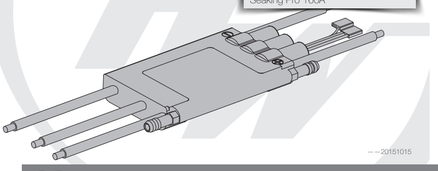
HOBBYWING®

USER MANUAL
SEAKING
Brushless Electronic Speed Controller
Seaking Pro 160A



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01 Introduction

Thank you for purchasing the Seaking Pro 160A, HOBBYWING's high performance sensorless brushless electronic speed controller! Brushless power systems can be very dangerous. Any improper use may cause personal injury and damage to the product and related devices. We strongly recommend reading through this user manual before use. Because we have no control over the use, installation, or maintenance of this product, no liability may be assumed for any damage or losses resulting from the use of the product. We do not assume responsibility for any losses caused by unauthorized modifications to our product.

02 Warnings

- Ensure all wires and connections are well insulated before connecting the ESC to related devices, as short circuit will damage your ESC.
- Ensure all devices are well connected, in order to prevent poor connections that may cause your boat to lose control or other unpredictable issues like damage to the device.
- Please use a soldering iron with the power of at least 60W to solder all input/output wires and connectors.
- Stop using the ESC when its heat-sink temperature exceeds 90℃/194℉; otherwise your ESC and/or motor will get damaged. We recommend setting the "ESC Thermal Protection" to 105℃/221℉ (this refers to the internal temperature of the ESC).
- Never attempt to drive two brushless motors with only one ESC, otherwise the ESC will fail.
- Please keep the propeller away from your body and other objects.

03 Features

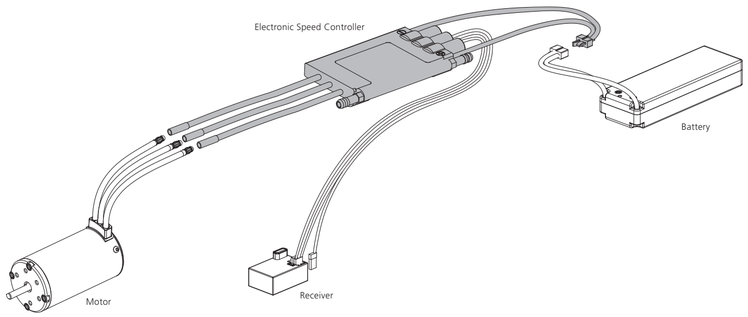
- Light-weight perfectly meets users' strict requirement against the weight of competition marine ESCs.
- No extra precaution is needed because of its outstanding water resistance (it can be immersed in water). (Note: It's necessary to fully dry all the connectors after use if they are immersed in water)
- Internal switch-mode BEC with switchable voltage of 6V/7.4V and cont./peak amp of 4A/8A for easily driving big torque servos and high voltage servos.
- HOBBYWING-patented heat-conductive copper bars combined with water cooling heatsink and MOSFETs with extremely low internal resistance greatly improve the current endurance and reliability of the ESC.
- Advanced firmware guarantees the user the excellent control feel and "abundant" programmable items for different competition environments.
- Innovative Turbo Acceleration function (which enables the Turbo Timing) can make the motor unleash the maximum power to speed up, and leave all rivals far behind in a moment.
- "Forward Only"& "Forward/Reverse" running modes.
- Multiple protections: low-voltage cutoff protection, ESC thermal protection, and fail safe (throttle signal loss protection).
- 8 Timing options perfectly match with various of brushless motors.
- Advanced programming via portable multifunction LCD program box (sold separately).
- Firmware upgrade via HOBBYWING multifunction LCD program box (sold separately).

