Venus™ 40 ARF

INSTRUCTION MANUAL

Wingspan: 55 in [1400mm]
Wing Area: 568 sq in [36.6 dm²]
Weight: 4.8 to 5.3 lbs [2180 to 2410g]
Wing Loading: 19.5 to 21.5 oz/sq ft [59 to 66 g/dm²]
Length: 54 in [1370mm]
Radio: 4-Channel (5 servos)
Engine: .40 - .51 cu in [6.5 - 8.5cc] two-stroke, .52 – .70 cu in [8.5 - 11.5cc] four-stroke

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.

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

GREAT PLANES® MODEL MANUFACTURING COMPANY
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GPMZ0238 for GPMA1025 V1.1

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INTRODUCTION

The Great Planes Venus 40 ARF is a versatile airplane designed for pattern training and sport flying. The Venus 40 ARF is neutrally stable. That means that it will stay in whatever position you put it in as long as it has enough flying speed. The model exhibits no roll or pitch coupling on knife edge when the C.G. is located at the recommended point. On low rates, this airplane likes doing large, smooth maneuvers, which is perfect for practicing all those precision aerobatic maneuvers. On high rates, it hovers great and does torque rolls with a .70 4-stroke. All in all, this airplane is a low cost approach to pattern aerobatics that will give you many hours of fun.

For the latest technical updates or manual corrections to the Great Planes Venus 40 ARF visit the web site listed below and select the Great Planes Venus 40 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.

http://www.greatplanes.com/airplanes/index.html

PROTECT YOUR MODEL, YOURSELF & OTHERS...FOLLOW THESE IMPORTANT SAFETY PRECAUTIONS

1. Your Great Planes Venus 40 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 Venus 40 ARF, if not assembled and operated correctly, could possibly cause injury to you 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 engine 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 already an experienced R/C pilot, you should fly the model only with the help of a competent, experienced R/C pilot.

8. While this kit has been flight tested to exceed normal use, if the plane will be used for extremely high stress flying, such as extreme 3D flying, the modeler is responsible for taking steps to reinforce the high stress points.

9. Remove the identification tag from the decal sheet, fill it out and place it on or inside the model.

We, as the kit manufacturer, provide you with a top quality 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.

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

If you 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.

In addition to joining an R/C club, we strongly recommend you join the AMA (Academy of Model Aeronautics). AMA membership is required to fly at AMA sanctioned clubs. There are over 2,500 AMA chartered clubs across the country. Among other benefits, the AMA provides insurance to its members who fly at sanctioned sites and events. Additionally, training programs and instructors are available at AMA club sites to help you get started the right way. Contact the AMA at the address or toll-free telephone 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

ADDITIONAL ITEMS REQUIRED

Hardware & Accessories

This is the list of hardware and accessories required to finish the Venus 40 ARF. Order numbers are provided in parentheses.

- ❏ 1/2 oz. Thin Pro™ CA (GPMR6001)
- ❏ .40 to .51 2-Stroke or .52 to .70 4-stroke engine
- ❏ Suitable propellers *(refer to the engine manufacturer's recommendations)*
- ❏ 3' Medium fuel tubing (GPMQ4131)
- ❏ Switch and charge jack mounting set (GPMM1000)
- ❏ Williams Brothers 1/5 scale standard pilot (WBRQ2477)
- ❏ R/C foam rubber (1/4"-HCAQ1000, or 1/2" HCAQ1050)
- ❏ Great Planes Aluminum Fuel Line Plug (GPMQ4166)

If you plan to use a non-computer radio you will also need:

- ❏ 4-channel radio with five servos (two aileron servos)
- ❏ Y-harness for dual aileron servos (HCAM2500 for Futaba® J)

If you plan to use a computer radio you will also need:

- ❏ 5-channel radio with five servos (two aileron servos)
- ❏ (2) 6" Servo extension cords (HCAM2000 for Futaba J)

Adhesives & Building Supplies

In addition to common household tools and hobby tools, this is the "short list" of the most important items required to build the Venus 40 ARF. ***Great Planes Pro***™ *CA and Epoxy glues are recommended.*

- ❏ Top Flite® MonoKote® sealing iron (TOPR2100)
- ❏ Top Flite Panel Line Pen (TOPQ2510)
- ❏ 1/2 oz. Thin Pro CA (GPMR6001)
- ❏ 1/2 oz. Medium Pro CA+ (GPMR6007)
- ❏ 30-Minute Epoxy (GPMR6047)
- ❏ Pacer Canopy Glue Formula 560 (PAAR3300)
- ❏ Hobby knife (HCAR0105)
- ❏ #11 blades (HCAR0211)
- ❏ Small T-pins (HCAR5100)
- ❏ Builder's triangle (HCAR0480)
- ❏ Electric drill and 1/16" [1.6mm], 3/32" [2.4mm], 7/64" [2.8 mm], 5/32" [4 mm] drill bits.
- ❏ Small phillips and flat blade screwdrivers
- ❏ Pliers with a wire cutter (HCAR0630)
- ❏ 6-32 Tap and drill set (GPMR8102)
- ❏ Great Planes Pro Thread Locking Compound (GPMR6060)
- ❏ Heat shrink tubing (GPMM1060)
- ❏ Curved-tip Canopy Scissors (for trimming plastic parts, HCAR0667)

Optional Supplies & Tools

Here is a list of optional tools mentioned in the manual that will help you build the Great Planes Venus 40 ARF.

- ❏ Easy Fueler™ fuel filling valve for glow fuel (GPMQ4160)
- ❏ Top Flite MonoKote heat gun (TOPR2000)
- ❏ Great Planes CG Machine™ (GPMR2400)
- ❏ Top Flite Precision Magnetic Prop Balancer™ (TOPQ5700)
- ❏ Top Flite Hot Sock™ iron cover (TOPR2175)
- ❏ Hobbico Hot Knife™ (HACR0770)
- ❏ Straightedge with scale (HCAR0475)

- ❏ Cutting mat (HCAR0456)
- ❏ CA Debonder (GPMR6039)
- ❏ CA Applicator tips (HCAR3780)
- ❏ CA accelerator (GPMR6034)
- ❏ 6-Minute epoxy (GPMR6045)
- ❏ Epoxy brushes (GPMR8060)
- ❏ Mixing sticks (GPMR8055)
- ❏ Denatured alcohol (for epoxy clean up)
- ❏ Non-elastic monofilament or Kevlar® fishing line (for stab alignment)
- ❏ Rotary tool such as a Dremel® Multi-Tool™ (for fiberglass cowl)
- ❏ Dead Center™ Engine Mount Hole Locator (GPMR8130)
- ❏ Great Planes AccuThrow™ Deflection Gauge (for measuring control throws, GPMR2405)
- ❏ Hobbico Servo Horn Drill (HCAR0698)
- ❏ Great Planes Plan Protector (GPMR6167)
- ❏ Great Planes Groove Tube™ (GPMR8140)
- ❏ Robart Superstand II (ROBP1402)
- ❏ Paper towels

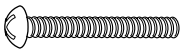
IMPORTANT BUILDING NOTES

• There are two types of screws used in this kit:

Sheet metal screws are designated by a number and a length. **For example #6 x 3/4" [19mm].**

This is a number six (6) screw that is 3/4" [19mm] long.

Machine screws are designated by a number, threads per inch, and a length. **For example 4-40 x 3/4" [19mm]. SHCS** is just an abbreviation for “socket head cap screw” which is a machine screw with a socket head.



This is a number four (4) screw that is 3/4" [19mm] long with forty (40) 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.

• Whenever just ***epoxy*** is specified you may use ***either*** 30-minute (***or*** 45-minute) epoxy ***or*** 6-minute epoxy. When 30-minute epoxy is specified it is **highly** recommended that you use only 30-minute (or 45-minute) epoxy, because you will need the working time and/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 Great Planes Venus 40 ARF 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.

True Red – TOPQ0227
Jet White – TOPQ0204
Cub Yellow – TOPQ0220
Teal – TOPQ0223
Royal Blue – TOPQ0221
Circus Pink – TOPQ0215
Metallic Plum – TOPQ0403
Orange – TOPQ0202
Dove Gray – TOPQ0211

ORDERING REPLACEMENT PARTS

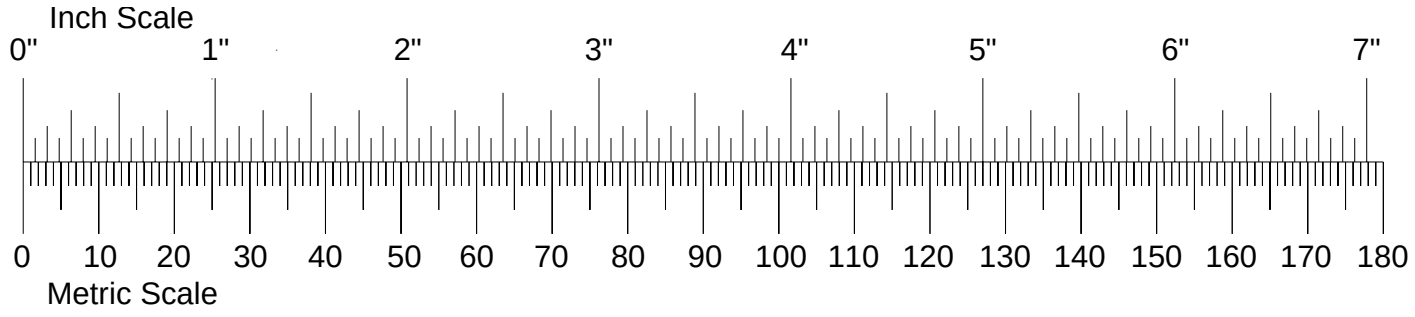
To order replacement parts for the Great Planes Venus 40 ARF, use the order numbers in the **Replacement Parts List** that follows. Replacement parts are available only as listed. Not all parts are available separately (an aileron cannot be purchased separately, but is only available with the wing kit). 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. If you need assistance locating a dealer to purchase parts, visit **www.greatplanes.com** and click on "Where to Buy." If this kit is missing parts, contact **Great Planes Product Support.**

Replacement Parts List

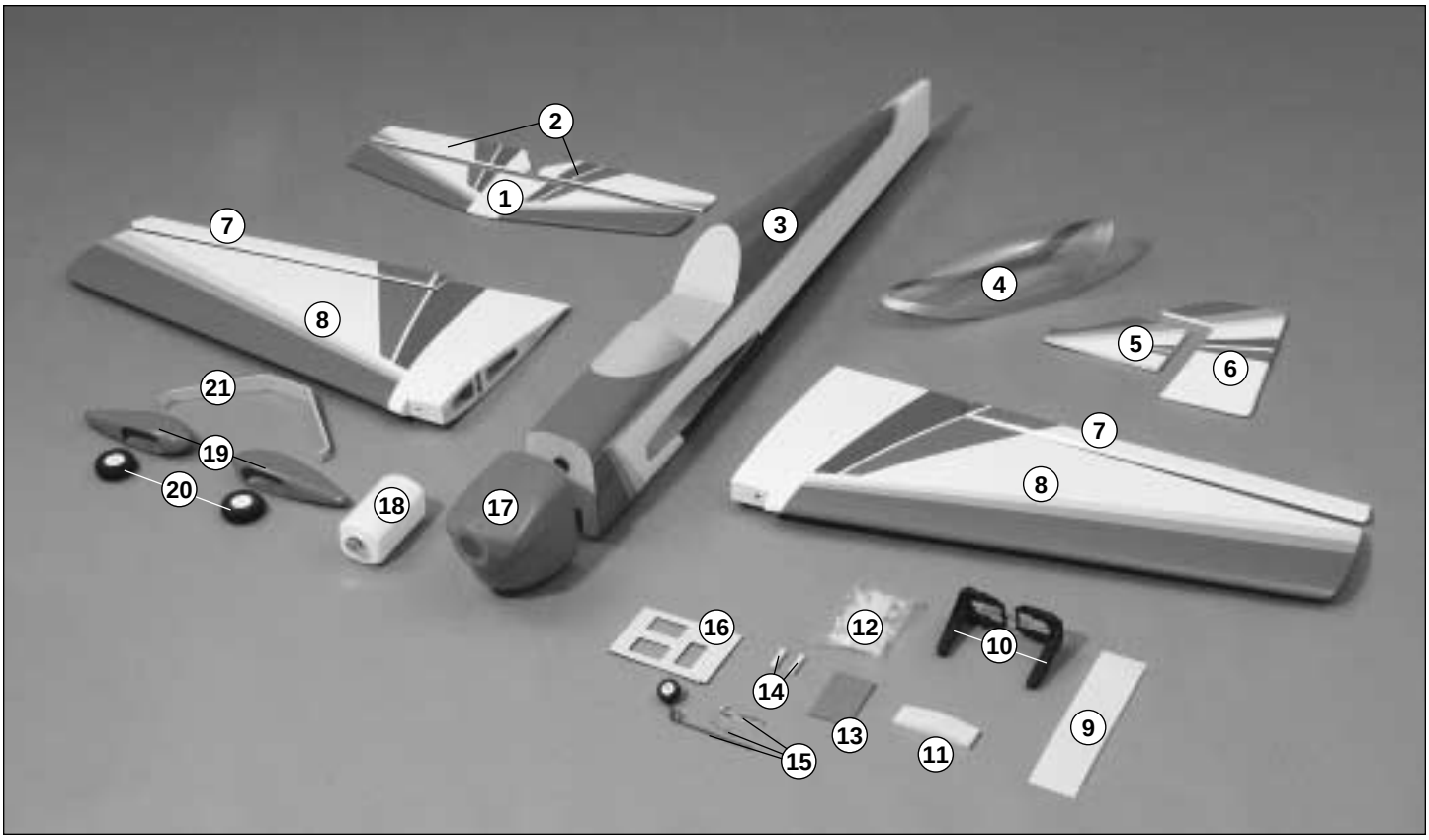
Order Number	Description	How to Purchase
	Missing pieces	Contact Product Support
	Instruction manual	Contact Product Support
	Full-size plans	Not available
GPMA2270	Wing Set	Contact Your Hobby Supplier To Purchase These Items
GPMA2271	Fuse Set	
GPMA2272	Tail Set	
GPMA2274	Cowl	
GPMA2275	Canopy	
GPMA2273	Landing Gear	
GPMA2276	Wheel Pants	
GPMA2277	Decal Sheet	

