

Revolver 50cc

INSTRUCTION MANUAL



SPECIFICATIONS

Wingspan: 90 in [2285 mm]	Weight: 19.5 – 20.5 lb [8840 – 9300 g]	Engine: 50 cc two stroke gasoline engine
Wing Area: 1303 in ² [84 dm ²]	Length: 82.5 in [2095 mm]	
Wing Loading: 34–36 oz/ft ² [104–110 g/dm ²]	Radio: 4 channel minimum	

WARRANTY

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

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

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

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

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

Hobby Services

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

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

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



Champaign, Illinois (217) 398-8970
email: airsupport@greatplanes.com

TABLE OF CONTENTS

INTRODUCTION	2	Complete the Engine Installation, Mount the Cowl, Prop & Spinner	20
Academy of Model Aeronautics	2	Apply the Decals	24
SAFETY PRECAUTIONS	2	GET THE MODEL READY TO FLY	24
DECISIONS YOU MUST MAKE	3	Check the Control Directions	24
Radio Equipment	3	Set the Control Throws	25
Engine	3	Balance the Model (C.G.)	26
ADDITIONAL ITEMS REQUIRED	3	Balance the Model Laterally	26
Required Hardware & Accessories	3	PREFLIGHT	27
Adhesives & Building Supplies	3	Identify Your Model	27
Optional Supplies & Tools	3	Charge the Batteries	27
IMPORTANT BUILDING NOTES	3	Balance Propellers	27
KIT INSPECTION	4	Ground Check & Range Check	27
ORDERING REPLACEMENT PARTS	4	ENGINE SAFETY PRECAUTIONS	27
KIT CONTENTS	5	AMA SAFETY CODE	28
PREPARATIONS	5	General	28
BUILD THE WING	5	Radio Control	28
BUILD THE FUSELAGE	8	CHECK LIST	28
Assemble the Tail Section	8	FLYING	29
Install the Elevator Servos	9	Fuel Mixture Adjustments	29
Install the Rudder	10	Takeoff	29
Install the Landing Gear	11	Flight	29
Install the Rudder Servo & Pull-Pull Wires	13	Landing	29
Install the Engine, Fuel Tank & Remaining Servos ..	14	DLE55 MOUNTING PATTERN	31
Install the Radio System	19		

INTRODUCTION

Following the success of the .40 and .60 size Revolver we have responded to your request for an even larger version. This 50cc Revolver is a great flying airplane in the tradition of its smaller counterparts and is an easy to transport giant scale model. For the latest technical updates or manual corrections to the Revolver, visit the Great Planes web site at www.greatplanes.com. Open the "Airplanes" link, then select the Revolver 50cc ARF. If there is new technical information or changes to this model a "tech notice" box will appear in the upper left corner of the page.

Academy of Model Aeronautics

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

Academy of Model Aeronautics

5151 East Memorial Drive
Muncie, IN 47302-9252

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 Revolver 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 Revolver, if not assembled and operated correctly, could possibly cause injury to yourself or spectators and damage to property.
2. You must assemble the model **according to the instructions**. Do not alter or modify the model, as doing so may result in an unsafe or unflyable model. In a few cases the instructions may differ slightly from the photos. In those instances the written instructions should be considered as correct.
3. You must take time to **build straight, true and strong**.
4. You must use an R/C radio system that is in good condition, a correctly sized engine, and other components as specified in this instruction manual. All components must be correctly installed so that the model operates correctly on the ground and in the air. You must check the operation of the model and all components before **every** flight.
5. If you are not an experienced pilot or have not flown this type of model before, we recommend that you get the assistance of an experienced pilot in your R/C club for your first flights. If you're not a member of a club, your local hobby shop has information about clubs in your area whose membership includes experienced pilots.
6. While this kit has been flight tested to exceed normal use, if the plane will be used for extremely high stress flying, such as racing, or if an engine larger than one in the recommended

range is used, the modeler is responsible for taking steps to reinforce the high stress points and/or substituting hardware more suitable for the increased stress.

7. WARNING: The cowl and wheel pants included in this kit are made of fiberglass, the fibers of which may cause eye, skin and respiratory tract irritation. Never blow into a part (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.

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 Revolver 50cc that may require planning or decision making before starting to build. Order numbers are provided in parentheses.

Radio Equipment

One of the great things about the Revolver 50cc is that it does not require a sophisticated radio. This airplane can be flown with something as simple as a four channel radio. We think you will be able to enjoy all of the capabilities of this model with the Futaba 6 EX (FUTK6900), the 7C (FUTK7004), or the 8 FG Super (FUTK8010). The airplane will also require:

- 1- six (or more) channel receiver
- 5 - 99 oz. servos. Futaba 3305 (FUTM0045) Two required for the elevator, two for the ailerons and one for the rudder.
- 2 - 50 oz. servos. Futaba 9001 (FUTM0075) One required for the throttle. One is an optional servo that can be used on the choke.
- 2 - 36" [914mm] Pro Series Heavy Duty Servo Extensions (HCAM2726 for Futaba) for the elevator servos. One is required if you use a dual servo extension to connect the servos. Two if you use a separate lead to two separate ports in the receiver.
- 3 - 12" [305mm] Pro Series Heavy Duty Servo Extensions (HCAM2711 for Futaba). Two for the aileron servos and one for the throttle.
- 2 - 12" [305mm] Pro Series Heavy Duty Servo Extensions (HCAM2711 for Futaba). These would be required if you do not use "Y" connectors from your receiver to the ailerons.
- 1 - 6" Pro Series Heavy Duty Servo Extensions (HCAM2711 for Futaba) for the choke.

