

# EXTRA

## 300SP



## INSTRUCTION MANUAL

### SPECIFICATIONS

**Wingspan:** 50 in [1270 mm]

**Wing Area:** 478 in<sup>2</sup> [30.8 dm<sup>2</sup>]

**Radio:** 4 channel radio (minimum)

**Length:** 47.75 in [1215 mm]

**Wing** 16 – 19 oz/ft<sup>2</sup>

5 channel computer radio with mixing capabilities (for separate ailerons)

**Weight:** 3.5 – 4 lb [1590 – 1810 g]

**Loading:** [46 – 49 g/dm<sup>2</sup>]

**Motor:** RimFire 42-50-800

### 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.



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## INTRODUCTION

The full scale Extra 300SP is the choice of many airshow performers. The Extra 300SP is known for its tremendous power and ability to perform all-out aerobatics. Great Planes has taken the best qualities of the full scale aircraft and reduced it down to a lightweight, 50" electric powered ARF.

For the latest technical updates or manual corrections to the "Extra 300SP" visit the Great Planes web site at [www.greatplanes.com](http://www.greatplanes.com). Open the "Airplanes" link, and then select the "Extra 300SP" 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

We urge you to join the AMA (Academy of Model Aeronautics) and a local R/C club. The AMA is the governing body of model aviation and membership is required to fly at AMA clubs. Though joining the AMA provides many benefits, one of the primary reasons to join is liability protection. Coverage is not limited to flying at contests or on the club field. It even applies to flying at public demonstrations and air shows. Failure to comply with the Safety Code (excerpts printed in the back of the manual) may endanger insurance coverage. Additionally, training programs and instructors are available at AMA club

sites to help you get started the right way. There are over 2,500 AMA chartered clubs across the country. Contact the AMA at the address or toll-free phone number below:

#### Academy of Model Aeronautics

5151 East Memorial Drive  
Muncie, IN 47302-9252

Tele. (800) 435-9262  
Fax (765) 741-0057



Or via the Internet at: <http://www.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.

## SAFETY PRECAUTIONS

### Protect Your Model, Yourself & Others... Follow These Important Safety Precautions

1. Your "Extra 300SP EP" 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 "Extra 300SP EP," 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 first-class condition, and a correctly sized motor and components (fuel tank, wheels, etc.) throughout the building process.

5. You must correctly install all R/C and other components so that the model operates correctly on the ground and in the air.

6. You must check the operation of the model before **every** flight to insure that all equipment is operating and that the model has remained structurally sound. Be sure to check clevises or other connectors often and replace them if they show any signs of wear or fatigue.

7. 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.

8. **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 (wheel pant, cowl) 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 kit manufacturer, provide you with a top quality, thoroughly tested kit 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.

9. Never charge LiPo batteries unattended.

**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 "Extra 300SP EP" that may require planning or decision making before starting to build.

### Radio Equipment

A 4-channel radio system with four micro servos and micro receiver are required for this plane. The servos and receiver shown in the manual are Futaba® S3150 Slim Digital Servos and the Futaba 617FS FASST 2.4 GHz receiver. A lower priced alternative would be the Futaba 3115 Micro Precision Servo.

### Transmitter

- 4-channel radio (minimum)

**OR**

- 5-channel computer radio with mixing capabilities

### Receiver

- Futaba 617FS FASST 2.4 GHz receiver [FUTL7637]

### Servos

- (4) Futaba S3150 Slim Digital Servos [FUTM0303] [51.4 oz-in (3.7 kg-cm) of torque]

**OR**

- (4) Futaba S3115 Micro Precision Servos [FUTM0415] [38.9 oz-in (2.8 kg-cm) of torque]

### Connectors

- (1) "Y" harness [FUTM4135]
- (3) 16" [400mm] extension [FUTM4145]
- (1) 9" extension [FUTM3910]

### Motor Recommendations

The Extra 300SP EP ARF comes with a mounting box for the Great Planes RimFire brushless out-runner motor. The motor has been tested with this plane and works well.

- Great Planes RimFire .32 (42-50-800) Brushless Out-runner Motor [GPMG4700]

### ESC

A brushless ESC (electronic speed control) is required for the recommended motor set-up. We recommend using the:

- Great Planes Silver Series SS-45A Brushless ESC [GPMM1840]

### Flight Battery

We recommend the Great Planes ElectriFly LiPo 2200mAh 11.1V, 3200mAh 11.1V battery or FlightPower 2200mAh 11.1V and the 2550mAh 11.1V with an APC 13" × 8E propeller.

- Great Planes ElectriFly LiPo 2200mAh 11.1V 30C discharge w/balance plug [GPMP0861]
- Great Planes ElectriFly LiPo 3200mAh 11.1V 25C discharge w/balance plug [GPMP0871]
- FlightPower Pro50 LiPo 2200mAh 11.1V 50C (FPWP5000)
- FlightPower Pro50 LiPo 2550mAh 11.1V 50C (FPWP5040)
- APC 13" × 8E Propeller (APCQ3080)

For all out 3D type flying we recommend the Great Planes ElectriFly LiPo 4S 14.8V 2200mAh 30C (GPMP0862) battery with an APC 12 × 6E (APCQ 1260) propeller. A voltage regulator

will also be required to power the receiver. Be sure to follow the ESC instructions for using a separate power source (voltage regulator or receiver battery) for the receiver.

### 3D Set-Up

- Great Planes ElectriFly LiPo 4S 14.8V 2200mAh 30C discharge w/balance plug [GPMP0862]
- FlightPower LiPo Pro50 4S 14.8V 2550mAh 50C [FPWP5041]
- APC 12 × 6E Propeller (APCQ4130)
- ElectriFly Voltage Regulator (GPMM1920)
- Great Planes Parallel ESC Adapter Deans® Ultra Plug® Connector (GPMM3141)

### Optional Pilot

- Williams Brothers 1/4 Pilot Bust Kit Sportsman pilot (WBRG1160)

## ADDITIONAL ITEMS REQUIRED

### Required Adhesives & Building Supplies

This is the list of adhesives and building supplies required to finish the Extra 300SP EP. Order numbers are provided in parentheses.

- 1/2 oz. [15g] Thin Pro CA (GPMR6001)
- 1/2 oz. [15g] Medium Pro CA+ (GPMR6007)
- Pro 30-minute epoxy (GPMR6047)
- Denatured alcohol (for epoxy clean up)
- Drill bits: 1/16" [1.6mm], 5/64" [2mm], 3/32" [2.4mm]
- #1 Hobby knife (HCAR0105)
- #11 blades (5-pack, HCAR0211)
- Small T-pins (100, HCAR5100)

### Optional Supplies & Tools

Here is a list of optional tools mentioned in the manual that will help you build the Extra 300SP EP.

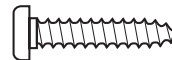
- 2 oz. [57g] spray CA activator (GPMR6035)
- CA applicator tips (HCAR3780)
- CA debonder (GPMR6039)
- Epoxy brushes (6, GPMR8060)
- Mixing sticks (50, GPMR8055)
- Mixing cups (GPMR8056)
- Threadlocker thread locking cement (GPMR6060)
- AccuThrow Deflection Gauge (GPMR2405)
- CG Machine™ (GPMR2400)
- 21<sup>st</sup> Century® sealing iron [COCR2700]
- 21<sup>st</sup> Century iron cover [COVR2702]

## IMPORTANT BUILDING NOTES

- There are three types of screws used in this kit:

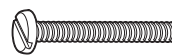
**Sheet Metal Screws** are designated by a number and a length. For example #6 × 3/4" [19mm].

*This is a number six screw that is 3/4" [19mm] long.*



**Machine Screws** are designated by a number, **threads per inch**, and a length. For example 4-40 × 3/4" [19mm].

*This is a number four screw that is 3/4" [19mm] long with forty threads per inch.*



- When you see the term **test fit** in the instructions, it means that you should first position the part on the assembly **without using any glue**, then slightly modify or *custom fit* the part as necessary for the best fit.
- Whenever the term **glue** is written you should rely upon your experience to decide what type of glue to use. When a specific type of adhesive works best for that step, the instructions will make a recommendation.
- We recommend 30-minute epoxy only, because you will need the working time or the additional strength.
- **Photos** and **sketches** are placed **before** the step they refer to. Frequently you can study photos in following steps to get another view of the same parts.
- The Extra 300SP EP is factory-covered with Top Flite MonoKote film. Should repairs ever be required, MonoKote can be patched with additional MonoKote purchased separately. MonoKote is packaged in six-foot rolls, but some hobby shops also sell it by the foot. If only a small piece of MonoKote is needed for a minor patch, perhaps a fellow modeler would give you some. MonoKote is applied with a model airplane covering iron, but in an emergency a regular iron could be used. A roll of MonoKote includes full instructions for application. Following are the colors used on this model and order numbers for six foot rolls.

TOPQ0203 - Yellow      TOPQ0202 - Orange  
TOPQ0221 - Royal Blue      TOPQ0201 - Missile Red

## KIT INSPECTION

Before starting to build, take an inventory of this kit to make sure it is complete, and 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 Kit Contents list.

### Great Planes Product Support

3002 N Apollo Drive, Suite 1      Ph: (217) 398-8970, ext. 5  
Champaign, IL 61822      Fax: (217) 398-7721

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

## ORDERING REPLACEMENT PARTS

Replacement parts for the Great Planes Extra 300SP EP 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.

To locate a hobby dealer, visit the Hobbico web site at [www.hobbico.com](http://www.hobbico.com). Choose "Where to Buy" at the bottom of the menu on the left side of the page. Follow the instructions provided on the page to locate a U.S., Canadian or International dealer. If a hobby shop is not available, replacement parts may also be ordered from Tower Hobbies at [www.towerhobbies.com](http://www.towerhobbies.com), or by calling toll free (800) 637-6050.

Parts may also be ordered directly from Hobby Services by calling (217) 398-0007, or via facsimile at (217) 398-7721, but full retail prices and shipping and handling charges will apply. Illinois and Nevada residents will also be charged sales tax. If ordering via fax, include a Visa® or MasterCard® number and expiration date for payment.

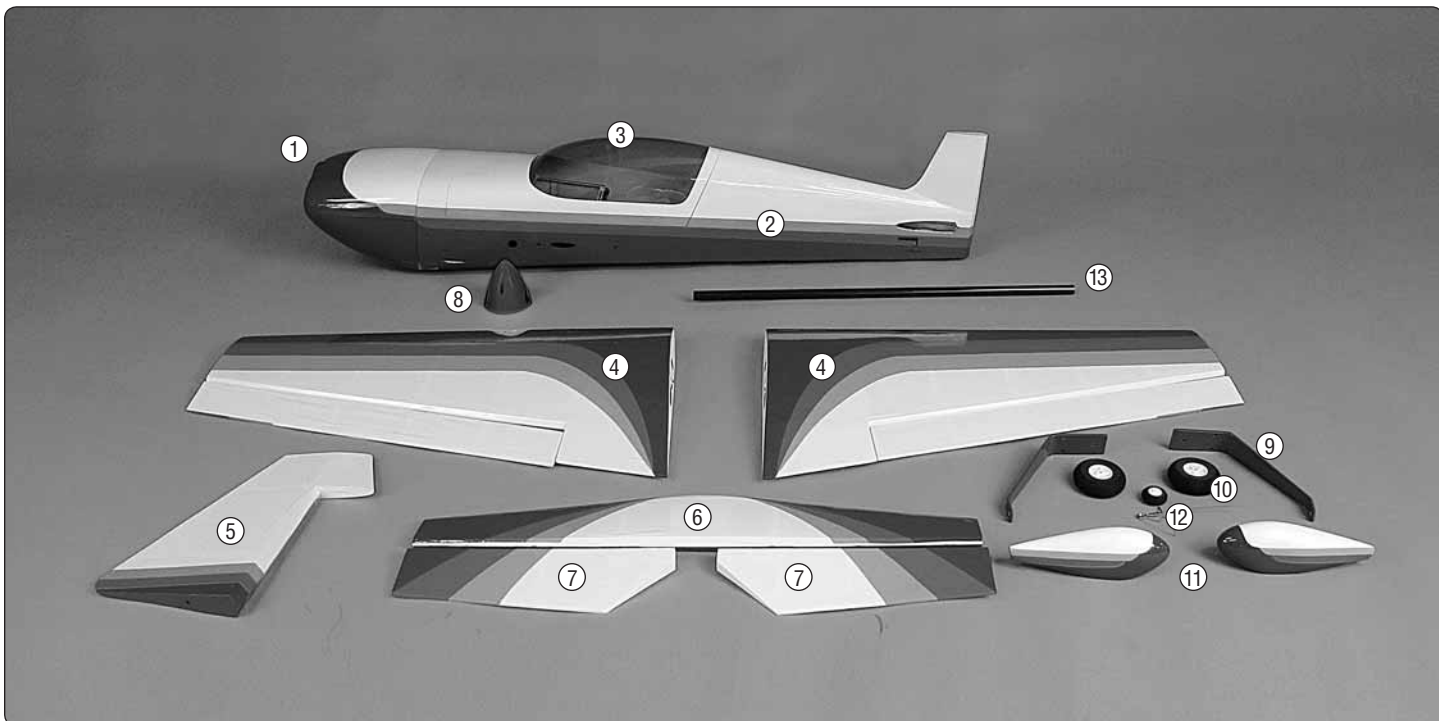
Mail parts orders **Hobby Services**  
and payments by 3002 N Apollo Drive, Suite 1  
personal check to: Champaign IL 61822

Be certain to specify the order number exactly as listed in the **Replacement Parts List**. Payment by credit card or personal check only; no C.O.D.

