92" Extra 300





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.

Please read over the manual completely before beginning. This will give you an overall understand of the assembly process and familiarize you with the tools and supplies you will need.

Extreme Flight consantly upgrades and improves its products. Hardware and details may change, but the basic process remains the same. If you are confused about a step, please call or email us at the contact information on our website, we will be glad to help.

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. 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. IF YOU ARE INEXPERIENCED WITH COVERING, WE RECOMMEND TO USE ONLY THE IRON AT FIRST. THE HEAT GUN WORKS VERY FAST AND YOU MAY NOT BE ABLE TO REACT QUICKLY ENOUGH.





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2.Landing Gear

The Extra 300 uses a carbon one-piece landing gear which sweeps *slightly forward* when installed properly.





The gear attaches to the fuselage with four screws and washers as shown. Use blue threadlocker here. Install the cosmetic cover plate with ruberized glue. We prefer Gorilla Clear Grip, Goop is an acceptable substitute. Your kit includes fiberglass landing gear fairings. Test fit them onto the landing gear. Open the slot in the fairing as necessary to fit the gear leg. Test the fairings on both sides to find the best fit. Remove the fairings and add a large dollop of rubberized glue to the landing gear leg. Slide the fairings on over the glue. Tape the fairings in place and allow to cure.









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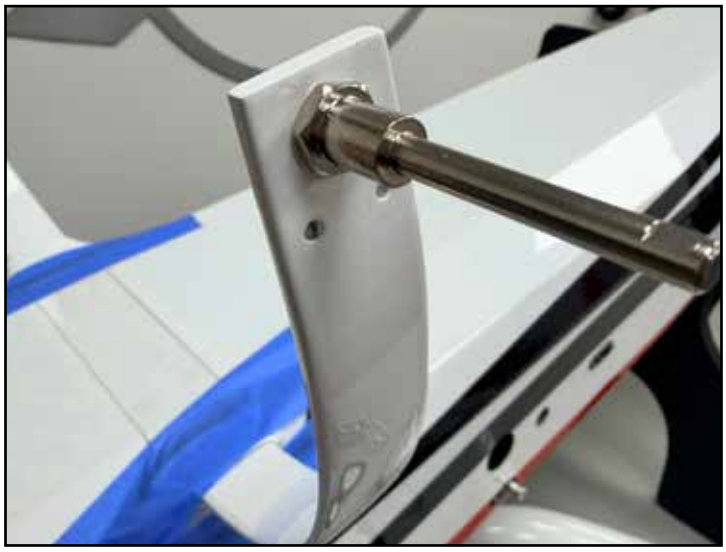
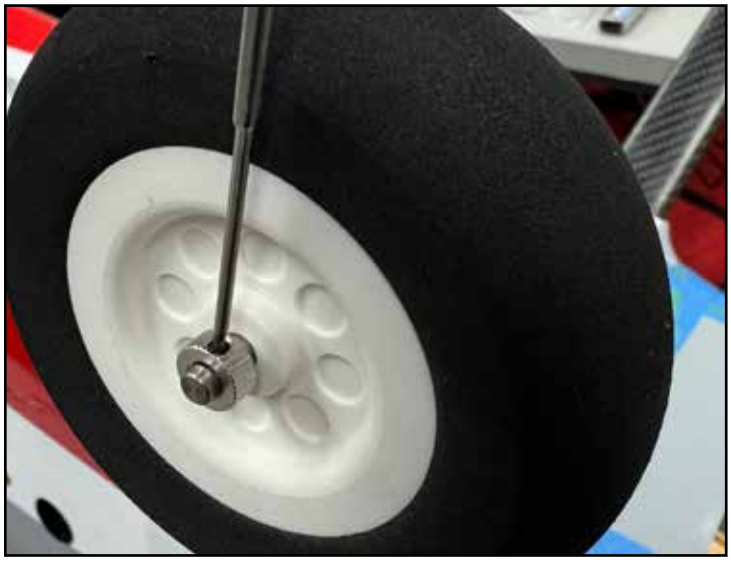
The wheel axles are attached to the landing gear with washers and locknuts. When tightening, make sure the flat spot machined into the axle tip points DOWN, toward the runway. If you wish to run BARE WHEELS (no wheel pants) use the conventional wheel collars as shown.









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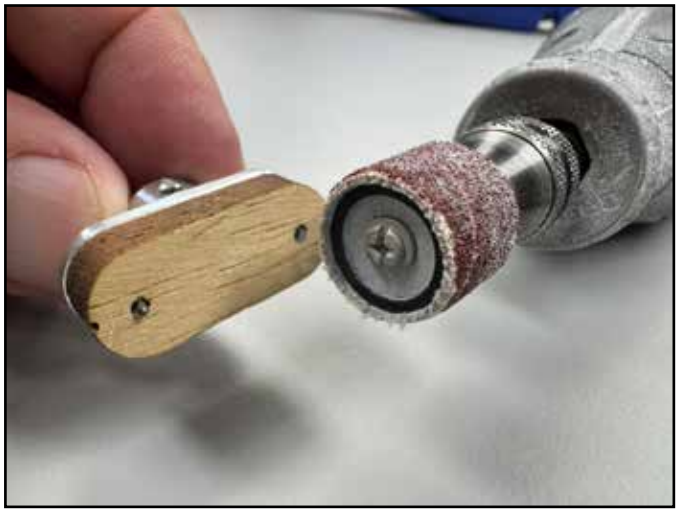
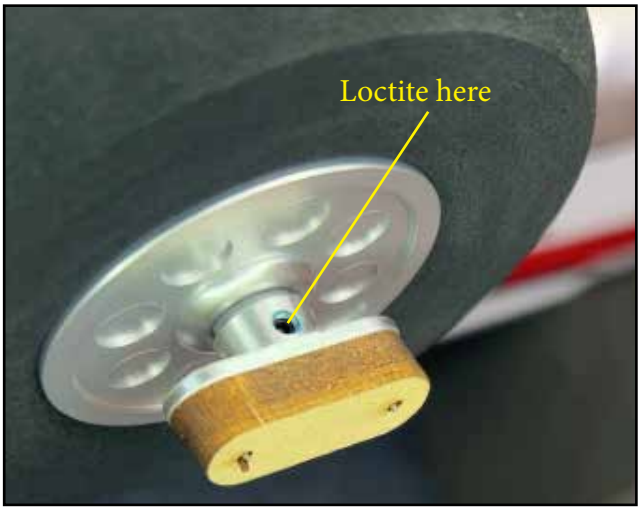
If you wish to run wheel pants, assemble and install the wheel-pant-mounts/wheel collars as shown. Two wood screws attach the wooden wedges to the aluminum body as shown. Scuff the face of the wood wedge and remove the tips of the screws if they are poking through. Assemble onto the axle and use blue threadlocker on the set screw. Apply adhesive (we recommend Gorilla Clear Grip or Epoxy) to the face of the wheel pant mount as shown.











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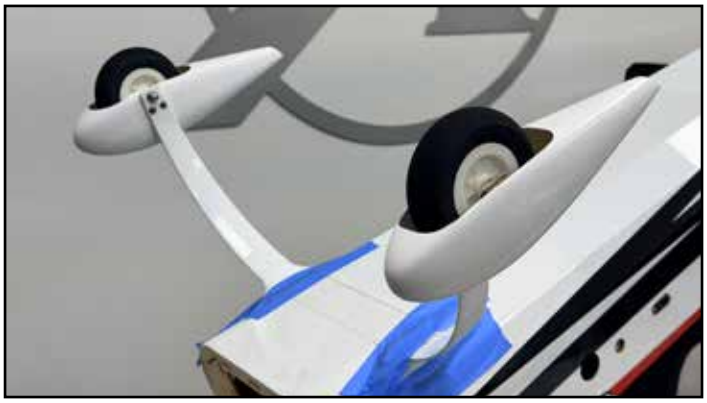
Install the wheel pant over the wheel and axle, tighten to the landing gear with screws as shown, using blue loctite. The wheel pant support should sit against the pant as shown. By stabilizing the pant, this design lengthens the life of your wheels pants. Just like on full-size aerobatic aircraft, however, wheel pants take a lot of abuse and over its life your aircraft will probably need a replacement set.











