵-”       | 运行模式     | (1短音) |
| 2. “啵-啵-”     | 锂电节数     | (2短音) |
| 3. “啵-啵-啵-”   | 电池低压保护阈值 | (3短音) |
| 4. “啵-啵-啵-啵-” | 进角       | (4短音) |

#### 第三步: 改变参数值

进入某设定项后, 马达会循环鸣叫, 在鸣叫某个提示音后将油门摇杆推至最高点, 则选择该提示音所对应的参数值, 接着电机鸣叫特殊提示音“♪i5i5”, 表示该参数值已被保存。(此时如果不想再设定其它选项, 则在2秒内将油门摇杆推至最低点, 即可快速退出编程设定模式; 如果还要设定其它选项, 则继续等待, 退回第二步, 再选择其它设定项)

提示音	“啵” 1短声	“啵啵” 2短声	“啵啵啵” 3短声	“啵啵啵啵” 4短声	“啵—” 1长声	“啵—啵” 1长1短	“啵—啵啵” 1长2短	“啵—啵啵啵” 1长3短
运行模式	正转 (单向)	正反转 (双向)						
锂电节数	自动	2节	3节	4节	5节	6节		
锂电低压保护阈值	不保护	2.8V/CELL	3.0V/CELL	3.2V/CELL	3.4V/CELL			
进角	0度	3.75度	7.5度	11.25度	15度	18.75度	22.5度	26.25度

备注5: 一声长“啵—”表示五短声“啵”。比如“啵—啵”就表示第6个参数值 (5+1=6)

#### 第四步: 退出设定

- 在第三步, 选择设定值时, 电机鸣叫特殊提示音“♪i5i5”后, 2秒内将油门推至最低点, 则退出设定。
- 您也可以在设定过程中, 将电调断电强制退出, 然后重新设置参数。

2. 利用参数设定卡进行参数设置

参数设定卡为船用电调的升级选配件, 体积小, 适合外场使用。其界面直观, 编程过程十分简单快捷。调整参数时, 只需将电调上的控制排线插入编程卡右上角标注着  $\ominus \oplus \cup$  的插座中, 然后给电调接上电源, 该电调的各项参数即可显示出来。利用编程卡上的“ITEM”和“VALUE”按键即可快速选择编程项目和参数值, 然后按“OK”键后, 新参数即可存入电调中。

### 【保护功能说明】

- 电压保护: 当电调连续1秒检测到电池电压低于保护阈值后切断输出, 停止后红灯慢闪。油门归零后, 再加大油门, 电调以半功率的方式重新启动和运行。
- 温度保护: 当电调内部温度高于100℃ (212华氏度 °F) 时将会切断输出, 停止后绿灯慢闪。油门归零后, 再加大油门, 电调以半功率的方式重新启动和运行; 或等电调降至80℃ (176华氏度 °F) 后则恢复正常输出。
- 无信号保护: 当电调连续0.1秒没有检测到油门信号将会关闭输出, 信号恢复后将立即恢复运转。建议将遥控器油门通道的无信号保护“F/S”保护值设置为关闭输出方式或将保护值设置为中点位置。

### 【指示灯功能说明】

电调内部有两颗指示灯 (红色和绿色), 它们在不同时候分别代表不同含义, 如下:

- 当油门量高于零速油门值时, 红色灯亮, 马达转动; 油门推至最大时, 马达全速转动, 红色和绿色指示灯同时亮;
- 在电调进行油门行程设定和参数设定时, 电机鸣叫的同时红色指示灯也闪亮, 以便观察。
- 当绿灯慢闪时, 表示电调进入温度过高保护状态; 当红灯慢闪时, 表示电调进入电池低压保护状态。