If additional assistance is required for any reason contact Product Support by e-mail at [productsupport@greatplanes.com](mailto:productsupport@greatplanes.com), or by telephone at (217) 398-8970.

REPLACEMENT PARTS LIST	
Order No.	Description
GPMA5350	Wing
GPMA5351	Fuselage
GPMA5352	Tail Surface Set
GPMA5353	Canopy
GPMA5354	Landing Gear
GPMA5355	Wheel Pants
GPMA5356	Spinner
GPMA5357	Cowl
GPMA5358	Wing Tube
GPMA5359	Decals
GPMA5360	Wing Bolts

## KIT CONTENTS



### Kit Contents

- |                    |                          |                         |
|--------------------|--------------------------|-------------------------|
| 1. Cowl            | 6. Horizontal Stabilizer | 11. Wheel Pants         |
| 2. Fuselage        | 7. Elevator Halves       | 12. Tail Wheel Assembly |
| 3. Canopy Hatch    | 8. Spinner               | 13. Wing Tube           |
| 4. Wing / Ailerons | 9. Landing Gear          |                         |
| 5. Rudder          | 10. Wheels               |                         |

## PREPARATIONS

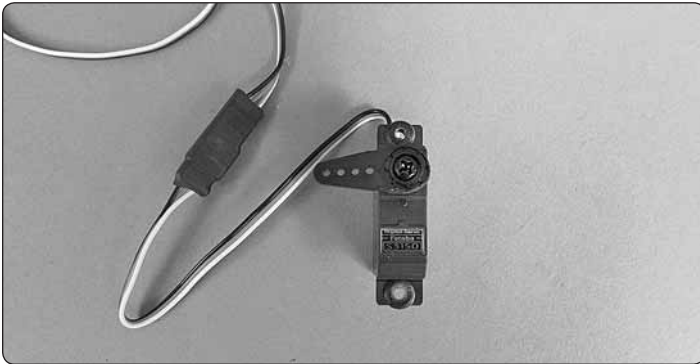
1. If you have not done so already, remove the major parts of the kit from the box and inspect for damage. If any parts are damaged or missing, contact Product Support at the address or telephone number listed in the "Kit Inspection" section on page 4.
2. Remove the tape and separate the elevators from the stab. Use a covering iron with a covering sock on medium heat to tighten the covering on the wings, fuselage, etc. if necessary. Apply pressure over sheeted areas to **thoroughly** bond the covering to the wood. **CAUTION:** The Extra 300SP EP was designed to be strong where needed, but lightweight for excellent flight performance. Care must be taken when assembling the plane to avoid damage.

## ASSEMBLE THE WINGS

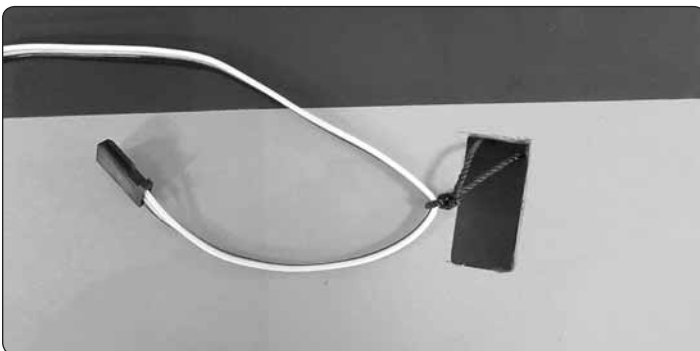
### Install the Ailerons

*Do the right wing first so your work matches the photos the first time through.*

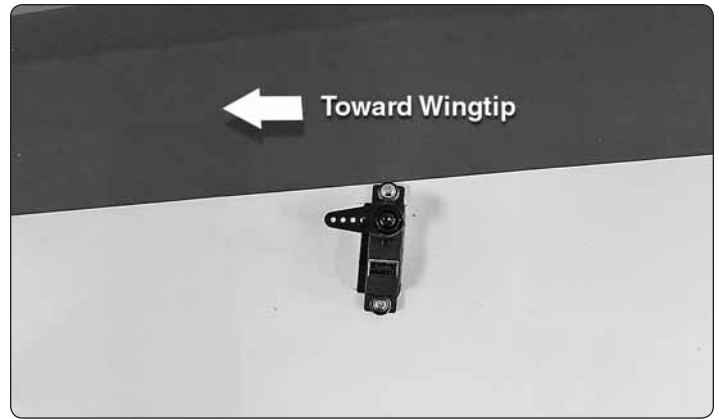
### Install the Aileron Servos & Pushrods



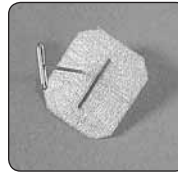
1. Install the mounting hardware that came with your servo to the servo. Cut three arms from a four arm servo horn, center the servo and install the arm as shown. Install a 16" [400mm] servo extension onto the servo lead. Secure the extension to the lead with tape, a piece of shrink tube or some other method to keep them from coming unplugged.



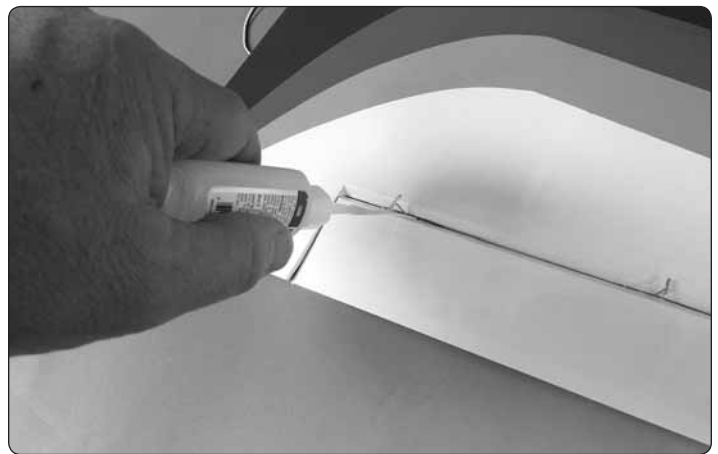
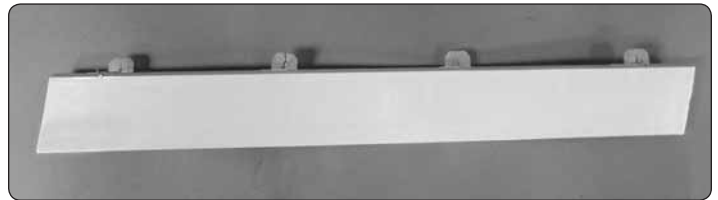
2. Inside the wing a string is taped. Remove the tape and then tie the string to the servo extension. Pull the string and the servo lead through the wing. Untie the string from the lead.



3. Install the servo into the servo opening. Drill a 1/16" [1.6 mm] hole through each of the mounting holes in the servo. Install and then remove a servo mounting screw into each of the holes you have drilled. Apply a drop of thin CA into the holes to harden the threads. Once the glue has cured install the servo into the servo opening using the hardware included with your servo. Center the servo and then install a servo arm as shown. The arm should be pointing towards the wingtip.



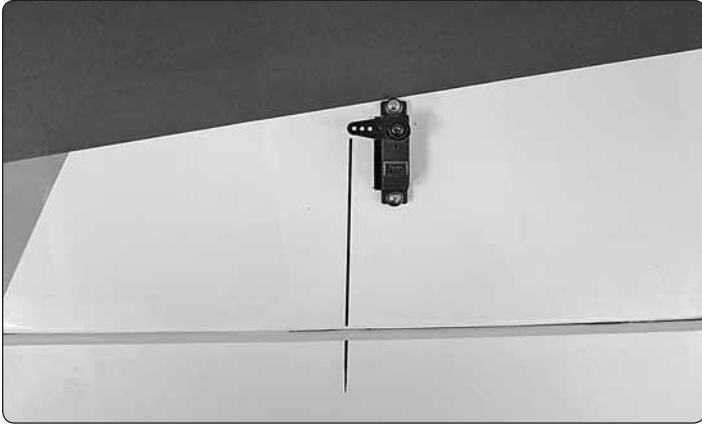
4. Install a pin into the center of four hinges. This will keep the hinge centered in the slots of the wing and aileron.



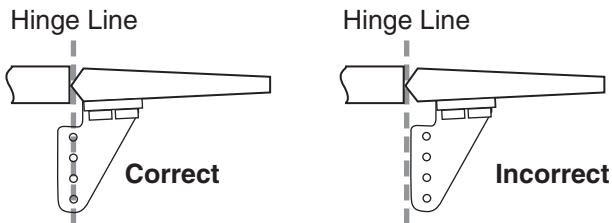
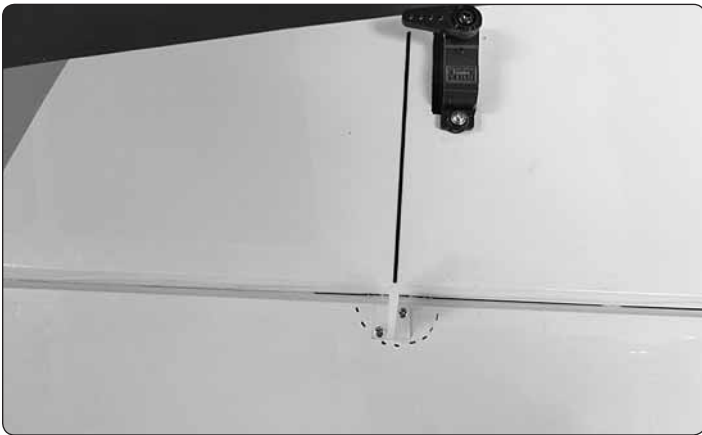
5. Install the hinges into the four slots in the aileron and then install the aileron to the wing. Center the aileron in the wing and be sure the hinges are all positioned properly in the slots. When you are satisfied with the installation of the aileron apply a couple of drops of thin CA glue onto each side of the four hinges. Allow the glue to completely harden and then remove the pins. **Do not apply CA accelerator.** This will cause the hinge to get brittle and possibly break. Test the hinges by pulling on the aileron and use more CA to secure them, if needed.



❑❑ 6. Remove the flat nylon mounting plate from the clevis. The flat plate can be discarded.

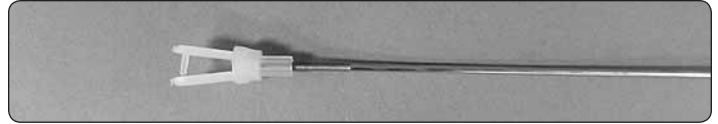


❑❑ 7. Using a felt tip marker, draw a line from the servo arm to the aileron.

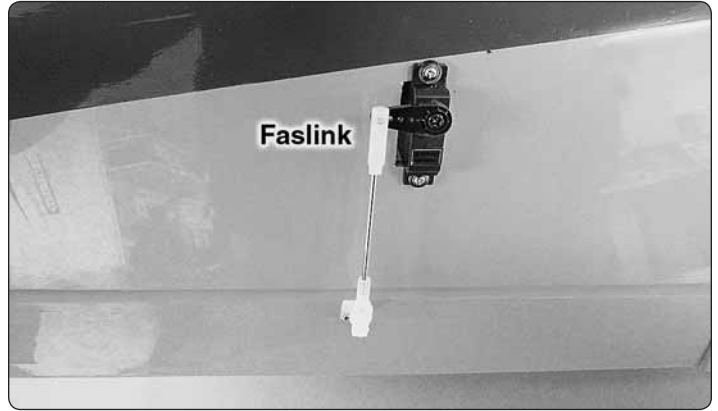


❑❑ 8. Place the nylon control horn onto the aileron in line with the line you drew and using the sketch to properly place the hinge. Be sure the control horn is placed over the shaped hardwood. (Look closely and this will be visible under the covering).

❑❑ 9. Mark the location of the mounting holes onto the aileron. Drill a 1/16" [1.6mm] hole on the marks, drilling through the plywood plate but **not through the top of the aileron**. Install and then remove a #2 x 3/8" screw into each of the holes you have drilled. Apply a drop of thin CA into the holes to harden the threads. Once the glue has cured secure the control horn to the aileron with the screws.