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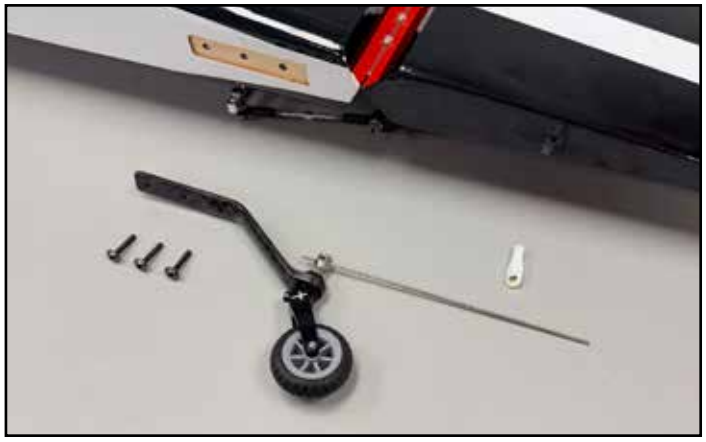
3.Tailwheel

Install the tailwheel onto the fuselage with blue threadlocker. Locate the mounting hole in the bottom of the rudder and install the tiller holder (a plastic ball joint) with epoxy as shown.









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4.Rudder installation

The 92" Extra 300 arrives with control horns installed and with the wings and stabilizers pre-hinged and gap-sealed. The rudder is quick-release type using a wire hinge. Take your time aligning the rudder and fuselage, then insert the hinge wire through the top of the rudder. Carefully feed the wire down through the hinges and screw into the top of the rudder as shown.











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5. Elevator servos

We prefer to add a single drop of thin CA glue to each of the servo screw mounting holes. Begin to install the servo by threading the wire through as shown. The first time you install an elevator servo into an interior mount like this, it can be a challenge. Be patient and you'll succeed. Note that if your servo has an oversized case, you may need to sand or file the opening to match.









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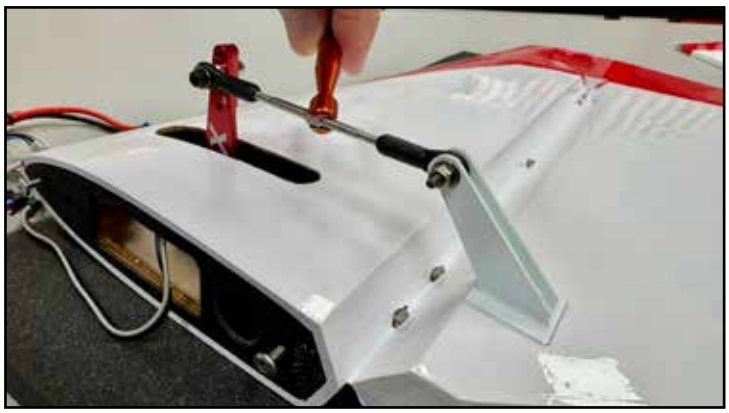
Install the servo arm, and install the pushrod, using bolts, washers, locknuts, and tapered spacers on the servo-arm end as shown. For most installations, depending on transmitter/receiver/servo type and brand, you can use the 1.75" location on the 2" arm, and maximize end points to achieve the desired throws. Maximizing endpoints and using the shortest possible arm length maximizes effective servo torque and resolution.

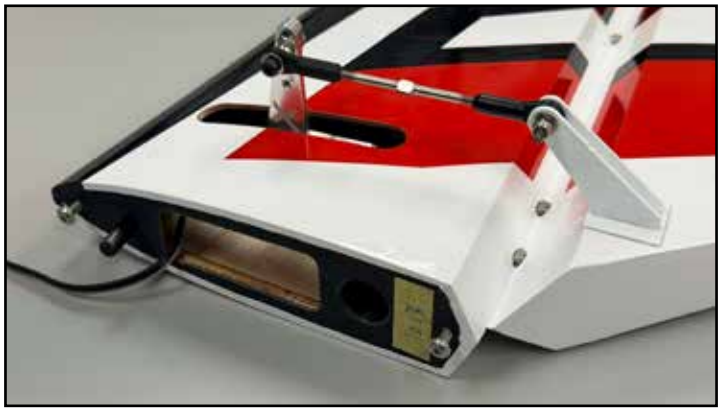












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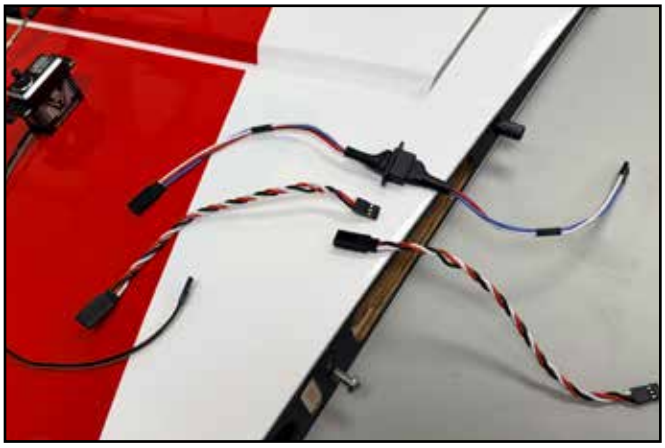
6.Aileron Servos

Again, we prefer to add a single drop of thin CA to each servo mounting screw location. Run the servo wire through the tube in the wing interior as shown. Mount the servo as shown, and install the arm and pushrod. Use the cone-shaped spacer between the ball joint and servo arm, as shown. See the photo for the CORRECT orientation of these parts once installed. The servo linkage is "crooked" at the neutral/center position. This is correct, so that the linkage will be aligned within specs when fully deflected. At full deflection is when stresses are highest, that's the important position.

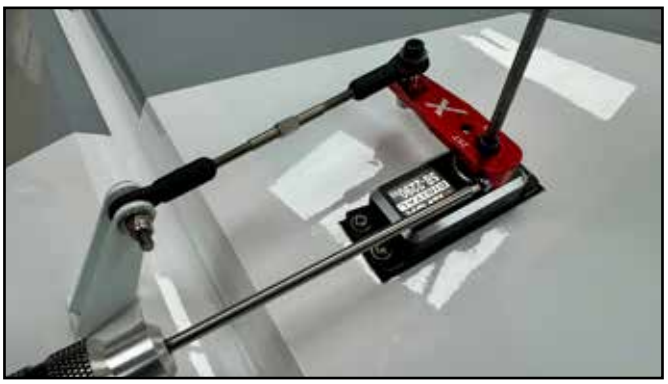
















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We recommend the use of MPX-style connectors on the aileron servos. We provide two mounting points for these connectors, in the equipment tray, and also in the fuselage side. The locations in the side are perforated, but need to be fully removed as shown. We use a hobby knife or Dremel-style tool.













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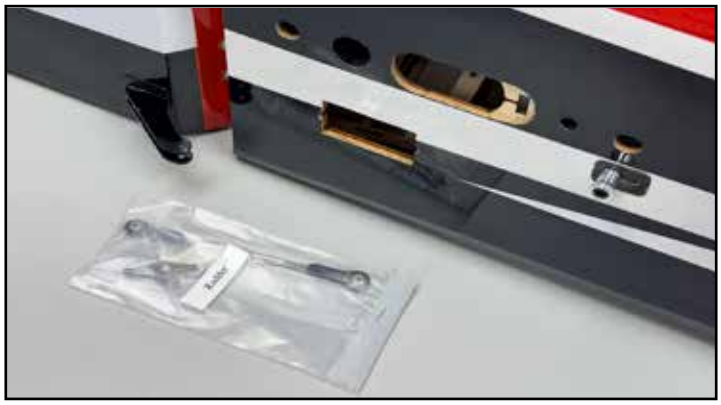
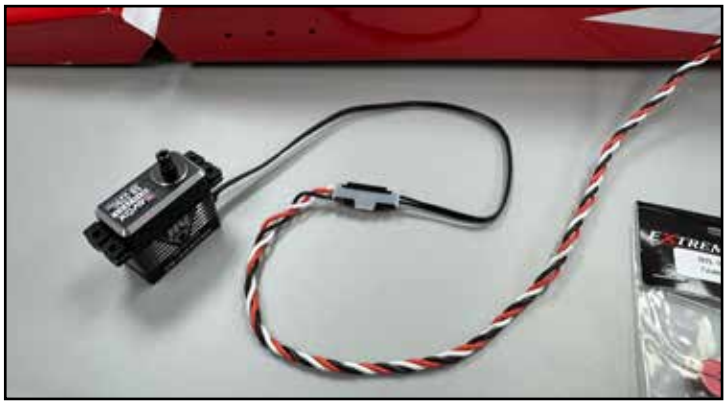
7.Rudder Servo

Install the pushrod as shown. Open the rudder servo opening as needed.