Metric Conversions

1/64"	=	.4 mm	3/8"	=	9.5 mm	12"	=	304.8 mm
1/32"	=	.8 mm	1/2"	=	12.7 mm	18"	=	457.2 mm
1/16"	=	1.6 mm	5/8"	=	15.9 mm	21"	=	533.4 mm
3/32"	=	2.4 mm	3/4"	=	19.0 mm	24"	=	609.6 mm
1/8"	=	3.2 mm	1"	=	25.4 mm	30"	=	762.0 mm
5/32"	=	4.0 mm	2"	=	50.8 mm	36"	=	914.4 mm
3/16"	=	4.8 mm	3"	=	76.2 mm			
1/4"	=	6.4 mm	6"	=	152.4 mm			



KIT CONTENTS



Kit Contents (Photographed)

1	Stab	9	CA Hinge Material	17	Fiberglass Cowl
2	Elevators	10	Engine Mount	18	Fuel Tank
3	Fuselage & Belly Pan	11	Dihedral Brace	19	Wheel Pants
4	Canopy	12	Hardware Bag	20	Foam Wheels
5	Fin	13	Wing Bolt Plate	21	Aluminum Landing Gear
6	Rudder	14	Wing Dowels		
7	Ailerons	15	Tail Wheel Components		
8	Wing Panels	16	Servo Tray		

Kit Contents (Not Photographed)

(5) Large Control Horns	(2) 5/32" Wheel Collars	(4) #2 Flat Washers
(3) 2-56 x 36" Threaded On One End Pushrods	(2) 6-32 x 1/4" Socket Head Cap Screws	(2) 8-32 x 1-1/4" Socket Head Cap Screws
(1) 2-56 x 17-1/2" Threaded On One End Pushrod	(2) 1/4-20 x 2" Nylon Bolts	(4) 8-32 Hex Nuts
(2) 2-56 x 12" Threaded On One End Pushrods	(10) 2-56 x 5/8" Bolts	(2) 3/16" Wheel Collars
(6) 2-56" Nylon Clevises	(10) #6 Flat Washers	(2) #8 Flat Washers
(6) Silicone Retainers	(10) 6-32 x 3/4" Socket Head Cap Screws	(1) 11-3/4" Plastic Outer Pushrod
(4) FasLinks	(4) 6-32 Blind Nuts	
(1) Brass EZ Connector	(10) #6 Lock Washers	
(1) 4-40 x 1/4" Socket Head Cap Screw	(2) #4 x 1/2" Screws	
(1) Nylon EZ Retainer	(4) #2 x 3/8" Screws	

PREPARATIONS

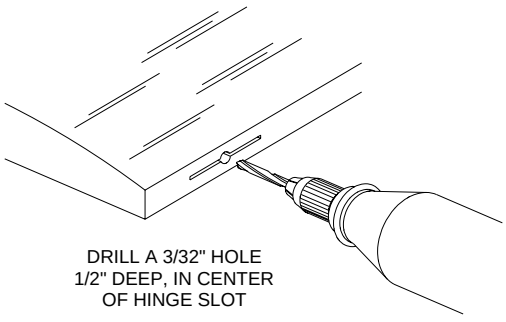
❏ 1. If you have not done so already, remove the major parts of the kit from the box (wings, fuselage, cowl, tail parts, etc.) and inspect them for damage. If any parts are damaged or missing, contact Product Support at the address or telephone number listed in the front cover.

❏ 2. Remove the masking tape and separate the **ailerons** from the **wing**, the **elevators** from the **stab**, and the **rudder** from the **fin**. Use a covering iron with a covering sock on high heat to tighten the model's covering if necessary. Apply pressure over sheeted areas to thoroughly bond the covering to the wood.

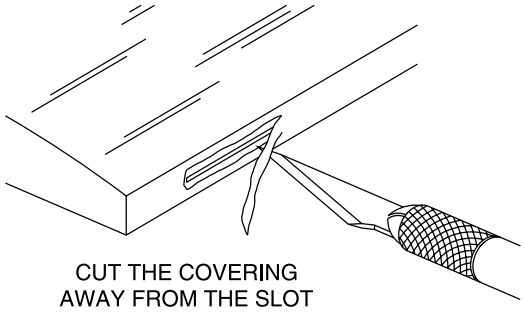
ASSEMBLE THE WING

Attach the Ailerons

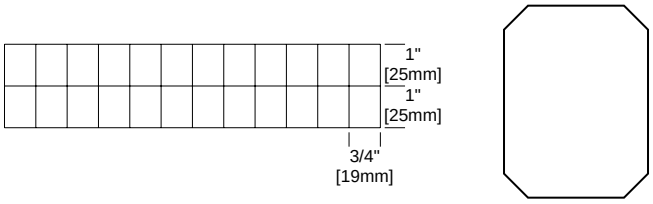
❏ 1. The first steps in the construction of this wing will be the installation of the ailerons and the aileron servos. The process described here will explain how to install the right aileron and the right aileron servo. The process has to be repeated again to install the left aileron and the left aileron servo, or you can work on both at the same time.



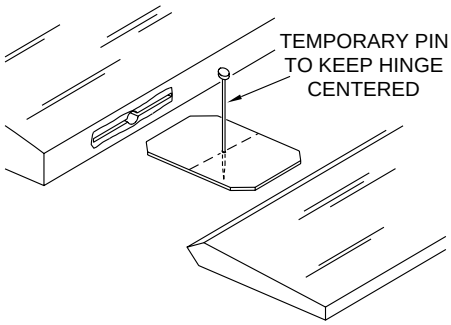
❏ ❏ 2. Locate the pre-cut hinge slots on the wing's trailing edge and the leading edge of the aileron. Drill a 3/32" [2.4mm] hole, 1/2" [12mm] deep in the center of each hinge slot to allow the CA to "wick" in. Follow-up with a #11 blade to clean-out the slots. **Hint:** If you have one, use a high-speed rotary tool to drill the holes.



❏ ❏ 3. Use a sharp #11 blade to cut a strip of covering from the hinge slots in the wing and aileron.



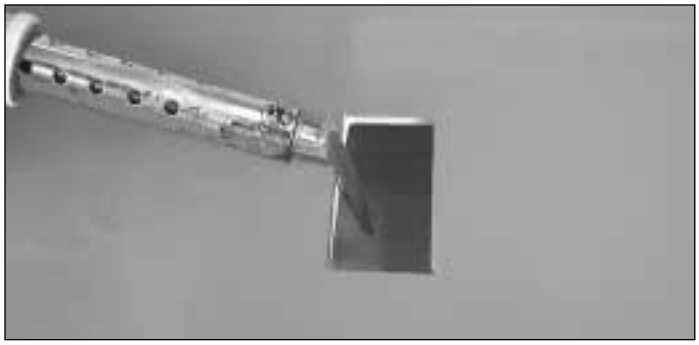
❏ ❏ 4. Cut four 3/4" x 1" [19mm x 25mm] hinges from the CA hinge strip. Snip off the corners so they go in easier.



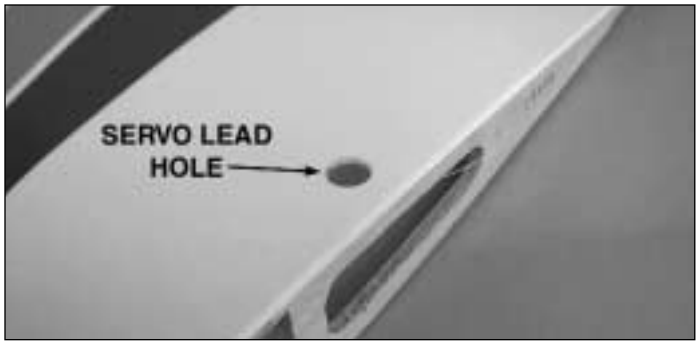
❏ ❏ 5. Test fit the ailerons to the wing with the hinges. If the hinges do not remain centered, stick a pin through the middle of the hinge to hold it in position.

❏ ❏ 6. Remove any pins you may have inserted into the hinges. Adjust the aileron so that there is a small gap between the LE of the aileron and the wing. The gap should be small–just enough to see light through or to slip a piece of paper through.

❏ ❏ 7. Apply six drops of thin CA to the top and bottom of each hinge. Do not use CA accelerator. After the CA has fully hardened, test the hinges by pulling on the aileron.

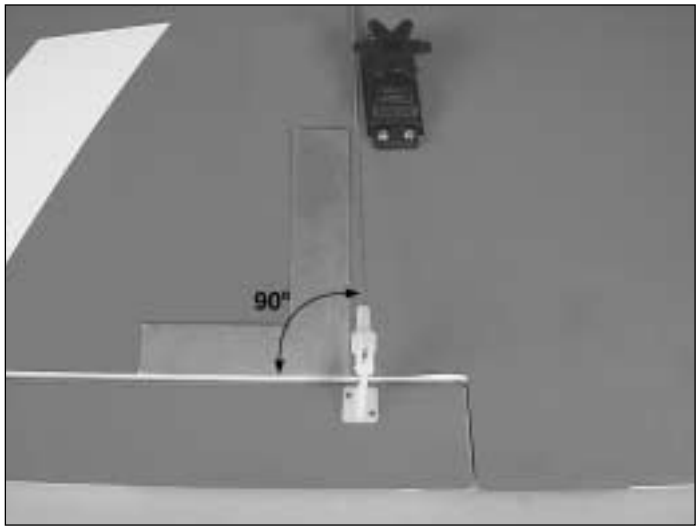


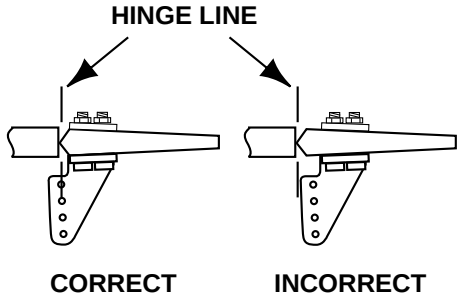
❏ ❏ 8. Feel through the MonoKote on the bottom surface of the wing and find the opening for the aileron servo. Cut the covering 1/8" [3.2mm] inside the opening. Use a sealing iron or trim seal tool to seal the covering to the edges of the opening.



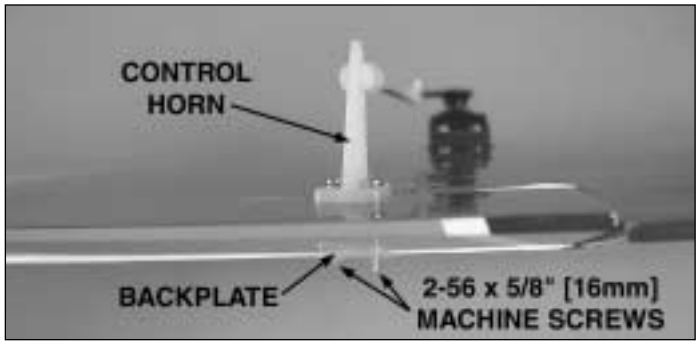
❏ ❏ 9. Feel through the MonoKote on the top surface of the wing and find the hole for the servo lead. Cut the covering at the edges of the hole and use a sealing iron to seal the MonoKote to the wing's structure.

❏ ❏ 10. Tie the string inside the aileron servo opening to the aileron servo lead. Pull the servo lead out of the end of the wing with the string, then pull the lead through the servo lead's hole in the top of the wing. Test fit the servo in the opening and trim the opening if necessary. Mark the location of the servo mounting screws and drill 1/16" [1.6mm] holes at the marks. Wick some thin CA in the holes you just made and install the aileron servo with the hardware that was supplied with it.

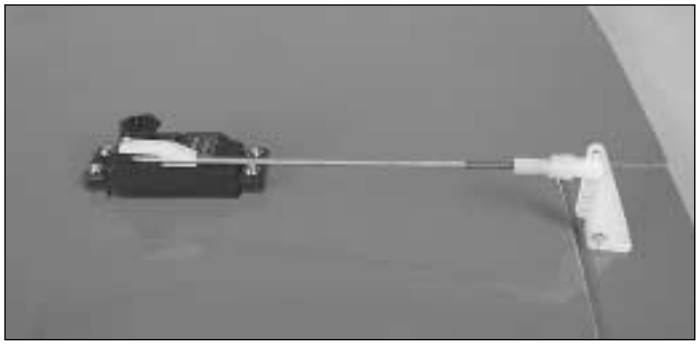


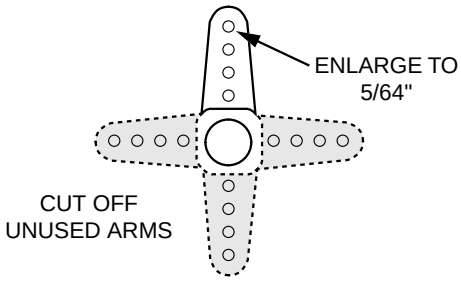


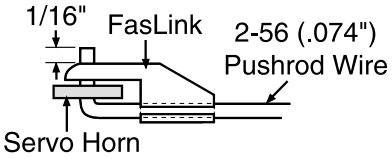
❏ ❏ 11. Thread a nylon clevis to one of the 12" [305mm] threaded on one end pushrods approximately 18 full turns. Connect the clevis to a large nylon control horn and slip a silicone retainer onto it. Align the pushrod 90 degrees to the aileron's edge as shown above and mark the control horn screw mounting holes on the aileron. Position the control horn on the aileron as shown in the above line drawing.



❏ ❏ 12. Use a 1/16" [1.6mm] drill bit to drill the control horn's screw holes. Wick some thin CA into the holes and mount the control horn using two 2-56 x 5/8mm" [16mm] machine screws and the control horn's back plate. You may cut away any excess threads.



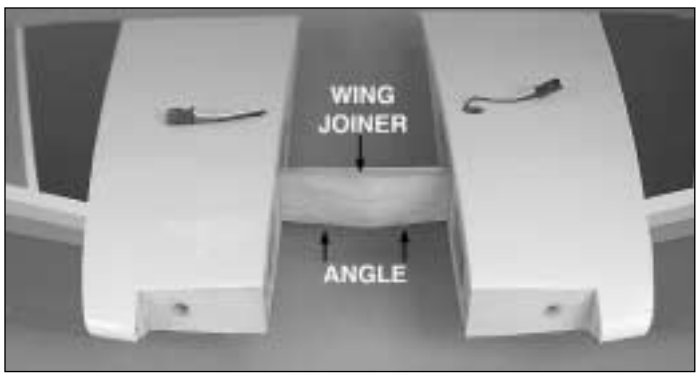




❏ ❏ 13. Cut up a servo arm as shown above, attach it to the servo and center it so that the servo arm is 90 degrees to the pushrod. Center the aileron and mark on the pushrod where it meets with the servo arm's hole. Enlarge the hole on the servo arm with a Hobbico Servo Horn Drill (or a #48 or 5/64" [2mm] drill bit). Bend the pushrod 90 degrees up and install a FasLink as shown in the sketch above. Cut away any excess wire, leaving 1/16" [1.6mm] protruding from the FasLink.

