

Instruction Manual

ARF

EXTRA^{120CC} 300



Giuseppe Tompazini

FLEX
INNOVATIONS™



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flexinnovations.com/product/extra-300-120cc

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INTRODUCTION

The Extra 300 120cc draws inspiration from the legendary full-scale Extra 300, a pinnacle of aerobatic engineering. Designed by German aerobatic champion Walter Extra, the Extra 300 made its first flight in 1988 and has since become a staple in competitive aerobatics worldwide. Walter Extra, a former aerobatic competitor himself, sought to create an aircraft that combined his passion for aerobatics with his technical expertise. The result was the Extra 300 — a two-seat, mid-wing monoplane capable of unlimited aerobatic maneuvers.

The Birth of 3D

In 1994, Quique Somenzini took to the skies at Bennett Field in Las Vegas, Nevada, for the Tournament of Champions. Flying his Extra 300, he changed the world of aerobatics forever in a single flight. His groundbreaking routine didn't just showcase precision — it introduced 3D flight to the world. For the first time, an airplane performed sustained post-stall maneuvers, including the now-iconic harrier, along with aggressive tumbles and twisting transitions that no one had ever seen before.

As Norm Staub wrote in *Model Airplane News*, *"The crowd stood motionless, eyes staring, jaws dropped low in disbelief."* He continued, *"Eyewitnesses struggled to distinguish between the illusion they were seeing and the principles of aerodynamics they were thinking."*

The Flex Innovations design team is proud to present the ALL-NEW Extra 300 120cc!

Now, with the all-new, Flex Innovations Extra 300 120cc, that legacy comes full circle. Leading the Flex Design team, Quique Somenzini merges the birth of 3D with the relentless evolution of RC flying—bridging decades of innovation, passion, and performance. The result is an Extra 300 that embodies the spirit of the Full-Scale Extra 300 while redefining what's possible in today's modern, high-energy, XA flight.

Aggression Perfected!

The Extra 300 120cc isn't just another aerobatic airplane — it was purpose-built from the ground up to be aggressively insane in the air. Every line, every contour, every ounce of this aircraft screams XA-style performance, while maintaining authentic scale looks that honor the full-scale Extra 300. Designed with absolute precision, it delivers the speed, snap rolls, and razor-sharp responsiveness demanded by the most discerning pilots. From the first flight, you'll feel the difference. The Extra 300 120cc is built to dominate, whether it's high-energy maneuvers, precise knife-edge passes, or gravity-defying snap rolls. This is an aircraft that doesn't compromise — it pushes boundaries, giving you the ultimate edge in aggressive aerobatics.

The Extra 300 120cc features Flex Innovations' proprietary Speed-Lock system on the wings, stabilizers, and canopy. This allows for quick, screw-free assembly without the need for tools. Whether you're assembling at the field or preparing for transport, Speed-Locks make setup effortless, secure, and precise. Constructed from the top down to withstand unlimited G loads, the Extra 300 120cc combines carbon fiber and laminated plywood for an airframe that is extremely lightweight yet rigid. On top of the modern construction, the Extra 300 120cc features bold Clint Sweet Designs color schemes, matching performance with standout style.

The Extra 300 120cc is for pilots who demand aggression, precision, and total control.

Specifications:

Wingspan:	102 in. (2590mm)
Length:	102 in. (2590mm)
Estimated Weight: (DA-120 w/standard muffler)	27 - 28 lbs. (12.25 – 12.7kg)
Engine Size:	100-125cc

Required Equipment:

Radio Equipment & Servos:

Transmitter:	8+ channels
Receiver:	8+ channels, high-voltage capable
Receiver Battery:	(2) 2S 2000mAh 15C+ LiPos (FPZBR20002S15 recommended)
Recommended Servos:	(7) Minimum 450 oz/in (32.4 kg/cm) for control surfaces & (1) standard servo for throttle. (8) Axis 650 Servos (FPZDSAXIS650 recommended)

Servo Arms:

Aileron, Elevator & Rudder:	(3) FPZA1036B Flex 2-inch Clamping Servo Arm (4) FPZA1068B Flex 1.5-inch Clamping Servo Arm
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Servo Extensions:

Ailerons:	Root Servo (Inside Wing) – None Required Tip Servo (Inside Wing) – (2) 12-inch (305mm) FPZA1045 All Aileron Servos (Inside Fuselage) – (4) 12-inch (305mm) FPZA1045 Optional MPX Double Servo connector – (2) FPZA1066
Elevators:	(2) 48-inch (1200 mm) FPZ1049
Rudder:	Tail-Mounted Push-Pull – (1) 48-inch (1200 mm) FPZA1049 Forward-Mounted Pull-Pull – None Required
Throttle:	(1) 12-inch (305cm) FPZA1045

Spinner:

Spinner:	5-inch (127 mm) Flex Innovations 5-Inch Edge Style Carbon Fiber Spinner, Blue Color FPMA1087 Flex Innovations 5-Inch Edge Style Carbon Fiber Spinner, TOC Color FPMA1088
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Gas Engine Setup

Engine:	100-125cc Two-Stroke Engine Desert Aircraft DA-120 or GP-123 recommended
Exhaust:	Follow your engine manufacturer's recommendation, as well as local noise restrictions in your area. Desert Aircraft Stock Muffler Set (FPMDA120MUFFLER) recommended
Other Exhaust Options:	KS 3086 Canisters (Rear Exit) 90mm drop flexible header for the DA-120
Propeller:	Follow your engine manufacturer's recommendation. Falcon 28 x 9.5 recommended for the DA-120 on stock mufflers
Engine Standoffs:	Flex/Dualsky 20mm/120cc Standoff Kit (FPZMEMDA120H20)
Ignition Regulator:	Follow your engine manufacturer's recommendation
Ignition Battery	Follow the manufacturer's voltage requirements. Potenza 2S 2000mAh 15C+ Li-Po (FPZBR20002S15) recommended
Fuel Dot:	McFueled Fuel Dot (FPMA1049)

Optional Equipment:

FPZAURA08PRO	Aura 8 Professional
FPM1623	32oz Lightweight Fuel/Smoke Tank (for smoke)
DP1000	Dualsky DP1000 Brushless Smoke Pump
FPM1314	Flex Innovations Premium Wing and Tail Bag Set
FPM00113016A	Extra 300 120cc Pilot Figure – Blue
FPM00113016B	Extra 300 120cc Pilot Figure – TOC
FPM1332	Protection Pack – Edge 120cc
FPMA1055	Hook and Loop Strap, 400mm (2 for gas tank)
FPMA1012	Hook and Loop Strap, 200mm (2 for ignition batteries)

Ultracote®/Oracover® Colors:

Blue Scheme:

Ultracote®

Midnight Blue (HANU885)

White (HANU870)

True Red (HANU866)

Light Gray (HANU882)

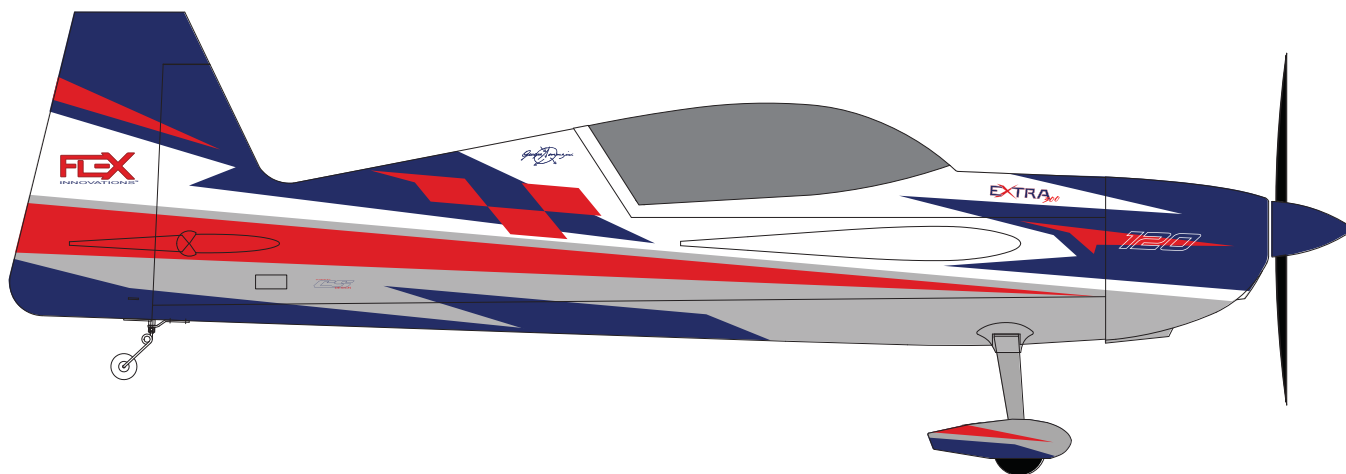
Oracover®

Dark Blue (21-052)

White (21-010)

Ferrari Red (21-023)

Grey (21-011)



TOC '94 Scheme:

Ultracote®

True Red (HANU866)

Green (HANU880)

White (HANU870)

Gold (HANU879)

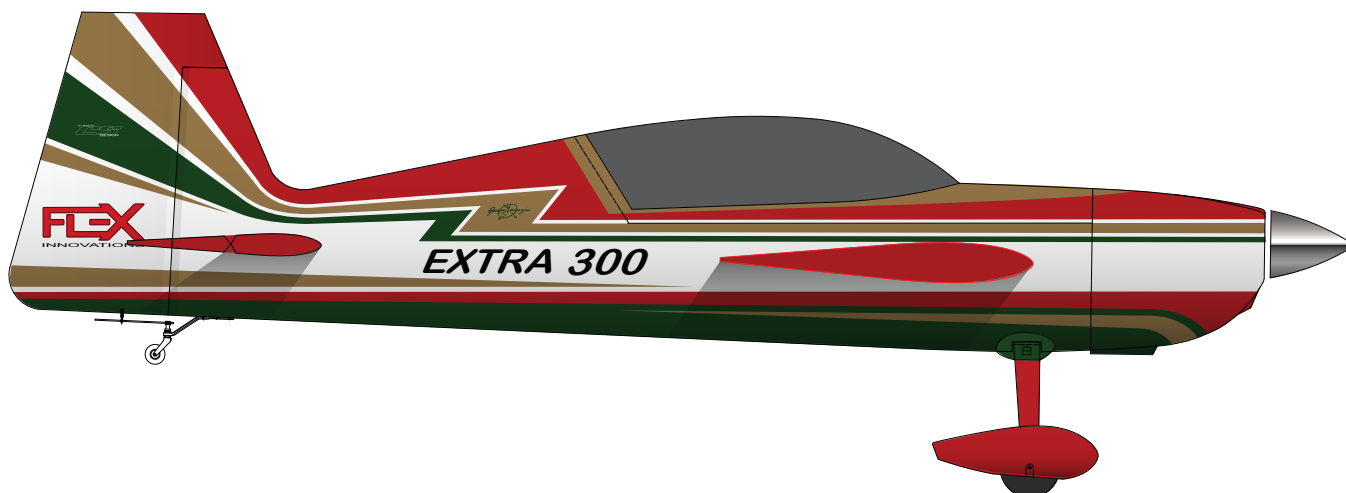
Oracover®

Ferrari Red (21-023)

Green (21-040)

White (21-010)

Gold (21-092)



USING THIS MANUAL

The manual is divided into sections to make the assembly of the airplane easier to follow.

Note: The squares "□" next to each step that can be checked off to help you keep track of the steps that have been completed.

ATTENTION

Read the ENTIRE instruction manual to become familiar with the features and assembly of the product before starting assembly. Failure to assemble or operate the product correctly can result in damage to the product, personal property and cause serious or fatal injury.

All instructions, warranties and other collateral documents are subject to change at the sole discretion of Flex Innovations, LLC. For up-to-date product literature, please visit our website at www.flexinnovations.com and navigate to the product page for this product.

WARNING

This is NOT a toy. This product is not intended for use by children under 14 years of age without direct adult supervision.

IMPORTANT INFORMATION REGARDING WARRANTY

Please read our Warranty and Liability section before building this product. If you as the purchaser or user are not prepared to accept the liability associated with the use of this product, you are advised to return this product immediately in new and unused condition, in the original packaging material, to the place of purchase.

SAFETY WARNINGS AND PRECAUTIONS

Protect yourself and others by following these basic safety guidelines.

1. This manual contains instructions for safety, operation, and maintenance. It is essential to read and follow all the instructions in the manual, prior to assembly, setup, or use, in order to operate correctly and avoid damage or serious injury.
2. In some cases, the written instructions may differ slightly from the photos. In those instances, the written instructions should be considered correct.
3. This model is not a toy, rather it is a sophisticated remote control hobby product and must be operated with caution and common sense. This product requires some basic mechanical ability. Failure to operate this product in a safe and responsible manner could result in injury, or damage to the product, or other property.
4. This model must be assembled according to these instructions. Do not alter or modify the model outside of these instructions provided by Flex Innovations, LLC, as doing so may render it unsafe and/or unflyable. You must take time to build straight, true, and strong. It is your responsibility to ensure the air worthiness of this product.
5. Use only compatible, appropriate components for the final assembly of this model. Ensure that the radio system is in functional condition, that the engine is appropriately sized for the model and that all other components are appropriate for use in this model as specified in this instruction manual. All components must be installed correctly so that they operate correctly both on the ground and in the air.
6. Inspect and check the operation of the model and all its components before every flight.

7. If you are not an experienced pilot, or have not flown a high-performance model before, it is recommended that you seek assistance from an experienced pilot in your R/C club for your first flights. If you're not a member of a club, the Academy of Model Aeronautics (AMA) has information about clubs in your area whose membership includes experienced pilots.
8. Keep the propeller area clear from such items as loose clothing, jewelry, long hair, or tools, as they can become entangled. Keep your hands and body parts away from the propeller as injury can occur.

SPECIAL LANGUAGE DEFINITIONS

The following terms are used throughout the product literature to indicate various levels of potential harm when operating the product.

- NOTICE:** Procedures, which if not properly followed, create a possibility of physical property damage AND a liable or no possibility of injury.
- CAUTION:** Procedures, which if not properly followed, create a probability of physical property damage AND a possibility of serious injury.
- WARNING:** Procedures, which if not properly followed, create the probability of property damage, collateral damage and serious injury OR create a high probability of serious injury.

IMPORTANT BEFORE ASSEMBLY

Carefully unpack your aircraft and inspect the parts. Review the manual and gather the required tools and supplies.

- Remove all parts from their plastic bags, inventory all items and closely examine all the major airframe components for damage. If any items are missing or you find damaged components, do not proceed. Please contact customer support.
- Your aircraft has experienced many changes in temperature, density, etc. Throughout its transit from the factory, warehouse, and finally to your location. It is expected that some areas of covering will show wrinkles
- Use a covering iron with a covering sock on high heat to tighten the covering as necessary, paying special attention to the leading edges of the flying surfaces, hinge lines and stabilizer and wing saddle areas. Apply slight pressure over sheeted areas to thoroughly bond the covering to the wood. Use caution around seams to prevent inadvertently pulling them loose.
 - **Pro-Tip:** You can use a "Seal-It Pen" or clear nail polish to permanently seal any sharp edges or corners of covering that may come loose in flight.
- Use thin CA to go over any important glue joints, such as the motor box, firewall, servo mounting rails and any other pre-assembled joints that may see high stress during flight.
- Gather all the required components such as motor and radio equipment that will be used to equip the airplane. Create a new radio program in your transmitter and bind this model program to the receiver that will be used in the airplane
- Glass cleaner and paper towels work well to clean your airframe. For an additional shine, spray wax is an option.
- It is a good idea to have some isopropyl alcohol on hand throughout assembly. This can be used to help clean residual adhesives.

