85-93"

Build Sequence Manual



EXTREME FLIGHT

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Please read the following paragraph 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, Ltd. 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.

Congratulations on the purchase of a high-performance model aircraft from Extreme Flight. This basic build manual will guide you through the assembly process. All aircraft from Extreme Flight assemble in fundamentally the same way, so we have created this manual to cover the 85-93" class of aircraft which are powered by 50-76CC gas engines or 6KW 12S electric.

1.Unpacking and Sealing 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. 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 stores. 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.



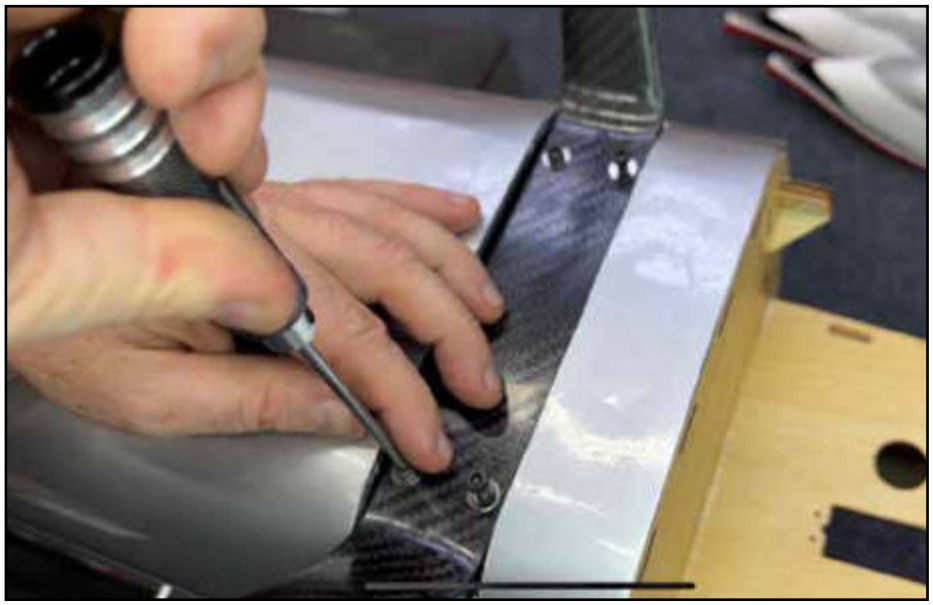


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2.Landing Gear

Extreme Flight aircraft use a carbon-fiber high strength landing gear. Depending on the model, it may sweep forward (Extras, Slicks, Yaks, MXS, Edge) or back (Gamebird) when installed. Consult photos of your aircraft if you are unsure which direction to install the landing gear.





The landing gear installs onto the fuselage using four screws and washers, which thread into either locking nuts, or pre-installed blind nuts in the fuselage. Use blue loctite here. Your kit may include landing gear fairings made of either fiberglass or wood. Test fit these fairings to find the best fit, then attach to the landing gear legs with a dollop of GOOP rubberized adhesive. Allow to cure. Locate the wheel axles and attach to the landing gear legs as shows using the locking nuts. Find the flat spot on the end of the axle, make sure it points DOWN when the aircraft is upright.





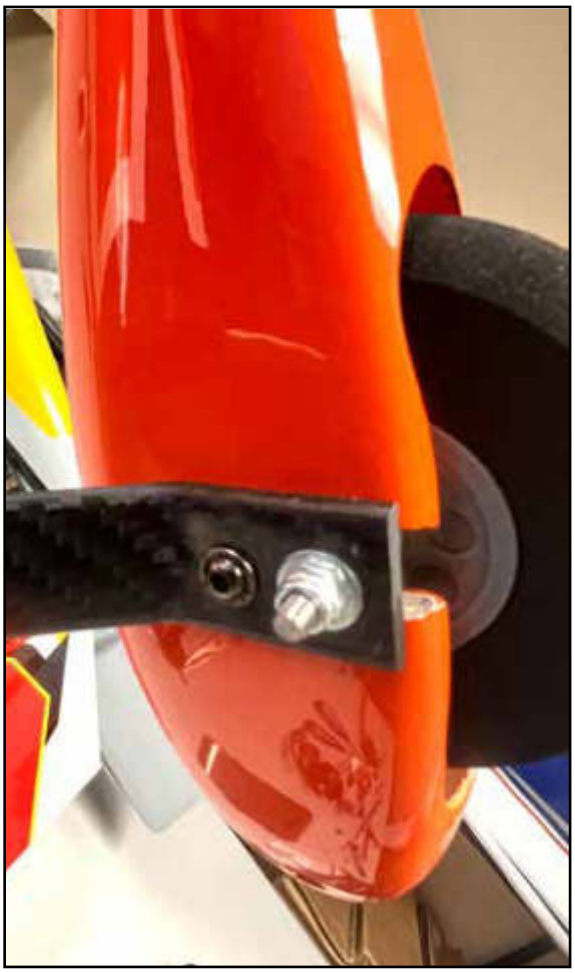
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Most Extreme Flight aircract use full-coverage wheel pants (The 85" Yak is one exception) and so they have a wheel pant support integrated into the outer wheel retainer. Assemble the retainer from the wood piece and aluminum piece with screws as shown. Place the wheel on the axle and retain with this assembly. Use blue Loctite on the set screw.





Install the wheel pant over the wheel and axle, tighten to the landing gear with one or two screws as designed, using blue loctite. The wheel pant support should sit against the pant as shown. Flex the pant away from the retainer and apply some epoxy glue between the rainter and pant.





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The 85" Yak uses a half-pant on its wheel. To install these, drill holes as appropriate for the wheel axles, and sandwich the half-pant between the axle and landing gear as shown. Lock the half-pant in place with included wood screws as shown. Finish with a wheel collar to retain the wheel, use blue loctite on the set screw.