❏ 14. If you have not done so, go back to step 1 and finish the left wing the same way.

Join the Wing

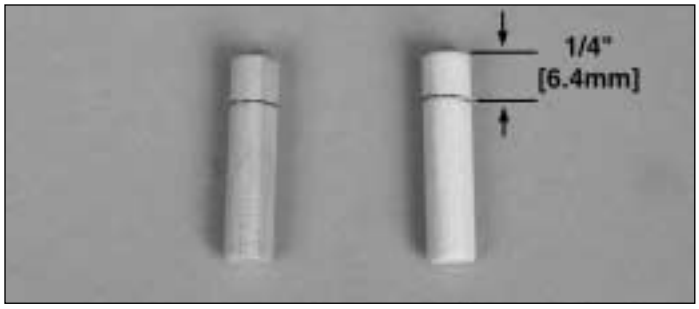


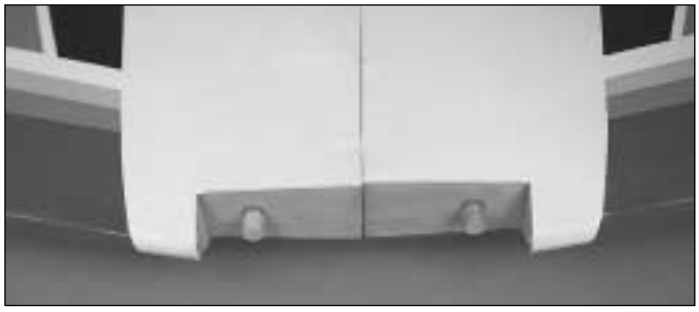
❏ 1. Tape the servo leads to the top of the wing to keep them out of the way when joining the wing panels. Test fit the wing halves with the **hardwood joiner**. Be certain that the dihedral angle on the wing joiner is pointing towards the bottom of the wing. You may need to sand the joiner slightly to obtain a perfect fit.

❏ 2. The following are critical steps in the construction of your model. You want to make sure you take as much time as necessary to glue the two wings together correctly. Epoxy should be used generously in each one of the following steps. Use 30-minute epoxy to allow enough time to fit the parts and to wipe off the excess glue with denatured alcohol and a paper towel.

❏ 3. Prepare 3/4 oz [22cc] of 30-minute epoxy. Apply epoxy to the right wing's wing joiner pocket and to the right side of the wing joiner. Insert the wing joiner into the pocket. Apply epoxy to the other half of the wing joiner, the left wing's wing joiner pocket and both root ribs. Hold both wings together tightly. Clean up any excess epoxy that squeezes out. Use masking tape to hold both wings together until the epoxy has cured. Again, wipe off any excess epoxy with alcohol and a paper towel. Set the wing aside and do not disturb until the epoxy has cured.

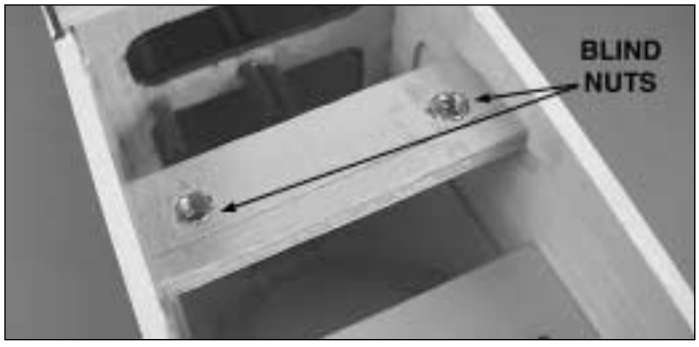
Note: If the panels are joined correctly and the fit is tight, you should obtain the correct dihedral. If you would like to check it, set the bottom of one wing flat against your working surface. The bottom of the other wing tip should be raised 2-3/16" [55.5mm] from your working surface.



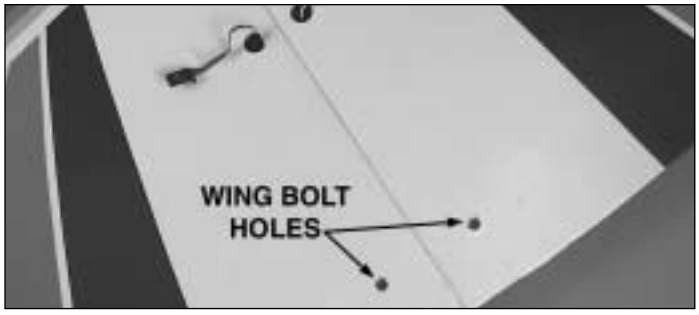


❏ 4. Find the two 1-1/4" x 1/4" [30mm x 6.4mm] **hardwood wing dowels** and make a mark on the dowels 1/4" [6.4mm] from the end of each as shown above. Sand the corners of the ends slightly. Mix a small amount of epoxy and drop it into the wing's dowel holes. Also apply some epoxy on the dowels. Insert the dowels up to the mark you just made, so that just 1/4" [6.4mm] of each dowel protrudes. Clean up any excess epoxy.

Mount the Wing on the Fuselage

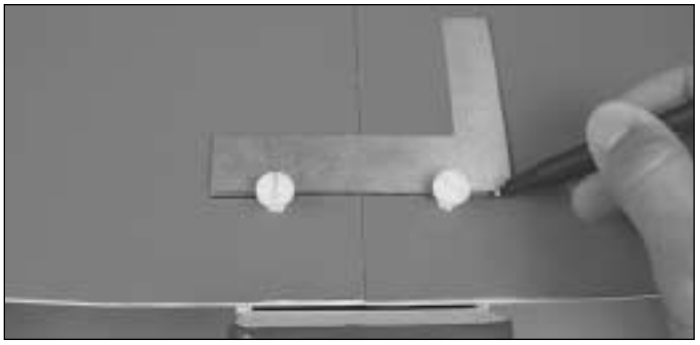


❏ 1. Inspect the blind nuts that are pressed into the wing bolt plate in the **fuselage**. Apply a little epoxy around them on the inside of the plate to prevent them from becoming loose. Do not get epoxy in the blind nuts.

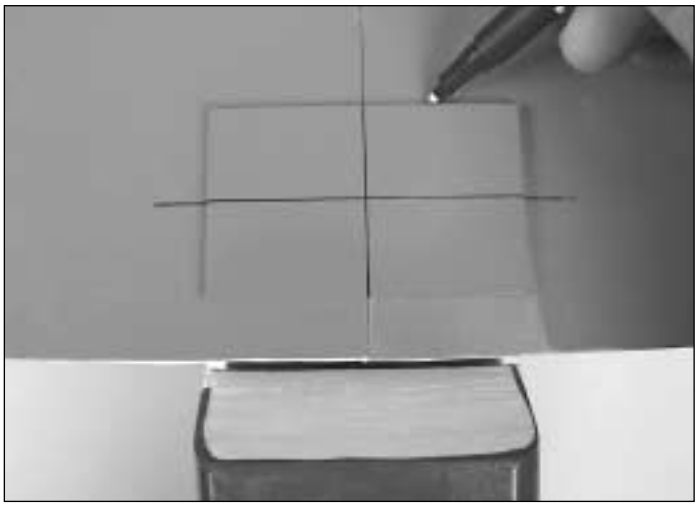


❏ 2. Feel through the MonoKote at the trailing edge of the wing for the pre-drilled wing bolt holes. Cut away the MonoKote on the top and bottom of the wing and seal with a sealing iron.

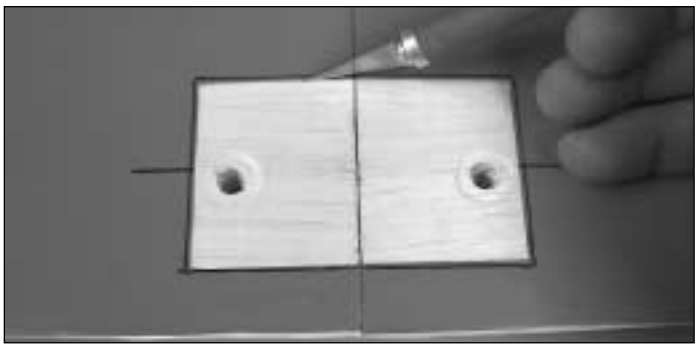
❏ 3. Test fit the wing to the fuse and bolt it in position using two 1/4-20 x 2" [51mm] nylon bolts. If necessary, enlarge or adjust the wing bolt holes in the wing so the wing bolts will align with the blind nuts.



❏ 4. Unscrew the wing bolts about 1/2" [12mm]. Place a ruler against the bolts as shown and with a Top Flite Panel Line Pen, mark a line along the edge of the ruler. Remove the wing bolts.



❏ 5. Find the 1/8" x 1-1/4" x 2-7/8" [3.2mm x 32mm x 73mm] **wing bolt plate**. Draw two centerlines on the wing bolt plate. Line up the centerlines on the wing bolt plate with the bolt line you previously drew and the centerline of the wing. Mark the edges of the wing bolt plate on the wing. Remove the wing from the plane.

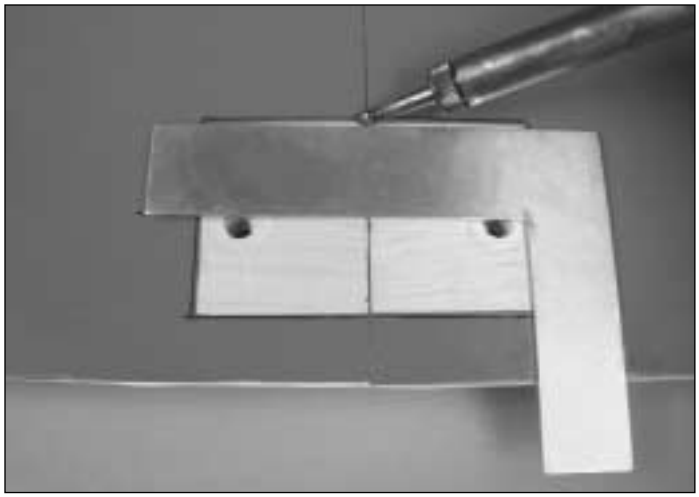


❏ 6. Cut the MonoKote 1/16" [1.6mm] inside of the lines you just made. Use a sharp #11 hobby knife or use the ***Expert***

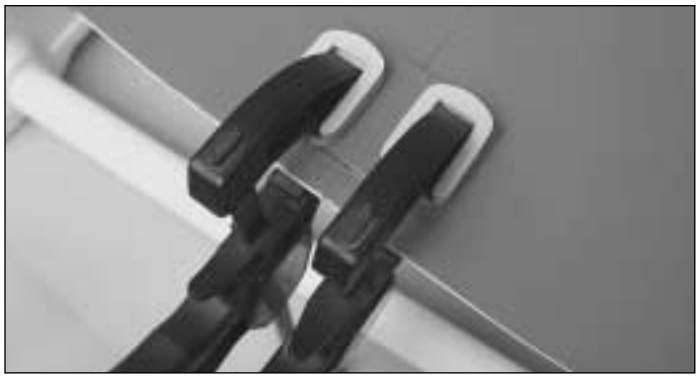
Tip that follows to cut the covering from the wing. Use care to cut **only into the covering** and **not into the wood**.

EXPERT TIP

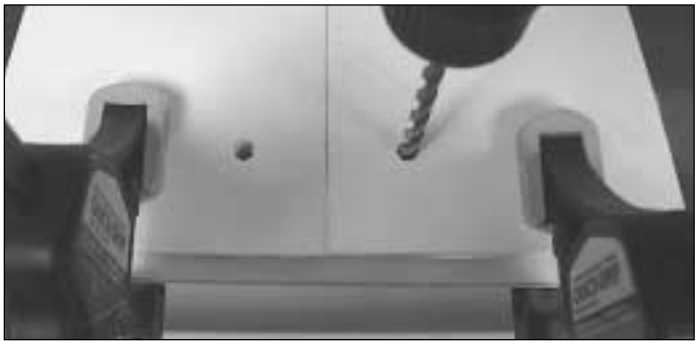
HOW TO CUT COVERING FROM BALSA



Use a soldering iron to cut the covering from the wing. 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.

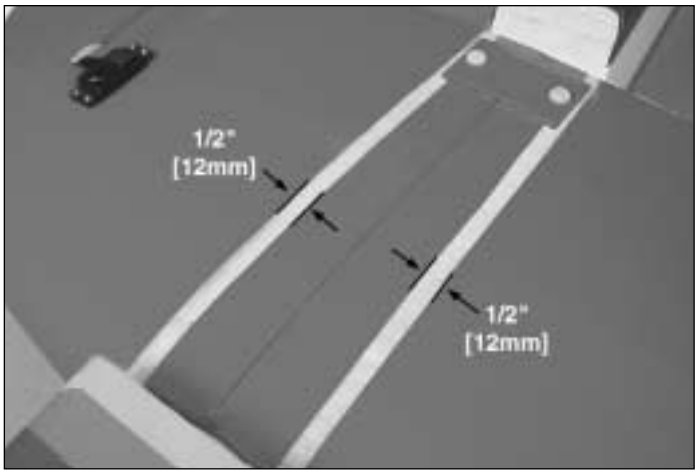


❑ 7. Glue the wing bolt plate in place with epoxy. Clamp the plate in place so that it does not move while the epoxy cures. Clean off any excess epoxy with a paper towel and alcohol and let cure.

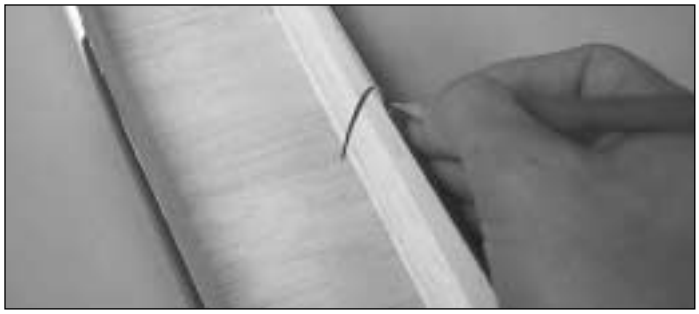


❑ 8. Flip the wing over. Use a 1/4" [6.4mm] drill bit through the pre-drilled wing bolt holes to drill through the wing bolt plate as shown. **Hint:** If you clamp a 1/4" [6.4mm] piece of wood (not included) to the bottom of the wing right under the wing bolt plate the wood will not splinter. Use thin CA to strengthen the hole.

