

NOTICE

All instructions, warranties and other collateral documents are subject to change at the sole discretion of Horizon Hobby LLC. For up-to-date product literature, visit horizonhobby.com and click on the support tab for this product.

MEANING OF SPECIAL LANGUAGE

The following terms are used throughout the product literature to indicate various levels of potential harm when operating this product:

WARNING: Procedures, which if not properly followed, create the probability of property damage, collateral damage, and serious injury OR create a high probability of superficial injury.

CAUTION: Procedures, which if not properly followed, create the probability of physical property damage AND a possibility of serious injury.

NOTICE: Procedures, which if not properly followed, create a possibility of physical property damage AND a little or no possibility of injury.

WARNING: Read the ENTIRE instruction manual to become familiar with the features of the product before operating. Failure to operate the product correctly can result in damage to the product, personal property and cause serious injury.

This is a sophisticated hobby product. 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. Do not attempt disassembly, use with incompatible components or augment product in any way without the approval of Horizon Hobby LLC. This 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 serious injury.

CAUTION: This product can become extremely hot when in use, which could lead to burns.

Age Recommendation: Not for children under 14 years. This is not a toy.

SAFETY PRECAUTIONS AND WARNINGS

- Read instructions before operating.
- Always ensure the motor screws do not go into the motor more than 1/8 in (3mm).
- Always avoid over-gearing by monitoring temperature.
- Never allow motor operating temperature to exceed 160°F (71°C). Doing so may cause permanent damage and will not be covered under warranty.
- Never use a Schottky Diode with this motor.
- Never over-tighten the motor mounting screws. The warranty does not cover damaged threads.

WATERPROOF COMPONENT

Your new Horizon Hobby Onyx® sensorless brushless ESC has been designed and built to allow you to operate the product in many “wet conditions”, including puddles, creeks, wet grass, snow and even rain.

While waterproof, this component has not been designed to be immersed in water for long periods of time and should NOT be treated like a submarine. In addition, most metal parts, including any screws and nuts, as well as the contacts in the electrical cables, will be susceptible to corrosion if additional maintenance is not performed after running in wet conditions.

To maximize the long-term performance of your ESC and to keep the warranty intact, it should only be used as described in the “Usage Conditions” section of this manual. Additionally, the procedures described in the “Wet Conditions Maintenance” section must be performed regularly if you choose to run in wet conditions. If you are not willing to perform the additional care and maintenance required, then you should not operate your vehicle in those conditions.

CAUTION: Failure to exercise caution while using this product and comply with the following precautions could result in product malfunction and/or void the warranty.

GENERAL PRECAUTIONS

- Read through the wet conditions maintenance procedures and make sure that you have all the tools you will need to properly maintain your ESC.
- Do not operate your ESC where it could come in contact with salt water (ocean water or water on salt-covered roads), contaminated or polluted water. Salt water is very conductive and highly corrosive, so use caution.

USAGE CONDITIONS

Your ESC will operate successfully in any of the following, individual-usage scenarios:

- 2 hours continuous operation in dew-covered (damp) grass or vegetation.
- 2 hours continuous operation in heavy fog (95% humidity, saturated air, condensing water).
- 1 hour continuous operation in light rain (<0.10 in/2.5mm per hour).
- 15 minutes continuous operation in heavy rain (>0.30 in/7.6mm per hour).
- 1 hour continuous operation in light sleet (<0.10 in/2.5mm per hour).
- 1 hour continuous operation in light snow (<0.25 in/6.35mm per hour).
- 45 minutes continuous operation in standing or running fresh water (the water level should always remain below the vehicle frame), or constant splashing water, without any immersion of waterproof component(s).
- 5 minutes continuous operation in standing or running fresh water (the water level should never rise higher than 0.5 in (about 10 mm) above the vehicle frame), constant splashing water, or frequent, intermittent immersion of waterproof component(s).

- 1 hour continuous operation in damp sand, dirt, mud or snow (the material level should always be below the vehicle frame), constant splatter without any immersion or coverage of waterproof component(s).

Furthermore, when appropriate maintenance procedures (as described below) are performed promptly following exposure, the ESC will remain best protected from corrosion or other long-term, water-related damage.

WET CONDITIONS MAINTENANCE

- Gently rinse the mud and dirt off the ESC with a garden hose.
- Remove the battery pack(s) and dry the contacts.
- If you have an air compressor or a can of compressed air available, blow off the ESC to help remove any water that may have gotten into small crevices or corners. Dry any water that may be inside a recessed connector housing.
- Let the ESC air dry before you store it. Water may continue to seep or evaporate out of tight areas for a few hours.