There is a plastic tube installed in the fuselage to contain the extension wires for your rear servos, for the elevators and rudder. Run your extensions through the tube to the receiver in the front. Sometimes it can be helpful to feed a wire or other tool through the tube from the front and pull the extensions through. Electrical solder is an excellent choice for this, with its combination of stiff and soft, it is easily fed through the tube and strong enough to pull extensions through. This is also the correct step to install your elevator extensions and pull all three together as a group.

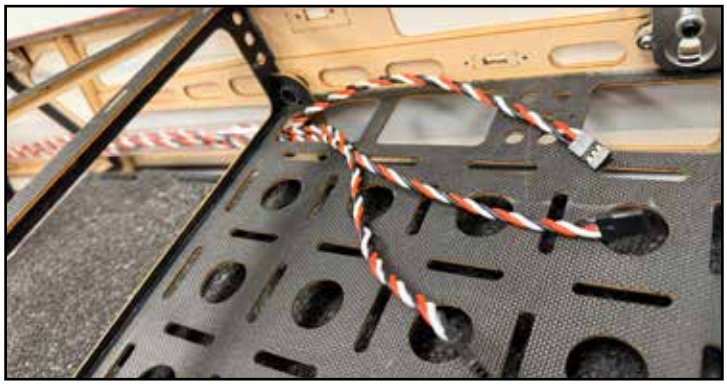












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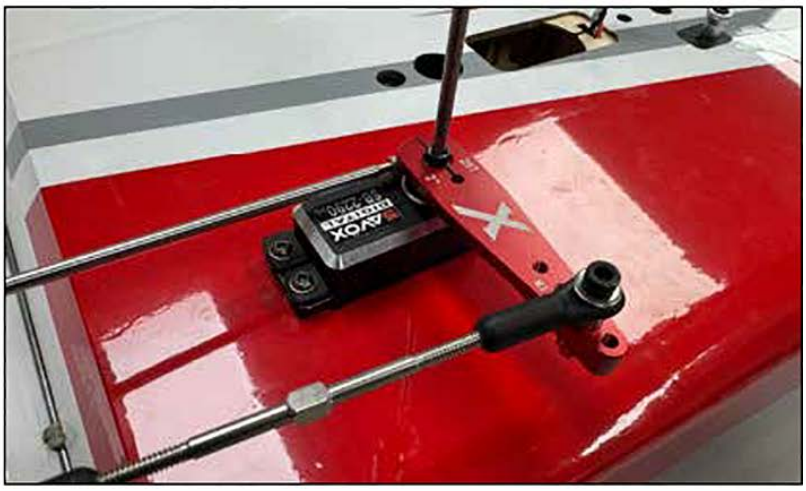
Install your rudder servo and arm. Attach the pushrod as shown, using the cone-shaped spacer on the servo-arm end of the pushrod.











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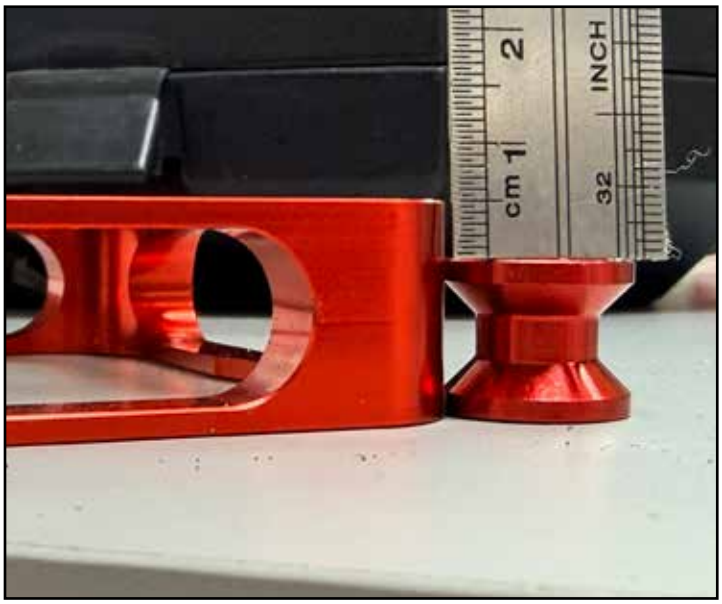
8.Power system mounting

Note that your kit is designed with RIGHT thrust on the motor mount. This is a correct and by design. All of our Extreme Flight aerobatic aircraft use 2-3 degrees of right thrust to counteract prop effects and give the lowest pilot workload.



SPECIAL NOTE ON THE FIRST SHIPMENT OF 92" EXTRA 300:

On ONLY very early production 92" Extras, the firewall length is non-standard, and to smooth the installation of your 70-76CC gas engine, we have included special length individual engine standoffs as shown. Please check your kit for them. Later batches will be standardized to use our typical Blazing Star 70CC engine mount. Electric power systems typically feature modular stand-offs systems, adjust yours as needed for length.





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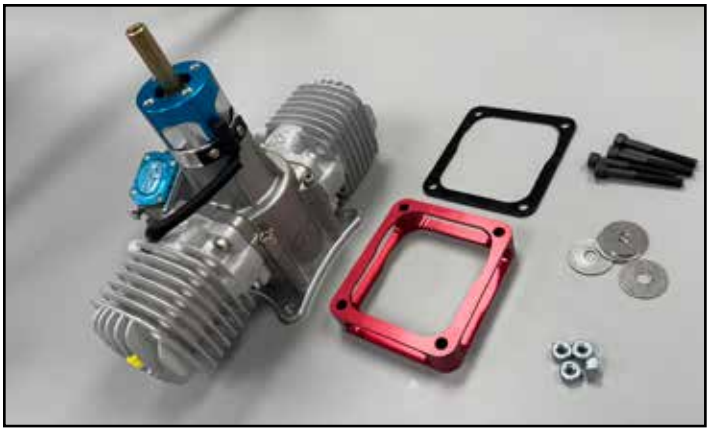
Here we show the installation of the GP76CC.

The firewall of your 300 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. Drill the firewall on the provided marks. Use large washers and nylon locking nuts on your engine-mounting screws to prevent anything coming loose from vibration.

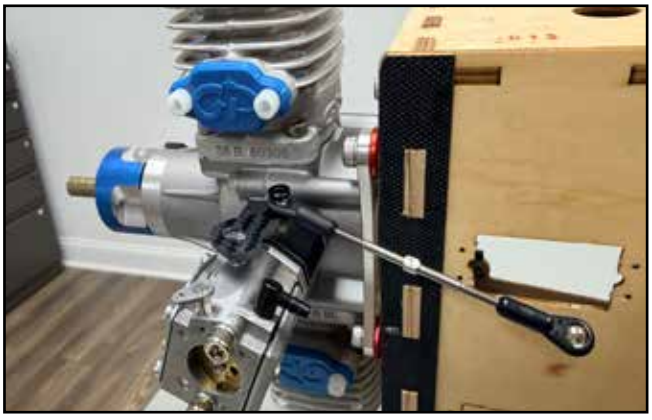
Locate the throttle pushrod, drill your engine's throttle arm if necessary, and install using a locking nut.













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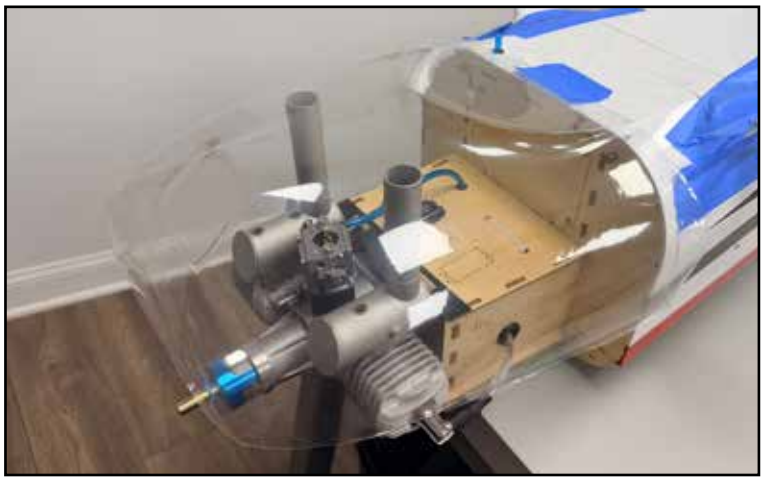
9.Cowl prep for stock mufflers

The 92" Extra 300 includes a clear-plastic cowl marking tool to mark and cut the cowl accurately if you are running "stock" (in-cowl) mufflers which exit through the cowl bottom. First, mark and drill the clear tool for the cowl screw holes as shown. The allows you to accurately locate the tool on the cowl and over the engine. We use masking tape to hold the tool in place over the engine and mufflers for marking. Study these photos carefully. Once the marks are perfect, cut the tool and verify fit over the muffler pipes. Place the tool over the cowl, mark the cowl, and cut. There are a few tools which work well to cut the fiberglass cowl material, we usually choose a Dremel-type rotary tool with sanding drum attachment. Be sure to wear eye protection and work in a well-ventilated area with a dust mask.











