



Mini High Power Electronic Speed Controls w/BEC



INTRODUCING THE ELECTRIFLY C-20 AND C-30 MINI ESCs

The ElectriFly C-20 High frequency and C-30 High Power ESCs feature the "Safe Start" system to prevent accidental motor starts by disabling the motor circuitry until the throttle stick is moved to full throttle, then to the "off" position.

Other features include BEC circuitry which allows the motor battery to power the receiver and servos. When the motor battery voltage is reduced to 4.8 volts, the low voltage cut-off circuitry stops the motor while continuing to supply power to the receiver and servos. This eliminates the need for and weight of a separate receiver battery. Both speed controls come with thermal shutdown protection that turns the motor off if the transistors overheat.

SPECIFICATIONS

	C-20 Mini	C-30 Mini
Dimensions:	.95" x .65" x .35" (24 x 16.5 x 9mm)	1.3" x .69" x .37" (33 x 17.5 x 9.5mm)
Weight:	0.6 oz. with wires(17g)	0.7oz. with wires(19.8g)
Input Voltage:	5-8 cells	5-10 cells
Max Rated Current:	22 amps	30 amps
BEC Voltage:	5V / 1A	5V / 1.5A
Low Voltage Cutoff:	4.8V	4.8V
Battery Plug:	Standard Type	Standard Type
Switching Frequency:	1.5 KHz	1.5 KHz

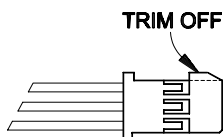
IMPORTANT PRECAUTIONS

Read and follow these instructions carefully before using.

- Do not operate the airplane on or near water. Never allow water, moisture or any foreign material onto the ESC's PC board.
- Never use more cells than specified for the main battery pack.
- The ceramic capacitors must be properly installed on the motor to prevent radio interference.
- Always disconnect the motor battery from the ESC when not in use.
- Always switch on the transmitter before switching on the ESC.
- Use heat shrink tubing to insulate any bare wires from the motor battery to the ESC and from the ESC to the motor to prevent a short circuit.
- Allow the ESC to cool before touching.

STEP 1 THE RECEIVER PLUG

The receiver plug attached to the speed control plugs directly into a Futaba "J" receiver. However, if you are using an Airtronics "Z", Hitec "S" or JR receiver, you will need to slightly modify the receiver plug on the ESC. To modify the plug, use a hobby knife or wire cutter to carefully cut off the alignment tab on the side of the receiver plug as shown.



The white "signal wire" on the ESC receiver plug should be in the same position in the receiver slot as the white wire on Futaba, the blue wire on the new 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.

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 2 MOUNTING THE SPEED CONTROL

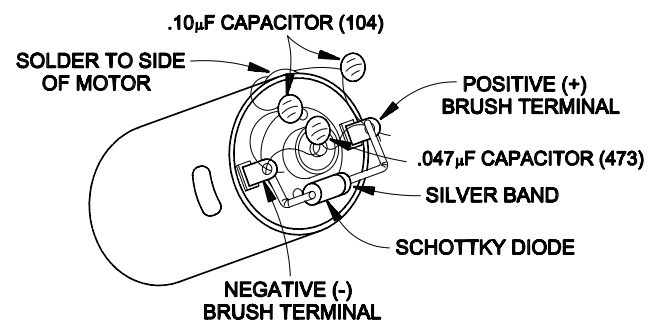
Determine the best location for the ESC inside the fuselage. The ESC should be in a position which allows good airflow for proper cooling, and closely enough to the motor so the motor wires reach the motor. It is highly recommended to put cooling air intake holes in the front of the fuselage and exit holes towards the aft end.

The best method to mount the ESC in the fuselage is with Velcro®. If the ESC will be mounted on wood, first saturate the wood with thin CA and allow to dry. Cut a piece of Velcro (both hook and loop) approximately 1/2" x 1". Attach the hook (hard) material to the inside of the fuselage. Clean the bottom of the ESC (the side with the wires) with rubbing alcohol and attach the loop (soft) material. The ESC on/off switch can be mounted on the outside of the fuse using two #2 x 3/8" self-tapping screws.