AIRFRAME ASSEMBLY

AILERON SERVO AND LINKAGE INSTALLATION

Required for this section

Components

- Main Wing Panels (2)
- Aileron Linkage (4)
- Aileron Servos (4)
- Aileron Servo Arms 1.5" (4)
- Tip Aileron Servo Extensions (2)
- Ball Links (8)
- M3x20 Socket Head Cap Screw (4)
- M3x15 Socket Head Cap Screw (4)
- M3 Washer (24)
- M3 Lock Nut (8)

Tools

- 2.5mm Hex Driver
- 5.5mm Nut Driver
- #1 Phillips Screwdriver

Adhesives/Building Materials

- Thin CA
- Blue Thread Lock
- Heat shrink, dental floss or safety clips
- Cable Ties

- ☐ 1. Use a #1 Phillips screwdriver to thread a servo mounting screw into each of the pre-cut holes in the servo mounting rails in the wing. Remove the screw and apply a small amount of thin CA to each of the holes to harden the threads cut by the screw. Do not use CA accelerator. Let the CA fully cure before moving forward.
- ☐ 2. Assemble your servo grommets per your servo manufacturer's instructions.

Quique's Pro Tip:

Many servo grommet brass eyelets will fit over most hex drivers. Slide all the eyelets over the hex driver, flared end first. Use the hex driver to push the eyelets into the servo grommets one right after the other for easier installation.

- ☐ 3. Secure a servo extension to each of the two tip aileron servos. Use servo connector safety clips (FPZA1040), heat shrink or dental floss to secure the extension.
- ☐ 4. Insert the aileron servo into the servo bay with the output shaft towards the **leading edge** of the wing. Be sure to route the servo lead out of the wing before mounting the servo. There is string routed through the wing to assist you in pulling the tip aileron servo extension through the wing. Mount the servo to the wing using the servo mounting screws provided with your servos.
- ☐ 5. Using an aileron pushrod, assemble the aileron linkages so that the total length from center of ball to center of ball is approximately 4-¼ inches (107mm). Final length will be adjusted when centering the control surface. Note that one end of each aileron linkage has left-hand threads, while the other end has right hand threads, this will allow for adjusting the linkage length without removing either end of the linkage.

Quique's Pro Tip:

Use a set of digital calipers to measure the length of threads exposed on each end of the linkage. This allows you to ensure that the ball links are equally threaded onto each end of the linkage.

- ☐ 6. Attach the linkage to the servo arm. The correct hole location is 1 ½ inches (38mm) from center. If using the recommended 1 ½ inch servo arm, this is the hole at the end of the servo arm. The order of hardware components, starting from the top of the servo is as follows:
- M3x20 socket head cap screw
 - M3 washer
 - Servo Arm
 - Ball Linkage
 - M3 washer
 - M3 locknut
- ☐ 7. Power on your radio system to center the servo. Install your aileron servo arm onto the servo as close to parallel with the hinge line as possible. Apply blue thread lock to the servo arm output shaft screw and fully tighten the screw. If your servo arms have clamping screws, apply blue thread lock, and secure them in place as well. Once complete, use sub-trim to fine tune the center position of the servo to be perfectly parallel to the hinge line.



Note: The depicted servo arms are prototypes and different than the recommended ones. When using the recommended 1.5" servo arms you will mount the linkage to the outermost hole from the end of the servo arm (1.5" away from the servo center).

- ☐ 8. With the radio powered-on and the servo arm parallel to the hinge line, connect the root aileron servo linkage to the control horn with the hardware in the following order:
- M3x15 Socket Head Cap Screw
 - M3 Washer
 - Control Horn (Side 1)
 - M3 Washer
 - Ball Link
 - M3 Washer
 - Control Horn (Side 2)
 - M3 Washer
 - M3 Lock Nut

- ☐ 9. Center the aileron by lengthening or shortening the linkage as needed.

Note: The angle of the linkage when centered is correct. As the servo arm rotates and the control surface deflects, the linkage will straighten.

- ☐ 10. Once the root aileron servo is connected, set your end points in both directions so that the ailerons travel 38 degrees up and 37 degrees down, at the root of the aileron, when set to high rates. Once complete, center the tip servo, and adjust the linkage so that there is no binding with the tip root at neutral. Deflect the servos to maximum and adjust the tip servo end points to match the root servo in both directions. Once satisfied with the matching of the servos, attach the linkage to the control horn using the same order of components used previously.

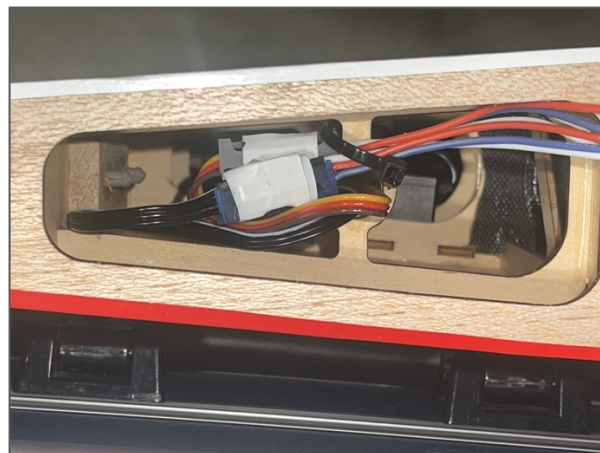
Quique's Pro Tip:

When matching the tip servo to the root servo, don't connect the linkage to the control horn of the tip servo. Instead, place the ball link in the control horn, and use a bolt, or hex driver with a 3mm shaft, to check the alignment of the hole in the control horn and the hole in the ball link. If it slides easily through the hole, its aligned. If not, you still need to adjust the servo travel.

- ☐ 11. For the wing servos, the Dual Servo MPX Connector (FPZA1066) is an easy way to route both servos to the receiver. The fuselage has a slot specially designed to mount the MPX connector.



- ☐ 12. Be sure the leads of the connector are secured with a cable tie within the wing to help prevent them from coming unplugged.



ELEVATOR SERVO AND LINKAGE INSTALLATION

Required for this section

Components

- Left and Right Horizontal Stabilizers (2)
- Elevator Servos (2)
- Elevator Servo Arm 2" (2)
- M3x20 Socket Head Cap Screw (2)
- M3x15 Socket Head Cap Screw (2)
- M3 Washer (12)
- M3 Lock Nut (4)

Tools

- 2.5mm Hex Driver
- 5.5mm Nut Driver
- #1 Phillips Screwdriver

Adhesives/Building Materials

- Thin CA
- Blue Thread Lock
- Dental Floss, Heat Shrink or Safety Clips

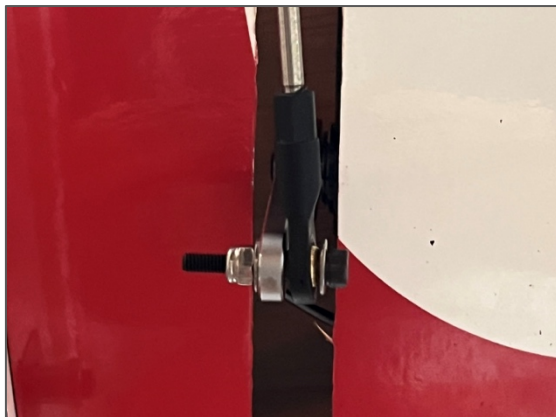
- ☐ 1. Use a #1 Phillips screwdriver to thread a servo mounting screw into each of the holes in the servo mounting rails in the horizontal stabilizer. Remove the screw and apply a small amount of thin CA to each of the holes to harden the threads cut by the screw. Do not use kicker, allow the CA to fully cure before moving forward.
- ☐ 2. Assemble your servo grommets per your servo manufacturer's instructions.



- ☐ 3. Insert the elevator servo into the mounting location with the output shaft towards the leading-edge of the stab. Mount the servo to the stab using the mounting screws provided with your servo. Note that the servo wire will exit on the leading-edge side of the stab as shown in the picture above.
- ☐ 4. Power on your radio system to center the servo. Install a 2-inch (51mm) servo arm onto the servo as close to perpendicular with the servo's case as possible. Apply a small amount of blue thread lock to the servo arm screw and secure it in place. If your servo arm has clamping screws, apply blue thread lock to these screws and secure them in place. Note that you may need to power off the model and rotate the servo arm by hand

to have access to each clamping screw. Use sub-trim to set the servo arm perfectly perpendicular before installing the elevator.

- ☐ 5. Using an elevator pushrod, assemble the elevator linkages and ball links so that the total length from center of ball to center of ball is approximately 3 ¼ in (84mm). Final length will be adjusted when centering the control surface. Note that both ends of the elevator linkages have opposite direction threads.
- ☐ 6. Attach the linkage to the servo arm. The correct hole location is 2-inches (50.8mm) from the center of the servo. If you are using the recommended servo arm this is the hole at the end of the servo extension arm. The order of hardware components, starting from the top of the servo is as follows:
 - M3x20 socket head cap screw
 - M3 washer
 - Ball Linkage
 - Servo Arm
 - M3 washer
 - M3 locknut
- ☐ 7. Attach the linkage to the control horn. The order of hardware components, starting from the tip of the stabilizer is as follows:
 - M3x15 socket head cap screw
 - M3 washer
 - Control Horn #1
 - M3 washer
 - Ball Linkage
 - M3 washer
 - Control Horn #2
 - M3 washer
 - M3 locknut



- ☐ 8. With the radio powered on and the servo arm centered perpendicular to the servo case, adjust the linkage length so that the control surface is centered.

Quique Pro Tip:

- For elevator centering, it is best to install the stabilizers onto the fuselage and stand approximately 10 feet (3m) behind the aircraft while sighting the two elevator halves. Using this method, you can best align the most important part of the control surface, the wider section, rather than referencing something less important, like the elevator counterbalance.



- ☐ 9. After installation is complete, your linkage setup should match the image above. Repeat the same procedure for the other horizontal stabilizer.

MAIN LANDING GEAR INSTALLATION

Required for this section**Components**

- Fuselage Assembly
- Landing Gear
- Wheel Pants (L & R)
- Main Wheel (2)
- M6x25 Socket Head Cap Screw (4)
- M6 Flat Washer (8)
- M3x15 Socket Head Cap Screw (4)
- M3 Flat Washer (4)
- Landing Gear Axle (2)
- M5 Wheel Collar (4)

Tools

- 1.5mm Hex Driver
- 2.5mm Hex Driver
- 5mm Hex Driver
- 7mm Wrench
- 13mm Wrench
- 12mm Wrench
- Felt-Tipped Pen

Adhesives/Building Materials

- Blue Thread Lock
- Red Thread Lock
- Rubber Adhesive (e.g. GOOP)

Landing Gear Installation



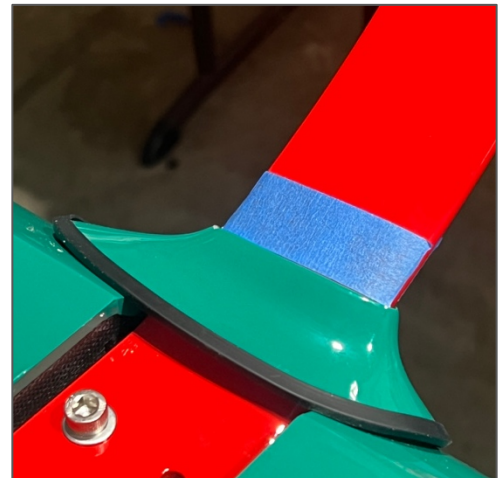
The landing gear is secured using four M6x25 bolts that thread from the bottom of the airplane into the blind nuts pre-installed in the fuselage.

- ☐ 1. Place the landing gear on the fuselage so that it sweeps forward and the wheels are closer to the nose of the airplane. The hole pattern is such that the landing gear can only be installed in one orientation.
- ☐ 2. Using blue thread lock, install the M6x25 socket head cap bolts with an M6 washer through each one of the holes in the landing gear and through the corresponding landing gear mounting hole in the fuselage. Tighten the screws using a 5mm hex driver loosely. Do not fully tighten until all four M6 screws are in place.

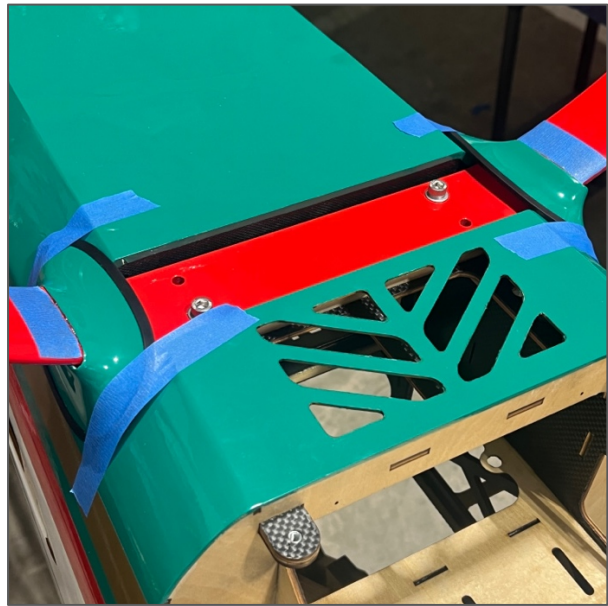
Landing Gear Cuff Installation

The landing gear cuffs are glued to the landing gear itself, and not the fuselage. This allows for easy removal of the landing gear.

- ☐ 1. Slide the gear cuff up into place against the fuselage. Apply a piece of masking tape at the bottom edge of the cuff on each side of the landing gear.



- ☐ 2. Slide the cuff back down and apply a bead of adhesive on each side of gear based on where you marked the bottom of the cuff. We recommend a rubberized adhesive such as GOOP.



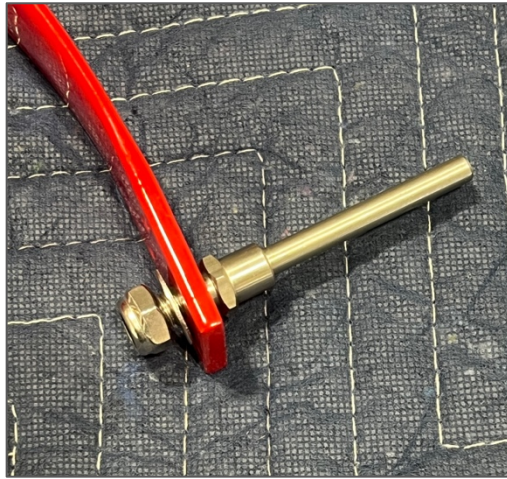
- ☐ 3. Slide the gear cuff back up into place. Tape over the bottom of cuff to ensure no residual adhesive runs down the landing gear. Also tape the top of the cuff to the fuselage to keep it in place while the adhesive sets.
- ☐ 4. Keep airframe upright and allow the adhesive to cure for 12 hours (if using GOOP).

Wheel, Axle, and Wheel Pant Installation

The wheel, axle, and wheel pants feature a wheel pant saver system which will increase the longevity of the wheel pants when flying off grass runways for example.



- ☐ 1. Mount the axle to the landing gear by using the provided washer and locknut, use red thread lock on these nuts. Notice the flat spot on the end of the axle. To properly use the wheel pant savers, make sure this is facing towards the bottom of the airplane.



- ☐ 2. Put the wheel in place by sliding it over the axle. A collar will likely need to be installed to keep the wheel in place laterally.



- ☐ 3. Locate the wheel pant saver and mount it by aligning the set screw with the flat spot on the axle. Also thread the wood screws into the wooden piece of the wheel pant saver.



- ☐ 4. Dry fit the wheel pant in place and install the retaining bolts. Test fit the wheel pant saver by tightening the bolts. You may need to shave the wooden piece slightly to improve fitment.
- ☐ 5. Once fitment is confirmed, apply adhesive to the end of the wooden piece of the wheel pant saver. GOOP or E600 is recommended. Epoxy, for example, may be too brittle for this area.



- ☐ 6. Use blue thread lock, re-install and tighten the wheel pants for flight. Allow the adhesive to cure for at least 12 hours.