04 Specifications

Model	Cont. AMP	Peak AMP (0.15)	BEC Output	LiPo Cells	Weight	Diameter of Water Cooling Tube (mm)	Size L*W*H (With the outstreched water cooling tube)	Main Application
Seaking Pro 160A	160A	1050A	6V/7.4V Switchable, Continuous AMP of 4A (Switch-mode BEC)	2-6S LiPo	127g	Inner:Φ3.0 Outer:Φ5.5	108.5x51.5x14.4mm	Mono2 and other race boats (Length<120cm)

05 Begin to Use a New ESC

1 Connections



1. Water Cooling Tube Connecting（Silicon tube needs to be provided by users.）
The aluminum water cooling tube (outer diameter ≈ 5.5mm) has been pre-mounted on the ESC heatsink at factory. Please connect the silicon tube to the aluminum water cooling tube.

2. Motor Wiring
There is no polarity on the A/B/C wires between ESC and motor, so do not worry about how you connect them initially. You may find it necessary to swap two wires if the motor runs in reverse.

3. Receiver Wiring
1) How to connect the throttle control cable
Plug the throttle control cable (also called Rx cable) on the ESC into the throttle (TH) channel on receiver. The RED wire in the throttle control cable will output the BEC voltage of 6V/7.4V to the receiver and servo, so please do not connect any additional battery to the receiver.
2) How to connect the Turbo Acceleration signal wire (/single YELLOW wire)
Plug the Turbo Acceleration signal wire of the ESC into any unoccupied channel (for example, CH3/CH4) on your receiver.

4. Battery Wiring
Proper polarity is essential here! Make absolutely sure positive (+) of ESC connects to positive (+) of battery, and negative (-) of ESC connects to negative (-) of battery when you plug in your battery! If reverse polarity is applied to your ESC from the battery, it will damage your ESC. This will NOT be covered under warranty!

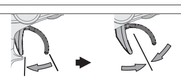
2 ESC/Radio Calibration

ATTENTION

In order to make the ESC match the throttle range, you must calibrate it when you begin to use a new ESC, or a new transmitter, or after you change the settings such as the neutral, ATV, EPA and other parameters of throttle channel on your transmitter, otherwise the ESC will not work properly. Please refer to the following steps and calibrate the throttle range.

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 FutabaTM radio transmitter, 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 motor can be stopped when there is no signal received from the transmitter.) Note: if the transmitter has the "ABS braking function", then please ensure it must be DISABLED.

2.How to calibrate the throttle range with pistol-style transmitter.
Pull the throttle trigger to the full throttle position and hold it there, connect a battery pack to the ESC. 2 seconds later, the motor will beep two short beeps "BB" to indicate the full throttle endpoint is accepted. And release the throttle trigger to the neutral position, the motor will beep a long beep "B—" to indicate the calibration is complete.



"Beep- Beep-" "Beep—"

ATTENTION

Note: the RED LED in the ESC flashes at the same time when the motor beeps.

3.How to calibrate the throttle range with board-style transmitter.
Move the throttle stick to the top position, and connect a battery pack to the ESC. 2 seconds later, the motor will beep two short beeps "BB" to indicate the full throttle endpoint is accepted.
If you want to set throttle range to "half- range", then move the throttle stick to the neutral position. Or you want to set it to "full-range", then move the throttle stick to the bottom position.
The motor will beep a long beep "B—" to indicate the calibration is complete.

"BB" 2 Short Beeps "B—" A Long Beep

ATTENTION

Note: the RED LED in the ESC flashes at the same time when the motor beeps.

2 Start-up

Move the throttle trigger/stick to the Zero-Speed throttle position, and then turn on the transmitter.
1. Connect a battery pack to the ESC; the motor will beep "Number" times to indicate the amount of Lipo cells you have plugged in. Please ensure the cell count is correct. If the motor only beeps one time, it means the Low-Voltage Cutoff Protection is disabled. This "Disabled" option is only applicable to NiMH battery packs.
2. 1 second later, the motor will beep a long beep "B—"to indicate the ESC is ready to run. If the throttle trigger/stick is not at the Zero-Speed throttle position, the motor will keep beeping a short beep "BBB……" until the throttle trigger/stick is moved to the Zero-Speed throttle position.
3. Increase the throttle amount, the motor spins up.