- 2- Heavy Duty Dual Servo Lead (FUTM4135 for Futaba). If you choose to use a dual servo lead or "Y" harnesses to mix multiple servos you will need one for the elevator and the ailerons. If you are using a 6 channel (or more) radio then you may wish to operate each servo independently and mix them through the radio.
- 2 - Heavy Duty Switch Harnesses (FUTM4385)

Engine

For all of our testing we used the DLE 55 (DLEG0055). Another good choice would be the O.S. GT55 (OSMG1555), though with this engine you will need to cut a bit more of the cowl away for clearance for the carburetor. The Revolver flies well with any of the 50cc class gasoline engines available and has been designed to work with engines with the carburetor linkage on either the left or right side of the fuselage.

ADDITIONAL ITEMS REQUIRED

Required Hardware & Accessories

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

Adhesives & Building Supplies

This is the list of Adhesives and Building Supplies that are required to finish the Revolver.

- 1/2 oz. [15g] Thin Pro CA (GPMR6001)
- 1 oz. [30g] Medium Pro CA+ (GPMR6008)
- Pro 6-minute epoxy (GPMR6045)
- Drill bits: 1/16" [1.6mm], 3/32" [2.4mm], 3/16" [4.8mm], 13/64" [5.2mm], 1/4" [6.4mm].
- Stick-on segmented lead weights (GPMQ4485)
- Silver solder w/flux (STAR2000)
- #1 Hobby knife (HCAR0105)
- #11 blades (5-pack, HCAR0211)
- 2 - 3' lengths of Tygon Fuel Tube (DUBQ0486)

Optional Supplies & Tools

Here is a list of optional tools mentioned in the manual that will help you build the Revolver.

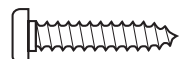
- Top Flite MonoKote sealing iron (TOPR2100)
- Top Flite Hot Sock iron cover (TOPR2175)
- 4 oz. [113g] aerosol CA activator (GPMR634)
- Mixing sticks (50, GPMR8055)
- Mixing cups (GPMR8056)

IMPORTANT BUILDING NOTES

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

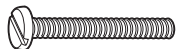
Sheet Metal Screws are designated by a number and a length. For example #6 × 3/4" [19mm].

*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.



Socket Head Cap Screws (SHCS) are designated by a number, **threads per inch**, and a length. For example 4-40 × 3/4" [19mm].

This is a 4-40 SHCS 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.
- 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 Revolver 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.

○ Missile Red (TOPQ0201)○ Orange (TOPQ0202)○ Sapphire Blue (TOPQ0226)
- The stabilizer and wing incidences and engine thrust angles have been factory-built into this model. However, some technically-minded modelers may wish to check these measurements anyway. To view this information visit the web site at www.greatplanes.com and click on "Technical Data." Due to manufacturing tolerances which will have little or no effect on the way your model will fly, please expect slight deviations between your model and the published values.

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

ORDERING REPLACEMENT PARTS

Replacement parts for the Great Planes Revolver 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 Great Planes web site at www.greatplanes.com. Select "Where to Buy" in the menu across the top of the page and follow the instructions provided to locate a U.S., Canadian or International dealer.

