

# Factor 30cc



## INSTRUCTION MANUAL

### SPECIFICATIONS

<b>Wingspan:</b>	70 in [1174 mm]	<b>Weight:</b>	12–14 lbs [5440–6350 g]	<b>Engine:</b>	1.8–2.0 cu in (30–35 cc) gasoline engine
<b>Length:</b>	75 in [1905 mm]	<b>Wing Loading:</b>	24–27 oz/ft <sup>2</sup> [73–82 g/dm <sup>2</sup> ]	<b>Motor:</b>	RimFire 1.60 (63-62-250) outrunner brushless
<b>Wing Area:</b>	1174 in <sup>2</sup> [75.7 dm <sup>2</sup> ]	<b>Radio:</b>	4–7 Channel		

### WARRANTY

**Great Planes® Model Manufacturing Co.** guarantees this kit to be free from defects in both material and workmanship at the date of purchase. This warranty does not cover any component parts damaged by use or modification. **In no case shall Great Planes' liability exceed the original cost of the purchased kit.** Further, Great Planes reserves the right to change or modify this warranty without notice.

In that Great Planes has no control over the final assembly or material used for final assembly, no liability shall be assumed nor accepted for any damage resulting from the use by the user of the final user-assembled product. By the act of using the user-assembled product, the user accepts all resulting liability.

**If the buyer is not prepared to accept the liability associated with the use of this product, the buyer is**

**advised to return this kit immediately in new and unused condition to the place of purchase.**

To make a warranty claim send the defective part or item to Hobby Services at the address below:

#### Hobby Services

3002 N. Apollo Dr. Suite 1  
Champaign IL 61822 USA

Include a letter stating your name, return shipping address, as much contact information as possible (daytime telephone number, fax number, e-mail address), a detailed description of the problem and a photocopy of the purchase receipt. Upon receipt of the package the problem will be evaluated as quickly as possible.

READ THROUGH THIS MANUAL BEFORE STARTING CONSTRUCTION. IT CONTAINS IMPORTANT INSTRUCTIONS AND WARNINGS CONCERNING THE ASSEMBLY AND USE OF THIS MODEL.



Champaign, Illinois  
(217) 398-8970, Ext 5  
airsupport@greatplanes.com

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## INTRODUCTION

Continuing with the success of the Factor 3D EP, Great Planes brings you the Factor 30cc ARF. This is a great first gas powered 3D model. The plane can go from mild to wild with just the flip of a switch. We believe you will be very pleased with the ease of assembly and flight performance of the Factor 30cc ARF.

For the latest technical updates or manual corrections to the Factor 30cc ARF visit the Great Planes web site at [www.greatplanes.com](http://www.greatplanes.com). Open the "Airplanes" link, then select the Factor 30cc ARF. If there is new technical information or changes to this model a "tech notice" box will appear in the upper left corner of the page.

## Academy of Model Aeronautics

If you are not already a member of the AMA, please join! The AMA is the governing body of model aviation and membership provides liability insurance coverage, protects modelers' rights and interests and is required to fly at most R/C sites.

### Academy of Model Aeronautics

5151 East Memorial Drive  
Muncie, IN 47302-9252  
Ph. (800) 435-9262  
Fax (765) 741-0057

Or via the Internet at: [modelaircraft.org](http://modelaircraft.org)



### IMPORTANT!!!

Two of the most important things you can do to preserve the radio controlled aircraft hobby are to avoid flying near full-scale aircraft and avoid flying near or over groups of people.

## Know Before You Fly

As a new owner of an unmanned aircraft system (UAS), you are responsible for the operation of this vehicle and the safety of those around you. Please contact your local authorities to find out the latest rules and regulations.

In the United States, please visit:



**KNOWFLY**  
BEFORE YOU



Federal Aviation  
Administration

[knowbeforeyoufly.org](http://knowbeforeyoufly.org) [faa.gov/uas](http://faa.gov/uas)

## IMPORTANT SAFETY PRECAUTIONS

1. Your Factor 30cc ARF should not be considered a toy, but rather a sophisticated, working model that functions very much like a full-size airplane. Because of its performance capabilities, the Factor 30cc ARF, if not assembled and operated correctly, could possibly cause injury to yourself or spectators and damage to property.
2. You must assemble the model **according to the instructions**. Do not alter or modify the model, as doing so may result in an unsafe or unflyable model. In a few cases the instructions may differ slightly from the photos. In those instances the written instructions should be considered as correct.
3. You must take time to **build straight, true and strong**.
4. You must use an R/C radio system that is in good condition, a correctly sized engine, and other components as specified in this instruction manual. All components must be correctly installed so that the model operates correctly on the ground and in the air. You must check the operation of the model and all components before **every** flight.

5. If you are not an experienced pilot or have not flown this type of model before, we recommend that you get the assistance of an experienced pilot in your R/C club for your first flights. If you're not a member of a club, your local hobby shop has information about clubs in your area whose membership includes experienced pilots.

6. While this kit has been flight tested to exceed normal use, if the plane will be used for extremely high stress flying, such as racing, or if an engine larger than one in the recommended range is used, the modeler is responsible for taking steps to reinforce the high stress points and/or substituting hardware more suitable for the increased stress.

7. **WARNING:** The cowl and wheel pants included in this kit are made of fiberglass, the fibers of which may cause eye, skin and respiratory tract irritation. Never blow into a part to remove fiberglass dust, as the dust will blow back into your eyes. Always wear safety goggles, a particle mask and rubber gloves when grinding, drilling and sanding fiberglass parts. Vacuum the parts and the work area thoroughly after working with fiberglass parts.

We, as the manufacturer, provide you with a top quality, thoroughly tested ARF and instructions, but ultimately the quality and flyability of your finished model depends on how you build it; therefore, we cannot in any way guarantee the performance of your completed model, and no representations are expressed or implied as to the performance or safety of your completed model.

**Note:** Some technically-minded modelers who wish to check the wing, stab and motor thrust angles may do so by visiting the web site at [www.greatplanes.com](http://www.greatplanes.com) and clicking on "Technical Data."

**Remember:** Take your time and follow the instructions to end up with a well-built model that is straight and true.

## DECISIONS YOU MUST MAKE

This is a partial list of items required to finish the Factor 30cc ARF that may require planning or decision making before starting to build. Order numbers are provided in parentheses.

## Engine Recommendations

The recommended engine size range for the Factor 30cc ARF is a 30 – 35cc [1.8 – 2.0 ci.] two-stroke gasoline engine. The Factor 30cc ARF is designed to use the DLE 30, DLE 35RA or O.S. GT33. Other engines can also be used but you may need to make modifications for mounting those engines. The stock mufflers for the DLE engines can be used.

- The OSMG1533 O.S. GT33 requires:
  - (4) 2" (50.8mm) standoffs (OSMG8962)
  - (4) M5×15 socket head bolts (OSMG8781)
  - (4) M5×20 socket head bolts (OSMG8779)
  - (4) M5 lock washers (OSMG9403)
  - J'TEC JTC-DL30B muffler (from [www.jtecrc.com](http://www.jtecrc.com))

## Motor Recommendations

- Great Planes RimFire 1.60 [63-62-250] Outrunner Brushless Motor (GPMG4795)
- Castle Creations Phoenix Edge 80HV (CSEM0500)

### OR

- Castle Creations Talon 120HV (CSEM3100)
- Great Planes 6mm Male/4mm Female Bullet Adapter (GPMM3119)
- Great Planes 6mm female Bullet Connectors (GPMM3117) For the ESC
- Two FlightPower LiPo FP50 5000mAh 18.5V Batteries (FPWP5505)
- Spinner Adapter Kit (GPMQ4589)
- 19x8 Propeller Xoar (XOAQ4087) or APC (APCQ4024)

## Radio Equipment

The Factor 30cc ARF can be flown with a minimum of a 4-channel radio. For our installation we used seven channels:

- |                    |              |               |
|--------------------|--------------|---------------|
| (1) throttle       | (1) rudder   | (2) elevators |
| (1) optional choke | (2) ailerons |               |

The elevators require the use of a high-quality servo of at least 150 oz-in of torque. The ailerons and rudder require a servo with at least 250 oz-in of torque. A servo of 40 oz-in of torque can be used for the throttle and optional choke.

### RECOMMENDED SERVOS

- (2) Elevators (min. 150 oz-in torque) (Futaba S9155 FUTM0215)
- (1) Rudder (min. 272 oz-in torque) (Futaba S9156 FUTM0216)
- (2) Ailerons (min. 272 oz-in torque) (Futaba S9156 FUTM0216)
- (1) Throttle (standard) (Futaba S9001 FUTM0075)
- (1) Optional Choke (standard) (Futaba S9001 FUTM0075)

### ELECTRIC MOTOR INSTALLATION

- (2) 20" Servo extension (FUTM4147) (for aileron servos)

### OR

- (2) 24" Servo extension (TACM2721)
- (1) 8" Servo extension (FUTM4140) (for receiver battery switch to receiver)

### OR

- (1) 6" Servo extension (TACM2701)
- (2) Optional Y-harness (FUTM4135) (TACM2751) (for connecting the elevator servos and aileron servos)
- (1) Heavy duty on/off switch (FUTM4385) (TACM2761)
- (1) Optional Charge Receptacle #124 (ERNM3001)
- (1) 2100mAh LiFe receiver battery (HCAM6436)

### ADDITIONAL ITEMS FOR GAS ENGINE INSTALLATION

- (1) Additional Y-harness for choke if using a 7-channel receiver
- (1) Heavy duty on/off switches (FUTM4385) (TACM2761) for ignition
- (1) Optional Charge Receptacle #124 (ERNM3001) for ignition battery
- (1) 1300mAh LiFe ignition battery (HCAM6411)

## ADDITIONAL ITEMS REQUIRED

### Required Hardware and Accessories

- (1) Dubro #554 X-large Tygon Fuel Line (DUBQ0427)
- (1) R/C foam rubber (1/4" [6mm] (HCAQ1000) or 1/2" [13mm] (HCAQ1050)
- Propeller and spare propellers suitable for your engine

### Required Hardware and Accessories

This is the list of Adhesives and Building Supplies that are required to finish the Factor 30cc ARF.

- 1/2 oz. [15g] Thin Pro CA (GPMR6001)
- 2 oz. [57g] spray CA activator (GPMR6035)
- Pro 30-minute epoxy (GPMR6043)
- Pro 6-minute epoxy (GPMR6042)
- Threadlocker thread locking cement (GPMR6060)
- Mixing sticks (50, GPMR8055)
- Mixing cups (GPMR8056)
- Epoxy brushes (6, GPMR8060)
- Denatured alcohol (for epoxy clean up)
- Masking tape
- String
- T-pins (HCAR5150)
- Drill
- Drill bits: 1/16" [1.5mm], 5/64" [2mm], 1/8" [3mm], 5/32" [4mm], 3/16" [5mm]
- Small metal file
- Stick-on segmented lead weights (GPMQ4485)
- Silver solder w/flux (STAR2000)

- Hobbico 60 Watt Soldering Iron (HCAR0776)
- #1 Hobby knife (RMXR6903)
- #11 blades (5-pack, RMXR6930)
- Rotary tool such as Dremel
- Rotary tool reinforced cut-off wheel (GPMR8200)
- DLE-30 Propeller Drill Guide (DLEQ0301)

### Covering Tools

- Top Flite MonoKote Sealing Iron (TOPR2100)
- Top Flite Hot Sock Iron Cover (TOPR2175)
- Top Flite MonoKote Trim Seal Iron (TOPR2200)
- Top Flite MonoKote Heat Gun (TOPR2000)

### OR

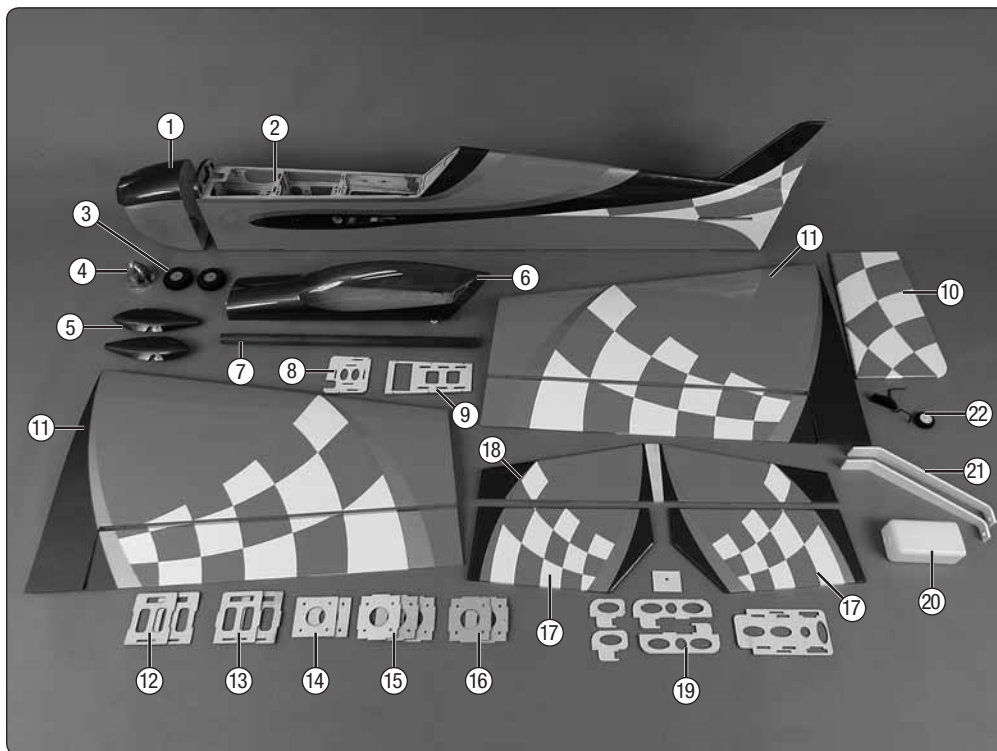
- Coverite 21st Century Sealing Iron (COVR2700)
- Coverite 21st Century Cover Sock (COVR2702)
- Coverite 21st Century Trim Sealing Iron (COVR2750)

### Optional Supplies and Tools

Here is a list of optional tools mentioned in the manual that will help you build the Factor 30cc ARF

- CA applicator tips (HCAR3780)
- CA debonder (GPMR6039)
- 36" metal ruler
- Pliers with wire cutter (HCAR0625)
- Robart Super Stand II (ROBP1402)
- Servo horn drill (HCAR0698)
- AccuThrow Deflection Gauge (GPMR2405)
- CG Machine™ (GPMR2400)
- Precision Magnetic Prop Balancer (TOPQ5700)

## KIT CONTENTS



1. Cowl
2. Fuselage
3. Main Wheels
4. Spinner
5. Wheel Pants
6. Canopy
7. Wing Tube
8. Forward Battery Hatch
9. Receiver Battery Tray
10. Rudder
11. Wing Halves
12. Motor Mount Sides
13. Motor Mount Sides
14. Motor Mount Back Plates
15. Motor Mount Front Plates
16. Motor Mount Front Plates
17. Elevators
18. Horizontal Stabilizer
19. Battery Tray
20. Fuel Tank
21. Main Landing Gear
22. Tailwheel Assembly



## IMPORTANT BUILDING NOTES

- Anytime thin CA glue is recommended you will see this symbol. We recommend that when threading screws into wood that first the screw be installed. Then, remove the screw and apply a couple of drops of thin CA in the hole to harden the threads. After the CA has cured, reinstall the screw.
- Anytime threadlocker is recommended you will see this symbol. We recommend that anytime a threaded screw or nut is installed, a drop of threadlocker be applied to the threads. An exception, do not use threadlocker on screws installed in the nylon control horns.
- Denatured alcohol is great for cleaning epoxy from surfaces before the epoxy cures.
- When connecting servo extensions to servos, we recommend that the connection be secured with heat shrink or tape (not included).



## REPLACEMENT MONOKOTE COLORS

Orange (TOPQ0202)  
Jet White (TOPQ0204)  
Aluminum (TOPQ0205)  
Metalic Plum (TOPQ0403)

## KIT INSPECTION

Before starting to build, inspect the parts to make sure they are of acceptable quality. If any parts are missing or are not of acceptable quality, or if you need assistance with assembly, contact Product Support. When reporting defective or missing parts, use the part names exactly as they are written in the instruction manual.

### Great Planes Product Support

3002 N Apollo Drive, Suite 1  
Champaign, IL 61822

Ph: (217) 398-8970, ext. 5

Fax: (217) 398-7721

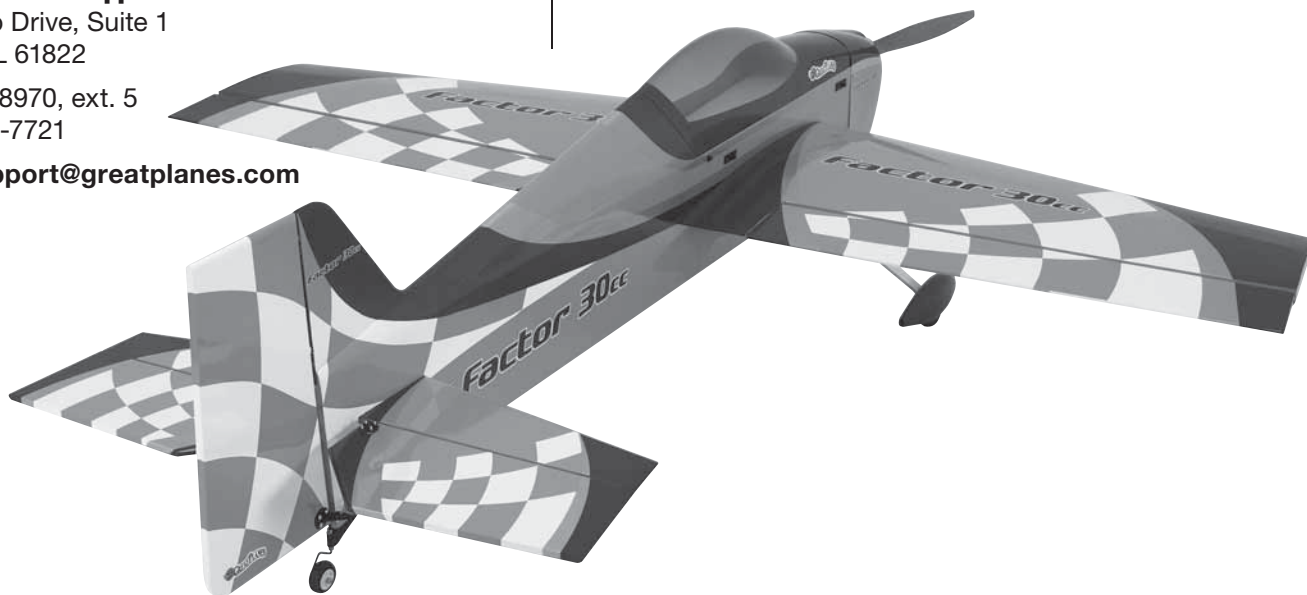
E-mail: [airsupport@greatplanes.com](mailto:airsupport@greatplanes.com)

## REPLACEMENT PARTS LIST

Replacement parts for the Great Planes Factor 30cc ARF are available using the order numbers in the Replacement Parts List that follows. The fastest, most economical service can be provided by your hobby dealer or mail-order company. Not all parts are available separately (an aileron cannot be purchased separately, but is only available with the wing kit). Replacement parts are not available from Product Support, but can be purchased from hobby shops or mail order/Internet order firms. Hardware items (screws, nuts, bolts) are also available from these outlets.