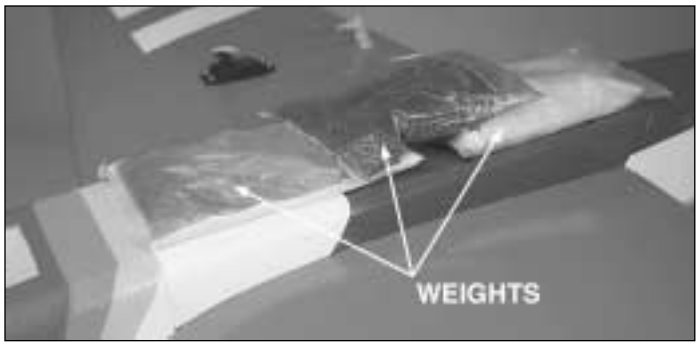
❑ 9. Install the wing on the fuselage using two 1/4-20 x 2" [51mm] nylon bolts. Find the **belly pan** and feel through the MonoKote for the two wing bolt holes. Cut away the MonoKote and seal the edges with a sealing iron. Fit the belly pan under the wing and mark its edges on the wing with a Top Flite Panel Line Pen. **Hint:** If you tape the belly pan to the fuselage for this step it will not move and it will be easier to mark both sides of the belly pan on the wing.



❑ 10. Remove the belly pan and use a hobby knife with a sharp #11 blade or follow the previous ***Expert Tip*** to cut the covering 1/16" [1.6mm] inside the lines you just marked. Be careful **not to cut the wood under the covering**. Make an additional cut 1/2" [12mm] inside the cuts already made. Peel the covering from the wing to expose the balsa wing sheeting. If necessary, seal the edges with a sealing iron.



❏ 11. Use a hobby knife with a sharp #11 blade to trim the covering on the belly pan 1/16" [1.6mm] away from the edge. Seal the MonoKote down with a sealing iron.

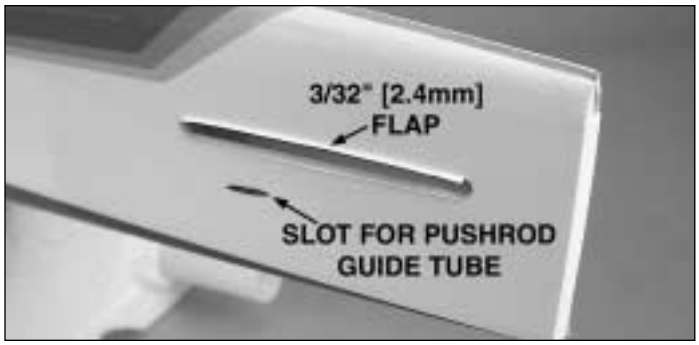


❏ 12. Use 30-minute epoxy to glue the belly pan to the wing. Make sure the belly pan is aligned with the fuselage. Use weights and/or tape to hold the belly pan in place. If you are afraid of gluing the belly pan to the fuselage, you can use some Plan Protector film or wax paper between the fuselage and the wing. Wipe off any excess epoxy using a paper towel and alcohol. Remove the weights once the epoxy has cured.

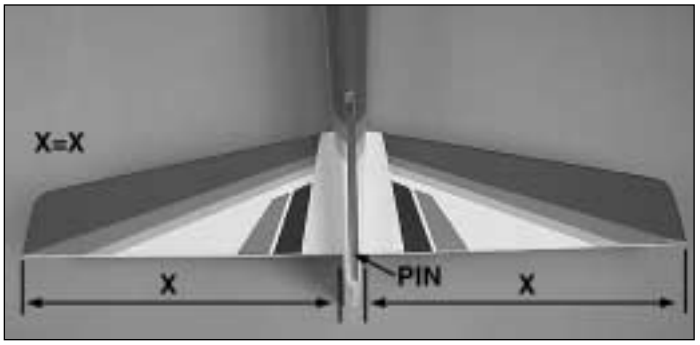
❏ 13. This completes your wing.

ASSEMBLE THE FUSELAGE

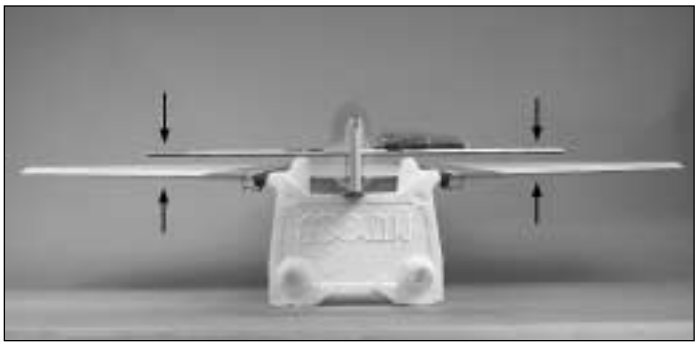
Install the Tail Surfaces



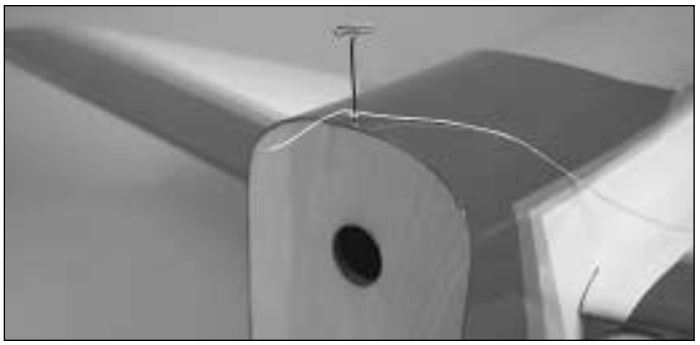
❏ 1. Cut the covering from the slots in the fuse for the stab and for the pushrod guide tubes. There should be two guide tubes for the elevator and one for the rudder. **Hint:** Cut the covering from the slots for the stab and fin 3/32" [2.4mm] from both edges, thus leaving flaps of covering that can be ironed to the stab and fin after gluing them into position.



❏ 2. Fit the stab into the fuse. Center the trailing edge by taking accurate measurements as shown in “X”=“X” in the photo. Once the trailing edge of the stab is centered, stick a pin through the fin slot into the stab’s trailing edge to keep it in position.

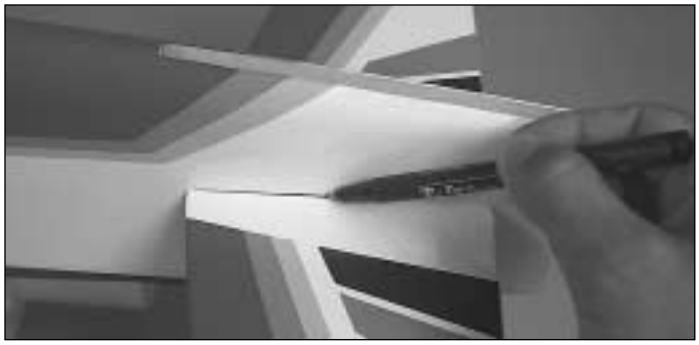


❏ 3. Bolt the wing to the fuse. Place the model in a building stand. Stand five to ten feet behind the model and view the stab and the wing. The stab and the wing should line up. If they do not line up, place a weight on the “high” side of the stab to bring it into alignment. If much weight is required, remove the stab and sand the “high” side of the slot in the fuse where the stab fits until the stab aligns with the wing.

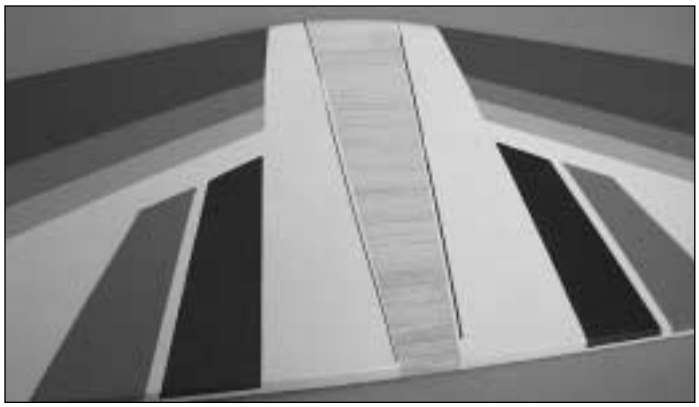


❏ 4. Stick a pin into the center of the fuselage on top of the firewall. Tie a small loop on one end of a 42" [1066mm] piece of non-elastic string such as a K & S #801 Kevlar thread (K+SR4575). Slip the loop in the string over the T-pin.

❏ 5. Fold a piece of masking tape over the end of the string and draw an arrow on it. Slide the tape along the string and align the arrow with one corner of the stab as shown in the photo. Swing the string over to the same position on the other corner of the stab. Rotate the stab and slide the tape along the string until the arrow aligns with both sides. Be certain the stab remains centered from side-to-side during this process.

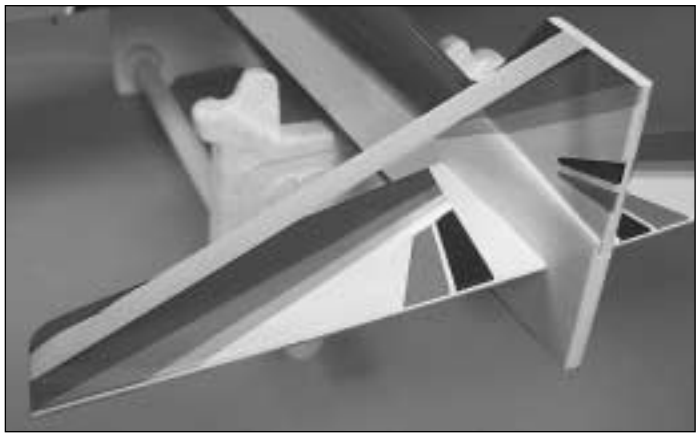


❏ 6. Use a Top Flite Panel Line Pen to mark the outline of the fuse onto the top and bottom of the stab.

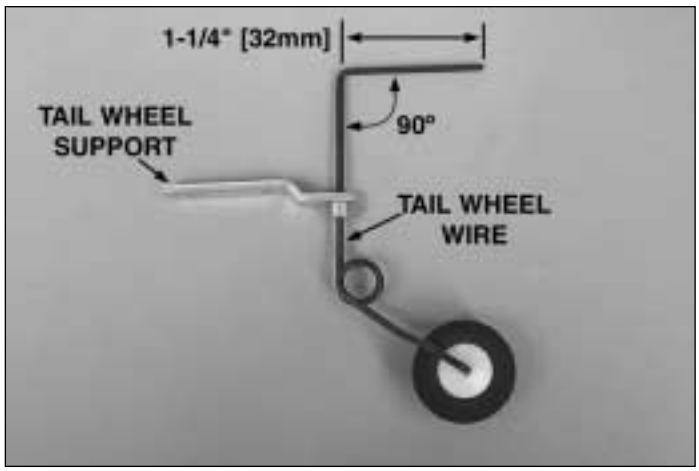


❏ 7. Remove the stab from the fuse. Use a sharp #11 hobby knife or use the ***Expert Tip on page 11*** to cut the covering 1/16" [1.6mm] inside of the lines you marked. Use care to cut **only into the covering and not into the wood**.

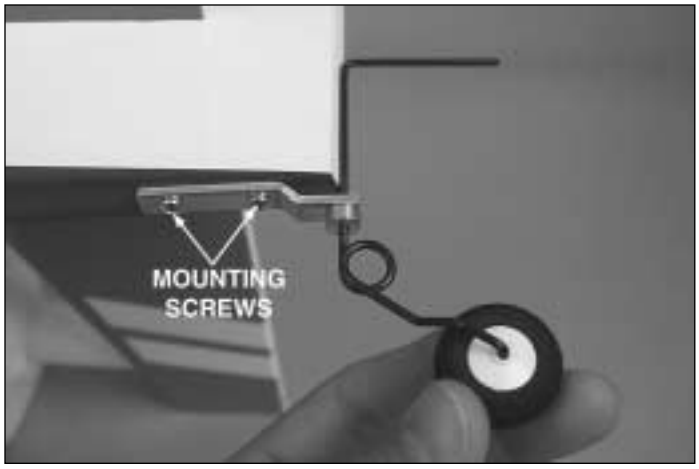
❏ 8. Use 30-minute epoxy to glue the stab into the fuse. For the most strength, apply epoxy to both sides of the stab and inside the fuse where the stab fits. Slide the stab into position. Wipe away residual epoxy with a paper towel and alcohol. Use the pin and string method to confirm the stab is aligned. Stand behind the model to check the stab's alignment with the wing. If you cut the covering as suggested over the slots in the fuse for the stab, carefully use a trim iron to iron the covering to the stab before the epoxy hardens. Do not disturb the model until the epoxy has fully hardened.



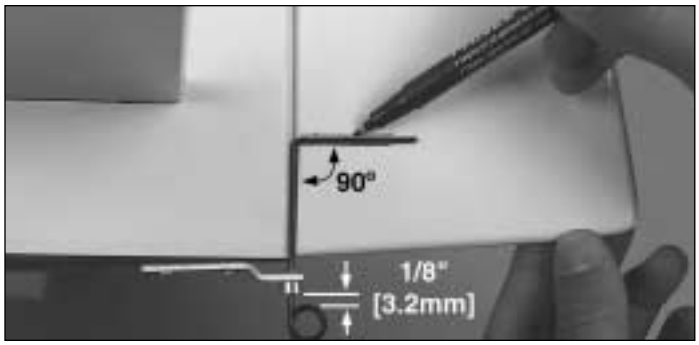
❏ 9. Fit the **fin** into the fuse. Mark the outline of the fuse onto the fin with a Top Flite Panel Line Pen. Just as you did with the stab, remove the covering 1/16" [1.6mm] away from the line. Glue the fin into position with 30-minute epoxy using a builder's square to make certain the fin is vertical. If necessary, pull the fin to one side or the other with masking tape until the fin is perpendicular to the stab.