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

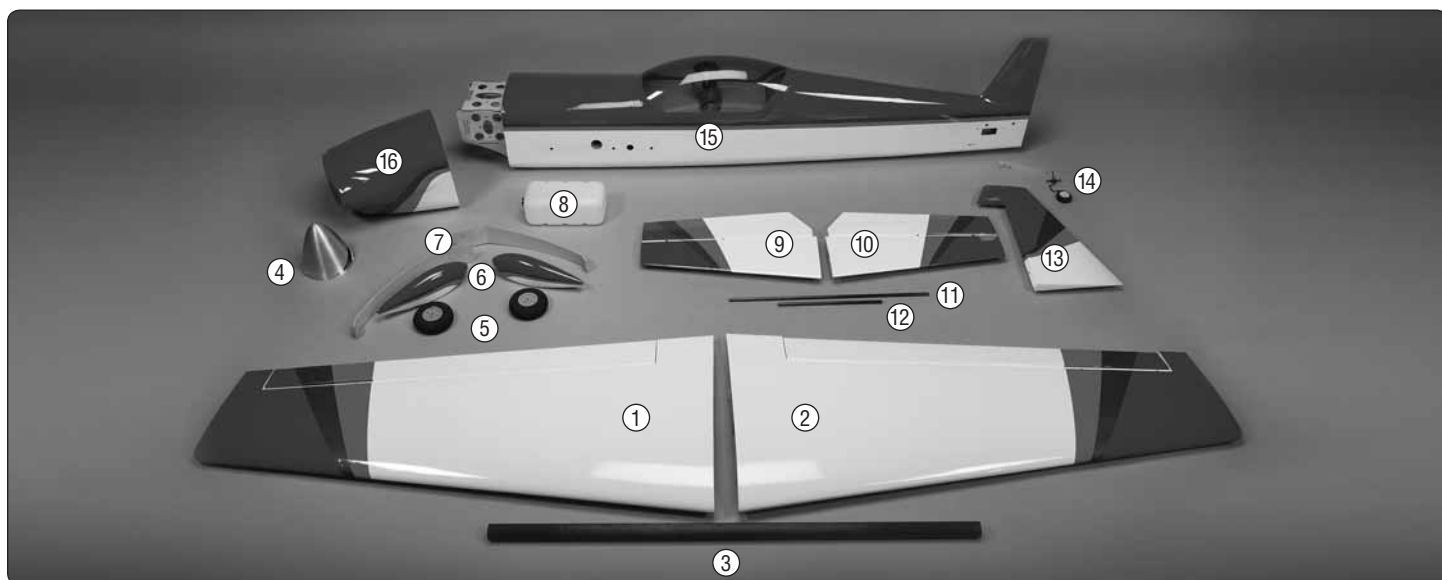
Be certain to specify the order number exactly as listed in the **Replacement Parts List**. Payment by credit card or personal check only; no C.O.D.

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

REPLACEMENT PARTS LIST

Order No.	Description
GPMA4520	FUSELAGE
GPMA4521	WING SET
GPMA4522	HORIZONTAL STAB SET
GPMA4523	RUDDER
GPMA4524	COWL
GPMA4525	CANOPY/HATCH
GPMA4527	TAIL GEAR
GPMA4528	WING JOINER TUBE
GPMA4529	HORIZONTAL STAB TUBES
GPMA4530	WHEELPANTS
GPMA4531	DECALS
TOPA1657	ALUMINUM SPINNER

KIT CONTENTS

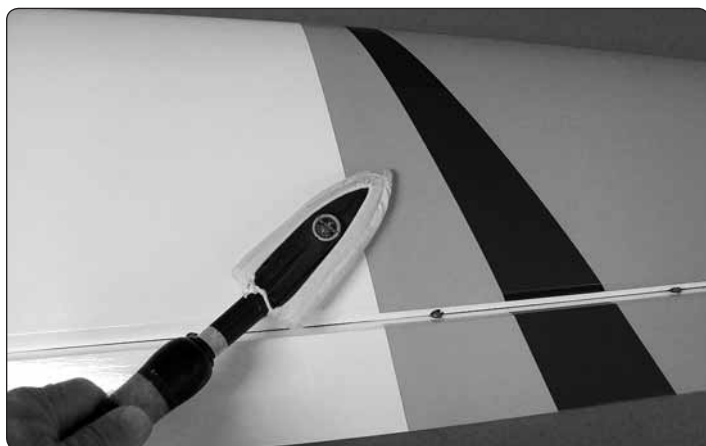


Kit Contents

- | | | |
|--------------------------|--------------------------------|-------------------------|
| 1. Right Wing w/ Aileron | 7. Landing Gear | 13. Rudder |
| 2. Left Wing w/ Aileron | 8. Fuel Tank | 14. Tail Wheel Assembly |
| 3. Wing Tube | 9. Right Stab & Elevator | 15. Fuselage |
| 4. Spinner | 10. Left Stab & Elevator | 16. Cowl |
| 5. Wheels | 11. 19-3/4" [501 mm] Stab Tube | |
| 6. Wheel Pants | 12. 9-1/2" [241 mm] Stab Tube | |

PREPARATIONS

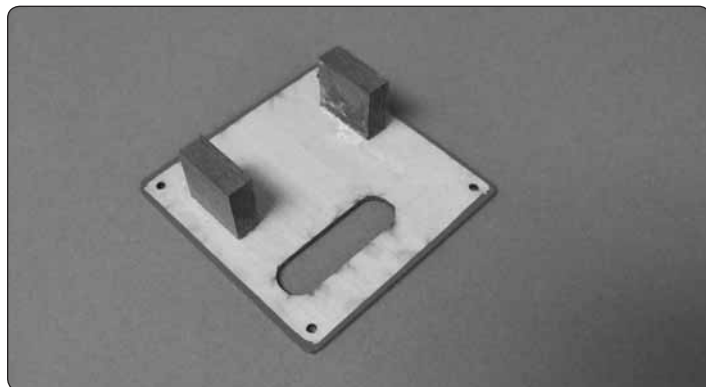
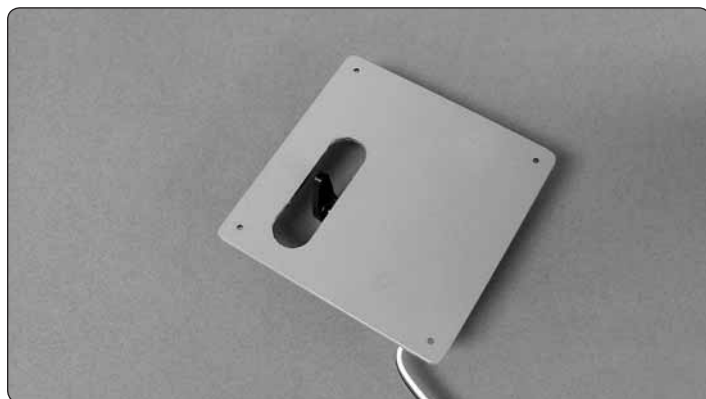
❑ 1. If you have not done so already, remove the major parts of the kit from the box and inspect for damage. If any parts are damaged or missing, contact Product Support at the address or telephone number listed in the "Kit Inspection" on the previous page.