06 ESC Setup

(Those "black backgroud and white text" options are the factory 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	Forward/Reverse						
2. Lipo Cells	Auto Calc.	2S	3S	4S	5S	6S		
3. Cutoff Voltage	Disabled	2.8V/Cell	3.0V/Cell	3.2V/Cell	3.4V/Cell			
4. ESC Thermal Protection	105℃/221℉	125℃/257℉	Disabled					
5. BEC Voltage	6.0V	7.4V						
6. Start Mode (Punch)	Level 1	Level 2	Level 3	Level 4	Level 5			
7. General Timing	0 Degree	3.75 Degrees	7.5 Degrees	11.25 Degrees	15 Degrees	18.75 Degrees	22.5 Degrees	26.25 Degrees
8. Turbo Acceleration	Enabled	Disabled						
9. Turbo Timing	0 Degree	3.75 Degrees	7.5 Degrees	11.25 Degrees	15 Degrees	18.75 Degrees	22.5 Degrees	26.25 Degrees
10. PWM Frequency	6KHz	8KHz	12KHz	16KHz				

1. Running Mode
Option 1: Forward Only
The boat can only go forward in this mode. This mode is usually for racing.
Option 2: Forward/Reverse
The boat can also go backward in this mode. This mode is applicable to most applications. (Note: Please ensure that the drivetrain of your boat can reverse. Because the drivetrain with flexible shaft can only go in one direction, the reversal may damage the flexible shaft.)

2. Lipo Cells
The ESC will automatically calculate the number of Lipo cells you have plugged in as per the battery voltage it detects, if the voltage is below 8.8V, it will be identified as 2S Lipo; if the voltage is from 8.8V to 13.2V, it will be identified as 3S Lipo; and so on. If a battery pack is not fully charged before connecting it to the ESC, miscalculation may occur like a not fully charged 6S Lipo may be identified as a 5S Lipo. This may cause the Low-Voltage Cutoff Protection function abnormal. Therefore, you need to ensure that the battery you connect to the ESC is fully charged. If you only use one particular Lipo battery, we recommend manually setting the "Lipo Cells" to the specific option instead of using "Auto Calc.", so the Low-voltage Cutoff Protection can always function properly.

3. Cutoff Voltage
When using a LiPo battery, you need to set a proper cutoff voltage for your battery as per its discharge C count and the load. The ESC will monitor the battery voltage all the time, LVC(Low Voltage Cutoff) protection will be activated and the output power will be remarkably decreased when the battery voltage goes below the programmed cutoff voltage.
How to calculate the cutoff voltage: cutoff voltage=cutoff voltage per cell * cell count. For instance, when setting the cutoff voltage per cell at 3.2V, the total cutoff voltage for a 3S Lipo should be 3.2V*3=9.6V.
After entering the Low-Voltage Cutoff Protection: when the LVC protection is activated, the output will be halved. That means the output power will be only 50% even at full throttle, the RED LED will flash slowly at the same time. Please get your boat back immediately when this happens and change another fully charged battery.
Warning! If you ignore the "hint" and keep using the battery will get your battery irreversibly damaged.
When using a NiMH battery: because NiMH batteries don't need this LVC protection, so you can set the "Cutoff Voltage" to "Disabled". When you find the power is remarkably decreased in sailing, you only need to get the boat back immediately.

4. ESC Thermal Protection
The ESC will cut off the output when its internal temperature goes above the preset value. The GREEN LED will flash slowly to indicate the ESC Thermal Protection is activated. The motorcan resume rotation and run at halved power after you first move the throttle stick/trigger back to the Zero-Speed throttle position and then move the throttle stick/trigger to the full throttle position.
The ESC will resume normal output after the temperature goes below 80℃ (176℉).

5. BEC Voltage
Option 1：6.0V
It's applicable to ordinary servos. Do not use this option with high voltage servos; otherwise your servos may not function normally due to insufficient voltage.
Option 2：7.4V
It's applicable to high voltage servos. Do not use this option with ordinary servos; otherwise your servos may be burnt due to high voltage.

