

SILVER SERIES

Brushless Electronic Speed Controls



ElectriFly's Silver Series line of ESC's are designed for no-frill, quick plug-and-play convenience for controlling brushless motors. All feature the Safe-Start function, which prevents accidental propeller rotation until the ESC is deliberately "armed". NiCd, NiMH, and LiPo compatibility is also included, plus a high-power battery eliminator circuit (BEC). A thermal protection system will automatically stop motor rotation if ESC temperatures reach extreme levels, and a brake function can be manually switched on or off. Radio, battery, and motor connectors are all factory installed.

IMPORTANT PRECAUTIONS

Read and follow these precautions carefully before use.

- NEVER use more than the specified voltage on the ESC's input.
- ALWAYS mount the ESC in a position where air can freely flow across it 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 propeller from the motor when working on the model!
- ALWAYS observe that a propeller might unexpectedly rotate anytime that power is applied to the ESC, which could cause severe injury! Never get near the propeller!!
- Make sure the input battery is fully charged before connecting to the ESC, so the low voltage cutoff feature can function properly.
- Do not attempt to use Silver Series ESC with brushed motors.
- Do not allow water, moisture or any foreign material onto the ESC's PC board.
- Use heat-shrink tubing to insulate any bare wires between the motor battery and ESC, and from the ESC to the motor to prevent a short circuit.
- Allow the ESC to cool before touching and between flights.
- Keep out of reach of children.
- ElectriFly is not responsible for incidental damage or personal injury as a result of mis-use of this product.

BATTERY ELIMINATOR CIRCUIT (BEC)

The built-in Battery Eliminator Circuit allows the ESC's battery to also supply power to the receiver and servos, eliminating the need for a separate receiver battery. Refer to the specification chart at the end of this manual for the BEC current ratings for each Silver Series ESC.

It's very **IMPORTANT** to understand that BEC circuits are rated to handle **only a certain amount of current, power, and heat**. If such limits are exceeded the ESC might reset itself, automatically returning throttle control back to minimum! This could happen if too many servos are used, if using servos which draw high current (high torque or digital servos), **and is especially important to know when flying extreme 3D maneuvers which require all servos to be activated very rapidly at the same time**. If a BEC reset occurs, only the throttle channel will be affected – control of all other surfaces will not be interrupted. By simply "re-arming" the throttle channel (**see "STEP 6 - ESC SETUP"**) while in flight you should be able to re-gain throttle control very quickly.

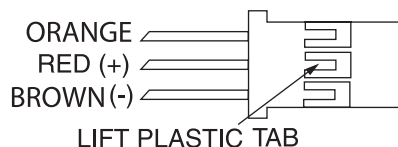
It might be hard to determine exactly how much current is being demanded through the BEC circuit. **As a general guide**, refer to the chart below to determine approximately how many servos can be used with the different size Silver Series ESCs. Remember, this is only an approximation! More extreme setups (with very high powered digital servos, for example) will be more demanding on the BEC circuit.

SS-8 & SS-12 Speed Controls	Up to 8 NiCd/NiMH cells, or 7.4V LiPos	9-10 NiCd/NiMH cells, or 11.1V LiPos	12 NiCd/NiMH cells, or 14.8V LiPos
Micro or nano size analog servos	3	3	3
Micro or nano size high torque or digital servos	2	2	2

SS-25, SS-35 & SS-45 Speed Controls	Up to 8 NiCd/NiMH cells, or 7.4V LiPos	9-10 NiCd/NiMH cells, or 11.1V LiPos	12 NiCd/NiMH cells, or 14.8V LiPos
Standard size analog servos	4	4	3
Standard size high torque or digital servos	3	3	Do not use BEC
Micro or nano size servos	5	5	4

If you experience unwanted throttle resets, it may be necessary to (a) reduce the number of servos in your aircraft, (b) use less powerful servos, (c) disable the ESC's built-in BEC circuit (described below), and instead power the receiver and servos with a separate receiver battery, or (d) disable the ESC's built-in BEC circuit, and power the receiver with a stand-alone BEC circuit that is rated for high power.