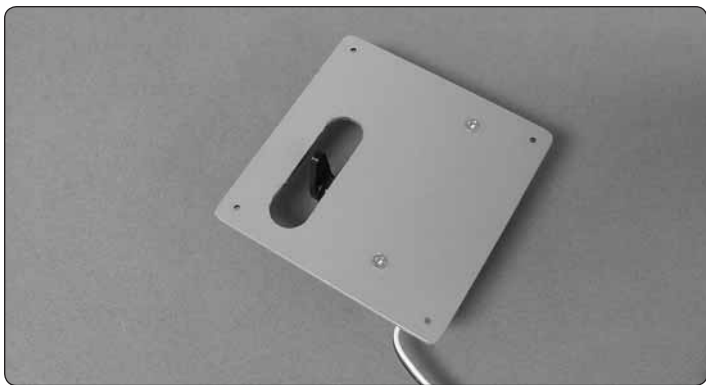
❑ 2. Use a covering iron with a covering sock on high heat to tighten the covering if necessary. Apply pressure over sheeted areas to thoroughly bond the covering to the wood.

BUILD THE WING

We recommend you begin with the right wing so that your assembly matches the photos.



❑ ❑ 1. Use your servo as a guide for the servo placement. Place the servo so the servo arm is centered in the opening in the cover. Use epoxy to glue the 11/16" x 11/16" x 5/16" [20mm x 20mm x 8mm] hardwood servo mounting blocks to the insides of the hatch covers. Allow the epoxy to cure.

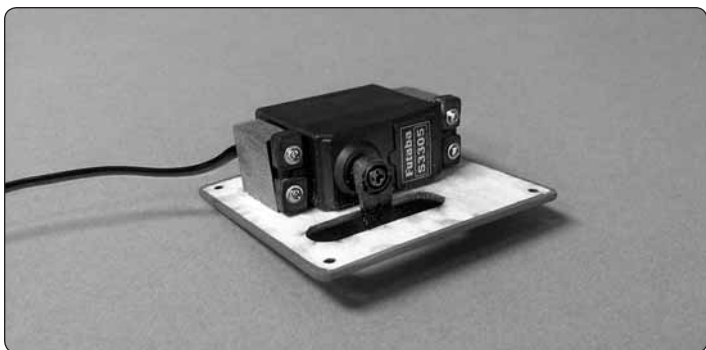


❑ ❑ 2. Drill a 1/16" [1.6mm] hole in the hatch covers through the mounting blocks approximately 3/8" [9.5mm] deep. Thread a #2 x 3/8" [9.5mm] flat head wood screw into each hole and back it out. Apply a drop of thin CA glue to each hole to harden the wood. When the CA glue has dried, thread a #2 x 3/8" [9.5mm] flat head screw into each of the four holes.

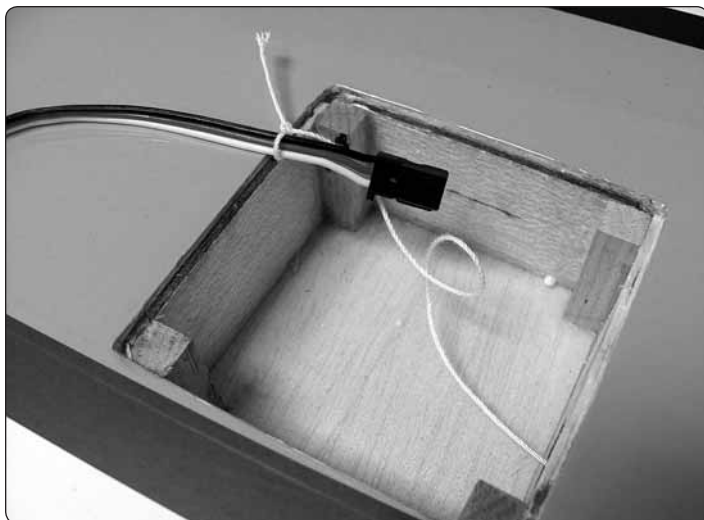
❑ ❑ 3. Cut three arms from a four-armed servo arm for each aileron servo. Enlarge the outer hole of each remaining arm with a 5/64" [2mm] drill bit.