STEP 3 INSTALL THE MOTOR CAPACITORS

Motors generate radio noise which can interfere with your receiver and cause problems. Your ESC includes two .10µF (104) and one .047µF (473) non-polarized, ceramic capacitors. These capacitors must be used at all times, and on every motor to help reduce the radio noise generated by the motor and prevent possible damage to the ESC.

- Cut a piece of heat shrink tubing long enough to cover one of the leads on both of the .10µF capacitors, leaving approximately 1/4" of the lead exposed at the bottom.
- Solder the 1/4" of exposed lead from one of the capacitors to the positive brush terminal on the motor end cap.
- Solder the 1/4" of exposed lead from the second capacitor to the negative brush terminal on the motor end cap.
- Solder the remaining leads from both capacitors to the side of the motor case.
- Cut two pieces of heat shrink tubing long enough to cover both leads on the .047µF capacitor, leaving approximately 1/4" of the lead exposed at the bottom.
- Solder one of the leads to the positive brush terminal and the other lead to the negative brush terminal.
- Solder the positive (+) lead from the ESC to the positive brush terminal on the motor and the negative (-) lead to the negative brush terminal on the motor.



SCHOTTKY DIODE

Installing the schottky diode will provide a slight increase in the ESC efficiency and reduce its operating temperature. The schottky diode must be installed correctly. Installing it backwards will destroy it.

Correct Installation Of The Schottky Diode:

- Solder the lead **closest** to the silver band on the diode body to the positive (+) terminal on the motor.
- Solder the lead **opposite** the silver band to the negative (-) terminal on the motor.

STEP 4 CHANGING THE MOTOR & BATTERY PLUG (OPTIONAL)

Because of the many different types of plugs available, we cannot cover the installation of each plug type. The following instructions will help you prepare the wires for installation of any plug type.

1. Remove the existing plug by cutting the wires behind the plug, and separate the red and black wires.
2. Strip 1/4" of insulation from the end of the red wire.
3. Twist the strands of the bare wires together tightly.
4. Tin the ends of the wires with solder made specifically for soldering electronics. We recommend 60/40 rosin core solder.
 - A. Pre-heat your 15 to 30 watt soldering iron.
 - B. While holding the tip of the soldering iron on the bare wire, touch the solder to the bare wire very near the iron tip and allow the liquid solder to flow through the wire. This whole process should only take a couple of seconds. Make sure the soldering iron is not held on the bare wire too long, otherwise the insulation will start to shrink.
 - C. When properly tinned, the end of the wires should be completely covered with a light coat of solder.

- Follow the instructions included with your replacement plugs for proper installation. **WARNING:** Be sure to observe proper polarities. Also, make certain that solid physical and electrical connections are made with solder joints. Failure to do so can jeopardize the ESC, and other components.

STEP 5 TRANSMITTER ADJUSTMENTS

Adjusting the transmitter is critical for proper ESC operation. The transmitter throttle adjustments should be set as follows:

- If your transmitter has servo travel adjustment (on some transmitters this is may be called ATV, EPA or ATL, see the instructions included with your transmitter for proper adjustment), set the travel adjustment for the throttle channel to 100% or full travel. Servo travel adjustment allows a modeler to change the amount of deflection on a particular channel. Setting the throttle channel travel adjustment to 100% will allow the power transition from minimum to maximum power on the electronic speed control to be smoother.
- Set the throttle trim and sub trim on your transmitter to neutral or zero. Most non-computer transmitters do not have sub trim. The throttle trim on nearly all transmitters is adjusted by the lever next to the throttle stick. This lever should be centered.
- If you are using a Futaba transmitter, set the throttle reversing switch on the transmitter to **reverse**. On Hitec, Airtronics and JR transmitters, set the throttle reversing switch to **normal**. If you have a different brand of transmitter, begin by setting the reversing switch to normal.

STEP 6 SPEED CONTROL SETUP

Before you begin this step, remove the propeller from the motor. Then, plug the ESC into the throttle channel on the receiver and adjust the transmitter. Before you connect the motor battery pack to the ESC, make sure the power switch on the ESC is switched "OFF." Connect the motor battery pack to the ESC.