RUDDER CONTROL HORN INSTALLATION

An Important Note on Rudder Setup

When using the recommended equipment, to achieve the desired CG, we have opted to install the rudder servo in the tail using a push-pull setup, that is the installation that is shown in this manual. However, the Extra 300 120cc is also set up for a pull-pull system with the servos in the main radio tray under the canopy. If you feel that your setup may result in a tail-heavy airplane you can use this option.

In addition, you can skip this step and complete the rest of the assembly so that you can lay out all your equipment to check the airplane's CG and test which rudder servo location will best suit your build. Then you can come back and complete this step at the end of your assembly.

Control Horn Installation

Required for this section

Components

- Rudder Control Horns (set of 2)
- Rudder Control Horn Base (1)
- Rudder

Tools

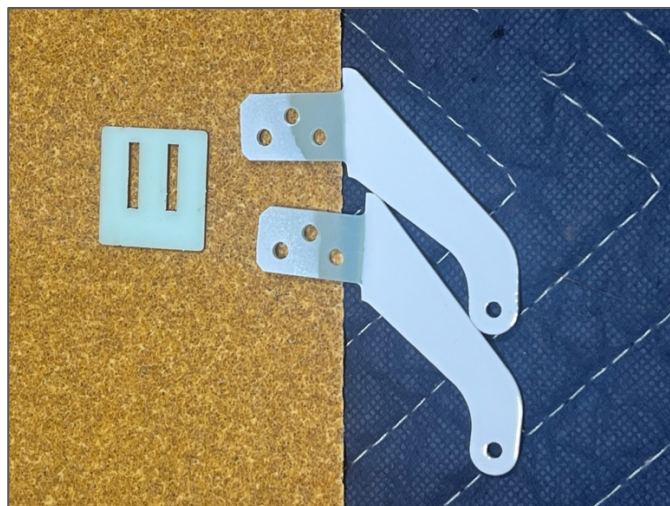
- Hobby Knife with a #11 blade

Adhesives/Building Materials

- Isopropyl Alcohol
- 30-minute Epoxy
- Paper Towels
- Toothpicks
- Mixing Cups
- Mixing Sticks (something to mix epoxy with)

Note: When using the recommended push-pull setup on the Extra 300 120cc the rudder servo and the control horn can be installed on either side of the fuselage, just ensure that you cut openings for both on the same side!

- ☐ 1. Scuff each control horn with medium grit sandpaper where it enters the control surface. Use a paper towel and isopropyl alcohol to clean up the control horn after it has been scuffed.



- ☐ 2. Cut openings for the control horn on the rudder. Slide the control horns through the square control horn base, and test fit them in their corresponding slots. Note that the holes in the control horn base are offset. This is so that the base does not extend over the hinge line. Adjust the holes in the control surfaces to fit the control horns if needed.



- ☐ 3. Apply epoxy to the control horn slots and control horn and insert the control horn into its corresponding slots. Double check the rudder control horn to ensure it is straight and seated properly. Use a paper towel and isopropyl alcohol to clean up any excess epoxy. Set the rudder aside and let the epoxy fully cure.



Quique's Pro Tips:

Use a ball link and the corresponding hardware to keep the two parts of each control horn aligned while the epoxy cures.

RUDDER AND TAILWHEEL INSTALLATION

Required for this section

Components

- Fuselage Assembly
- Rudder
- Rudder Hinge Wire
- Tail Gear Assembly
- Steering Ball Link (1)
- M3X16mm Socket Head Cap Screws (3)
- M3 Washers (3)

Tools

- 2.5mm Hex Driver
- Hobby knife
- Flat Head Screwdriver

Adhesives/Building Materials

- Blue Thread Lock
- 15 Minute Epoxy
- Isopropyl Alcohol
- Paper Towels
- Toothpicks
- Mixing Cups
- Mixing Sticks

Rudder Installation

The rudder is removable using a wire sliding through the hinges from the top.

- ☐ 1. Install the rudder by making sure the slots in the hinges are aligned. Also be sure, the bottom of the rudder lines up with the bottom of the fuselage.



- ☐ 2. Run the wire through the top of the rudder (with the threaded section on top) through the hinges.
- ☐ 3. Apply thread locker to the threads and screw the wire into the embedded nut using a small flat head screwdriver.



Tailwheel Installation

The tailwheel is mounted using three bolts along with a ball link.

- ☐ 1. Locate the hole in the bottom of the rudder that will accept the ball link for the steering arm. It is about 3-3/8 inches (85mm) aft of the rudder hinge line. Use a hobby knife with a #11 blade to remove the covering from the hole.
- ☐ 2. Scuff the cylindrical part of the ball link with a medium grit sandpaper. Clean the ball link with isopropyl alcohol and a paper towel to remove any leftover plastic particles.
- ☐ 3. Once clean and dry, apply 15-minute epoxy adhesive and glue the steering ball link into the hole, keeping it square to the bottom of the rudder and perpendicular to the wire steering arm. Apply epoxy around the ball link for added strength.



- ☐ 4. Once the adhesive is cured, slide the wire steering arm through the ball link and bolt the tail wheel mount in place using the supplied bolts and blue thread lock.



- ☐ 5. You can trim the steering wire leaving some overhang. Ensure that the steering wire stays on track within the ball link throughout the rudders full range of motion.



RUDDER SERVO AND LINKAGE INSTALLATION

Required for this section

Components

- Rudder Control Horns (set of 2)
- Rudder Control Horn Base (1)
- Fuselage Assembly
- Rudder Servo
- Rudder Servo Arm 2" (2)
- Rudder Servo Extension (1)
- Elevator Servo Extensions (2)
- M3x20 Socket Head Cap Screw (1)
- M3x15 Socket Head Cap Screw (1)
- M3 Washer (6)
- M3 Lock Nut (2)
- M3 Conical Spacer (2)

Tools

- Hobby Knife with a #11 blade
- 2.5mm Hex Driver
- 5.5mm Nut Driver
- #1 Phillips Screwdriver

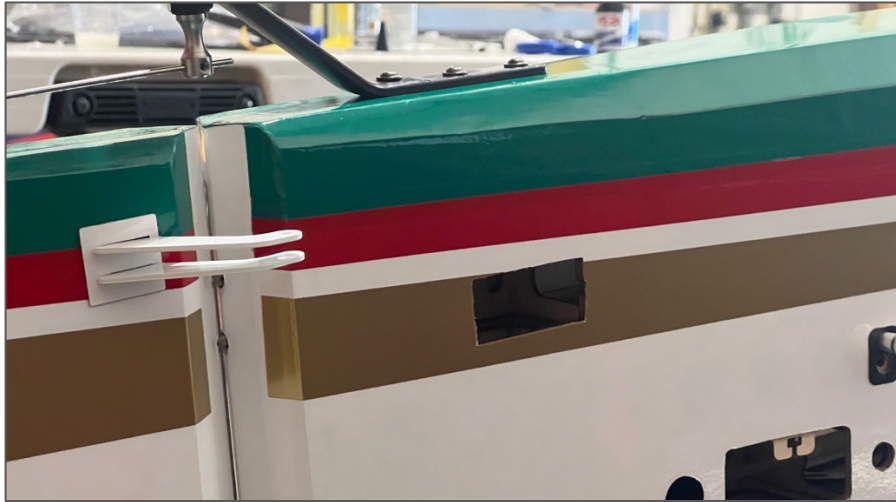
Adhesives/Building Materials

- Isopropyl Alcohol
- 30-minute Epoxy
- Paper Towels
- Toothpicks
- Mixing Cups
- Mixing Sticks (something to mix epoxy with)
- Thin CA
- Blue Thread Lock
- Dental Floss, Heat Shrink or Safety Clips

Rudder Servo Opening

- ☐ 1. Using a flashlight locate the opening for the rudder servo.
- ☐ 2. Double check that you are exposing the servo opening that is on the same side as the rudder control horn.

- ☐ 3. Once you have located the correct opening use a hobby knife with a sharp blade to remove the covering. You can cut the covering with an X shape and use a covering iron with a fine tip to seal the edges down to prevent the covering from lifting up in flight.



Rudder Servo Installation

- ☐ 1. Use a #1 Phillips screwdriver to thread a servo mounting screw into each of the holes in the servo mounting rails in the horizontal stabilizer. Remove the screw and apply a small amount of thin CA to each of the holes to harden the threads cut by the screw. Do not use kicker, allow the CA to fully cure before moving forward.
- ☐ 2. Assemble your servo grommets per your servo manufacturer's instructions.
- ☐ 3. Secure a servo extension to the rudder servo. Use servo connector safety clips (FPZA1040), heat shrink or dental floss to secure the extension.
- ☐ 4. Feed the rudder servo extension and the two elevator servo extensions through the tube in the fuselage that is provided for this purpose. Secure the extensions to prevent excessive movement during flight.

Rudder Servo Linkage Installation

- ☐ 1. Insert the rudder servo into the mounting location you exposed, with the output shaft towards the rear of the fuselage. Mount the servo to the fuselage using the mounting screws provided with your servo.
- ☐ 2. Power on your radio system to center the servo. Install a 2-inch (51mm) servo arm onto the servo, pointing down, as close to perpendicular with the servo's case as possible. Apply a small amount of blue thread lock to the servo arm screw and secure it in place. If your servo arm has clamping screws, apply blue thread lock to these screws and secure them in place.
- ☐ 3. Using the rudder pushrod, assemble the rudder linkage and ball links so that the total length from center of ball to center of ball is approximately 4-1/4 inches (107mm). Final length will be adjusted when centering the control surface. Note that both ends of the rudder linkage have opposite direction threads.

- ☐ 4. Attach the linkage to the servo arm. The correct hole location is 2-inches (50.8mm) from the center of the servo. If you are using the recommended servo arm this is the hole at the end of the servo extension arm. The order of hardware components, starting from the top of the servo is as follows:

- M3x20 socket head cap screw
- M3 washer
- Servo Arm
- Conical Spacer
- Ball Linkage
- Conical Spacer
- M3 washer
- M3 locknut



- ☐ 5. Attach the linkage to the control horn. The order of hardware components, starting from the tip of the stabilizer is as follows:

- M3x15 socket head cap screw
- M3 washer
- Control Horn #1
- M3 washer
- Ball Linkage
- M3 washer
- Control Horn #2
- M3 washer
- M3 locknut



- ☐ 6. With the radio powered on and the servo arm centered perpendicular to the servo case, adjust the linkage length so that the control surface is centered.



- ☐ 7. After installation is complete, your linkage setup should match the image above.

GAS POWER SETUP

ENGINE INSTALLATION

Required for this section

Components

- Fuselage Assembly
- Engine
- Flex/Dualsky 20mm/120cc Standoff Kit
- M6 Lock Nuts (4)
- M6 Flat Washers (4)
- M6 Fender Washers (4)
- M6 x 55mm Socket Head Cap Screws (4)

Tools

- Drill
- 1/8-inch (3mm) Drill Bit
- 1/4-inch (6.5mm) Drill Bit
- 1/4-inch Hex Driver

Adhesives/Building Materials

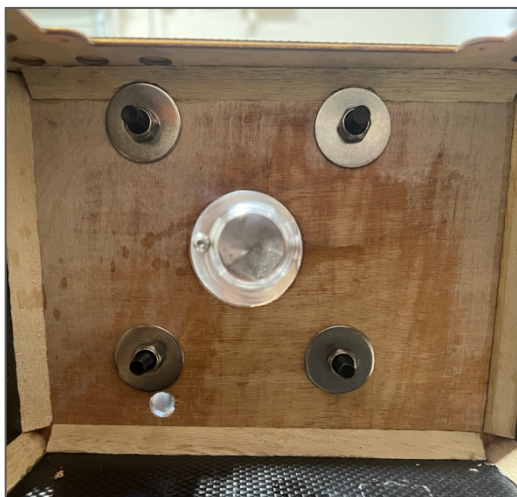
- Blue Thread Lock
- Thin CA

Mount the Engine

- ☐ 1. The engine mounting location for the DA-120 and GP-123 is laser-etched into the firewall for your convenience. If you will be using an engine with a different mounting pattern, the "+" represents the engine crankshaft. Use a 1/8-inch drill bit and drill to create a pilot hole in the center of the four bolt hole etchings in the firewall. Use a 1/4-inch drill bit to enlarge these holes to the appropriate size for the engine mounting bolts. There is also a laser etching for the throttle linkage just below the lower right mounting hole (when looking at the firewall from the front). You can open this hole at this time as well if using the DA-120 or GP-123. Other engines may require a different hole location.



- ☐ 2. The hardware for mounting your engine is not provided with the airframe, instead it comes with the standoff kit. Mount the engine (without the exhaust) to the firewall using the Flex/Dualsky 20mm/120cc Standoff Kit, (4) M6 x 55mm socket head cap screws, (4) M6 flat washers, (4) M6 fender washers and (4) M6 Lock Nuts as shown in the pictures below.



Throttle Servo and Linkage Installation

Required for this section

Components

- Fuselage Assembly
- Throttle Servo
- 12-inch (305mm) Servo Extension
- Throttle pushrod
- 3mm Ball Link
- M3x16mm Socket Head Cap Screw
- M3 Flat Washers (2)
- M3 Lock Nut
- 2mm Ball Link
- M2x10 Phillips Head Screw
- M2 Flat Washer (2)
- M2 Lock Nut

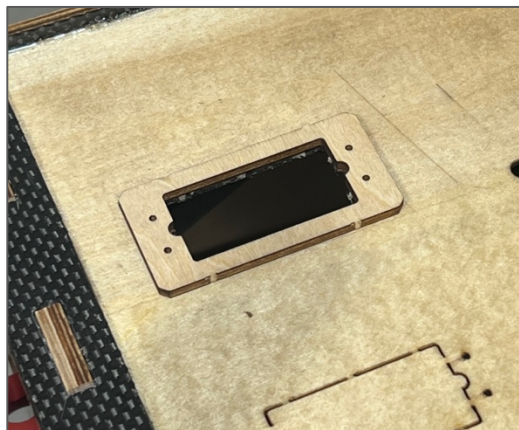
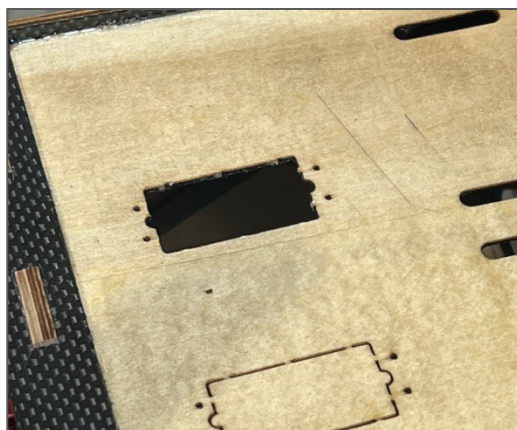
Tools

- #1 Phillips Screwdriver
- 2.5mm Hex Driver

Adhesives/Building Materials

- Thin CA
- Blue Thread Lock
- Heat Shrink, Dental Floss or Safety Clips

- ☐ 1. Punch out the servo opening that matches your engine's carburetor orientation. Reinforce the opening with the wooden doubler before mounting the servo.

