ONYX™ 80A ESC 120A ESC INSTRUCTIONS

Thank you for purchasing the ONYX electronic speed controller (ESC). Operating RC models can be very dangerous, so please read this manual carefully.

Please read and understand all warnings before installation and operation!

⚠ OPERATIONAL WARNINGS!

- **ALWAYS** disconnect the battery from the ESC immediately if the ESC or battery becomes hot!! Allow the ESC or battery to cool down before reconnecting.
- **NEVER** use more than the specified voltage on the ESC's input.
- **ALWAYS** mount the ESC in a position where free air can flow through the heat sink during operation.
- **ALWAYS** turn on the transmitter before connecting the battery to the ESC.
- **ALWAYS** disconnect the battery from the ESC when not in use.
- **ALWAYS** remove the pinion gear when making programming changes. This will prevent the model from taking off accidentally.
- **DO NOT** use with brushed motors.
- **ALWAYS** activate the LVC when using a LiPo Battery. We recommend 3.1V per cell.
- **ALWAYS** use heat-shrink tubing to insulate any bare wires to prevent a short circuit.
- **ALWAYS** allow the ESC to cool before touching. It is normal for ESCs to get warm during operation.
- **ALWAYS** unplug the cooling fan if you are using the ESC in wet conditions.
- **DO NOT** allow metal/conductive materials to accidentally make contact across any or all motor/battery posts.
- **NEVER** power up the ESC before plugging it into the receiver (Rx) and switching on the transmitter (Tx).
- **ALWAYS** keep out of reach of children.
- ONYX is not responsible for incidental damage or personal injury as a result of misuse of this product.

⚠ LITHIUM BATTERY CAUTIONS!

This product may use a lithium polymer (LiPo) battery. Improper handling could result in FIRE! A lithium battery fire has the potential to ignite surrounding areas and may cause property damage or cause personal injury.

- **ALWAYS** set the LVC to a minimum of **3.2V** per cell to prevent over discharging.
- **NEVER** leave a LiPo battery unattended while charging or during operation.
- **NEVER** operate a vehicle with a LiPo battery inside a building.
- **IMPORTANT!** Always unplug the LiPo battery immediately when finished operating your vehicle.
- **ALWAYS** charge and store LiPo batteries in a fireproof location. **Never** store LiPos inside the model.
- If you ever see a LiPo battery puff or smoke during operation, disconnect the battery and move the entire model, with the battery installed, to a fireproof location (outside if possible).
- Consult the battery and charger instruction manuals for additional safety and handling precautions.

FEATURES

- Designed for sensorless brushless motors.
- Includes Forward with Brake mode and Forward with Brake/Reverse mode.
- Water and dustproof. The ESC is resistant to splashes and briefly under water. **(Note: If the cooling fan is equipped, remove it if the ESC is running near water. After running, please clean and dry the ESC to prevent corrosion).**
- Smooth acceleration and linear feel.
- Adjustable drag and maximum brake force.
- Adjustable "punch" setting from soft to aggressive.
- Safety features: Low voltage cut-off protection for LiPo and NiMH battery, Thermal protection, Signal loss protection, Motor overload protection.
- Easily to program using the "SET" button on the ESC.
- Auto-select cell count.

SPECIFICATIONS		ONXM1180	ONXM1220
Continuous / Burst		80A / 90A	120A / 300A
Resistance		0.005 ohm	0.0010 ohm
Scale		1/10 scale	
Motor Limit	2S LiPo/ 6 cell NIMH	≤ 5000 Kv motor	≤ 6000 Kv motor
	3S LiPo/ 9 cell NIMH	≤ 3000 Kv motor	≤ 4000 Kv motor
Battery		6-9 cell NiMH or 2-3S LiPo	
Cooling Fan		Included 5V (BEC-powered)	

## ESC SETUP AND OPERATION
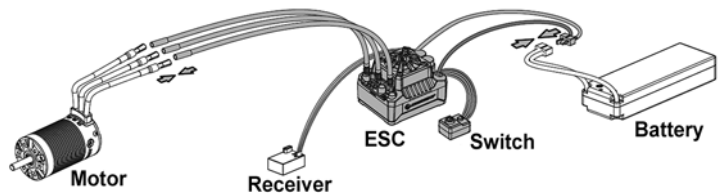
1. CONNECT THE ESC.
A. Connect the ESC to the motor in any order. If the motor rotates the wrong direction, swap any two of the three wires.
B. Connect ESC's Rx lead to the throttle channel of the receiver (typically CH2)
C. Connect the "**+**" and "**–**" wires of the ESC to the battery pack.