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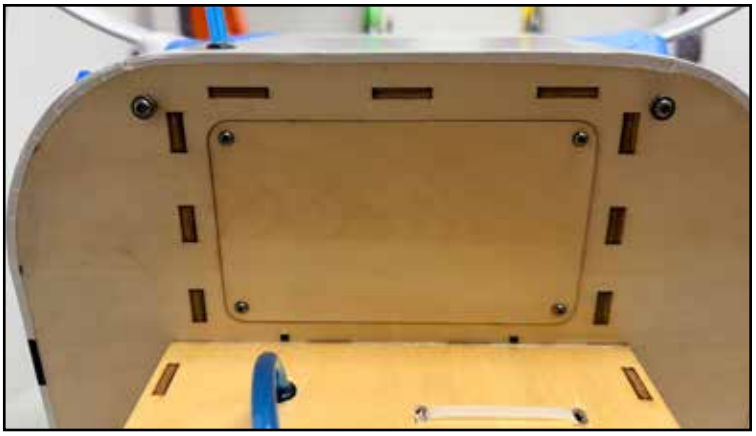
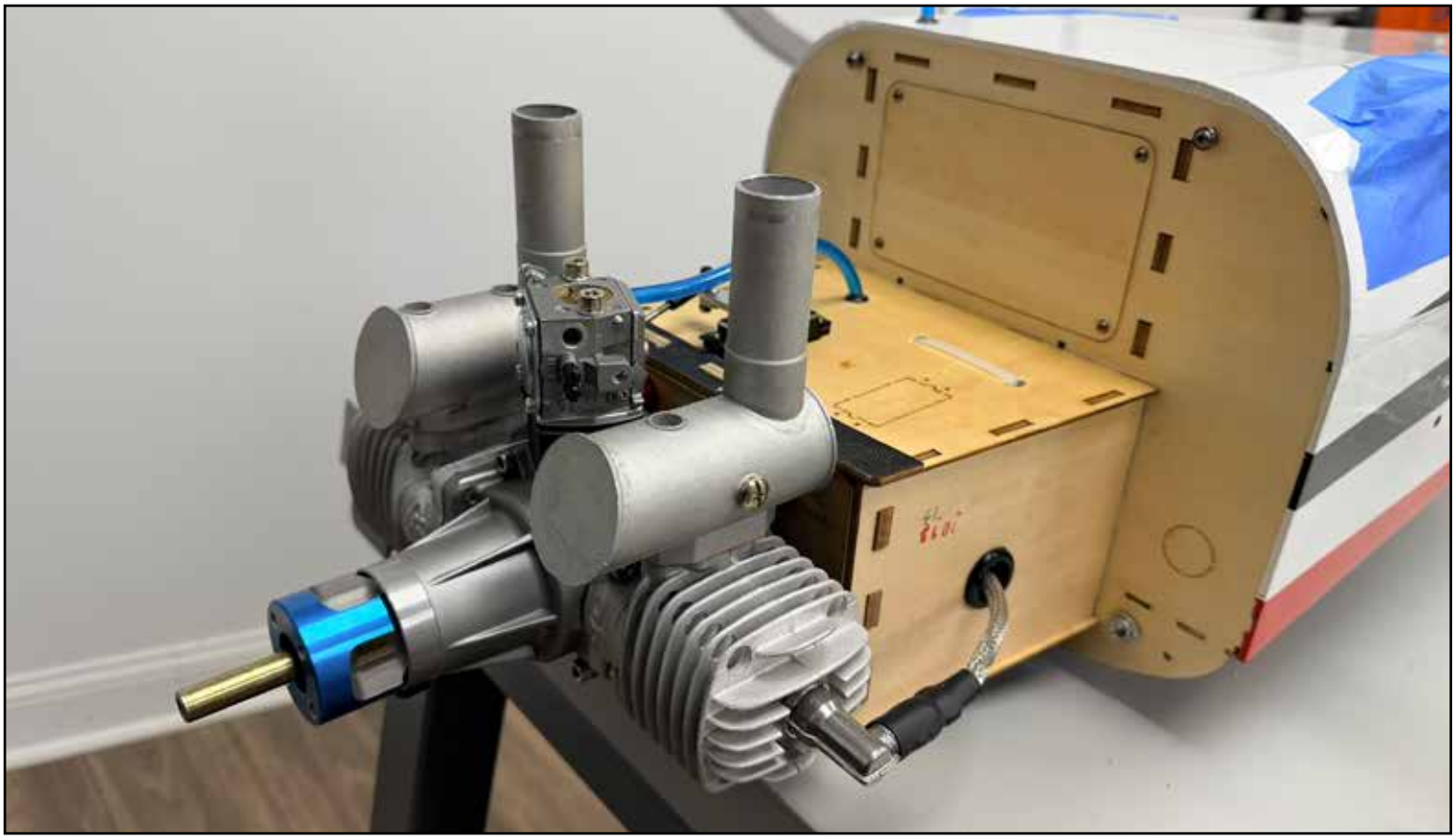
IF you elect to run “stock” (in-cowl) mufflers, your kit includes a ply wood block-off plate to cover the exhaust tunnel area as shown. Your cowl includes a large molded cooling outlet on the bottom. This sufficient outlet even for hot climates. If you want even more cooling outlet, you can delete the block off plate and install the vent plates in the bottom of the fuselage (detailed in the next step).

NOTE: We like to trim approx 1” off of the length of our muffler exit tubes to make cowl installation easier. This also allows for a smaller hole in the cowl bottom. If you run full-length tubes, your may need to elongate the holes in the cowl into oval slots for easy cowl installation.







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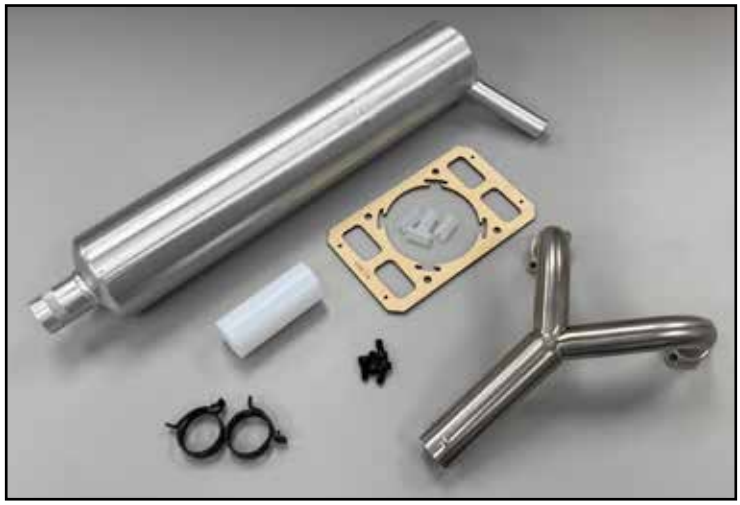
10.Canister muffler (or tuned pipe)

The 92" Extra 300 can also fit an MTW Y-header for DA-70CC (which also works for the GP76CC) and TD-110H rear-exit canister muffler. Note that some of these photos feature the 88" Extra 260, which uses a nearly identical installation, EXCEPT:

On the 92" Extra 300, the canister exhaust tube outlets are found in the non-removable parts of the aircraft bottom sheeting. The removable plates shown are only for extra air venting and should be installed when using a canister.

Begin by removing the covering over these locations on the bottom of the fuselage. Seal the covering afterwards with your iron as shown. These cooling outlet plates attach with screws.