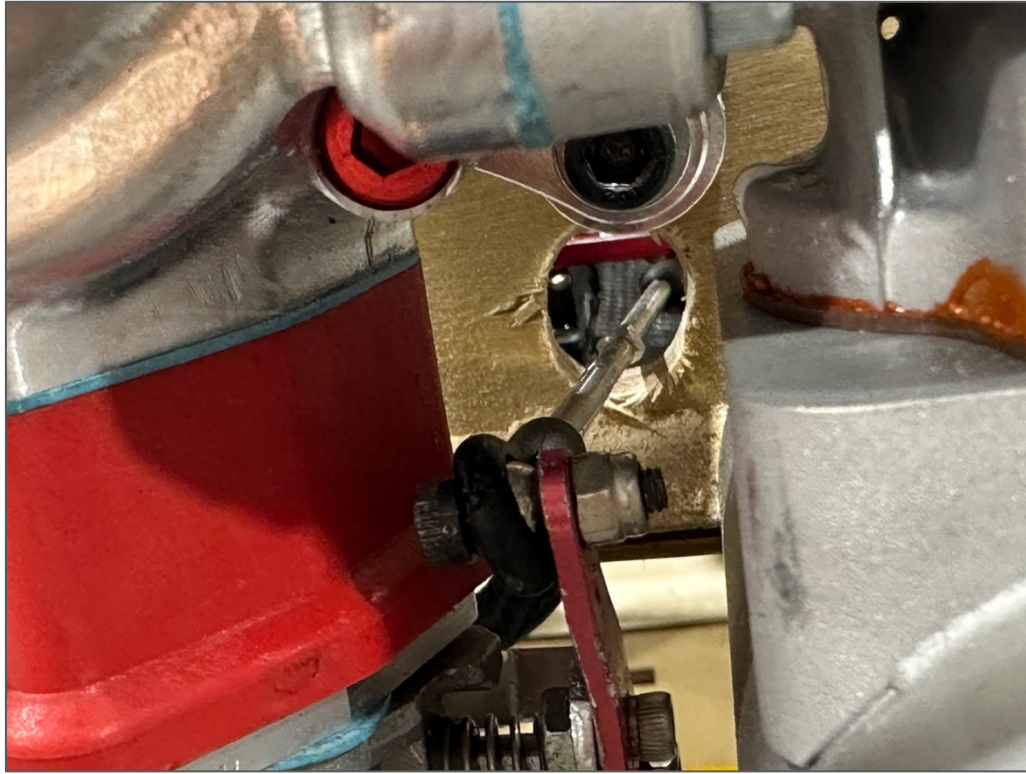


- ☐ 2. Thread a servo mounting screw into each of the four mounting screw holes in the motor box. Apply thin CA to each of the holes to harden the threads.



- ☐ 3. Attach the 12-inch (305mm) servo extension to the throttle servo. Use a Servo Connector Safety Clip (FPZA1040), thread or heat shrink tubing to secure the extension in place. Mount the servo with the output shaft towards the tail of the airplane and route the servo extension appropriately through the aircraft.
- ☐ 4. Assemble the throttle linkage with a 2mm ball link on one side and a 3mm ball link on the other. Install a 1" servo arm on your servo, If your arm is longer, use the 1" location.
- ☐ 5. Use an M2x10 socket head cap screw, M2 washers, and M2 lock nut to secure the ends of the linkage to the throttle arm on the carburetor. The order of components is as follows:
- M2x10 Socket Head Cap Screw
 - M2 Washer
 - 2mm Ball Link
 - M2 Washer
 - Carburetor Throttle Arm
 - M2 Lock Nut
- ☐ 6. Use an M3x10 socket head cap screw, M2 washers, and M2 lock nut to secure the ends of the linkage to the servo arm. Note that the linkage goes below the servo arm to provide better throttle geometry (see pictures above). The order of components is as follows:
- M3x12 Socket Head Cap Screw
 - M3 Washer
 - Servo Arm
 - M3 Washer
 - 3mm Ball Link
 - M3 Lock Nut

- 7. Adjust the length of the throttle linkage so that both the throttle arm and servo are in the exact center location when your throttle stick is centered. Set your end-points to achieve full range of motion and to avoid binding at either end-point.



Quique's Pro Tips:

- Use the shortest servo arm possible while still getting full throttle arm movement on your engine. Your throttle end points should be around 110-120% when finished with the installation. A faster servo (like the Potenza DS19410) with a shorter arm is preferred over a slower servo with a longer arm.
- For the most linear throttle response, adjust the throttle linkage length to balance the end points for your throttle servo. You do NOT want your end points to be mismatched (example: 60/120). Set your end points as close to one another as possible (example: 114/116) for the most linear throttle response.
- If there is any contact between the throttle push rod and the firewall at any point in the full range of motion use a rotary tool or a file to slightly enlarge the hole until there is no contact. The entire range of the throttle movement should be completely unimpeded.

COOLING AND EXHAUST INSTALLATION

If you plan to use stock mufflers, please follow the “Muffler Installation (A)” instructions right below the cooling vent section (next page). If you plan on using a canister exhaust setup, please follow the “Canister Installation (B)” instructions starting on page 37. Be sure to follow the engine baffling instructions for both setups. Different engines and exhaust setups may require significantly different installations. You will need to decide what is best for your setup.

Cooling Vents and Cover Plate Installation

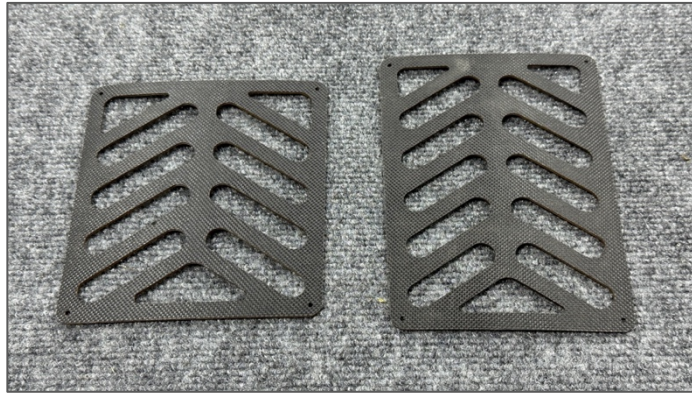
Required for this section

Components	Tools	Adhesives/Building Materials
○ Fuselage Assembly ○ Cooling Plates ○ (4) M2.5 x 8mm Wood Screws ○ Your Exhaust Choice ○ Canister or Pipe Mount	○ Covering Iron ○ 2mm Hex Driver ○ Soldering Iron	

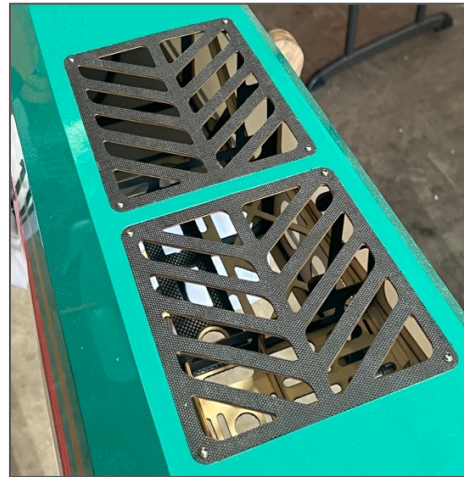
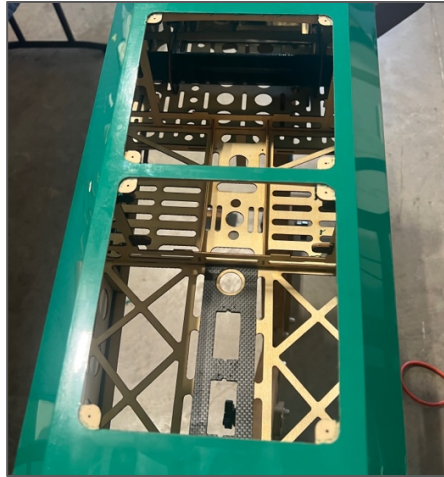
- ☐ 1. Remove the covering from the cooling vents located in front of the landing gear. We recommend that you remove the covering with a soldering iron set to 470C. Alternately you can use a sharp hobby knife.



- ☐ 2. The Extra 300 120cc includes fuselage cover plates installed on the bottom for can/tuned pipe use and air venting even when using a stock muffler setup.



- ☐ 3. To install these plates, remove the covering where the plate provisions are located. Each plate is installed using four wood screws. Be sure to apply thin CA after the openings are threaded to prevent stripping. If you opt for canisters, you should install the cooling plates after installation of the canister.



Muffler Installation (A)

Required for this section

Components

- Fuselage Assembly
- Your Exhaust Choice
- Mounting Bolts
(provided with your engine)

Tools

- To match your exhaust bolts

Adhesives/Building Materials

- Red Silicone (RTV)
- Red Thread Lock
- Paper Towels

- ☐ 1A. If using stock mufflers, locate the two bolts for each muffler, lock washers, and the gaskets. We recommend that you temporarily cover the carburetor opening while installing the mufflers and the cowling to prevent any debris from accidentally entering it and harming your engine.

Quique's Pro Tip:

When using the stock mufflers on the DA120 we recommend that you trim the muffler pipes to a length of 25mm. This will allow for an easier installation of the cowling and a cleaner look.

- ☐ 2A. Apply a moderate layer of RTV silicone (Permatex Ultra Copper recommended) to the muffler port on the engine followed by placing the gasket.



- ☐ 3A. Apply red thread lock to the muffler bolts and install the mufflers.

Canister Installation (B)

Required for this section

Components

- Fuselage Assembly
- 2-to-1 Exhaust Header
- Canisters
- Exhaust Gaskets (2)
- Canister Mount Plate
- Silicones Tubes
- M2.5 x 12mm Wood Screws (4)

Tools

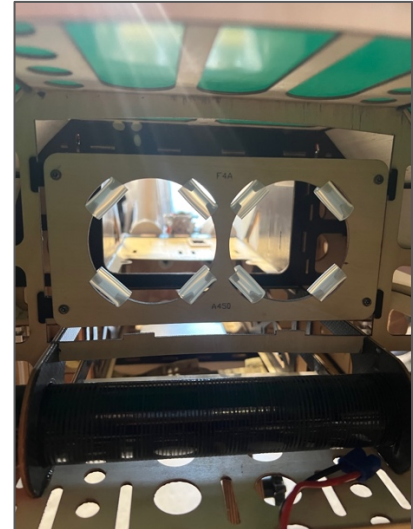
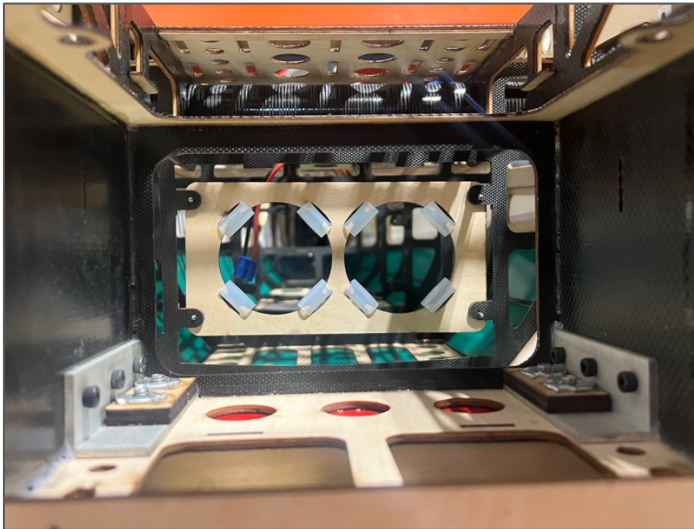
- 4mm Driver
- 2.5mm Hex Driver
- Soldering Iron
- #11 Exacto Knife

Adhesives/Building Materials

- Red Silicone (RTV)
- Red Thread Lock
- Paper Towels

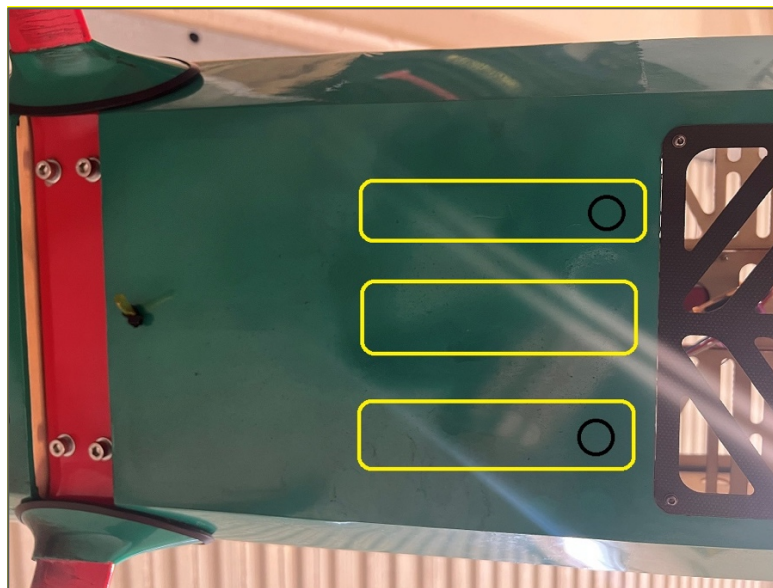
There are an extraordinary number of possible engine and exhaust combinations that we can't completely cover in this manual. This section will cover the typical setup as recommended at the beginning of this manual.

- ☐ 1B. Assemble your header and canister or pipe per your exhaust manufacturer's recommendations and select a canister or pipe mount that fits your exhaust. Assemble the silicone tubing into the mount if needed. Included with the Extra 300 120cc are a canister mount labeled **F4A** and a tuned pipe mount labeled **F6A**. If your exhaust is a different size, you'll need to make one or get one from your exhaust or engine supplier.
- ☐ 2B. Mount the appropriate plate to the appropriate location as shown in the picture below using M2.5 x 12mm wood screws.

**Quique's Pro Tip:**

We recommend that you trim 1 inch off the length of the header, this will increase the power and mid-range. The total length of the header should be 11 inches (measured at the center-line).

- ☐ 3B. The picture on the next page shows where the canister exhausts should exit. As with the cooling plates, use a soldering iron to remove the covering where your exhaust will exit.



IGNITION INSTALLATION

Required for this section

Components

- Fuselage Assembly
- Ignition
- Ignition Switch
- Ignition Battery or IBEC
- Regulator (if applicable)
- (4) M2.5 x 12mm Wood Screws
- Motor box access hatch

Tools

- Hobby Knife w/#11 Blade
- #1 Phillips Screwdriver

Adhesives/Building Materials

- Hook and Loop Strap (2)
- Adhesive-Back Hook and Loop Tape
- Thin CA

- ☐ 1. Locate the ignition switch hole towards the nose of the fuselage. Note that there are switch locations on both sides of the fuselage for your preference. Use a hobby knife with a #11 blade to remove the covering from the hole of your choice. Test fit your switch and modify the hole if needed. Secure it in place using the screws included with your switch. If your switch mounting screws thread into metal, be sure to apply blue thread lock. **DO NOT** apply blue thread lock if they thread into plastic.
- ☐ 2. The ignition can be mounted wherever you prefer. We have found that with the DA-120, the inside of the motor box or the motor box hatch is our preferred location. There are many ways to install an ignition and we recommend you mount it per your engine manufacturer's recommendations.



- ☐ 3. If you are using an ignition battery, we recommend using a 2S 2000mAh Li-Po (FPZBR20002S15) placed in the motor box in the provided location next to the ignition module that is accessible from the main hatch. Use adhesive-backed hook and loop tape between the battery and the hatch and secure the battery with a hook and loop strap. For our installation we are showing an IBEC and a Futaba PS-10 BR 5.2 Regulator 5.2v with a separate ignition battery and regulator switch.