### 【快速故障排查】

故障现象	可能原因	解决方法
上电后电机无鸣音, 指示灯也未闪亮	电池电压没有输入到电调或正负极接反	检查电池到电调的电源输入通路是否存在不可靠的连接。如有焊接不良, 请重新焊好 如果正负极接反, 需立即切断电源。否则将损坏电调
上电后电机无法启动, 发出“啵-啵-, 啵-啵-”警示音 (每组鸣音之间的间隔为1秒)	1. 电池组电压不在正常范围内 2. 开机时电调温度高于80摄氏度	1. 检查电池组电压 2. 检查水冷散热是否通畅或更换更高电流等级的电调来匹配负载
遥控器正向加大油门, 船模反而倒退	电调输出线和电机线之间的连线顺序错误	将电机三条连线中的任意两条互换即可
船模无法倒退	3. 电调未设置为双向运转模式 4. 电调未能识别油门中点	1. 将运行模式设置为“正反转 (双向)”模式 2. 按照第1页的说明, 重新校准油门行程。 3. 使用板式遥控器时, 需将油门行程调整为半油门行程模式。
电机转动过程中, 突然动力减弱	1. 电调进入电池低压保护状态 2. 电调进入过热保护状态	1. 立即更换电池。(关于低压保护的详细说明, 请参考【编程设定说明】章节中的“电池低压保护阈值”功能描述)。 2. 电调温度过高, 请等电调温度降低后再使用
电机无法启动, 只能抖动	1. 电机线和电调输出线连接不可靠 (焊接不良或断线) 2. 电调或电机损坏	1. 仔细检查接头是否接触不良 2. 更换电调或电机 (注意: 此时要先用小油门测试, 正常后再加大油门, 以免再次损坏设备)



Thanks for purchasing the "SEAKING V3 RTR" series of Electronic Speed Controller (ESC) for RC boats. High power system for RC models can be very dangerous, so please read through this manual carefully before use. In that we have no control over the use, installation and maintenance of this product or other related electronics, no liability may be assumed nor will be accepted for any damages, losses or costs resulting from the use of the product. Any claims arising from the operation, malfunction and others will be denied. We assume no liability for personal injury, consequential damages resulting from our product or workmanship. Besides, we don't shoulder any responsibility for any losses caused by unauthorized modifications to our product. The last but not least, we have the right to change the product design, appearance, features and operating requirements without notice.

**【Features】**

- ▶ The water-proof level of the "SEAKING V3 RTR" series has reached IP67, indicating the speed controllers can operate in water and users can directly use them without taking any precaution measures. (Note: please fully dry all the connectors after use for avoiding rustiness.)
- ▶ The Copper Bar Heat Conduction technology (exclusively patented), water-cooling system and MOSFET with extremely low internal resistance, all these greatly upgrade the over-current withstanding capability and reliability of the speed controllers.
- ▶ Brand-new software specially designed for RC boats, featured by excellent start-up & acceleration performance. In addition, it has outstanding adaptability to sudden load change caused by the hull bumping in sailing.
- ▶ 2 running modes: "Forward Only" and "Forward and Backward" for different applications.
- ▶ Multiple protections like low-voltage cutoff protection, over-heat protection and throttle signal loss protection, those features specially designed for RC boats are reasonable and personalized.
- ▶ 8 options for timing adjustments, compatible with most kinds of sensorless brushless motors.
- ▶ Pocket-sized program card can help users to set the speed controller easily. (Note1: The program card is optional)