To locate a hobby dealer, visit [www.greatplanes.com](http://www.greatplanes.com) and click on "Where to Buy". Follow the instructions provided on the page to locate a U.S., Canadian or International dealer.

GPMA2475	Fuselage
GPMA2476	Wing
GPMA2477	Tail Surface Set
GPMA2478	Canopy/Hatch
GPMA2479	Wing Tube
GPMA2480	Landing Gear
GPMA2481	Wheel Pants
GPMA2482	Cowl
GPMA2483	Decal
GPMA2484	EP Motor Mount Box
GPMA2485	Battery Tray
GPMA2486	Spinner
GPMA5390	Tail Wheel Assembly
GPMA5391	Hatch/Battery Tray Screws



## PREPARATIONS

- ❑ 1. Firmly pull on each aileron to confirm they are securely glued.

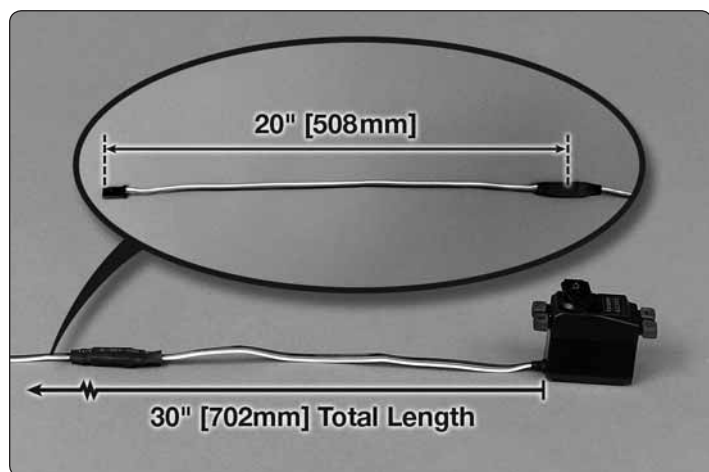


- ❑ 2. Tighten the covering with a covering iron.

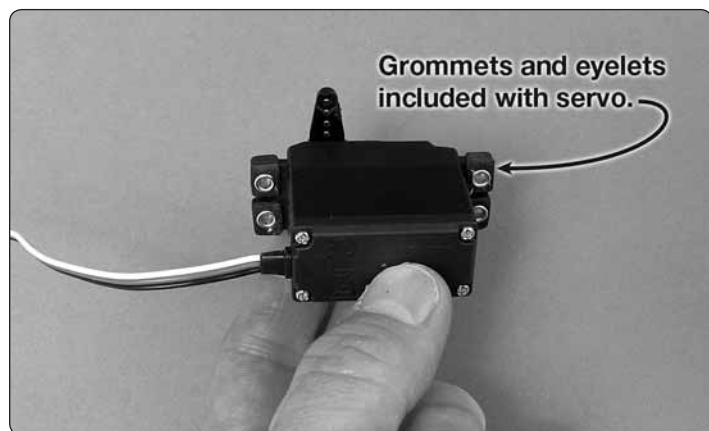
## ASSEMBLE THE WING

### Aileron Servo Installation

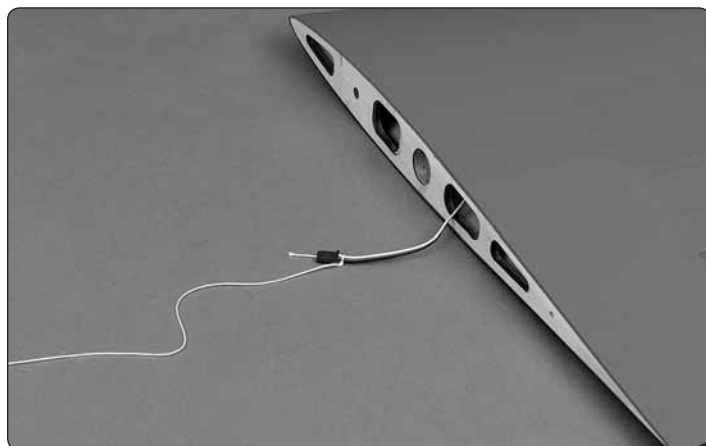
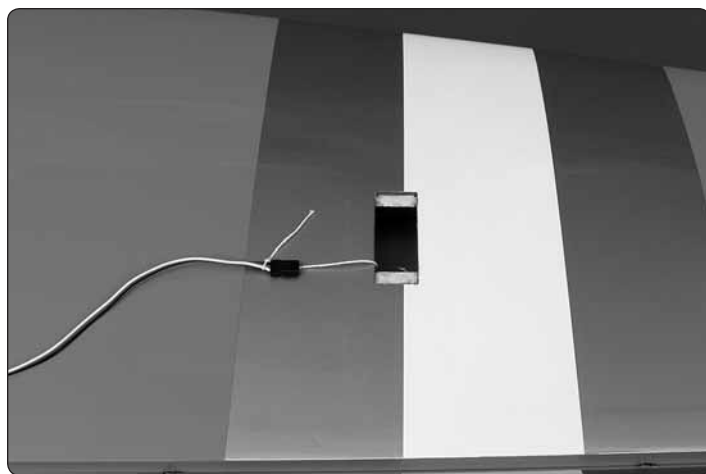
**BEGIN WITH THE LEFT WING PANEL.**



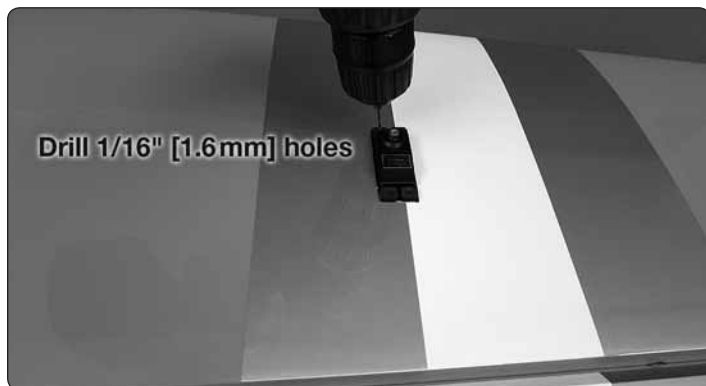
- ❑ ❑ 1. Install a servo lead extension (not included) and secure the connection.



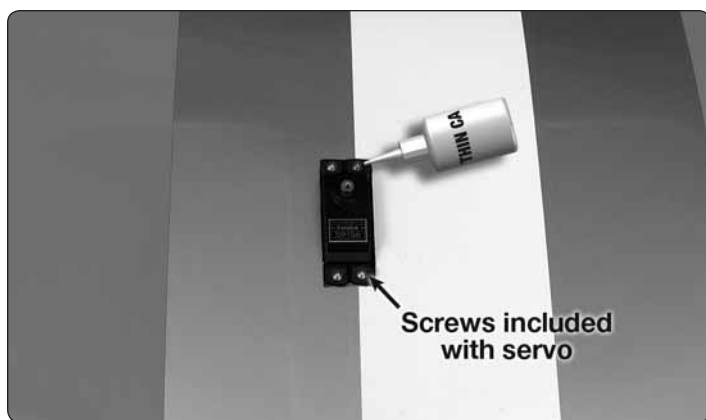
- ❑ ❑ 2. Install grommets and eyelets on all servos.



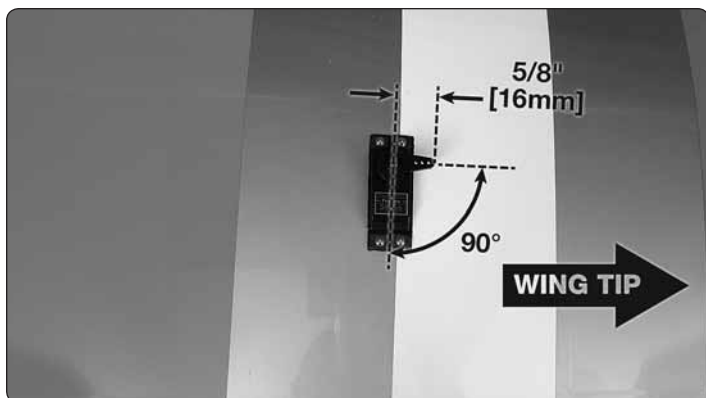
- ❑ ❑ 3. Route servo lead through wing.



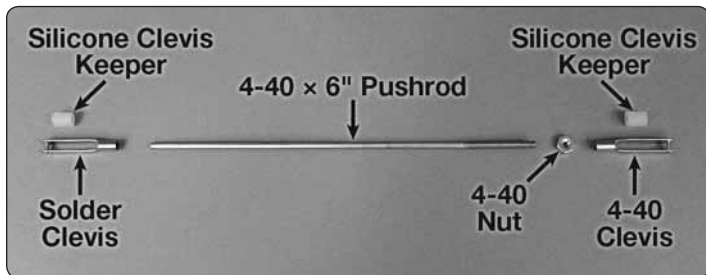
- ❑ ❑ 4. Drill servo screw mounting holes.



- ❑ ❑ 5. Install servo screws.



6. Install servo horn.



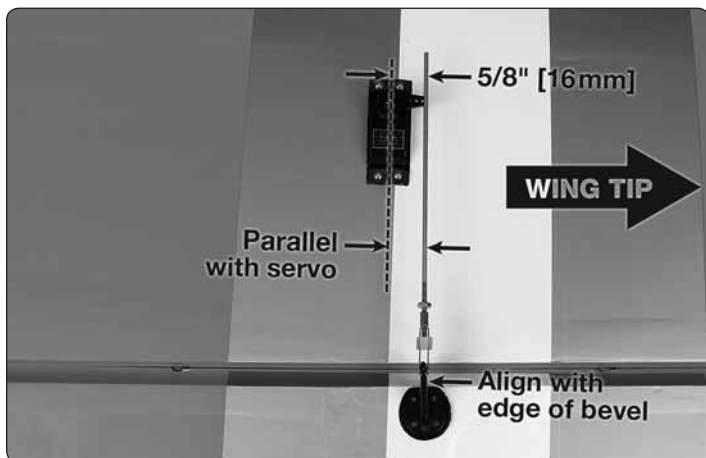
7. Aileron pushrod components.



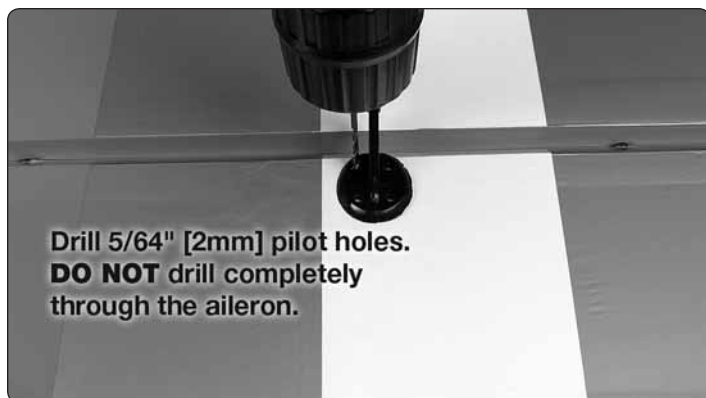
8. Install the 4-40 threaded clevis.



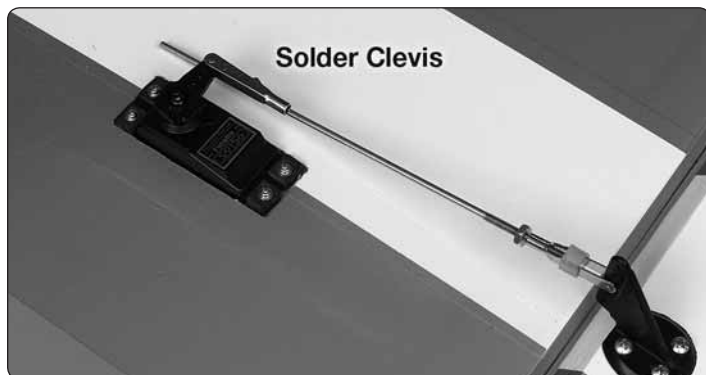
9. Attach clevis to control horn.



10. Position control horn on aileron.



11. Mount control horn.

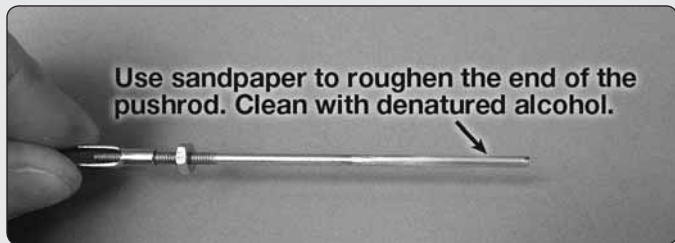


12. Install the solder clevis.



**EXPERT TIP**

### HOW TO SOLDER



Use sandpaper to roughen the end of the pushrod. Clean with denatured alcohol.

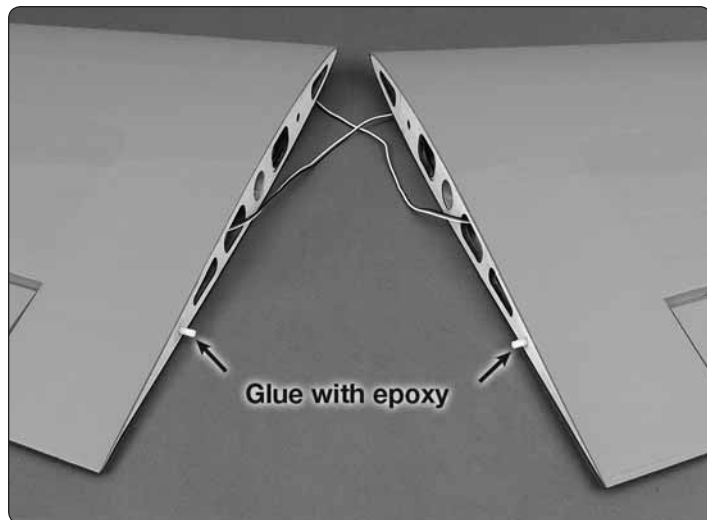
Apply a few drops of soldering flux to the end of the pushrod. "Tin" the end of the pushrod by applying heat. Apply silver solder to the heated area. The pushrod should melt the solder, not the flame of the torch. The end of the pushrod should be tinned all the way around.

Position the solder clevis on the pushrod and apply a drop of flux to the joint. Apply heat and add solder. Again, the heat of the part should melt the solder, not the flame of the torch. Allow the part to cool naturally. Make sure the joint is thoroughly soldered. It should be shiny, not rough. Reheat if necessary.

Wipe off the flux residue with denatured alcohol. Coat the joint with oil to prevent rust.



Properly soldered clevis.



Glue with epoxy

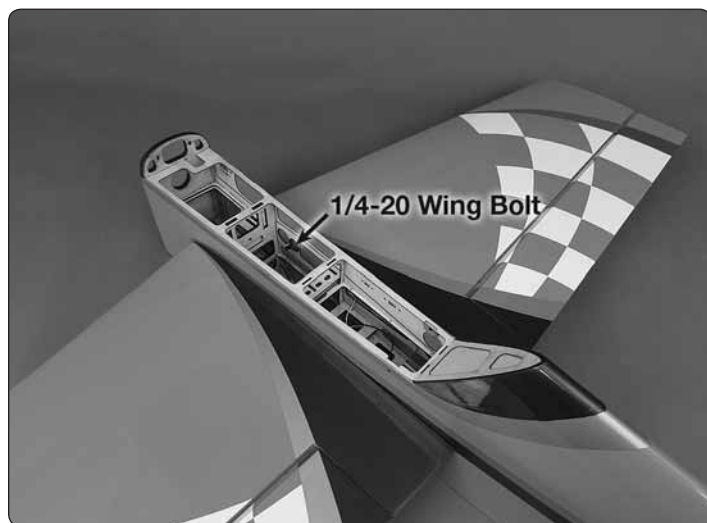
- ❑ 15. Install the nylon wing dowels.

## ASSEMBLE THE FUSELAGE

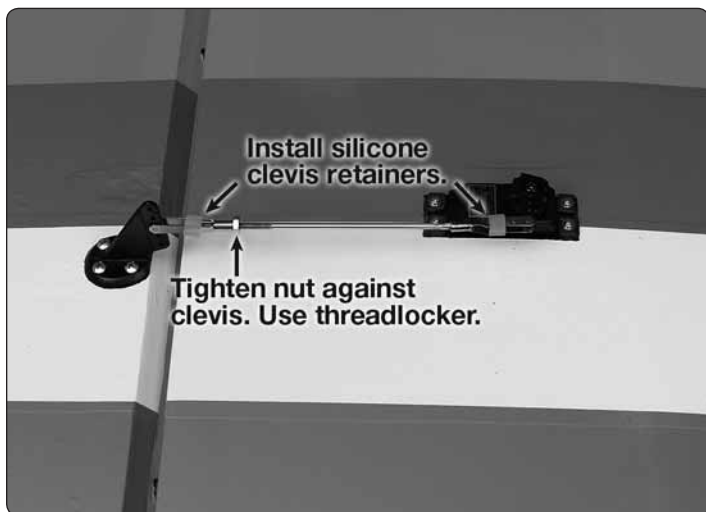
### Install the Tail



- ❑ 1. Slide the Carbon Wing Tube into the fuselage.



