

49" Aircraft



Build Guide

EXTREME FLIGHT

Please read the following paragraphs before beginning assembly of your aircraft!

THIS IS NOT A TOY! Serious injury, destruction of property, or even death may result from the misuse of this product. Extreme Flight RC is providing you, the consumer with a very high quality model aircraft component kit, from which you, the consumer, will assemble a flying model. It is beyond our control to monitor the finished aircraft you produce. Extreme Flight RC will in no way accept or assume responsibility or liability for damages resulting from the use of this user assembled product. This aircraft should be flown in accordance to the AMA safety code. It is highly recommended that you join the Academy of Model Aeronautics in order to be properly insured, and to operate your model at AMA sanctioned flying fields only. If you are not willing to accept ALL liability for the use of this product, please return it to the place of purchase immediately.

Extreme Flight RC guarantees this kit to be free of defects in materials and workmanship for a period of 30 DAYS from the date of purchase. All warranty claims must be accompanied by the original dated receipt. This warranty is extended to the original purchaser of the aircraft kit only.

Extreme Flight RC in no way warranties its aircraft against flutter. We have put these aircraft through the most grueling flight tests imaginable and have not experienced any control surface flutter. Proper servo selection and linkage set-up is absolutely essential. Inadequate servos or improper linkage set up may result in flutter and possibly the complete destruction of your aircraft. If you are not experienced in this type of linkage set-up or have questions regarding servo choices, please contact us at info@extremeflightrc.com or 770-887-1794. It is your responsibility to ensure the airworthiness of your model.

We recommend that you read this build guide entirely before beginning your assembly, to familiarize yourself with the tools needed and materials used.

Notes on the 49" Series:

- 1.The only hinges you need to install are for the rudder. The ailerons and elevator are pre-hinged and gap-sealed.
- 2.Our standard power recommendation for the 49" Series is the T-Motor AM480 + T-Motor AM66A ESC. The T-Motor AM480 is, at the time of this writing, available in two flavors - a 900KV version for 4S 2000-2700mah lipo and a 600KV version for 6S 1800-2200 lipo.
- 3.All of our Extreme Flight aircraft have Datasheets available on their respective webpages. On these data-sheets you will find information specific to each aircraft, such as the codes for the covering material, should you need to repair.
- 4.At the time of this writing, we recommend EF/Theta 921 servos with our EF aluminum 1" arms. Be cautious about the servos you choose for this aircraft. The recommended power system is quite powerful and will cause surface blowback and possibly flutter on weak, inexpensive servos.

Covering

Your aircraft has been on a journey around the world since it left our factory. Although the covering material was perfectly smooth when it was boxed up, changes in weather and humidity may have wrinkled the covering material. For certain, wrinkles will appear in the covering once you have unpacked your aircraft and it adjusts to the atmospheric conditions in your region. Learning to remove wrinkles from covering is a necessary skill to maintain your wood aircraft.

Your Extreme-Flight produced aircraft is covered in Ultracote covering material (US market name), also called Oracover in global markets. If you need replacement covering to repair damage, Ultracote/Oracover is widely available from retail hobby suppliers. Also, each roll of Ultracote/Oracover includes excellent instructions which are also available online. Please refer to them for details about working with and/or repairing your covering.

The basic tools are a covering iron and a hobby heat gun. Start by using the iron at 220F (104C) to seal all of the edges on the covering scheme. This is CRITICAL on the leading edges of wings and stabilizers. Then use the iron at 300F (149C) or a heat gun to shrink out any wrinkles in the covering. Remove the plastic canopy from the aircraft when using a heat gun to protect it from heat damage. GO SLOWLY AND CAREFULLY to avoid over-shrinking or burning the covering. This is a skill which takes a bit of practice. There are many tutorial videos online demonstrating shrinking wrinkles from Ultracote.

Periodically repeat the sealing and shrinking process to keep your aircraft in good condition.