DISABLING THE BEC:



1. Make sure that no battery is connected to the ESC's power input.
2. Looking at the top side of the ESC's receiver plug, using a tiny flat bladed screwdriver, carefully raise the plastic tab in the middle which holds the pin for the RED (+) wire. Gently pull the red wire out of the receiver plug. Be sure to cover the bare pin with heat-shrink tubing or electrical tape so that it cannot short-circuit against other items.
3. Plug the ESC's receiver plug into the throttle channel on the receiver.
4. Connect a fully charged receiver battery to a receiver switch harness, and plug this into the battery slot on the receiver. In most small electric planes a 300-600mAh NiCd or NiMH battery will be adequate. A larger battery is recommended for larger airplanes, or for planes using more than 4 servos.
5. Turn on the transmitter, then the receiver's switch harness. Then connect the motor battery to the ESC. Reverse this order to shut the receiver off.

STEP 1 - CONNECTING TO THE RECEIVER



Firmly press the "receiver connector" into the receiver's throttle slot (refer to your radio's instruction manual). The orange "signal wire" should be in the same position as would the white wire on Futaba servos, the blue wire on Airtronics' "Z" connector, the yellow wire on Hitec servos, or the orange wire on JR or Spektrum servos. **Caution:** An Airtronics Servo Adapter must be used when connecting to an old style Airtronics radio.

STEP 2 - MOTOR CONNECTIONS

Silver Series ESC's have gold plated female bullet connectors installed on each motor output lead. These connections are not polarized, so there is no need to match the color of the ESC and motor wires. If the motor rotates backwards, simply switch **any two** of the ESC's motor connectors. Once connected, make sure all connections are insulated electrically. Failure to do so could result in permanent damage to the motor/ESC, and void all warranties.

STEP 3 - MOUNTING THE ESC

Determine the best location for the ESC, inside or outside the fuselage.

IMPORTANT! It's highly recommended to install the ESC so that air can freely flow across it during operation! This is especially important when using the maximum number of cells on the input, when ambient temperatures are very high, when using a lot of servos in the aircraft, or performing very active 3D maneuvers! If the airplane's structure doesn't naturally allow for air to flow into the fuselage, create vent holes fore and aft in the fuselage to allow air to pass through and across the ESC for cooling. Do NOT pack the ESC with foam padding as it will not allow the ESC to properly radiate heat and likely cause a thermal shutdown.

The best method to mount the ESC in the aircraft is with Velcro®. If the ESC will be mounted on wood, first saturate the wood with thin CA and allow it to dry. To mount the ESC on shrink covering, first clean the surface with rubbing alcohol. Then, cut a small piece 1/2" x 1/2" [12.7mm x 12.7mm] of Velcro (both hook and loop), and attach the hard hook material to the fuselage. Clean the side of the ESC with rubbing alcohol and attach the loop material.

If the wires are not long enough to make all necessary connections to the ESC yet achieve good balance in the aircraft, it's best to extend the length of the wires to the motor (not to the battery).

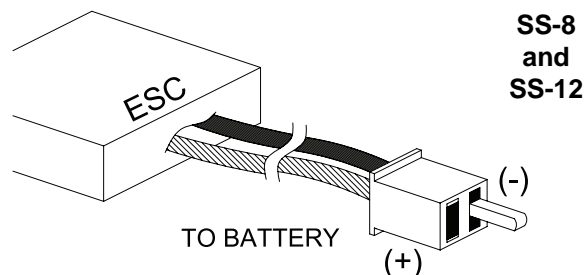
STEP 4 - NECESSARY TRANSMITTER SETTINGS

For proper ESC operation, it's very important to set the transmitter's throttle channel adjustments, as follows:

1. Set the throttle channel's travel adjustment (ATV, EPA or ATL) to 100%.
2. Set the throttle trim and sub-trim to neutral or zero.
3. Set the throttle channel's reversing switch to reverse on Futaba transmitters. Other transmitters might require you to set the throttle reversing switch to normal.

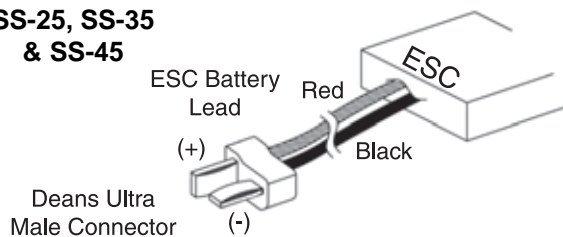
STEP 5 - CONNECTING THE BATTERY

IMPORTANT! REMOVE THE PROPELLER FROM THE MOTOR BEFORE CONNECTING THE BATTERY!