- ❑ 2. Install the wing panels.



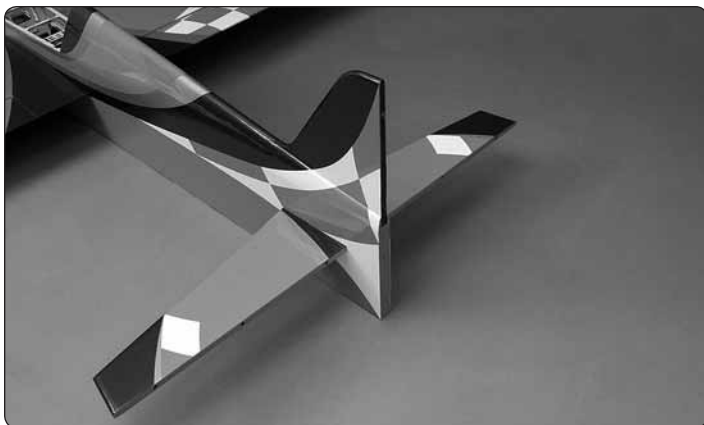
Install silicone clevis retainers.

Tighten nut against clevis. Use threadlocker.

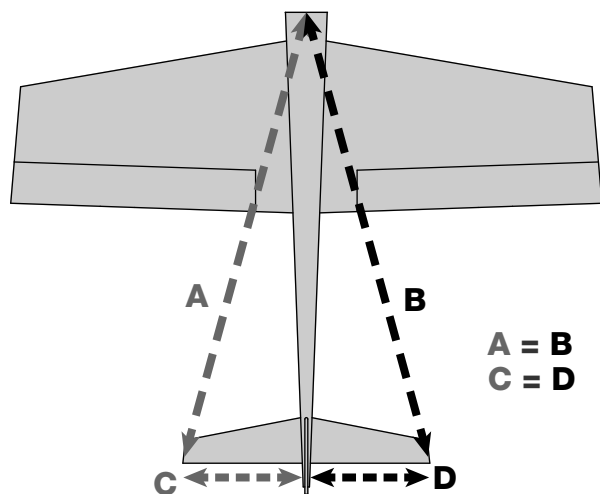
- ❑ 13. Reinstall the aileron pushrod and slide the retainers over the clevises.

- ❑ 14. Repeat steps 1 – 13 to install the aileron servo in the right wing. The two aileron servos can be connected with a Y-harness and plugged into the aileron channel on the receiver, or each aileron can be plugged into a separate channel.

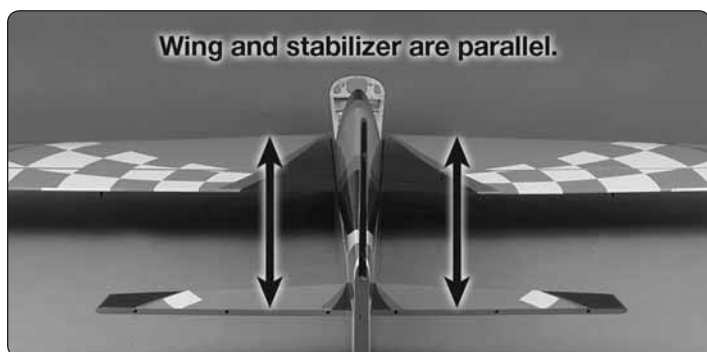




- ❑ 3. Temporarily install the horizontal stabilizer.



- ❑ 4. Check the alignment of the horizontal stabilizer. The distance from the center of the nose of the fuselage to the tips of the horizontal stabilizer should be equal.



- ❑ 5. The wing and stabilizer should be parallel. If they are not, lightly sand the stabilizer slot.

- ❑ 6. Use 30-minute epoxy to glue the stabilizer in the fuselage. Wipe off any excess epoxy with a paper towel and denatured alcohol.

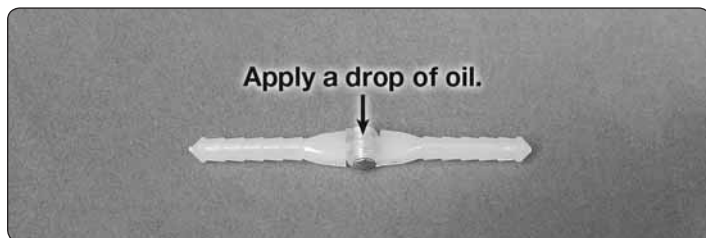
- ❑ 7. Clean the tail gear wire.



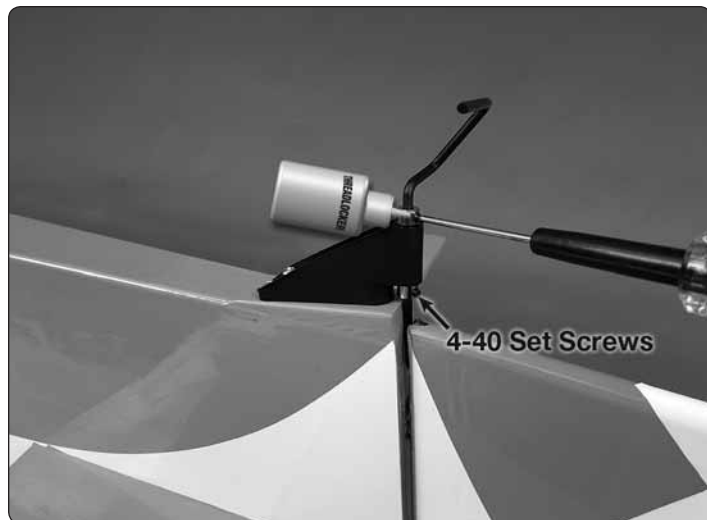
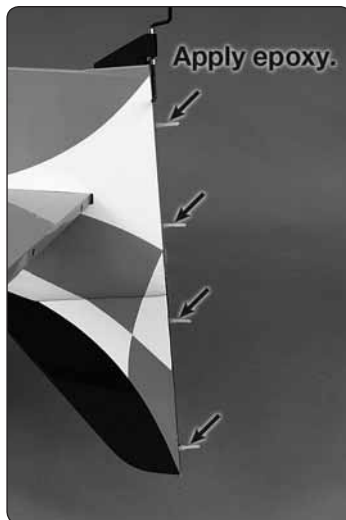
- ❑ 8. Position the tail gear by temporarily installing the rudder.



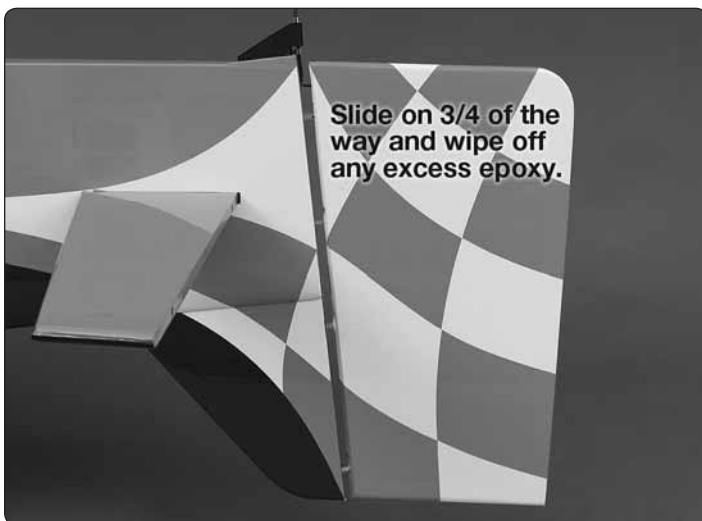
- ❑ 9. Center and attach the tail gear to the fuselage.



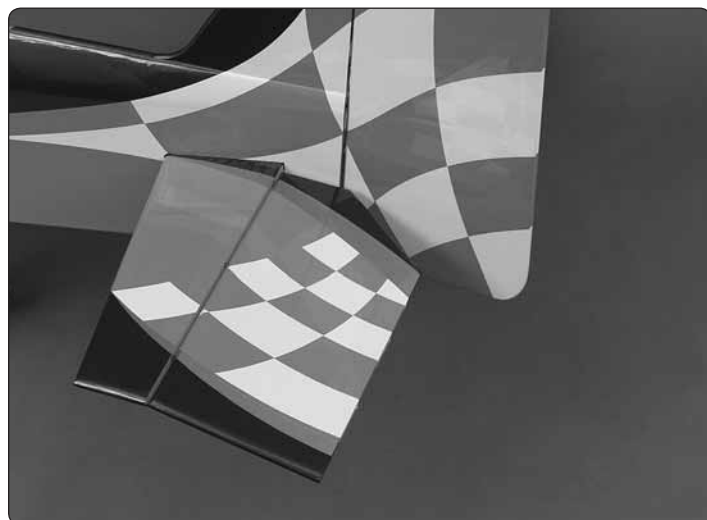
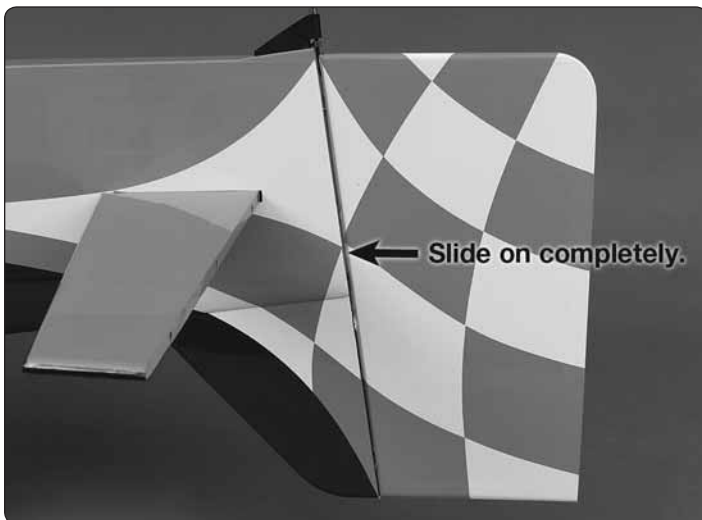
- ❑ 10. Remove the rudder and hinges. Add a small drop of oil to the pivot point on each hinge. The oil will prevent the epoxy from adhering to the pivot point. Makes sure the oil does not get on the gluing surface of the hinge. If it does, clean the oil off with a paper towel dampened with denatured alcohol.



□ 12. Install the set screws in the wheel collars.



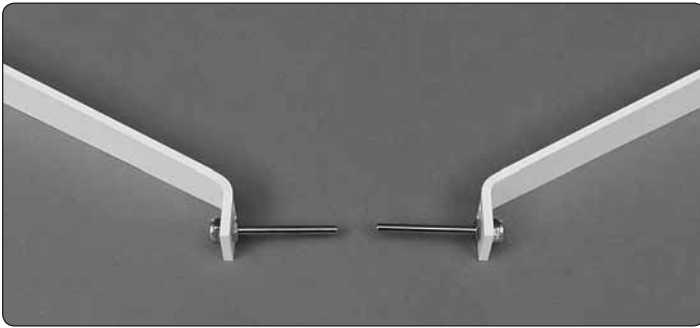
□ 13. Install the tail wheel.



□ 14. Install the two elevators following the same procedure used for installing the rudder.

□ 11. Use 30-minute epoxy to glue in the hinges.

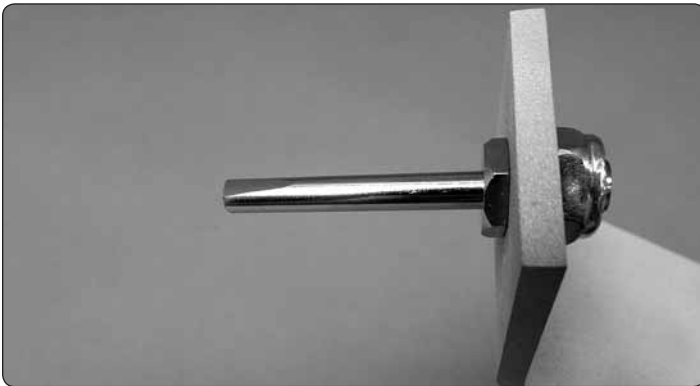
## Install the Main Landing Gear



- ❑ 1. Install the 3/16" [5mm] axles.



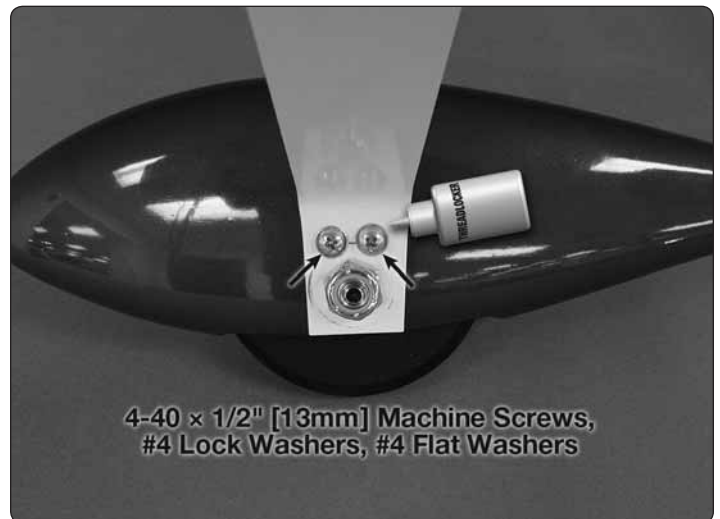
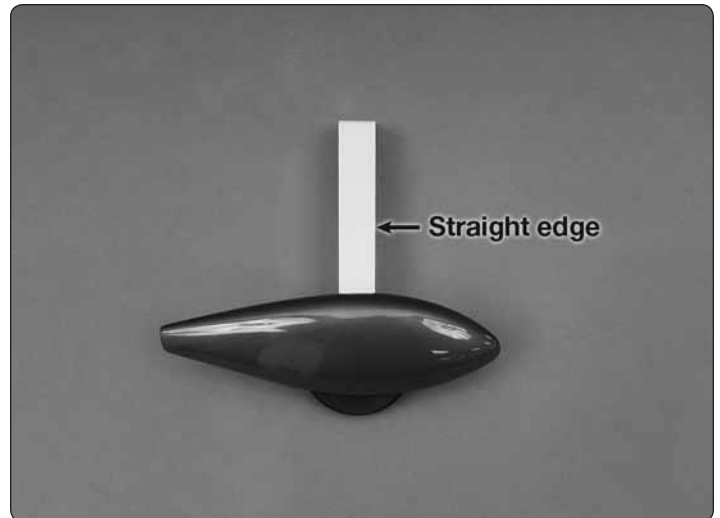
- ❑ 2. Cut the axle to length.



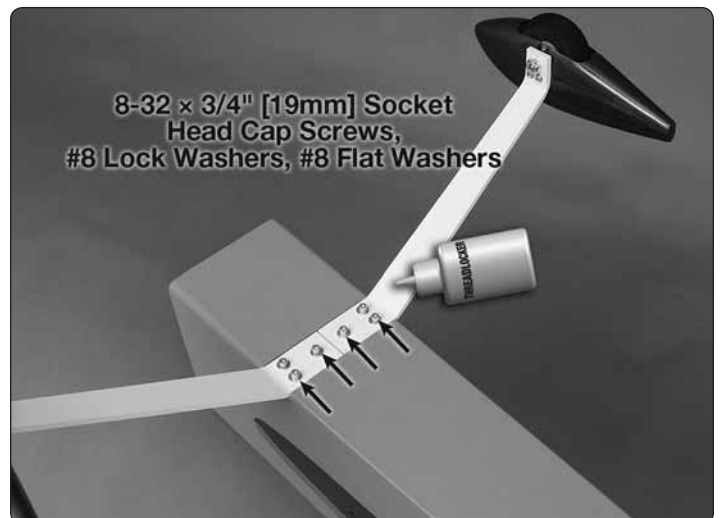
- ❑ 3. File a flat spot at the end of the axle.



- ❑ 4. Install the wheels.

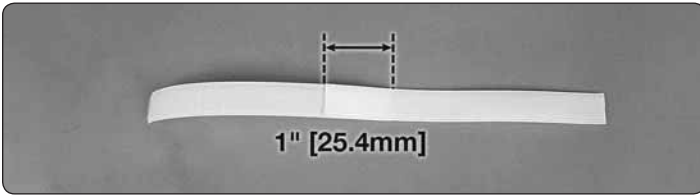


- ❑ 5. Install the wheel pants.

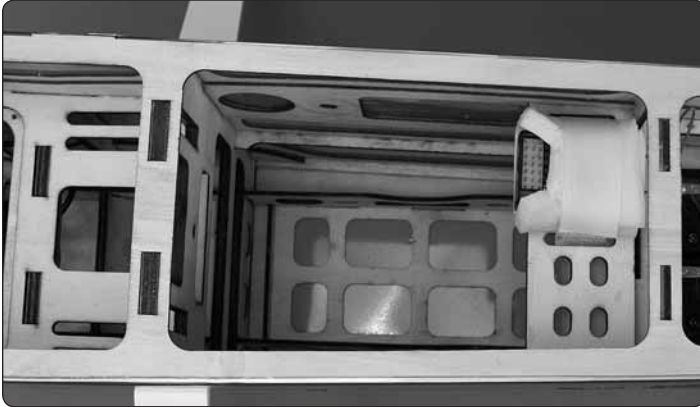


- ❑ 6. Install the main landing gear on the fuselage.

## Install the Rudder and Elevator Servos



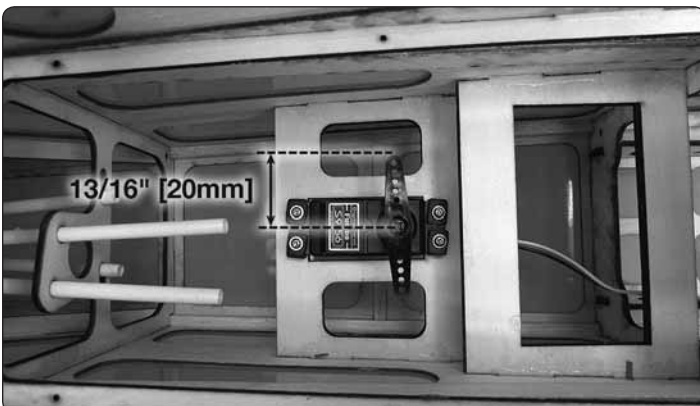
- ❑ 1. Make a battery strap from the supplied hook and loop material.