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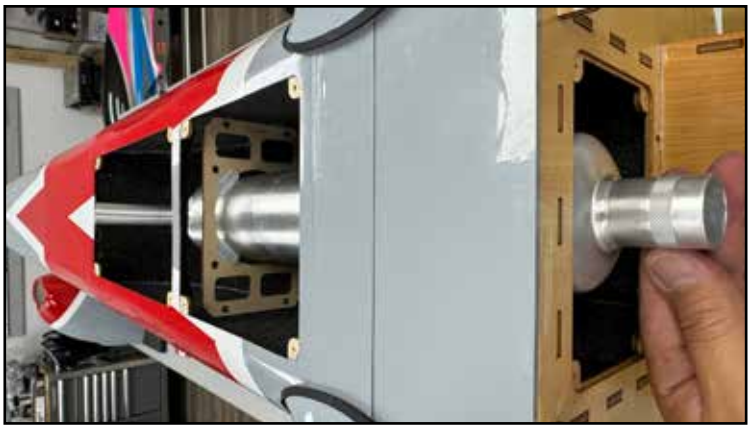
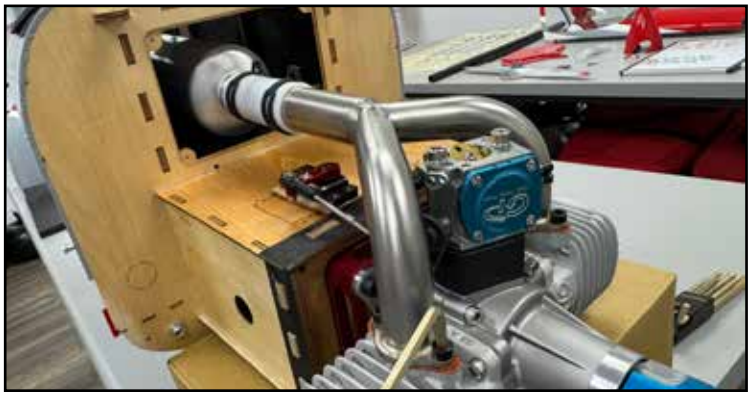
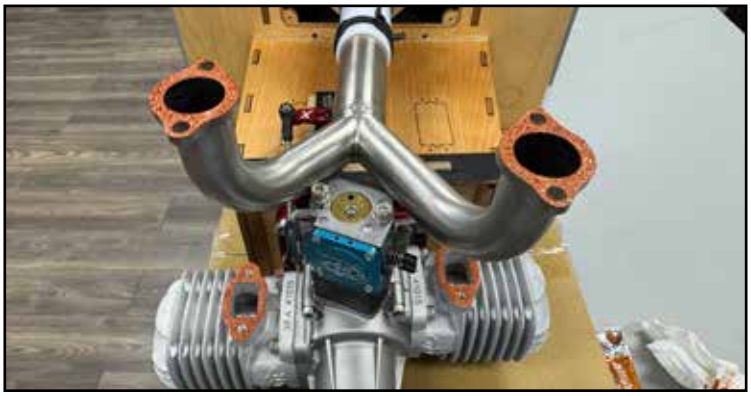
Install the silicone tubing sections onto the canister mount as shown. Install the canister mount into the exhaust tunnel with loctite on the screws. Slip the canister muffler into place, and install the cover plates. We like to use “Ultra Copper” sealant on the flanges of the exhaust header to seal. Install the exhaust header and coupler tube into the canister muffler. For increased reliability, we like to drill and screw through the coupler pipe into the header and muffler with small sheet metal screws as shown, then place the clamps in their final position over the screws.

Installation of a tuned pipe exhaust is similar. A mount is built-in to the aircraft structure at the rear of the fuselage, install the silicone tubing mount bumpers as on the canister mount, and remove covering over the appropriate outlet. Also, remove a section of foam at the rear of the tunnel to allow the pipe to pass through.













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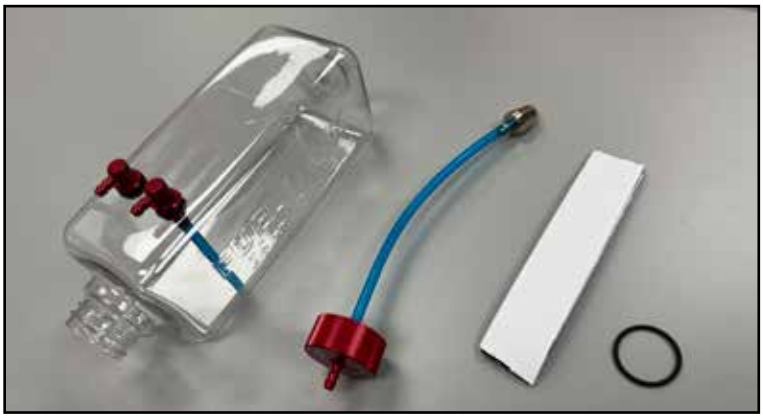
11.Fuel System

The 92" Extra 300 typically uses one 24oz. Extreme Flight Flowmaster fuel tank for fuel, and a second 24oz. Flowmaster for smoke if desired. The tanks are secured with a self-adhesive velcro strip on the bottom and 2-3 strong velcro straps around the tank. Note that the "vent" line is looped, this is to prevent fuel siphoning out during aerobatic maneuvers. Also note that it is generally a good idea to have a stiffened section in the internal fuel "clunk" line inside the tank. The tank kit includes a brass tubing section for this purpose; an even easier way to provide this stiff section is to slip a piece of a large drinks straw over the clunk line, see photo. For gasoline only, mount the tank on the centerline of the aircraft. If also using smoke, mount side-by-side.

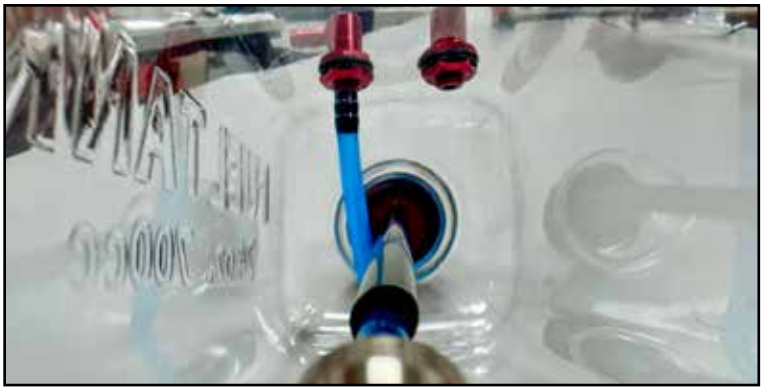
See photos for how we use a short section of fuel line as a "clamp" on the tank clunk, tanks barbs, and carburetor barb. Check the tightness of all fittings on the tank before final install.