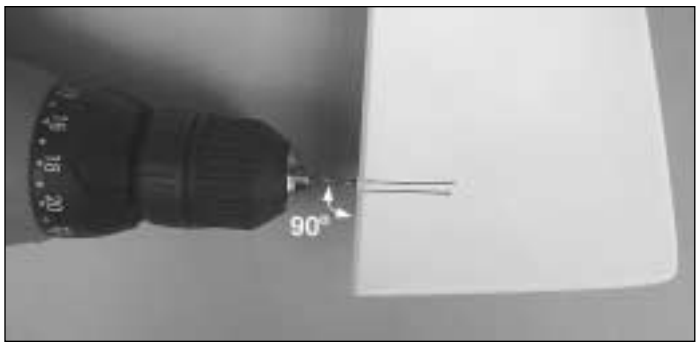


❏ 10. Insert the tail wheel wire in the tail wheel support. Mark the tail wheel wire 1-1/4" [32mm] from the end. Bend the wire 90 degrees as shown above. **Note:** Make sure the bent wire is in line with the tail wheel.

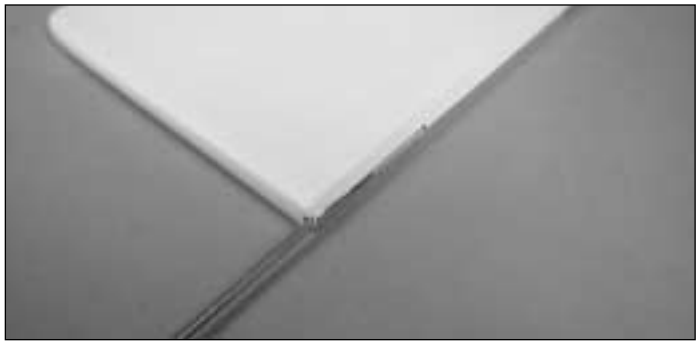


❏ 11. Position the tail wheel assembly in place and mark the location of the two mounting holes. Drill the two holes with a 1/16" [1.6mm] drill bit. Wick some thin CA in the holes. Install the tail wheel assembly using two #4 x 1/2" [12mm] screws as shown.





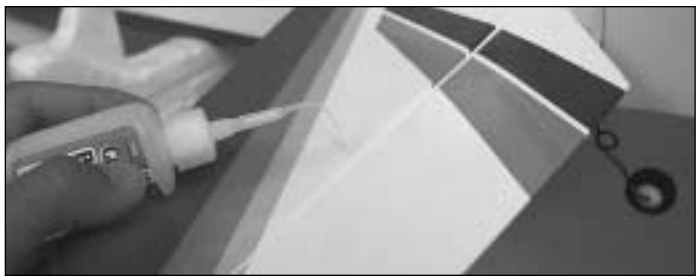
❏ 12. Position the **rudder** in place and mark where the tail wire is inserted in the rudder. The bottom of the tail wheel wire's first coil should be 1/8" [3.2mm] away from the tail wheel support as shown above. Use a 3/32" [2.4mm] drill bit to drill a hole into the rudder 1-1/4" [32mm] at the mark. Make sure the hole is perpendicular with the rudder's leading edge and be careful not to drill through the covering.



❏ 13. Use a Groove Tube or a sharpened 3/32" [2.4mm] brass tube to cut a groove on the leading edge of the rudder to accommodate the tail wheel wire.

❏ 14. Cut six CA hinges for the elevators and three for the rudder just as it was done for the ailerons.

❏ 15. Test fit the rudder on the fin with the tail wheel wire and the CA hinges. Adjust the groove and the hole on the leading edge of the rudder until everything fits well. Remove the rudder from the fin. Mix a small amount of 30-minute epoxy and wick it into the rudder's tail wheel wire hole. Install the rudder in position with the CA hinges just as it was done for the ailerons on page 7, and apply six drops of thin CA to each side of each CA hinge. Clean up any excess epoxy with a paper towel and alcohol.

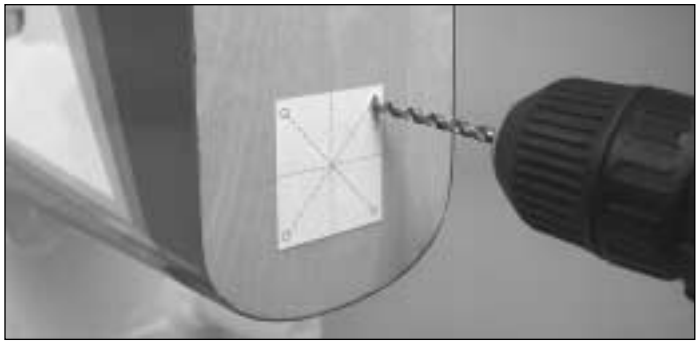


❏ 16. Follow steps two to seven of ***"Assemble the Wing"*** on page 7 to install the CA hinges on the elevator. **Important:** Make sure you apply six drops of thin CA on each side of each hinge.

Engine Installation

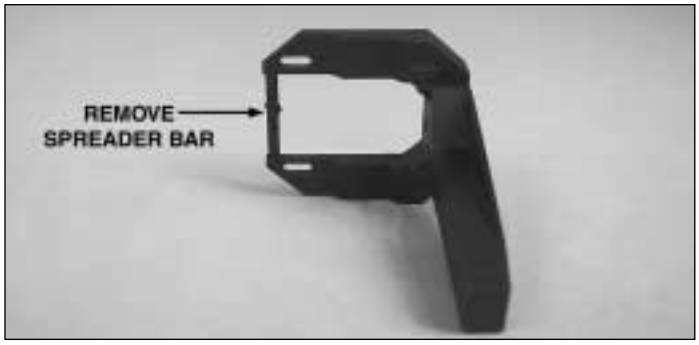
This airplane can use a wide variety of engines. This installation will show the installation of an O.S.® .46 FX. The procedure for installing other engines will be similar except for minor variations. The engine can be installed at different angles. On the instruction's model the engine was installed inverted because that is the position that requires the least cutting of the cowl.

Note: If you use a short engine such as the O.S. .40 L.A., you will need to use the **engine spacing template** on the back cover page to cut two 1/4" [6.4mm] plywood spacers to be glued on the firewall. You will also need to substitute 6-32 x 1-1/4" [32mm] SHCS for the 6-32 x 3/4" [19mm] SHCS included with this kit.

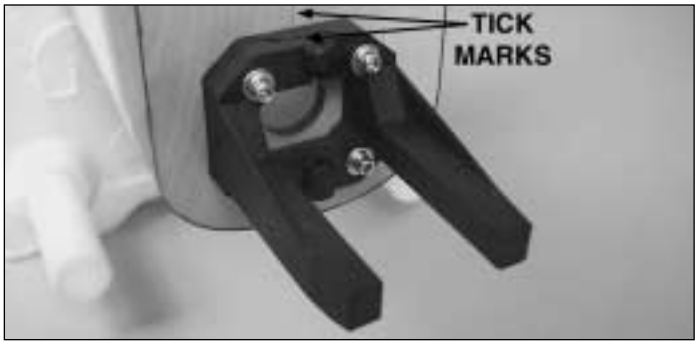


❏ 1. Cut the **engine mount template** from the back cover page. Use spray adhesive or tape to temporarily attach the template to the firewall. Align the template using the vertical and horizontal lines of the firewall. Drill 5/32" [4mm] holes through the firewall at the marks.

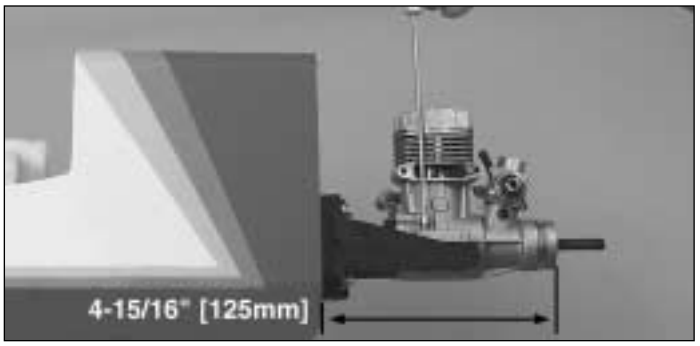
❏ 2. Install four 6-32 blind nuts into the holes on the back of the firewall. Use a small amount of epoxy on the blind nuts to keep them in place. Do not get epoxy in the threads.



❏ 3. Find the left and right engine mounts and cut off the spreader bar on both of them.

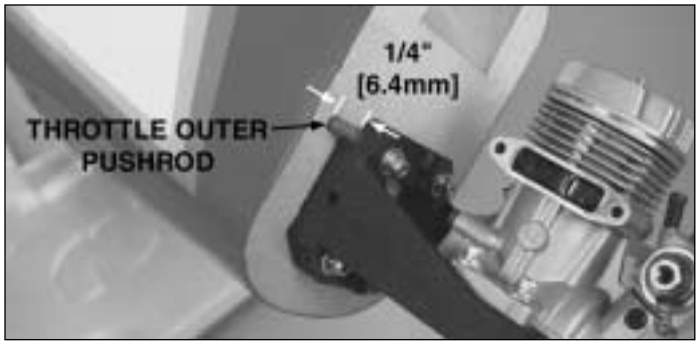


❏ 4. Remove the engine mount template. Mount the engine mount to the firewall with four 6-32 x 3/4" [19mm] SHCS, four #6 flat washers, and four #6 lock washers into the four 6-32 blind nuts, but do not fully tighten the SHCS. Place the engine on the mount and adjust the width of the mount to fit the engine. Center the molded-in "tick" marks on the engine mount with the marks on the firewall and tighten the mounting bolts. It would be a good idea to use some Great Planes Pro Thread Locking Compound on the engine mount bolts.

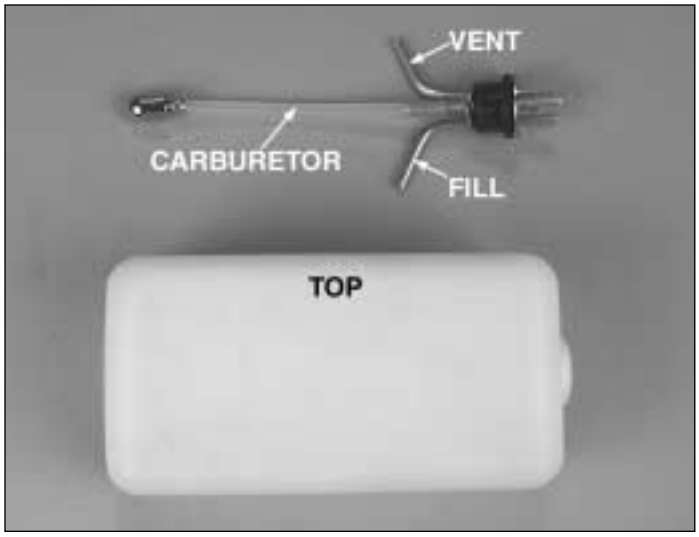


❏ 5. Position the engine so that the face of the drive washer is 4-15/16" [125mm] from the front of the fuse. Use a Great Planes Dead Center Engine Mount Hole Locator or your own method to mark the engine mount holes onto the engine mount. Drill the engine mount at the marks with a #36 (7/65" [2.8mm]) drill bit. Use a 6-32 tap to thread the hole for the engine bolts.

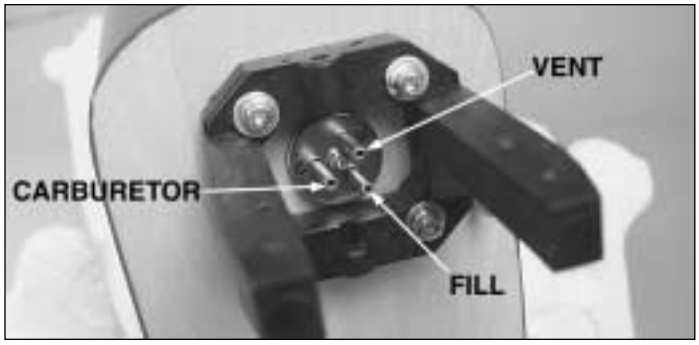
❏ 6. Install the engine using four 6-32 x 3/4" [19mm] SHCS, four #6 flat washers, and four #6 lock washers.



❏ 7. Mark the position of the throttle pushrod on the firewall. Remove the engine from the engine mount. Drill a 5/32" [4mm] hole through the firewall for the throttle pushrod. Find the 11-3/4" [298mm] plastic outer pushrod. Roughen up one of the ends of the plastic outer pushrod. Insert it into the hole until only about 1/4" [6.4mm] of the rough end shows outside of the firewall as shown above and glue it in place with CA.



❏ 8. Find the fuel tank. Assemble the stopper and tubes as shown in the photo, and then insert them into the tank. Do not tighten the screw to expand the stopper. You will do that in the next step. Be certain the fuel line weight (clunk) at the end of the fuel line inside the tank does not contact the rear of the tank. Otherwise, the line may become stuck above the fuel level and stop the fuel flow. Remember which is the fuel pick-up, vent and fill tubes. You can mark the tubes with a Top Flite Panel Line Pen if you wish.

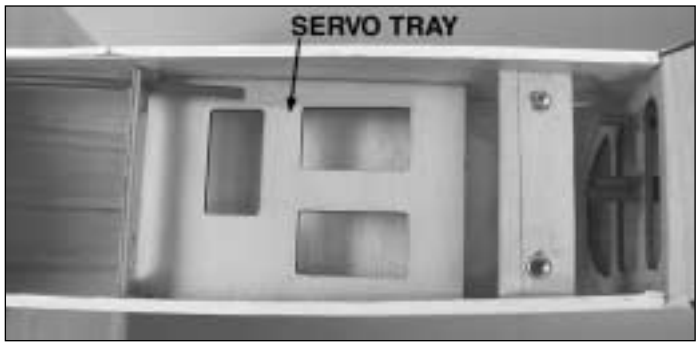


❏ 9. Install the fuel tank in the fuse. Fit the neck through the hole in the firewall. Be certain you install the fuel tank inside the fuselage with the vent tube pointing up and the fill tube down. Tighten the fuel tank screw.

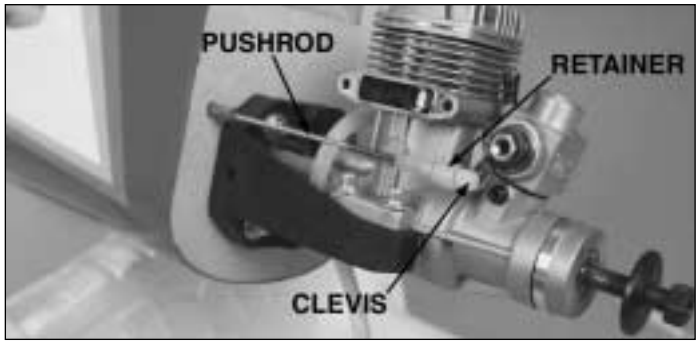
❏ 10. Glue a 1/2" x 1/4" [12mm x 6.4mm] balsa stick (not included) as shown above to hold the fuel tank in place.