6. Start Mode / Punch
You can choose the punch from level 1 (very soft) to level 5 (very aggressive). In addition, "level 4" and "level 5" have strict requirement on battery's discharge capability. It may affect the starting-up if the battery discharges poorly and cannot provide large current. The boat stutters or suddenly loses power indicating the battery's discharge capability is not good, then you need to lower down the punch.

7. Timing / General Timing
This item has three effects:
- Make the ESC compatible with different motors. Some motors may function abnormally with the default Timing (15 degrees), you need to adjust the ESC timing to a proper degree and then they will work fine.
- Fine tune the output power of the motor. The bigger the ESC timing, the higher the motor speed , and the more electric energy it will consume.
- Make the motor operate at the optimum efficiency point through adjusting this item.

8. Turbo Acceleration
If the Turbo Acceleration is triggered, the ESC will immediately activate the programmed Turbo Timing (refer to the 9th programmable item). The motor can output greater power (than in normal condition). This function is mainly used on long waterway or when driving the boat out of corner.
Note 1:
- Turbo Acceleration signal wire is usually plugged into CH3 or CH4 on receiver, and the amount of the valid signal must over 80% of the maximum travel volume (usually the maximum travel volume is 100%) .
- With a pistol-style transmitter: CH3/CH4 is often controlled by a button (on the transmitter), you only need to press the button to activate the Turbo Acceleration. With a board-style transmitter: If CH3/CH4 is controlled by a switch, then push the switch to the up/down position can deactivate/activate the Turbo Acceleration.
- When the programmed General Timing is bigger than Turbo Timing (for example, the General Timing is set to 22.5 degrees and the Turbo Timing is 15 degrees), there won't be any effect even if Turbo Acceleration is enabled. Please ensure that the Turbo Timing value must bigger than General Timing if you want to use Turbo Acceleration function.

9. Turbo Timing
Turbo Timing is adjustable from 0 to 26.25 degrees. With the Turbo Acceleration is enabled, the ESC will activate the corresponding Turbo Timing after it receives Turbo Acceleration signals.

10. PWM frequency
The increase of PWM frequency can make the motor running smoother and the noise lower, but it will also make your ESC hotter. If the motor has no unsmooth/uneven issue, we recommend selecting the default setting (8KHz).

07 ESC Programming

1 Program your ESC with the transmitter stick/trigger

Four steps to program your ESC with a transmitter:
Entering Programming Mode —> Selecting Programmable Item(s) —> Selecting Parameter Value(s) /Option(s) —> Exiting Programming Mode.

Step 1: Entering Programming Mode
1. Turn on the transmitter, move the throttle stick to the top position (/full throttle position), connect a battery pack to the ESC, and the motor will beep "BB" (to indicate the full throttle position has confirmed).
2. Five seconds later, the motor will beep "♪5671̂2̂" to indicate the ESC has entered the programming mode.

Step 2: Selecting Programmable Item(s)
After entering the programming mode, you will hear 10 kinds of tones beep out circularly. Move the throttle stick to the bottom position within 3 seconds after you hear one specific kind of warning tone, you will enter the corresponding programmable item.
1. "B", Running Mode (One Short Beep)
2. "BB", Lipo Cells (Two Short Beeps)
3. "BBB", Cutoff Voltage (Three Short Beeps)
4. "BBBB", ESC Thermal Protection (Four Short Beeps)
5. "B——", BEC Voltage (One Long Beep)
6. "B——B", Start Mode (Punch) (One Long Beep & One Short Beep)
7. "B——BB", Timing (General Timing) (One Long Beep & Two Short Beeps)
8. "B——BBB", Turbo Acceleration (One Long Beep & Three Short Beeps)
9. "B——BBBB", Turbo Timing (One Long Beep & Four Short Beeps)
10. "B——B——", PWM Frequency (Two Long Beeps)

Step 3: Selecting Parameter Value(s) / Option(s)
After entering the specific programmable item, the motor will circularly beep out several kinds of warning tones. Move the throttle stick to the top position within 2 seconds after you hear some kind of specific warning tone can select the corresponding parameter option. And then the motor will beep out the special warning tone "♪1̂5̂1̂5̂" indicating the parameter value has been stored into your ESC. In case you want to terminate programming early, move the throttle stick to the bottom position in 2 seconds can rapidly exit programming mode. If you want to continue, please wait and return to Step 2 and choose other programmable item(s).

