

BL-8

8 AMP BRUSHLESS SPEED CONTROL

INSTRUCTIONS

ElectriFly's™ BL-8 Brushless ESC is designed for powering small, brushless motors for 3D aerobats and flat-foam airplanes. The BL-8 ESC is capable of delivering 8 amps of current continuously, or 9 amps of surge current, and has numerous programmable features including battery type (NiCd/NiMH or Li-Po), soft-start, brake, timing and more.

SPECIFICATIONS

Input Voltage:	5 – 10 NiCd/NiMH cells, 2-3 Li-Po cells (20V input w/o BEC)
Output current:	8A continuous max., 9A surge max.
BEC:	5V / 1.5A
Operating frequency:	8 or 16kHz programmable
On resistance:	0.013 ohms
Brake:	on / off
Acceleration:	soft, hard or automatic
Low voltage cutoff:	programmable
Max. temp. cutoff:	230°F [110°C]
Dimensions:	0.87 x 0.16 x 0.83" [22 x 4 x 21mm]
Weight:	0.42oz. with wires [12g]

SPECIAL FEATURES

- Great for small, high-performance airplanes, from flat foams to built-up 3D's.
- Fully proportional forward with brake.
- Very smooth throttle response.
- Custom BEC circuit handles up to 1.5A – great for models requiring up to three high-powered servos.
- Li-Po compatible, as well as NiCd and NiMH batteries.
- Other programmable features include:
 - Brake Control: On/off.
 - Safe-Start: On/off, prevents accidental motor spin at start-up.
 - Switching frequency: 8kHz or 16kHz, to optimize battery run-time and cool operation.
 - Low-Voltage Control: Reduce or cut motor power, but maintain radio control.
 - Timing: Soft (7 degrees), hard (30 degrees for outrunners), or automatic.
 - Reverse rotation.
- Includes over-temperature protection.
- Pre-installed universal radio connector, micro battery connector, and 2mm female bullet motor connectors.

IMPORTANT PRECAUTIONS

Please read and follow these instructions carefully before using.

- Do NOT apply an input voltage that exceeds the maximum specification above.
- Do NOT apply currents to the motor that exceeds the maximum specifications above.
- Do NOT allow the input or output connectors to accidentally touch each other while power is applied. Make sure all connections are insulated electrically.
- Do NOT allow water or moisture to make contact with the ESC's circuitry as it can cause permanent damage.
- Do NOT place the ESC in a location inside the airplane where air cannot flow. Always provide a path for external air to flow freely across the ESC while in operation.
- Do NOT attempt to touch a rotating motor as personal injury can result! If setting up the motor/ESC on the workbench, make sure the motor is securely attached and that nothing is connected to the output shaft BEFORE applying power.
- Always connect the power battery just before flight, and disconnect the battery immediately after the flight has ended.

COMPATIBLE MOTORS

The BL-8 ESC is designed to work with brushless motors of all types – except motors that include sensors. Its adjustable timing makes the BL-8 a great choice for great operation with inner-rotating and outrunner type brushless motors. Do NOT attempt to use the BL-8 ESC with traditional brushed motors as permanent damage may result!

STEP 1 – MOUNTING THE SPEED CONTROL

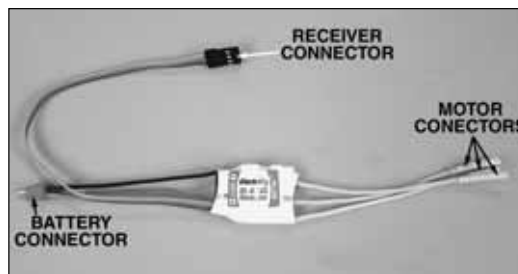
IMPORTANT!! The ESC should always be mounted in a location which allows good airflow for proper cooling!! Failure to allow good airflow over the ESC during operation can cause severe overheating, resulting in thermal shutdown and/or permanent damage to the ESC!