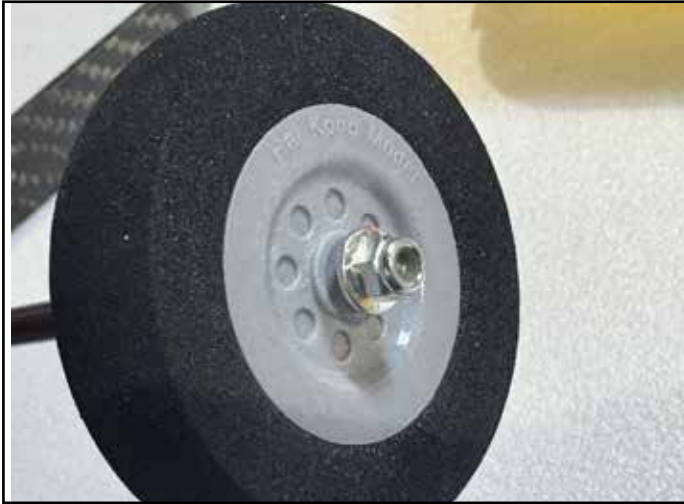
If you need additional covering material to repair your aircraft, check the aircraft datasheet available on the airplane page on our website for color codes.

1

Locate the carbon landing gear and note that when installed correctly, the gear sweeps slightly forward.

Install the wheels onto the axles, securing with locking nuts.

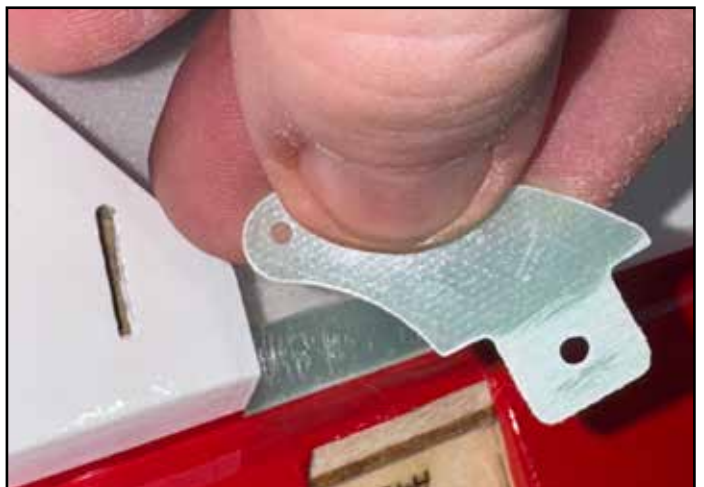
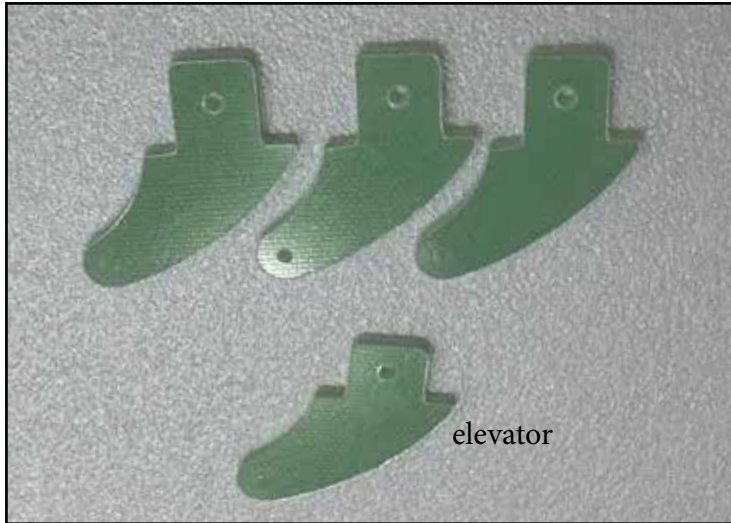
Install the axles onto the gear, capturing the fiberglass wheel pants as shown, and install the washers and nylon-locking nuts as shown. Finally, install the gear assembly onto the bottom of the fuselage with 3mm bolts as shown, put a drop of BLUE Loctite onto each bolt.



2.

Locate the control horns for your aircraft, there are four, one for each control surface. They are installed into pre-made slots in the control surfaces. One horn has a shorter "tab", the portion which is inserted into the surface. This shorter horn is for the elevator, because the elevator is a thinner surface.

Begin by using sandpaper to scuff the tab portion of each horn as shown. This cleans the surface and preps it for glue. Then test-fit each horn into its slot with no glue, to make sure of an easy fit. Remove the horn and apply glue into the slot. There are two types of glue you can use. We use Medium CA glue on our builds. You can also use an epoxy glue (5-30 min cure time) if you prefer. Either way, put plenty of glue into the slot and a little on each side of the horn tab. Some excess glue will squeeze out as you insert the horn. For CA, use Acetone to clean up. For epoxy, use denatured alcohol to clean. Allow to cure.