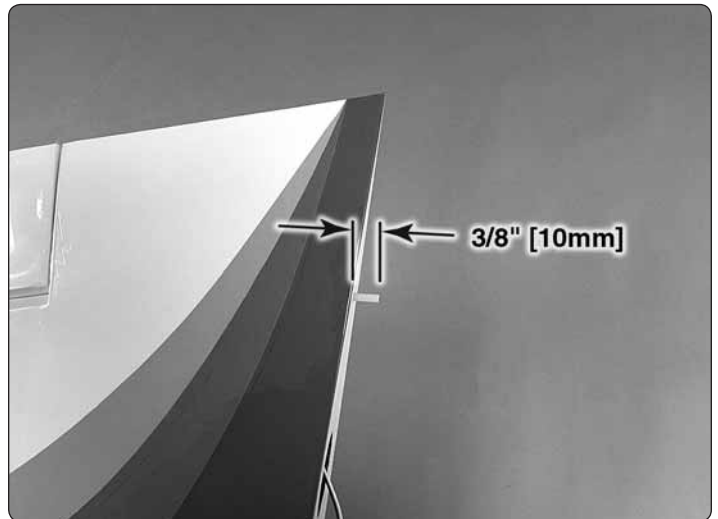
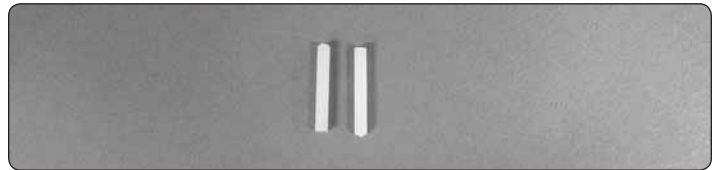


❑❑ 10. Thread a nylon clevis, 20 turns, onto a 6" [152mm] wire pushrod. Slide a silicone clevis retainer over the clevis. Attach the clevis in the outer hole of a nylon control horn.



❑❑ 11. With the aileron servo and the aileron centered, mark the aileron pushrod where it crosses the aileron servo arm. Make a 90° bend at the mark. Cut the pushrod 3/8" [9.5mm] past the bend. Drill a 5/64" [2mm] hole in the outer hole of the control arm of the servo. This should be the hole that is approximately 5/8" [16mm] from the center of the servo. Attach the pushrod to the aileron servo arm with a nylon Faslink.

❑❑ 12. Repeat steps 1-11 for the left wing panel.

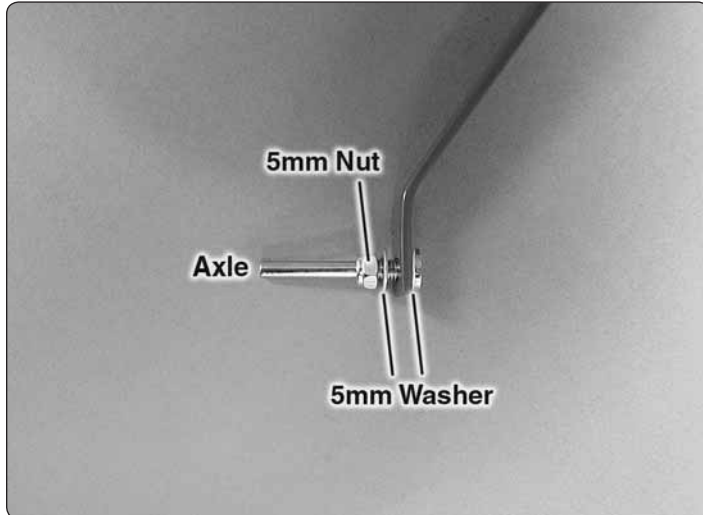


❑❑ 13. Included with the kit are two 1/8" x 7/8" [3mm x 22mm] smooth nylon pins. (There is another ribbed nylon pin in the kit. Do not confuse the two.) Epoxy a pin into the root rib of each of the wing panels. When you install the pin it will stop when fully inserted in the hole. Approximately 3/8" [10mm] of the pin will extend outside of the root rib.

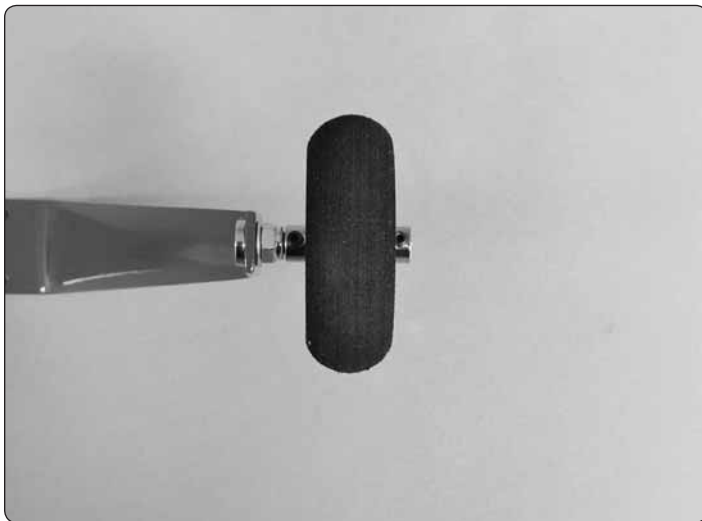
## ASSEMBLE THE FUSELAGE

**Note:** If you have not already figured out how to remove the canopy, the magnets at the rear of the canopy keep it locked in place. Lift the back of the canopy to remove it.

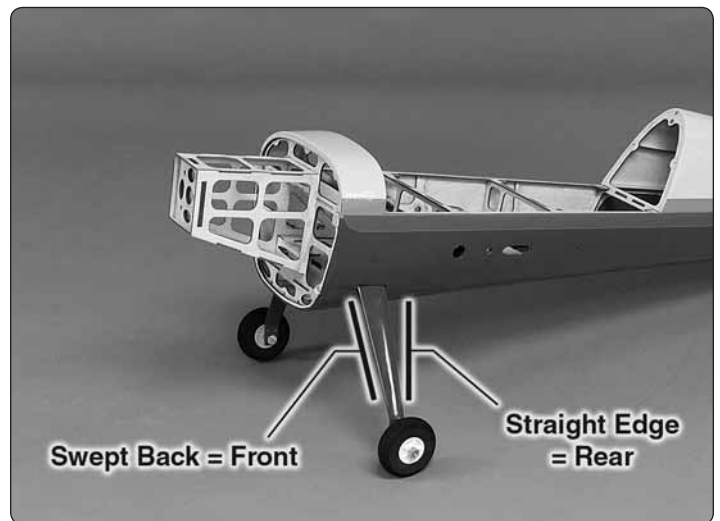
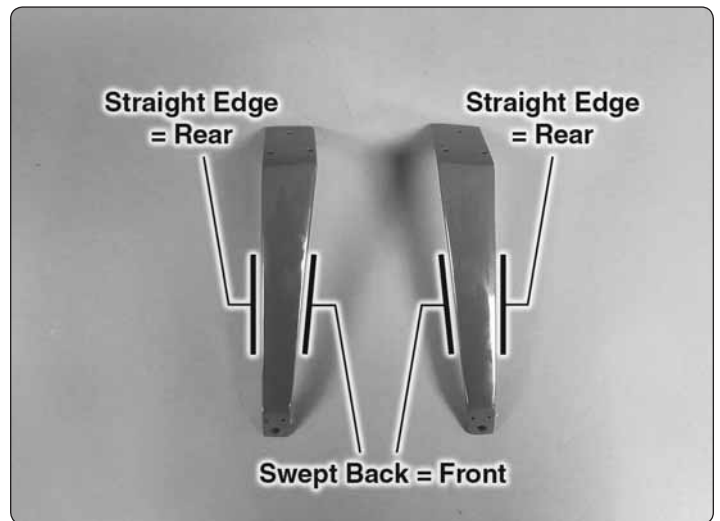
### Install the Main Landing Gear



1. Slide a 5 mm washer onto the axle. Insert a 4 mm axle through the right main **landing gear**. Slide a 5 mm washer onto the axle followed by the 5 mm lock nut and the wheel. (All of these need to be slid into position before securing the assembly to the wheel part). Tighten the axle nut to secure the axle to the landing gear. Do this for both landing gears.

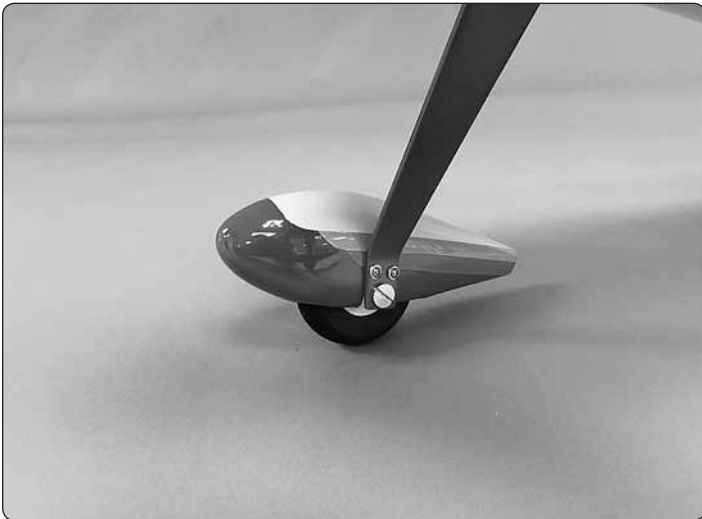
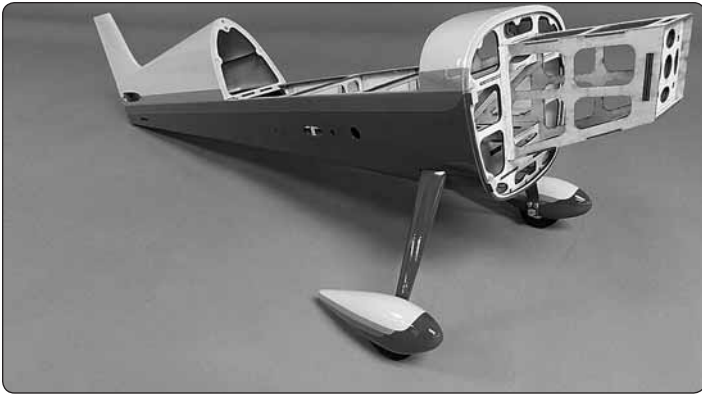


2. Apply a drop of thread locker to two 6-32 set screws and thread them into two 5/32" [4mm] wheel collars. Slide one wheel collar onto the axle followed by the wheel and then the second wheel collar. Tighten the set screws against the axle. Be sure the wheel spins freely after the wheel collar is in place. Do this for both axles.



3. Attach the main landing gear to the **fuselage** with three 4-40  $\times$  1/2" SHC screws, #4 lock washers and #4 flat washers. **Note:** The front of the main landing gear sweeps back, while the back of the gear is straight. Do this for both landing gear halves.

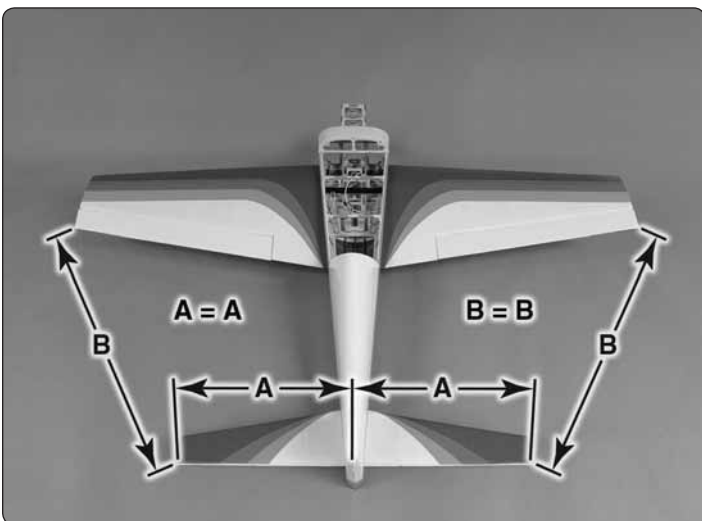




☐☐ 4. Install the wheel pants to the landing gear using two 2-56 × 3/8" [10 mm] machine screws, #2 lock washers and #2 flat washers. Apply a drop of thread locker to each screw before installing them in the pant.

