

PRO BOAT

Waterproof 45A Brushless Electronic Speed Control (ESC)



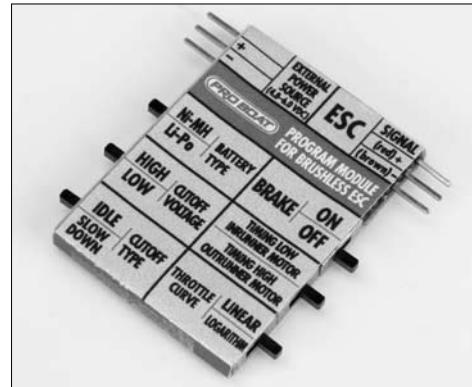
Instruction Manual

Thank you for choosing the Pro Boat™ brand. Your satisfaction is our number one priority. With this in mind, we have produced this product to be of the highest quality, performance and reliability, and at a "value-packed" price. We hope it provides you with hours of enjoyment in your next R/C project.

Features

- Rev limiter allows brief operation of the motor out of the water to protect the motor and drivetrain components.
- Water cooled for optimum performance without the need for large heat sinks.
- The soft start feature slightly limits current to increase the life of the electronic components.
- The ESC also features a cutoff voltage indicator that will stop the motor from operating if the batteries are reaching full discharge. To reset, return the throttle to neutral and bring the boat to shore at low throttle and recharge batteries.

- High-power FET control with proportional forward
- High-frequency design delivers smooth speed transition
- Pre-wired with Dean's battery plug, bullet-style motor connectors and universal receiver plug that fit JR, Hitec, Airtronics Z, Futaba and new KO radios
- Pre-programmed for use with Ni-MH batteries. Can be programmed for use with Li-Po batteries with PRB3311 Programming Module (sold separately)



Specifications

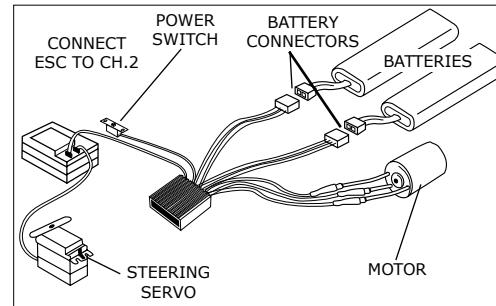
- Operation:** Proportional forward
Minimum input voltage: 10V
Maximum input voltage: 21V
BEC voltage: 5.8V
BEC current limit: 5A
continuous current maximum: 45A
Peak current maximum: 55A

Mounting the Speed Control

Note: Be sure all wiring connections can be reached prior to mounting.

Mount the Pro Boat ESC in the location specified by your boat's instruction manual. Use the double-sided foam tape (not included) to secure the speed control in position.

Diagram



Wiring the Receiver

Note: The Pro Boat ESC uses the motor battery to supply power to the receiver. There is no need for a separate receiver battery.

- See your radio's instruction manual for proper connection. Typically, channel 2 is used to control the throttle.
- There are three wires involved in the universal receiver connector. It is directly compatible with JR, Hitec, Airtronics Z, Futaba and new KO systems.
- Older Airtronics or KO radio systems must use a modified wiring order.

1. The positive (red) and negative (brown) wires must be reversed to operate with these radio systems. To remove the wires from the plug use a small jeweler's screwdriver to pry up the plastic tab associated with each wire. Gently slide the brown wire out of the plug. Repeat on the red wire and replace in the opposite positions.

2. Install the ESC receiver plug into channel 2 or the throttle channel of the receiver. Install the plug referencing the wire colors on the steering servo for proper polarity.

Connecting the Motor Wires

Connect all three wires to the motor in any order. If the motor runs backwards, simply switch any two wires.



Connecting the Battery

The Pro Boat ESC comes pre-wired with Dean's-style connectors, compatible with most high-power battery packs.