2. THROTTLE CALIBRATION
In order to match the ESC to your transmitter, you must calibrate it to match the trigger throw. To do this, there are 3 points that need to be set: neutral, full throttle and full brake.

A. If your Tx has an ABS feature, it must be turned off during calibration.
B. Center the throttle trim.
C. Set the EPA/ATV settings to 100%
D. Set the Tx throttle to REV for Futaba and Tactic systems (other radio systems may be different).
E. Be sure the ESC is turned off.
F. Be sure the Tx is turned on.

Press and hold the SET button.
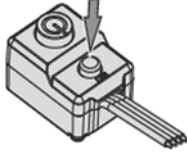
Press the ON/OFF button.
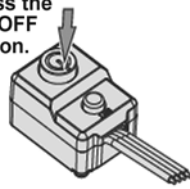
G. Press and hold the ESC's SET button.
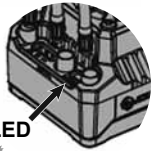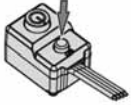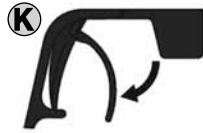
H. Turn on the ESC.

I. Release the SET button as soon as the red LED begins to blink. (If you don't release it quickly, the ESC will enter Program mode. If this happens, simply switch off the ESC and start again.)
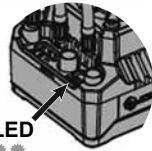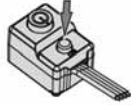

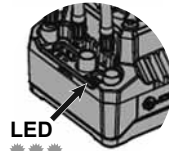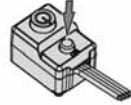**J** Neutral point
Press and hold.

LED ●
Green LED: 1 Flash

K Top point of full throttle
Press and hold.

LED ●●
Green LED: 2 Flashes

L Top point of full brake
Press and hold.

LED ●●●
Green LED: 3 Flashes

J. With the Tx trigger at the neutral point, press the SET button. The green LED will flash once to indicate the setting point has been accepted.

K. Pull the trigger to full throttle and press the SET button. The green LED will flash twice.

L. Move the trigger to the full brake position, and press the SET button. The green LED will flash three times.

M. Turn off the ESC for 2 seconds and turn it back on.

N. The ESC is now calibrated to the Tx.

IMPORTANT! Any time you reverse the throttle channel on your Tx, be sure to calibrate the throttle range.

3. LED STATUS IN NORMAL USE

A. When the throttle is in neutral, neither the red LED nor the green LED lights up.

B. When the trigger is pulled, the red LED will turn on. The full throttle position is reached when the green LED turns on.

C. When applying the brakes, the the red and green LEDs will turn on when the full brake position is reached.

D. When the car reverses, the red LED turns on.

4. PROGRAMMING THE ESC

Your ESC settings can be customized to fit your driving style and running surface conditions. Enter the programming mode and adjust the value of the items you want to change using the chart at the bottom of this page. To enter the programming mode:

A. Be sure ESC is turned off.

B. Turn on the Tx.

C. Press and hold the ESC's SET button.

D. Press the ESC on/off button to turn it on. The ESC will begin flashing red and the motor will start beeping. When the flashing LED changes from red to green, the ESC has reached the first item in the programming mode. One flash/beep is item 1, two flashes/beeps is item 2, etc. Item 5 is represented with a long flash/beep.

E. Release the set button when the flash/beeps match the number of the item you want to change. For example, if you want to change the motor's "punch" setting, you would continue holding the set button until green LED and motor flashes/beeps 10 times.

Once you released the set button the item you want to change has been selected from the menu, the motor will begin to beep and the ESC will flash red to indicate the value of the item currently set. To change the value:

F. Press the SET button and wait for the ESC to flash/beep the new value. Keep pressing the button until the ESC flashes/beeps the amount of times that match the value you want. For example, you have selected to change the value of the "punch" setting to the it will beep 3 times (its default setting). To change the value, press the SET button, the ESC will now flash/beep 4 times, showing it is now on value 4.

G. Turn off the ESC, wait 2 seconds and turn it back on. The punch setting has been changed.

Repeat the programming process for any item you want to change.

To reset all items to their default values (shown in black).