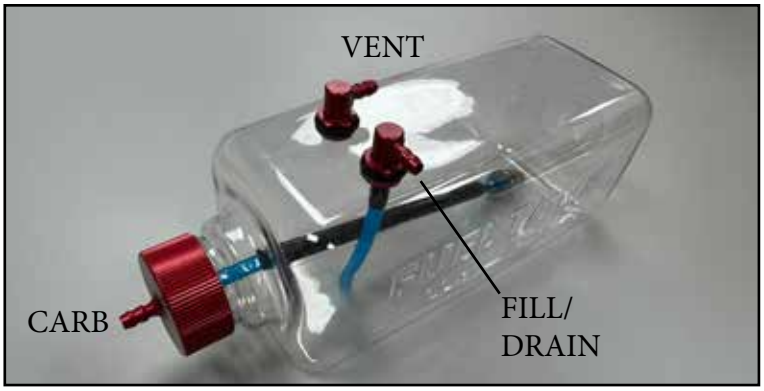
















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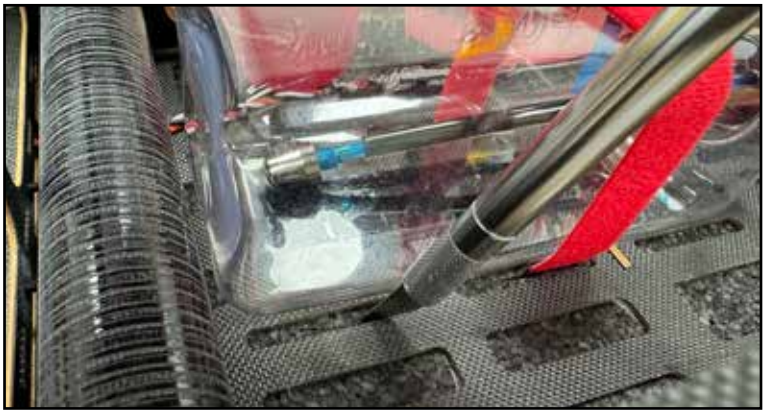
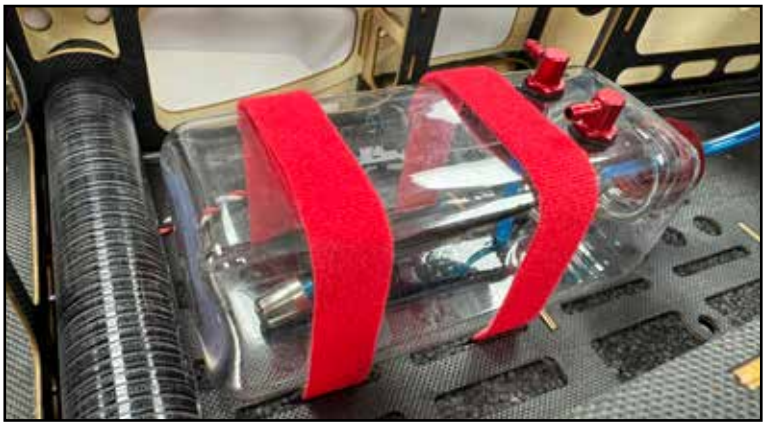
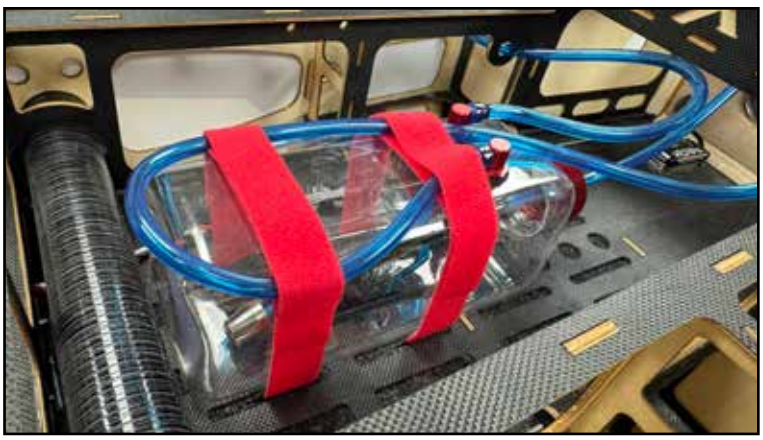
Mount the tank with a strip of self-adhesive velcro to the equipment tray just in front of the wing spar tube. We like for the tank to be as close to the tube as possible to minimize CG changes during flight as the tank drains. Cut slits in the foam as shown to encircle the tank with velcro straps. Mount your fuel dot to the fuselage side as shown (in this case we are using an Extreme Flight magnetic dot, which is large diameter and requires enlarging the hole a bit). Attach the fill/drain line to the dot, cut a slit in the foam as shown and run the vent line in a loop around the top of the tank (this helps to prevent fuel siphoning in flight) then down to the bottom of the aircraft. Pass the vent/overflow line out of the bottom of the fuselage as shown.













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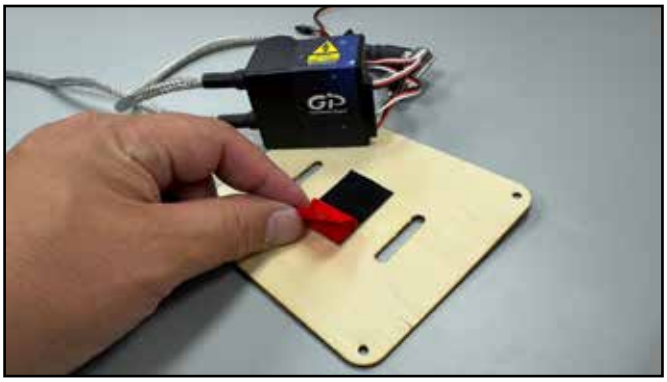
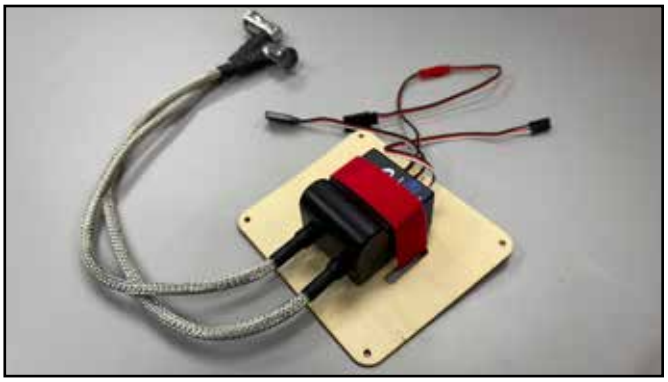
12.Ignition system

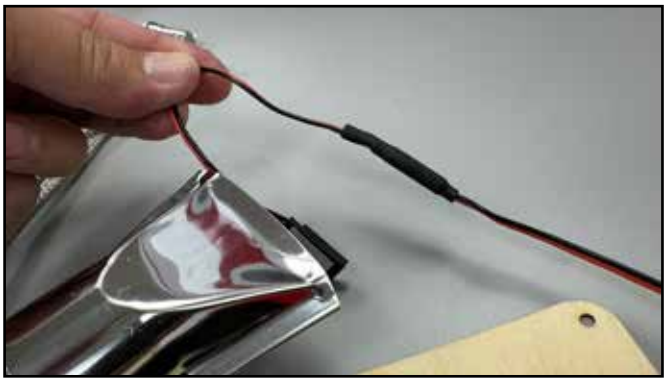
To save weight and complexity, we prefer to use an ignition-battery eliminator circuit (IBEC) such as the Tech-Aero or comparable unit, instead of a separate ignition battery. A good location for your twin-cylinder ignition unit is inside the motor box as shown. Remove the two slot pieces in the motor box top plate and attach the ignition with velcro. Use heat-shrink tubing or servo plug locks on all of these critical connections as appropriate. Run the ignition wires as shown, we recommend the use of 3M brand wire anchors as pictured for organizing wiring and tubing. Install the top plate using loctite.

















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13.Cooling

For gas twin cylinder installations, install the provided cooling duct into the front of the cowl as shown. You can use epoxy or rubberized glue such as Gorilla Clear Grip or Goop. The duct is extra long, to allow you to trim as appropriate if your engine is right-cylinder-forward or left-cylinder-forward. The cowl has a large molded-in cooling outlet which is more than sufficient. If you are using stock mufflers, install the cover plate over the exhaust tunnel. If you are using the canister muffler, be sure the vent holes on the bottom of the fuselage are opened.

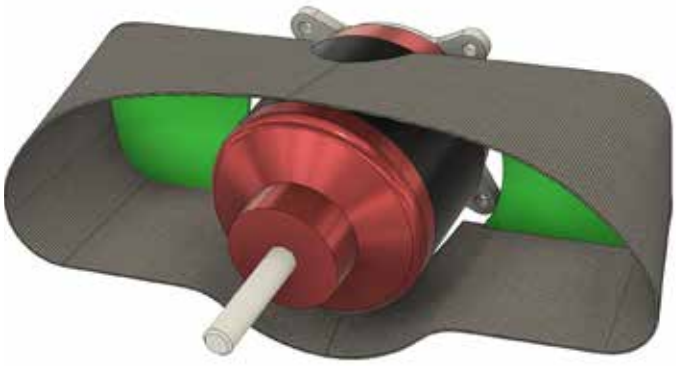








For electric power, we recommend to modify the baffle with balsa wood or foam as shown (by adding the plates colored green in the diagram). Delete the cover plate on top of the motor box to allow air to flow to the batteries. The cooling outlet on the bottom of the cowl is sufficient exit for the cowl air, but you can also open the cooling vents on the bottom of the fuselage to evacuate air from the battery area.