Determine the best location for the ESC on the fuselage. If the location of the ESC is not vented or ducted to allow airflow inside and out of the fuselage you will need to create one or more vents or ducts. For some airplanes, mounting the ESC in front of the firewall or next to the motor might be good options. Other airplanes only allow for the ESC to be mounted behind the firewall, in which case air vent holes will need to be cut in the firewall, and air exit holes may need to be cut in the tail end of the fuselage.

Mount the ESC to the airplane in a way that minimizes the amount of shock and vibration to the ESC. Attaching the body of the ESC to the model with double-sided foam tape or Velcro® is recommended. It's also a good idea to try and locate the body of the ESC as far away from the electric motor as possible, to help avoid any unwanted electrical interference.

STEP 2 – THE BEC CIRCUIT & RECEIVER CONNECTION

This ESC has a built-in "BEC" or "Battery Eliminator Circuit" which takes power from the airplane's main power battery and supplies it to the receiver and servos. The BEC delivers this power through the receiver connector. Therefore, it is **not necessary** to connect a separate battery to the receiver. Always connect the ESC's receiver connector to the receiver's throttle channel (see your radio's instruction manual for details). **IMPORTANT!!** The BL-8's BEC circuit is rated to handle up to 1.5A of current for short bursts – NOT continuous 1.5 amps of current. If your application will use higher powered servos it is very important to make sure to mount the ESC so that a large amount of air can flow over the ESC during operation.

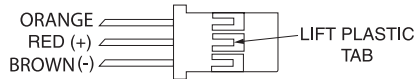


The BL-8's receiver connector is a universal style plug, and will connect directly to most R/C receivers without need for physical modification or re-wiring. The orange "signal" wire on the ESC's receiver plug should be in the same position in the receiver slot as the white wire

on Futaba®, the blue wire on the newer Airtronics “Z” connector, the yellow wire on the Hitec “S” connector, or the orange wire on the JR connector. **WARNING:** This connector is NOT directly compatible with the old Airtronics connector style. Use an Airtronics Servo Adapter to connect this ESC to the older style Airtronics radios.

DISABLING THE BEC CIRCUIT

If using more than 10 NiCd/NiMH or 3 Li-Po cells, it will be necessary to **disable the speed control's BEC circuit** and connect a separate battery to power the receiver and servos. Failure to do so will permanently damage the BEC circuit. To disable the BEC circuit:

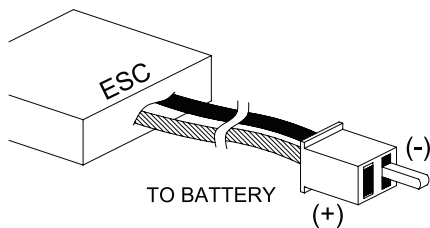


- The red wire and its terminal should be removed from the plastic shell. To do this use a small flat bladed screwdriver to **slightly, carefully** raise the plastic tab holding the metal pin. Carefully pull the red wire out of the receiver plug. Or, cut a small section of the red wire out completely with wire cutters.
- Always make sure to cover the bare terminal or cut wire with electrical tape or shrink tubing to avoid an unwanted short circuit condition.
- Connect the ESC's receiver connector to the receiver's throttle channel (see your radio's instruction manual for details).

A separate battery will then need to be connected to the receiver. When the BEC circuit is disabled, it will be important to remember not to exceed the ESC's maximum rated current!

WARNING: NEVER ALLOW THE BARE RED (+) AND BLACK (-) WIRES TO TOUCH ON ANY RECEIVER OR ESC, AS PERMANENT DAMAGE WILL RESULT TO BOTH ITEMS AND VOID ALL WARRANTIES!