NOTICE: Never use a pressure washer to clean your vehicle.

NOTICE: This ESC is waterproofed for use in wet conditions. Make sure the other components in your vehicle are waterproof or water-resistant before driving in wet conditions.

Thank you for purchasing the Onyx® sensorless brushless motor. Onyx brushless motors are high-torque motors designed for bashing and sport racing applications. These 1/10-scale sensorless motors feature the same basic dimensions and mounting patterns as industry-standard, 1/10-scale, 540-size brushed motors. These motors also offer high performance over a longer lifetime with little to no maintenance.

FEATURES

- Perfect upgrade for brushed 540 motors with the same diameter and industry standard mounting hole patterns
- High torque
- Includes connectors
- High-quality construction with ball bearings and hardened steel 1/8-inch motor shaft

MOTOR SPECIFICATIONS

	ONXS0500	ONXS0501
RPM/V	3000Kv	4000Kv
No load current 7.2V (A)	1.5 +/-0.5	1.5 +/-0.5
Diameter	37mm	37mm
Length	52mm	52mm
Weight	158 g	158 g
Efficiency	90%	90%
Poles	4	4
Power	260W	260W
Shaft Diameter	3.175mm	3.175mm
Shaft Length	15mm	15mm
Turns	1.5Y	1Y
Voltage	4.5–13.0	4.5–13.0

GEARING

Improper gearing will cause excessive heat buildup in the motor and speed control. Use your vehicle’s kit manual in order to find the manufacturer’s recommended pinion size. It is best to monitor the motor’s operating temperature when you are operating on new and different tracks or racing surfaces, changing to a new motor or making gearing changes. Your motor’s operating temperature should never exceed 160° F (71° C). The best place to monitor the motor’s temperature is at the center of the end bell. If the motor temperature is higher than 160° F (71° C) after a 5 minute run, the gearing should be lowered (change to a smaller pinion gear).

CAUTION: Once the battery is connected to the motor, stay clear of the rotating shaft and pinion gear. Failure to do so could result in personal injury.

INSTALLATION OF THE MOTOR

Always ensure the motor mounting screws are long enough to properly seat into the motor. However, ensure the screws do not enter into the motor too far, which could damage the motor.

The maximum depth that the motor mounting screws can enter into the motor is approximately 1/8 in (3mm). We suggest using the motor mounting hardware included with your vehicle. The use of screws that are too long will damage the motor and void any warranty.

When installing the motor into your vehicle, it is very important that the gear mesh is correct and smooth with no binding. The vehicle’s motor mounts usually feature adjustable slotted mounting holes so that you can adjust the gear mesh properly.

Proper gear mesh (how gear teeth meet) is important to the performance of the vehicle. When the gear mesh is too loose, the spur gear could be damaged by the pinion gear of the motor. If the mesh is too tight, speed could be limited and the motor and ESC will overheat. Insert a small piece of paper in between the pinion and spur gears as you are installing them. Push the gears together while tightening the screws that mount the motor. When the mesh is at the correct distance,

remove the small piece of paper by rotating the spur gear until the paper comes out. Check the mesh at multiple points around the larger spur gear before finalizing the motor mounting position.

ACCESSORIES

See our website at www.horizonhobby.com for our complete line of accessories.

QUICK START GUIDE

The quick start setup guide will get you running quickly using the ESC’s default settings.

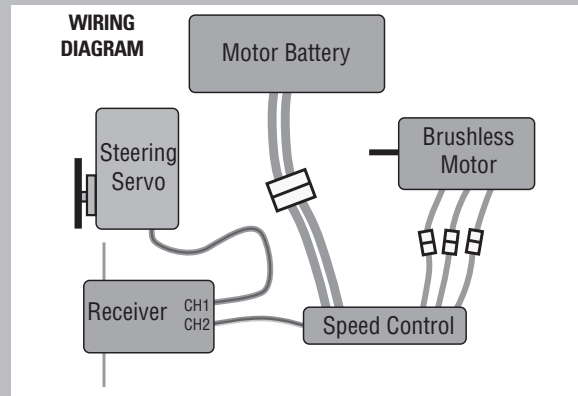
1. Mount the ESC and motor in the car.
2. Connect the ESC to the motor.
3. Connect the ESC receiver lead to CH2 on your receiver.
4. Ensure the ESC switch is OFF.
5. Connect a fully charged battery to the ESC.