A. Position the Tx trigger to neutral.

B. Press and hold the set button for 5 seconds. The red and green LEDs will both flash.

C. Turn off the ESC for 2 seconds.

D. All items are now back at their default factory settings.

PROGRAMMABLE ITEMS *(BLACK IS DEFAULT)*									
VALUE	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Running Mode	Forward with Brake	*Forward with Brake and Reverse*							
Cell Count	*Auto Calculation*	2S	3S	4S					
Low Voltage Cut-Off	Disabled	2.8V	*3.1V*	3.3V					
ESC Thermal Protection	*105°C/221°F*	125°C/257°F							
Motor Thermal Protection	*Disabled*								
Motor Rotation	*CCW*	CW							
BEC Voltage	*6.0V*	7.4V							
Brake Force	12.5%	25%	37.5%	50%	62.5%	*75%*	87.5%	100%	Disabled
Reverse Force	25%	*50%*							
Punch	Level 1	Level 2	*Level 3*	Level 4	Level 5				
Drag Brake	0%	2%	4%	6%	8%	10%	12%	14%	16%

PROGAMMABLE ITEM DEFINITIONS

1. **Running Mode:** *Forward with brake:* The kit can go in forward and has brakes, but cannot reverse. *Forward with brake and reverse:* The kit can go in forward, has brakes, and reverse. This setting uses the "double-click" method to make the car go in reverse.
2. **Cell Count:** Select the setting that matches the pack you will be installing in the kit or let the ESC detect the pack's voltage and set itself automatically by selecting the Auto Calculation option (default).
3. **Low Voltage Cut-Off:** The function is used to prevent a LiPo battery from over-discharging. The ESC monitors the battery's voltage and if at any time the voltage drops lower than the selected value for more than 2 seconds, the motor power will be reduced to 50%. The ESC will completely cut off the output power in 10 seconds. Use the value chart to change the LVC to the setting you need. A setting of 3.1V per cell or higher is recommended.
4. **ESC Thermal Protection:** To protect itself from overheating, the ESC will automatically shut down (and the green LED will flash) if its temperature reaches the selected setting (setting 1 is suggested). The ESC will resume working once it has cooled.
5. **Motor Thermal Protection:** Locked in the disabled setting.
6. **Motor Rotation:** Use to change the direction the motor rotates when looking at the motor with its shaft point toward you. Setting 1 is counter-clockwise (default and most common). Setting 2 is clockwise.
7. **BEC Voltage:** This setting is used to change the voltage supplied to the servos. *Settting 1* (default) is 6V and is used with most servos. *Setting 2* is 7.4V which can only be used if the kit is equipped with a high-voltage servo. This setting must not be used with "standard" servos as damage may result. *Always be sure this is adjusted correctly before installing a new servo by using the program chart to determine the BEC's voltage.*
8. **Brake Force:** This adjustment alters the amount of brake the ESC applies when the trigger is moved to the full brake position. The higher the number, the more brake is applied.
9. **Reverse Force:** The amount of power applied to the motor when the Tx trigger is moved to the reverse position. **Setting 1** allows the kit to back-up at 25% of its maximum speed. **Setting 2** (default) allows the kit to back-up at 50% of its maximum speed.
10. **Punch:** This adjustment changes how much power the motor delivers at low RPM. Lower values are suggested for loose surfaces to help prevent wheel spin when getting on the throttle. The higher the number, the more aggressive the throttle feels.
11. **Drag Brake:** The amount of brake automatically applied when the throttle is at neutral. The greater the value, the more drag brake is applied. This value is set independently of the brake force.

ALERT SIGNALS

Input Voltage Error: If the input voltage is not correct, the LED will flash green twice, pause for 1 second, and then flash green twice again until the voltage input error is corrected.

Abnormal Throttle Setting/Signal Alert: When the ESC can't detect a throttle signal or the ESC is properly calibrated, it will begin to rapidly flash a red LED.

PROTECTION FUNCTION

Low Voltage Cut-Off Protection: If the voltage of a battery is lower than the select cut-off voltage for more than 2 seconds, the ESC will cut off the output power. The ESC cannot be restarted if the voltage is too low.

Thermal Protection: If the temperature of the ESC is over the factory preset threshold for 5 seconds, the ESC will cut off the output power.

Throttle Signal Loss Protection: The ESC will cut off the output power if the throttle signal is lost for 0.2 seconds.

1-YEAR LIMITED WARRANTY

PLEASE DO NOT RETURN YOUR PRODUCT TO THE STORE! ONYX will repair or replace factory defects for one year from the date of purchase. This warranty specifically does not cover crash damage, misuse or abuse. To make a warranty claim, please contact our product support team at *www.oynx-rc.com/support.*