❑ ❑ 4. Attach a 12" [305mm] servo extension to the aileron servo and secure the connector using tape or heat shrink tubing (not included). Center the servos with your radio system and install the servo arms to the servos perpendicular to the servo cases as shown. Be sure to reinstall the servo arm screws into the servos.



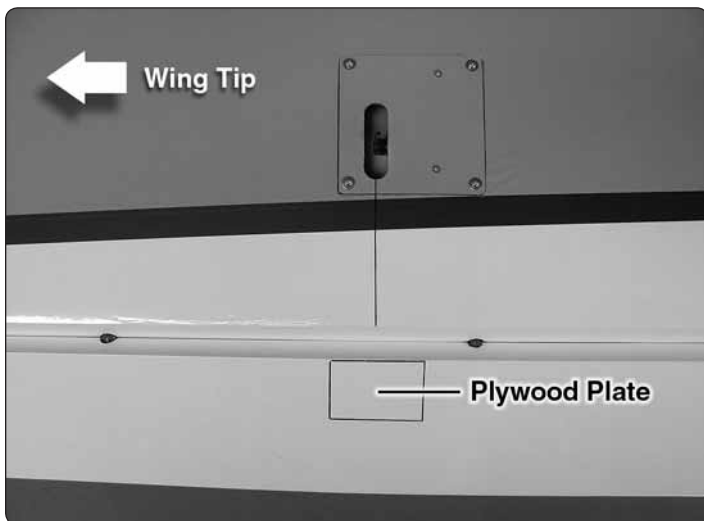
❑ ❑ 5. Position the servos against the underside of the aileron servo hatch covers between the mounting blocks. Drill 1/16" [1.6mm] holes through the mounting tabs on the servo cases into the blocks. Thread a servo mounting screw (included with the servo) into each hole and back it out. Apply a drop of thin CA to each hole to harden the wood. When the CA has dried, install the servos onto the hatch covers using the hardware supplied with the servos.



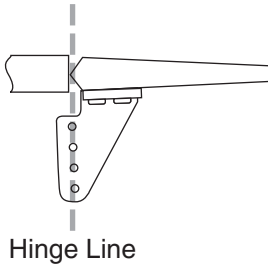
❑ ❑ 6. Inside the servo bay a string is taped. Tie the string to the servo lead. Taped to the root rib you will find the other end of the string. Pull the string and the servo lead through the wing.



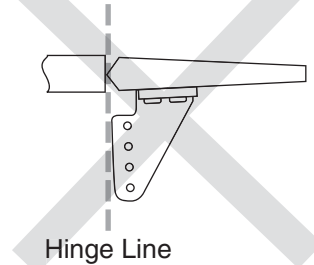
❑ ❑ 7. Position the aileron servo hatch covers in place and drill a 1/16" [1.6mm] hole through the mounting holes and into the hatch mounting blocks. Thread a #2 x 3/8" [9.5mm] screw into each hole and back it out. Apply a drop of thin CA to each hole to harden the wood. Install the hatch covers to the wings using four #2 x 3/8" [9.5mm] and four #2 flat washers.



CORRECT

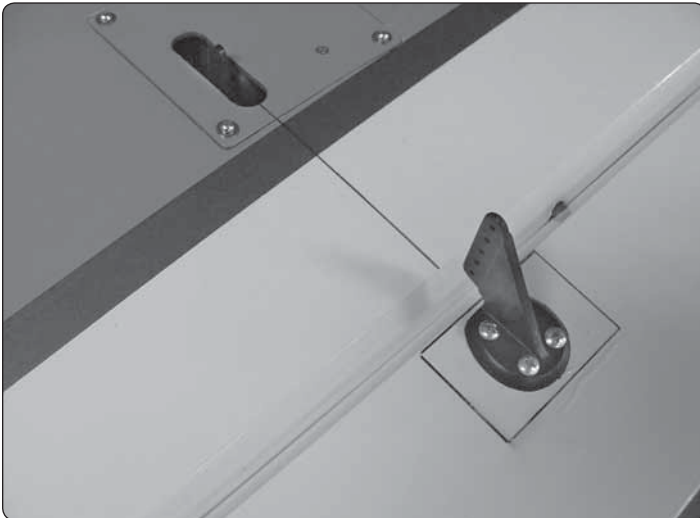


INCORRECT



❑ 8. The aileron has a plywood control horn mounting plate built into it. Place a control horn onto the plate in line with the servo arm. Drill a 3/32" [2.4mm] hole through each of the four mounting holes, into the plywood plate. **DO NOT DRILL THROUGH THE OPPOSITE SIDE OF THE AILERON!**

❑ 9. Install and then remove a #4 x 5/8" sheet metal screw into the four holes you drilled. Apply a couple of drops of thin CA glue into the holes to harden the threads. Allow the glue to harden.