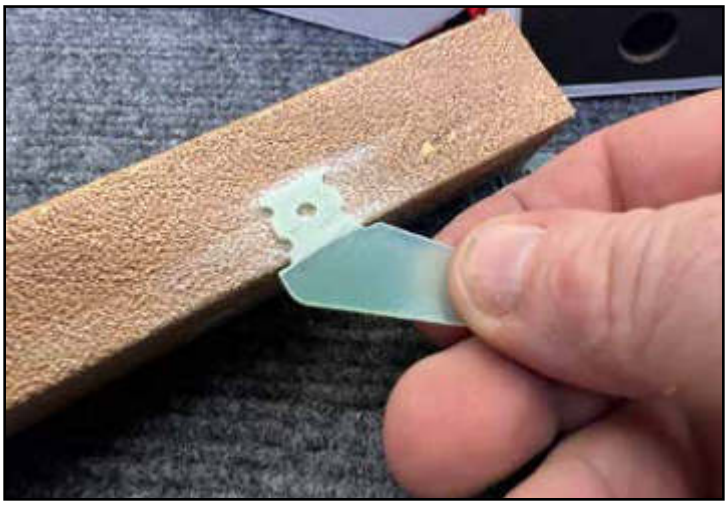




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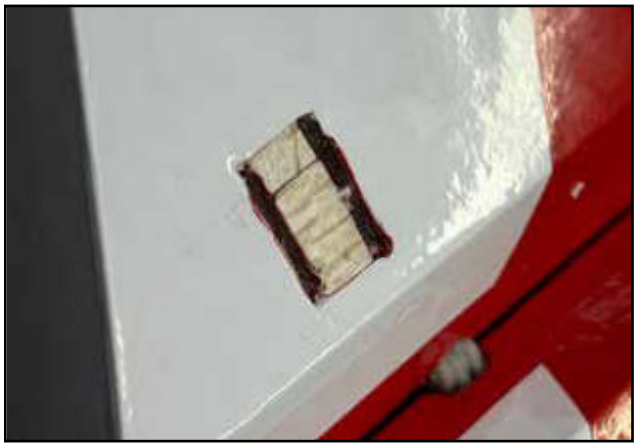
3.Installing Control Horns

All of the control horns on your aircraft install in the same way. Begin by scuffing the area of the control horn which will be inserted into the control surface with sandpaper as shown. Then, assemble the horns with the correct pushrod assembly as shown, using washers and locking nuts.





Locate the slots in the control surface, remove covering as shown with a hobby knife. Test fit the horn into the surface, make sure it seats fully. If necessary, remove any sawdust or debris from the slot.





Apply good quality 15 or 30 minute epoxy into the slots and to the scuffed area of the horn. Press the horn firmly into the slot and make sure it seats all the way. Clean up any excess epoxy with a rag and denatured alcohol.





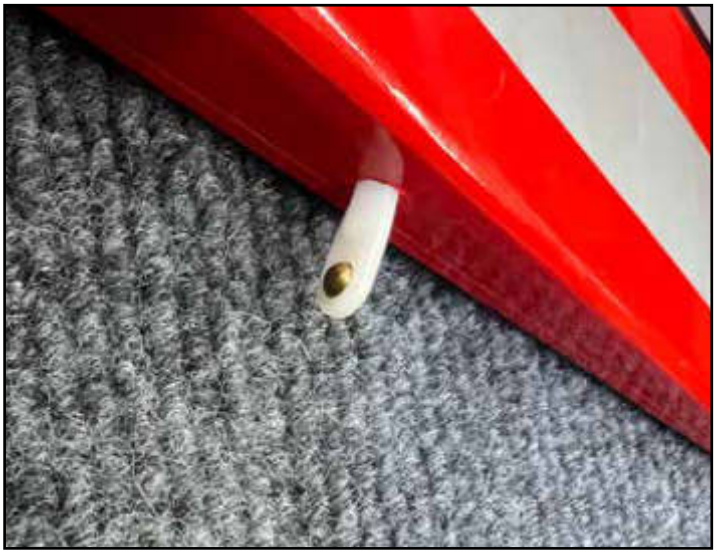
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4.Rudder and Tail Wheel

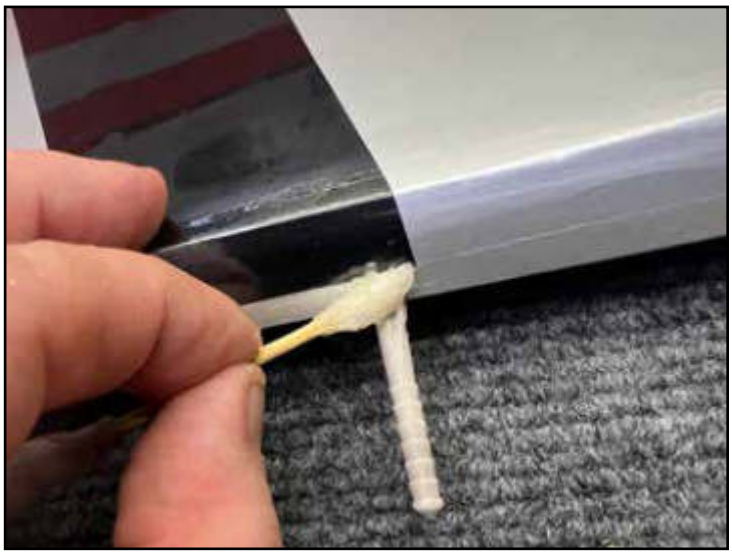
Our latest version Extreme Flight giant scale aircraft arrive with the wings and stabilizers pre-hinged and gap sealed. The only hinges you need to attach are the fuselage-side of the rudder hinges. Before you install the rudder to the fuselage, if you definitely want to use pull-pull cable actuated rudder with the rudder servo at the front, use the included jig as shown to install the rudder control horns first. We recommend the pull-pull style of rudder on the 85" Gamebird with all power systems, and for the 85" Muscle Bipe with twin cylinder gas or electric. For other aircraft we recommend pull-pull if using a DA-50 or another lightweight engine.

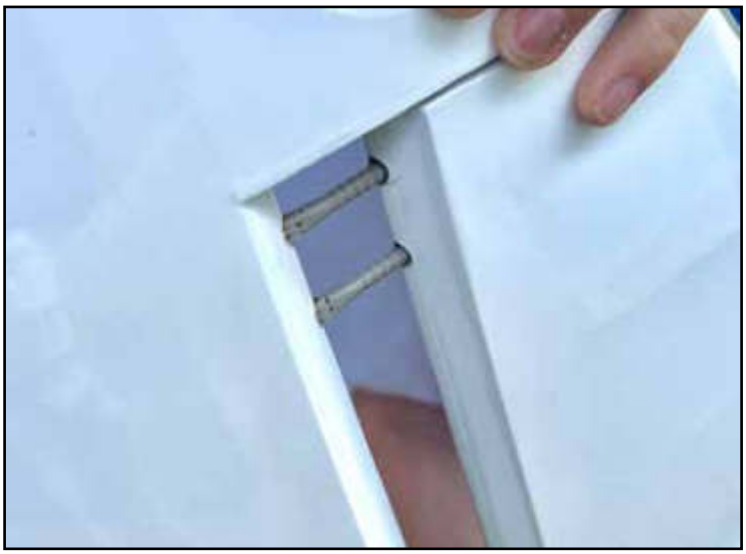
If using pull-pull rudder controls, you will install two rudder horns, one on each side of the rudder. A wooden jig is included in the kit to help align these horns during installation as shown. Also install the rudder tiller keeper in the bottom of the rudder as shown with epoxy glue. If using a rear-mounted rudder servo, locate the servo mounting location in the fuselage and make sure the servo and horn are on the same side of the airplane.