### ***Install the Stabilizer***

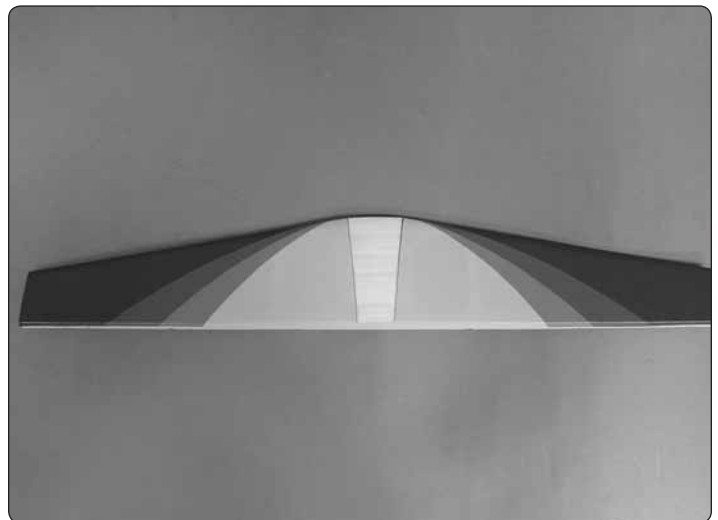
☐ 1. Center the **wing tube** in the fuselage. Slide the wing halves onto the wing tube and secure the wing halves to the fuselage with the nylon 10-24 thumb screws.



☐ 2. Center the **horizontal stabilizer** in the slot in the fuselage, measuring each side of the stab from the fuselage and the distance from each wing tip.



☐ 3. When you are satisfied the stab is centered, mark on the top and bottom of the stab the sides of the fuselage. This is best done with a fine tip marker.

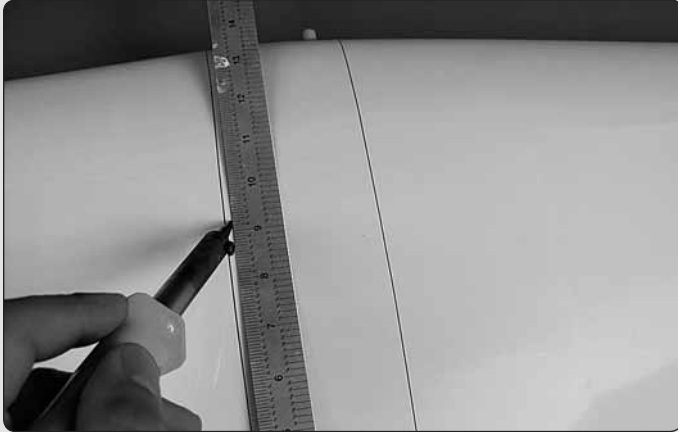


☐ 4. On the lines you drew on the stab, cut the covering away from the stab. Be careful not to cut into the surface of the stab. Do this for both the top and bottom of the stab. You may find this process easiest if you follow the **"Expert Tip: How to Cut Covering From Balsa."**

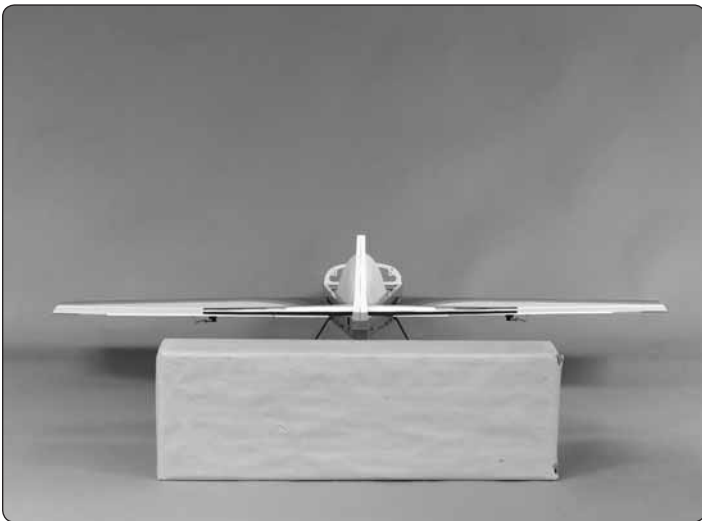
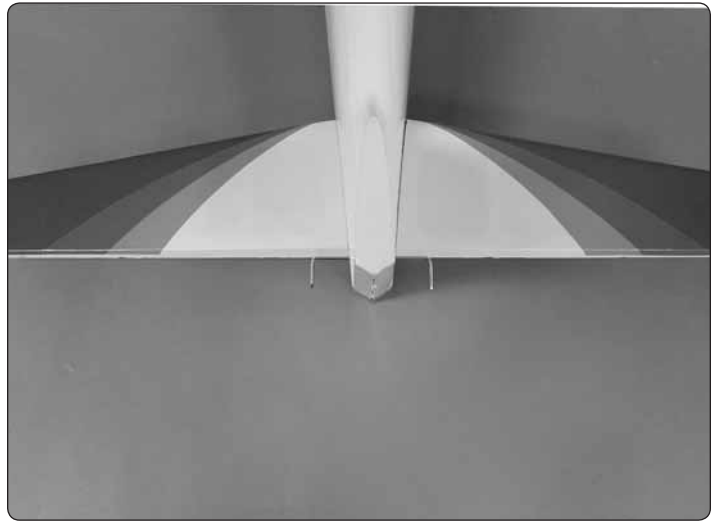
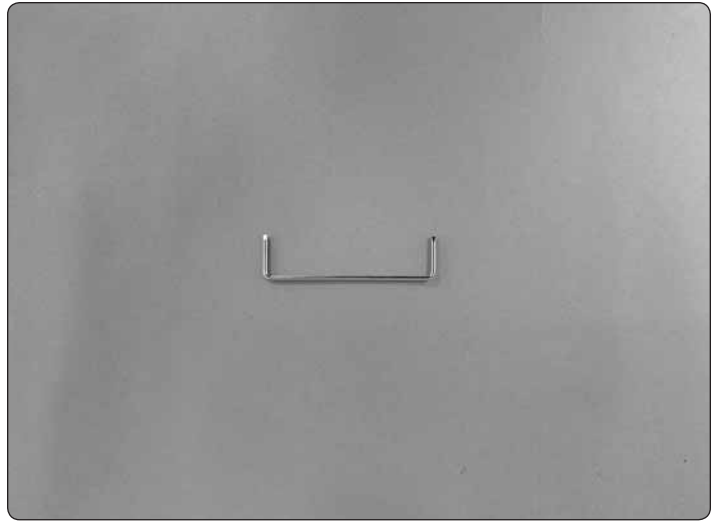


## HOW TO CUT COVERING FROM Balsa

Use a soldering iron to cut the covering from the stab. The tip of the soldering iron doesn't have to be sharp, but a fine tip does work best. Allow the iron to heat fully.



Use a straightedge to guide the soldering iron at a rate that will just melt the covering and not burn into the wood. The hotter the soldering iron, the faster it must travel to melt a fine cut. Peel off the covering.



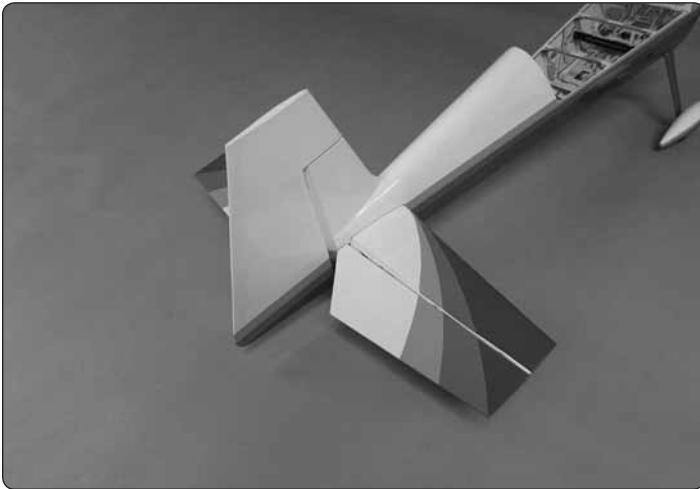
❑ 5. Slide the stab back into the fuselage. Stand back and look at the stab in relation to the wing. The stab should be parallel with the wing. If not, sand the stab saddle until the stab and wings are aligned. Remove the stab from the fuselage.

❑ 6. Locate the stab joiner wire. Insert it into the stab opening and then slide the stab into the stab opening in the wing. Apply 30 minute epoxy to the wood center section of the stab where you cut away the covering. Do this for the top and bottom of the stab. Move the stab back and forth to work the epoxy into the opening in the fuselage. Once the glue has been worked sufficiently into the joint re-center the stab, making sure it is properly aligned with the wing. Wipe away any excess epoxy from the covering on the stab and fuselage with a paper towel and rubbing alcohol. When you finish the clean-up, double check the stab position and then set the fuselage aside to allow the glue to harden.

❑ 7. Install a small amount of epoxy into the hole in the leading edge of the right elevator. Using the same method used for the ailerons, install three hinges into the elevator and then install the elevator to the stab, making sure you install the end of the joiner wire into the hole in the leading edge of the elevator. When you have the elevator positioned, apply thin CA glue to each of the hinges just like you did for the ailerons. Do this for both halves of the elevators. Test pull both elevator halves.

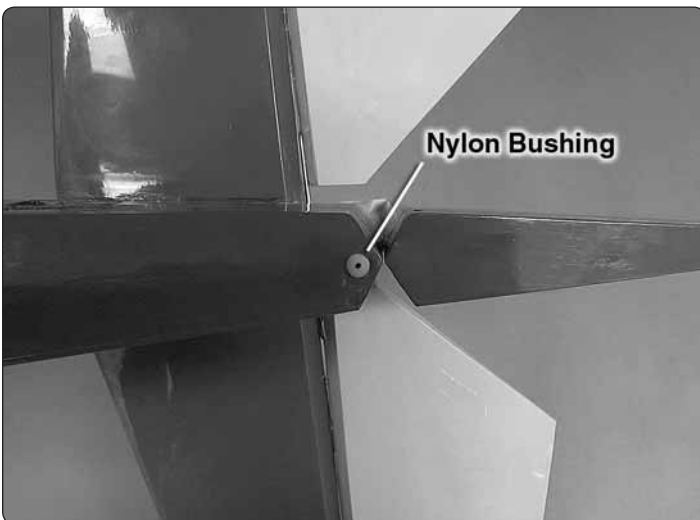
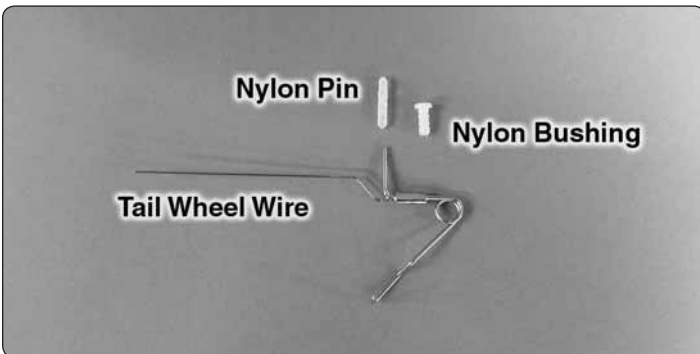
***You can now remove the wings and continue with the assembly of the fuselage.***

## Install the Rudder

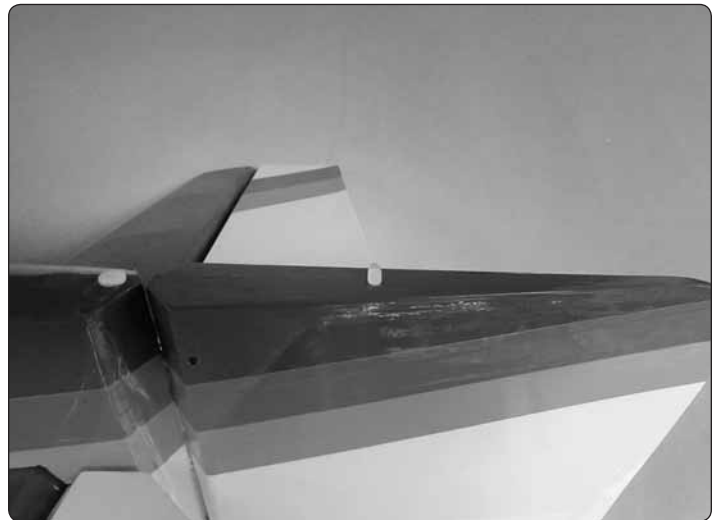
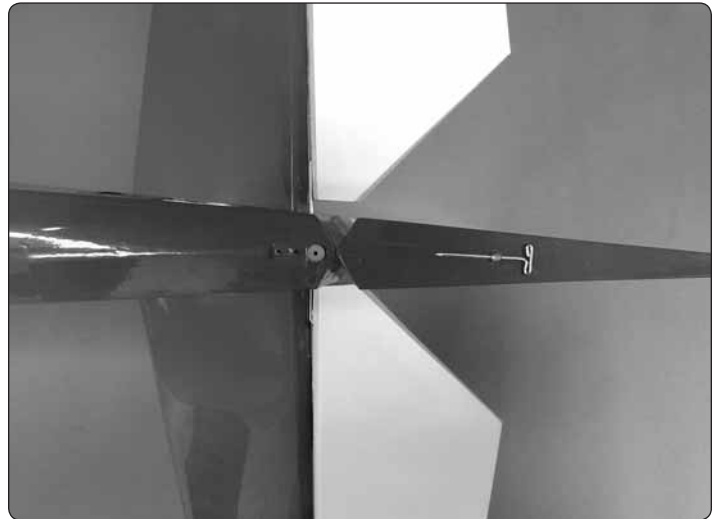
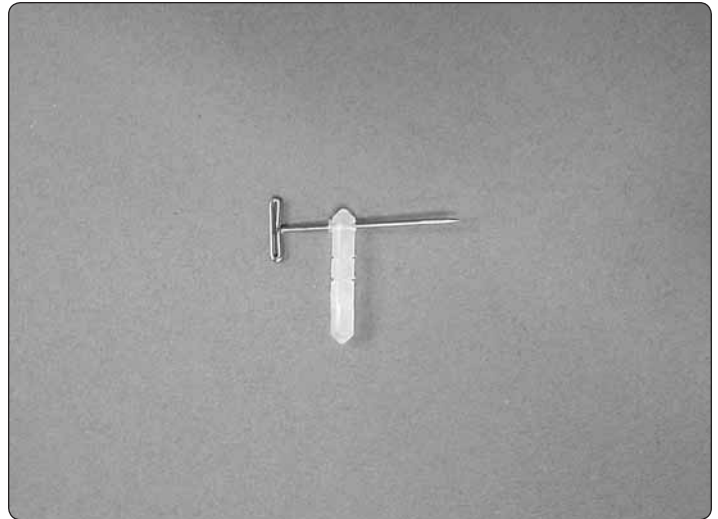


- ❑ 1. Install three hinges into the rudder using the same techniques used on the ailerons and elevators and then install the rudder to the fin post.
- ❑ 2. Apply three drops of thin CA to each side of each of the rudder hinges. Allow the glue to harden. Test pull the rudder hinges.