❑ 10. Secure the horn to the aileron with four #4 x 5/8" sheet metal screws.



❑ 11. Locate a 4-40 x 5-3/4" [146mm] threaded pushrod wire, 4-40 nut, 4-40 threaded clevis, 4-40 solder clevis and two silicone clevis keepers. Assemble the pushrod as shown.

❑ 12. Install the pushrod assembly to the servo arm. Install the 4-40 solder clevis into the hole second from the end of the control horn. Center the aileron and make a mark on the wire where it will need to be cut. Remove the pushrod assembly and the solder clevis. Cut the wire on the mark you made.



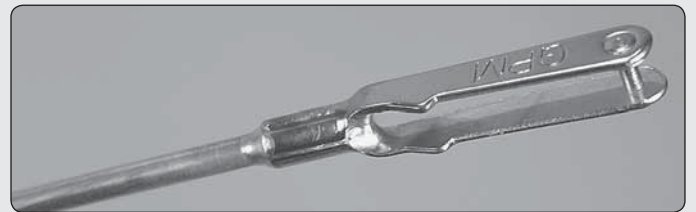
HOW TO SOLDER

1. Use denatured alcohol or other solvent to thoroughly clean the pushrod. Roughen the end of the pushrod with coarse sandpaper where it is to be soldered.

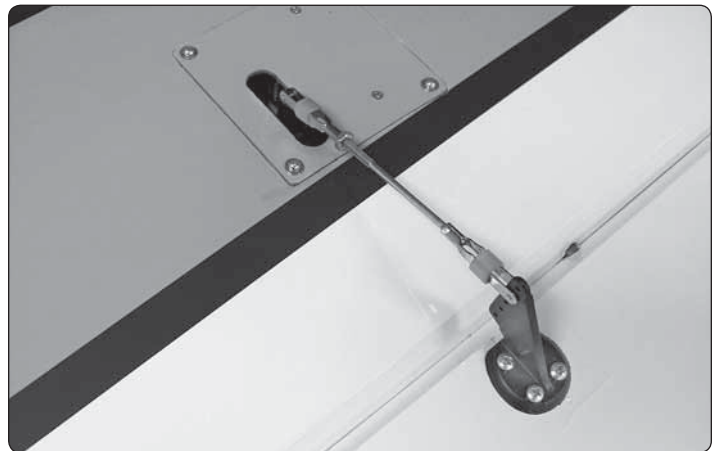
2. Apply a few drops of soldering flux to the end of the pushrod, and then use a soldering iron or a torch to heat it. "Tin" the heated area with silver solder by applying the solder to the end. The heat of the pushrod should melt the solder – not the flame of the torch or soldering iron – thus allowing the solder to flow. The end of the wire should be coated with solder all the way around.

3. Place the clevis on the end of the pushrod. Add another drop of flux, then heat and add solder. The same as before, the heat of the parts being soldered should melt the solder, thus allowing it to flow. Allow the joint to cool naturally without being disturbed. Avoid excess blobs, but make certain the joint is thoroughly soldered. The solder should be shiny, not rough. If necessary, reheat the joint and allow to cool.

4. Immediately after the solder has solidified, but while it is still hot, use a cloth to quickly wipe off the flux before it hardens. **Important:** After the joint cools, coat the joint with oil to prevent rust. **Note:** Do not use the acid flux that comes with silver solder for electrical soldering.

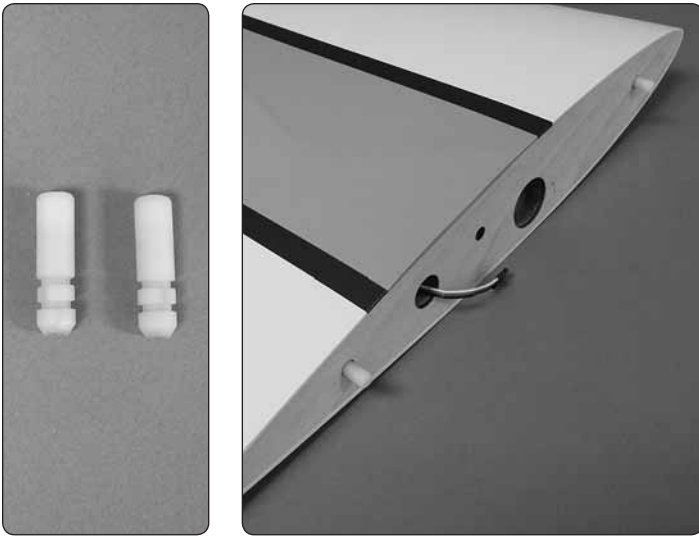


This is what a properly soldered clevis looks like – shiny solder with good flow, no blobs and flux removed.



❑ 13. Using the instructions in the **Expert Tip**, "How To Solder", install the 4-40 solder clevis onto the end of the pushrod wire soldering the clevis to the wire. After the solder

has cooled slide the clevis retainer over the solder clevis. Center you servo and then install the pushrod into the control horn and the servo arm. Adjust the clevis as needed and then tighten the 4-40 nut against the clevis. Be sure to apply a drop of thread locker to the threaded wire and nut.