Apply a bit of petroleum jelly (vaseline) to the center of the rudder hinge points to protect the hinge mechanism from glue, and glue the hinges into the fuselage using 15 or 30 minute epoxty. Clean up any excess epoxy with denaturted alcohol. Use masking tape to hold the rudder perfectly in position while the glue cures.





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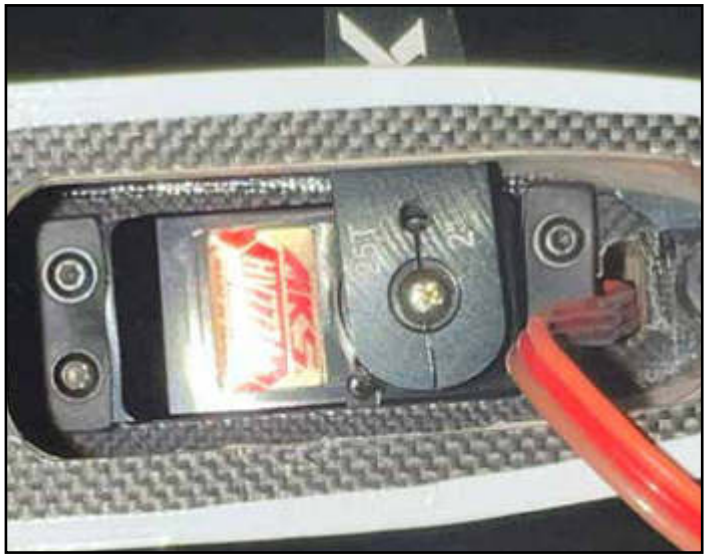
Once the rudder hinges have cured, your can install the tailwheel using screws, washers and blue loctite.

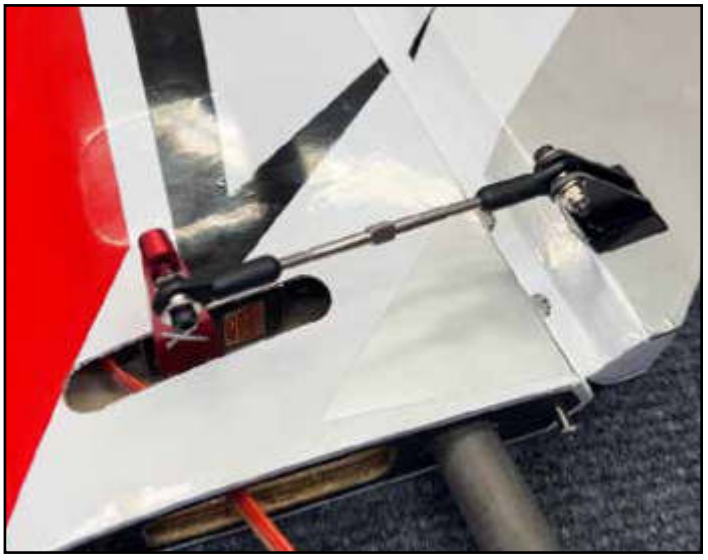




5.Servos and Control Linkages

Elevator servos mount inside the horizontal stabilizers as pictured. Often, threading the servo wire into position and seating the servo will require some patience. Note that the servo orientation will be correct when the servo arm is located in the center of the slot in the stabilizer. The slots in the stabilizers are cut for the most common servo/arm combinations, but some combinations will require either shims between the servo and the mount to move the servo, or trimming the slot to widen it.





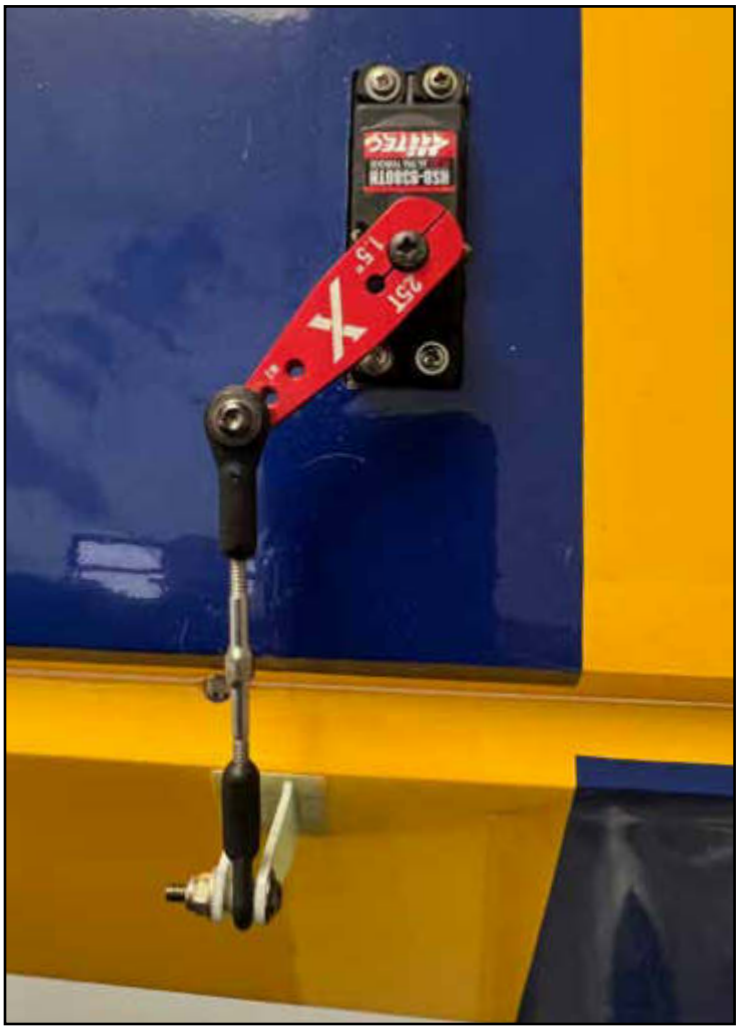
On many linkages, a cone-shaped spacer is included if needed. This spacer goes between the ball link and the servo arm to prevent any interference between the ball link and arm. The pushrod has one left-hand anf one right-hand threaded end. This allows you to spin the pushrod to change its assembled length after installation.





Mount the aileron servos as shown, using a servo wire extension as needed. Look closely at the linkage, this is how the linkage should appear with the servo centered and the pushrod set to the correct length.