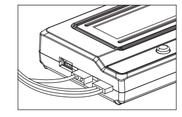
Items \ Tone	"B" 1 short Beep	"BB" 2 short Beeps	"BBB" 3 short Beeps	"BBBB" 4 short Beeps	"Beep—" 1 long Beep	"Beep—B" 1 long 1 short	"Beep—BB" 1 long 2 short	"Beep—BBB" 1 long 3 short
Running Mode	Forward	Forward/Reverse						
Lipo Cells	Auto Calc.	2S	3S	4S	5S	6S		
Cutoff Voltage	Disabled	2.8V/Cell	3.0V/Cell	3.2V/Cell	3.4V/Cell			
ESC Thermal Protection	105℃/221℉	125℃/257℉	Disabled					
BEC Voltage	6.0V	7.4V						
Start Mode (Punch)	Level 1	Level 2	Level 3	Level 4	Level 5			
General Timing	0°	3.75°	7.5 °	11.25 °	15°	18.75°	22.5°	26.25°
Turbo Acceleration	Enabled	Disabled						
Turbo Timing	0°	3.75°	7.5°	11.25°	15°	18.75°	22.5°	26.25°
PWM Frequency	6KHz	8KHz	12KHz	16KHz				

Note 2: One long beep "B—" represents five short beeps "BBBBB". For example, "B—B" represents the 6th (5+1) parameter value.

Step 4: Exiting Programming Mode
1. Move the throttle stick to the bottom position within 2 seconds after you select the parameter value and hear the special warning tone " " beeped out by motor in Step 3 can exit programming mode.
2. Or you disconnect the ESC when it's in programming mode to forcibly exit programming.

2 Program your ESC with a multifunction LCD program box

You can program this Seaking Pro 160A ESC through a multifunction LCD program box or a PC (HOBBYWING USB LINK software needs to be installed on the PC). Before the programming, you need to plug the throttle control cable & the Turbo Acceleration signal wire on your ESC into ports marked with -+ & -+s respectively and then turn on the ESC, then the boot screen will show up on the LCD, press any button on the program box to initiate the communication between your ESC and the program box. The "CONNECTING ESC" will be displayed, a few seconds later, the program box will display the 1st programmable item like "Running Mode". You can adjust the setting through "ITEM" & "VALUE" buttons, and then press the "OK" button to save new settings to your ESC.



3 Factory Reset

Restore the default values with a multifunction LCD program box
After connecting the program box to the ESC, continuously press the "ITEM" button on the program box until you see the "RESTORE DEFAULT" item, and then press "OK" to factory reset your ESC.

08 Explanations for LED Status

1. During the Start-up Process
1) The RED LED flashes one time per 2 seconds and the motor beeps "B,B,B,B,..." at the same time indicating the ESC doesn't detect any throttle signal.
2) The GREEN LED flashes "Number" times indicating the number of Lipo cells you have connected to the ESC.

2. In Operation
1) The RED LED & GREEN LED die out when the throttle stick is located at the neutral position.
2) The RED LED turns on solid when your boat runs forward. The GREEN LED will also come on when moving the throttle stick to the full throttle (100%) endpoint.
3) The RED LED turns on solid when you reverse your boat.

3. When Some Protection is Activated
1) The RED LED flashes a short, single flash that repeats (☆, ☆, ☆) indicating the low-voltage cutoff protection is activated.
2) The GREEN LED flashes a short, single flash that repeats (☆, ☆, ☆) indicating the ESC thermal protection is activated.