**【Specifications】**

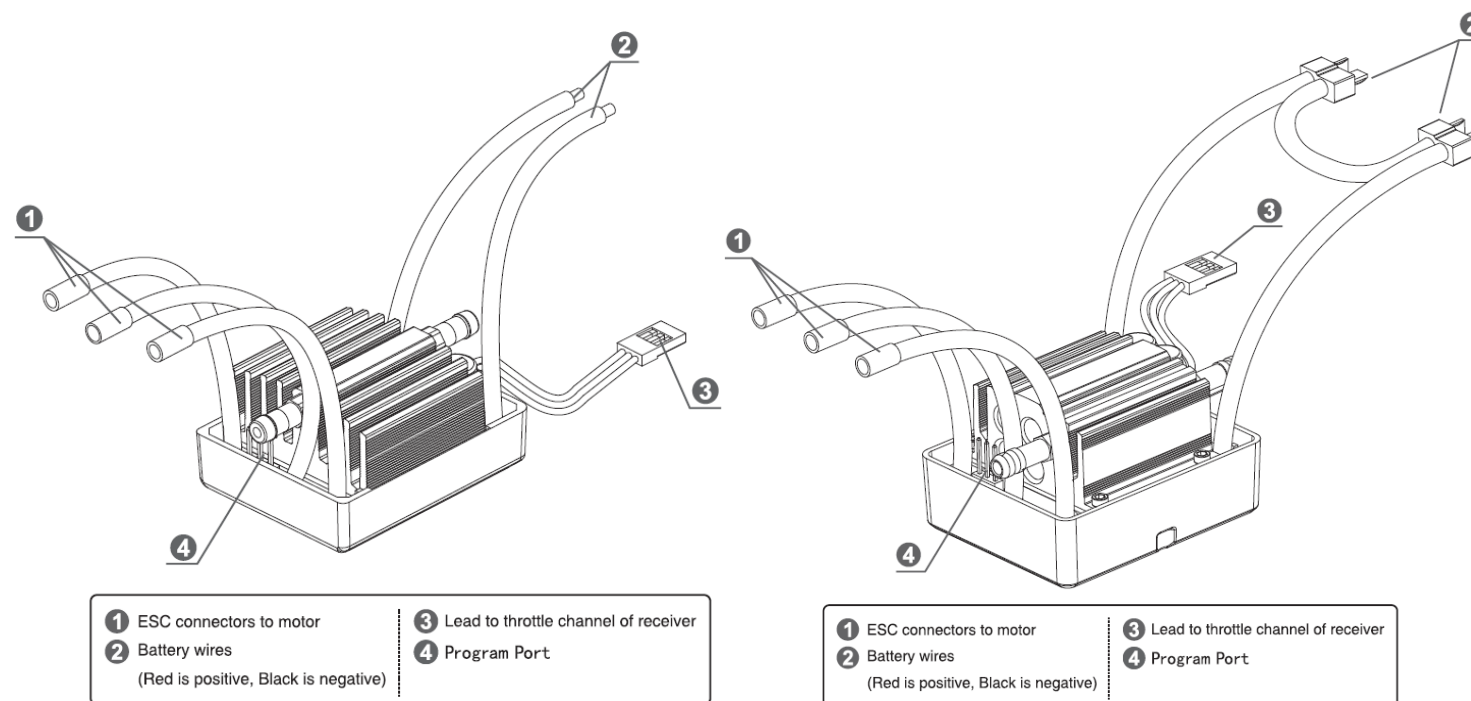
Model	Current (Continuous / Peak)	BEC Output	Lipo (s)	Weight	Water CoolingPipe Inside / Outside (mm)	Size L*W*H (mm) Incl. the Water Cooling Pipe	Applicable
SEAKING-30A-V3-RTR	30A / 180A	Linear Mode , 6V/1A	2-3S	41g	Φ2.0/4.0	54.5*28.3*18.7	Length<45cm
SEAKING-60A-V3-RTR	60A / 360A	Linear Mode , 6V/2A	2-3S	93g	Φ2.0/4.0	60.5*38.5*25.6	Length<70cm
SEAKING-60A-V3.1-RTR	60A / 360A	Switch Mode , 6V/3A	2-3S	95g	Φ2.0/4.0	60*38.5*25.6	Length<70cm
SEAKING-90A-V3-RTR	90A / 540A	Switch Mode , 6V/5A	2-6S	140g	Φ3.0/5.4	68.5*39.4*32	Length<95cm
SEAKING-120A-V3-RTR	120A / 720A	Switch Mode , 6V/5A	2-6S	150g	Φ3.0/5.4	68.5*39.4*32	Length<110cm
SEAKING-180A-V3-RTR	180A / 1080A	Switch Mode , 6V/5A	3-6S	207g	Φ3.0/5.4	72*48*36.6	Length<130cm
SEAKING-130A-HV-V3-RTR	130A / 720A	Without BEC	5-12S	182g	Φ3.6/5.0	88*58*23	Length<150cm

**【Begin to Use a New ESC】**

**Warning! For safety, please always keep the propeller away from human body or any other objects.**

**STEP 1. Connect the ESC, motor, receiver, battery and servo according to the wiring diagram below (Picture 1&2).**

Three wires① from the ESC to the motor have no polarity, so you can connect them freely. Please recheck all the connections and ensure they are correctly connected before proceeding to step 2. (And you may find it's necessary to swap two wires if the motor runs in reverse.)



Picture 1

Picture 2

- 1) Picture 1 is the diagram for Seaking-30A-V3-RTR, Seaking-60A-V3-RTR and other ESCs that work with only one LiPo battery pack;
- 2) Picture 2 is the diagram for Seaking-90A, Seaking-120A-V3-RTR, Seaking-180A-V3-RTR, and other ESCs that work with two LiPo battery

packs;

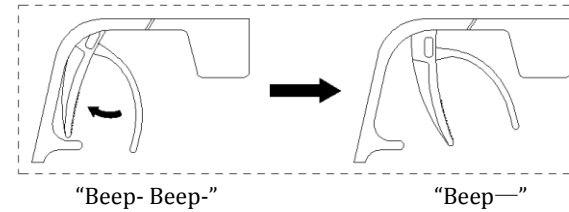
**STEP 2. Throttle Range Calibration**

**Attention!** Users need to recalibrate the throttle range when using a new ESC or a used transmitter with some of its settings have been changed like the Throttle Trim, D/R, EPA or other parameters; otherwise the ECS cannot work properly.