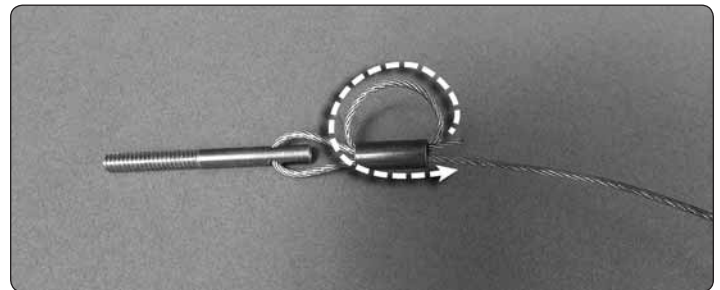
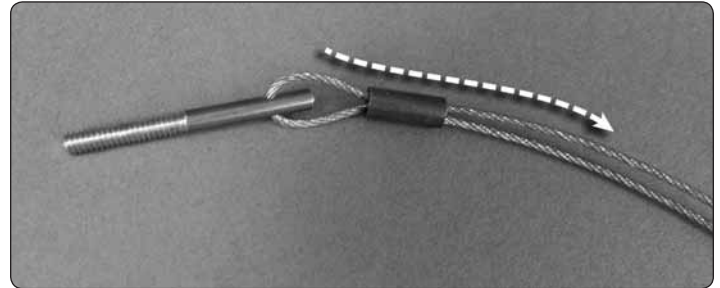
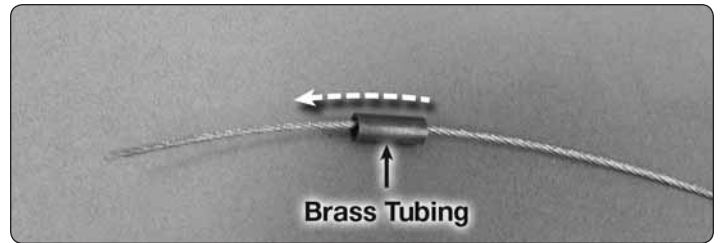
- ❑ 2. Wrap the receiver in foam and secure it to the receiver tray with a hook and loop strap.



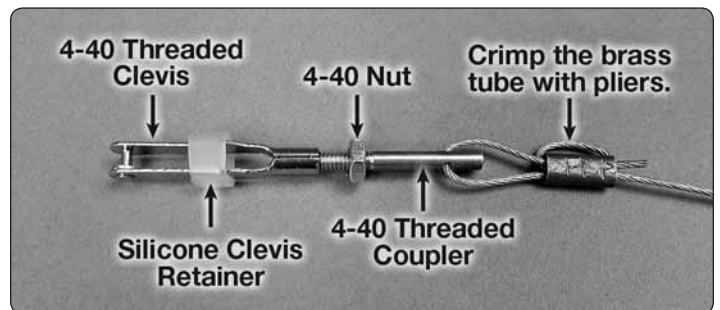
- ❑ 3. Install the rudder servo and plug it into the receiver. Switch on the transmitter and temporarily plug the receiver battery into the receiver.



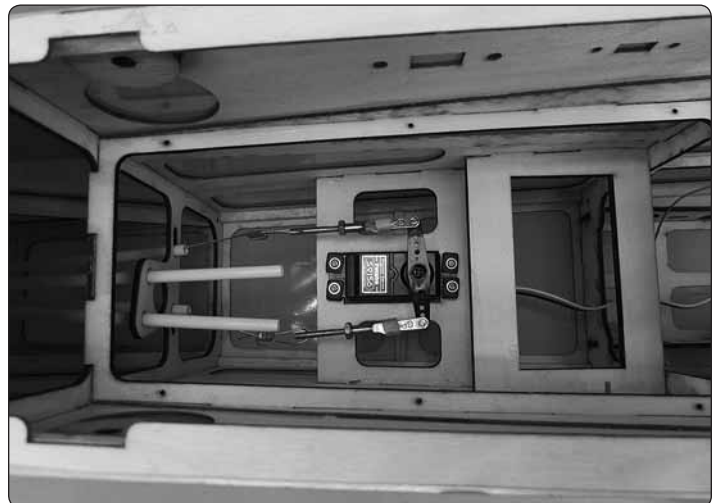
- ❑ 4. Install and center the rudder servo arm.  
❑ 5. Cut the 110" [2800mm] pull-pull cable in half.



- ❑ 6. Install a 4-40 threaded coupler to one end of both pull-pull cables as shown.

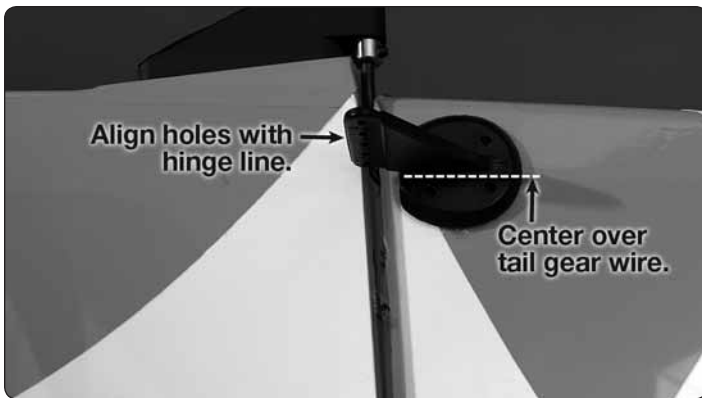


- ❑ 7. Install a 4-40 nut and threaded clevis on the coupler.

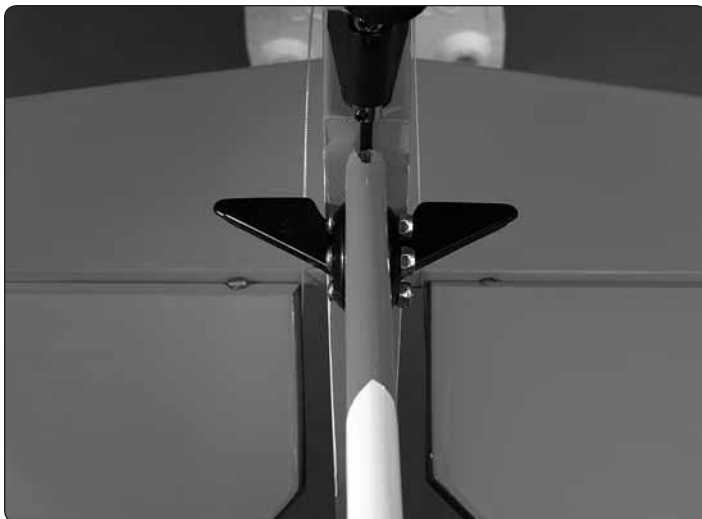
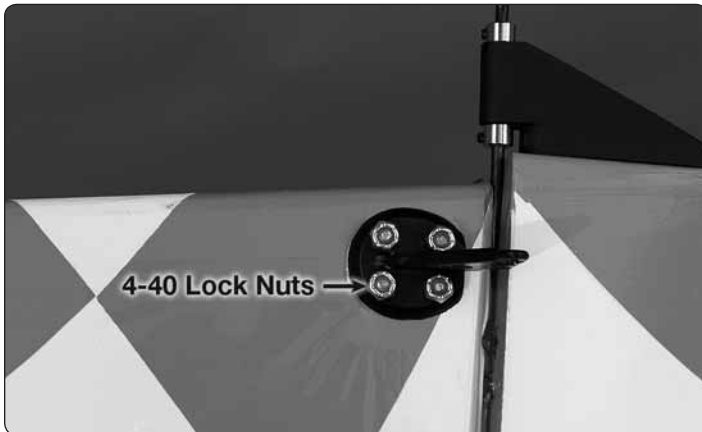
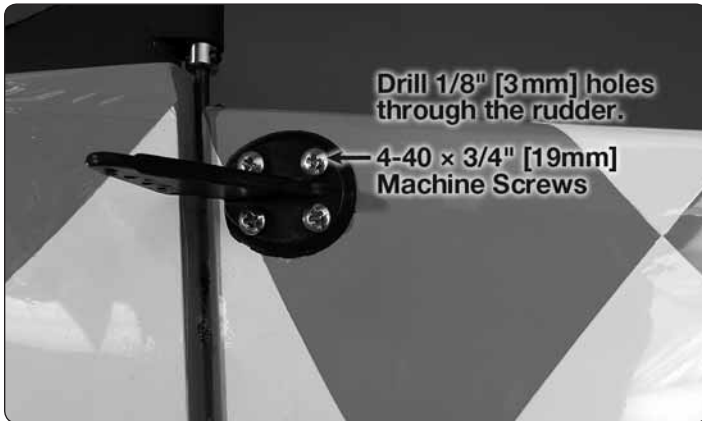


- ❑ 8. Insert the pull-pull cables into the guide tubes. Attach the clevises to the servo arm.

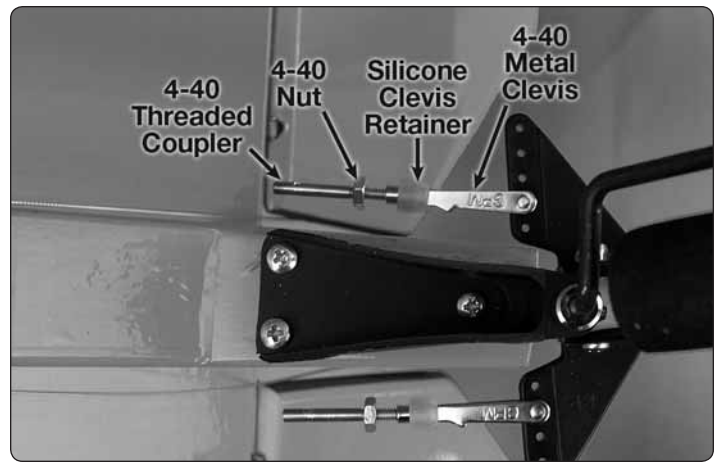




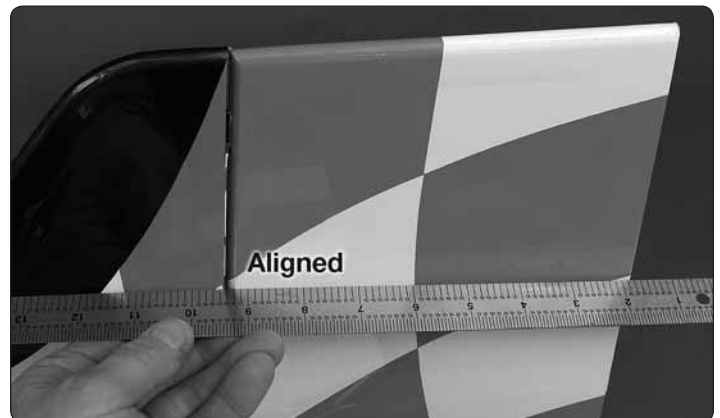
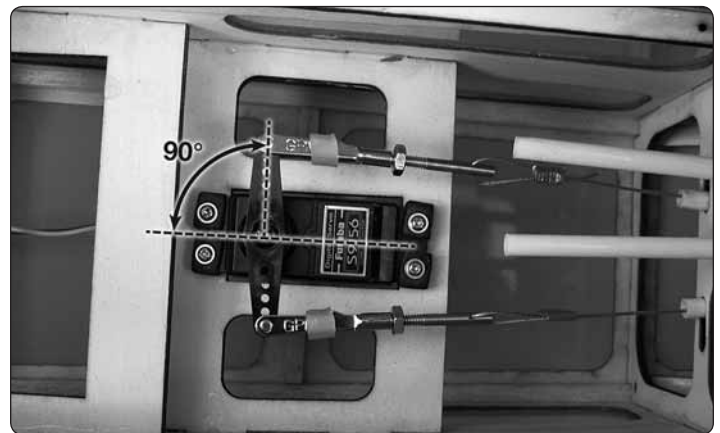
9. Position the rudder control horn.



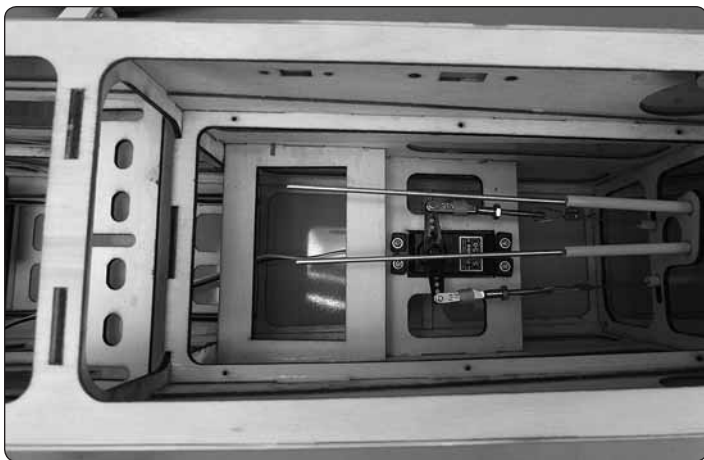
10. Attach rudder control horns.



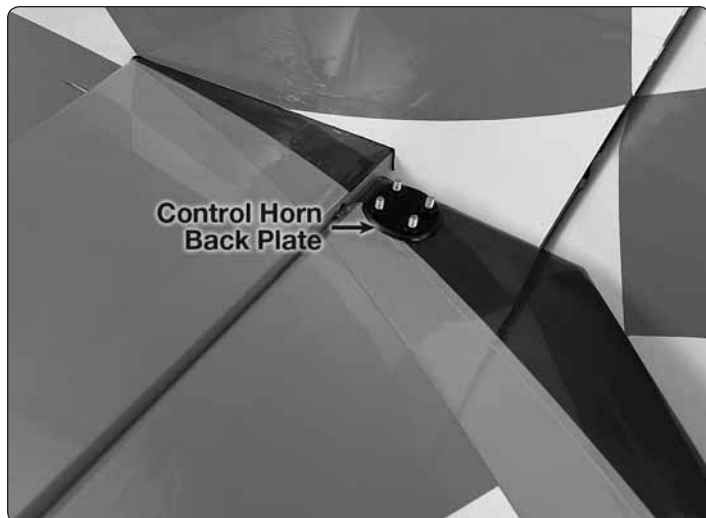
11. Attach a second set of clevises, 4-40 couplers, 4-40 nuts and silicone clevis retainers to the rudder control horns.



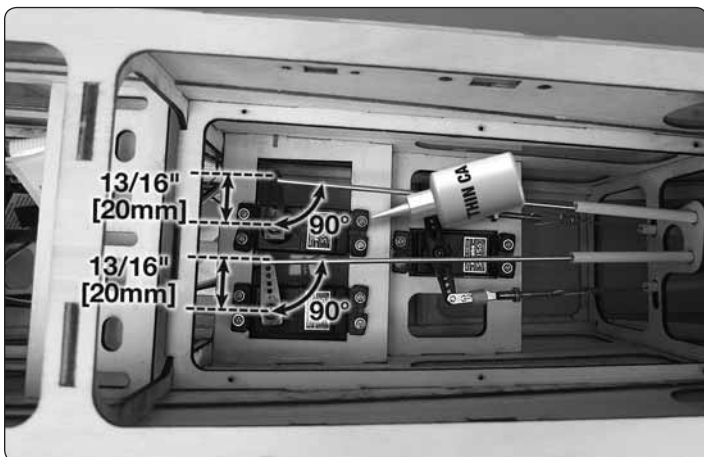
12. Attach the clevises to the control horns and pull the cables tight. Crimp the brass tubes with pliers.



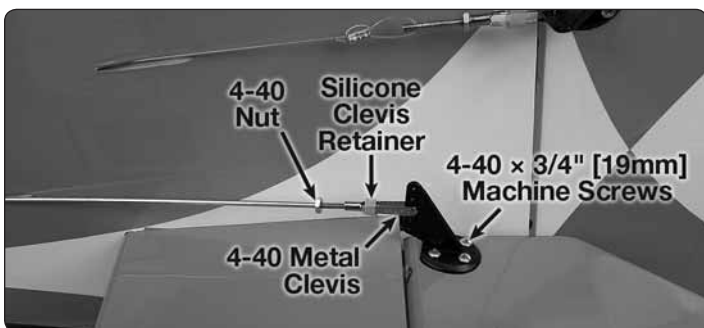
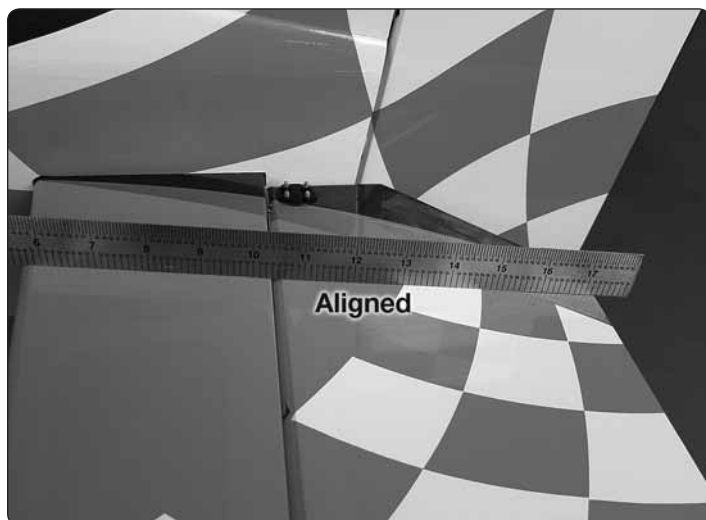
□ 13. Install the 4-40 x 48" (1220mm) elevator pushrods.