The SS-8 and SS-12 ESCs have a polarized micro connector installed, to connect the ESC to the battery (note the exposed terminal is negative polarity).

SS-25, SS-35 & SS-45



All other Silver Series ESCs have a Deans Ultra™ male battery connector like shown above.

Make sure the polarity of the battery's connector matches the polarity of the ESC's connector! Connect the red (+) leads together, and the black (-) leads. **NEVER** allow a battery's red (+) and black (-) wires to touch as permanent damage will result and void all warranties.

LOW VOLTAGE CUTOFF: All Silver Series ESCs include a low-voltage cutoff feature that stops motor rotation if the battery's voltage drops too low. This protects the battery from damage. If this activates, power will still be supplied to the receiver and all control surfaces except throttle, so you can maintain control of the aircraft.

It's **IMPORTANT** that the battery is fully charged before being connected to the ESC. The ESC will automatically set the low voltage cutoff point based on the voltage of the battery as soon as it is connected, multiplied by 0.67. For example, if the battery has only 50% full charge when connected, the ESC will set a low voltage cutoff that is too low. So make sure the battery is fully charged prior to every use.

STEP 6 - ESC SETUP

BRAKE FUNCTION: The factory default brake setting is "off". Skip to the "**ESC OPERATION**" section below if you want to keep this setting. To turn the brake "on":

1. Move the throttle stick to full throttle, turn on the transmitter and connect the battery to the ESC.
2. After 5 seconds the motor will beep twice.
3. Move the throttle stick to the off position (towards you). The motor will beep twice.
4. Again move the throttle stick to full power. The motor will beep twice to confirm the brake is now "on".
5. Move the throttle stick back to off. The motor will now beep four times indicating the motor is "armed".

To turn the brake off, repeat the above process. This time the motor will only beep once with each stick movement, but will beep four times again at the end to indicate the ESC is armed.

Once the brake is set, it does not require resetting after the ESC has been switched off.

ESC OPERATION

1. Turn the transmitter's power on.
2. Move the throttle stick to the off or brake position (towards you).
3. Connect the battery to the ESC. The motor will beep to indicate the brake setting (once for off, twice for on).

4. Move the throttle stick to full. The motor will again beep once or twice to indicate the brake setting.

5. Move the throttle stick to off or brake and the motor will beep four times. The ESC is now "armed".

If the ESC does not operate properly or makes a low pitched beeping sound following the above setup procedure, disconnect the battery from the ESC, reverse the throttle setting on the transmitter and repeat the ESC setup.

SAFE-START: As a safety precaution to prevent the motor from rotating when the battery is first connected, you must "arm" the ESC every time you connect the battery. The propeller will NOT rotate until the ESC is armed. To arm the ESC, move the throttle stick to full position, then back to off (or brake). **Now the motor will rotate anytime the throttle stick is advanced away from the off position! Care must be exercised when near the model's propeller!**

STEP 7 - RANGE TEST

Because electric motors generate electrical noise, it's critical to range test the airplane with the motor on, before flying. With the antenna collapsed and a helper holding the airplane, operate the flight controls while walking away from the airplane. You should be able to get approximately 75 to 100 feet away before losing control of the airplane's surfaces. Next, check the range with the motor running at half throttle. The range should be close to the range you got with the motor off. If it is not, you may need to move the receiver, receiver antenna, servo leads or the speed control to a different location.

TROUBLESHOOTING GUIDE

Problem - Motor and Rx do not work: Make sure the motor battery is fully charged. Make sure good contact is being made between the motor battery and ESC, and from the ESC to the receiver. Try powering the receiver directly from a separate Rx battery...if the receiver now works, the problem may be the ESC and require servicing.

Problem - The ESC functions but can't be controlled: Make sure the ESC is plugged into the receiver's throttle slot. Make sure the Tx is properly adjusted.

Problem - The receiver glitches or stutters while the motor is running: The receiver or its antenna is mounted too closely to the ESC, motor battery, or power wires. Make sure all electrical connections fit snugly.

Problem - The motor stops after only a few minutes of rotation, but all other surfaces in the aircraft can still be controlled: The propeller might be too large causing high current draw, and the ESC's temperature protection function is stopping motor rotation automatically. Make sure the motor is not damaged (bent shaft, tight bearing, etc.) causing high current draw. The ESC may need more cooling air flowing over it. Are too many servos being used in the model, or servos which are drawing too much power?