MOUNTING THE SPEED CONTROL

Mount the ESC in the location specified by your vehicle’s instruction manual. Use double-sided foam tape to secure the speed control in position.

Ensure all wiring connections can be reached prior to mounting.

Use double-sided foam tape to secure the switch to a convenient location in the vehicle.



ESC LED STATUS

- No ESC LEDs will glow when there is no throttle input from the transmitter
- The red ESC LED glows when there is any throttle input from the transmitter
- The red/green LED glows when the ESC is at full forward throttle

CONNECTING THE ESC

1. Connect the ESC terminal A to the motor’s terminal A.
2. Connect the ESC terminal B to the motor’s terminal B.
3. Connect the ESC terminal C to the motor’s terminal C.

If the motor turns in the wrong direction, reverse the connection of any 2 motor wires.

NOTICE: Always disconnect the battery from the ESC when you have finished operating your vehicle. The ESC’s switch only controls power to the receiver and servos. The ESC will continue to draw current when connected to the battery, resulting in possible damage to the battery through over-discharge.

ESC CALIBRATION PROCEDURE

Ensure proper ESC function by calibrating the ESC to your transmitter inputs.

1. Power OFF the ESC.
2. Ensure your transmitter is powered ON, the throttle is not reversed, the throttle trim is neutral and the throttle travel range is at 100%. Disable any special functions such as ABS, etc.
3. Press the SET button while powering ON the ESC. Release the button as soon as the green LED starts to flash.
4. Calibrate the throttle points by pressing the SET button once after each step.
 - Neutral point (1 flash)—leave the throttle at rest, untouched
 - Full throttle (2 flashes)—pull the throttle fully back
 - Full brakes/reverse (3 flashes)—push the throttle fully forward
5. The motor will run 3 seconds after the last step is completed.

ESC FUNCTIONS AND MODES

The ESC includes programming options so you can adjust the way your vehicle performs. Refer to the included settings table to adjust the ESC for your driving conditions.

ESC PROGRAMMING PROCEDURE

Programming is accomplished using the SET button on the ON/OFF switch.

Programming the ESC:

1. Connect a fully charged battery to the ESC.
2. Power ON the ESC.
3. Hold the SET button for 1 second until the green LED blinks, then release the SET button to enter programming mode.
4. Press and release the SET button as needed to get to the desired menu option (the Green LED will blink corresponding to the menu item number).
5. When at the desired menu item, press the SET button for 3 seconds until the green LED blinks.
6. Press the SET button to move among the settings based on how many times the green LED blinks (Refer to the table for more information).
7. Save the setting by pressing the SET button for 3 seconds.
8. Power OFF the ESC switch and repeat the instructions above to change other settings.

If desired, the ESC programming can be returned to default settings by powering on the ESC switch and pressing the SET button for 5 seconds. If you perform this operation, you must recalibrate the ESC to the transmitter.

Programmable Items	Programmable Value							
	1	2	3	4	5	6	7	8
1 Running Mode	Forward with Brake	Forward/Reverse with Brake						
2 Drag Brake Force	0%	5%	10%	15%	20%	25%	30%	40%
3 Low Voltage Cutoff Threshold	non-protection	2.6V per cell	2.8V per cell	3.0V per cell	3.2V per cell	3.4V per cell		
4 Start Mode (Punch)	Level 1	Level 2	Level 3	Level 4				
5 Max Brake Force	25%	50%	75%	100%				

DESCRIPTIONS

1 Running Mode: Forward Only with Brake: Intended for competition use, this mode allows only forward and brake controls.

Forward/Reverse with Brake—This mode is the basic all-around mode, allowing forward, reverse and brake controls. To engage reverse while moving forward, apply the brake until the vehicle has come to a complete stop, release brake, then apply the brake again. While braking or in reverse, engaging the throttle will result in the vehicle immediately accelerating forward.

2 Drag Brake Force: Adjusts the amount of brake automatically applied when the throttle is returned to the neutral position. This simulates the engine braking effect of a full-scale vehicle, allowing improved turn-in and your vehicle’s general response to controls.

3 Low Voltage Cutoff Threshold: This function helps to prevent battery over-discharge. The ESC continuously monitors the battery’s voltage. If the voltage falls below the voltage threshold for 2 seconds, the output power shuts off and the red LED flashes twice repeatedly.