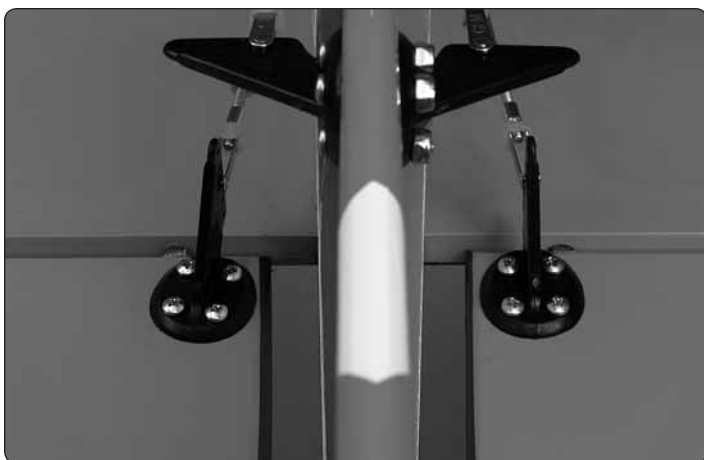
□ 15. Install the elevator control horns and attach the 4-40 clevises, nuts and retainers.

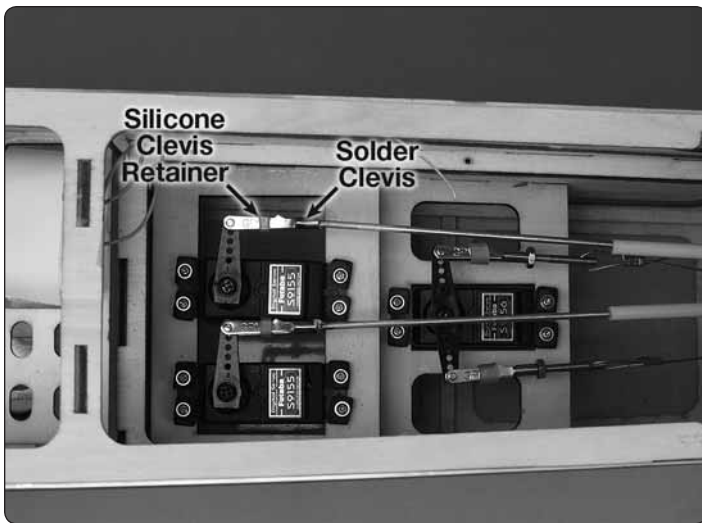


□ 14. Install the elevator servos. The two servo leads can be joined with a Y-harness and plugged into the receiver or each servo can be plugged into a separate channel in the receiver.



□ 16. Install the solder clevis.



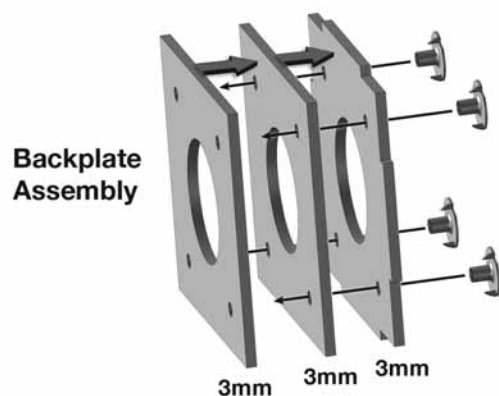
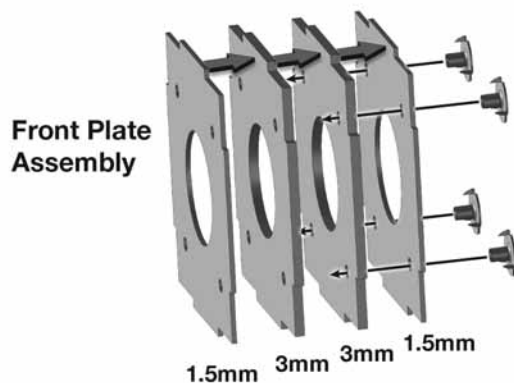


- ❑ 17 Solder the clevises to the elevator pushrods.

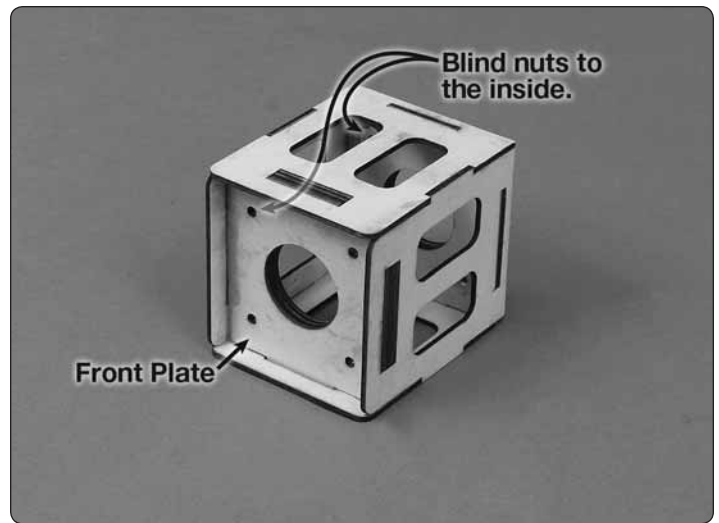
## POWER SYSTEM INSTALLATION

### Electric Motor Installation

**Proceed to Gas Engine Installation (page 7) if a gas engine will be installed.**



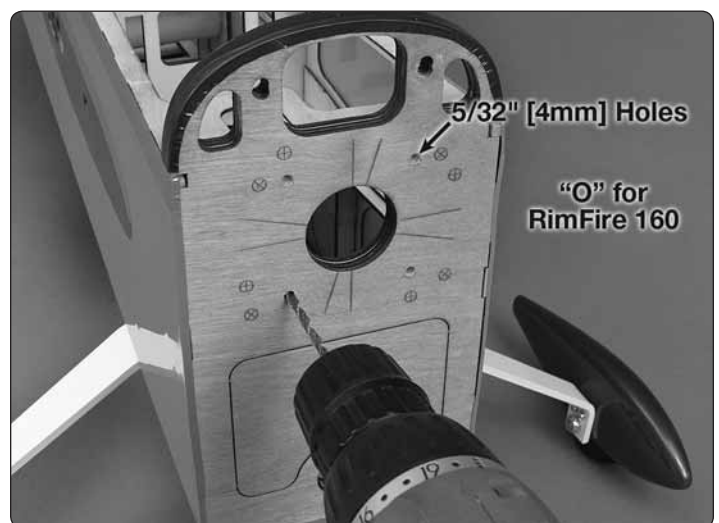
- ❑ 1. Use epoxy to glue the front and back plates of the motor box together and secure the 6-32 blind nuts with thin CA.



- ❑ 2. Glue the sides on using epoxy.

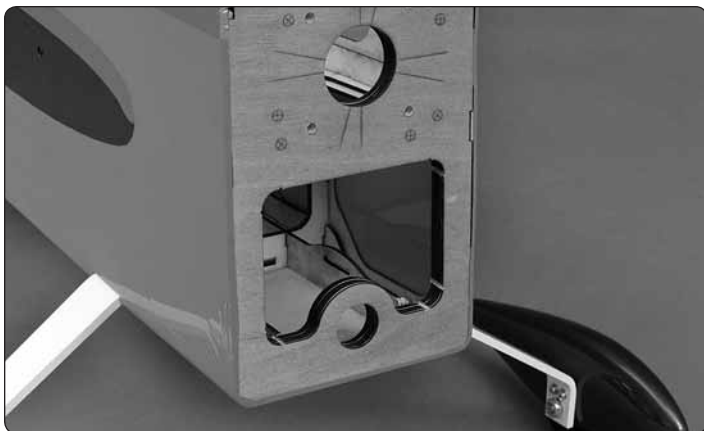


- ❑ 3. Glue eight pieces of triangle stock between the front plate and the sides and the back plate and the sides using epoxy.



- ❑ 4. Drill the firewall.





- ❑ 5. Open the cooling hole. Use a small drill bit to drill out each tab.



- ❑ 7. Attach the motor box to the firewall.



- ❑ 8. Install the RimFire 1.60 motor.



- ❑ 9. Install the forward battery hatch in the fuselage.

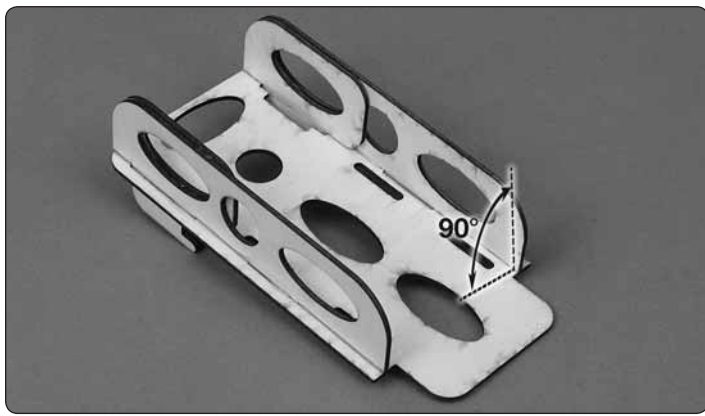


- ❑ 10. Mount the ESC. Connect the wires from the ESC to the motor wires. Plug the ESC into the receiver.

### ***Assemble the Removable Battery Tray***

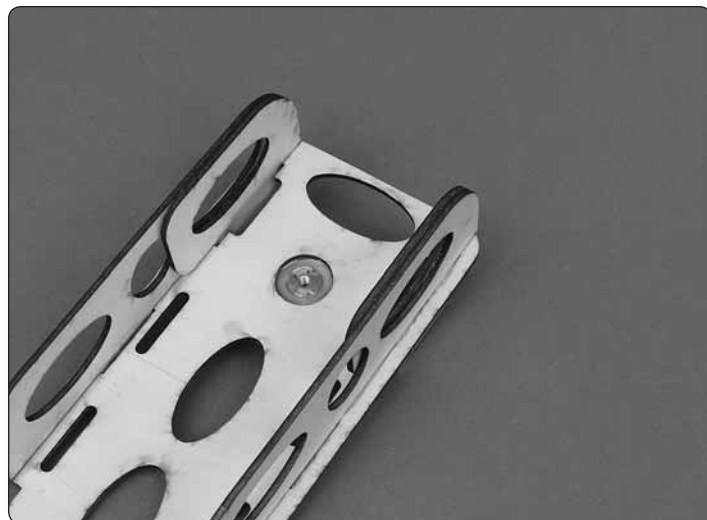


- ❑ 1. Use epoxy to glue the doublers to the sides.

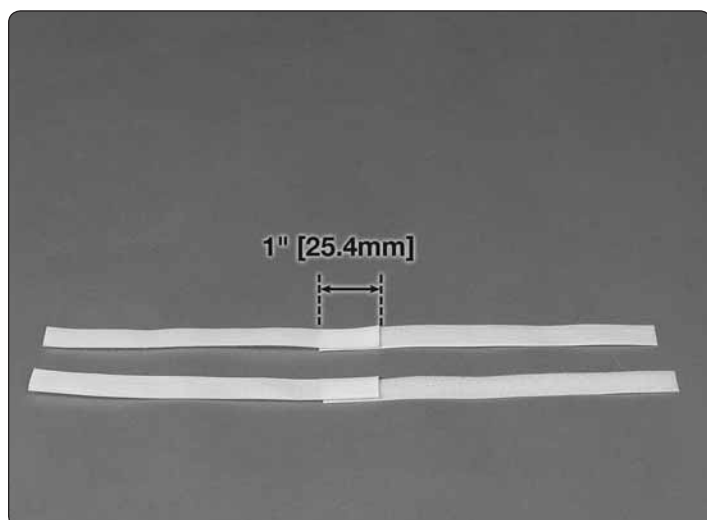
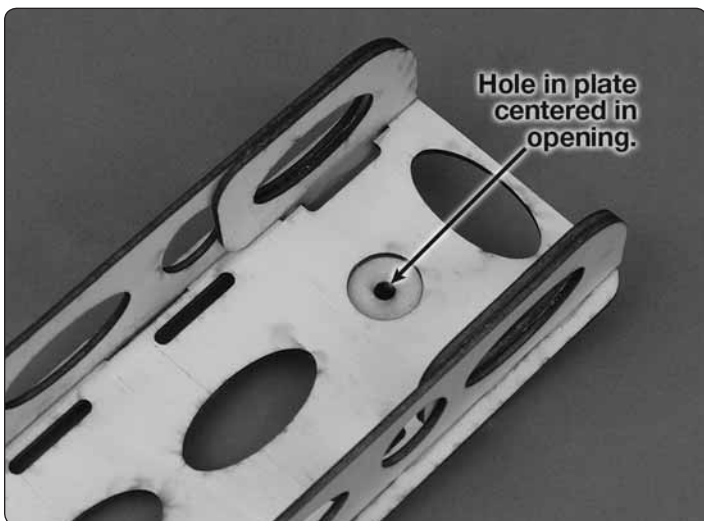


- ❑ 2. Glue the sides to the battery tray.

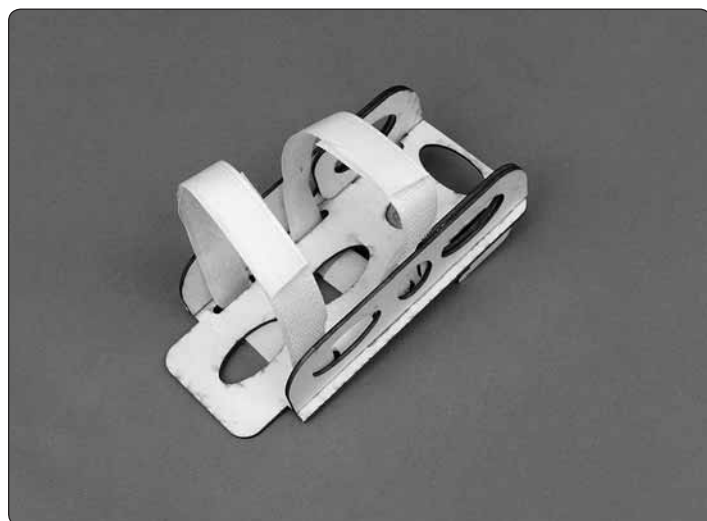




❑ 4. Securely glue the 4 x .7mm blind nut in the plate.

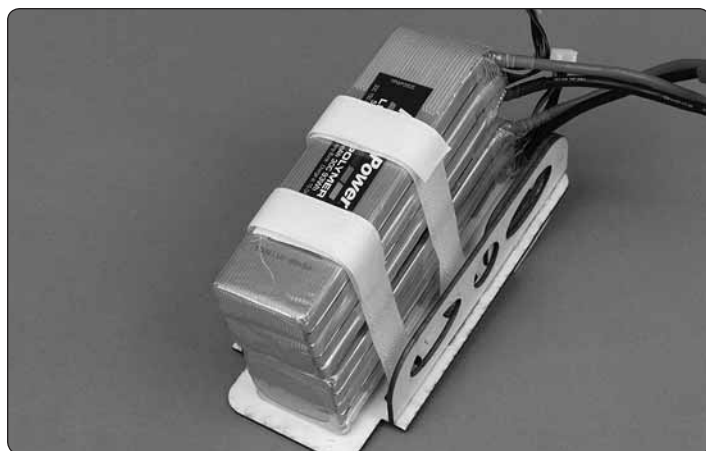


❑ 5. Make two battery straps from the supplied hook and loop material.

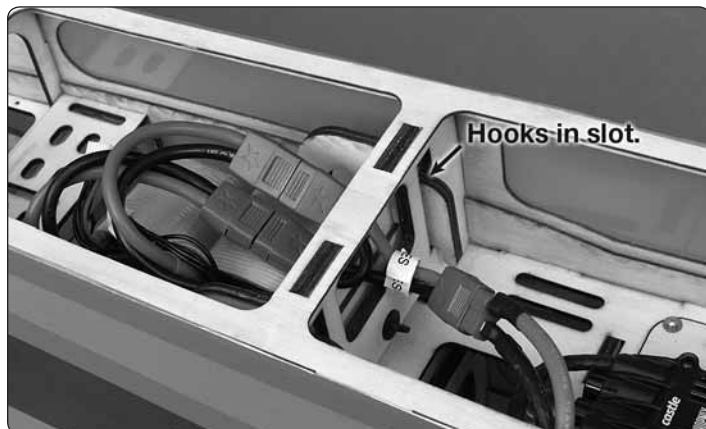
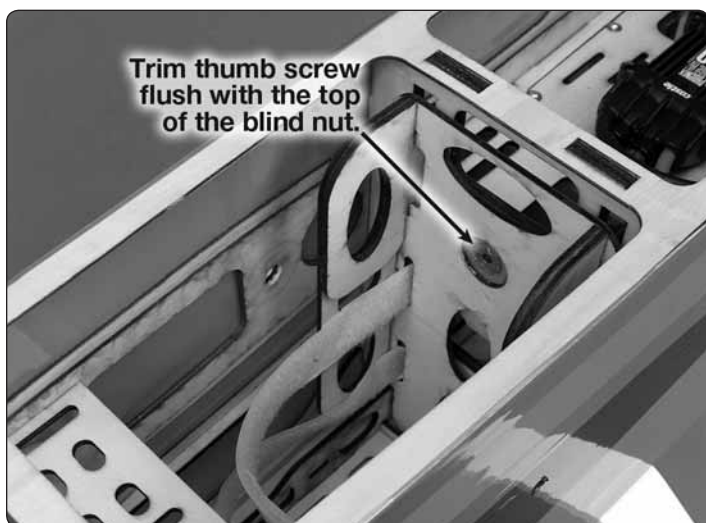


❑ 6. Install the battery straps on the battery tray.

❑ 3. Glue the plate to the back of the battery tray. Before the epoxy cures, insert the battery tray in the fuselage and check that the holes line up.

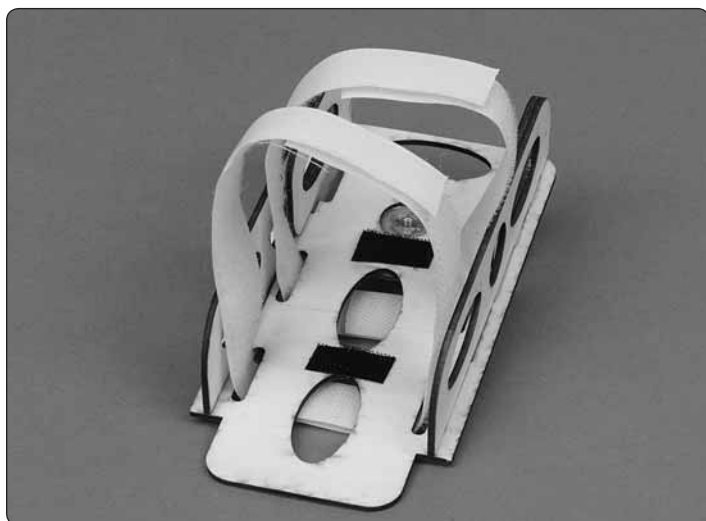


❑ 9. Secure the flight batteries on the battery tray.