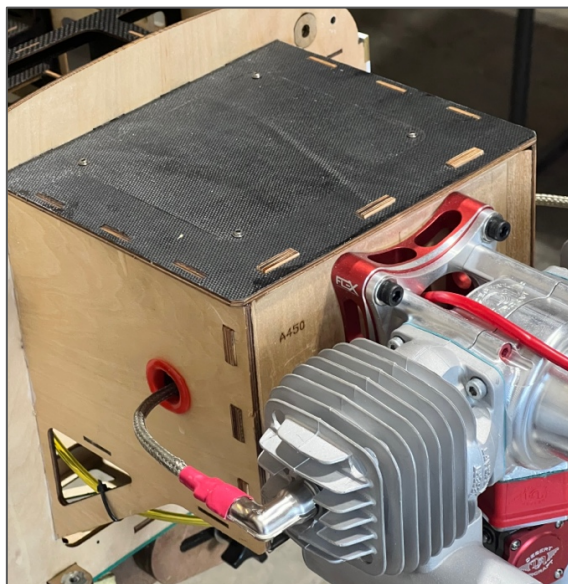
- ☐ 4. If installed in the motor box, route the ignition plug wires through the pre-cut holes on the sides of the motor box.
- ☐ 5. Secure any permanent connections with heat shrink dental floss or servo safety clips (FPZA1040). Be sure to secure the wiring so that it will not bounce around in the aircraft. For extra security we recommend that you wrap your ignition wiring, also, be sure to secure the wiring in a way that the wires will not chafe against sharp edges from vibration. A typical ignition setup will be connected as follows:

Ignition Battery → Ignition Switch → Ignition Regulator → Ignition → Engine

Or (if using an IBEC):

Receiver Channel → IBEC → Ignition → Engine

- ☐ 6. Thread a wood screw into each of the four access hatch screw holes in the motor box. Apply thin CA to each of the holes to harden the threads
- ☐ 7. Use the (4) wood screws to secure the motor box access hatch in place.



FUEL TANK INSTALLATION

Required for this section

Components

- Fuselage Assembly
- Fuel Tank
- Fuel Line
- Fuel Filler

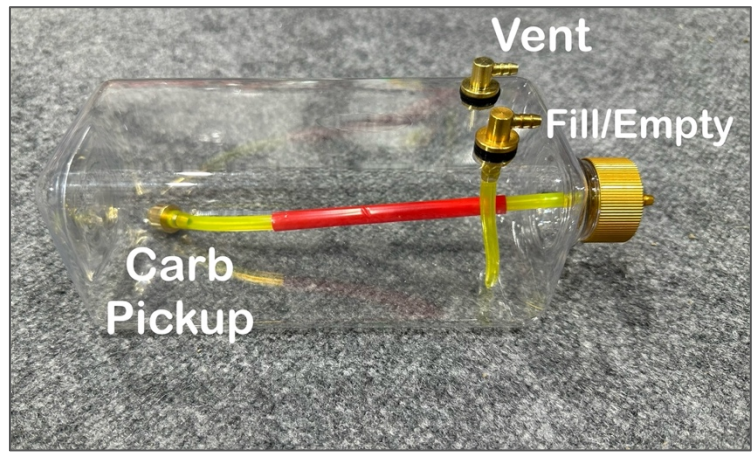
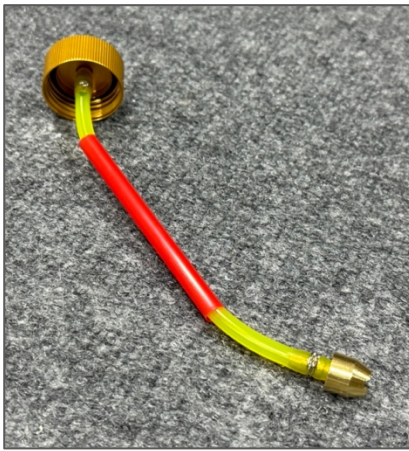
Tools

- Pliers

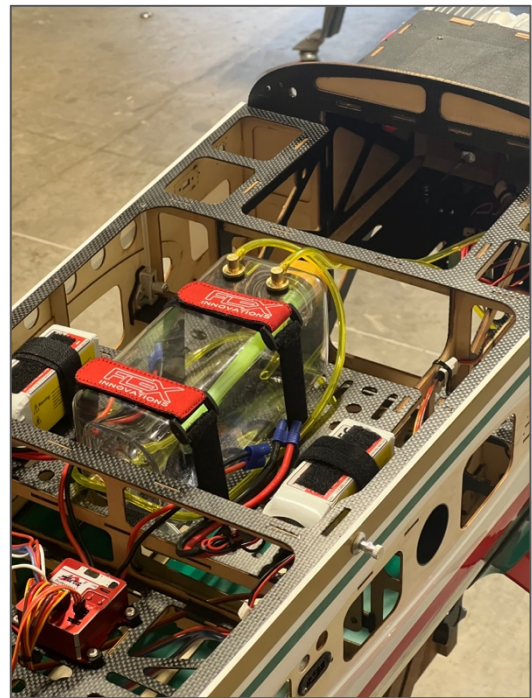
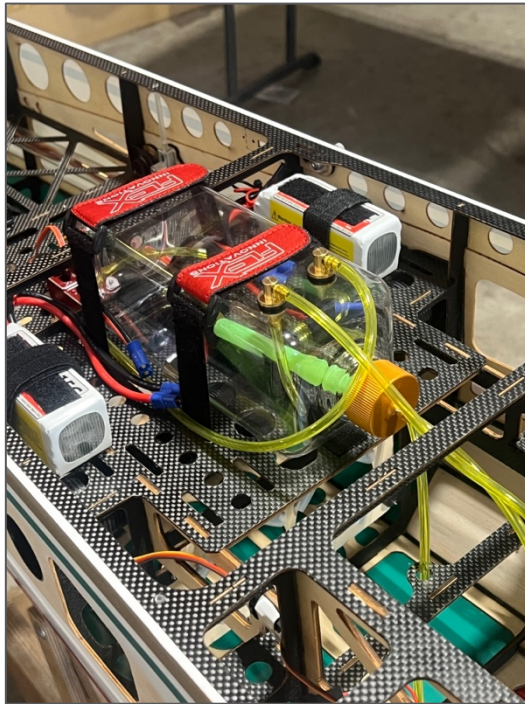
Adhesives/Building Materials

- Hook and Loop Strap (2)
(FPMA1055 recommended)
- Adhesive-Back Hook and Loop
- Cable Ties

The Flex Innovations 32oz Lightweight Fuel Tank is included with your Extra 300 120cc.



- ☐ 1. Assemble your fuel tank. Before installing the fuel tank check all fittings are properly installed and that the clunk line inside the tank is appropriately sized. Adjust as necessary. We recommend using a straw around the pickup line inside the tank as shown above, this will prevent the line from wrapping around itself during flight.
- ☐ 2. The fuel tank tray has plenty of room for your fuel tank. If you are using a single tank, you can place the fuel tank in the middle of the tray (as shown in this manual), If you plan on using a smoke system, two of the 32oz Lightweight Fuel/Smoke tanks (FPM1623) should be used, installed side by side. One is included in your kit. Both tanks should be centered over the wing tube in order to be closer to the airplane's CG. If installing two fuel tanks you may need to move your batteries around to achieve the desired CG.



- ☐ 3. To mount the tank(s), apply adhesive-backed hook and loop tape to the bottom of your tank(s) and to the fuel tank tray. Place the tank(s) in their location and secure them with two hook and loop straps (FPMA1055). These straps should be snug but not overly tight, as the fuel tanks are very lightweight and can be easily crushed. The hook and loop tape on the bottom of the tank(s) will prevent the tank from moving fore and aft, and the hook and loop straps will prevent the tank from pulling away from the tray.

Quique's Pro Tip:

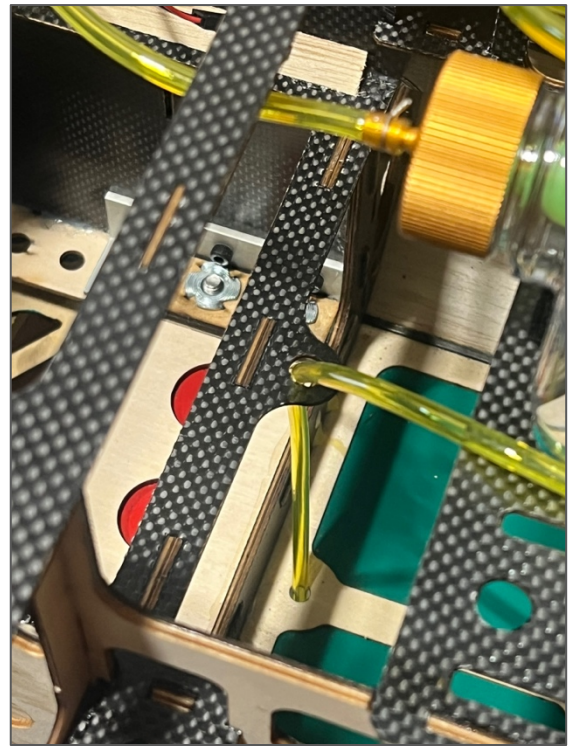
Wrap the vent line(s) around the top of the fuel tank(s) all the way to the back and then return to the front of the tank(s) to prevent siphoning.

Cable ties are a good way to keep all fuel line connections secure, do not over tighten them. You can also use a small ring of Tygon tubing as a clamp.

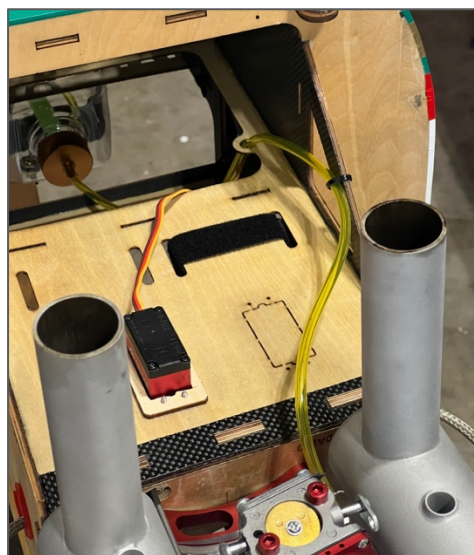
- ☐ 4. After the tank is in position, route and trim your fuel lines appropriately. Your clunk line should go to the carburetor or throttle body. The fill line should go to your fuel dot or filling system. We recommend the McFueeler Fuel Dot (FPMA1049).



- ☐ 5. The vent line should warp around the tank and should then be routed through the provided locations, finally exiting at the bottom of the fuselage as shown in the pictures below. A piece of metal tubing coming from the bottom of the airplane can be used for vent. Or the vent line can be run through the bottom of the fuselage and secured with a zip tie. Don't overtighten the cable tie, as air and fuel will need to vent from this line. Be sure to keep your fuel line away from components that get hot (like your exhaust or cylinder heads) and route it in such a way that it will not bounce around or chafe on any of the interior structure of the fuselage.



- ☐ 6. Route and install the fuel line to the carburetor as shown in the picture below.



RADIO INSTALLATION

Required for this section

Components

- Fuselage Assembly
- Receiver
- Receiver Switch
- Aura 8 or 12 Professional (Optional)
- Receiver Batteries

Tools

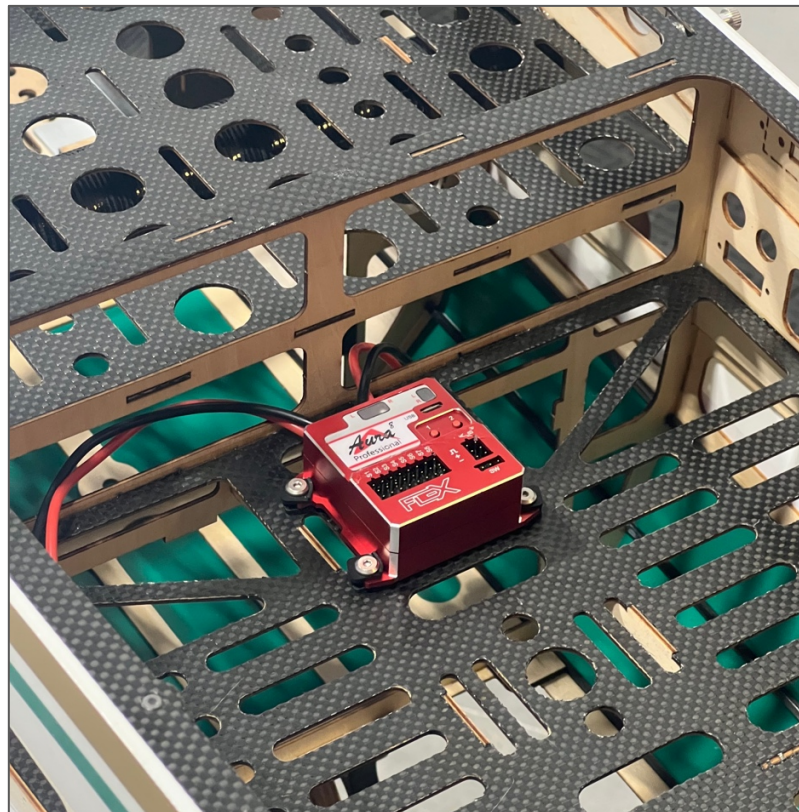
- #1 Phillips Screwdriver
- Hobby Knife

Adhesives/Building Materials

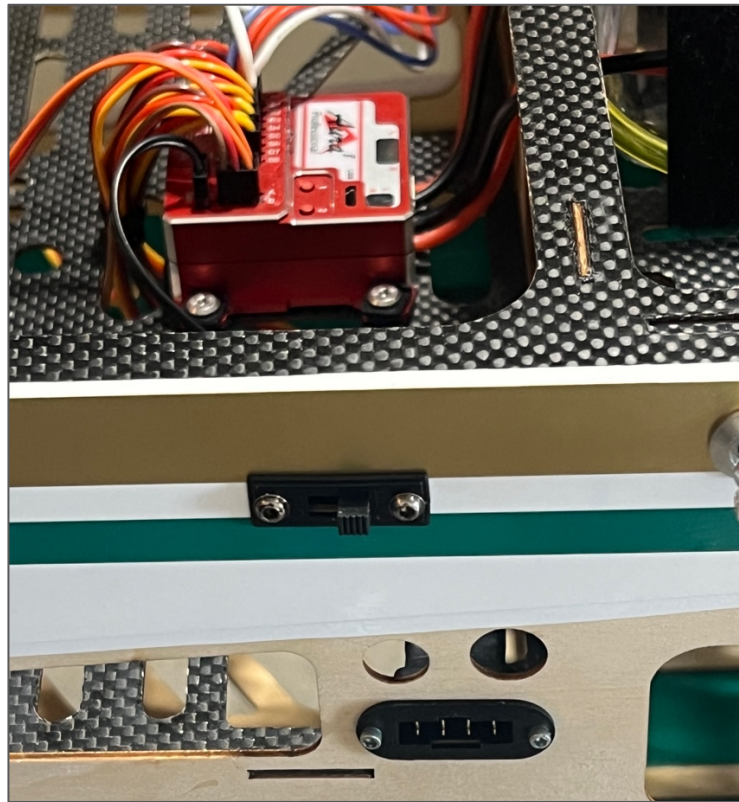
- Hook and Loop Straps (FPMA1012 recommended)
- Adhesive-Backed Hook and Loop Tape
- Tie-Wraps

Note: We recommend the use of an Aura 8 or 12 Professional AFCS for your Extra 300 120cc. However, this is optional, the Extra 300 120cc has been tested extensively with and without it and is an excellent flyer with any setup, there is no need to use an Aura. Aura is a pilot's choice and will help make flying more relaxing, particularly in windy conditions.