The cutoff threshold calculation is based on individual Li-Po cell voltage. For Ni-MH batteries, if the voltage battery pack is higher than 9.0V, it will be treated as a 3-cell Li-Po battery pack; if it is lower than 9.0V, it will be treated as a 2-cell Li-Po battery pack. Example: for a 8.0V Ni-MH battery pack used with a 2.6V/cell threshold, it will be treated as a 2-cell Li-Po battery pack and the low-voltage cutoff threshold will be 5.2V (2.6x2=5.2). Using the optional Digital Program Box (DYNS3005), you can adjust the custom values for the cutoff threshold. Unlike the preset values, custom cutoff values are for the total battery voltage, not individual cell voltage.

4 Start Mode (Punch): Sets the initial throttle punch when the car accelerates. Level 1 gives a very soft initial acceleration and level 4 gives a stronger initial acceleration.

5 Max Brake Force: Adjusts the maximum braking force. A higher value provides stronger braking, but can also cause the wheels to lock, resulting in loss of control of the car.

ESC SPECIFICATIONS

Type	Sensorless/Waterproof	Overload Protection	Thermal
Constant/Peak	70A/290A	Dimensions (LxWxH)	48mm x 35.2mm x 35.2mm
Resistance	0.0012 Ohms	Weight	74 g with wires
BEC Output	6V/3A	Battery Type/Input Voltage	2–3 cell Li-Po/Li-fe; 4–9 cell Ni-MH/Ni-Cd
Vehicle Type	1/10 Buggy or Truggy; 1/10 on-road and off-road	Function	Forward Only with Brake; Forward/Reverse with Brake
Motor Type	2S Li-Po up to 6000Kv on-road/4000Kv off-road 3S Li-Po up to 4000Kv on-road/2500Kv off-road	Operation	Proportional Forward Proportional Reverse with Braking Delay

TROUBLESHOOTING GUIDE

PROBLEM	SOLUTION
ESC switch powered ON, but no motor function and no audible tone	Recharge or replace battery
	Ensure all connections are secure
	Repair or replace ESC switch or ESC
ESC switch powered ON, but no motor function and ESC continuously sounds 1 beep between 2 second pauses	Ensure ESC programming for battery is correct for your battery
	Ensure connections between ESC and receiver are secure
	Ensure transmitter is bound to the receiver
Motor turns in the wrong direction	Ensure receiver antenna is not damaged
	Change connections of any 2 motor wires to the ESC and ensure motor turns in the correct direction
	When red ESC LED flashes, recharge or replace battery
Motor stops	When green LED flashes, let motor and ESC cool, changing set up or gearing to avoid overheating
	Ensure ESC programming is correct for voltage and battery
	Disconnect battery and let ESC cool
	Ensure ESC programming is not causing overheating
	Replace gearing
	Ensure gearing is not causing overheating
Motor accelerates irregularly	Replace with a high-power battery
	Replace battery
	Replace damaged wiring
	Adjust or replace gearing
Motor does not turn continuously in response to throttle	Replace wiring or motor
	Ensure good reception between transmitter and receiver
	Replace ESC
Steering servo operates but the motor does not run	Ensure all ESC programming matches your installed systems requirements for safety
	Ensure all receiver connections are correct and secure
	Test the motor apart from the vehicle system and repair or replace motor as needed
	Recharge or replace batteries
	Ensure all motor connections are secure
Steering and motor do not function	Adjust throttle travel or other throttle settings on the transmitter and the ESC
	Ensure all connections to receiver are correct and secure
	Refer to manufacturer's instructions to repair or replace transmitter
Vehicle does not operate at full speed	Recharge or replace batteries
	Ensure ESC programming is correct for voltage and battery
	Adjust transmitter settings, such as trim, throttle travel, etc.
	Ensure ESC settings are correct for system
Motor slows but will not stop	Calibrate throttle control to ESC
	Adjust transmitter settings, such as trim, throttle travel, etc.
	Ensure ESC settings are correct for system
Decreased transmitter range	Calibrate throttle control to ESC
	Repair or replace system antennas
	Repair or replace damaged motor, wiring and electrical parts
	Move receiver or adjust antenna location so that no metal parts are between the antenna and the transmitter
	Recharge or replace batteries
	Refer to receiver and transmitter manufacturer's instructions to adjust reception or change to a free and open radio frequency

LIMITED WARRANTY

What this Warranty Covers - Horizon Hobby, LLC, (Horizon) warrants to the original purchaser that the product purchased (the "Product") will be free from defects in materials and workmanship at the date of purchase.