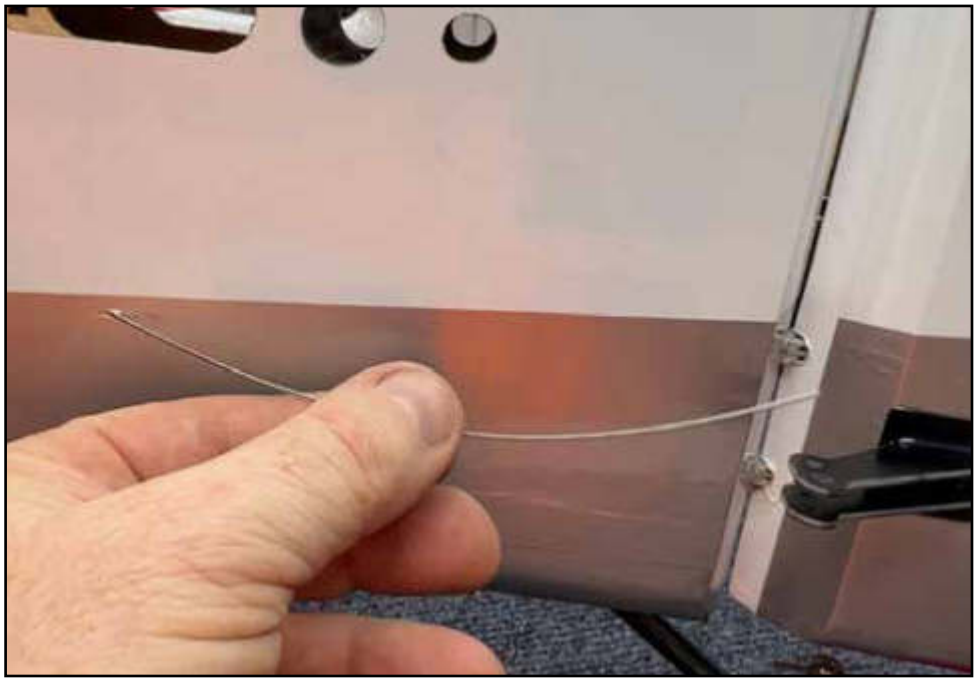




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For rudder linkage, if you are using a rear mounted rudder servo, the connection is via a pushrod as on the elevators and ailerons. If you are using the forward rudder servo position, the connection to the rudder is via pull-pull cables. Start by mounting the servo in the forward location as shown along with its double-sided servo arm. Next, locate the rear cable exits on the side of the fuselage. Look inside the fuselage, the cable exits have small piece of guide tubing for the cable to ride inside of. Make a slit in the covering over the exit location and feed the cables into the fuselage and forward to the servo. The cables cross each other one time to form an "X" shape inside the fuselage.





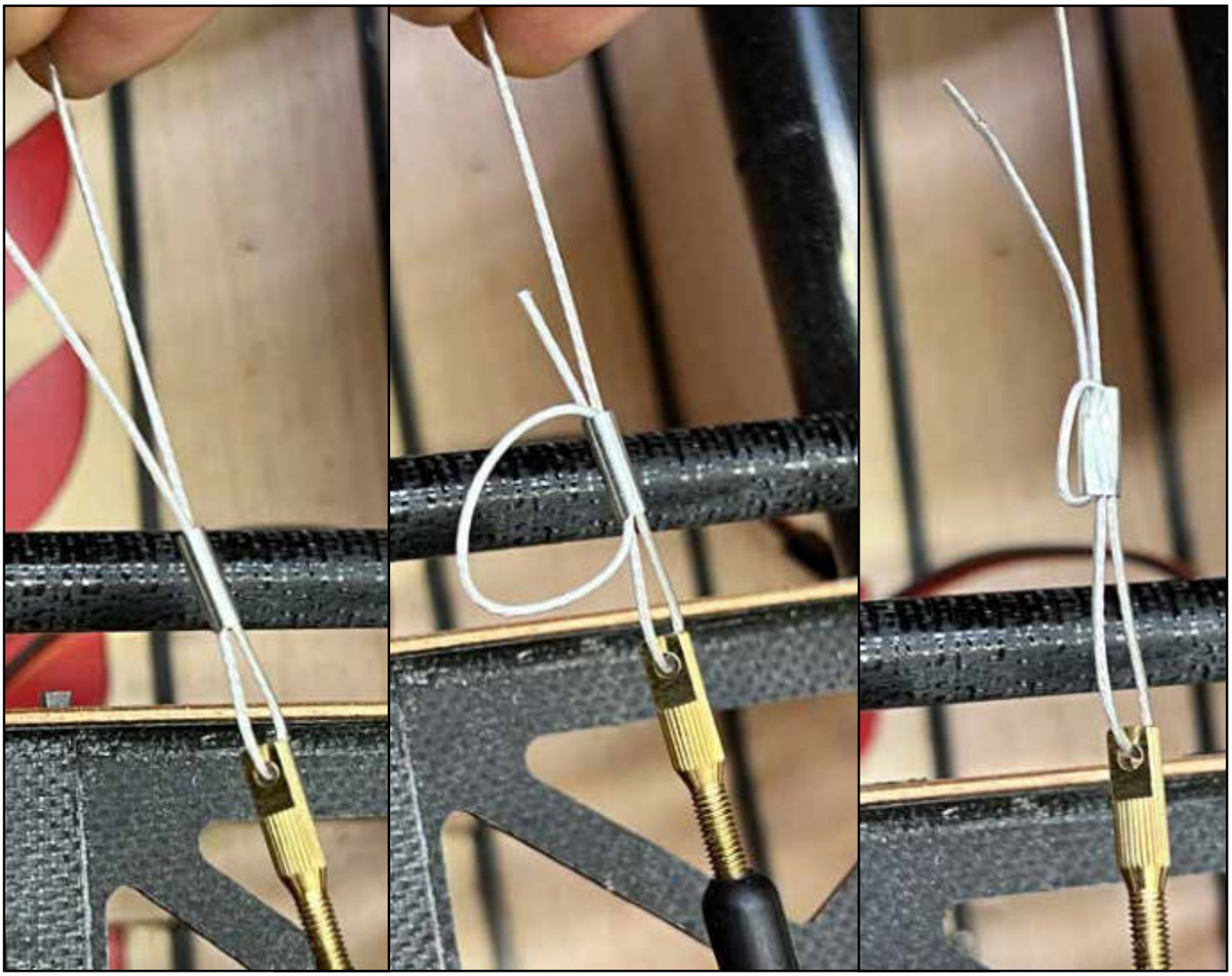
To terminate the cables at each end, you will use a ball link, a brass threaded end, and the small metal crimp tube. Thread the ball link onto the brass threaded end, and attach to the servo arm and control horn with screws, washers, locking nuts and cone spacers as applicable.





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To attach the cables, lace them through the crimp tube and brass end in the pattern shown. Pull the cable snug (not banjo-string tight) and crimp the tube with pliers to lock the cable in place, and drip one small drop of thin CA into the crimp tube.