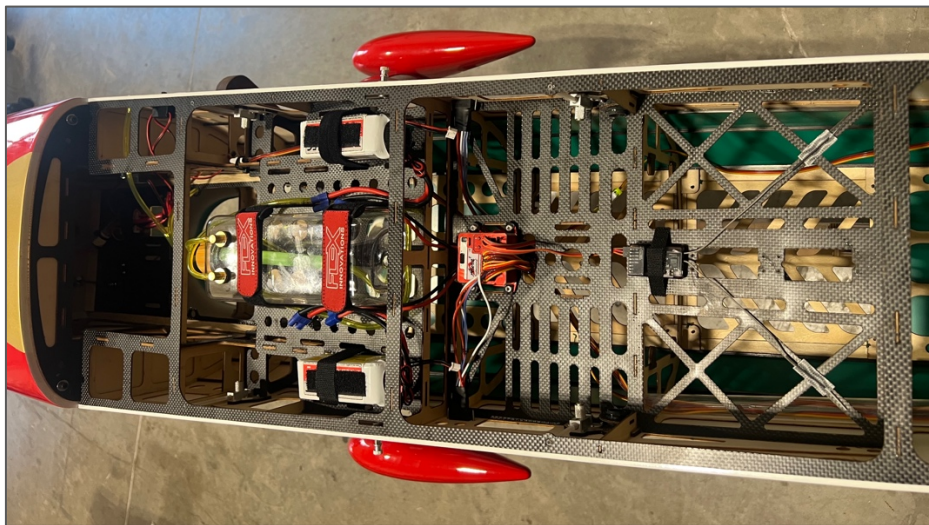
- ☐ 1. If you are using the Aura 8 or 12 Professional AFCS, it should be mounted forward of the rudder servo location in the center of the fuselage as shown in picture above. The Aura program for the Extra 300 120cc can be found in the Aura Config Tool Windows application.



- ☐ 2. Use a #1 Phillips screwdriver to thread an Aura mounting screw into each of the pre-cut holes in the mounting tray. Remove the screw and apply a small amount of thin CA to each of the holes to harden the threads cut by the screw. Let the CA fully cure before mounting the Aura and securing the (4) screws.



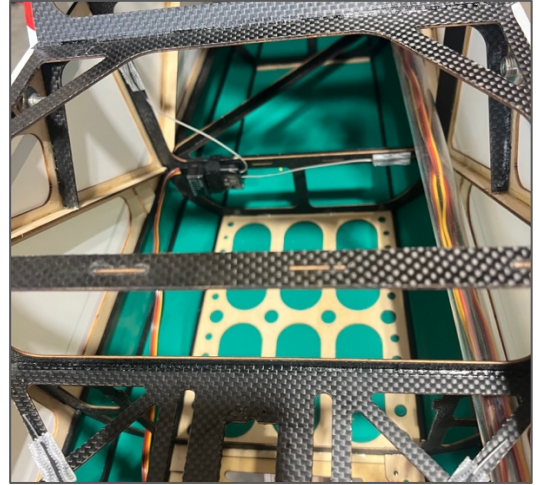
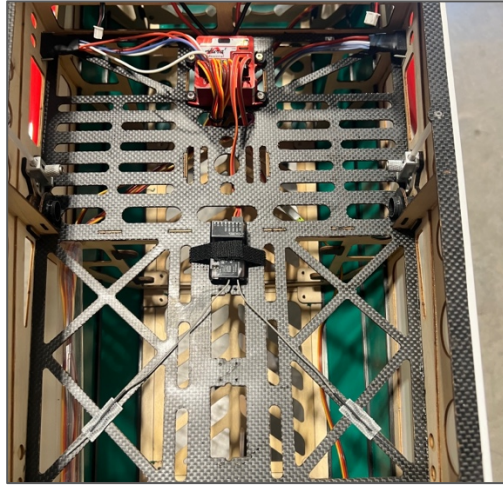
- ☐ 3. Locate the RX/Aura switch just under the canopy. Note that there are switch locations on both sides of the fuselage for both traditional and power safe switches. Remove the covering from the hole of your choice using a hobby knife with a sharp blade and install your RX switch. Use blue thread lock if your switch uses screws with metal-to-metal contact. DO NOT use thread lock if your screws thread into plastic!



- ☐ 4. Make all the necessary servo connections. Depending on the center of gravity (see the CG section), install your (2) receiver batteries in an appropriate location. The Extra 300 120cc has many available locations towards the nose and the tail of the airplane to accommodate the necessary adjustments to achieve the desired CG. Receiver batteries will most likely end up to the sides of the gas tank as shown in the picture above.

Use adhesive-backed hook and loop tape and a hook and loop strap (FPMA1012) to secure each battery in place.

- ☐ 5. Place your receivers in the appropriate area according to your receiver's instruction manual. Note that the carbon structure in the fuselage can cause issues with signal, so route your antennas appropriately. If using two receivers with the Aura 8 or 12 Pro we recommend you mount the receivers away from each other. An example of possible installation locations are shown in the pictures below



COWLING, PROPELLER AND SPINNER FINAL INSTALLATION

Cowling Exhaust Clearance

If you are running the stock exhaust this section describes how to cut the openings in the cowling for proper clearance and installation. If you are running canisters or other alternate exhaust test fit the cowling and determine if any type of clearance openings are necessary

Required for this section

Components

- Fuselage Assembly
- Cowling
- Exhaust marking template

Tools

- Ruler
- Hobby knife
- Scissors
- Rotary Tool
- Rotary Tool Sanding Drum
- Rotary Tool Cut-Off Wheel
- Felt-Tipped Pen

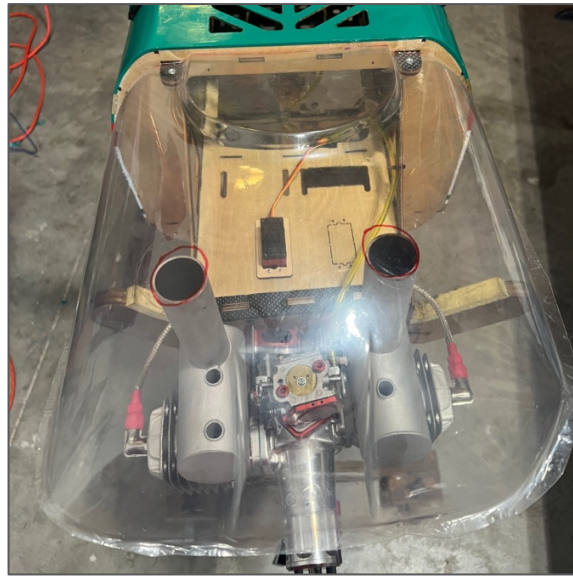
Adhesives/Building Materials

- Sandpaper
- Rubbing Alcohol

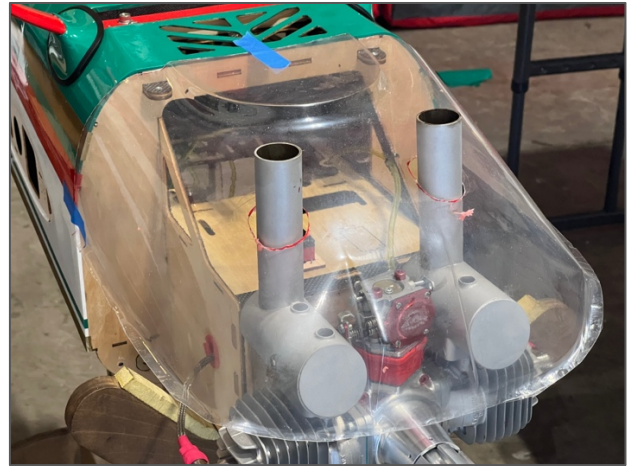
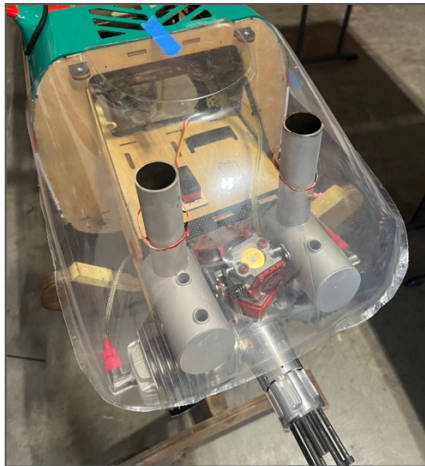
- ☐ 1. The Extra 300 120cc features a clear cowling template for simple exhaust hole mapping. Trim the template to the line provided by the vacuum forming. It may be easier to see the trim line if you highlight it with a marker.



- ☐ 2. Pre-fit the template by aligning it to the fuselage and taping it into position.
- ☐ 3. Mark where the exhaust needs to be relieved through the template.



- ☐ 4. Carefully cut out the holes in the template ensuring for a small amount of clearance.



- ☐ 5. Line up the template with the cowling and transfer your marking to the cowling



- ☐ 6. The holes can then be cut from the cowling using a Dremel tool with a sanding drum. Test fit the cowling and slowly open the exhaust openings until the cowling fits properly. You can then clean the edges of the openings.



Engine Baffling Installation

Required for this section

Components

- Fuselage Assembly
- Cowling
- Cowling Baffles

Tools

- Ruler
- Hobby knife

Adhesives/Building Materials

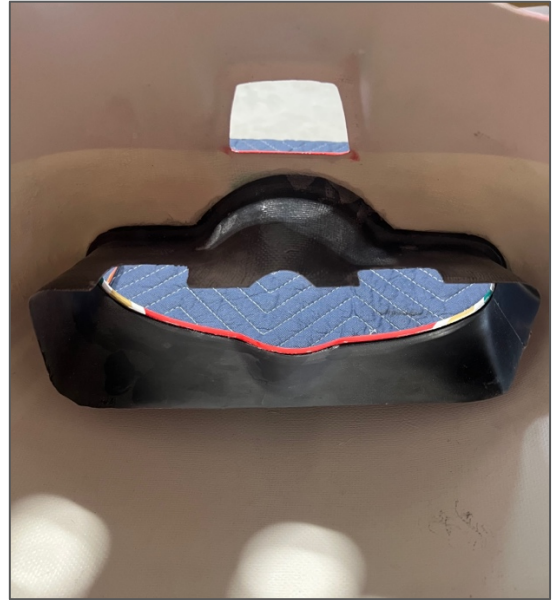
- GOOP or other flexible adhesive
- Sandpaper
- Rubbing Alcohol
- Thin CA

The Extra 300 features pre-molded fiberglass baffling for effective operation and easy installation.

- ☐ 7. Fit the baffle in place by aligning the shape of the baffle with the shape of the cowling. Temporarily tack in place with CA.



- ☐ 8. Test fit the cowling with the baffle to make sure fitment is proper. Depending on your engine, you may need to trim the baffles slightly.
- ☐ 9. Once proper fitment is confirmed, remove the baffle and scuff up the mating surfaces with some sandpaper to ensure proper adhesion. Clean the surfaces with rubbing alcohol and then use GOOP to permanently mount in place (this will ensure a slightly flexible bond). Allow the GOOP at least 12 hours to cure.



- ☐ 10. The cowling has a pre-cut pressure lip opening for hot air exit. Additionally, there is an opening in the cowl for easy choke access and proper airflow.



Mounting the Cowling and Installing the Propeller and Spinner

Required for this section

Components

- Fuselage Assembly
- Cowling
- Propeller
- Spinner
- (4) M4x20 Socket Head Hex Bolt
- (4) M4 Washer

Tools

- M3 Hex Driver
- M2 Hex Driver (Spinner)

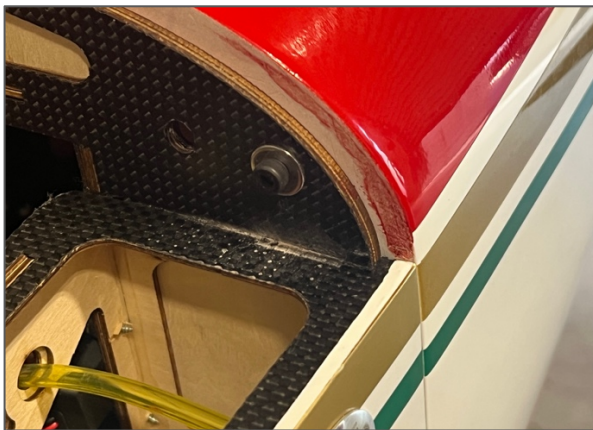
Adhesives/Building Materials

- Blue Thread Lock

The cowling is installed with four total bolts. Two bolts are accessed through the top of the fuselage, and two are accessed on the bottom of the cowling.

The Extra 300 120cc takes a 5" spinner. Flex offers matching spinners for the Extra 300 120cc schemes along with solid color spinners.

- ☐ 1. The cowling is installed with (2) M4x20 hex bolts with M3 washers at the top installed from the inside of the fuselage with the main hatch removed and (2) M4x20 bolts with M3 washers installed into the holes on the outside bottom of the cowling. Apply Blue Thread Lock. Use a 3mm hex driver and tighten well.



- ☐ 2. Drill the spinner and propeller using a drilling jig for your engine.
- ☐ 3. Mount the propeller and torque the engine bolts to approximately 95 in/lbs.
- ☐ 4. When applying the spinner, be careful not to overtighten the bolts. Be sure to use any provided spinner bolt washers



FIELD ASSEMBLY

Required for this section

Components

- Fuselage Assembly
- Main Wings (2)
- WingTube
- Stab Tube
- Canopy Hatch

Tools

Adhesives/Building Materials



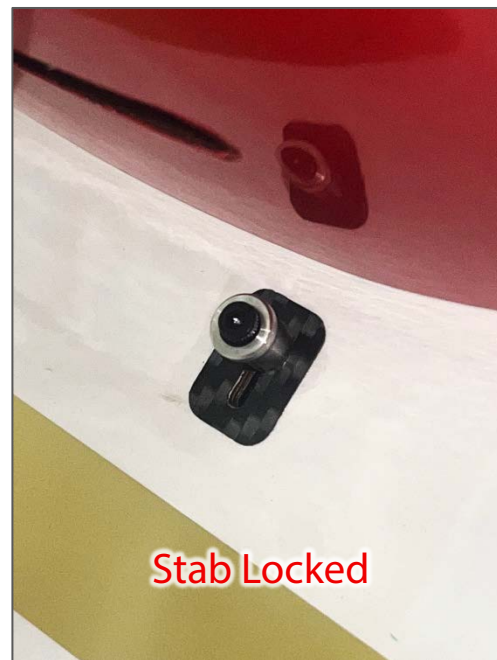
- ☐ 1. Pull out the Flex Canopy Speed-Lock knob until it bottoms out, then twist it CW or CCW 1/4 turn. You can now release the knob, and it will stay in the unlocked position (canopy open). Do the same to the Flex Canopy Speed-Lock on the other side of the fuselage. Proceed and lift the canopy from the rear at a shallow angle and pull back at same time until the two front canopy pins are out of their holes.



- ☐ 2. Unlock all 4 wing Flex Speed-Locks, two each from the right and the left sides. To unlock them you need to pull out on the knob and then slide it up until it reaches its limit. Note that the Flex Speed-Lock design has a plastic tube extension on the top that shows the unlock position when the tube is sticking out of the top of the airplane frame.
- ☐ 3. Slide the main wing tube into the fuselage so that they are roughly centered left to right. Slide one of the wing panels over the tube, connect the aileron servos to the servo extensions or MPX connector and fully slide the wing against the fuselage until you see no gap between the wing and the fuselage.
- ☐ 4. Proceed to lock the Flex Speed-Locks by pushing down on the plastic tubes until they are flush with the fuselage, and you hear a “click”. If the plastic tube is not flush with the top of the fuselage, then you know the Flex Speed-Lock is not properly locked. The protruding tube will also prevent the canopy from being installed when the Flex Speed-Locks are not fully locked.
Note: it is not recommended to lock the Flex Speed-Lock by pulling on handle and sliding it down as this does not guarantee that the knob will find the indentation and be in the proper locked position. Pushing on the tube and hearing the “click” is what ensures that it is locked properly.
- ☐ 5. Repeat for the second wing.

Always push down on the plastic tubes until you hear “click” and they sit flush with the fuselage frame.

Make sure you lock all 4 Flex Speed-Locks.