2.1 Turn on the transmitter, set parameters on the throttle channel like "D/R", "EPA" and "ATL" to 100% (for transmitter without LCD, please turn the knob to the maximum) and the throttle "TRIM" to 0 (for transmitter without LCD, please turn the corresponding knob to the neutral position). For Futaba™ radio transmitter and similar ones, the direction of throttle channel shall be set to "REV", while other radio systems shall be set to "NOR". We strongly recommend activating the "Fail Save" function of the radio system and set it (F/S) to "Output OFF" or set its value to the "Neutral Position" to ensure the boat can be stopped when there is no signal received from the transmitter.

**Note: if the transmitter has the ABS brake function, please disable it.**

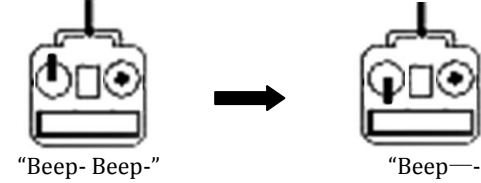
2.2 If you are using a **pistol** transmitter:  
 a) Pull the throttle trigger to the top forward position (/full throttle), connect the ESC to the battery pack; 2 seconds later, a row of "Beep- Beep-" can be heard, that means the full throttle position has been confirmed.  
 b) Release the throttle trigger to the neutral position, a steady and long "Beep—" can be heard, that means the neutral position has been confirmed.



Note: When the motor emits "Beep" tone(s), the red LED in the ESC flashes at the same time.

2.2 If you are using a **stick** transmitter:  
 a) Push the throttle stick to the top position (/full throttle), connect the ESC to the battery pack; 2 seconds later, a row of "Beep- Beep-" tone can be heard, that means the full throttle position has been confirmed.  
 b) If you want to set the throttle range to **half-range mode**, please move the throttle stick to the neutral position, a steady and long "Beep—" can be heard, that means the neutral position has been confirmed.

If you want to set it to **full-range mode** (In such a case, the boat cannot run backward), please pull the throttle stick to the bottom position, a steady and long "Beep—" can be heard, that means the bottom position has been confirmed.



Note: When the motor emits "Beep" tone(s), the red LED in the ESC blinks at the same time.  
 Note: If you want to run the boat forwardly and reversely, you must set the throttle range to half-range mode,.

**【The Normal Start Process】**

1. Move the throttle stick to the zero-speed position (the throttle stick locates at the neutral position or lowest position), then turn on the transmitter.
2. Connect the battery pack to the ESC.
3. The motor emits several "Beeps" to denote the cells number in your Lipo battery pack. Please make sure that the number is correct. If only one "Beep" tone is emitted, that means the "Low-voltage Cutoff Threshold" (Please refer to the "Programmable Items" in the following form) is set to "No protection", and it's only allowed when you are using a NiMH battery pack. Please never use the "No protection" mode for Lipo battery; otherwise the Lipo battery will be damaged irreversibly.
4. One second later, the motor emits a steady and long "beep—" to confirm the zero-speed position of the throttle. If the throttle is not at that position, the motor will emit the continuous "beep-beep-beep..." till the throttle returns to the zero-speed position.
5. Move the throttle stick upwards, the motor starts spinning and speeds up gradually.