3.

Locate the filler block at the rear of the fuselage and remove it. Locate the horizontal stabilizer with elevators, you should have just installed the elevator control horn into it. Make sure it is correct-side-up and test-insert it into the slot in the fuselage. Push it all the way forward until the joiner between the elevators is rotating in the cutout provided and the elevators can smoothly deflect all the way up and down. You have two choices for gluing in the stab. We prefer to fully install it and then add 9-12 drops of thin CA glue from the rear and through the servo openings. Alternately, you can remove the stab and apply some epoxy glue (5-30 min curing time) to the gluing area and then re-insert it. Use acetone or denatured alcohol to clean up as appropriate. Re-install the filler block with glue as shown.



4

The rudder is installed by inserting the flat hinges into slots in the vertical stabilizer. Spend a little time to line everything up, once you get the hinges and slots properly lined up, the hinges will easily insert into the slots with a slight back-and-forth sawing motion.

The only type of glue you should use on these hinges is thin CA glue. Fully insert the rudder hinges, swing the rudder back and forth a few times to insure full and smooth motion, and make sure the gap at the hinge isn't more than about 1mm. Then apply 2-3 drops of thin CA glue to each hinge. Allow to cure. Clean up any spilled glue with acetone.



5.

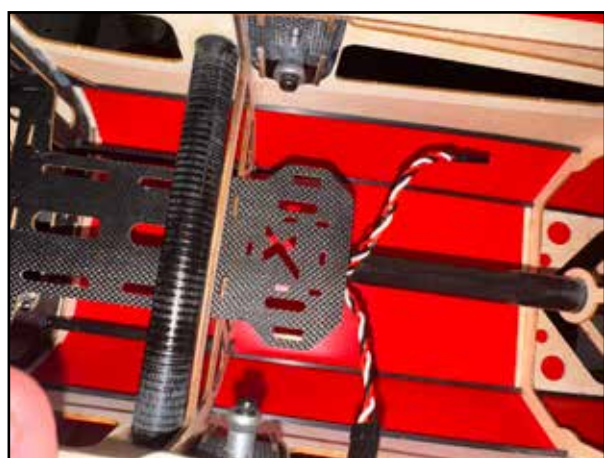
Once the rudder is cured, you can install the tailwheel using three wood screws as shown. Two of the screws hold the carbon mounting bracket to the fuselage and should be fully tightened. The rear screw holds the aluminum steering tiller arm to the rudder. Because the tiller needs to slide a tiny bit in order to smoothly function, this rear screw should be left just slightly loose, and check the action by making sure the rudder can freely and easily swing each direction.

Locate the parts for the pushrods. On these 49" aircraft all four pushrods are identical length. Assemble the pushrods by screwing the ball links onto the threaded ends as shown, we like to use a cordless drill to assist as shown.



6.

Next install the rear servo extension wires into the fuselage. There is a black plastic tube installed into the fuselage which can be used as a path for the extensions and to make a clean wire install. Because of the small size of the 49" aircraft, it can be challenging to pull the servo extension wires through the tube. A length of string is installed into the tube to assist. Look into the fuselage through the rear servo penings to locate the pull string and handle, use a needle-nose pliers or hemostat to grab the handle. Tie the pull string to the extensions and guide them through. We find that it helps sometimes to wrap tape around the plugs as shown to help guide them into the tube.



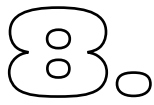
7.

Install the tail servos for elevator and rudder as shown. The recommended TH-921 servos include three mounting screws each. We recommend our matched Extreme Flight 1" servo arms as shown. Attach the pushrods to the servo arm and control horn with 2mm screws, washers, and nylon locking nuts as shown.



For the aileron servos, run the wires as shown, using a rubber grommer from your kit as indicated. Note that when the linkage is properly installed, it is "crooked" at the neutral position and becomes "straight" at full deflection.