After installation, you can tighten or loosen the cables as needed for maintenance by rotating the brass threaded ends to screw them into or out of the ball joints.



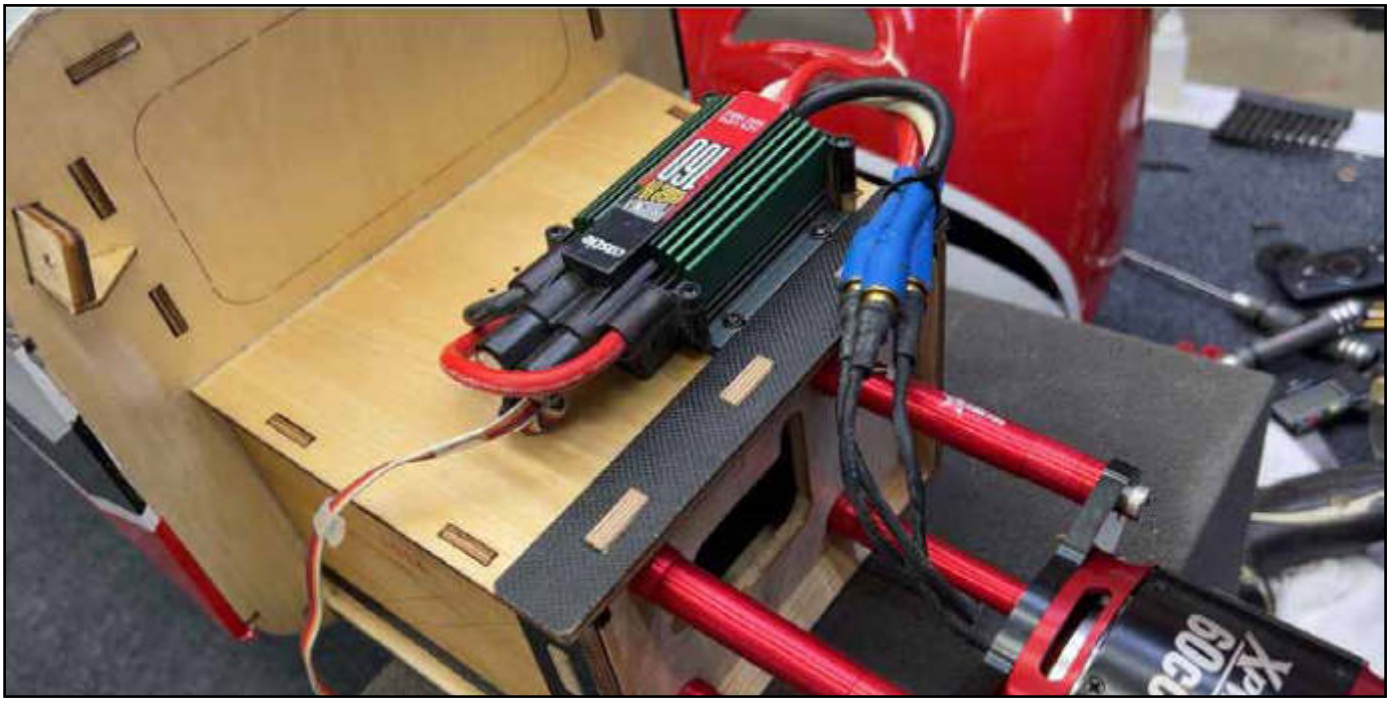
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6.Electric power

Airplanes in this size class are excellent candidates for electric power with the XPWR60CC brushless motor and 12S 5000-6000mah lipo batteries. Use our BlazingStar X-Large standoff set. The XPWR60CC motor has the same mounting bolt pattern as the DA-60/DA-70 gas engines. Drill the holes in the firewall on the pre-marked locations, first with a small drill bit such as 2mm or 1/16", then finish with the final size bit. Use blue loctite on all of the motor mounting screws.



Our favorite ESC for this application is the Castle Creations Edge HV 160. When we introduced the XPWR35-60CC motors, we worked with Castle technicians to create a compatible firmware for Castle ESCs which was lab tested on these motors. This is Firmware 4.22. We recommend that you backdate your Castle ESC to firmware release 4.22 using your Castle Link and a computer. This will ensure smooth operation. All other settings remain at default.



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7.Gas Power

For aircraft in the 85-88" size range we recommend 50-61CC single cylinder gas engines. For aircraft in the 91-93" range, we recommend twin cylinder 70-76cc engines.

We'll break down gas engine installation into several steps.

Firewall Drilling

The firewall of your aircraft is marked with a few common engine bolt patterns. Many engines share a common bolt pattern. The DA 50/60/70 and GP 61/76 share a common bolt pattern. If your bolt pattern is pre-marked, drill on those marks first with a small drill bit (2mm/1/16) and then finishing with the correct size bit for your motor mounting screws. If your engine has a different pattern which is not marked, consult the engine manufacturer for a pattern which can be printed, and use the centerline marks printed on the firewall to align your pattern for marking and drilling.

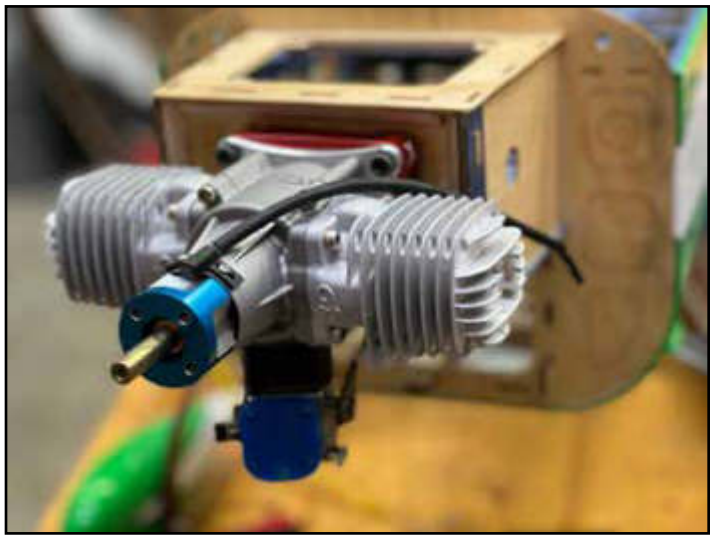




Engine Mounting

We recommend the use of our BlazingStar engine mounts. These mounts are the correct length for our aircraft, they come with adjustment shims to set the perfect cowl-to-spinner gap (about 2mm), and they protect the crankcase from damage in many crashes. The firewall of your EXtreme Flight aircraft already has the correct amount of right-thrust and up/down thrust built in, so there is no need to adjust or shim this in the installation. Use large washers and nylon locking nuts on your engine-mounting screws to prevent anything coming loose from vibration.