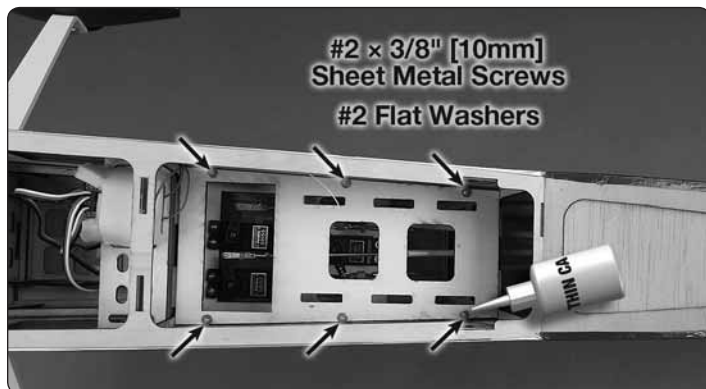


❑ 10. Secure the battery tray in the fuselage.

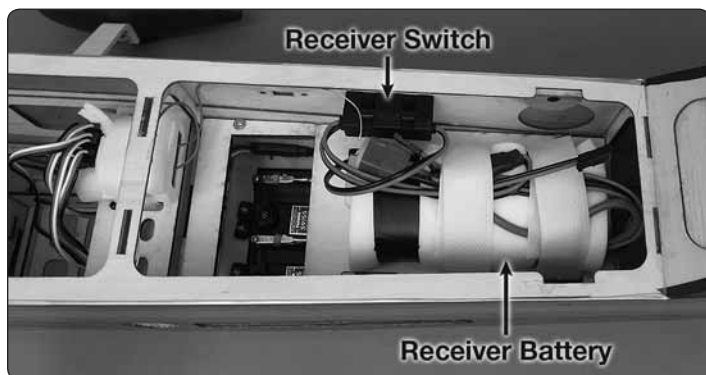
❑ 7. Test fit the battery tray in the fuselage.



❑ 8. Apply a couple of pieces of adhesive backed Velcro (not included) to the battery tray and the opposite side to the battery.



❑ 11. Install the receiver battery tray.



❑ 12. Make two straps from the remaining hook and loop material. Install the receiver battery and receiver switch.



❑ 13. Switch on the transmitter and temporarily plug in the receiver battery. Connect the motor batteries to the ESC and check the rotation direction of the motor. **WARNING!** Make sure the propeller is **NOT** installed.

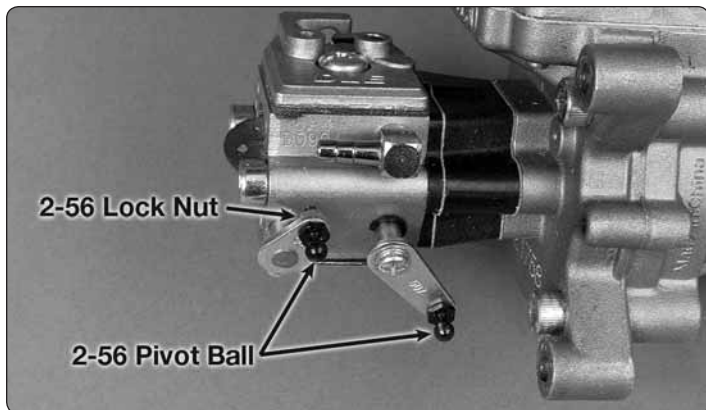
❑ 14. Disconnect the motor batteries, receiver battery and switch off the transmitter.

**Proceed to Install the Cowl (page 25).**

## Gas Engine Installation



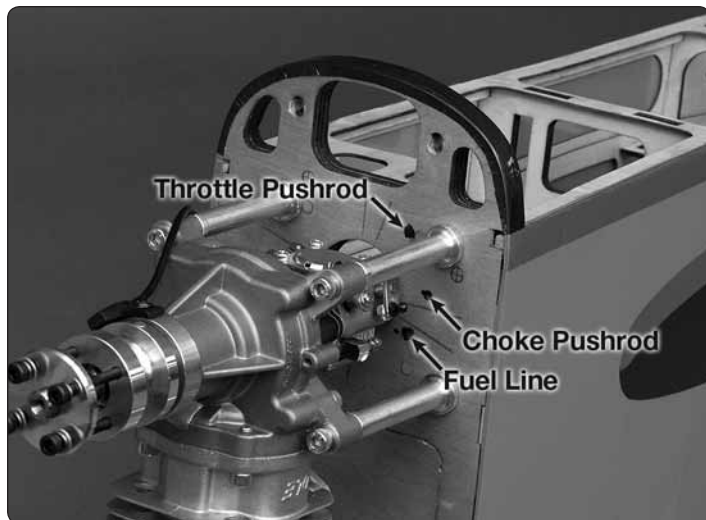
❑ 1. Using a 13/64" bit, drill the firewall for your engine. The DLE30 and O.S. GT33 are rotated 17 degrees so that the muffler remains inside the cowl.



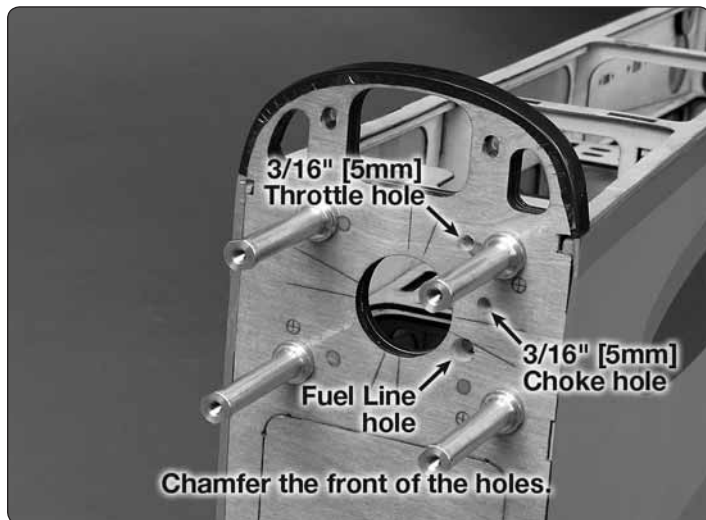
❑ 2. Install the pivot ball on the throttle and choke arm.



❑ 3. Temporarily mount the engine.



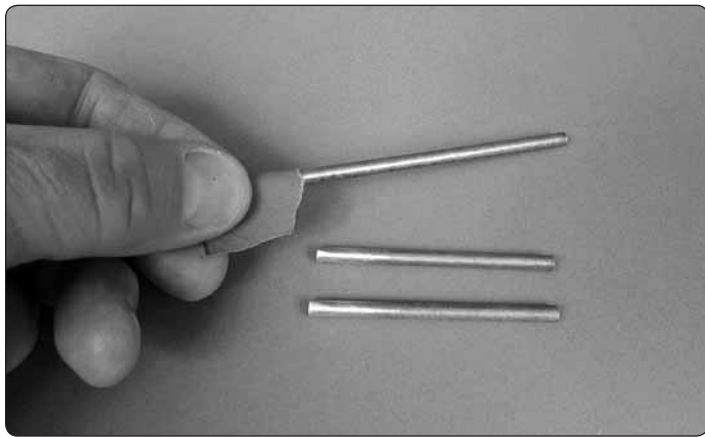
❑ 4. Mark the fuel line, throttle and optional choke pushrod locations on the firewall. The choke can also be operated manually through the front of the cowl.



❑ 5. Drill the firewall for the throttle, optional choke and fuel line.

❑ 6. Reinstall the engine. Use threadlocker on all the bolts.

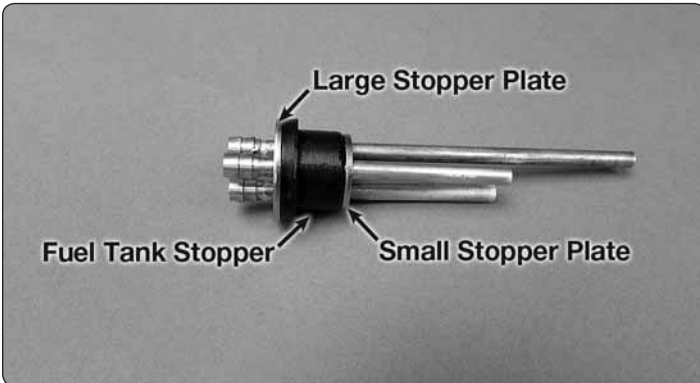
## Assemble the Fuel Tank



❑ 1. Roughen both ends of the brass tubes with sandpaper.



❑ 2. Solder fuel line barbs onto one end of the brass tubes.



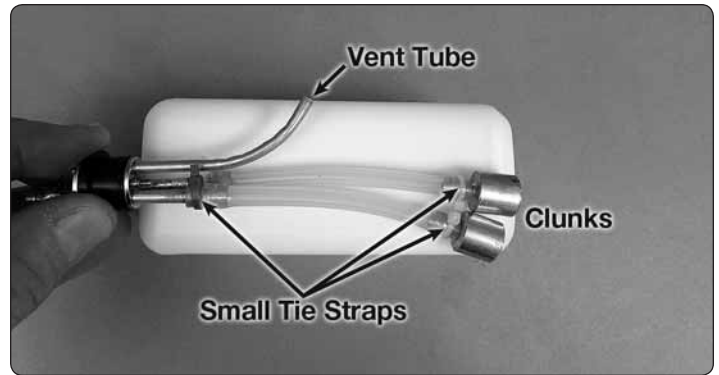
❑ 3. Insert the brass tubes in the fuel tank stopper and stopper plates. Loosely install the fuel tank stopper screw.



❑ 4. Solder the barbs on the other end of the two shorter brass tubes.



❑ 5. Carefully bend the vent line.



❑ 6. Install the two fuel pickup lines.

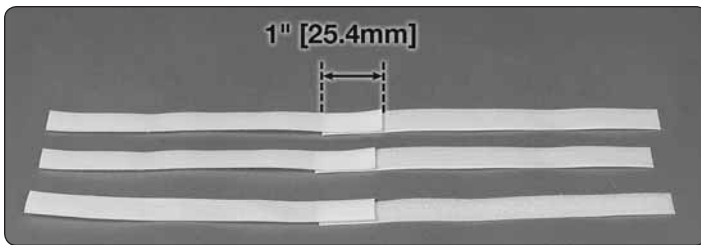


❑ 7. Slide the aluminum ring over the fuel tank neck.

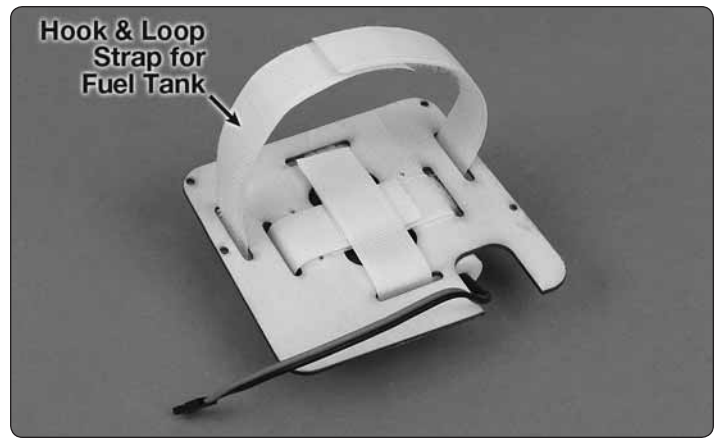


❑ 9. Secure the fuel tank stopper in the fuel tank. Mark the top of the tank.





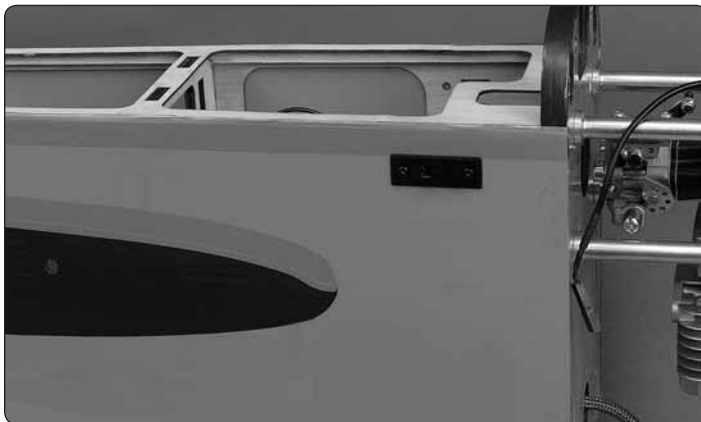
□ 10. Make three straps from the hook and loop material.



□ 11. Wrap the ignition module in foam and secure it to the bottom of the fuselage with a hook and loop strap.



□ 14. Install the forward battery hatch in the fuselage.



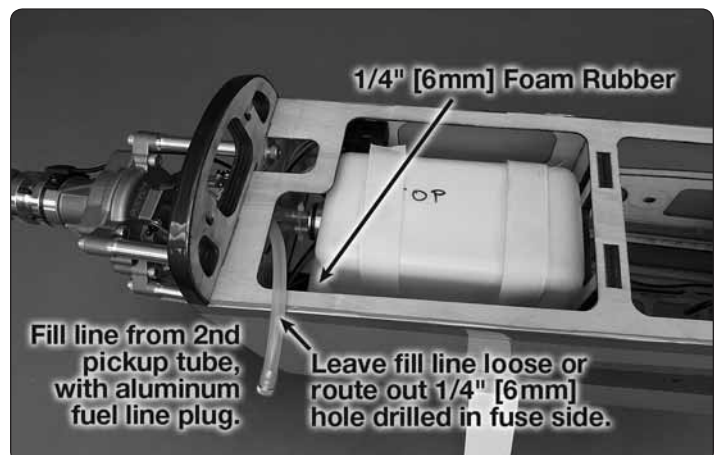
□ 12. Install the ignition switch. An ignition battery charge receptacle can also be installed.



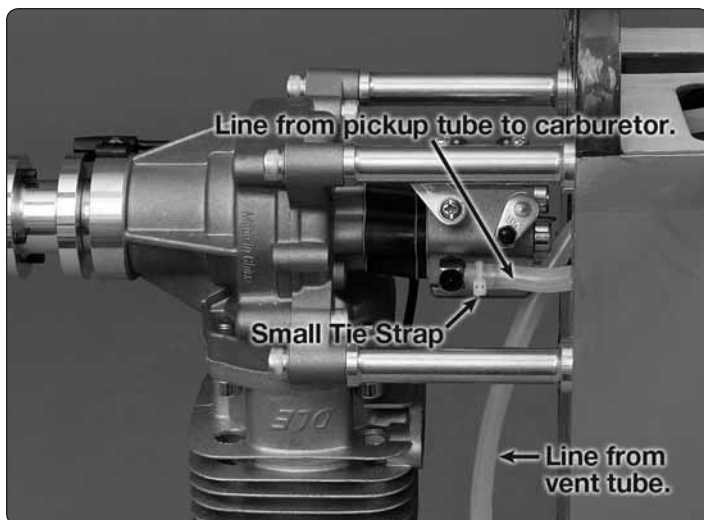
□ 15. Install the fuel line.



□ 13. Wrap the ignition battery in foam and secure to the bottom of the forward battery hatch.

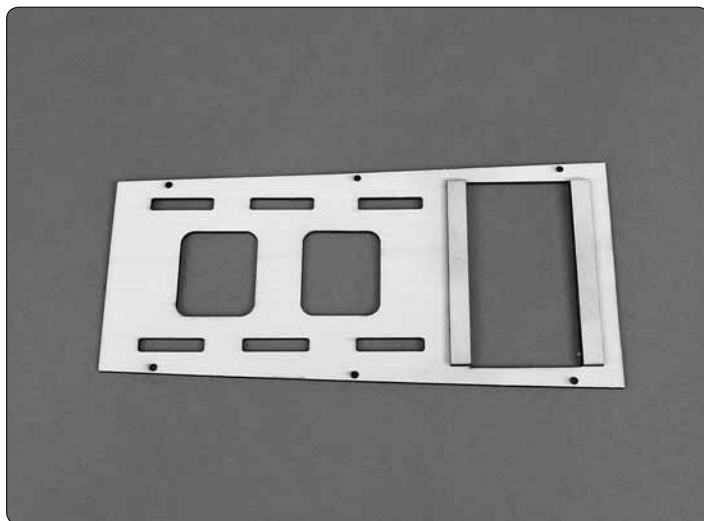


□ 16. Secure the fuel tank in the fuselage.



- ❑ 17. Attach the line from the pickup tube to the carburetor.

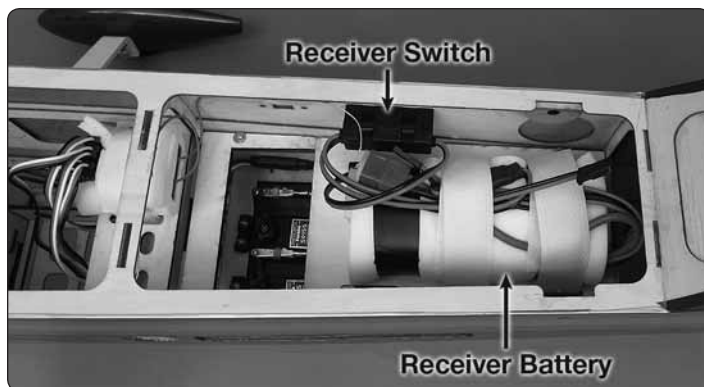
### ***Install the Throttle and Optional Choke Servos***



- ❑ 1. Glue the two plywood doublers to the bottom of the throttle servo tray.



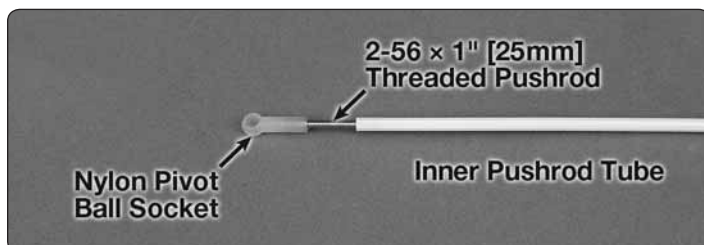
- ❑ 2. Install the throttle servo tray.