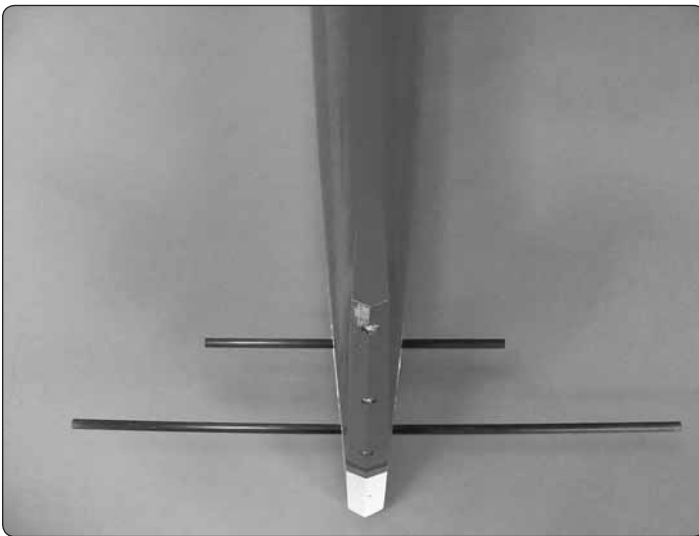


❑ 14. Locate two anti-rotation pins. Apply epoxy to the ribbed end of the pin and into the two holes at each end of the root rib. Insert the pin into the hole leaving approximately 3/8" [9.5mm] of the pin extending from the root rib. Clean any excess epoxy with denatured alcohol and a paper towel before the glue hardens. Set the wing aside to allow the glue to harden.

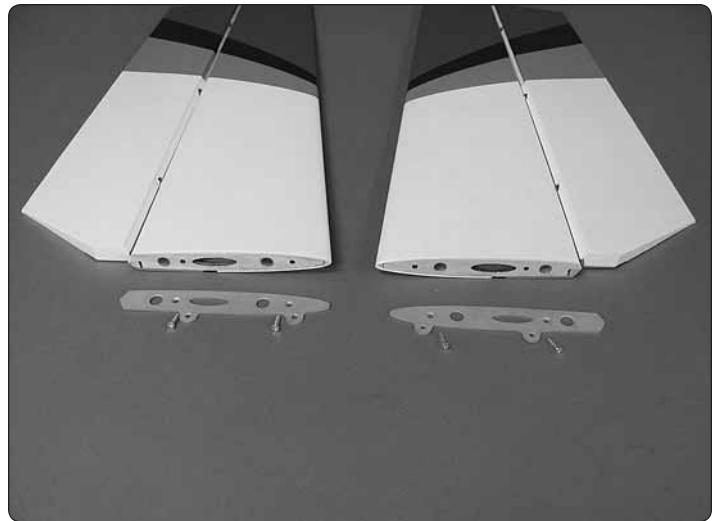
❑ 15. Repeat steps 1-14 for the left wing panel.

BUILD THE FUSELAGE

Assemble the Tail Section



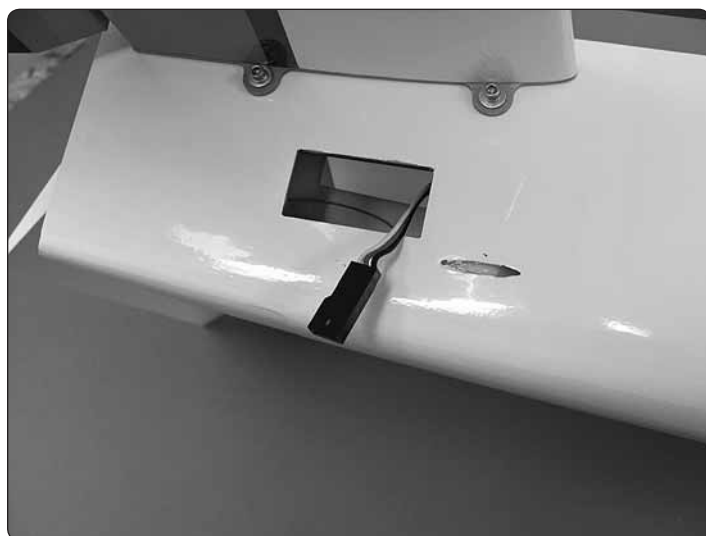
❑ 1. Locate the 9-1/2" [241mm] and 19-3/4" [501mm] carbon fiber stab tubes. Insert them into the fuselage as shown.



❑ 2. Locate the left and right halves of the stab/elevator, two aluminum ribs and four 4-40 x1/2" [13mm] machine screws. Install the aluminum ribs to each of the stabs with two 4-40 screws. Be sure that you use thread locker on each of the screws. During the assembly be sure the side of the rib with the counter sink faces the outside of the rib. This allows the screw to be flush with the surface of the rib.