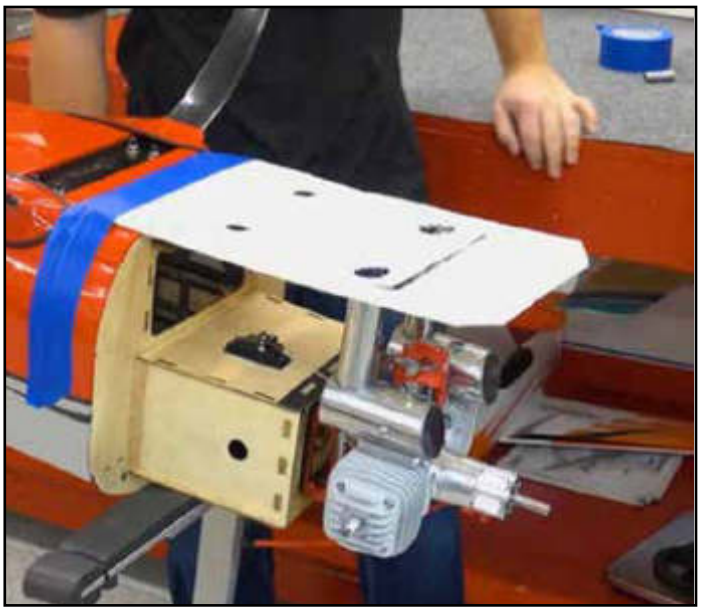




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Cowl cutting

You will need to cut clearance and ventilation holes in your cowl to match the exhaust and/or cylinder of your engine. The easiest way to do this is to install your muffler(s), tape a piece of paper or card stock to the fuselage as shown, and mark the locations of any protruding mufflers, pipes, or cylinder. Then, remove the muffler or engine, mount the cowl, and use the paper template to mark the cowl to cut the relief holes.





Once you have marked the locations where pipes and/or cylinder heads will protrude through the cowl, use a Dremel-type rotary roof to cut these location of the cowl. NOTE: The cowl is made of fiberglass, and the dust from cutting or grinding fiberglass can be harmful. Wear eye, hand, lung and skin protection when cutting or grinding fiberglass. It's also recommended to protect electronics and engine internals from fiberglass dust.Test fit the cowl, resume cutting as needed. We recommend also cutting a large cooling hole at the bottom rear of the cowling.





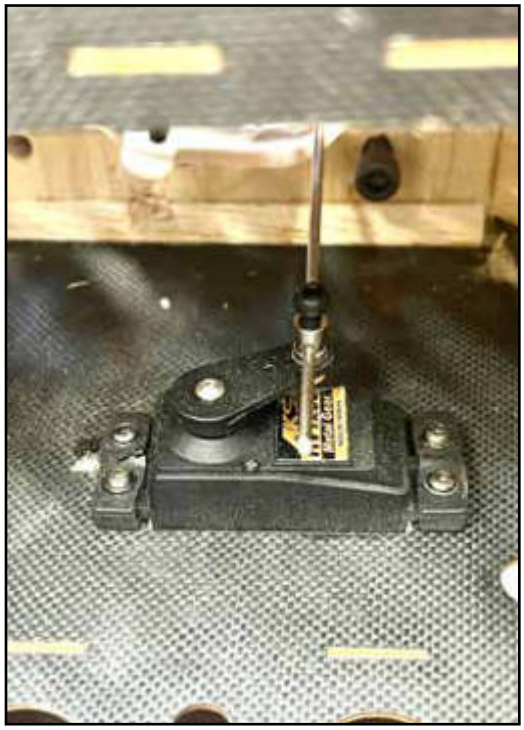
Throttle Linkage

Due to availability of parts, throttle linkage pieces may vary over time in our kits, this is the most common type. There are many different carburetor arm styles, so these instructions are approximate and some creativity may be required in creating your throttle linkage.

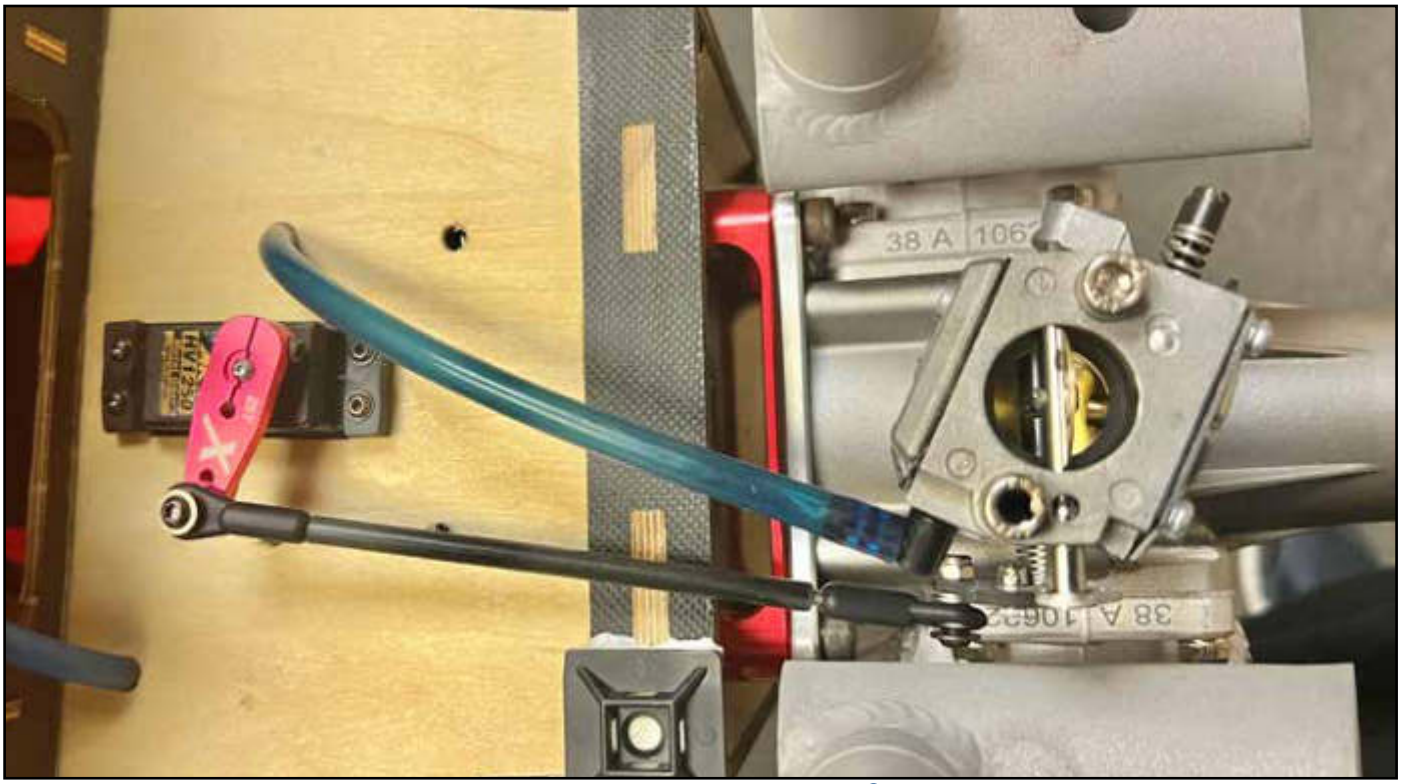
This type of connector is a common one for our linkage, it attaches to the servo arm by tightening the clinch nut so that the barrel of the connector is still free to rotate, and placing a drop of medium CA glue on the nut to stop it backing off. Pictured is a typical single-cylinder throttle installation, with the servo inside the motor box.