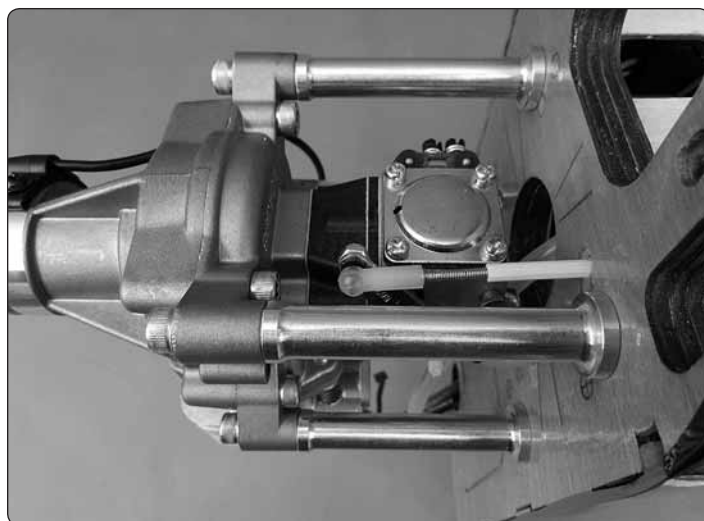
- ❑ 3. Make two straps from the remaining hook and loop material. Install the receiver battery and receiver switch.



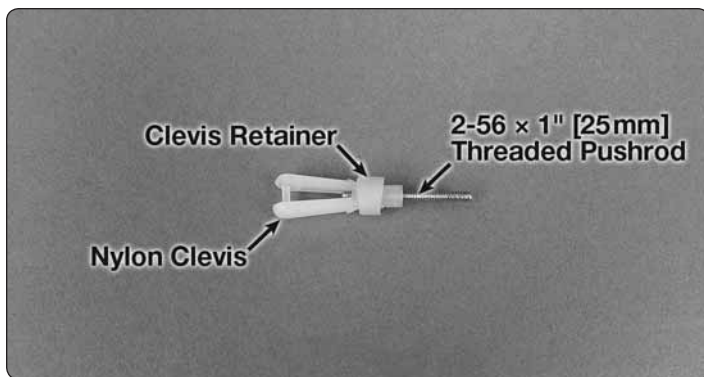
- ❑ 4. Install the throttle and optional choke servo and plug them into the receiver.



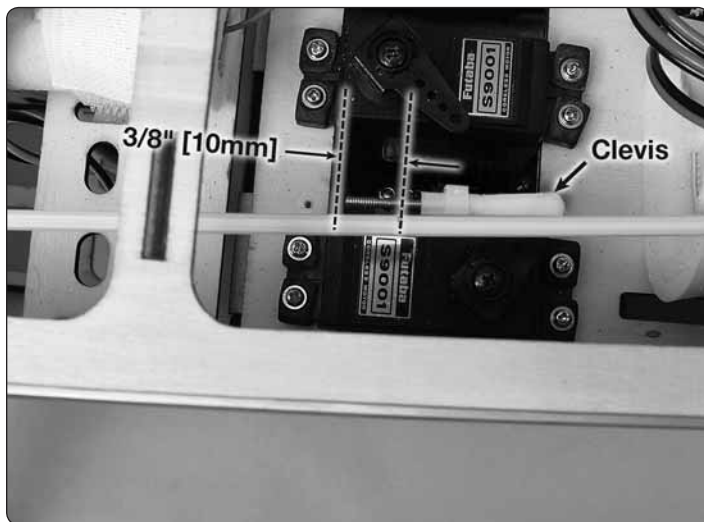
- ❑ 5. Assemble the throttle pushrod.



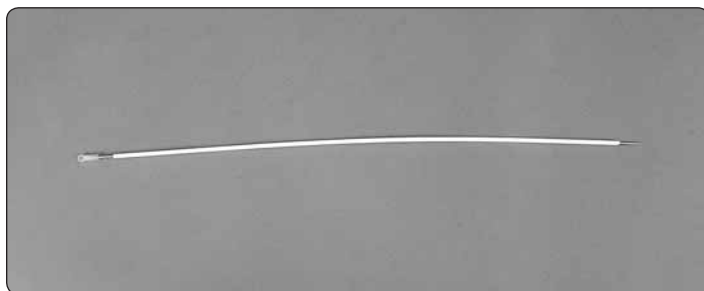
- ❑ 6. Install the throttle pushrod.



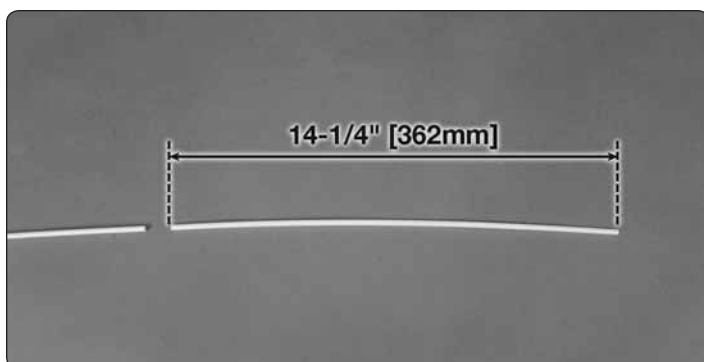
❑ 7. Assemble the throttle clevis.



❑ 8. Install the clevis on the throttle servo.

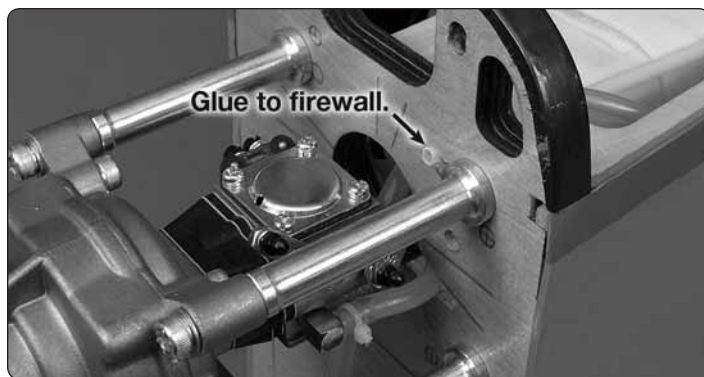


❑ 9. Attach the 2-56 x 1" [25mm] threaded rod to the throttle pushrod. It is easier to remove the pushrod from the throttle to install the threaded rod.



❑ 10. Cut the outer pushrod tube.

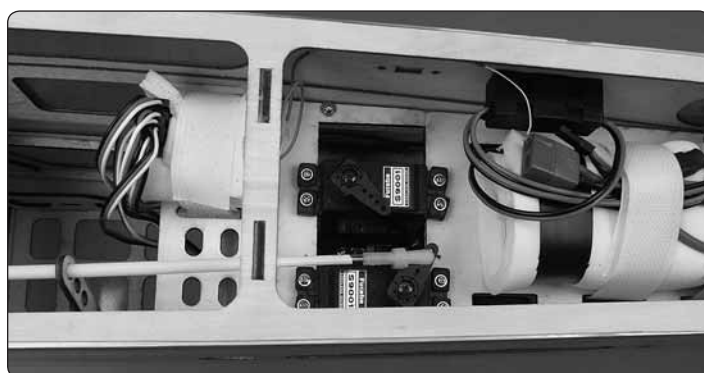
❑ 11. Roughen the outer pushrod tube with sandpaper.



❑ 12. Install the outer pushrod tube.



❑ 13. Slide a plywood outer pushrod support onto the outer pushrod. Do not glue it yet.



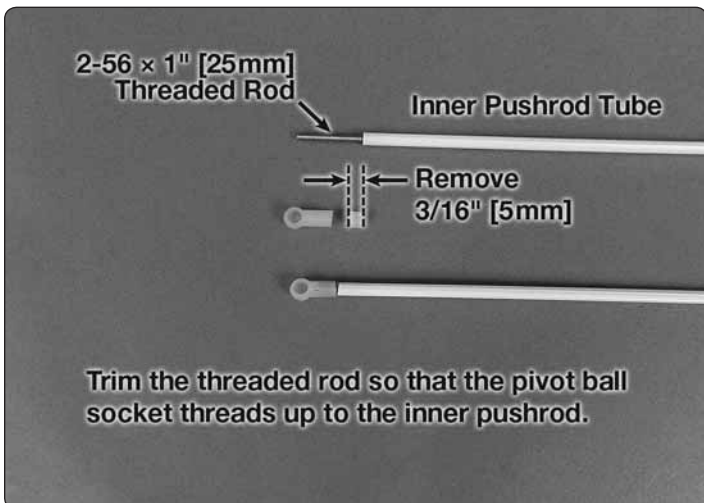
❑ 14. Reinstall the nylon clevis and connect it to the throttle servo arm. Adjust the clevis so that the throttle opens and



closes smoothly. We recommend that a throttle cutoff also be set up on the transmitter to close the throttle completely, stopping the engine.

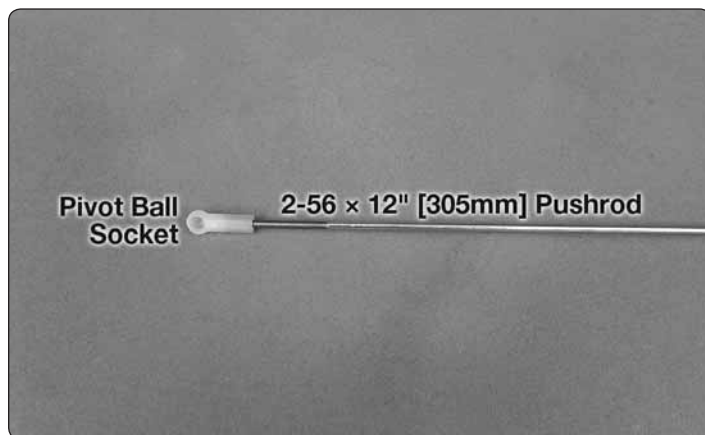


- ❑ 15. Glue the outer pushrod support to the outer pushrod and the fuselage.

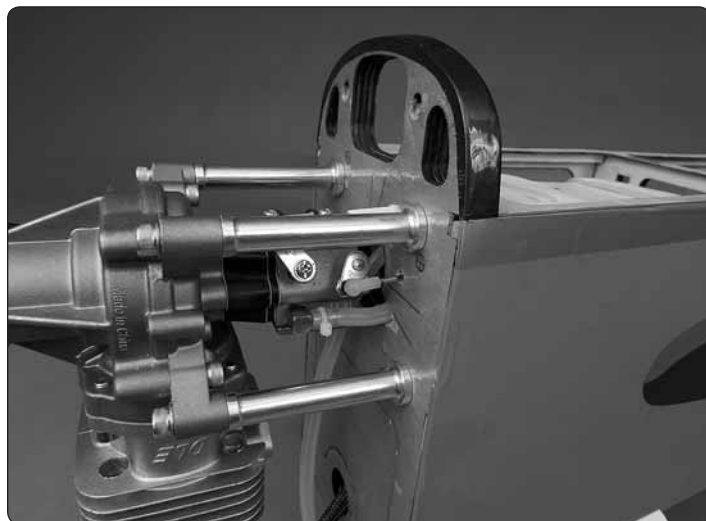


- ❑ 16. The optional choke pushrod is installed following the same procedure except the end of the pushrod with the pivot ball socket is modified.

## Choke Option #2



- ❑ 1. Install the pivot ball socket.



- ❑ 2. Install the choke pushrod.



### Choke Option #3



- ☐ 1. Insert the choke pushrod.



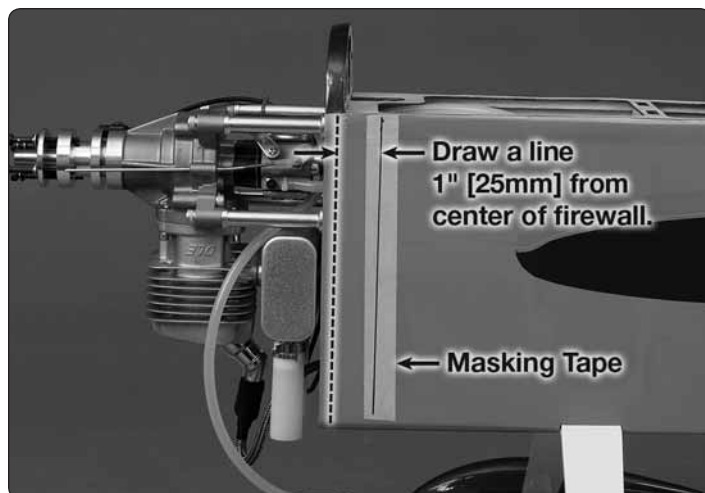
- ☐ 2. Install the pivot ball socket.

### *Install the Cowl*

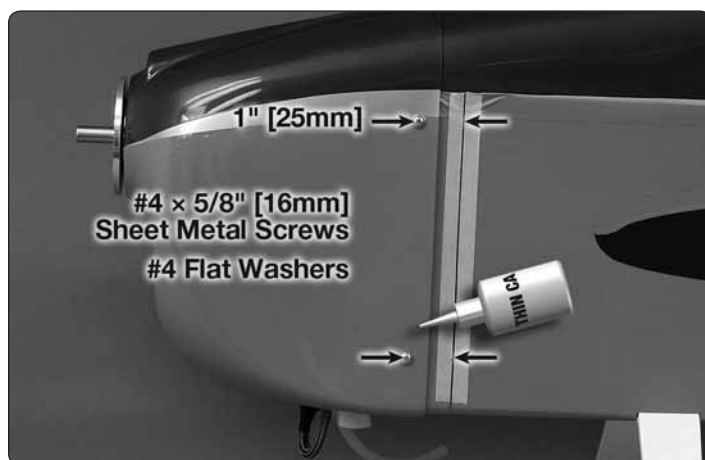
For the electric installation, skip to step 2.



- ☐ 1. Trim the cowl as shown to clear the muffler exhaust pipes and provide enough cooling air exit.



- ☐ 2. Position the cowl.



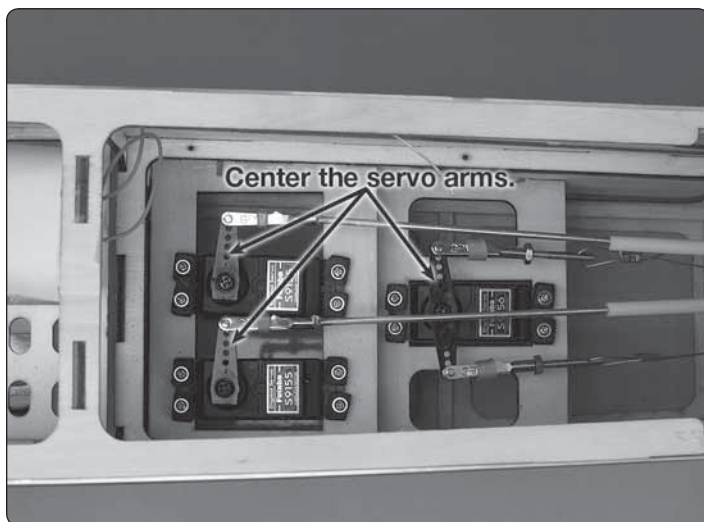
- ☐ 3. Attach the cowl.

## Apply the Decals

1. The decals are die-cut from the factory.
2. Be certain the model is clean and free from oily fingerprints and dust. Prepare a dishpan or small bucket with a mixture of liquid dish soap and warm water – about 1/2 teaspoon of soap per gallon of water. Submerge one of the decals in the solution and peel off the paper backing. **Note:** Even though the decals have a "sticky-back" and are not the water transfer type, submersing them in soap and water allows accurate positioning and reduces air bubbles underneath.
3. Position the decal on the model where desired. Holding the decal down, use a paper towel to wipe most of the water away.
4. Use a piece of soft balsa or something similar to squeegee the remaining water from under the decal. Apply the rest of the decals using the same method.

## GET THE MODEL READY TO FLY

### Check the Control Throws

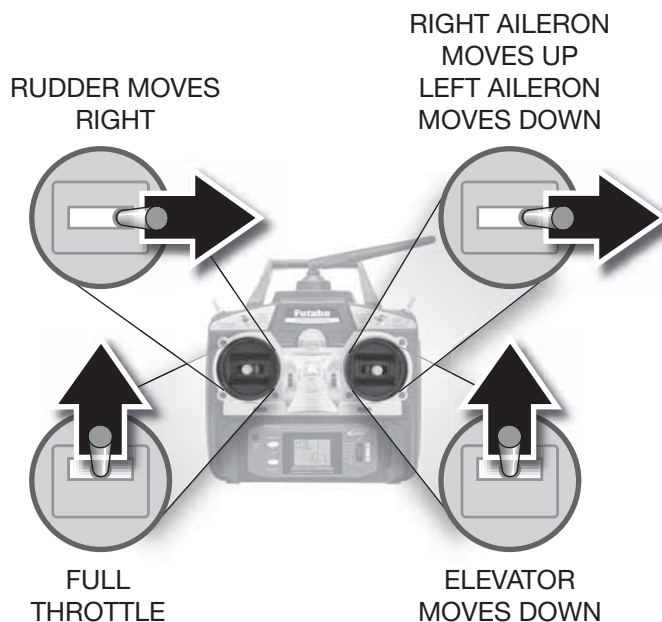


1. Switch on the transmitter and receiver.



2. Center the control surfaces.

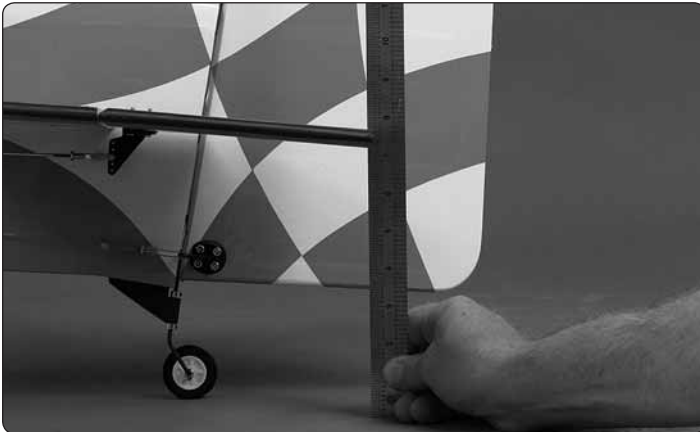
### 4-CHANNEL RADIO SETUP (STANDARD MODE 2)



3. Make certain that the control surfaces and the carburetor/motor respond in the correct direction as shown in the diagram. If any of the controls respond in the wrong direction, use the servo reversing in the transmitter to reverse the servos connected to those controls. Be certain the control surfaces have remained centered. Adjust if necessary.