❏ 11. Cut the fuel line in three 6" [152mm] length sections. Install the three sections of fuel line on the three fuel tank tubes. Mark the fuel lines so that you know what each one is for. Install the engine (less muffler) and connect the fuel carburetor line to the carburetor or remote needle valve. Use a Great Planes Aluminum Fuel Line Plug to plug the fill fuel line. If you wish, you could install a Great Planes Easy Fueler™ Valve for glow engines instead of the third (fill) line in the tank.

Radio Installation

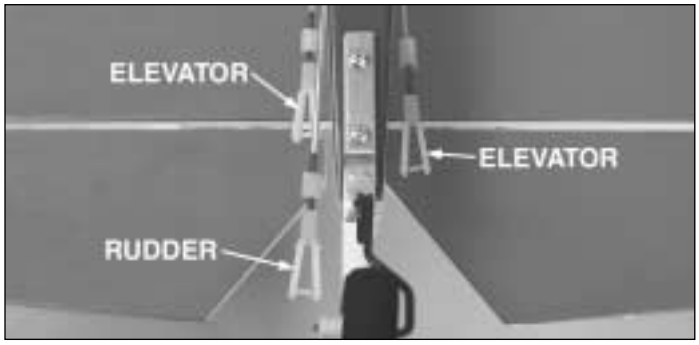


❏ 1. Glue the 1/8" [3.2mm] servo tray in place with CA. Add a couple of drops of CA where the plastic outer pushrods go through the formers. **Note:** If your throttle pushrod is installed on the opposite side of the fuselage from what is shown in the images, you may want to flip the servo tray to better align the throttle pushrod with the throttle servo.

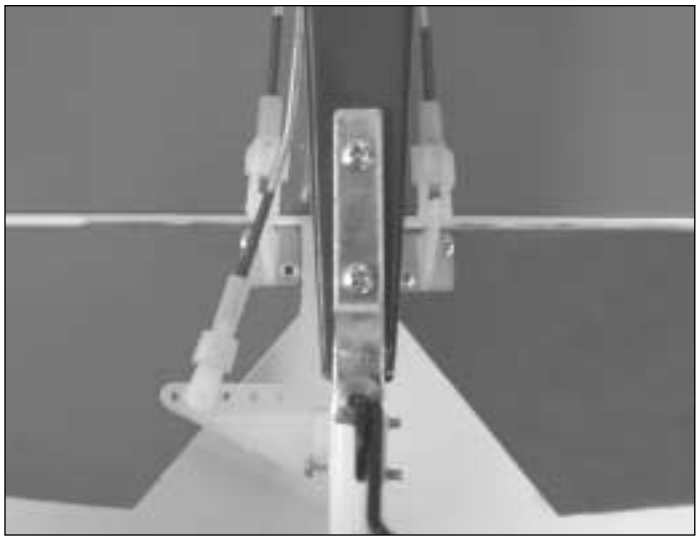


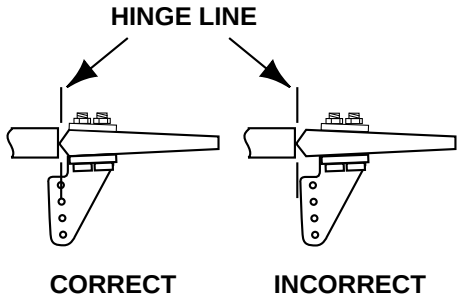
❏ 2. Find the .074" x 17-1/2" [444mm] threaded on one end pushrod, a clevis and a silicone retainer. Thread the clevis

onto the rod approximately 18 full turns, slip the silicone retainer on the rod and install the rod in the throttle outer pushrod. Install the engine and attach the clevis on the engine throttle arm. Make sure you have a free moving linkage. Slip the retainer on the clevis.

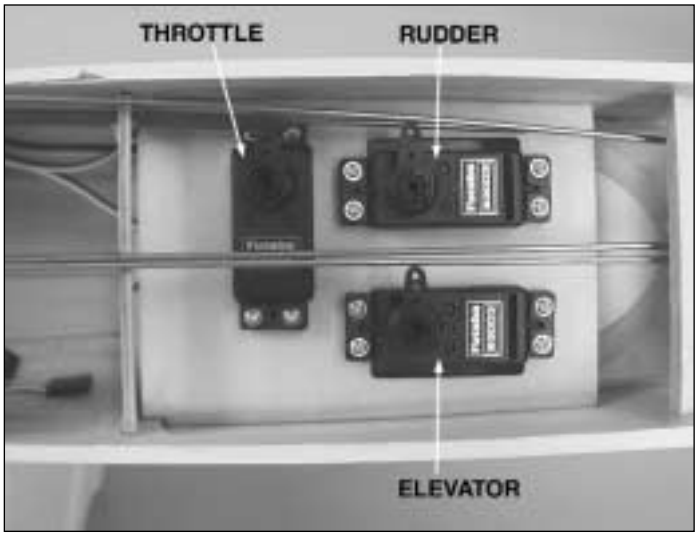


❏ 3. Locate three clevises, three retainers and three 0.074" x 36" [914mm] threaded on one end pushrods. Thread a clevis approximately 18 full turns onto each pushrod and slip a silicone retainer half way onto each clevis. Insert a pushrod into each one of the pushrod guide tubes.

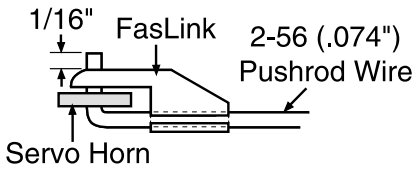




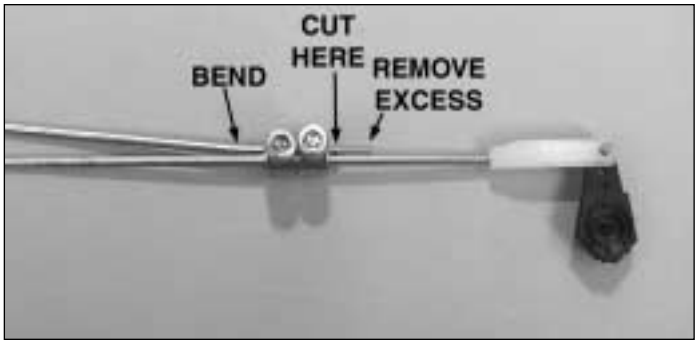
❏ 4. Connect a large nylon control horn on each clevis and position the control horn on each control surface as shown. Drill 3/32" [2.4mm] holes through the elevators and rudder to accommodate the control horn's screws. Wick some thin CA into the holes. Install the elevator and rudder control horns with six 2-56 x 5/8" [16mm] bolts and the control horn back plates.



❏ 5. Test fit the rudder, elevator and throttle servos. Depending on the size of your servos you may have to slightly trim the tray. Place the servos in the tray and mount them with the hardware that came with the servos. Center the rudder servo arm. If necessary, bend the pushrod slightly to align it with the servo arm hole you want to use.

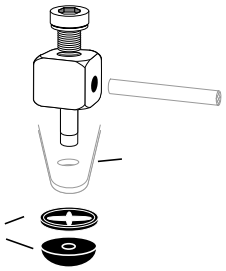


❏ 6. Center the rudder and make a mark on the pushrod where it meets with the servo arm hole you want to use. Bend the pushrod 90 degrees up and install a FasLink on the rudder pushrod as shown in the sketch. Cut away any excess wire, leaving 1/16" [1.6mm] above the FasLink.

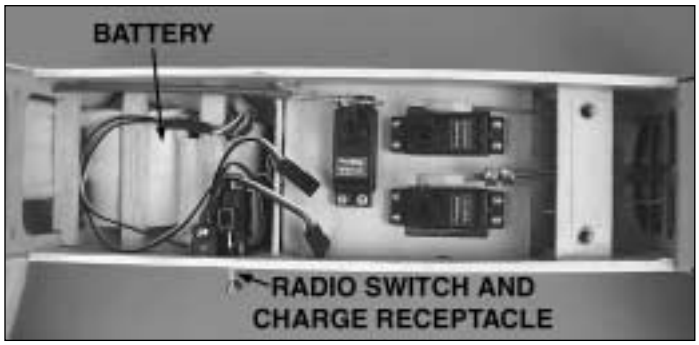


❏ 7. Center the elevator servo arm and elevators. Align one of the elevator pushrods with the hole you want to use in the servo arm and mark it where it meets the hole. Slip two 5/32" [4mm] wheel collars onto the pushrod. Center the elevator that this pushrod controls. Bend the pushrod 90 degrees up at the mark and install a FasLink. Center the other elevator and bend its pushrod as shown above to mate with the first pushrod. Place the two wheel collars as shown, put a drop of Great Planes Pro Thread Locking Compound in the wheel collar screw hole and tighten the

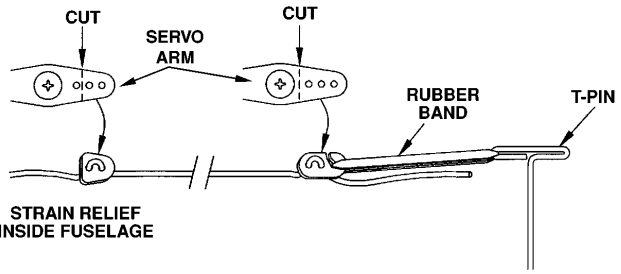
wheel collar SHCS (6-32 x 1/4" [6.4mm]). **Note:** The preceding image shows the completed pushrod assembly outside of the radio compartment for clarity.



❏ 8. Install a screw-lock pushrod connector on the throttle servo arm. Insert the throttle pushrod into the connector. Use a 4-40 x 1/8" [3.2mm] socket head cap screw to secure the pushrod into the connector. Make sure that you get the full range of carburetor rotation with the servo rotation. Use some Great Planes Pro Thread Locking Compound on the SHCS to prevent it from coming loose with vibration.

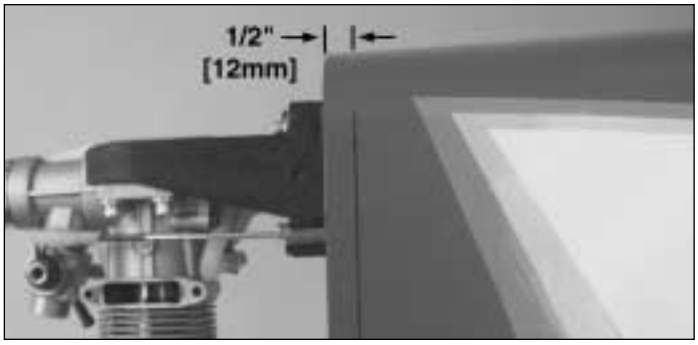


❏ 9. Install a radio switch and a charge receptacle on the fuselage's side away from the exhaust. Wrap the battery pack and the receiver in at least 1/4" [6.4mm] of R/C foam rubber and install them in the fuselage. Use shrink tubing to secure the battery and switch connections. Connect all your servos and the "Y" harness to the receiver. Glue two 1/2" x 1/4" [12mm x 6.4mm] balsa sticks (not included) to secure the battery and receiver in place.



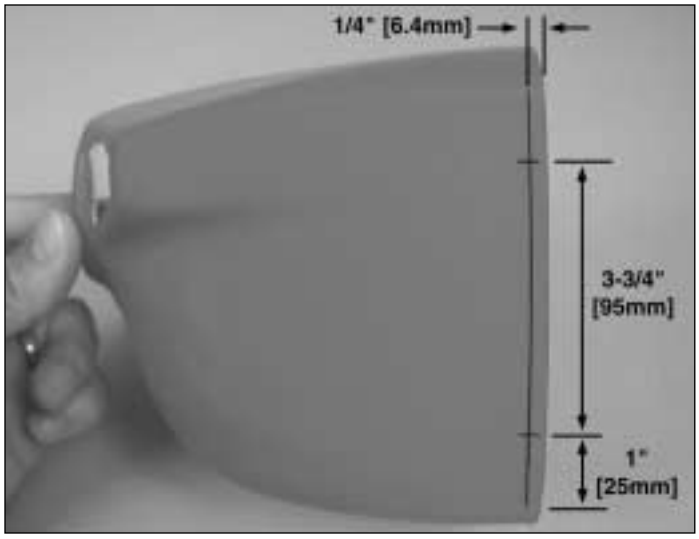
❏ 10. Make a small hole through the bottom of the fuselage and route the radio antenna to the aft fuselage. Be sure that there is a strain relief inside the fuselage on the antenna to keep stress off the solder joint inside the receiver. Use a small rubber band to keep the antenna extended. Hold it with a T-pin at the bottom of the fuselage or around the tail wheel wire.

Installing the Cowl

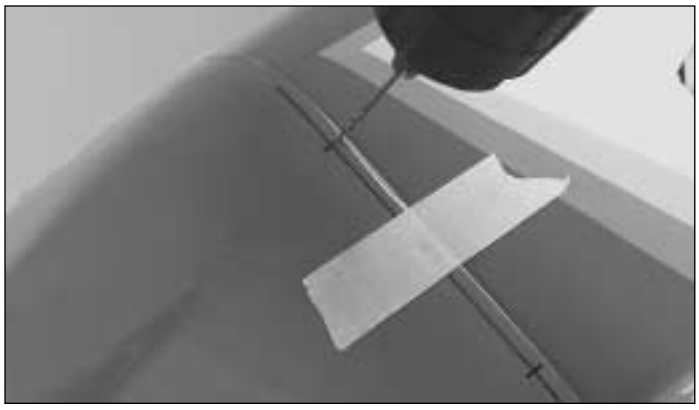


❏ 1. Draw a line 1/2" [12mm] away from the firewall, parallel to the firewall.