STEP 3 – BATTERY CONNECTION



A polarized micro connector is pre-installed for connecting the ESC to an external battery pack. It's a good idea for the length of wire between the battery and ESC to be no longer than 6

inches. **IMPORTANT! Make sure the polarity of the battery's wires/connector matches the polarity of the wires/connector on the ESC, with the battery and ESC's red (+) wires connected and the black (-) wires connected together. NEVER allow the bare red (+) and black (-) wires to touch as permanent damage will result to both items and void all warranties.**

STEP 4 – MOTOR CONNECTIONS

The BL-8 has **three** output leads. Female 2mm bullet connectors are pre-installed on each lead. These connections are not polarized, so there is no need to match the color of the ESC's wires to the motor's wires. Once connected to the motor, make sure all connections are insulated electrically. Failure to do so could result in permanent damage to the motor/ESC if the output leads touch each other while power is applied to the ESC, thus voiding all warranties. If the motor operates in the opposite direction desired, switch **any two** of the motor wires to reverse the motor's rotation, or adjust the “reverse rotation” setting in the BL-8's programming (see page 3).

STEP 5 – TRANSMITTER ADJUSTMENTS

Proper adjustment of the transmitter's controls is critical for proper operation of the ESC. The transmitter's throttle channel adjustments should be set as follows:

- Set the throttle travel adjustment (ATV, EPA or ATL) to maximum (+/- 100% or the greatest value available).
- Set the throttle trim and sub-trim to neutral, or zero.
- For most radio types (including Futaba, Hitec and others) set the throttle channel's reversing option to “reverse.”

STEP 6 – NORMAL START UP

The BL-8's normal start-up procedure is very simple, as follows:

- Turn the transmitter's power switch to “ON.”
- Move the Tx throttle stick to MINIMUM position.
- Connect the battery to the ESC.
- You will hear one tone “♪” if the brake is set to “ON,” or two tones “♪♪” to indicate the brake is set to “OFF.”
- If the brake setting is O.K. and no other programming adjustments are needed, skip directly to Step 8 and get ready to fly. If you do wish to change the brake setting or any other programmable feature, disconnect the battery and go to Step 7 below.


STEP 7 – PROGRAMMING MODE

The BL-8 has seven programmable features, and will automatically step through each feature in order as shown below. It is **not necessary** to wait for the ESC to step through all seven programmable features unless you wish to change the setting of the last feature. Each programmable feature has its own distinguishing series of audible tones. Selecting/changing features is accomplished by moving the Tx's throttle stick in conjunction with certain tones that are emitted by the ESC. Anytime a programmable feature has been set the ESC will memorize the setting until it's changed again manually. Before entering the programming mode, remove the propeller from the motor and make sure the battery is disconnected from the ESC. It's a good idea to read through all steps below BEFORE attempting to program your ESC.

IMPORTANT!! It's critical to remember that only ONE programmable feature can be adjusted at a time. To change more than one programmable feature, after changing the first feature you must disconnect the battery from the ESC, reconnect the battery, then re-start the programming mode below to change the next programmable feature. It will be necessary to repeat this process for each programming change that you wish to make.


- Turn the transmitter's power switch to “ON.”
- Move the Tx's throttle stick to FULL throttle.
- Connect the battery to the ESC. After a 5 second delay two tones will sound “♪♪” to indicate the programming mode has been entered. The ESC will automatically begin scrolling through all of the programmable features in this order: brake > battery type > reverse rotation > soft start > low voltage indication > timing > switching frequency > restore defaults > RPM control. Follow the points below to change any of these features.
- BRAKE:** To change the brake setting, simply pull the throttle stick to minimum within five seconds of hearing the programming tones noted in step C above. This will change the state of the brake setting - if the brake was on this will turn it off, and vice-versa. You can determine which setting is active by listening to the arming tone. One tone indicates that the brake is enabled, and two tones indicates that the brake is disabled. Skip to Step 8 if you do not wish to make any other programming changes. To CHANGE ANOTHER programmable feature disconnect the battery from the ESC and return to Step B above.
- BATTERY TYPE:** The ESC will automatically sound three different series of tones to indicate the three battery type settings as shown below. If you do NOT wish to change the battery setting wait after the “♪♪♪” tones sound and the ESC will automatically skip to the reverse rotation feature below. To CHANGE the battery type, move the throttle stick to minimum when you hear the tones that match the setting you wish to have. For example, to set for a “2-cell Li-Po” battery wait until the tones for NiCd batteries have ended, then when 2 short tones sound repeatedly “♪♪” move the Tx throttle stick to minimum position. The ESC will then sound a single tone “♪” to indicate the new setting was accepted, and the ESC is now armed and ready for operation. Skip to Step 8 if you do not wish to make any other programming changes. To CHANGE ANOTHER programmable feature disconnect the battery from the ESC and return to Step B above. **WARNING: Failure to set the proper battery type will likely result in unwanted operation and/or damage to your battery.**