ProBoat offers a PRB3313 3600mAh Ni-MH pack and a PRB3314 4200mAh high capacity Ni-MH battery with Dean's connectors for use with this ESC.

1. Be sure the On/Off switch is in the Off position.
2. Connect two fully charged 6-cell Ni-MH sub-C battery packs to the speed control's battery connectors.

Adjusting the Transmitter

Note: Refer to the radio instructions for specific information on transmitter setup.

1. Set the Throttle Reversing switch to the Normal position. (This may need to be reversed on some brands of radios).
2. Set the Throttle Trim to the CENTER position.
3. Set the Throttle Exponential (if applicable) to minimum or zero.
4. Set the "ATV" (if applicable) to 100%.
5. If your transmitter has an adjustable trigger (or stick), move it to the 70/30 position.

Water-cooling connections

Connect water cooling tubing to either of the nipples on the ESC. Be sure to connect the cooling lines through the ESC first, then the motor.

Speed Control Programming

Turn on the transmitter and leave the throttle control stationary in the neutral position.

Turn on the speed controller.

If you do not hear a "beep", switch off the speed controller, disconnect the power connectors, wait for 5 seconds and repeat the procedure of connecting and switching on.

You will hear the "beep" when first switching on the ESC. When you switch off the speed controller without disconnecting the power pack, you will not hear the beep the next time the ESC is turned on.

* The speed controller will adjust the full throttle position automatically.

When operation is complete, turn off the receiver, then the transmitter.

Note: Do Not turn off the transmitter first or the receiver may pick up stray signals and run out of control.

Note: The brushless ESC has an automatic rev limiter that will not allow the motor to maintain full throttle unless the motor is loaded (in the water). To reset, return throttle to neutral.

The ESC also features a cutoff voltage indicator that will stop the motor from operating if the batteries are reaching full discharge. To reset, return the throttle to neutral and bring the boat to shore at low throttle and recharge batteries. The optional programming module allows you to choose from a 1/2 power drop or total power off modes.

Brake Adjustments

The speed controller is supplied with the "brake" activated. If you want to turn off the brake, do the following:

- Switch on the transmitter and move the stick to full throttle.
- Connect the main power pack and turn on the ESC power switch.
- Wait 5 seconds.
- After 5 seconds you will hear 4 tones.
- Swiftly move the throttle stick to the full brake position; you will hear two "beeps".
- The brake is now turned off.

Note: The brake setting will not change after disconnecting the main power pack. When turning on the speed controller with the brake active, you will always hear one "beep". When the brake is turned off you will hear two "beeps". If you want to activate the brake again, repeat the procedure.

Motor Timing Adjustments

* It is possible to set two timing modes with these speed controllers.

-Soft timing- for 2, 4, 6, pole inrunner motors. Soft timing gives maximum efficiency.

-Hard timing- only for 6 and more pole inrunner motors or outrunner motors.

Hard timing increases both the motor revolutions and the current (up to 20%) with the same prop and battery pack when compared to soft timing. You will notice a substantial decrease in runtime using the hard timing mode.

Always use soft timing for first runs. If the temperature of the batteries, speed controller and motor are cool to the touch after operation in the soft timing mode, it is possible to test the system using the hard timing mode. Do not use hard timing with 2-pole motors, regardless of temperature.

* The speed controllers are supplied with soft timing. The following steps describe how to change the timing:

- Switch on the transmitter and move the stick to full throttle.
- Connect the main power packs and turn on the receiver switch and wait 5 seconds.
- After 5 seconds you will hear 4 "beeps".
- After further 5 seconds you will hear 5 "beeps" for soft timing.
- Or 5 double "beeps" for hard timing.
- The required timing is set by moving the throttle to the full brake position during the five beep sequence that you choose.
- The new timing is confirmed by a single "beep"(soft timing) or a double "beep"(hard timing).

Note: The timing setting will not change after disconnecting the main power pack.