## Set the Control Throws

- ❑ 1. Hold a ruler against the widest part of the control surface and measure the high rate throw first.



- ❑ 2. Adjust the location of the pushrod on the servo arm or on the control horn first. Then, use the endpoint adjustment in your transmitter to fine tune the throws.

- ❑ 3. Measure and set the **low rate** throws. Measure and set the high and low rate throws for the rest of the control surfaces the same way.

These are the recommended control surface throws:

	LOW RATE	HIGH RATE	3D RATE
ELEVATOR	Up & Down 3/4" [19mm] 6°	Up & Down 1-1/8" [29mm] 9°	Up & Down 4-1/4" [108mm] 37°
RUDDER	Right & Left 1-5/8" [41mm] 11°	Right & Left 2-3/8" [60mm] 16°	Right & Left 4-1/2" [114mm] 31°
AILERONS	Up & Down 3/4" [19mm] 9°	Up & Down 1-1/8" [29mm] 13°	Up & Down 1-7/8" [47mm] 23°

If your radio does not have the ability to set three throw rates, we recommend setting the throws at the low and high rate settings for the first flight.

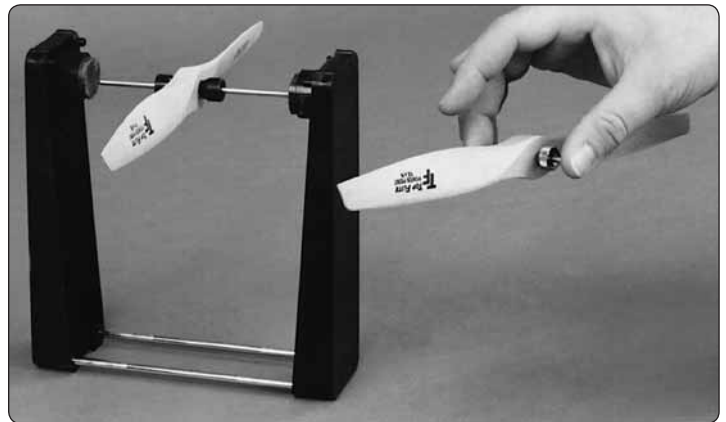


- ❑ 4. Once the throws are set, apply a drop of threadlocker to the threads and tighten the 4-40 nuts against the clevises. Slide the silicone retainers over the clevises.

### IMPORTANT! IMPORTANT! IMPORTANT!

Now that you have the throws set, be sure to set the failsafe on the radio.

## Install the Propeller



- ❑ 1. Balance the propeller.



- ❑ 2. Install the propeller. Drill holes through the propeller if necessary.

**NOTE:** Enlarge the hole in the spinner backplate to 25/64" [10mm] for the adapter ring used on the O.S. GT33 engine.





Install the spinner cone.

**ELECTRIC ONLY:** Install the spinner adapter (GPMQ4589) before installing the spinner cone.



❑ 4. Install the canopy.

### ***Balance the Model Laterally***

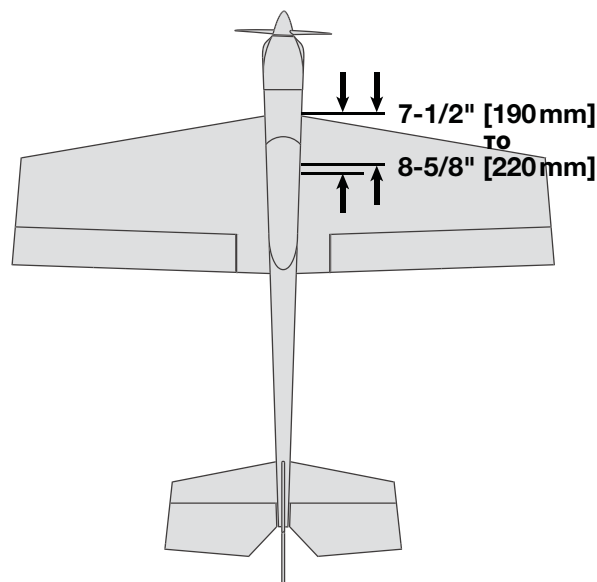
**ELECTRIC ONLY:** Install the flight batteries, but **do not plug the batteries into the ESC.**

❑ 1. With the wing level, have an assistant help you lift the model by the engine propeller shaft and the bottom of the fuse under the TE of the fin. Do this several times.

❑ 2. If one wing always drops when you lift the model, it means that side is heavy. Balance the airplane by adding weight to the other wing tip. **An airplane that has been laterally balanced will track better in loops and other maneuvers.**

### ***Balance the Model (C.G.)***

**DO NOT OVERLOOK THIS IMPORTANT PROCEDURE.** A model that is not properly balanced may be unstable and possibly unflyable.



❑ 1. Mark the C.G location.



❑ 2. With the plane **ready to fly**, with an empty fuel tank or motor batteries installed, use a Great Planes C.G. Machine or apply narrow (1/16" [2mm]) strips of tape at the front and rear C.G. locations so you will be able to feel them when lifting the model with your fingers to check the C.G. location. **Do not at any time balance the model outside this C.G. range.**

❑ 3. Use Great Planes "stick on" weight (GPMQ4485) to balance the plane. Place incrementally increasing amounts of weight on the bottom of the fuselage over the location where it would be mounted inside until the model balances. A good place to add stick-on nose weight is to the firewall. Do not attach weight to the cowl—this will cause stress on the cowl and could cause the cowl to crack at the screw holes. Once you have determined if additional weight needs to be installed, permanently attach the weight with glue or screws.

❑ 4. **IMPORTANT:** If you found it necessary to add any weight, recheck the C.G. after the weight has been installed.

## PREFLIGHT

### Identify Your Model

You should always have your name, address, telephone number and AMA number on or inside your model. It is **required** at all AMA R/C club flying sites and AMA sanctioned flying events. Fill out the identification tag on page 32 and place it on or inside your model. You must also have your FAA number on your plane and accessible without any tools.

### Charge the Batteries

Always charge your transmitter and receiver batteries the night before you go flying, and at other times as recommended by the radio manufacturer.

**CAUTION:** Unless the instructions that came with your radio system state differently, the **initial** charge on **new** transmitter and receiver batteries should be done for 15 hours **using the slow-charger that came with the radio system**. This will “condition” the batteries so that the next charge may be done using the fast-charger of your choice. If the initial charge is done with a fast-charger the batteries may not reach their full capacity and you may be flying with batteries that are only partially charged.

### Ground Check and Range Check

Make sure the engine idles reliably, transitions smoothly and maintains full power indefinitely. Shut the engine off and inspect the model closely, making sure all fasteners, pushrods and connections have remained tight and the hinges are secure. Following the radio manufacturer’s instructions to ground check the operational range of your radio, before the first flight of the day. This should be done once with the engine off and once with the engine running at various speeds. If the control surfaces do not respond correctly, **do not fly!** Find and correct the problem first. Look for loose servo connections or broken wires, corroded wires on old servo connectors, poor solder joints in your battery pack or a defective battery cell.

## ENGINE SAFETY PRECAUTIONS

**Failure to follow these safety precautions may result in severe injury to yourself and others.**

- Keep all engine fuel in a safe place, away from high heat, sparks or flames, as fuel is very flammable. Do not smoke near the engine or fuel; and remember that engine exhaust gives off a great deal of deadly carbon monoxide. Therefore **do not run the engine in a closed room or garage.**
- Get help from an experienced pilot when learning to operate engines.
- Use safety glasses when starting or running engines.
- Use a “chicken stick” or electric starter to start the engine. If you do flip the propeller with your fingers, wear a heavy leather glove, such as a welder’s glove. When hand starting

gas engines, if the engine should backfire, the large prop can cause severe injury to your hand and fingers.

- Do not run the engine in an area of loose gravel or sand; the propeller may throw such material in your face or eyes.
- Keep your face and body as well as all spectators away from the plane of rotation of the propeller as you start and run the engine.
- Keep these items away from the prop: loose clothing, shirt sleeves, ties, scarfs, long hair or loose objects such as pencils or screwdrivers that may fall out of shirt or jacket pockets into the prop.
- Stop the engine before making any engine adjustments.
- The engine and muffler get hot! Do not touch them during or right after operation. Make sure fuel lines are in good condition so fuel will not leak onto a hot engine, causing a fire.
- To stop a gasoline powered engine an on/off switch must be connected to the engine ignition. Do not throw anything into the propeller of a running engine.

## ELECTRIC MOTOR SAFETY PRECAUTIONS

- The motor gets HOT! Do not touch it during or right after operation.
- When working on your plane, remove the propeller if the motor batteries will be connected.
- Always remove the motor batteries when charging.
- Follow the charging instructions included with your charger for charging LiPo batteries. LiPo batteries can cause serious damage if misused.
- Once the motor batteries are connected the electric motor can start at any time. Make sure the fail safe is set on your radio to prevent the motor from starting if the signal is lost.
- **ALWAYS** unplug the motor batteries first.
- **NEVER** switch off the transmitter with the motor batteries plugged in.

**WARNING:** Read the entire instruction sheet included with your motor batteries. Failure to follow the instructions could cause permanent damage to the battery and its surroundings and cause bodily harm!

- **ONLY** use a LiPo approved charger.
- **NEVER** use a NiCd/NiMH peak charger to charge a LiPo battery.
- **NEVER** charge in excess of 4.20v per cell unless the battery is rated for a higher voltage.
- **ONLY** charge through the “charge” lead.
- **NEVER** charge through the “discharge” lead.
- **NEVER** charge at currents greater than 1C unless the battery is rated for a higher charge rate.
- **ALWAYS** set the charger’s output volts to match the battery volts.
- **ALWAYS** charge a LiPo battery in a fireproof location.
- **NEVER** trickle charge a LiPo battery.
- **NEVER** allow the battery temperature to exceed 150° F (65° C).

- **NEVER** disassemble or modify the pack wiring in any way or puncture the cells.
- **NEVER** discharge below 2.7V per cell.
- **NEVER** place the battery or charger on combustible materials or leave it unattended during charge or discharge.
- **ALWAYS** KEEP OUT OF THE REACH OF CHILDREN.
- **NEVER** charge the batteries in the plane.
- **ALWAYS** remove the batteries from the plane after a crash. Set them aside in a safe location for at least 20 minutes. If the batteries are damaged in the crash they could catch fire.
- If the battery starts to swell, quickly move the battery to a safe location, preferably outside. Place it in a bucket, covering the battery with sand. Never use water to try and put out a LiPo fire.

## AMA SAFETY CODE (EXCERPTS)

Read and abide by the following excerpts from the Academy of Model Aeronautics Safety Code. For the complete Safety Code refer to *Model Aviation* magazine, the AMA web site or the Code that came with your AMA license.

### General

- 1) I will not fly my model aircraft in sanctioned events, air shows, or model flying demonstrations until it has been proven to be airworthy by having been previously, successfully flight tested.
- 2) I will not fly my model aircraft higher than approximately 400 feet within 3 miles of an airport without notifying the airport operator. I will give right-of-way and avoid flying in the proximity of full-scale aircraft. Where necessary, an observer shall be utilized to supervise flying to avoid having models fly in the proximity of full-scale aircraft.
- 3) Where established, I will abide by the safety rules for the flying site I use, and I will not willfully and deliberately fly my models in a careless, reckless and/or dangerous manner.
- 5) I will not fly my model unless it is identified with my name and address or AMA number, on or in the model. Note: This does not apply to models while being flown indoors.
- 7) I will not operate models with pyrotechnics (any device that explodes, burns, or propels a projectile of any kind).

### Radio Control

- 1) I will have completed a successful radio equipment ground check before the first flight of a new or repaired model.
- 2) I will not fly my model aircraft in the presence of spectators until I become a qualified flier, unless assisted by an experienced helper.
- 3) At all flying sites a straight or curved line(s) must be established in front of which all flying takes place with the other side for spectators. Only personnel involved with flying the aircraft are allowed at or in the front of the flight line. Intentional flying behind the flight line is prohibited.
- 4) I will operate my model using only radio control frequencies currently allowed by the Federal Communications Commission.

5) I will not knowingly operate my model within three miles of any pre-existing flying site except in accordance with the frequency sharing agreement listed [in the complete AMA Safety Code].

9) Under no circumstances may a pilot or other person touch a powered model in flight; **nor should any part of the model other than the landing gear, intentionally touch the ground, except while landing.**

## FLYING

The Factor 30cc ARF is a great-flying sport/3D model that flies smoothly and predictably. However, it does not possess the self-recovery characteristics of a primary R/C trainer and should be flown only by experienced R/C pilots.

### Fuel Mixture Adjustments

A fully cowed engine may run at a higher temperature than an un-cowed engine. For this reason, the fuel mixture should be richened so the engine runs at about 200 rpm below peak speed. By running the engine slightly rich, you will help prevent dead-stick landings caused by overheating.

**CAUTION** (THIS APPLIES TO ALL R/C AIRPLANES): If, while flying, you notice an alarming or unusual sound such as a low-pitched “buzz,” this may indicate control surface **flutter**. Flutter occurs when a control surface (such as an aileron or elevator) or a flying surface (such as a wing or stab) rapidly vibrates up and down (thus causing the noise). In extreme cases, if not detected immediately, flutter can actually cause the control surface to detach or the flying surface to fail, thus causing loss of control followed by an impending crash. If flutter is detected, slow the model **immediately** and land as soon as safely possible. Identify which surface fluttered (so the problem may be resolved) by checking all the servo grommets for deterioration or signs of vibration. Make certain all pushrod linkages are secure and free of play. If it fluttered once, under similar circumstances it will probably flutter again unless the problem is fixed. Some things which can cause flutter are; Excessive hinge gap; Not mounting control horns solidly; Poor fit of clevis pin in horn; Side-play of wire pushrods caused by large bends; Excessive free play in servo gears; Insecure servo mounting; and one of the most prevalent causes of flutter; Flying an over-powered model at excessive speeds.

### Takeoff

Before taking off, see how the model handles on the ground by doing a few practice runs at **low speeds** on the runway. Hold “up” elevator to keep the tail wheel on the ground. If necessary, adjust the tail wheel so the model will roll straight down the runway.

Remember to takeoff into the wind. When you’re ready, set your control rates to high (not 3D) and point the model straight down the runway. Hold a bit of up elevator to keep the tail on the ground to maintain tail wheel steering, and then gradually advance the throttle. As the model gains speed, decrease up elevator, allowing the tail to come off the ground. One of the



most important things to remember with a tail dragger is to always be ready to apply **right** rudder to counteract engine torque. Gain as much speed as your runway and flying site will practically allow before gently applying up elevator, lifting the model into the air. At this moment it is likely that you will need to apply more right rudder to counteract engine torque. Be smooth on the elevator stick, allowing the model to establish a **gentle** climb to a safe altitude before turning into the traffic pattern.

## ***Flight***

It is a good idea to have an assistant on the flight line with you to keep an eye on other traffic. Take it easy with the Factor 30cc ARF for the first few flights, gradually getting acquainted with it as you gain confidence. Adjust the trims to maintain straight and level flight. After flying around for a while, and while still at a safe altitude with plenty of fuel, practice slow flight and execute practice landing approaches by reducing the throttle to see how the model handles at slower speeds. Add power to see how she climbs as well. Continue to fly around, executing various maneuvers and making mental notes of what trim or C.G. changes may be required to fine tune the model so it flies the way you like. Mind your fuel level, but use this first flight to become familiar with your model before landing.

## ***Landing***

The Factor 30cc is easy to land. We recommend landing on high rate throws. To initiate a landing approach, lower the throttle while on the downwind leg. Continue to lose altitude, but maintain airspeed by keeping the nose down as you turn onto the crosswind leg. Make your final turn toward the runway (into the wind) keeping the nose down to maintain airspeed and control. Level the attitude when the model reaches the runway threshold, modulating the throttle as necessary to maintain your glide path and airspeed. If you are going to overshoot, smoothly advance the throttle (always ready on the right rudder to counteract torque). Climb out to make another attempt. When the model is a foot or so off the deck, smoothly increase up elevator until it gently touches down. Once the model is on the runway and has lost flying speed, hold up elevator to place the tail on the ground, regaining tail wheel control.

**Final note:** Have a goal or flight plan in mind each time you fly. This may be learning or improving a maneuver or learning how the model behaves at certain speeds and control rates. Every maneuver should be deliberate, not impulsive. A flight plan reduces the chances of crashing your model because of poor planning and impulsive moves.

***Have a ball! But always stay in control and fly in a safe manner.***

**GOOD LUCK AND GREAT FLYING!**

***Tape to the underside of the canopy:***

	LOW RATE		HIGH RATE		3D RATE	
ELEVATOR	Up and Down	3/4" [19mm] 6°	Up and Down	1-1/8" [29mm] 9°	Up and Down	4-1/4" [108mm] 37°
RUDDER	Right & Left	1-5/8" [41mm] 11°	Right & Left	2-3/8" [60mm] 16°	Right & Left	4-1/2" [114mm] 31°
AILERONS	Up and Down	3/4" [19mm] 9°	Up and Down	1-1/8" [29mm] 13°	Up and Down	1-7/8" [47mm] 23°
C.G.	Forward 7-1/2" [190mm] from leading edge Aft 8-1/8" [220mm] from leading edge					
Receiver Battery: _____						
Ignition Battery: _____						
Motor Battery: _____						

***Tape inside your plane:***

This model belongs to: \_\_\_\_\_

\_\_\_\_\_ Name

\_\_\_\_\_ Address

\_\_\_\_\_ City, State, Zip

\_\_\_\_\_ Phone Number

\_\_\_\_\_ AMA Number

\_\_\_\_\_ FAA Number