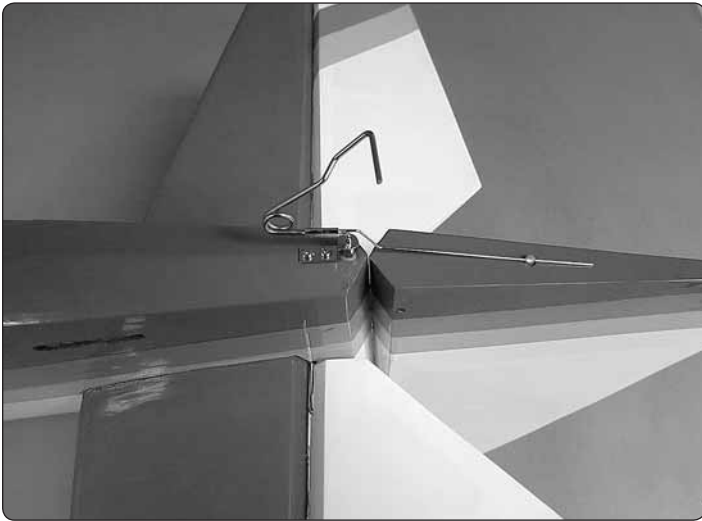
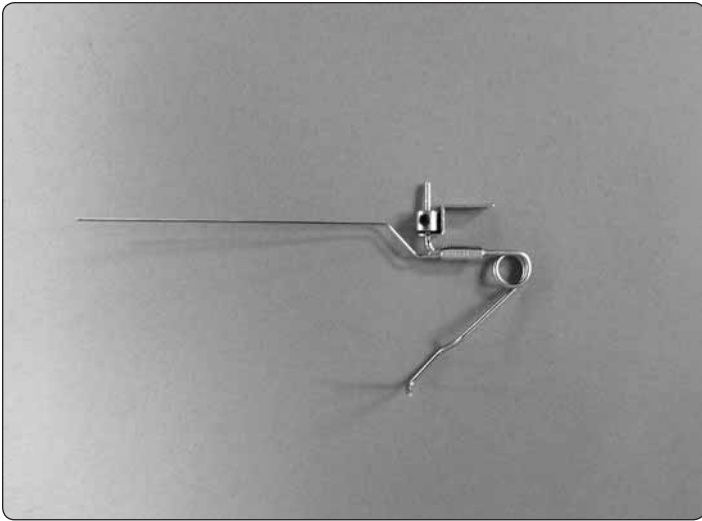
## Install the Tail Wheel Assembly



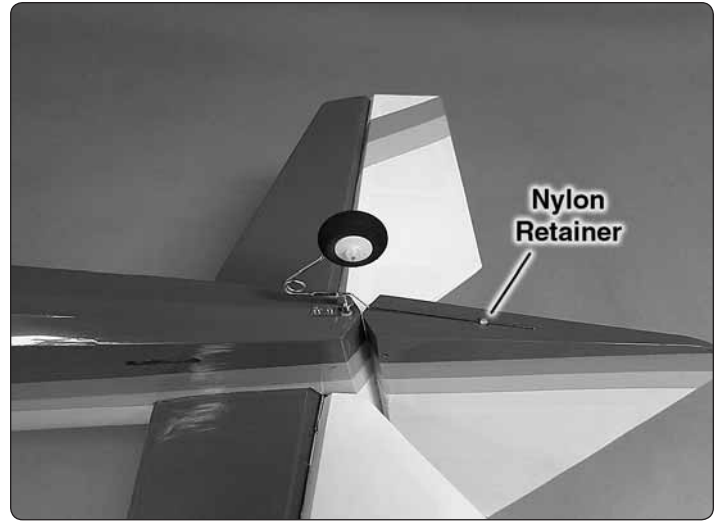
- ❑ 1. Locate the components of the tail wheel wire assembly. Glue the nylon tail gear bushing in the hole in the aft bottom of the fuse.



- ❑ 2. Insert a pin through the hole in the nylon tail wheel stud. Glue the stud into the hole in the bottom of the rudder. The stud should extend from the rudder approximately 3/16" [4.8mm]. When gluing the stud into the rudder be sure the pin is in line with the center of the fuselage. This will assure proper alignment for the hole. After the stud is glued in place remove the pin.



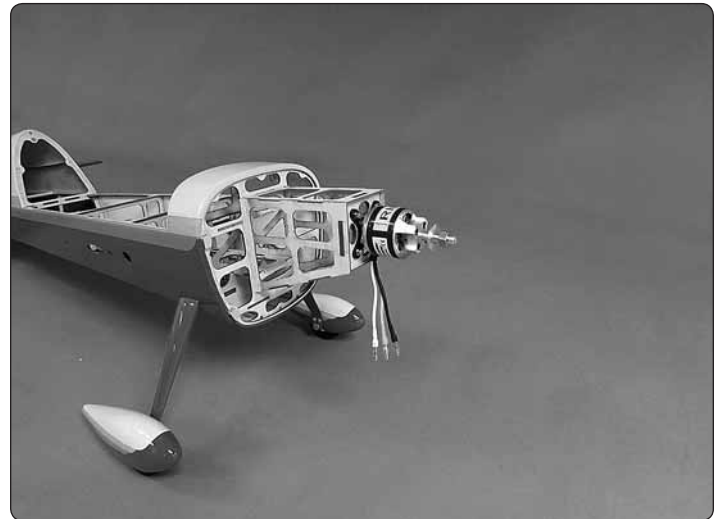
❑ 3. Apply thread locker to the 4-40 set screw and then install it into the 3/32" [2 mm] wheel collar. Slide the wheel collar onto the tail wire. Then, insert the tail wire into the nylon bushing and nylon stud you glued into the fuselage and rudder. Place the tail gear bracket in place as shown with the tail gear bracket aligned with the bottom of the fuse. Mark and drill a 1/16" [1.6mm] pilot hole at both tail gear bracket mounting hole locations. Secure the tail gear bracket to the fuse with two #2 × 1/2" [13 mm] sheet metal screws.



❑ 4. Install the **tail wheel** on the tail gear wire and press the nylon retainer on the tail gear wire to secure the tail wheel. If necessary, add a small drop of CA glue to lock it tightly to the wire.

### *Install the Motor*

The Extra 300SP EP has been designed to use the Great Planes RimFire .32 (42-50-800) Outrunner Brushless motor. If you will be installing a different motor, you may need to modify the plywood motor box. We recommend that this be done at this time.

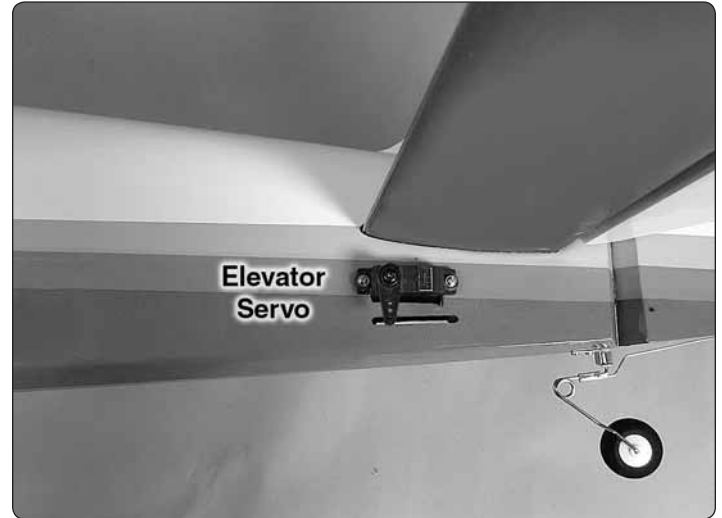


❑ 1. Install the RimFire motor using four 4-40 × 1/2" [13 mm] SHC screws, four #4 lock washers and four #4 flat washers. Before installing, apply a drop of threadlocker to the threads of the SHC screws.

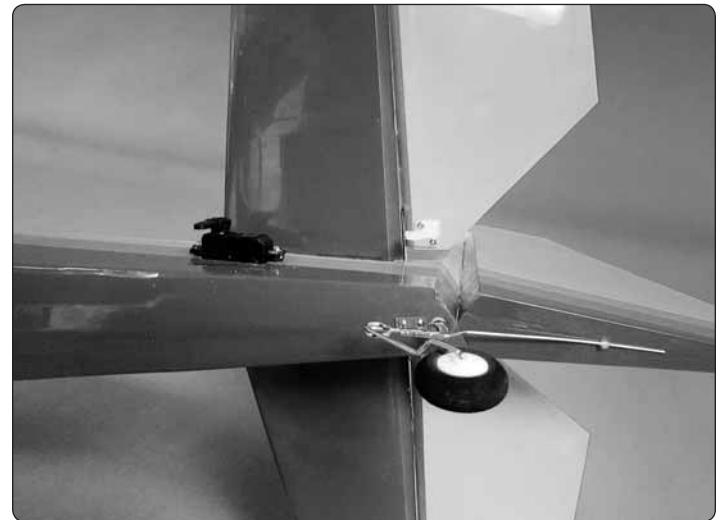
## INSTALL THE RADIO SYSTEM

### Install the Elevator Servo

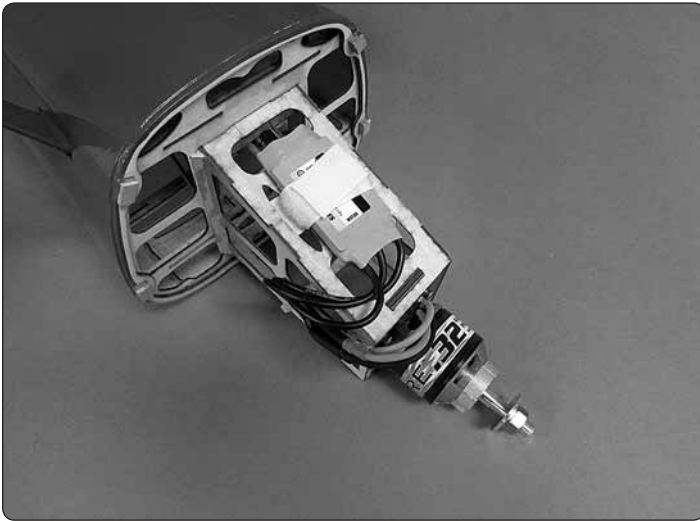
- ❑ 1. Install a 16" [400mm] servo extension to the elevator servo. Secure the extension to the lead with tape, a piece of shrink tube or some other method to keep them from coming unplugged.
- ❑ 2. Install the servo mounting hardware that came with your servo onto the servo. Place the elevator servo into the opening on the left side of the fuselage. Drill a 1/16" [1.6 mm] hole into the fuselage for each of the mounting holes.