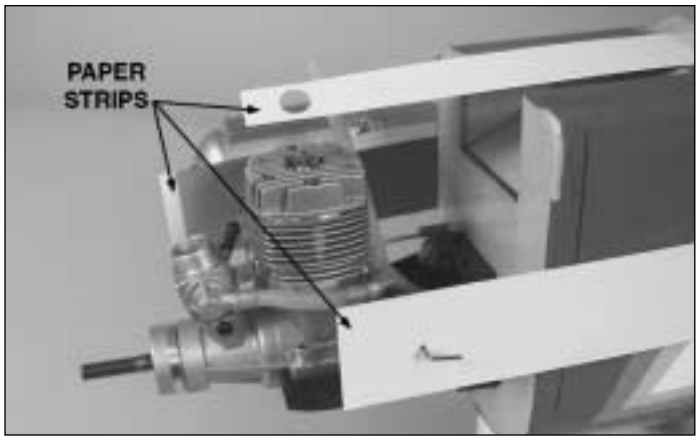
❏ 2. Test fit the **cowl** on the fuselage. Push the cowl all the way up to the line. Center the cowl ring with the engine crankshaft. Use a rotary tool to cut cooling openings and a carburetor opening on the fiberglass cowl. **Hint:** It will be easier to line up the cowl with the engine crankshaft if you temporarily install the spinner back plate. There should be a 3/32" [2.4mm] gap between the spinner back plate and the cowl ring.



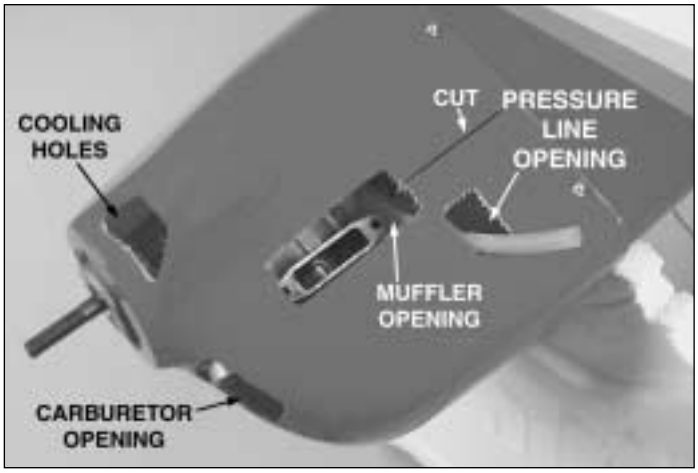
❑ 3. Draw a line on the cowl using a Top Flite Panel Line Pen 1/4" [6.4mm] parallel to the cowl's edge. Make two marks on that line 1" [25mm] and another 3-3/4" [95mm] away from the bottom of the firewall. Do the same for the other side of the cowl.



❑ 4. Position the cowl on the fuselage all the way to the 1/2" [12mm] line and center the cowl ring with the engine crankshaft. Drill a 1/16" [1.6mm] hole through the fiberglass cowl and fuselage as shown on each mark. Make sure you do not drill through the fuel tank. **Hint:** Tape the cowl to the fuselage so it will not move as you drill the holes. Wipe the line off with denatured alcohol.



❑ 5. Remove the cowl. Wick some thin CA into the holes in the fuselage. Install an extension on the carburetor's needle valve. Install the engine's muffler. Use paper strips to mark the location of the needle valve, engine glow plug access and muffler. Remove the muffler and needle valve.

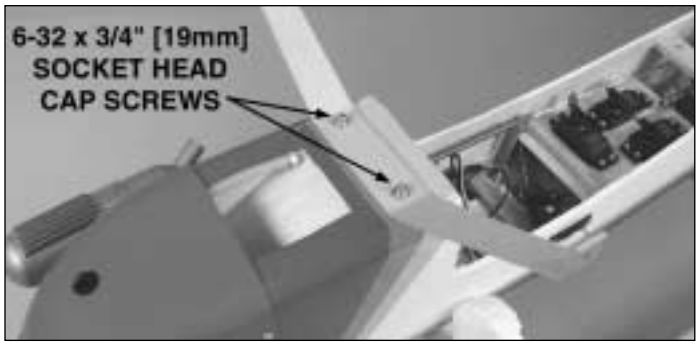


❑ 6. Install the cowl with four #2 x 3/8" [9.5mm] screws and four #2 washers and mark the location of the needle valve, muffler, pressure line, and engine glow plug on the cowl with a Top Flite Panel Line Pen. Remove the cowl and use a high speed rotary tool to cut away the holes marked. You will need to make a cut from the center of the muffler's slot to the aft edge of the cowl as shown to be able to remove the cowl from the fuselage without removing the muffler. If you wish, you could just extend the muffler slot all the way to the edge of the cowl. Once all the holes are made, carefully wick a little CA on the edges of the cuts to stiffen the fibers up. Then, cut them with a hobby knife or scissors.

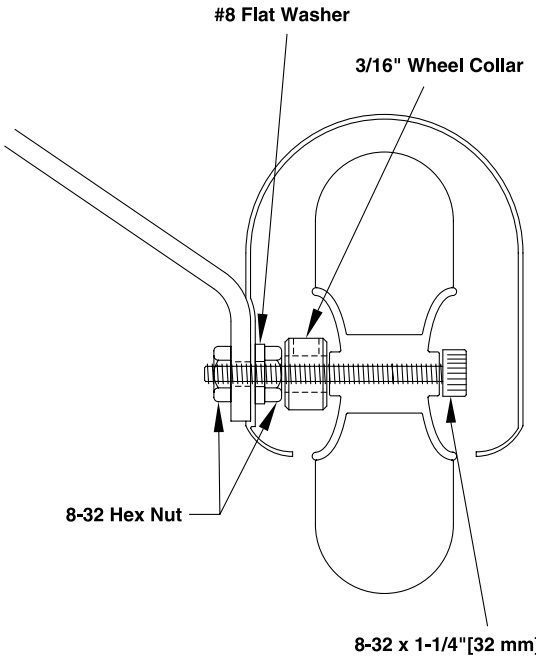
❑ 7. Install the muffler, the cowl, the supplied 2" [51mm] red spinner, the needle valve, and the engine's prop.

This finishes the installation of the engine.

Install the Landing Gear



❏ 1. Feel through the MonoKote for the two landing gear mounting holes on the bottom side of the fuselage. Cut away the covering over the holes and install the main landing gear with the angle towards the back using two 6-32 x 3/4" [19mm] SHCS, two #6 washers and two #6 lock washers. Use some Great Planes Pro Thread Locking Compound on the screws.



❏ 2. Install the wheels and wheel pants. Use an 8-32 x 1-1/4" [32mm] SHCS, two 8-32 hex nuts, one #8 washer and a 3/16" [4.8mm] wheel collar for each wheel and wheel pant. The wheel collar only works as a spacer. Check the above image and diagram to install the wheel pants correctly. Also, remember to line up the wheel pants with the fuselage. Use some Great Planes Pro Thread Locking Compound on the nuts to prevent them from loosening with vibration. Make sure you center the wheel within the wheel pant opening.

This finishes the installation of the landing gear.

Finish the Cockpit

❏ 1. Cut the instrument panel decal from the decal sheet and place it in position in the cockpit.

❏ 2. If you wish to install a pilot, now it is the time to do it. On the instruction manual model we used a Williams Brothers Standard 1/5 Pilot. Trim the canopy at the cut lines. Glue the canopy to the fuselage using Pacer Formula 560 Canopy glue. Clean up any excess glue and tape the canopy in place until the glue is dry.

Apply the Decals

1. Use scissors or a sharp hobby knife to cut the decals from the sheet.

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 one teaspoon of soap per gallon of water. Submerse 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 and water allows accurate positioning and reduces air bubbles underneath.

3. Position the decals on the model as seen on the box cover. Holding the decal down, use a paper towel to wipe most of the water away.

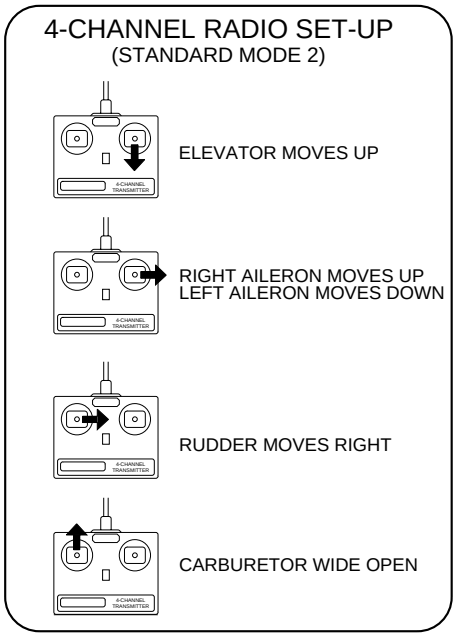
4. Use a piece of soft balsa or something similar to squeegee remaining water from under the decal. Apply the rest of the decals the same way.

GET THE MODEL READY TO FLY

Check the Control Directions

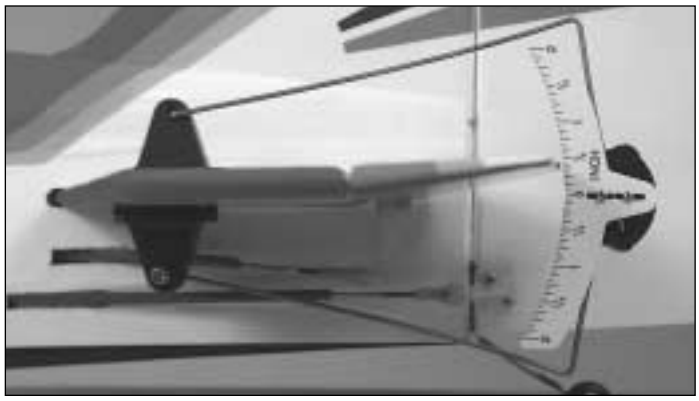
❑ 1. Turn on the transmitter and receiver and center the trims. If necessary, remove the servo arms from the servos and reposition them so they are centered. Reinstall the screws that secure the servo arms.

❑ 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.



❑ 3. Make certain that the control surfaces and the carburetor 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 Great Planes Accu-Throw (or 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 somewhere between the low rate and the high rate setting. **Note:** The throws are measured at the **widest part** of the elevators, rudder and ailerons.

These are the recommended control surface throws:

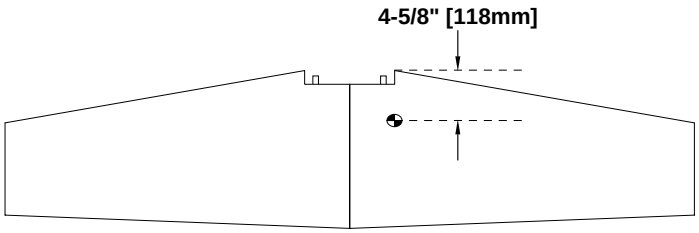
	High Rate	Low Rate
ELEVATOR:	7/16" [11mm] up 9/16" [14mm] down	1/4" [6.5mm] up 3/8" [9.5mm] down
RUDDER:	1-5/8" [41mm] right 1-5/8" [41mm] left	1" [25m] right 1" [25mm] left
AILERONS:	5/16" [8mm] up 5/16" [8mm] down	3/16" [5mm] up 3/16" [5mm] down

IMPORTANT: The Great Planes Venus 40 ARF 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 Great Planes Venus 40 ARF 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.”

Balance the Model (C.G.)

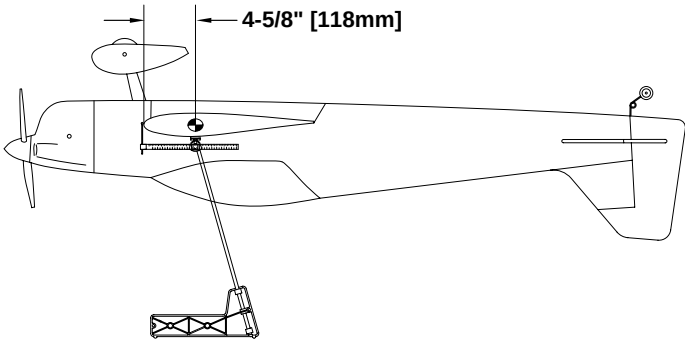
More than any other factor, the **C.G.** (balance point) can have the **greatest** effect on how a model flies, and may determine whether or not your first flight will be successful. If you value this model and wish to enjoy it for many flights, **DO NOT OVERLOOK THIS IMPORTANT PROCEDURE.** A model that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



❏ 1. Use a felt-tip pen or 1/8"-wide tape to accurately mark the C.G. on the top of the wing on both sides of the fuselage. The recommended C.G. is located 4-5/8" [118mm] back from the leading edge of the wing where it meets the fuselage.

This is where your model should balance for your first flights. Later, you may wish to experiment by shifting the C.G. up to 5/8" [16mm] forward or 1/4" [6.5mm] back to change the flying characteristics. Moving the C.G. forward may improve the smoothness and stability, but it may then require more speed for takeoff and make the airplane 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 for you to control. In any case, start at the location we recommend and do not at any time balance your model outside the recommended range. At the recommended C.G. the model has no roll coupling on knife-edge and a very small pitch coupling.



❏ 2. With the wing attached to the fuselage, all parts of the model installed (ready to fly) and an empty fuel tank, place the model upside-down on a Great Planes CG Machine™, or lift it upside-down 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 and/or receiver must be shifted aft or weight must be added to the tail to balance. If possible, relocate the battery pack and receiver to minimize or eliminate any additional ballast required. If additional weight is required, nose weight may be easily added by using a “spinner weight” (GPMQ4645 for the 1 oz. [28g] weight, or GPMQ4646 for the 2 oz. [56g] weight). If spinner weight is not practical or is not enough, use Great Planes (GPMQ4485) “stick-on” weights. A good place to add stick-on nose weight is to the firewall (don’t attach weight to the cowl–it is not intended to support weight). Begin by placing incrementally increasing amounts of weight on the bottom of the fuse over the firewall until the model balances. Once you have determined the amount of weight required, it can be permanently attached. If required, tail weight may be added by cutting open the bottom of the fuse and gluing it permanently inside.

Note: Do not rely upon the adhesive on the back of the lead weight to permanently hold it in place. Over time, fuel and exhaust residue may soften the adhesive 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

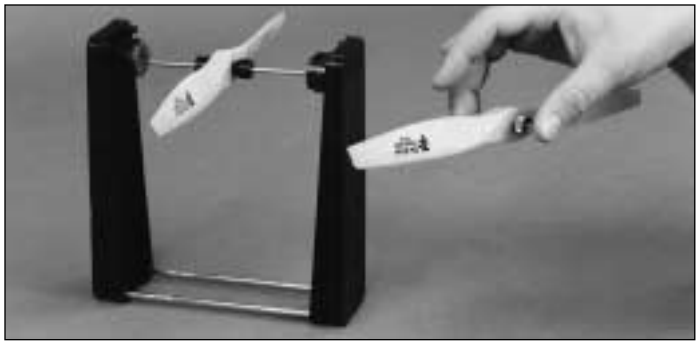
No matter if you fly at an AMA sanctioned R/C club site or if you fly somewhere on your own, you should always have your name, address, telephone number and AMA number on or inside your model. It is **required** at all AMA R/C club flying sites and AMA sanctioned flying events. Fill out the identification tag on the decal sheet 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 and receiver batteries the night before you go flying, and at other times as recommended by the radio manufacturer.