SPECIFICATIONS

	SS-8	SS-12	SS-25
Input Volts:	6-12 NiCd/NiMH 2-4 LiPo (20V max w/o BEC)	6-12 NiCd/NiMH 2-4 LiPo (20V max w/o BEC)	6-12 NiCd/NiMH 2-4 LiPo (20V max w/o BEC)
Output Current:	8A cont. max (10A surge)	12A cont. max (15A surge)	25A cont. max (28A surge)
BEC:	5V / 1.5A	5V / 1.5A	5V / 2.0A
Max. Power:	100 watts	150 watts	250 watts
Operating Freq.:	8.5kHz	8.5kHz	8.5kHz
On Resistance:	0.05 ohms	0.03 ohms	0.015 ohms
Brake:	on / off	on / off	on / off
Low Volts Cutoff:	battery volts x 0.67	battery volts x 0.67	battery volts x 0.67
Thermal Cutoff:	230°F (110°C)	230°F (110°C)	230°F (110°C)
Dimensions:	1.18 x 0.24 x 0.79" (30 x 6 x 20mm)	1.30 x 0.24 x 0.91" (33 x 6 x 23mm)	1.58 x 0.31 x 1.02" (40 x 8 x 26mm)
Weight:	0.39oz. (11g)	0.49oz. (14g)	0.92oz. (26g)

	SS-35	SS-45	SS-45D
Input Volts:	6-12 NiCd/NiMH 2-4 LiPo (20V max w/o BEC)	6-12 NiCd/NiMH 2-4 LiPo (20V max w/o BEC)	7-14 NiCd/NiMH 4 LiPo (20V max w/o BEC)
Output Current:	35A cont. max (40A surge)	45A cont. max (50A surge)	45A cont. max (50A surge)
BEC:	5V / 2.0A	5V / 2.0A	5V / 2.0A
Max. Power:	350 watts	500 watts	500 watts
Operating Freq.:	8.5kHz	8.5kHz	8.5kHz
On Resistance:	0.01 ohms	0.008 ohms	0.008 ohms
Brake:	on / off	on / off	on / off
Low Volts Cutoff:	battery volts x 0.67	battery volts x 0.67	battery volts x 0.67
Thermal Cutoff:	230°F (110°C)	230°F (110°C)	230°F (110°C)
Dimensions:	2.0 x 0.31 x 1.02" (52 x 8 x 26mm)	2.76 x 0.39 x 1.30" (70 x 10 x 33mm)	2.76 x 0.39 x 1.30" (70 x 10 x 33mm)
Weight:	1.13oz. (32g)	1.76oz. (50g)	2.26oz. (64g)

SERVICE PROCEDURES

ESC's that operate normally when received by Hobby Services 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"** on this instruction sheet. The ESC may appear to have failed when other problems exist in the system – such as a defective transmitter, receiver or servo, or incorrect adjustments/installation.

- Hobby dealers are not authorized to replace ESC's thought to be defective.
- Do not cut the input 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 USA & 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, we will repair or replace, at our option, any product that does not meet these standards. You will be required to provide proof of purchase date (receipt or invoice). If, during the warranty period, your ESC shows defects caused by abuse, misuse or accident, it will be repaired or replaced at our option, at a service charge not greater than 50% of the current retail list price. Be sure to include your daytime telephone number in case we need to contact you about your repair. This warranty does not cover

components worn by use, application or reverse voltage, cross connections, poor installation, subjection of components to foreign materials, any alterations to wires or tampering. In no case shall our liability exceed the original cost of the product. Your warranty is voided if:

- You apply reverse voltage to the ESC by connecting the motor battery backwards.
- You allow any wires to become frayed which could cause a short.
- You use more than the rated number of cells in the motor battery.
- You tamper with any of the electronic components.
- You allow water, moisture or any other foreign material onto the PC board.

Under no circumstances will the purchaser be entitled to consequential or incidental damages. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. **If you attempt to disassemble or repair this unit yourself it may void the warranty.**

For service to your ElectriFly ESC, either in or out of warranty, send it post paid and insured to:

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Champaign, IL 61822
(217) 398-0007
E-Mail: hobbyservices@hobbico.com
Internet Address: www.electrifly.com