09 Explanations for Protections

1. Low-voltage Cutoff Protection
The ESC will cut off the output after it detects the battery voltage goes below the preset cutoff voltage for 1 second. The RED LED will flash slowly to indicate the Low-Voltage Cutoff Protection is activated. The motor can resume rotation and run at halved power after you first move the throttle stick back to the Zero-Speed throttle position and then move the throttle stick to the full throttle position.

2. ESC Thermal Protection
The ESC will cut off the output when its internal temperature goes above the preset value. The GREEN LED will flash slowly to indicate the ESC Thermal Protection is activated. The motor can resume rotation and run at halved power after you first move the throttle stick back to the Zero-Speed throttle position and then move the throttle stick to the full throttle position. The ESC will resume normal output after the temperature goes below 80℃(176℉).
Note 3: Temperature here means the internal temperature of the ESC. It's often 60 Fahrenheit degrees higher than the heat-sink temperature (of the ESC).

3. Throttle Signal Loss Protection
The ESC will cut off the output after it fails to detect any throttle signal for 0.1 second. The motor will immediately resume rotation after the signal is re-detected. We recommend activating the "Fail Save" function of the radio system and set it (F/S) to "Output OFF" or set its value to the "Zero-Speed Position" to ensure the motor can be stopped when there is no signal received from the transmitter.

10 Trouble Shooting

Trouble(s)	Possible Causes	Solution(s)
No motor beep and no LED flash after the ESC was powered on.	1. No battery voltage was supplied to the ESC. 2. Battery was reversely installed.	1. Check connections between the ESC and battery to see if they are well connected to each other or cold joint exists. Re-solder connector(s) when necessary . 2. Disconnect the battery immediately; otherwise, your ESC will be damaged.
The ESC was unable to start the motor, the motor beeped repetitive "BB, BB, BB" (The interval between each group of BB was 1 second)	1. The battery voltage was beyond the normal operating voltage range of the ESC. 2. The ESC temperature was above 80℃(176℉).	1. Check the battery voltage. 2. Check if the water cooling tube is blocked or change another high AMP ESC to match the motor.
The ESC was unable to start the motor, the motor beeped repetitive "B, B, B, B" (the interval between each "B" was 2 seconds).	1. The ESC didn't detect any throttle signal. 2. The transmitter and receiver were not well bound.	1. Check if the throttle cable is reversely plugged in or into the wrong channel on the receiver. And if the transmitter is turned on. 2. Refer to the user manual and re-bind the transmitter and receiver.
The boat sailed backward when increasing the throttle advance.	Improper wiring/connection between the ESC and motor.	Swap any two wire connections between the ESC and motor.
The boat couldn't reverse.	1. The "Running Mode" on the ESC was not set to "Forward/Reverse" option. 2. The ESC couldn't recognize the throttle neutral position.	1. Set the "Running Mode" on the ESC to "Forward/Reverse" option. 2. Refer to the user manual and re-calibrate the throttle range.
The power was suddenly decreased during the motor rotation.	1. The ESC entered the LVC protection.. 2. The ESC entered the ESC Thermal protection.	1. Change another battery immediately. 2. The ESC temperature is too high, let your ESC cool down before using it again.
The motor stuttered but couldn't start.	1. Some soldering between the motor and the ESC was not good. 2. The ESC/motor was damaged.	1. Check if all the connectors are well soldered. 2. Change another ESC/motor. (Note: you need to test with low throttle amount first. Increase the throttle advance only after you confirm the operation is normal. Otherwise, your device may be damaged again.)
The LCD program box kept displaying "CONNECTING ESC" after you connected it to your ESC.	The programming wire and throttle control cable on the ESC were plugged into the wrong ports on the multifunction LCD program box.	Refer to the "Program your ESC with a multifunction LCD program box" section, plug the programming wire and the throttle control cable into the right ports.