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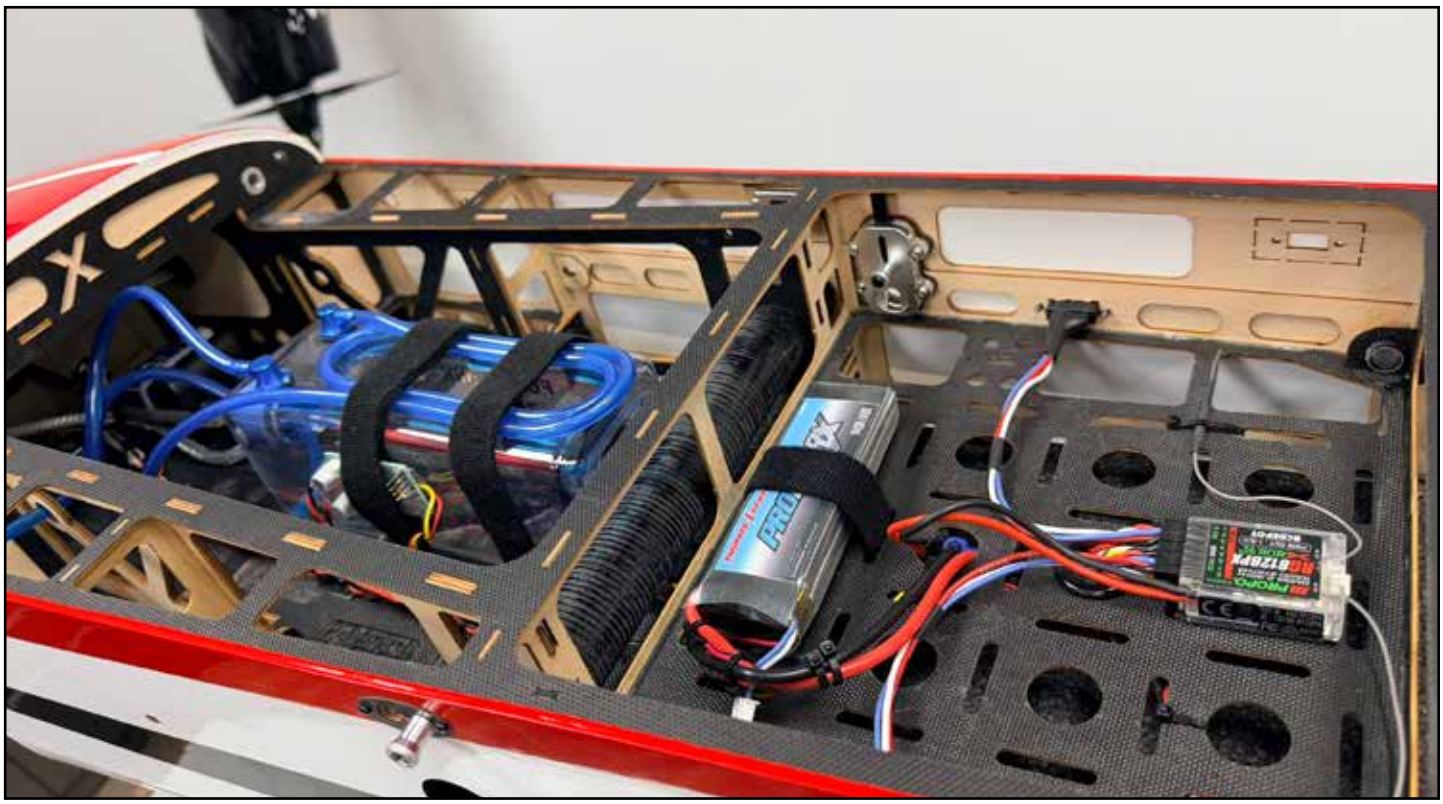
14.Final Assembly

Install spark plugs. We prefer to use the thickness of a common X-acto knife #11 blade to set our plug gap. Install the cowl. Use loctite on the cowl screws. Install your receiver and, route and tie all wiring and restrain your antenna(s) according to you radio mfg. directions.









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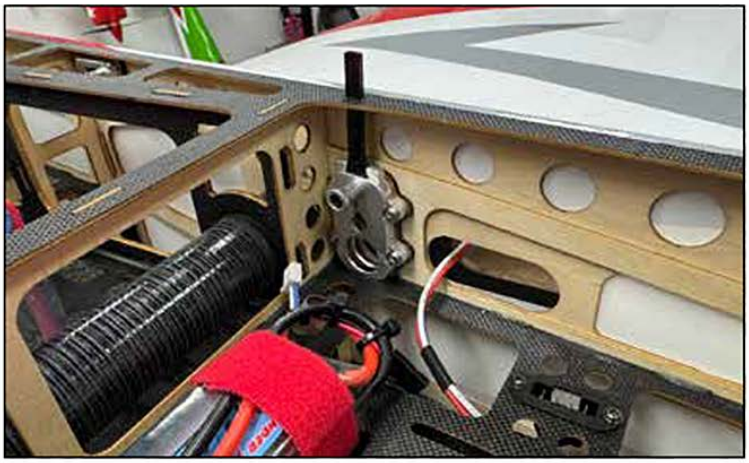
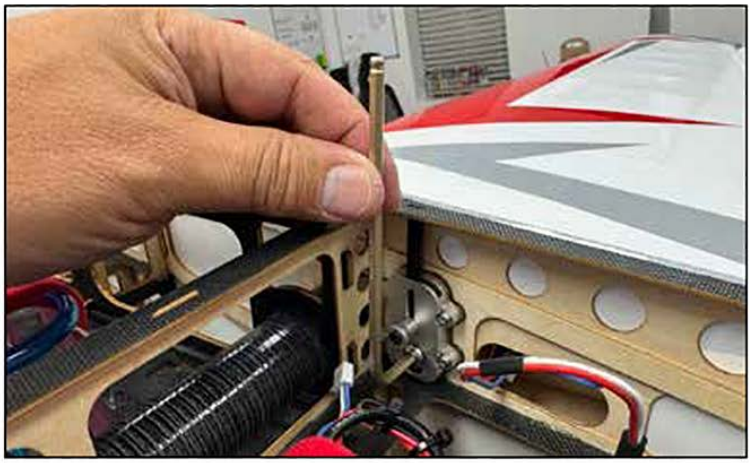
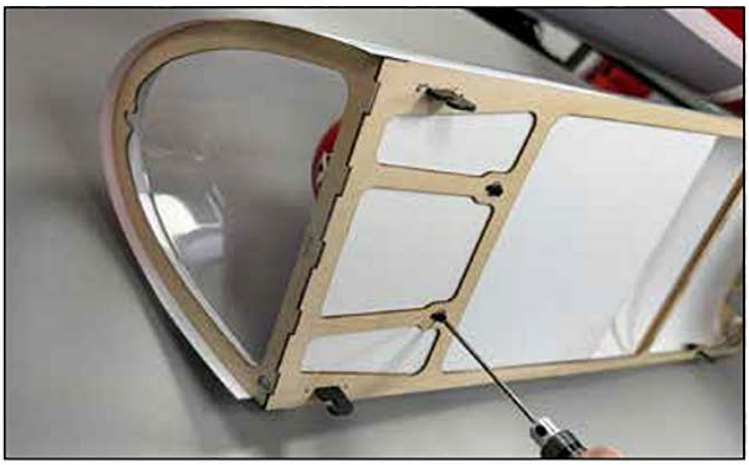
Assemble the major parts of the aircraft. Insert the carbon spar tubes for the wing and stab and slide the stabs on. Use a servo wire lock on the servo connection. Open the latch, fully seat the stab, then close the latch. Open the wing latch (the black plastic “flag” will pop up) and fully seat the wing. If you wish to tighten or loosen the fit of the wing, rotate the wing screw as shown. Check the tightness of the pilot figure as shown.

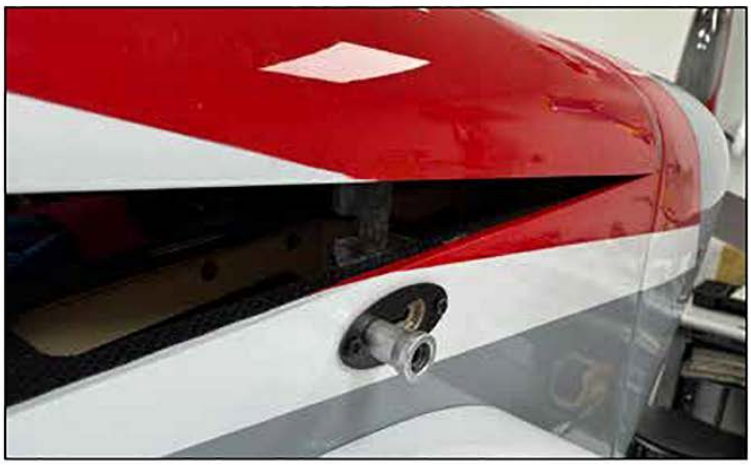












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15.SFGs

The 92" Extra 300 includes quick-release SFGs. The purpose of SFGs is to increase stability in slow 3D maneuvers. We recommend that you fly with and without them to feel the difference; we prefer to fly with SFGs ON. Attach the keyhole washers to the SFG's with rubberized glue as shown. Place the clear plastic spacer on the wingtip as shown. It is not necessary to fully remove the screws to mount or dismount the SFGs. Just loosen the screws a bit, slide the SFGs on, and tighten.