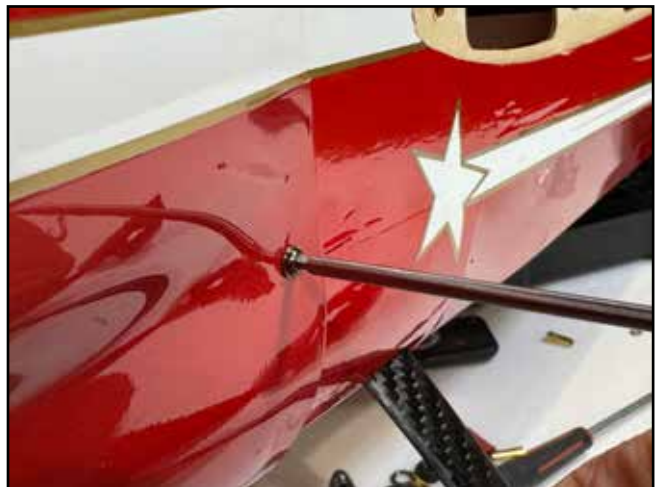


This step details the installation of the T-Motor AM480 power system, but the installation of all brushless outrunner motors will be very similar. There are two X-mounts which can be equipped on the AM480, the 49" aircraft can accommodate either one. Attach the X-mount to the motor (if your motor includes both, the larger is somewhat easier to install) with loctite and attach the motor to the firewall with bolts and locking nuts.

Note that the firewall/motor mount is pointed 2.5 degrees to the RIGHT. This is by design. The effect of the spinning prop is to push the nose of the aircraft left in high-power/low-air-speed maneuvers. The motor points slightly right to largely cancel this effect and make the airplane easier to fly.

NOTE: Over the course of AM480 production since the beginning, there have been both 49mm length and 51mm length motors produced. Either length can be used on the 49" aircraft, but the longer motor will have a slightly larger gap between the spinner and a cowl. Other motors besides the AM480 can be used, but if their length is not extremely close to the length of the T-Motor 480, you will need to supply appropriate spacing.

Attach your ESC to the bottom of the motor box using velcro or zip ties. Install your cowl with four screws as shown.



9

Your kit includes a cosmetic cover plate for the landing gear mount area. Install it with two dollops of rubberized glue as shown, we prefer Gorilla brand "Clear Bond" glue, Goop or Silicone are good alternatives.



10.

Mount your receiver to the tray behind the wing tube as shown.