* Timing monitor (if you want to know what timing you have).

After the first "beep" wait 5 seconds (keep the throttle in the neutral position).

The controller gives 5 single beeps for soft timing or 5 double beeps for hard timing.

It is possible to interrupt this beeping at any time by moving the throttle control.

Automatic Voltage Cutoff Analyzer

*These controllers have automatic cutoff with auto detection for the number and type of cells. This circuit provides the correct cutoff for all types and number of cells.

ESC Programming

Your ESC is pre-programmed from the factory. The programming is set for Ni-MH batteries, with the brake on, in the soft timing mode with linear throttle curve.

A programming module (PRB3311) is available to change the programming of your speed control quickly and easily. Settings include Ni-MH or Li-Po batteries, cutoff voltage settings, cutoff type, brake on or off, motor timing and throttle curve.

Caution: It is imperative that you do not attempt to use Li-Po batteries in the Blackjack 26 Brushless unless it has been properly programmed or serious damage to the batteries and electronics may occur.

Note: Do not turn off the transmitter first or the receiver may pick up stray signals and run out of control.

Warranty Information

Warranty Period

Horizon Hobby, Inc., (Horizon) warranties that the Products purchased (the "Product") will be free from defects in materials and workmanship at the date of purchase by the Purchaser.

Limited Warranty

(a) This warranty is limited to the original Purchaser ("Purchaser") and is not transferable. REPAIR OR REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE EXCLUSIVE REMEDY OF THE PURCHASER. This warranty covers only those Products purchased from an authorized Horizon dealer. Third party transactions are not covered by this warranty. Proof of purchase is required for warranty claims. Further, Horizon reserves the right to change or modify this warranty without notice and disclaims all other warranties, express or implied.

(b) Limitations- HORIZON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCT. THE PURCHASER ACKNOWLEDGES THAT THEY ALONE HAVE DETERMINED THAT THE PRODUCT WILL SUITABLY MEET THE REQUIREMENTS OF THE PURCHASER'S INTENDED USE.

(c) Purchaser Remedy- Horizon's sole obligation hereunder shall be that Horizon will, at its option, (i) repair or (ii) replace, any Product determined by Horizon to be defective. In the event of a defect, these are the Purchaser's exclusive remedies. Horizon reserves the right to inspect any and all equipment involved in a warranty claim. Repair or replacement decisions are at the sole discretion of Horizon. This warranty does not cover cosmetic damage or damage due to acts of God, accident, misuse, abuse, negligence, commercial use, or modification of or to any part of the Product. This warranty does not cover damage due to improper installation, operation, maintenance, or attempted repair by anyone other than Horizon. Return of any goods by Purchaser must be approved in writing by Horizon before shipment.

Damage Limits

HORIZON SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCT, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY. Further, in no event shall the liability of Horizon exceed the individual price of the Product on which liability is asserted. As Horizon has no control over use, setup, final assembly, modification or misuse, no liability shall be assumed nor accepted for any resulting damage or injury. By the act of use, setup or assembly, the user accepts all resulting liability.

If you as the Purchaser or user are not prepared to accept the liability associated with the use of this Product, you are advised to return this Product immediately in new and unused condition to the place of purchase.

Law: These Terms are governed by Illinois law (without regard to conflict of law principals).

Safety Precautions

This is a sophisticated hobby Product and not a toy. It must be operated with caution and common sense and requires some basic mechanical ability. Failure to operate this Product in a safe and responsible manner could result in injury or damage to the Product or other property. This Product is not intended for use by children without direct adult supervision.

The Product manual contains instructions for safety, operation and maintenance. It is essential to read and follow all the instructions and warnings in the manual, prior to assembly, setup or use, in order to operate correctly and avoid damage or injury.

Questions, Assistance, and Repairs

Your local hobby store and/or place of purchase cannot provide warranty support or repair. Once assembly, setup or use of the Product has been started, you must contact Horizon directly. This will enable Horizon to better answer your questions and service you in the event that you may need any assistance.