This warranty applies only if the product is operated in compliance with the instructions and warnings provided with each model. ONYX assumes no liability except for the exclusive remedy or repair of parts as specified above. ONYX shall not be liable for consequential or incidental damages. Some states do not allow the exclusion of consequential or incidental damages so the above exclusion may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
The motor will not run and no sound is emitted.	The connections between the battery pack and the ESC are not correct.	Check the connectors for contact.
The motor won't run and emits an alert tone: « *beep beep* » with a 1 second pause, then « *beep beep* » again.	The input voltage is too high or too low.	Check the voltage of the battery pack.
The motor won't run and rapidly flashes the red LED.	Problem with the throttle signal.	Make sure the ESC is properly connected to the receiver.
	The neutral point of the throttle channel is incorrect.	Calibrate the throttle. Adjust the throttle channel trim to neutral.
The motor runs in the wrong direction.	The wiring between the ESC and the motor is incorrect.	Swap any **two** wire connections between the ESC and the motor.
The motor suddenly stops running.	The throttle signal is lost.	Check the transmitter and receiver. Check the ESC-to-throttle channel connection.
	The ESC has entered the Low Voltage Protection Mode.	Replace or charge the battery pack.
Random stopping and restarting.	Wiring is not reliable.	Check all battery, ESC signal wire, and motor connections.

PROGRAMMING FLOW CHART

ESC OFF, then Tx ON

Press & Hold SET Button, then ESC ON

Red LED Flashes

RUNNING MODE
Green LED Flashes 1 TIME

To adjust RUNNING MODE, release SET button.

Red LED Flashes 1 TIME = Forward/Brake
Red LED Flashes 2 TIMES = Forward/Brake/Reverse

CELL COUNT
Green LED Flashes 2 TIMES

To adjust CELL COUNT, release SET button.

Red LED Flashes 1 TIME = Auto Calculation
Red LED Flashes 2 TIMES = 2S
Red LED Flashes 3 TIMES = 3S
Red LED Flashes 4 TIMES = 4S

LOW VOLTAGE CUTOFF (LVC)
Green LED Flashes 3 TIMES

To adjust LVC, release SET button.

Red LED Flashes 1 TIME = Disabled
Red LED Flashes 2 TIMES = 2.8V
Red LED Flashes 3 TIMES = 3.1V
Red LED Flashes 4 TIMES = 3.3V

ESC THERMAL PROTECTION
Green LED Flashes 4 TIMES

To adjust ESC THERMAL, release SET button.

Red LED Flashes 1 TIME = 105°C / 221°F
Red LED Flashes 2 TIMES = 125°C / 257°F

MOTOR THERMAL PROTECTION (Locked, cannot adjust)
Green LED Flashes 5 TIMES

MOTOR ROTATION
Green LED Flashes 6 TIMES

To adjust MOTOR ROTATION, release SET button.

Red LED Flashes 1 TIME = Counter-clockwise
Red LED Flashes 2 TIMES = Clockwise

BEC VOLTAGE
Green LED Flashes 7 TIMES

To adjust BEC VOLTAGE, release SET button.

Red LED Flashes 1 TIME = 6.0V
Red LED Flashes 2 TIMES = 7.4V

BRAKE FORCE
Green LED Flashes 8 TIMES

To adjust BRAKE FORCE, release SET button.

Red LED Flashes 1 TIME = 12.5% (Softest)
Red LED Flashes 2 TIMES = 25%
Red LED Flashes 3 TIMES = 37.5%
Red LED Flashes 4 TIMES = 50%
Red LED Flashes 5 TIMES = 62.5%
Red LED Flashes 6 TIMES = 75%
Red LED Flashes 7 TIMES = 87.5%
Red LED Flashes 8 TIMES = 100% (Most Aggressive)
Red LED Flashes 9 TIMES = Disabled

REVERSE FORCE
Green LED Flashes 9 TIME

To adjust REVERSE FORCE, release SET button.

Red LED Flashes 1 TIME = 25%
Red LED Flashes 2 TIMES = 50%

PUNCH
Green LED Flashes 10 TIMES

To adjust PUNCH, release SET button.

Red LED Flashes 1 TIME = Level 1 (Softest)
Red LED Flashes 2 TIMES = Level 2
Red LED Flashes 3 TIMES = Level 3
Red LED Flashes 4 TIMES = Level 4
Red LED Flashes 5 TIMES = Level 5 (Most Aggressive)

DRAG BRAKE
Green LED Flashes 11 TIMES

To adjust DRAG BRAKE, release SET button.

Red LED Flashes 1 TIME = 0% Drag
Red LED Flashes 2 TIMES = 2% Drag
Red LED Flashes 3 TIMES = 4% Drag
Red LED Flashes 4 TIMES = 6% Drag
Red LED Flashes 5 TIMES = 8% Drag
Red LED Flashes 6 TIMES = 10% Drag
Red LED Flashes 7 TIMES = 12% Drag
Red LED Flashes 8 TIMES = 14% Drag
Red LED Flashes 9 TIMES = 16% Drag

TO COMPLETE PROGRAMMING, SWITCH OFF THE ESC, AND THEN SWITCH IT ON