- Move the throttle stick to idle (towards you).
- Switch on the transmitter.
- Connect the motor to the ESC. **WARNING: Never attempt to connect the battery pack to the motor wires on the speed control.**
- Switch on the ESC. The "idle" or "motor off" position is now set.
- Move the throttle stick to full power (away from you). The red LED will blink (approximately 3 seconds) indicating full power has been set.
- Move the throttle stick back to idle (towards you). The red LED will go off.
- The ESC is now ready to operate.

IMPORTANT: If the speed control does not operate properly after following the above set-up procedure, switch the throttle reversing switch on the transmitter and repeat the speed control set-up.

As a safety precaution to prevent the motor from starting when the ESC is first switched on, you will need to move the throttle to full and off every time the ESC is switch on.

STEP 7 RANGE TEST

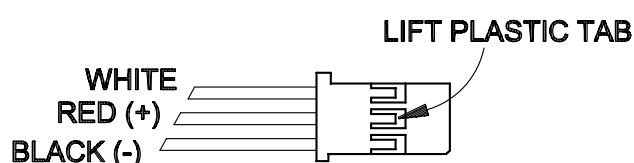
Because electric motors generate electrical noise it is critical to range test the airplane, with the motor on, before flying. With the antenna collapsed and a helper holding the airplane, operate the flight controls while walking away from the airplane. You should be able to get approximately 75' to 100' away before losing control of the airplane. 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 speed control to a different location.

OPTIONAL RECEIVER BATTERY

A separate receiver battery may be needed if high power servos are used. With a helper holding the airplane and the motor running, move all the servos simultaneously. If the servos slow down or stop, a separate receiver battery should be used.

Installing A Separate Receiver Battery:

- Remove the red wire from the ESC receiver plug. To do this use a small flat bladed screwdriver to raise the plastic tab holding the metal pin. Carefully pull the red wire out of the receiver plug and insulate the pin with heat shrink tubing or electrical tape.



- Plug the ESC into the throttle channel on the receiver.
- Connect a separate receiver battery to a receiver switch harness and plug this into the battery slot of the receiver. In most electric planes a 270mAh receiver battery will work well. If the ESC is used in an electric sailplane a 600mAh receiver battery is recommended.
- To operate the receiver, first switch on the switch harness, then the ESC. Reverse the order to shut the receiver off.

TROUBLESHOOTING GUIDE

SPEED CONTROL DOES NOT WORK

Problem: Motor and receiver do not work.

- Make sure motor battery is charged.
- The plug between the motor battery and ESC may not be making contact.
- Check that the ESC plug is correctly plugged into the receiver.
- Unplug the ESC from the receiver and plug a receiver battery into the receiver. Does the radio work now? If it does, the problem may be the ESC and requires servicing.

Problem: The ESC runs but cannot be controlled.

- Make sure the ESC is plugged into the correct slot in the receiver.
- Check that the transmitter is adjusted properly.

SPEED CONTROL WORKS (BUT OTHER PROBLEMS EXIST)

Problem: Receiver glitches or stutters while motor is running.

- The three motor capacitors are not installed correctly or have broken.
- Receiver is mounted too close to the ESC.
- The receiver antenna is routed too close to the motor battery, ESC or wires.
- The motor battery/ESC plugs do not fit tightly.

Problem: Motor quits after only a few minutes of running.

- The prop on the motor may be too large, causing high current draw and overheating the speed control. The thermal cutoff is switching the motor off.
- The motor may be damaged (bent shaft, tight bearing or shorted winding) causing high current draw.
- The ESC may need more cooling air flowing over it.

Problem: Motor runs backwards.

- The ESC is wired to the motor backwards.

SERVICE PROCEDURES

Please Note: 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 Trouble-Shooting 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 ESCs thought to be defective.
- Do not cut the input wires or switch harness 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

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 of 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 pack backwards or plugging the motor wires into the motor battery pack.
- You allow any wires to become frayed which could cause a short.
- You use more than the rated number of cells (1.2 volts per cell) in the motor battery pack.
- 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 C-20 and C-30 ESC**, either in or out of warranty, send it post paid and insured to:

Hobby Services

1610 Interstate Drive
Champaign, IL 61822
(217) 398-0007

E-Mail: hobbyservices@hobbico.com
Internet Address: www.electrifly.com