**【Programmable Items】** Note2: The italics in the following form are the default settings.

Programmable Items	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8
1. Running Mode	Forward Only	<i>Forward and Backward</i>						
2. Lipo cells	<i>Auto Calculate</i>	2S	3S	4S	5S	6S		
		5S	6S	8S	10S	12S		
3. Low-voltage Cutoff Threshold	No Protection	2.8V/Cell	3.0V/Cell	<i>3.2V/Cell</i>	3.4V/Cell			
4. Timing	0.00°	3.75°	7.50°	11.25°	<i>15.00°</i>	18.75°	22.50°	26.25°

\*Second line of Lipo cells is for SEAKING-130A-HV-V3-RTR

1. **Running Mode:** With the "Forward Only" mode, the boat can only go forward; while in the "Forward and Backward" mode, the boat can go forward and reverse, which is suitable for some specially-designed boats. Please read the user manual of your boat to check if it can run backward.
2. **Lipo Cells:** We strongly suggest setting the "Lipo Cells" item manually. If you choose the "Auto Calculate", the ESC will measure the battery

voltage the moment it is connected to the controller, then the ESC counts the cells number. For example, if the battery voltage is lower than 8.8V, it will be identified as 2S Lipo battery. In order to ensure the ESC calculate the cells number correctly, please always use a fully charged battery to connect the ESC. If the battery is not fully charged or partly discharged, then the “Auto Calculate” may get a wrong result.

Hint: In the startup process, the motor will emit several “Beeps” to indicate the Lipo cells number; it is helpful for you to check if it is consistent with the actual cells number in your battery pack. If you often use Lipo battery packs with the fixed number of cells, then we strongly suggest you to set the “Lipo Cells” to a fixed value instead of using the “Auto Calculate”, as this can ensure the low-voltage cutoff protection works normally all the time.

- Low-voltage Cutoff Threshold:** This function prevents the Lipo battery pack from over-discharging. The ESC detects the battery voltage all the time, if the voltage goes below the threshold for 2 seconds, the output power will be cut off, then the Red LED blinks slowly. The controller can be re-operated at the halved power after the throttle returns to zero. then please replace the battery pack as soon as possible.

**Warning!** If you ignore the low voltage cutoff warning and keep running, the Lipo battery will be damaged irreversibly!

- How to calculate the cutoff threshold of a whole battery pack:  
The cutoff threshold of a battery pack = the threshold of each cell x cells number  
For example, if the threshold of each cell is set to “3.2V/Cell”, and the battery pack is a 3S (3 Cells), then the cutoff threshold of this battery pack is 3.2x3=9.6V.
  - If you are using a NiMH battery:  
NiMH battery is not easy to be damaged, so you needn’t worry about the over-discharging problem, you can set this programmable item to “No Protection”.
- Timing:** Please select the most suitable timing option according to the motor you are using. The correct timing makes the motor run smoothly. Generally speaking, higher timing brings out higher output power, higher speed and also higher temperature.

**【Program the ESC】**

- Program the ESC with your transmitter**

**By 4 Steps:** Enter the programming mode → Select programmable item(s) → Choose a new value for the selected item → Exit

**STEP 1. Enter the programming mode**

- Switch on the transmitter, move the throttle stick to the top position (/full throttle).
- Connect the battery pack to the ESC, wait for 2 seconds, the motor emits “Beep-Beep-” tone.
- Wait for 5 more seconds, the motor emits a special tone “♪īīīī”, that means the controller enters the programming mode.

**STEP 2. Select programmable items**

After entered the programming mode, you will hear the following 4 kinds of “Beep” tones circularly. If move the throttle stick to the bottom position (/full brake) within 3 seconds after one kind of “Beep” tone emits, then the corresponding item will be selected.

1. “Beep-”	Running Mode	(1 short “beep”)
2. “Beep-Beep-”	Lipo Cells	(2 short “beeps”)
3. “Beep-Beep-Beep-”	Low-voltage Cutoff Threshold	(3 short “beeps”)
4. “Beep-Beep-Beep-Beep”	Timing	(4 short “beeps”)

**STEP 3. Choose a new value for the selected item**

After entered a certain item, the motor will beep in a loop. Set the corresponding value by moving the throttle stick to the top position (/full throttle) when you hear the tone, then a special tone “♪īīīī ” emits, which means the value has been chosen and saved into the ESC. (If keep the throttle stick at the top position (/full throttle) for over 2 seconds, you can return to STEP 2 and set other items; if move the stick to the bottom position (/full brake) within 2 seconds, then you will exit this programming mode directly.)