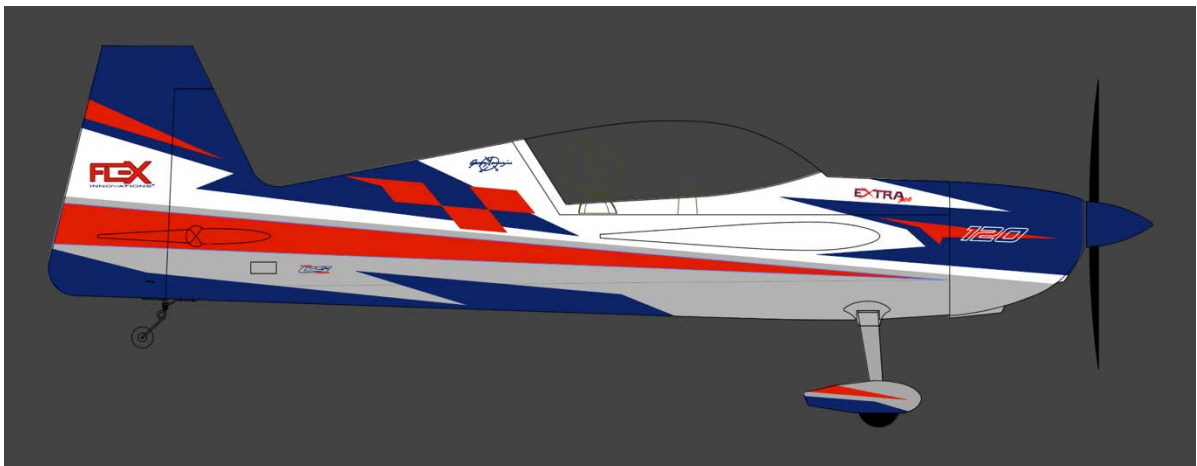
- ☐ 6. Unlock the horizontal stabilizer Flex Speed-Locks from both right and left sides. To unlock them you need to pull out on the knob and then slide it down until it reaches its limit.
- ☐ 7. Slide the horizontal stabilizer tube into the fuselage so that it is roughly centered left to right. Slide one of the horizontal stabs over the tube, connect the elevator servo to the servo extension and fully slide the horizontal stab against the fuselage until it completely seated in the pocket in the fuselage.
- ☐ 8. Once the horizontal stab is seated properly lock the Flex Speed-Lock by pushing the knob upwards until it settles into position. Pull out on the horizontal stabilizer to ensure that it is properly locked. Repeat these two steps for the horizontal stabilizer on the other side of the fuselage.
- ☐ 9. Install the canopy hatch back on the fuselage by inserting the two front pins in the fuselage and seat flush to the fuselage. One in place, then proceed to lock the canopy. Turn the Flex Canopy Speed-Lock knob $\frac{1}{4}$ turn CW or CCW and the knob will go in a find lock position. Do the same with the other side. Check that the Flex Speed-Locks are in the locked position by pulling up on the canopy to confirm that it is secure.

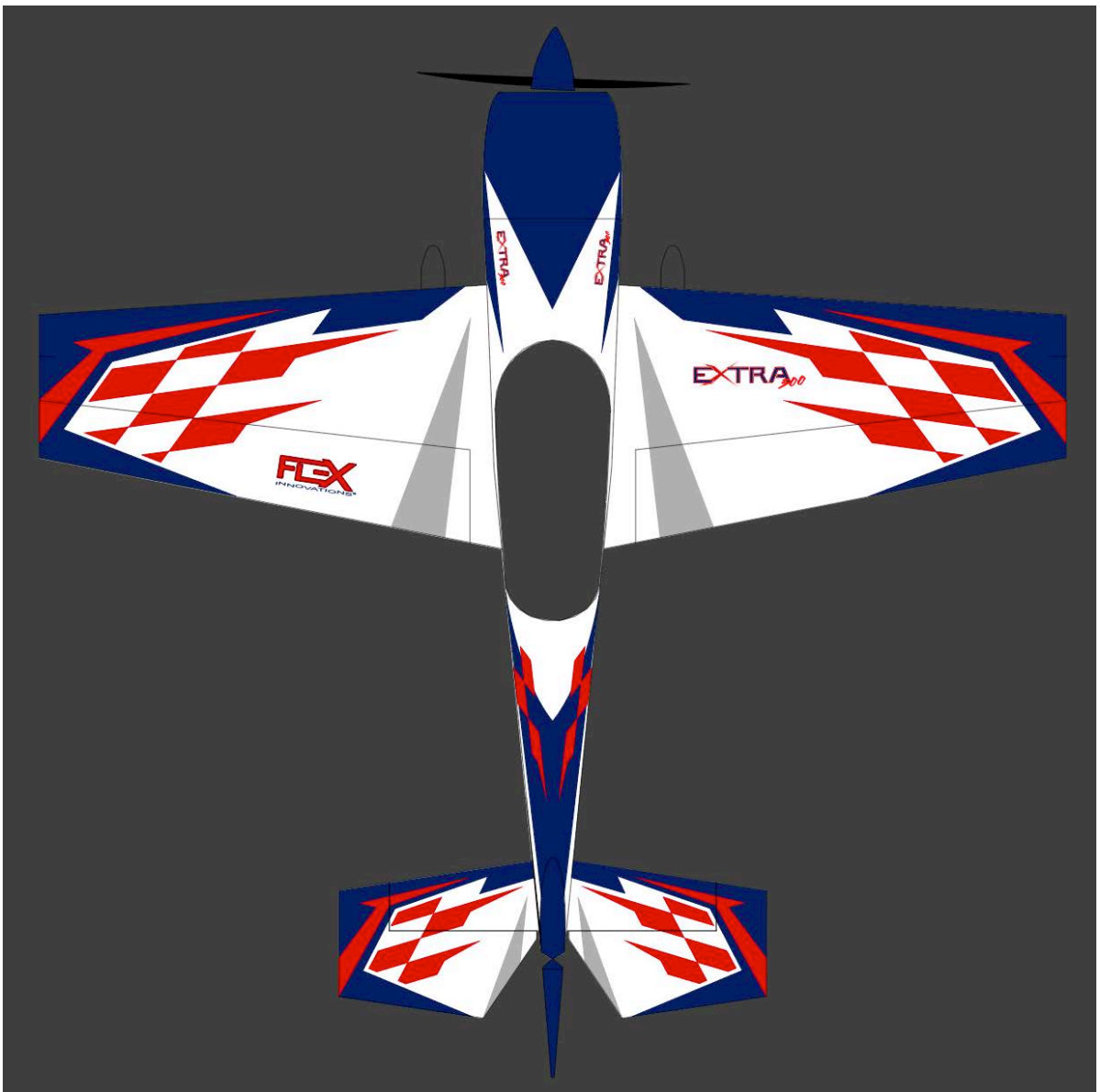
DECAL INSTALLATION

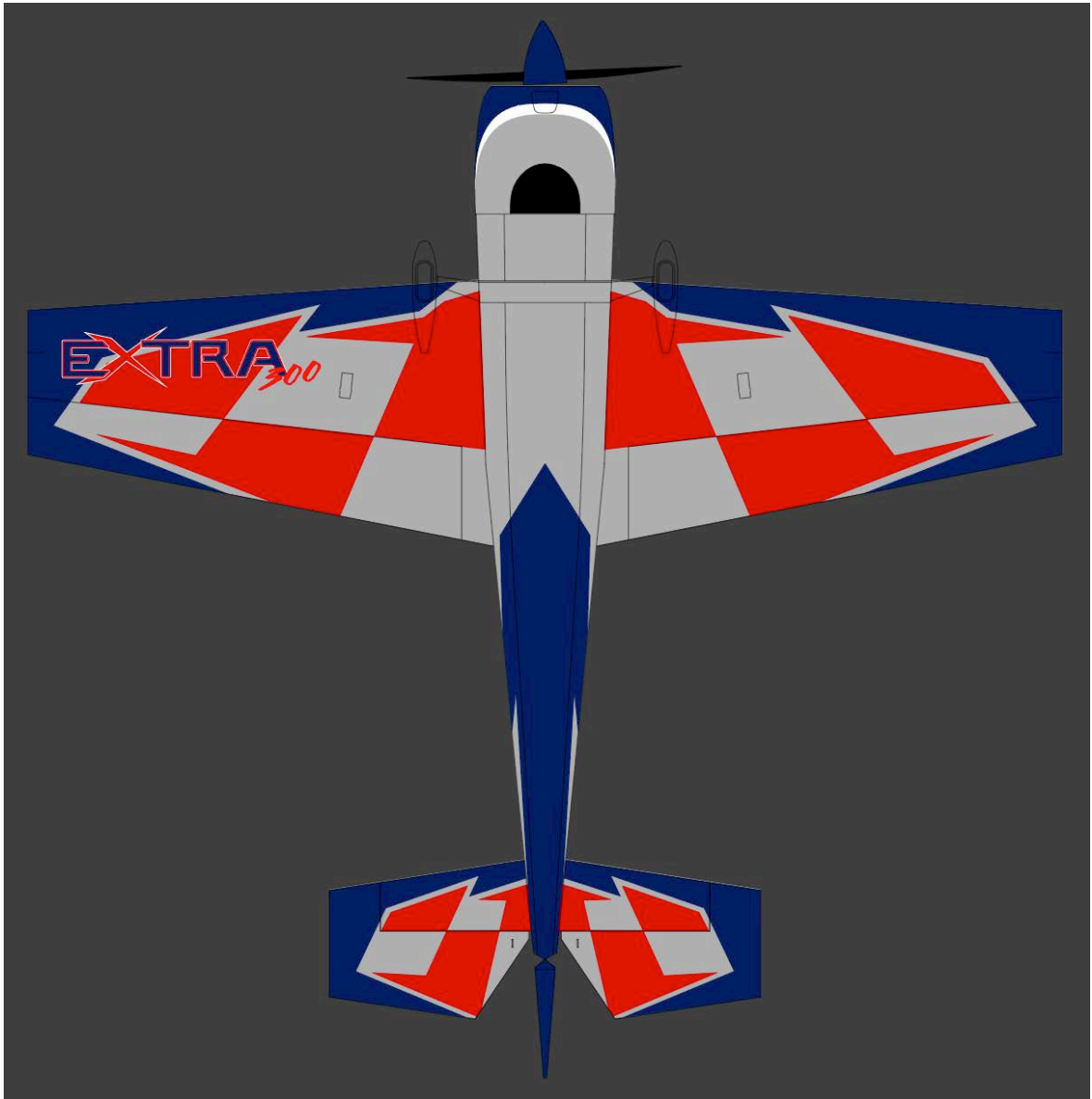
Use the drawings provided below for a guide to apply the decals to your model.

- ☐ 1. Thoroughly clean the model to ensure it is free of oil, fingerprints, and dust.
- ☐ 2. Separate the decals, but do not remove the paper backing.
- ☐ 3. The decals provided with the Extra 300 120cc are very application friendly and can be applied dry. They will not create bubbles, and they can be re-positioned if placed incorrectly.
- ☐ 4. Lay down the decal lightly in location and anchor it by pressing on the center. If the decal is not in the right place, lift it off and place it again.
- ☐ 5. Use a soft piece of balsa or something similar, to smooth out the decal, working from the center towards the edges of the decal.
- ☐ 6. Repeat the process until all decals are applied.
- ☐ 7. Do not move or otherwise touch the model for at least 24 hours to allow adequate time for the decal glue to firm up. After time the adhesive will cure and the decals will become firmly affixed.

Extra 300 120cc Blue Scheme

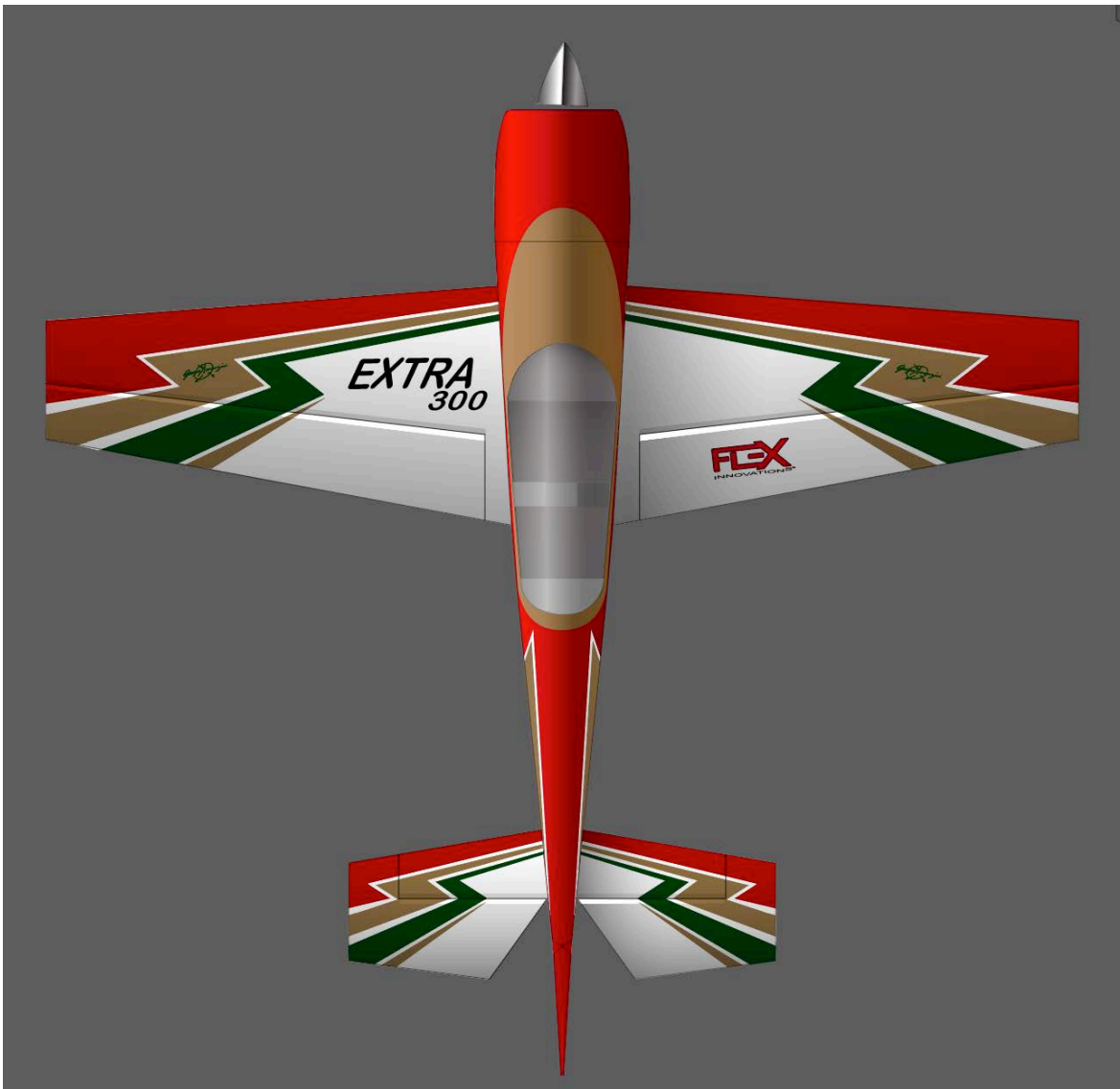






Extra 300 120cc TOC '94 Scheme







FINAL SETUP AND FLYING NOTES

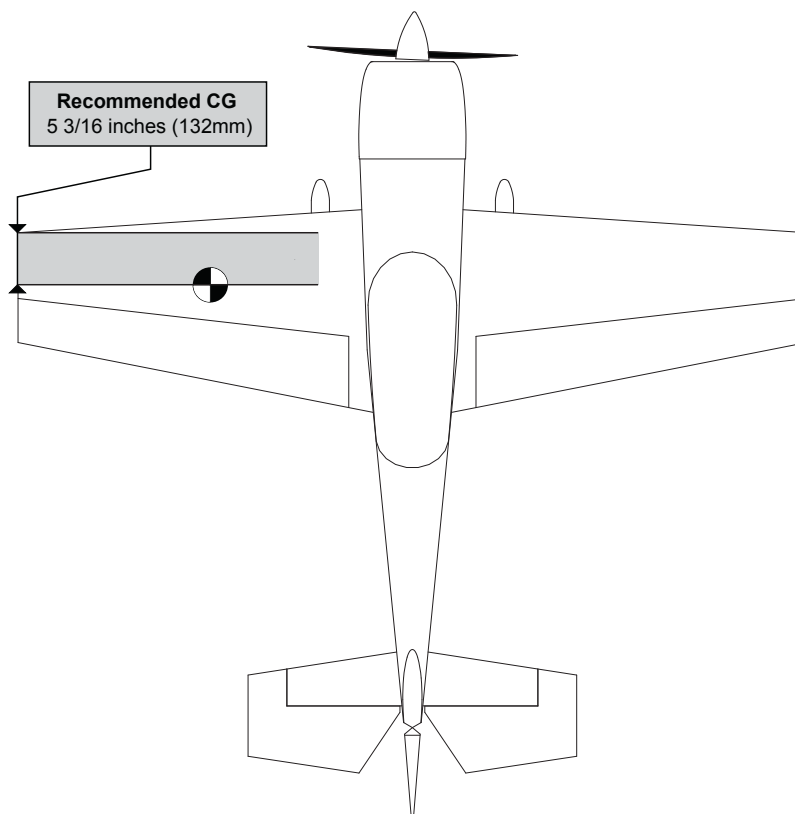
CENTER OF GRAVITY

Setting the center of gravity (CG) is one of the most important steps for success, particularly with a new airplane. The Flex Innovations Extra 300 120cc is a high-performance airplane with large control surface throws, and a very high thrust to weight ratio. These factors combined make the Extra 300 120cc a very enjoyable aircraft to fly, but if the center of gravity is not within an acceptable range, it will make the airplane difficult, if not impossible, to control. To have the most success and enjoyment from your Extra 300 120cc, please follow the next few steps very carefully.