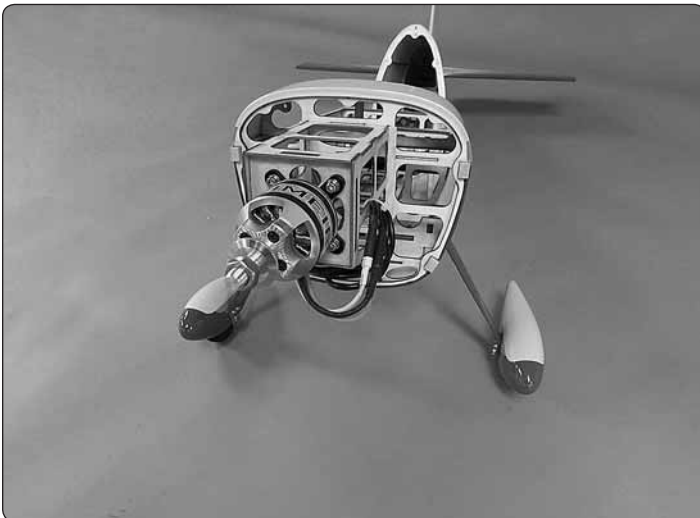
- ❑ 3. Install and then remove a servo mounting screw into each of the holes. Apply a drop of thin CA into the holes to harden the threads. Once the glue has hardened install the servo into the servo opening using the hardware included with your servo. Center the servo. Then, install a servo arm as shown.



- ❑ 4. Position the control horn in line with the servo arm. When positioned properly the control horn will rest on a hardwood plate in the elevator. Mark the location of the mounting holes onto the elevator. Drill a 1/16" [1.6 mm] hole on the marks, drilling through the elevator plate only. **Do not drill through the top of the elevator.** Install and then remove a #2 x 3/8"

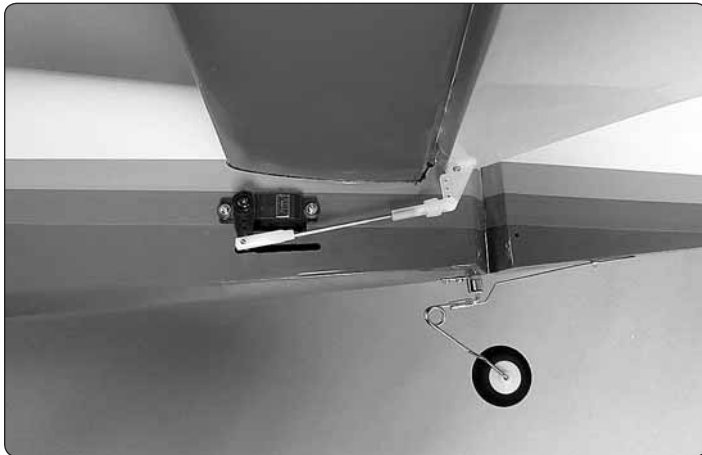


- ❑ 2. Install one half of a 2" [51 mm] piece of adhesive backed Velcro® to the bottom of the motor box and the other half to the bottom of the ESC. Secure the ESC to the motor box and install a Velcro® strap around the motor box and ESC.



- ❑ 3. Connect the ESC to the motor following the instructions with the ESC and motor.

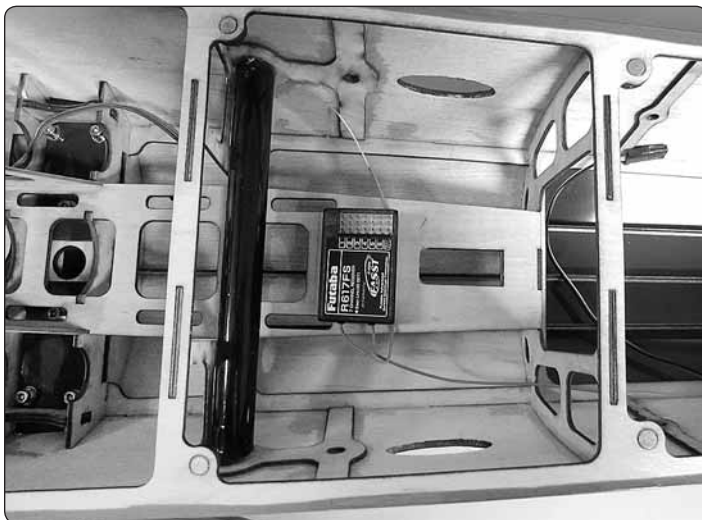
screw into each of the holes you have drilled. Apply a drop of thin CA into the holes to harden the threads. Once the glue has cured secure the control horn to the elevator with the screws.



❑ 5. Thread a nylon clevis 20 turns onto a 2-56 × 6" [152 mm] wire pushrod. Connect the clevis to the outer hole from the base of a nylon control horn. Slide a silicone clevis retainer over the clevis. With the elevator servo and the elevator centered, mark the elevator pushrod where it crosses the elevator servo arm. Make a 90° bend at the mark. Cut the pushrod 3/8" [9.5 mm] past the bend. Attach the pushrod to the elevator servo arm with a nylon Faslink.

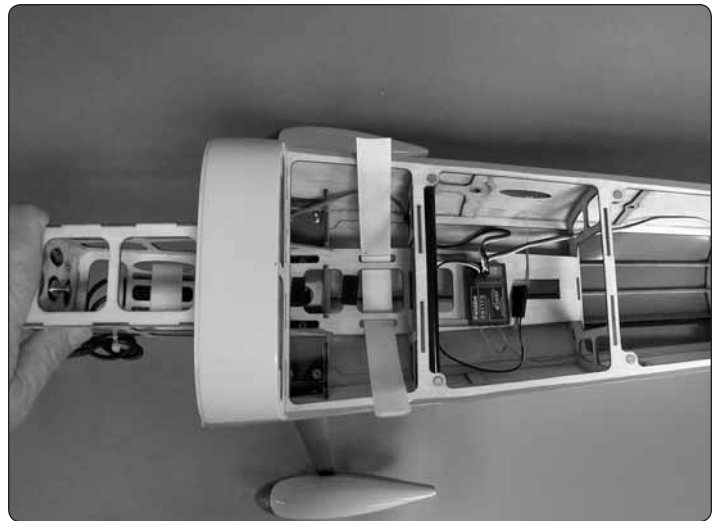
### ***Install the Receiver***

Before installing the rudder servo you need to complete the installation of the receiver and battery. To properly set up the rudder pull-pull system you will need to be able to operate the servos.



❑ 1. Use adhesive backed hook and loop material to mount the receiver to the servo tray.

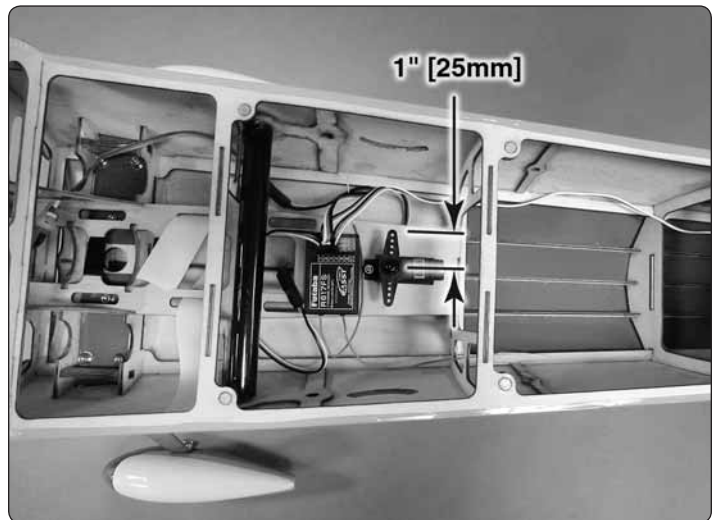
❑ 2. Connect the ESC, elevator servo and Y-harness for the ailerons to the receiver. (Depending on where you mounted the ESC, you may need to install a 9" [230 mm] servo extension to the ESC.) If using the 4S battery set up with a regulator, follow the instructions with the regulator.



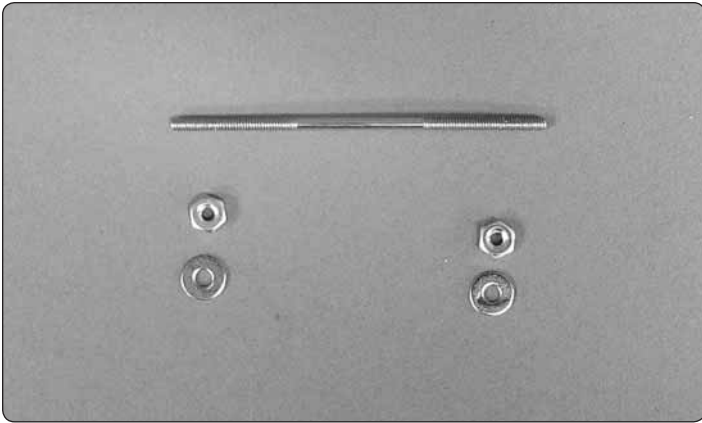
❑ 3. Overlap by 1" [25 mm] two strips of non-adhesive backed hook and loop material. Route the hook and loop material through the slot in the battery tray, under the tray and back through the slot on the other side of the tray. Apply a strip of adhesive backed hook material to the center of the battery tray. The loop material can be applied to the battery.

❑ 4. Connect the flight battery to the ESC and check that the servos are operating correctly. Arm the motor (with the prop removed) and slowly start the motor to make sure it is rotating in the correct direction. If not follow the instructions with your ESC to reverse the direction of rotation.

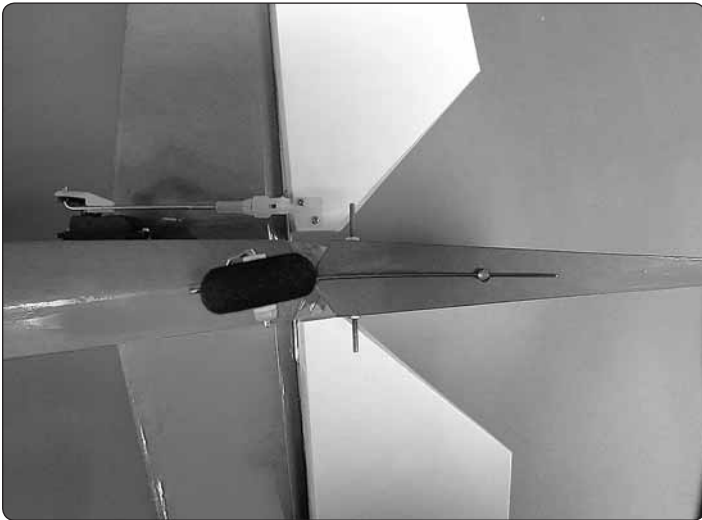
### ***Install the Rudder Servo and Rudder Pull-Pull Installation***



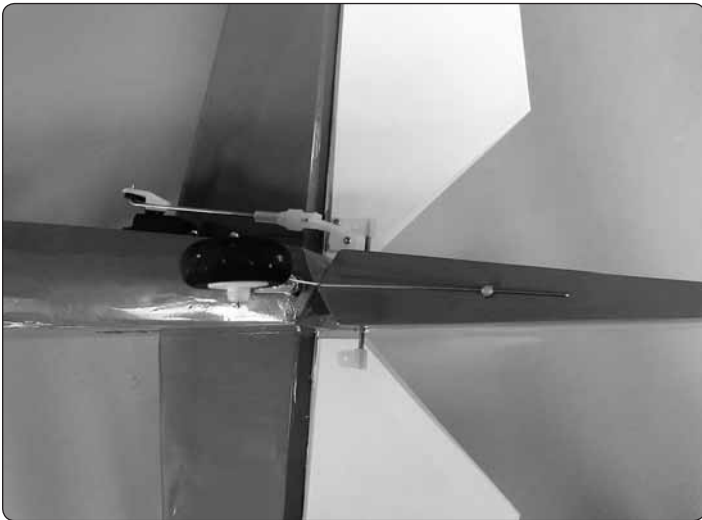
❑ 1. Drill a 1/16" [1.6 mm] hole in the servo tray, drilling through the servo mounting holes. Install and then remove a servo mounting screw into each of the holes in the rudder servo tray. Apply a drop of thin CA into the holes to harden the threads. Once the glue has hardened, install the servo into the servo opening using the hardware included with your servo. Center the servo. Then, install a 1" [25 mm] two arm servo arm as shown.



❑ 2. Locate the 2-56 wire with threads at both ends, two #2 flat washers and #2 nuts.

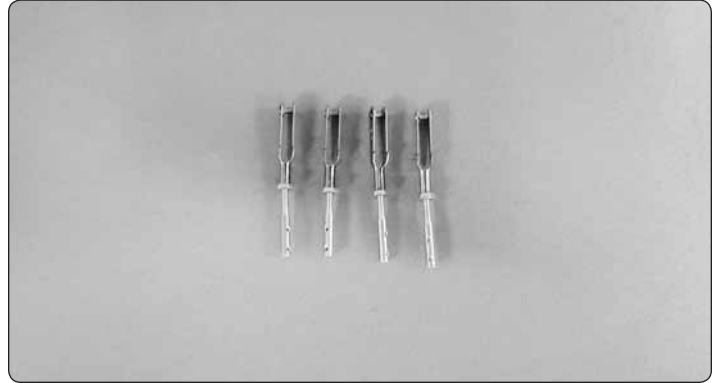


❑ 3. Insert the wire into the hole in the bottom of the rudder. Center the wire and then secure the wire with a washer and nut on each end of the wire tightened against the rudder. Apply a drop of threadlocker on the threads. This will help prevent the nuts from coming loose.