Tone	“B”	“BB”	“BBB”	“BBBB”	“Beep—”	“Beep—B”	“Beep—BB”	“Beep—BBB”
Items	1 short Beep	2 short Beeps	3 short Beeps	4 short Beeps	1 long Beep	1 long + 1 short	1 long+ 2 short	1 long+ 3 short
<b>Running Mode</b>	Fwd. Only	Fwd. & Bwd.						
<b>Lipo Cells</b>	Auto Calculate	2 Cells	3 Cells	4 Cells	5 Cells	6 Cells		
<b>Low-voltage Cutoff Threshold</b>	No Protection	2.8V/Cell	3.0V/Cell	3.2V/Cell	3.4V/Cell			
<b>Timing</b>	0°	3.75°	7.5°	11.25°	15°	18.75°	22.5°	26.25°

*Note5: One long “Beep—” = 5 short “Beep”. For example, “Beep—Beep” tone means the No.6 value. (5+1=6)*

**STEP 4. Exit the programming mode**

There are 2 methods to exit the programming mode:

- In STEP 3, the motor emits the special tone “♪īīīī” after chosen the value, at this moment user can move the throttle stick to the bottom position (/full brake) in 2 seconds to exit the programming mode.
- Disconnect the battery pack from the ESC to exit the programming mode forcibly.

**2. Program the ESC with a Program Card**

Program card is an optional equipment for boat ESCs, it has 3 digital LEDs to display the programmable items and corresponding parameter values, so the user interface is very intuitive. It’s quite easy to program ESCs with this small equipment. For more detailed information, please read its operation manual.

**【Multiple Protections】**

- Low Voltage Cutoff Protection:** when the battery voltage falls below the preset cutoff threshold for over 1 second, the ESC will cut off the output and stop working, then the Red LED blinks slowly. The controller can be reoperated at the halved power after the throttle returns to zero.
- Overheat Protection:** when the ESC temperature goes above the factory preset value (100℃ or 212 ℉), the ESC will cut off the output and stop running, then the Green LED flashes slowly. The controller can be reoperated at the halved power after the throttle returns to zero, the output will resume if the temperature decreases below 80℃ (176℉) .
- Throttle Signal Loss Protection:** when the receiver detects no throttle signal (from the transmitter) for over 0.1 second, the ESC will cut off the output. The controller will not resume running until the signal is detected again. Hereby, we suggest users setting the no signal protection (or F/S Protection) on the Throttle channel (on the transmitter) to “Output off” or “Neutral position” to ensure that the motor can be stopped when the throttle signal is lost.

**【LED Indications】**

There are two LED indicators in the ESC, a Green one and a Red one.

- When the throttle is above the zero-speed position, the Red LED will come on and the motor starts to spin; while pushing the throttle to the maximum position (/ full throttle), the motor runs at its full speed and both the Red & Green LEDs light up.
- When setting the throttle range and parameters of the ESC, the motor beeps and Red LED flashes simultaneously for easy observation.
- Green LED blinks slowly denoting the ESC has entered the overheat protection, Red LED flashes slowly means the Low-Voltage Cutoff Protection is activated.

**【Troubleshooting】**

Trouble	Possible Cause	Solution
After powered on, the motor doesn’t emit any beep tone and the LED doesn’t light up.	No battery voltage is inputted to the ESC or got the polarity reversed.	Check the connection between the battery and ESC, please re-solder if poor soldering exists. If the polarity is reversed, please cut off the power immediately. Otherwise, the ESC will be damaged irreversibly.
After powered on, the motor doesn’t work, but the following alert tone is emitted: “beep-beep-, beep-beep-” (here the time interval is 1 second).	The battery voltage is abnormal; or the startup temperature of the ESC is above 80℃ (176℉).	Check the battery voltage; Check whether the water cooling system runs smoothly or not, or change another ESC with greater amperage capability.
Pulling the throttle trigger, while the boat goes backward.	Wrongly connected the ESC and motor wires.	Swap any two wires connections between the ESC and the motor.
The boat cannot run backward.	The ESC is not set to “Forward and Backward” running mode; The ESC cannot recognize the throttle neutral point. The throttle range is set to "Full-Range" mode for a stick transmitter.	Set the running mode to “Forward and Backward”; Recalibrate the throttle range according to instructions on page 1. Set the throttle range to "Half-Range " mode for the stick transmitter.
The output power suddenly weakens.	The Low-Voltage Cutoff Protection or the Overheat Protection is activated.	Replace another fully-charged battery; Cool the ESC down before using it again.
The motor cannot be started normally, and it only stutters.	The ESC and motor wire are not well connected or the ESC / motor is damaged	Check all the connections; replace the ESC or the motor. (Note: please test with a small throttle value first, then increase the value after the motor returns to normal. Otherwise, the ESC/motor may get damaged again.