If your engine and its carburetor and throttle arm allows it, it is an upgrade to use a 1" metal servo arm on the throttle servo, and to use a throttle pushrod with ball links at each end. Pictured is a typical twin-cylinder throttle installation, with the throttle servo on the outisde/bottom of the motor box.

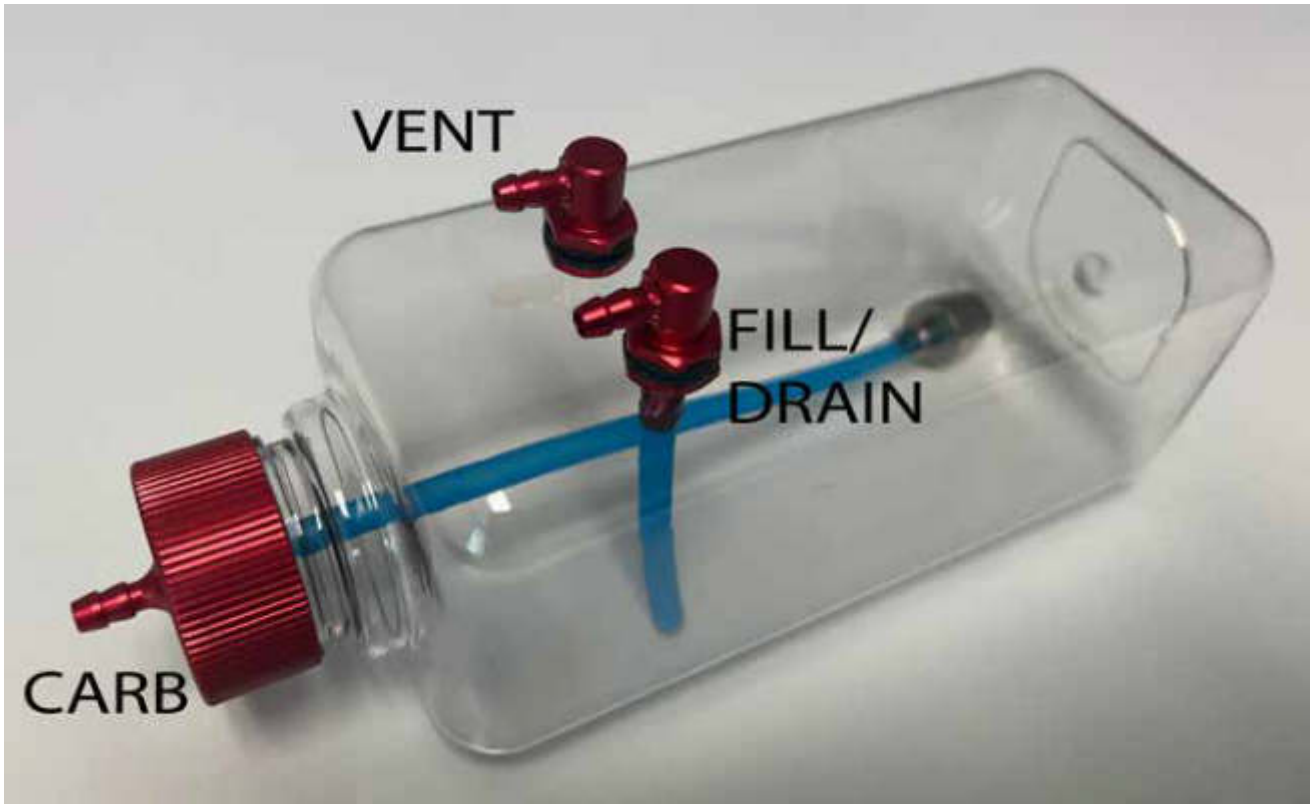


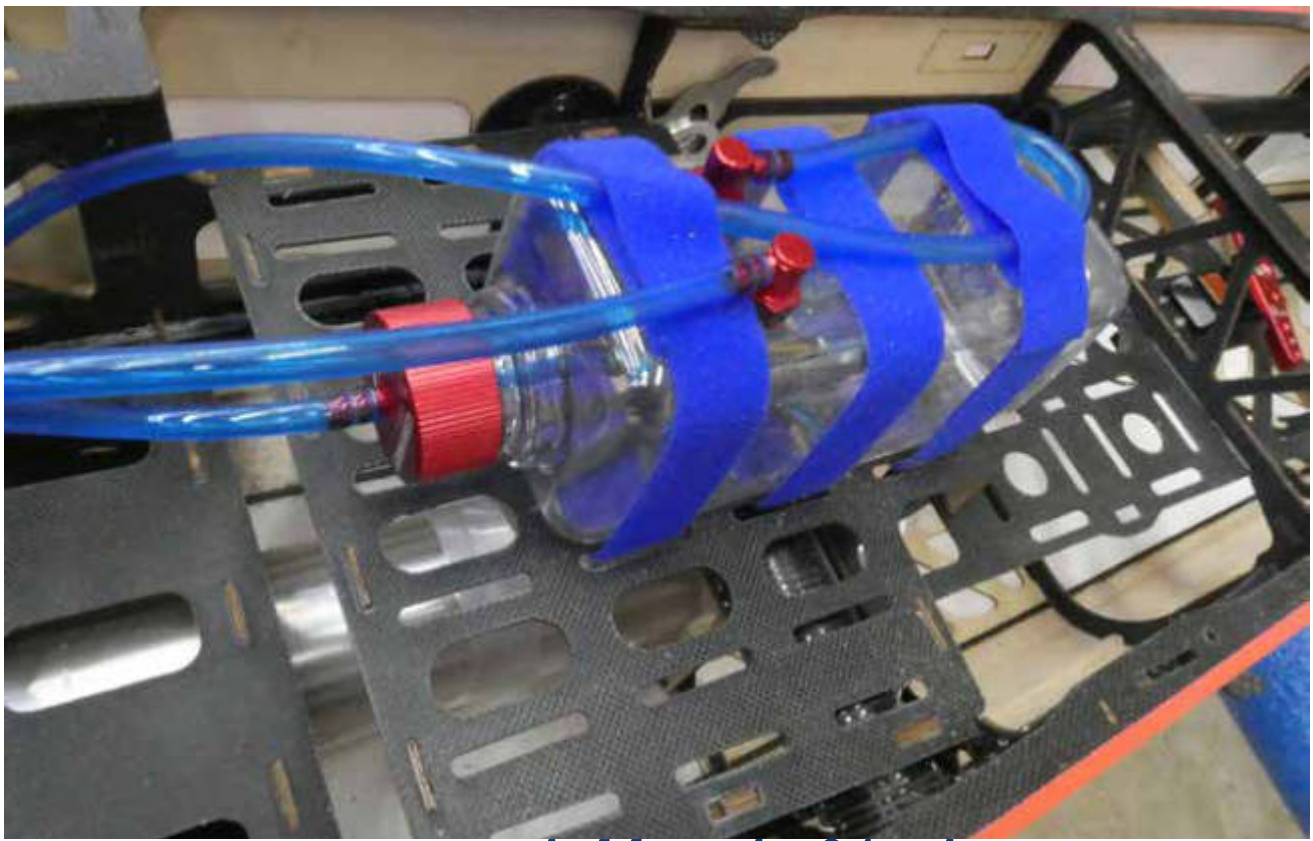
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Fuel Plumbing