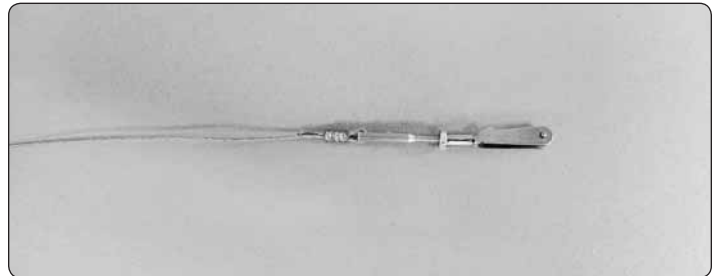
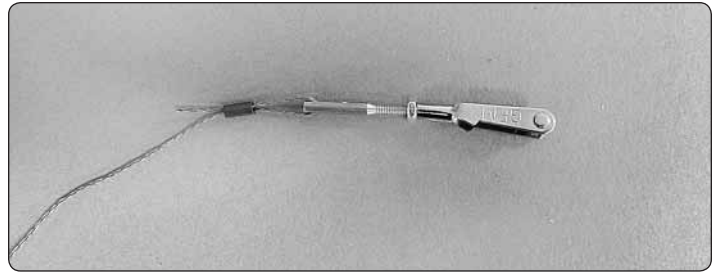


❑ 4. Thread the two plastic nylon torque rod horns onto each end of the wire. Thread them onto the wire until the wire is flush with the end of the horn. Adjust the torque rod horns so that they are both equal distance from the rudder.

❑ 5. Locate the pull-pull string and cut it in half. Put a small drop of thin CA on both ends of each piece of string. Allow the CA to cure and trim off any frayed thread.

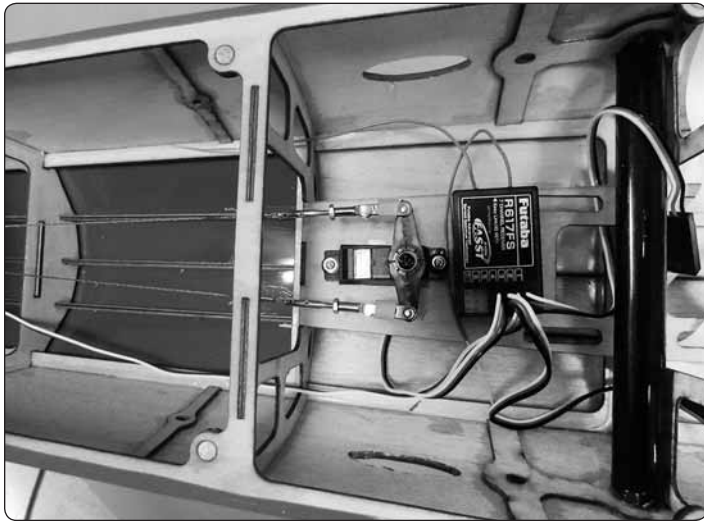


❑ 6. Thread 2-56 nuts onto four 2-56 rigging couplers. Thread the clevises 10 turns onto the rigging couplers. Tighten the 2-56 nuts against the metal clevises.



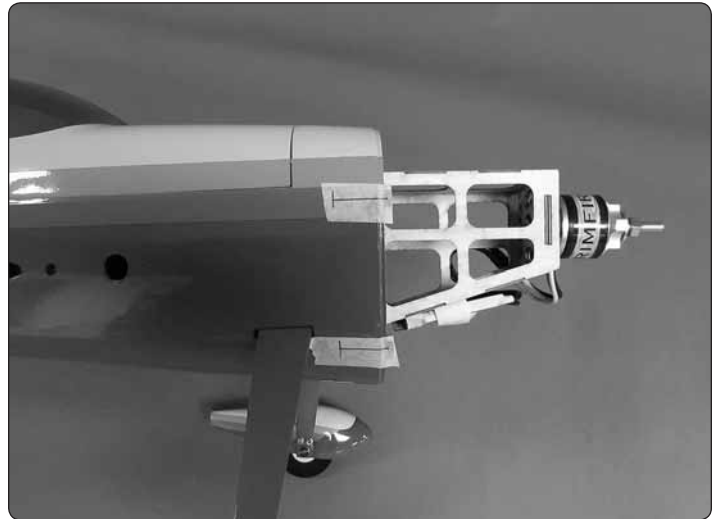
❑ 7. Pass one of the strings through a copper wire crimp, through the rigging coupler and back through the crimp. Squeeze the crimp with a pliers to secure the string in the crimp. Apply a drop of thin CA to the crimp. Install a silicone clevis keeper onto the clevis and then attach the clevises to

the rudder torque rod horn. Drop the string through the slot in the fuselage, feeding it through the fuselage to the rudder servo. Do this for both strings.

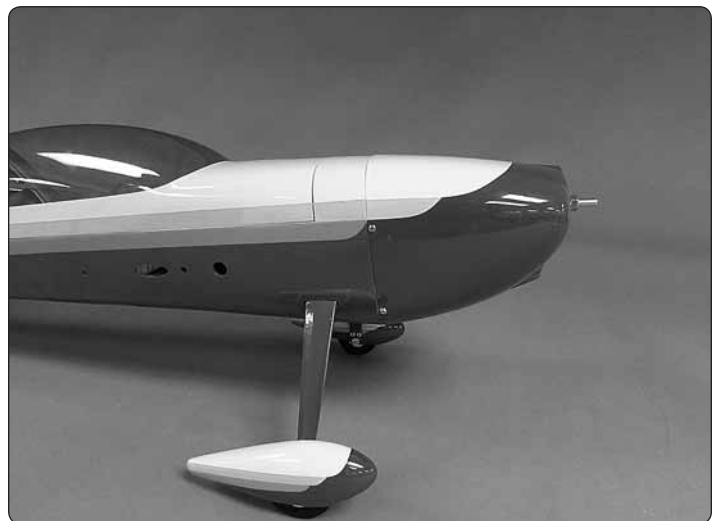


□ 8. Temporarily turn on the radio system and center the rudder servo arm. Temporarily tape the rudder so it is straight and won't move. Inside the fuselage, slide a silicone clevis keeper on the clevis and then attach the clevis to the outer hole of the servo arm. Pass the string through a crimp, then through the hole in the rigging coupler and back through the crimp. Repeat this for the remaining string and clevis. With the rudder and the rudder servo arm centered, pull the strings tight and squeeze the crimps to secure the strings. Apply a drop of CA to the strings and cut off the excess string. Fine tuning of the string lengths and rudder centering can be done by adjusting the clevises.

## Install the Cowl



□ 1. Apply masking tape over the cowl mounting blocks and fuselage. From the center of each mounting block draw a line measuring back 1" [25 mm]. Do this for all four blocks. After you have marked all four blocks tape the cowl in place, making sure the cowl is centered with the motor and spinner backplate.



□ 2. From the back of the line you drew, measure forward 1" [25 mm] and make a mark on the cowl. Do this for all four mounting blocks. Drill a 5/64" [2 mm] hole through the cowl and mounting block. Secure the cowl to the fuselage with the four 3/32" × 5/16" [2.5 × 8 mm] washer head screws.



❑ 3. Install the spinner back plate onto the motor shaft. Enlarge the hole in the back plate as needed to fit your brand of motor. Remove the spinner back plate. Do not complete the installation of the prop and spinner until the entire radio system has been set up. This will prevent the possibility of any mishaps prior to preparing the model for flight.

## Apply the Decals

The box photographs show the location of the decals on the airplane. Refer to these for the exact placement of the decals. The following tips may be useful for applying them.

❑ 1. 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 one teaspoon of soap per gallon of water. Submerge the decal in the soap and water 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 & water allows accurate positioning and reduces air bubbles underneath.

❑ 2. Position decals on the model. Holding the decal down, use a paper towel to wipe most of the water away.

❑ 3. Use a piece of soft balsa or something similar to squeegee remaining water from under the decal. Apply the rest of the decals the same way.

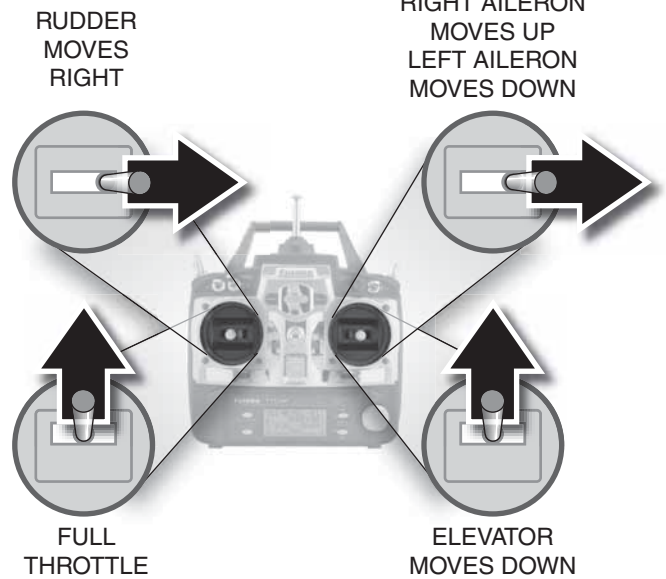
## GET THE MODEL READY TO FLY

### Check the Control Directions

❑ 1. Turn on the transmitter and receiver and center the trims. If necessary, remove the servo arms from the servos and reposition them so they are centered. Reinstall the screws that hold on the servo arms.

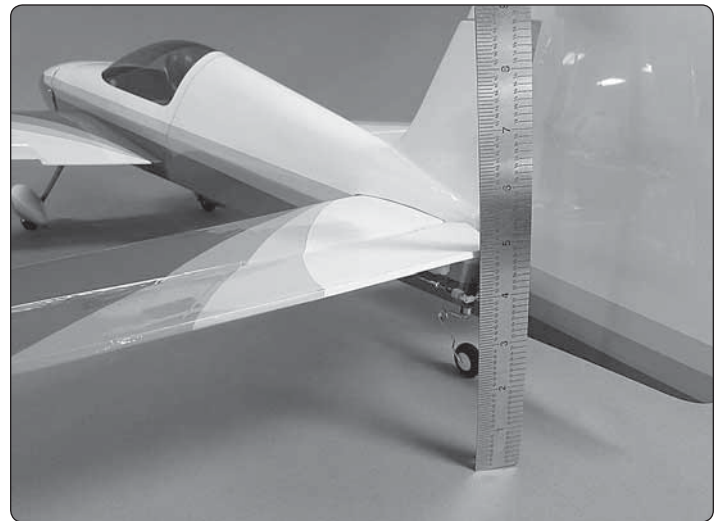
❑ 2. With the transmitter and receiver still on, check all the control surfaces to see if they are centered. If necessary, adjust the clevises on the pushrods to center the control surfaces.

## 4-CHANNEL RADIO SET UP (STANDARD MODE 2)



❑ 3. Make certain that the control surfaces and the throttle 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



Use a ruler to accurately measure and set the control throw of each control surface as indicated in the chart that follows. If your radio does not have dual rates, we recommend setting the throws at the **low** rate setting.

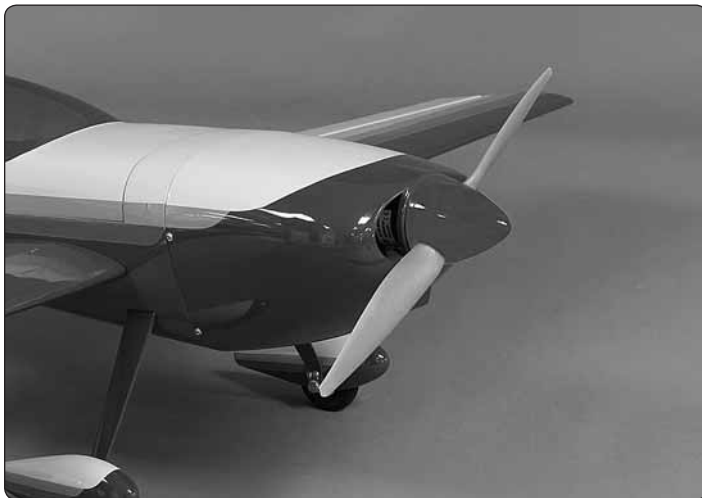
**NOTE:** The throws are measured at the **widest part** of the elevators, rudder and ailerons.