Battery type Series of tones

NiCd:  (cuts at 50% of initial battery voltage)



2-cell Li-Po:  (cuts at 5.6V)

3-cell Li-Po:  (cuts at 8.4V, factory default)

F. REVERSE ROTATION: The ESC will sound a series of tones as shown below to indicate the direction of motor rotation can be reversed. If you do NOT wish to change the direction of rotation wait 5 seconds after these tones sound and skip to the soft-start feature below. To CHANGE the direction of motor rotation, move the throttle stick to minimum when you hear these tones. The ESC will sound “” to indicate the new setting was accepted, and the ESC is now armed and ready for operation. Skip to Step 8 if you do not wish to make any other programming changes. To CHANGE ANOTHER programmable feature disconnect the battery from the ESC and return to Step B above. **Note:** *It may be necessary to reverse a motor's rotation when using a gear drive.*



Reverse Rotation:



G. SOFT-START: The ESC will sound two different series of tones to indicate the two soft-start settings as shown below. If you do NOT wish to change the soft-start setting wait 5 seconds after the “” tones sound and skip to the low voltage indication feature below. To CHANGE the soft-start setting, move the throttle stick to minimum when you hear the tones which match the setting you wish to have. The ESC will sound “” to indicate the new setting was accepted, and the ESC is now armed and ready for operation. Skip to Step 8 if you do not wish to make any other programming changes. To CHANGE ANOTHER programmable feature disconnect the battery from the ESC and return to Step B above. **Note:** *It's often recommended to enable the soft-start feature when using the motor with a gear drive, to help prevent breakage of the gears as the motor begins rotation (especially when a large diameter prop is being used). Enabling the soft-start feature is optional when not using a gear drive, but can be used as a safety precaution.*

Enable:  (factory default)

Disable: 

H. LOW VOLTAGE INDICATION: The ESC will sound three different series of tones to indicate the three low voltage indication settings as shown below. If you do NOT wish to change the low voltage indicator setting wait 5 seconds after the “” tones sound and skip to the timing feature below. To CHANGE the low voltage indicator setting, move the throttle stick to minimum when you hear the tones that match the setting you wish to have. The ESC will sound “” to indicate the new setting was accepted, and the ESC is now armed and ready for operation. Skip to Step 8 if you do not wish to make any other programming changes. To CHANGE ANOTHER programmable feature disconnect the battery from the ESC and return to Step B above.

This feature warns you that the battery's voltage has dropped to a dangerously low level. The ESC can be set to give a warning by either reducing or totally cutting throttle. When the throttle change is observed the airplane should be landed quickly. This feature can also be set to “ignore” so that no indication is given. When the low voltage indication is given the ESC will still deliver power to the receiver and servos to control the airplane, and regular throttle control can be regained by cycling the throttle stick to full minimum and back upward, **but the airplane should be landed quickly before all control is lost.** The voltages at which the low voltage indications will activate are as shown in the “**BATTERY TYPE**” section above.