For plumbing your aircraft, we recommend Extreme Flight Flowmaster fuel tanks, fuel line, and fuel dot connectors. There are three primary connections on your gasoline fuel system: Fuel clunk to carburetor, fill/drain line to fuel dot, and vent. Extreme Flight fuel tubing is designed to grab onto barbed connections, and so zip ties or wire ties to secure fuel connections are optional. Note that the vent line has a loop in it to prevent siphoning fuel during flight, and the vent exits the airplane on the bottom of the cowl.

We attach the fuel tank to the tray in the fuselage with self-adhesive velcro and two strong velcro straps. Typically, the fuel tank is located at the rear of the front tray, as close to the center of gravity as possible.





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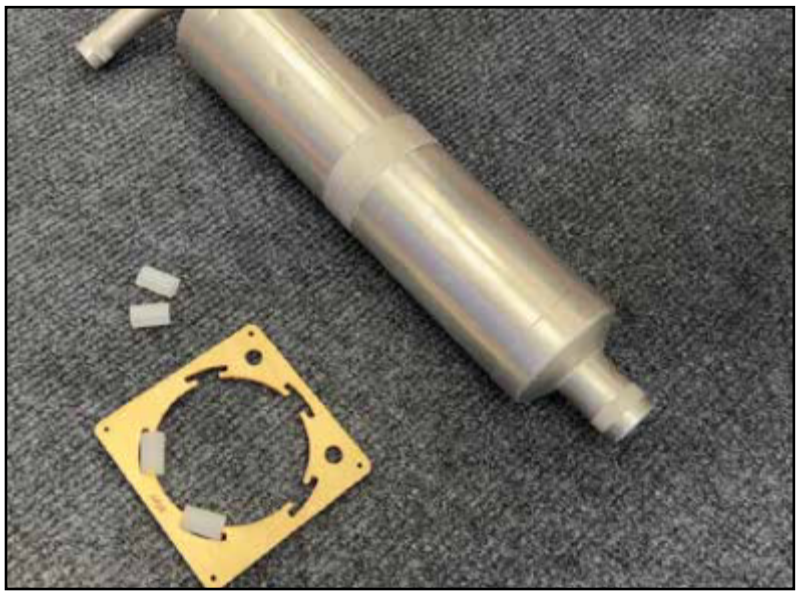
Locate your fuel dot in the fuselage side as shown. Mount your ignition to the motor box as shown, and arrange power for your ignition. We prefer an IBEC, such as the Tech-Aero IBEC unit.





Exhaust

Most of our aircraft in this size range have provisions and a mount for a canister or tuned-pipe exhaust. There are many different sizes and shapes of cans and pipes, some custom fitting may be necessary. The bottom of the fuselage of most of our aircraft has either pre-cut cooling and exhaust outlet holes under the covering, or the kit includes laser-cut outlet plates which attach to the bottom with screws. Open these outlets as appropriate for your exhaust system.





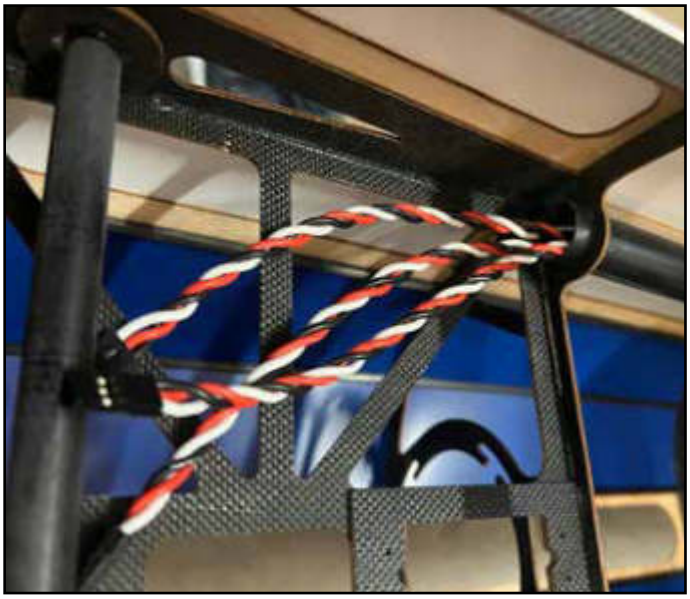
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8. Final Touches

Run your servo extensions through the plastic tube installed in the rear fuselage.

Mount your receiver on the tray behind the wing spar tube. Mount a switch into the fuselage side if you use one.

The stabilizers mount onto the fuselage with one or two carbon tiubes and latch in place. Then you plug in the servo wires, use a clip to prevent them coming unplugged in flight. The wings similarly attach with one or two carbon tubes and latch in place. Use a clip on the aileron servo wire.





Test run your power system on the ground. Set up control surface throws according to the data sheet for your particular aircraft. Dont forget to add exponential and make sure the controls are moving in the correct direction. Balance and drill your prop and spinner. On our Extras, Slicks, MXS, Gamebirds, NG's, and Yaks, balance the aircraft by supporting it from the main wing tube. It should hang level for a sport/precision CG or slightly tail-down for a 3D CG. For Edges and Biplanes, consult the data sheet for your airplane.



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