Note: Checking the condition of your receiver battery pack is **highly recommended**. All battery packs, whether it's a trusty pack you've just taken out of another model, or a new battery pack you just purchased, should be cycled, noting the discharge capacity. Oftentimes, a weak battery pack can be identified (and a valuable model saved!) by comparing its actual capacity to its rated capacity. Refer to the instructions and recommendations that come with your cycler. If you don't own a battery cycler, perhaps you can have a friend cycle your pack and note the capacity for you.

Balance the Propeller



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 engine mounting screws and bolts loosen, possibly with disastrous effect, but vibration may also damage your radio receiver and battery. Vibration can also cause your fuel to foam, which will, in turn, cause your engine to run hot or quit.

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.

Ground Check

If the engine is new, follow the engine manufacturer's instructions to break-in the engine. After break-in, confirm that the engine idles reliably, transitions smoothly and rapidly to full power and maintains full power–indefinitely. After you run the engine on the model, inspect the model closely to make sure all screws remained tight, the hinges are secure, the prop is secure and all pushrods and connectors are secure.

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 engine 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.

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.

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, scarves, long hair or loose objects such as pencils or screwdrivers that may fall out of shirt or jacket pockets into the prop.

Use a “chicken stick” or electric starter to start the engine. Do not use your fingers to flip the propeller. Make certain the glow plug clip or connector is secure so that it will not pop off or otherwise get into the running propeller.

Make all engine adjustments from behind the rotating propeller.

The engine gets hot! Do not touch it 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 glow engine, cut off the fuel supply by closing off the fuel line or following the engine manufacturer’s recommendations. Do not use hands, fingers or any other body part to try to stop the engine. To stop a gasoline powered engine an on/off switch should be connected to the engine coil. Do not throw anything into the propeller of a running engine.

AMA SAFETY CODE (excerpt)

Read and abide by the following Academy of Model Aeronautics Official Safety Code:

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 to, and avoid flying in the proximity of full-scale aircraft. Where necessary an observer shall be used 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.

7. I will not fly my model unless it is identified with my name and address or AMA number, on or in the model.

9. 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. I will perform my initial turn after takeoff away from the pit or spectator areas, and I will not thereafter fly over pit or spectator areas, unless beyond my control.

4. I will operate my model using only radio control frequencies currently allowed by the Federal Communications Commission.

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. Fuelproof all areas exposed to fuel or exhaust residue such as the wing saddle area, belly pan, or the engine spacer if needed.
- ❏ 2. Check the C.G. according to the measurements provided in the manual.
- ❏ 3. Be certain the battery and receiver are securely mounted in the fuse. Simply stuffing them into place with foam rubber is not sufficient.
- ❏ 4. 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.
- ❏ 5. Balance your model *laterally* as explained in the instructions.
- ❏ 6. Use thread locking compound to secure critical fasteners such as the screws that hold the carburetor arm (if applicable), screw-lock pushrod connectors, etc.
- ❏ 7. Add a drop or two of oil to the axles so the wheels will turn freely.
- ❏ 8. Make sure all hinges are **securely** glued in place.
- ❏ 9. Reinforce holes for wood screws with thin CA where appropriate (servo mounting screws, cowl mounting screws, etc.).
- ❏ 10. Confirm that all controls operate in the correct direction and the throws are set up as specified in this manual.
- ❏ 11. 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.
- ❏ 12. Secure the connections between servo wires and Y-connectors or servo extensions, and the connection between your battery pack and the on/off switch with vinyl tape, heat shrink tubing or special clips suitable for that purpose.

❏ 13. Make sure any servo extension cords you may have used do not interfere with other systems (servo arms, pushrods, etc.).
❏ 14. Secure the pressure tap (if used) to the muffler with high temp RTV silicone, thread locking compound or J.B. Weld.
❏ 15. Make sure the fuel lines are connected and are not kinked.
❏ 16. Balance your propeller (and spare propellers).
❏ 17. Tighten the propeller nut and spinner.
❏ 18. Place your name, address, AMA number and telephone number on or inside your model.
❏ 19. Cycle your receiver battery pack (if necessary) and make sure it is fully charged.
❏ 20. If you wish to photograph your model, do so before your first flight.
❏ 21. Remember to range check your radio when you get to the flying field.

FLYING

The Great Planes Venus 40 ARF is a great-flying model that flies smoothly and predictably. The Great Planes Venus 40 ARF does not, however, 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 cowled engine may run at a higher temperature than an un-cowled 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 any unusual sounds, such as a low-pitched "buzz," this may indicate control surface *flutter*. Because flutter can quickly destroy components of your airplane, any time you detect flutter you must **immediately** cut the throttle and land the airplane! Check all servo grommets for deterioration (this may indicate which surface fluttered), and make sure all pushrod linkages are secure and free of play. If the control surface fluttered once, it probably will flutter again under similar circumstances unless you can eliminate the free-play or flexing in the linkages. Here are some things which can cause flutter: Excessive hinge gap; Not mounting control horns solidly; Poor fit of clevis pin in horn; Side-play of pushrod in guide tube caused by tight bends; Poor fit of Z-bend in servo arm; Insufficient glue used when gluing in the elevator joiner wire; Excessive *play* or *backlash* in servo gears; and insecure servo mounting.

Takeoff

Before you get ready to takeoff, see how the model handles on the ground by doing a few practice takeoff 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, shut the engine down and bring the model back into the pits. Top off the fuel, then 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, 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

For reassurance and to keep an eye on other 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. While full throttle is usually desirable for takeoff, most models fly more smoothly at reduced speeds.

Take it easy with the Great Planes Venus 40 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 (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 fuel level, but use this first flight to become familiar with your model before landing. The Great Planes Venus 40 ARF is a very neutrally stable airplane. It was designed as a pattern trainer and it likes doing maneuvers large and smoothly. This is the area it excels in and you should take advantage of that.

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 lose 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 Venus 40 ARF 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. The Great Planes Venus 40 ARF is a very "clean" design and so it takes some space to bleed off speed. 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!

OTHER ITEMS AVAILABLE FROM GREAT PLANES

O.S.® 52 Surpass 4-Stroke
Looking for a mid-size engine with massive performance? That's the O.S. .52 Surpass! With an output of 0.9 bhp @ 12,000 rpm, it provides the "oomph" you'll need for any aerobatic maneuver you can imagine. Key ingredients in its design include a Type 40N carburetor for stable idling, with reversible needle for easy installation. Glow plug and standard silencer are included. Backed with 2-year warranty protection. **OSMG0852**

O.S. 70 Surpass II 4-Stroke
Improve your fuel economy and increase your power! The 70 Surpass II puts out an impressive 1.1 horsepower at 11,000 rpm -- all the power you need to execute big maneuvers. Its Type 60R carb provides more precise fuel flow control and smoother throttle control than the original FS-70 Surpass. The FS-70 Surpass II also features easier installation, adjustment and maintenance. Muffler and glow plug included. Two-year warranty. **OSMG0872**

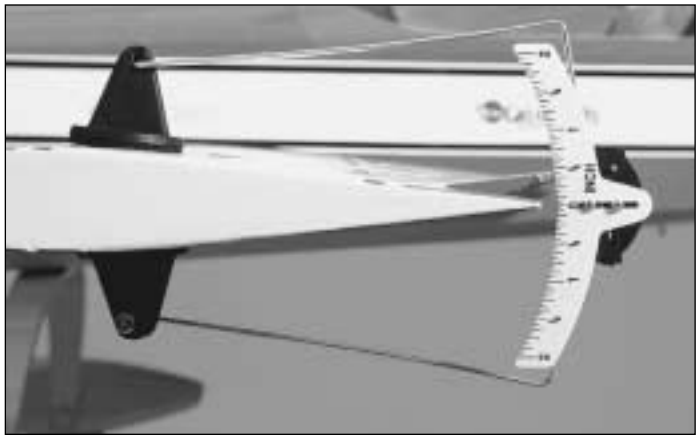
O.S. .46 FX
You'll find many "Modelers' Most Wanted" refinements on the .46 FX engine. Features include a backplate-mounted needle for easy, safe mixture adjustments; advanced carb for precise air/fuel mixing; coarse threads and an O-ring seal on the needle valve to prevent "creep" and air leaks; squared, low-profile head for increased cooling; and dual ball bearing-supported crankshafts. Rated at 1.59 bhp/16,000 rpm. Includes muffler with adjustable exhaust and 2 year warranty. Requires glow plug. **OSMG0546**

Futaba® 6DA FM Radio
Enjoy the best of today's sophisticated flight systems – without needing to learn codes or memorize programming routines! With the 6DA's Flight Set Control Center, advanced features come with the ease of pot and switch setup. All it takes to use them is the supplied screwdriver. Also includes high-capacity 600mAh Sanyo® transmitter NiCds and a 50mA AC charger, plus trainer system (trainer cord required), R127DF dual conversion 7-channel FM receiver, and 4 ball bearing S3004 servos. One-year warranty. **FUTJ65****

Great Planes Easy Fueler™ Fuel Filling Valve
Refill your tank without disconnecting fuel lines! Install the Easy Fueler Valve into your gas or glow model's fuselage or cowling, and attach the included probe to the line coming from your pump. When you insert the probe into the valve, fuel flow to the carb shuts off. Replacement probes also available. **GPMQ4160**

Top Flite® Power Point® Wood Propellers
Lighter than maple props of the same size, these fuelproofed beechwood props reduce rotational mass, letting your engine produce more power with less work. Wood construction also makes Power Point props stiffer than nylon, so they perform predictably throughout the full rpm range. Their symmetric pitch reduces prop vibration and boosts thrust at any rpm – a top choice for all fliers!

Hobbico® Accu-Cycle™ Tx/Rx Battery Cycler HCAP0260
Routine cycling will maximize the life and capacity of any NiCd or NiMH battery–and Accu-Cycle does it best! Set pack size and discharge rate, push a button and Accu-Cycle takes over. Tx and Rx packs can be cycled alone or simultaneously. Separate LED screens provide discharge time (min.) or battery capacity (mAh) at the flip of a switch. A built-in, 15 hour timer controls separate charge circuits for each type of pack, and switches automatically to trickle charge at the cycle's end. 2-year warranty. **HCAP0260**

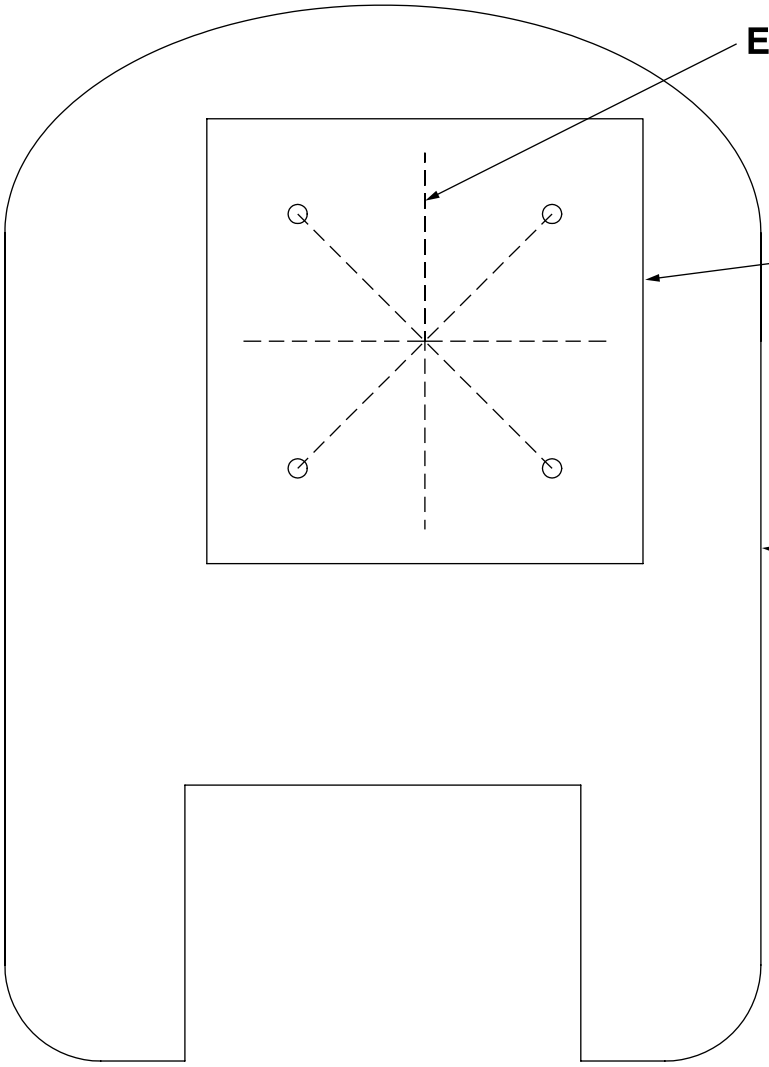


Great Planes Accu-Throw™ Control Surface Deflection Meter
One leading cause of crashes is flying an airplane with its control throws set differently from those recommended in the instructions. The Great Planes Accu-Throw lets you quickly and easily measure actual throws first, so you can make necessary corrections before you fly. Large, no-slip rubber feet provide a firm grip on covered surfaces without denting or marring the finish. Spring tension holds Accu-Throw's plastic ruler steady by each control surface. Curved to match control motions, the ruler provides exact readings in both standard or metric measurements. **GPMR2405**

GREAT PLANES®
MODEL MANUFACTURING COMPANY

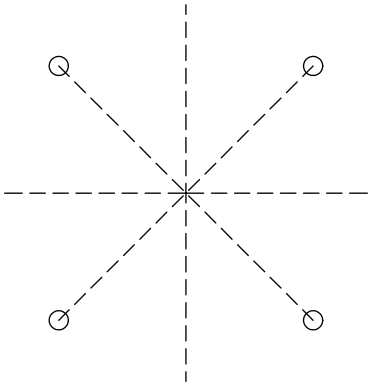
FUSELAGE TOP

Engine Spacing Template



FUSELAGE TOP

Engine Mount Template



EM4070 BOLT PATTERN