Ignore (no indication):





Reduce throttle power (factory default):



Cut motor power:



I. TIMING (rotor advancement timing): The ESC will sound three different series of tones to indicate the three timing advancement options as shown below. If you do NOT wish to change the timing setting wait 5 seconds after the tones “” sound and skip to the switching frequency setting below. To CHANGE the timing setting, move the throttle stick to minimum when you hear the tones that match the setting you wish to have. The ESC will sound “” to indicate the new setting was accepted, and the ESC is now armed and ready for operation. Skip to Step 8 if you do not wish to make any other programming changes. To CHANGE ANOTHER programmable feature disconnect the battery from the ESC and return to Step B above.

Selecting the proper timing will help to optimize the overall efficiency of your power system. The “automatic” setting is acceptable for all types of brushless motors. The “soft” setting is for “multi-pole” or “inner-rotating” motors. The “hard” setting is for outrunner type motors.

Automatic (7-30 degree advance, factory default):





Soft (7 degrees):



Hard (30 degrees):




J. SWITCHING FREQUENCY: The ESC will sound two different series of tones to indicate the two switching frequency options as shown below. If you do NOT wish to change the switching frequency wait 5 seconds after the tones “” sound and skip ahead to the restore factory default setting below. To CHANGE the switching frequency, move the throttle stick to minimum when you hear the tones that match the setting you wish to have. The ESC will sound “” to indicate the new setting was accepted, and the ESC is now armed and ready for operation. Skip to Step 8 if you do not wish to make any other programming changes. To CHANGE ANOTHER programmable feature disconnect the battery from the ESC and return to Step B above. **Note:** *The 8kHz frequency is good for all types of 2-pole and outrunner type motors, and the 16kHz setting is good for “multi-pole” or “inner-rotating” motors.*

8kHz (factory default):



16kHz:



K. RESTORE FACTORY DEFAULT SETTINGS: The ESC will sound a series of tones to indicate the function for restoring all ESC settings back to the factory defaults. If you do NOT wish to restore all settings back to factory defaults wait 5 seconds after these tones stop and skip ahead to the active RPM control setting below. To CHANGE all settings back to the factory defaults, move the throttle stick to minimum when you hear these tones. The ESC will sound a single tone “” to indicate the new setting was accepted, and the ESC is now

armed and ready for operation. Skip to Step 8 if you do not wish to make any other programming changes. To CHANGE ANOTHER programmable feature disconnect the battery from the ESC and return to Step B above.



- L. ACTIVE RPM CONTROL:** The ESC will sound four different series of tones to indicate the four RPM control options as shown below. To CHANGE the RPM control setting, move the throttle stick to minimum when you hear the tones that match the setting you wish to have. The ESC will sound a single tone “♪” to indicate the new setting was accepted. The ESC will now be armed and ready for operation, and skip to Step 8. If you do NOT wish to change the RPM setting do not move the throttle stick, and after the last tones sound the ESC will sound “♪” to indicate the programming mode has finished, the ESC is now armed, and go to Step 8.

The active RPM control function is designed for use with small electric helicopters. Selecting the proper RPM maximum control value will help to prevent the ESC from overpowering the model during flight. Refer to your helicopter’s instruction manual for a recommended maximum RPM value. Leave this setting “OFF” for model airplanes.

RPM control off (factory default):



first range (20,000 RPM max.):



second range (50,000 RPM max.):



third range (100,000 RPM max.):



STEP 8 – RANGE TEST

Once all connections have been made and all programming has been set it’s a good idea to perform a range test with your radio before attempting a flight to ensure that a good Rf link exists between the transmitter and the airplane. With the Tx antenna collapsed and a helper holding the airplane, apply full throttle and operate the other flight controls while walking away from the airplane. Full control should be maintained at a range of up to approximately 75 to 100 feet away from the airplane. If the system fails this range test it may be necessary to re-route the location of the Rx and/or its antenna away from linkages or electronic components in the airplane. Refer to the radio’s instruction manual for further details.