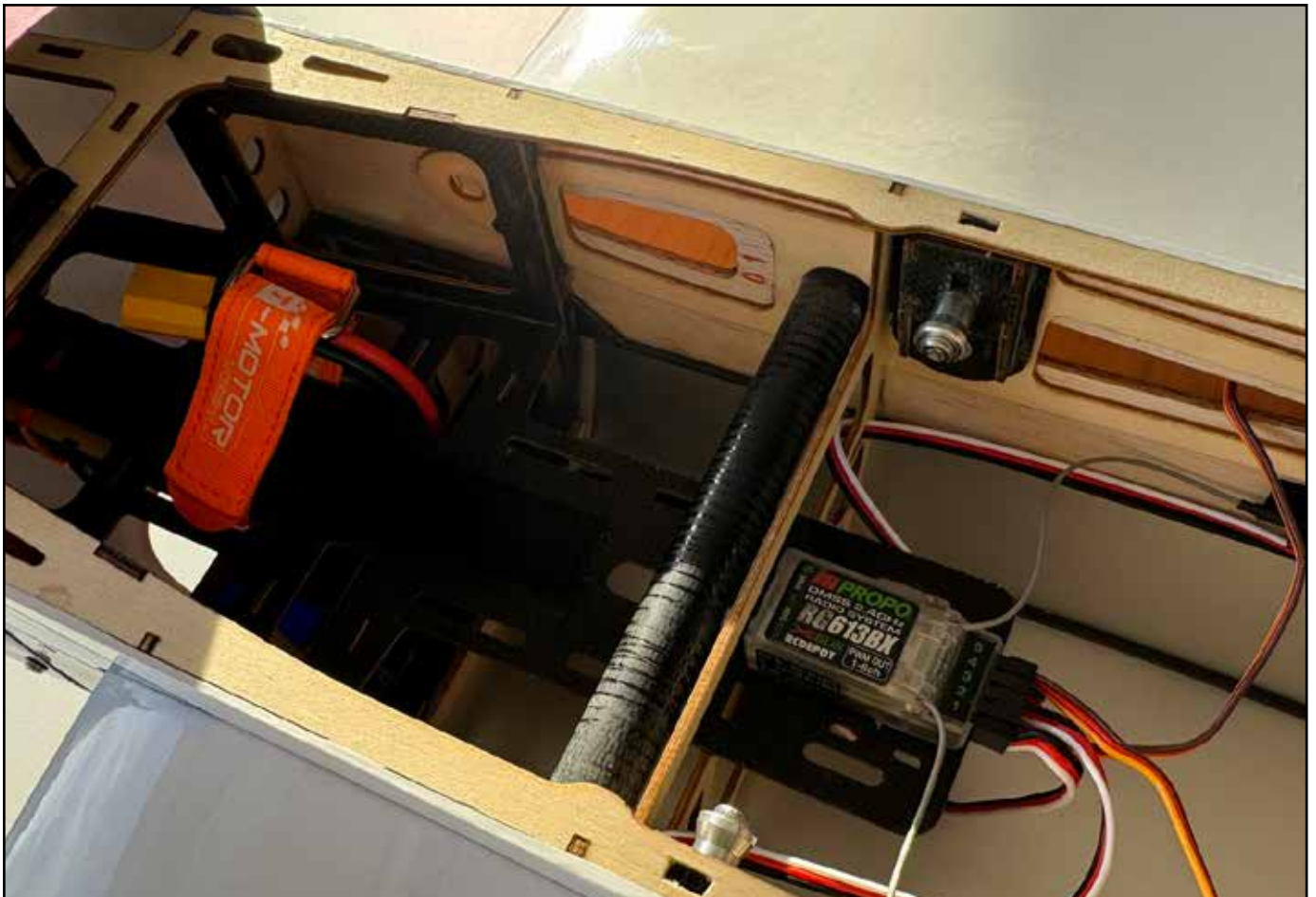
Mount your lipo battery using the included self-adhesive velcro between the battery and the tray, and use a velcro strap that go around the battery and the tray. The forces exerted during hardcore aerobatics trying to pull your battery off of the tray are extreme. Make sure it is well attached.

NOTE: when powering your aircraft, observe these important safety rules:

- 1.Remove the prop anytime you are working on your aircraft and the lipo will be plugged in.
- 2.Remove the prop before first powering your system in case the throttle channel is reversed or incorrect.
- 3.Remove the prop before powering your aircraft for any purpose except flight.

Special note about gyro stabilization systems:

49" aircraft are a popular choice to install stabilization systems into. The first note is that they are not needed, these aircraft are very stable and easy to fly, particularly on low rates. Secondly, it is imperative that, in order to successfully tune your aircraft, you fly and trim the airplane without the gyro installed. Difficulty in trimming is an extremely common complaint from gyro users, and the best way to prevent this is to trim without the gyro installed first, then install the gyro after the aircraft is fully trimmed.

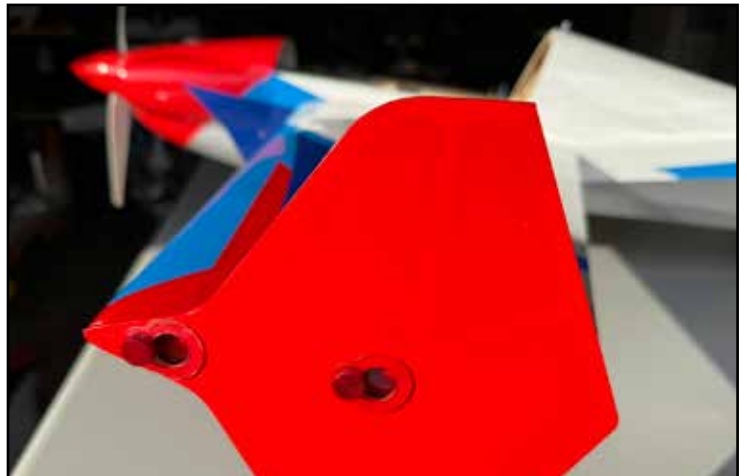
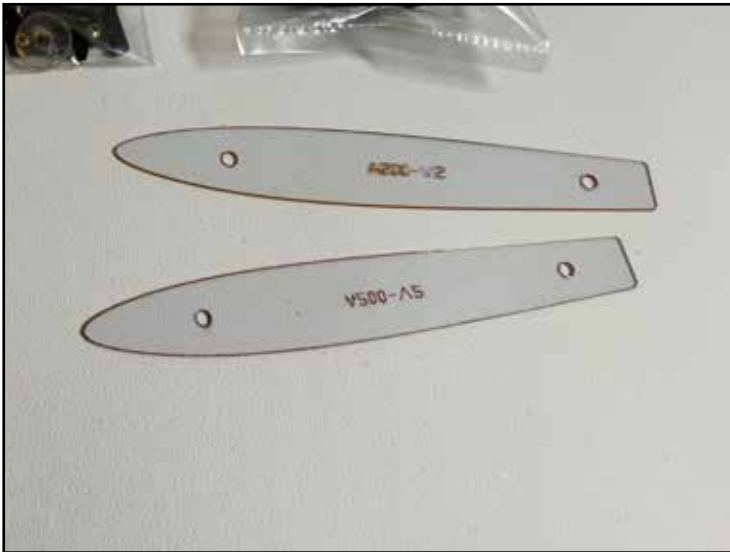