For questions or assistance, please direct your email to productsupport@horizonhobby.com, or call 877.504.0233 toll-free to speak to a service technician.

Inspection or Repairs

If this Product needs to be inspected or repaired, please call for a Return Merchandise Authorization (RMA). Pack the Product securely using a shipping carton. Please note that original boxes may be included, but are not designed to withstand the rigors of shipping without additional protection. Ship via a carrier that provides tracking and insurance for lost or damaged parcels, as Horizon is not responsible for merchandise until it arrives and is accepted at our facility. A Service Repair Request is available at www.horizonhobby.com on the "Support" tab.

If you do not have internet access, please include a letter with your complete name, street address, email address and phone number where you can be reached during business days, your RMA number, a list of the included items, method of payment for any non-warranty expenses and a brief summary of the problem. Your original sales receipt must also be included for warranty consideration. Be sure your name, address, and RMA number are clearly written on the outside of the shipping carton.

Warranty Inspection and Repairs

To receive warranty service, you must include your original sales receipt verifying the proof-of-purchase date. Provided warranty conditions have been met, your Product will be repaired or replaced free of charge.

Repair or replacement decisions are at the sole discretion of Horizon Hobby.

Non-Warranty Repairs

Should your repair not be covered by warranty the repair will be completed and payment will be required without notification or estimate of the expense unless the expense exceeds 50% of the retail purchase cost. By submitting the item for repair you are agreeing to payment of the repair without notification. Repair estimates are available upon request. You must include this request with your repair. Non-warranty repair estimates will be billed a minimum of 1/2 hour of labor. In addition you will be billed for return freight. Please advise us of your preferred method of payment. Horizon accepts money orders and cashiers checks, as well as Visa, MasterCard, American Express, and Discover cards. If you choose to pay by credit card, please include your credit card number and expiration date. Any repair left unpaid or unclaimed after 90 days will be considered abandoned and will be disposed of accordingly. Please note: non-warranty repair is only available on electronics and model engines.

Electronics and engines requiring inspection or repair should be shipped to the following address:

Horizon Service Center
4105 Fieldstone Road
Champaign, Illinois 61822

All other Products requiring warranty inspection or repair should be shipped to the following address:

Horizon Product Support
4105 Fieldstone Road
Champaign, Illinois 61822

Please call 877-504-0233 with any questions or concerns regarding this product or warranty.

Troubleshooting Guide

Symptom	Solution	Symptom	Solution
Steering servo operates but the motor does not run	<p>Programming is not complete. Reprogram the ESC by following the programming instructions.</p> <p>Speed control connected to receiver incorrectly. Refer to manufacturer's instructions.</p> <p>Motor defective. Test motor independently, repair or replace as needed.</p> <p>Low batteries. Change as needed.</p> <p>Throttle neutral trim not centered. Adjust throttle trim adjustment.</p>	Full speed not attainable	<p>Transmitter adjusted improperly. See radio instructions for proper adjustment.</p> <p>ESC programmed incorrectly. Reprogram ESC.</p>
Steering and motor do not function	<p>Receiver wired incorrectly. Check polarity and orientation of control plugs.</p> <p>Radio not operating. See radio instruction manual.</p> <p>Batteries discharged. Recharge or replace.</p>	Reduced radio range/interference	<p>Motor noise. Move receiver further away from ESC, motor and wiring.</p> <p>Transmitter batteries low. Replace batteries.</p> <p>Interference transmitted on or near radio frequency. Relocate or change radio channels (see manufacturer's instructions).</p> <p>Water-damaged servo or receiver. Allow components to dry or replace.</p>
Motor slows but will not stop	<p>Throttle trim may be set improperly. See radio instruction manual.</p> <p>ESC program does not match transmitter. Reprogram ESC.</p>		