What is Not Covered - This warranty is not transferable and does not cover (i) cosmetic damage, (ii) damage due to acts of God, accident, misuse, abuse, negligence, commercial use, or due to improper use, installation, operation or maintenance, (iii) modification of or to any part of the Product, (iv) attempted service by anyone other than a Horizon Hobby authorized service center, (v) Product not purchased from an authorized Horizon dealer, (vi) Product not compliant with applicable technical regulations, or (vii) use that violates any applicable laws, rules, or regulations.

OTHER THAN THE EXPRESS WARRANTY ABOVE, HORIZON MAKES NO OTHER WARRANTY OR REPRESENTATION, AND HEREBY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE PURCHASER ACKNOWLEDGES THAT THEY ALONE HAVE DETERMINED THAT THE PRODUCT WILL SUITABLY MEET THE REQUIREMENTS OF THE PURCHASER'S INTENDED USE.

Purchaser's Remedy - Horizon's sole obligation and purchaser's sole and exclusive remedy shall be that Horizon will, at its option, either (i) service, or (ii) replace, any Product determined by Horizon to be defective. Horizon reserves the right to inspect any and all Product(s) involved in a warranty claim. Service or replacement decisions are at the sole discretion of Horizon. Proof of purchase is required for all warranty claims. SERVICE OR REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE PURCHASER'S SOLE AND EXCLUSIVE REMEDY.

Limitation of Liability - HORIZON SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY, REGARDLESS OF WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, TORT, NEGLIGENCE, STRICT LIABILITY OR ANY OTHER THEORY OF LIABILITY, EVEN IF HORIZON HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. 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 the Product, purchaser is advised to return the 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). This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Horizon reserves the right to change or modify this warranty at any time without notice.

WARRANTY SERVICES

Questions, Assistance, and Services - Your local hobby store and/or place of purchase cannot provide warranty support or service. Once assembly, setup or use of the Product has been started, you must contact your local distributor or 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 visit our website at www.horizonhobby.com, submit a Product Support Inquiry, or call the toll free telephone number referenced in the Warranty and Service Contact Information section to speak with a Product Support representative.

WARRANTY AND SERVICE CONTACT INFORMATION

Country of Purchase	Horizon Hobby	Contact Information	Address
United States of America	Horizon Service Center (Repairs and Repair Requests)	servicecenter.horizonhobby.com/RequestForm/	2904 Research Road Champaign, Illinois, 61822 USA
	Horizon Product Support (Product Technical Assistance)	productsupport@horizonhobby.com	
		877-504-0233	
		websales@horizonhobby.com	
	Sales	800-338-4639	

Inspection or Services - If this Product needs to be inspected or serviced and is compliant in the country you live and use the Product in, please use the Horizon Online Service Request submission process found on our website or call Horizon to obtain a Return Merchandise Authorization (RMA) number. 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. An Online Service Request is available at http://www.horizonhobby.com/content/_service-center_render-service-center. If you do not have internet access, please contact Horizon Product Support to obtain a RMA number along with instructions for submitting your product for service. When calling Horizon, you will be asked to provide your complete name, street address, email address and phone number where you can be reached during business hours. When sending product into Horizon, please include your RMA number, a list of the included items, and a brief summary of the problem. A copy of your original sales receipt must be included for warranty consideration. Be sure your name, address, and RMA number are clearly written on the outside of the shipping carton.

NOTICE: Do not ship LiPo batteries to Horizon. If you have any issue with a LiPo battery, please contact the appropriate Horizon Product Support office.

Warranty Requirements

For Warranty consideration, you must include your original sales receipt verifying the proof-of-purchase date. Provided warranty conditions have been met, your Product will be serviced or replaced free of charge. Service or replacement decisions are at the sole discretion of Horizon.

Non-Warranty Service

Should your service not be covered by warranty, service 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 service you are agreeing to payment of the service without notification. Service estimates are available upon request. You must include this request with your item submitted for service. Non-warranty service estimates will be billed a minimum of ½ hour of labor. In addition you will be billed for return freight. Horizon accepts money orders and cashier's checks, as well as Visa, MasterCard, American Express, and Discover cards. By submitting any item to Horizon for service, you are agreeing to Horizon's Terms and Conditions found on our website http://www.horizonhobby.com/content/_service-center_render-service-center.

⚠ ATTENTION: Horizon service is limited to Product compliant in the country of use and ownership. If received, a non-compliant Product will not be serviced. Further, the sender will be responsible for arranging return shipment of the un-serviced Product, through a carrier of the sender's choice and at the sender's expense. Horizon will hold non-compliant Product for a period of 60 days from notification, after which it will be discarded.

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