Before checking the CG of your model please ensure that all the components are installed in your airplane. This means the batteries, servos, linkages, hardware, propeller, spinner, hatches; everything. The airplane must be in ready-to-fly condition (without fuel), otherwise the measurement will not be accurate.

There are several methods for determining center of gravity, from using a CG machine, to using fingers and a friend. Regardless of the method used, ensure that the tests are accurate and repeatable. If there are any inconsistencies between measurements, work to isolate the source of the error(s) making sure that the test can be repeated with the same results.

The location of the center of gravity for the Extra 300 120cc is 5-3/16 inches (132mm) AFT from the LEADING EDGE of the WING at the WING TIP. It is critical that the starting point for your model be at this point. This measurement is determined from many test flights by Quique Somenzini.



Quique's Pro Tip:

- The measurement noted is the best CG location for flying the Extra 300 120cc, and where all tweaks to the airframe have been made. The aircraft is safe to fly within the range of 5-1/8 inches (130mm) to 5-1/4 inches (134mm) when measured from the leading edge of the wing but may not fly as well as its optimized location.

AURA 8 PROFESSIONAL

If you choose to use Aura 8 Professional AFCS, you can find the Extra 300 120cc Aura setup in the Aura Config Tool by going to File > New Aura Config File Wizard.

STARTING CONTROL SURFACE THROWS AND EXPONENTIAL

The following throws and exponential have been tested thoroughly during the development of the airplane and have been determined to be the optimal starting point for the Extra 300 120cc. As you become more familiar with the airplane, you may tweak the rates and expos to better suit your flying style, but these numbers provide a very good starting point.

NOTE: Throws are measured in degrees. We recommend you download an App on your phone to measure degrees. Since expo directions vary by transmitter manufacturer, all expos listed below are those that make the control feel softer around the stick's center position.

Extra 300 120cc Control Throws and Expos

	Low Rate		High Rate	
	Up	Down	Up	Down
Aileron	20.5	20	38	37
Elevator	20-30	20-30	60-65	60-65
Rudder	20	20	Maximum Available	Maximum Available
Aileron Expo	35%	35%	55%	55%
Elevator Expo	25%	25%	50%	50%
Rudder Expo	25%	25%	50%	50%

Quique's Pro Tips:

- The low rate noted in the chart above includes enough aileron throw to do snap rolls. If you are sensitive to the ailerons, you can reduce value to 17 degrees for the first flights until you can adjust to your personal tastes.
- For high rudder rate, increase the travel until the control horn nearly touches the fuselage, and be sure to match both directions.

RANGE TESTING

Carefully follow the binding and range testing instructions included with your radio equipment. If there are any issues passing the test range, please consult your transmitter and receiver manuals or contact your transmitter and receiver manufacturer to determine the appropriate solution before attempting to fly.

BEFORE FIRST FLIGHT

Before going to the field for your first flight, please go over the finished, fully assembled model at home. The key to a successful first flight is preparation and ensuring that your plane is airworthy.

- ☐ 1. For optimal performance of your model, balance your propeller and spinner. Most propellers are balanced fairly-well out of the package; however, some fine-tuning can make a mediocre propeller perform great. An out-of-balance propeller or spinner can wreak havoc on the electronic components in the airplane, as well as prematurely shorten the life span of the engine, servos or even the model itself. A balanced propeller will be quieter, generate more thrust, produce less vibration, and operate more efficiently than one that is not balanced.
- ☐ 2. Re-check all linkages and connections, including those that may have been assembled by the factory. Ensure pushrods are sufficiently threaded into ball links, ensure that all metal-to-metal connections have thread lock applied and ensure that all control surfaces move freely and in their proper direction.
- ☐ 3. Verify proper functioning, break-in, and operation of your engine choice. Ensure that the fuel-air mixture is correct, and that the engine is producing full power. If you are not familiar with gas engines, ask for the assistance of a more experienced pilot in your area or speak with your engine manufacturer.
- ☐ 4. Secure any loose wiring inside the fuselage or wings in such a way that they do not rub or chafe.
- ☐ 5. Ensure that all batteries (transmitter, receiver, ignition, or flight packs) are fully charged prior to leaving for the flying field.
- ☐ 6. Take a few moments to assemble the airplane away from commotion, talkative onlookers, or any other distractions. Ensure that all connections are properly made and secured, the wing bolts are tight and take a few minutes to plan out your first flight.
- ☐ 7. If your gas engine is new, avoid prolonged full throttle runs and vertical climbs. Limit the first few flights to a short flight time. Start off short, gradually lengthening the flight times as you become comfortable with the performance of your engine. Six minutes is a good time to limit your first flights to. As you become more familiar with the airplane and begin to fly it in a more aggressive manner, monitor the temperature of the engine and adjust the fuel-air mixture according to your engine manufacturer's recommendations.

AMA SAFETY CODE

When flying your aircraft, we recommend following the guidelines set by the Academy of Model Aeronautics (AMA). You can find their Safety handbook as well as more information on the AMA at their website, located at the address below.

<https://www.modelaircraft.org/>

REPLACEMENT PARTS

FPM0011300A	Extra 300 120cc ARF - Blue
FPM0011300B	Extra 300 120cc ARF - TOC '94
Blue Scheme	
FPM0011301A	Extra 300 120cc Fuselage, NO hatches
FPM00113002LA	Extra 300 120cc Left Wing with painted control horns not installed
FPM00113002RA	Extra 300 120cc Right Wing with painted control horns not installed
FPM00113003A	Extra 300 120cc Horizontal Stabilizer with Elevators and painted control horns not installed
FPM00113004A	Extra 300 120cc Rudder with hinge pin, painted control horns not installed
FPM00113005A	Extra 300 120cc Cowling with hardware and clear template
FPM00113006A	Extra 300 120cc Canopy with foam floor and cockpit
FPM00113007A	Extra 300 120cc Landing Gear (Painted Silver)
FPM00113008A	Extra 300 120cc Wheel Pants
FPM00113015A	Extra 300 120cc Decal Set
FPM00113017A	Extra 300 120cc Landing Gear Cuffs - Blue
TOC '94 Scheme	
FPM0011301B	Extra 300 120cc Fuselage, NO hatches
FPM00113002LB	Extra 300 120cc Left Wing with painted control horns not installed
FPM00113002RB	Extra 300 120cc Right Wing with painted control horns not installed
FPM00113003B	Extra 300 120cc Horizontal Stabilizer with Elevators and painted control horns not installed
FPM00113004B	Extra 300 120cc Rudder with hinge pin, painted control horns not installed
FPM00113005B	Extra 300 120cc Cowling with hardware and clear template
FPM00113006B	Extra 300 120cc Canopy with foam floor and cockpit
FPM00113007B	Extra 300 120cc Landing Gear (Painted Red)
FPM00113008B	Extra 300 120cc Wheel Pants
FPM00113015B	Extra 300 120cc Decal Set
FPM00113017B	Extra 300 120cc Landing Gear Cuffs
Both Schemes	
FPM00113009	Extra 300 120cc Wing Tubes and Stab Tubes
FPM00113012	Extra 300 120cc Linkage and Control Horn Set
FPM00113013	Extra 300 120cc Hardware Set
FPM00113018	Extra 300 120cc Engine Baffling
FPM00113019	Extra 300 120cc Removable Rudder Wire

FPMA1086	Flex 120cc Flex Speed Locks STAB (1) Internal and External Parts
FPM00117024	Extra 300 120cc Laser Cut Wood Parts

OPTIONAL ACCESSORIES

FPM00113016A	Extra 300 120cc Pilot Figure - Blue
FPM00113016B	Extra 300 120cc Pilot Figure - TOC '94
FPMA1087	5" "Edge Style" Carbon Spinner Solid Blue
FPMA1088	5" "Edge Style" Carbon Spinner Solid Red
FPM1314	Extra 300 120cc ARF Premium Wing and Tail Bag Set
FPMDA120	Desert Aircraft DA-120cc Engine
FPMDA120MUFLR	DA120 Muffler
FPMGP123	GP 123cc V2 Engine with Mufflers
DP1000	Dualsky DP1000 Brushless Smoke Pump
FPM1623	32oz Lightweight Fuel/Smoke Tank
FPMPFC2895CF	Falcon 28x9.5 Carbon Fiber Propeller
FPZA1036	Aluminum Servo Arm 2-in Clamping (25T)
FPZA1037	Aluminum Servo Arm 4-in Clamping (25T) (for Pull-Pull setup)
FPZA1040	Servo Connector Safety Clip
FPZAURA08PRO	Aura 8 Professional AFCS
FPZAURA12PRO	Aura 12 Professional AFCS
FPZBR20002S15	2000 mAh 2s 15C JR/EC3 Connector RX Li-Po Battery Pack
FPZDSAXIS650	Axis 650 Brushless Servo
FPMA1049	McFueled Fuel Dot

LIMITED WARRANTY

Warranty Coverage

Flex Innovations LLC and its authorized resellers ("Flex") warrant to the original purchaser that this product (the "Product") will be free from defects in materials and workmanship at the date of purchase.

Outside of Coverage

The warranty is not transferable and does not cover:

- (a) Products with more than 45 days after the purchase date
- (b) Damage due to acts of God, accident, misuse, abuse, negligence, commercial use, or due to improper use, installation, operation, or maintenance
- (c) Damage to other components or assemblies associated with the use of the Product.
- (d) Modification of or to any part of the Product
- (e) Product not purchased from an authorized Flex Innovations dealer or distributor.
- (f) Product that has been partially, or fully assembled
- (g) Shipping damage
- (h) Cosmetic damage
- (i) Services or labor associated with the repair, use or assembly of the Product.

OTHER THAN THE EXPRESS WARRANTY ABOVE, FLEX MAKES NO OTHER WARRANTY REPRESENTATION, AND HEREBY DISCLAIMS ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF NONINFRINGEMENT, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE PURCHASER ACKNOWLEDGES THAT THEY ALONE HAVE DETERMINED THAT THE PRODUCT WILL SUITABLY MEET THE REQUIREMENTS OF THE PURCHASER'S INTENDED USE.

Purchaser's Remedy

Flex's sole obligation and purchaser's sole and exclusive remedy shall be that Flex will, at its option, either (i) service, (ii) replace any part of the Product determined by Flex to be defective, or (iii) replace the Product determined by Flex to be defective. Flex reserves the right to inspect all Product(s) involved in a warranty claim. Service or replacement decisions are at the sole discretion of Flex. Proof of purchase is required for all warranty claims. **SERVICE OR REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE PURCHASER'S SOLE AND EXCLUSIVE REMEDY.**

Limitation of Liability

FLEX SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSS OF WAY, REGARDLESS OF WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, TORT, NEGLIGENCE, STRICT LIABILITY OR ANY OTHER THEORY OF LIABILITY, EVEN IF FLEX HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Further, in no event shall the liability of Flex exceed the individual price of the Product on which liability is asserted. As Flex has no control over use, setup, assembly, modification or misuse, no liability shall be assumed nor accepted for any resulting damage and/or injury. By the act of use, setup or assembly, the user accepts all resulting liability. If you as the purchaser or user are not prepared to accept the liability associated with the use of the Product, purchaser is advised to return the Product immediately in new and unused condition to the place of purchase.

Law

These terms are governed by Florida law (without regard to conflict of law of principals). This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. FLEX RESERVES THE RIGHT TO MODIFY THIS WARRANTY AT ANY TIME WITHOUT NOTICE.

Questions & Assistance

Contact us by:

E-Mail – support@flexinnovations.com

Phone – 1 (866) 310-3539

Inspection or Services

If this Product needs to be inspected or serviced and is compliant in the region you live and use the Product in, please contact your regional Flex authorized reseller. Pack the Product securely using the original shipping carton. Please note that both the inner and outer boxes need to be included. The inner box is not designed to withstand the rigors of shipping without additional protection from the outer shipping carton. Ship via a carrier that provides tracking and insurance for lost or damaged parcels, as Flex is not responsible for merchandise until it arrives and is accepted at our facility.

Warranty Requirements

For Warranty consideration, you must include your original sales receipt verifying the proof of purchase date. Provided any warranty conditions have been met, your Product or its defective parts will be replaced or serviced free of charge. Responsibility of shipping charges are as follows:

To Flex from customer, customer is responsible.

To Customer from Flex, Flex is responsible.

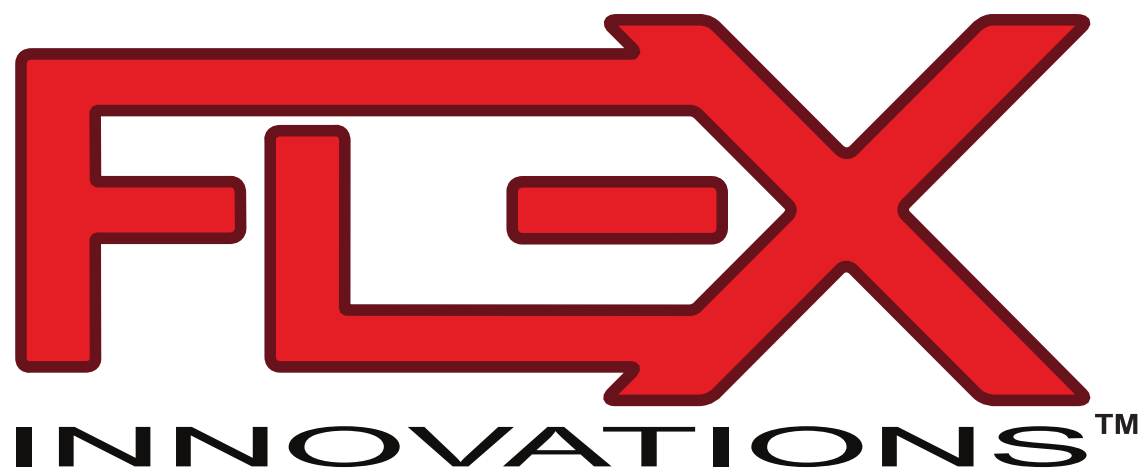
Service or replacement decisions are at the sole discretion of Flex.

BUILDING AND FLYING NOTES









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Rev.A
Created 07/2026