TROUBLESHOOTING GUIDE

ESC DOES NOT WORK

Problem: Motor and/or Rx or servos do not function.

1. Batteries are dead. Recharge batteries.
2. Check for incorrect or faulty battery connections.
3. Check for a damaged connection between ESC and Rx.
4. Check for faulty motor connections.
5. Internal damage. Unit may require service. See “*Service Procedures.*”
6. Make sure the ON/OFF switch is set to “ON.”

Problem: Motor rotates in the wrong direction.

1. Motor wires attached incorrectly. See “*Step 4 – Motor Connection.*”
2. “Reverse rotation” setting in ESC must be changed. See “*Step 5 – Speed Control Setup.*”

ESC WORKS BUT OTHER PROBLEMS EXIST

Problem: Rx glitches or stutters during acceleration.

1. Rx mounted too close to ESC causing interference. Relocate Rx away from ESC.
2. Check for faulty power connections.

Problem: Rx and servos function, but programming tones do not function properly (does not emit setup tones).

1. ESC may need to be reset. Remove and re-apply power to the ESC.
2. Check the Tx throttle channel to see if it needs to be reversed.
3. Check ATV, EPA or ATL must be set to maximum or +/- 100%.

Problem: Model runs slowly or has no acceleration.

1. The ESC is not set up properly. Repeat “*Step 5 – Speed Control Setup.*”
2. Check for faulty battery and/or motor connections.
3. Tx is improperly adjusted. Repeat “*Step 4 – Transmitter Adjustments.*”

Problem: Rx and servos function, but motor does not rotate.

1. Tx is improperly adjusted. Repeat “*Step 4 – Transmitter Adjustments.*”
2. Check for faulty motor connections.
3. Motor is bad or hung up. Clean or replace motor.

Problem: Motor seems to function very inefficiently, has difficulty in starting to rotate, or hesitates when trying to rotate.

1. The timing feature is set improperly for the selected motor. See “*Step 5 – Speed Control Setup.*”
2. Check for faulty motor connection.
3. Problem with motor. Try a different motor.

Problem: Low voltage cutoff indicator activates at improper voltage.

1. Low voltage cutoff feature set improperly. See “*Step 5 – Speed Control Setup.*”
2. Bad cell or battery pack. Replace battery.

SERVICE PROCEDURES

ESCs that operate normally when received will be charged a minimum service fee and return shipping charges. Before sending your ESC in for service, it is important that you review the “*Troubleshooting Guide*” in this instruction sheet. The ESC may appear to have failed when other problems exist in the system, such as a defective Tx, Rx or servo, or incorrect adjustments/installation.

- Hobby dealers are not authorized to replace ESCs thought to be defective.
- Do not cut the input harness, switch harness, or power wires of the ESC before sending it for service. A fee will be charged for cut wires which must be replaced for testing.

180 DAY LIMITED WARRANTY – *U.S.A. AND CANADA ONLY

Great Planes® warrants this product to be free from defects in materials and workmanship for a period of 180 days from the date of purchase. During that period, Great Planes will, at its option, repair or replace without service charge any product deemed defective due to those causes. You will be required to provide proof of purchase (invoice or receipt). This warranty does not cover damage caused by abuse, misuse, alteration or accident. If there is damage stemming from these causes within the stated warranty period, Great Planes will, at its option, repair or replace it for a service charge not greater than 50% of its then current retail list price. Be sure to include your daytime telephone number in case we need to contact you about your repair. This warranty gives you specific rights. You may also have other rights, which vary from state to state.

For service on your Great Planes product, warranty or non-warranty, send it post-paid and insured to:

HOBBY SERVICES
3002 N. Apollo Drive, Suite 1
Champaign, IL 61822
(217) 398-0007
e-mail: hobbyservices@hobbico.com

*For warranty and service information if purchased outside the USA or Canada, see the additional warranty information insert (if applicable) or ask your retailer for more information.

www.greatplanes.com
www.electrify.com