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16.Gas Prop and Spinner

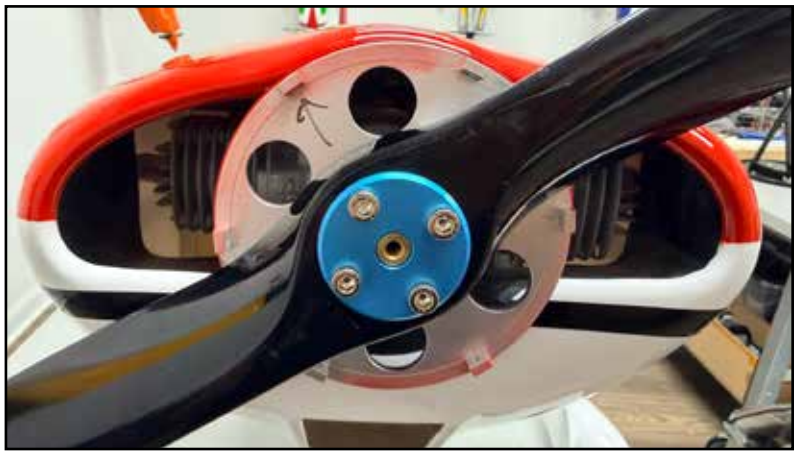
For gas, use a jig as shown to drill your prop and spinner for your engine prop bolt pattern. We prefer to drill the prop and spinner backplate at the same time if possible.













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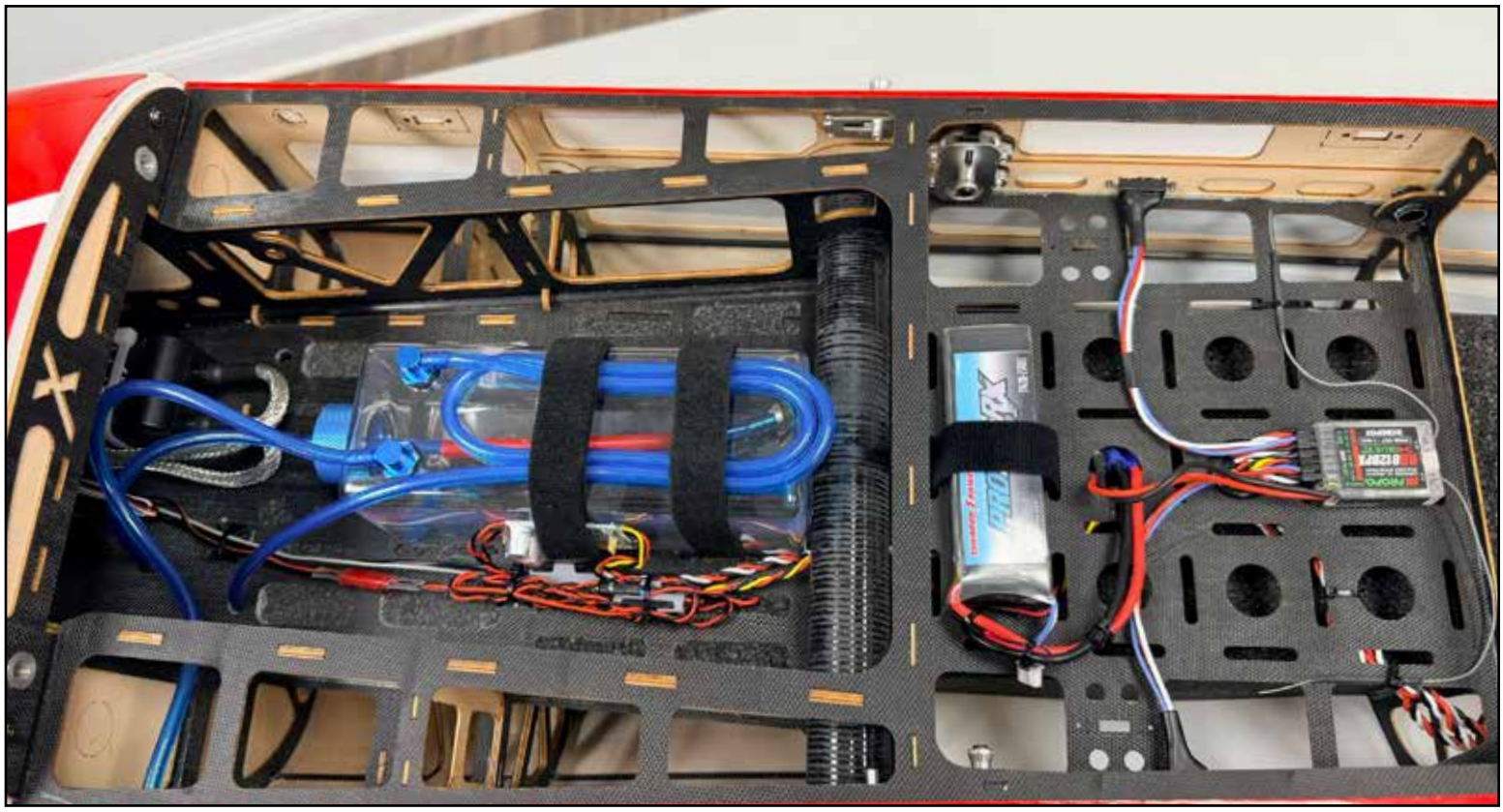
17.Balancing

Balancing the 92" Extra 300 is very simple. The preferred CG for aerobatic flight is on the center of the wing tube. With the aircraft fully assembled, but with canopy hatch OFF, lift the aircraft by the point shown, directly above the wing tube. One easy method is a loop of string under the tube. The aircraft should hang level.





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18.Control Throws

Set the control throws. Be sure to add adequate EXPO and be sure each surface is moving in the correct direction. There are various kinds of throw-meters available for this purpose, but our favorite is the smart phone most of us carry every day. Use a "level" app (most phones come equipped with one) and hold the phone against the control surface to measure deflection.

Aileron Low:	20 deg up, 20 deg down 18-20% exponential
High:	37 deg up, 36 deg down 50-60% exponential
Elevator Low:	10-12 deg 18-20% exponential
High/3D:	50-55 deg 50-60% exponential
Rudder Low:	20 deg 50-60% exponential
High:	45+ deg 60-80% exponential

NOTES: Even with SFG's installed (our preferred setup) 38/37 degrees of aileron gives a very fast roll rate. Try it before deciding to add more.

In our testing, 50-55 degrees of elevator is perfect. We prefer to set the elevator at 55 degrees of high rate and use Expo to tune the feel around center.









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SPECS

Wingspan: 92 inches
Length: 90 inches
Wing Area 1500 sq. in.
Weight: 19 to 21 lbs.
Center of Gravity: Center of wing tube.

Spinner: 4.5" (Included)
Pilot: 180mm Short (Included)



CONTROL SETTINGS:

Aileron: Low: 20 deg up, 20 deg down 18-20% exponential
High: 38 deg up, 37 deg down 50-60% exponential
Elevator: Low: 10-12 deg 18-20% exponential
High/3D: 50-55 deg 50-60% exponential
Rudder: Low: 20 deg 50-60% exponential
High: 45+ deg 60-80% exponential



POWER SYSTEM:

GP-76
Desert Aircraft DA 70cc
Blazing Star DA 70 stand-off
FlowMaster 24 oz. fuel tank
Header Drop: MTW 60mm Y header
MTW-TD-110H Rear exit canister
IBEC circuit to power ignition
24x9, 24x10, 25x9 prop based on engine/exhaust

ELECTRIC:

XWorks 70cc Combo, TMOTOR AM910 Combo
If purchased separately, Blazing Star XL Standoff or TMotor AM910 Standoff
24x12, 25.5x13 electric prop



SERVOS:

5 x Savox SB2290SG (Surfaces)
5 x Savox SV280SGP (Surfaces)
5 x Savox SV1270TGP(Surfaces)
1 x Savox 2262 (Throttle)

SERVO ARMS:

2x Extreme Flight 1.5" single servo arms (tapped 3mm) for Ailerons
2 x Extreme Flight 2" single servo arms (tapped for 3mm) for Elevators
1 x Extreme Flight 2" servo arm (tapped for 3mm) for Push-Pull
1 x Extreme Flight 1" servo arm (tapped for 3mm) for Throttle



SERVO EXTENSIONS:

4 x Extreme Flight 20 AWG 6" OR QTY 2 MPX Single Plug for Ailerons
2 x Extreme Flight 20 AWG 48" for Elevators
1 x Extreme Flight 20 AWG 36" for Rudder
1 x Extreme Flight 20AWG 12" for Throttle



COVERING:

Oracover colors

Blue/White Scheme
Ferrari Red 23
Dark Blue 52
White 10
Sky Blue 53

Red/White Scheme
Red 20
White 10
Ferrari Red 23
Black 71

Ultracote colors

True Red HANU866
Midnight Blue HANU885
White HANU885
Sky Blue HANU875

Deep Red HANU871
White HANU885

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