These are the recommended control surface throws:			
	LOW	HIGH	3D
ELEVATOR	Up & Down	Up & Down	Up & Down
	3/8" [10 mm] 7°	5/8" [16 mm] 11°	2" [51 mm] 38°
	Up & Down	Up & Down	Up & Down
AILERON	3/8" [16 mm] 9°	5/8" [16 mm] 14°	1" [25 mm] 24°
	Right & Left	Right & Left	Right & Left
	1-1/4" [32 mm] 12°	1-7/8" [48 mm] 18°	3-1/2" [89 mm] 35°

We also put exponential into the high rates and the 3D rates to make the control throws less sensitive around neutral. These can be set up to your own preference and flying style. For our Futaba radio system we put -20% to -30% in the high rate and -50% to -60% in the 3D rates.

**IMPORTANT:** The Extra 300SP EP has been **extensively** flown and tested to arrive at the throws at which it flies best. Flying your model at these throws will provide you with the greatest chance for successful first flights. If, after you have become accustomed to the way the Extra 300SP EP flies, you would like to change the throws to suit your taste, that is fine. However, too much control throw could make the model difficult to control, so remember, "more is not always better."

## Finish the Model



1. Install the spinner back plate, propeller with washer and prop nut and the spinner cone. Secure the spinner cone to the back plate with two 3 × 10 mm sheet metal screws.

2. Insert a flight battery in the fuselage and use the hook and loop material to hold the battery in position. Do not connect the battery to the ESC while balancing the model.



3. If you wish to install a pilot do so now. We used the Williams Brothers 1/4 Pilot Bust Kit Sportsman pilot (WBRQ1160).

4. Install the canopy/hatch.

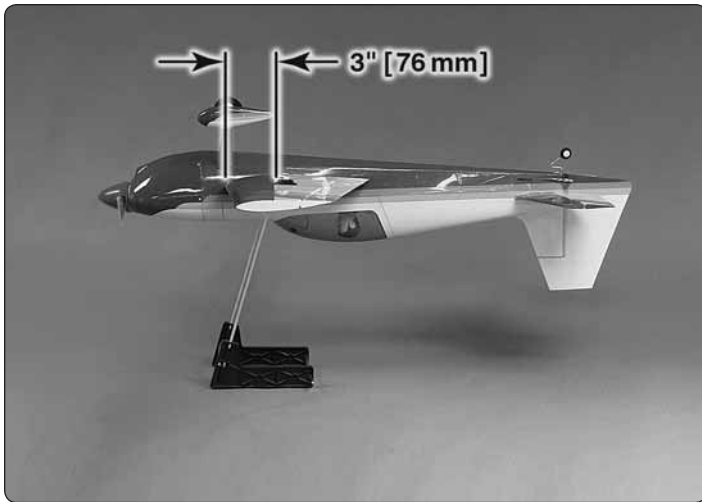
## Balance the Model (C.G.)

More than any other factor, the **C.G.** (balance point) can have the **greatest** effect on how a model flies, and may determine whether or not your first flight will be successful. If you value this model and wish to enjoy it for many flights, **DO NOT OVERLOOK THIS IMPORTANT PROCEDURE.** A model that is not properly balanced will be unstable and possibly unflyable.

At this stage the model should be in ready-to-fly condition with all of the systems in place including the motor and battery, landing gear, covering and paint, and the radio system.

1. Use a felt-tip pen or 1/8" [3 mm]- wide tape to accurately mark the C.G. on the top of the wing at the side of the fuselage. The C.G. is located 3" [76 mm] back from the leading edge of the wing at the side of the fuselage.

This is where your model should balance for the first flights. Later, you may wish to experiment by shifting the C.G. up to 3/16" [5mm] forward or 5/8" [16mm] back to change the flying characteristics. Moving the C.G. forward may improve the smoothness and stability, but the model may then require more speed for takeoff and make it more difficult to slow for landing. Moving the C.G. aft makes the model more maneuverable, but could also cause it to become too difficult to control. In any case, **start at the recommended balance point** and do not at any time balance the model outside the specified range.



2. With the wing attached to the fuselage, all parts of the model installed (ready to fly) and LiPo battery, lift it at the balance point you marked.

3. If the tail drops, the model is “tail heavy” and the battery pack and/or receiver must be shifted forward or weight must be added to the nose to balance. If the nose drops, the model is “nose heavy” and the battery pack must be shifted aft or weight must be added to the tail to balance. If additional weight is required, use Great Planes (GPMQ4485) “stick-on” weights. A good place to add stick-on nose weight is to the motor box (don’t attach weight to the cowl—it is not intended to support weight). Begin by placing incrementally increasing amounts of weight on the fuse over the motor box until the model balances. Once you have determined the amount of weight required, it can be permanently attached.

**Note:** Do not rely upon the adhesive on the back of the weight to permanently hold it in place. Over time the adhesive may soften and cause the weight to fall off. Use #2 sheet metal screws, RTV silicone or epoxy to permanently hold the weight in place.

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

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

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.**

## ***PREFLIGHT***

### ***Identify Your Model***

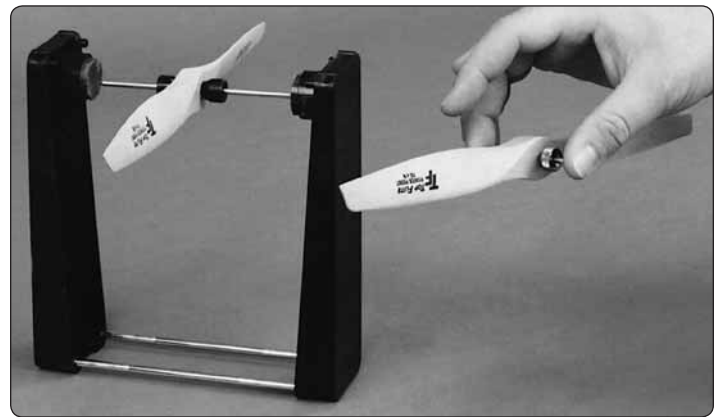
No matter if you fly at an AMA sanctioned R/C club site or if you fly somewhere on your own, you should always have your name, address, telephone number and AMA number on or inside your model. It is **required** at all AMA R/C club flying sites and AMA sanctioned flying events. Fill out the identification tag on page 23 and place it on or inside your model.

### ***Charge the Batteries***

Follow the battery charging instructions that came with your radio control system to charge the batteries. You should always charge your transmitter 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 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.

### ***Balance Propellers***



Carefully balance your propeller and spare propellers before you fly. An unbalanced prop can be the single most significant cause of vibration that can damage your model. Not only will motor mounting screws and bolts loosen, possibly with disastrous effect, but vibration may also damage your radio receiver and battery.

We use a Top Flite Precision Magnetic Prop Balancer (TOPQ5700) in the workshop and keep a Great Planes Fingertip Prop Balancer (GPMQ5000) in our flight box.

## Range Check

Ground check the operational range of your radio before the first flight of the day. With the transmitter antenna collapsed and the receiver and transmitter on, you should be able to walk at least 100 feet away from the model and still have control. Have an assistant stand by your model and, while you work the controls, tell you what the control surfaces are doing. Repeat this test **with the motor running** at various speeds with an assistant holding the model, using hand signals to show you what is happening. 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 cell, or a damaged receiver crystal from a previous crash. The problem may be the location of the antenna. The antenna should be as far away from the ESC and battery as possible.

## MOTOR SAFETY PRECAUTIONS

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

- Get help from an experienced pilot when learning to operate electric motors.
- Use safety glasses when running electric motors.
- Do not run the motor 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 run the motor.
- 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.
- The motor gets hot! Do not touch it during or right after operation.
- **When working on your plane, remove the propeller if the motor battery will be connected.**
- **Always remove the motor battery from the plane when charging.**
- **Follow the charging instructions included with your charger for charging LiPo batteries. LiPo batteries can cause serious damage if misused.**

## AMA SAFETY CODE

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.**

## CHECK LIST

During the last few moments of preparation your mind may be elsewhere anticipating the excitement of the first flight. Because of this, you may be more likely to overlook certain checks and procedures that should be performed before the model is flown. To help avoid this, a check list is provided to make sure these important areas are not overlooked. Many are covered in the instruction manual, so where appropriate, refer to the manual for complete instructions. Be sure to check the items off as they are completed (that's why it's called a *check list!*).

- 1. Check the C.G. according to the measurements provided in the manual.
- 2. Be certain the battery and receiver are securely mounted in the fuse. Simply stuffing them into place with foam rubber is not sufficient.
- 3. Extend your receiver antenna and make sure it has a strain relief inside the fuselage to keep tension off the solder joint inside the receiver.
- 4. Balance your model *laterally* as explained in the instructions.
- 5. Use threadlocking compound to secure critical fasteners such as the motor screws, wheel collar SHC screws and screw-lock pushrod connectors, etc.
- 6. Add a drop of oil to the axles so the wheels will turn freely.
- 7. Make sure all hinges are **securely** glued in place.
- 8. Reinforce holes for wood screws with thin CA where appropriate (servo mounting screws, control horn screws, etc.).
- 9. Confirm that all controls operate in the correct direction and the throws are set up according to the manual.
- 10. Make sure there are silicone retainers on all the clevises and that all servo arms are secured to the servos with the screws included with your radio.
- 11. Secure connections between servo wires and Y-connectors or servo extensions with vinyl tape, heat shrink tubing or special clips suitable for that purpose.
- 12. Make sure any servo extension cords you may have used do not interfere with other systems (servo arms, pushrods, etc.).
- 13. Balance your propeller (and spare propellers).
- 14. Tighten the propeller nut and spinner.
- 15. Place your name, address, AMA number and telephone number on or inside your model.
- 16. If you wish to photograph your model, do so before your first flight.
- 17. Range check your radio when you get to the flying field.
- 18. **NOTE:** If you plan to fly aggressive 3D maneuvers such as blenders, consider adding a piece of clear tape to the canopy for additional security.

## FLYING

**NOTE:** If you plan to fly aggressive 3D maneuvers such as blenders, consider adding a piece of clear tape to the canopy for additional security.

The Extra 300SP EP is a great-flying model that flies smoothly and predictably. The Extra 300SP does not, however, possess the self-recovery characteristics of a primary R/C trainer and should be flown only by experienced R/C pilots.

**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. The best thing to do when flutter is detected is to slow the model **immediately** by reducing power, then 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 you get ready to takeoff, 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. If you need to calm your nerves before the maiden flight, bring the model back into the pits, peak the battery and check all fasteners and control linkages for peace of mind.

Remember to takeoff into the wind. When you're ready, 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, 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 motor 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

For reassurance and to keep an eye on other air traffic, it is a good idea to have an assistant on the flight line with you. Tell him to remind you to throttle back once the plane gets to a comfortable altitude. The Extra 300SP EP with the recommended power system will only require full throttle in short bursts. Most aerobatic flight can be performed at around ½ throttle. If you observe the flight of some of the best aerobatic pilots, they very seldom use full throttle.

Take it easy with the Extra 300SP EP for the first flight, 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 battery, 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 (or having your assistant write them down) of what trim or C.G. changes may be required to fine tune the model so it flies the way you like. Mind your battery power level, but use this first flight to become familiar with your model before landing. With most electric planes it is best to have a timer set on your transmitter or a separate timer with an alarm to alert you when the battery may be getting low. This will require a few flights before determining the maximum flight time you can achieve with the batteries. This will prevent the downwind auto motor cutoff over the end of the flying field. With the plane properly trimmed you will want to get started with some aerobatics. This plane is capable of just about every aerobatic maneuver you can do. Become familiar with the high and low rate settings before using the 3D rates. If you have not flown an airplane with 3D rates you should work your way into these higher 3D rates cautiously. The extreme throws can stall the airplane if you are not careful. Over controlling could also result in unwanted snaps. If you have not flown 3D you might want to consider getting help from an experienced 3D pilot. When executing “down line” maneuvers it is important to use good throttle management. Full power down lines could result in over stressing of the aircraft.

## Landing

To initiate a landing approach, lower the throttle while on the downwind leg. Allow the nose of the model to pitch downward to gradually bleed off altitude. 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) and climb out to make another attempt. When you're ready to make your landing flare and 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.

One final note about flying your model. Have a goal or flight plan in mind for **every** flight. This can be learning a new maneuver(s), improving a maneuver(s) you already know, or learning how the model behaves in certain conditions (such as on high or low rates). This is not necessarily to improve your skills (*though it is never a bad idea!*), but more importantly so you do not surprise yourself by impulsively attempting a maneuver and suddenly finding that you've run out of time, altitude or airspeed. Every maneuver should be deliberate, not impulsive. For example, if you're going to do a loop, check your altitude, mind the wind direction (anticipating rudder corrections that will be required to maintain heading), remember to throttle back at the top, and make certain you are on the desired rates (high/low rates). A flight plan greatly reduces the chances of crashing your model just because of poor planning and impulsive moves. **Remember to think.**

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

**GOOD LUCK AND GREAT FLYING!**

This model belongs to:

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Name

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Address

---

City, State, Zip

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Phone Number

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AMA Number