11.

Your kit includes quick-attach SFG's (Side-Force Generators), flat winglets which attach to the wingtip. The main effect of the SFG's is to make the aircraft more stable in 3D flight. You should definitely try them, all of our pro team pilots prefer the 49" series with the SFG's installed. Use the included clear plastic spacers between the SFG's and the wingtip to prevent the SFG rubbing on the aileron during flight.

Clear plastic wear guard washers are included, glue these to the SFG's with Clear Bond or similar. With the tumb screws loosened, the SFG's slide on, then tighten the screws.

The SFG's are meant to be removed to allow the wing to be stored between trips to the flying field, so do not loctite these screws.



12.

Set up your control surfaces with appropriate throws, our recommended settings are below:

NOTE: Remove your prop when doing this step, it is a common mistake to accidentally reverse the throttle channel with disastrous results.

Our favorite tool for measuring control throw is a cell phone with an angle finder app. Place the phone against the surface at the neutral position, zero the app, then deflect the surface and hold the phone against it to measure.

Control settings:

Elevator: Low Rate 8-10 deg. 15-20% expo
High Rate 55 deg. 60-65% expo

Aileron: Low Rate 15-20 deg. 40-45% expo
High Rate 36 degrees up, 35 degrees down 70-75% expo

Rudder: Low Rate 20 deg 40-45% expo
High Rate 55 deg. 80-90% expo



13.

Center of gravity:

Your model has a very wide Center of Gravity range. Unlike some types of model aircraft, CG is not merely a point on these 3D aerobatic aircraft, it is a range.

At the front of the range, a more nose-heavy airplane will:

Fly in straight lines without much pilot attention.
Be overall less responsive, especially less responsive to elevator.
Tend to keep its nose down on final approach for easy landings.

At the back of the range, a more tail-heavy airplane will:

Tend to need more attention to hold perfectly straight lines.
Be overall more responsive, especially more responsive to elevator.
Tend to need the pilot to hold the nose down on final approach.

On these aircraft, to balance at a nose heavy CG, assemble the aircraft except for the canopy hatch. Pick the airplane up by its carbon wing spar tube. It should hang level or slightly nose-down. Adjust the battery position as needed.

If you would rather have a more tail-heavy CG for high performance 3D flight, pick the aircraft up and set the battery so it hangs level:

49" Laser: When supported by the knobs of the wing locks.

49" Extra 260: When supported by the wood former immediately behind the wing tube.

Your final CG location should be determined after testing at different positions to find your best one.

14.

If you are using the T-Motor AM480 power system, it is pre-programmed and no settings adjustments are needed. You will need to calibrate your throttle channel.

While the prop is OFF of the airplane, calibrate your throttle channel to the ESC.

Move your transmitter stick to FULL THOTTLE

Power on your airplane

Wait for the ASCENDING TONES

Move the stick to LOW THOTTLE

Wait for the DESCENDING TONES

Calibration is complete.

ALWAYS do this kind of work with the prop removed.

NOTE: If the system is unresponsive to throttle when you power it up, most likely your *throttle channel needs to be reversed* (especially Futaba radios) or you need to trim/sub-trim your throttle channel LOWER so that the ESC receives the correct signal to arm.