Install the Elevator Servos

Note: Steps 1 and 2 describe the installation of the servo lead for the elevator servos. The installation described uses one extension and a "Y" connector. Some might prefer a separate line for each servo. Either method is acceptable.



❑ 1. Install a 36" [914mm] servo extension into the tube, sliding the extension to the back of the fuselage. When it is through the tube pull the extension outside one of the servo openings.

❑ 2. Install a "Y" connector onto the servo extension. Secure the connection with shrink tubing, tape or some other method to secure the connection. Note: You may choose to use two leads for the servos instead of the "Y" connector.

❑ 3. Slide the stab assembly onto the carbon fiber tubes, flush to the fuselage. Secure the stab to the fuselage with two 4-40 x1/2" [13mm] socket head cap screws, #4 lock washers and #4 flat washers. Be sure to use thread locker on each of the bolts. Do this for both halves of the stab.



Right Side of Fuselage

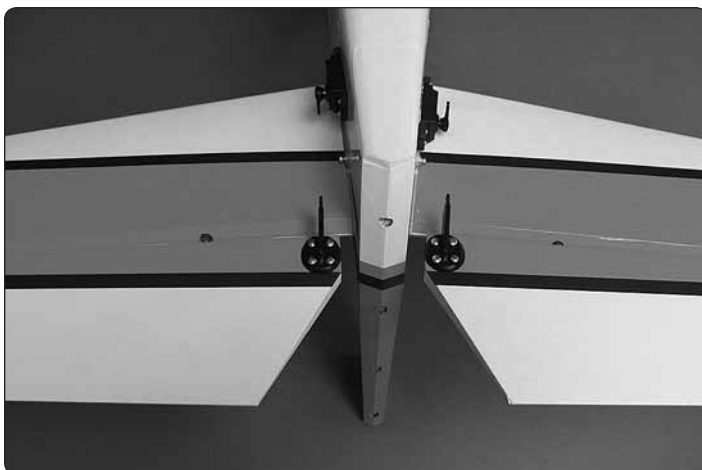


Left Side of Fuselage

❑ 3. Using the hardware that came with your servo, set up two servos as shown and install them into the servo bays. When installing the servos be sure that you secure the servo connections with shrink tubing, tape or some other method for securing the connections.

❑ 4. The elevator has a plywood control horn mounting plate built-in. Place a control horn onto the plate in line with the servo arm. Drill a 3/32" [2.4mm] hole through each of the four mounting holes, into the plywood plate. **DO NOT DRILL THROUGH THE OPPOSITE SIDE OF THE ELEVATOR!**

❑ 5. Install and then remove a #4 x 5/8" sheet metal screw into the four holes you drilled. Apply a couple of drops of thin CA glue into the holes to harden the threads. Allow the glue to harden.

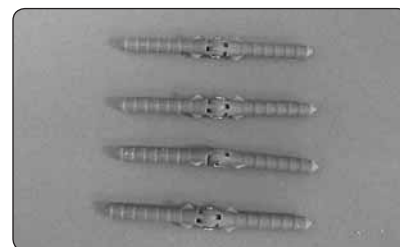


❑ 6. Secure the horn to the elevator with four #4 x 5/8" sheet metal screws.

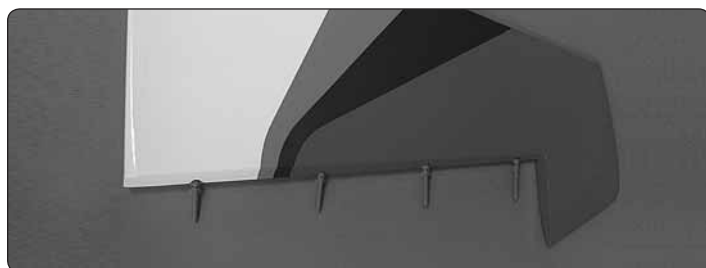


❑ 7. Locate two 4-40 x 5-3/4" [146mm] threaded pushrod wires, 4-40 nuts, 4-40 threaded clevises, 4-40 solder clevises and silicone clevis keepers. Use the same procedure used for making the aileron pushrods and make two pushrod wires for the elevators.

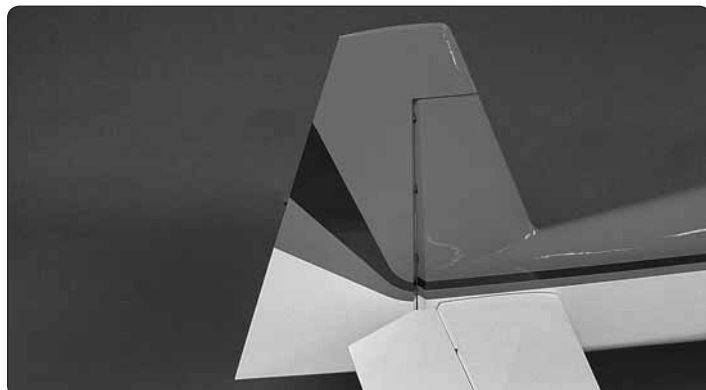
Install the Rudder



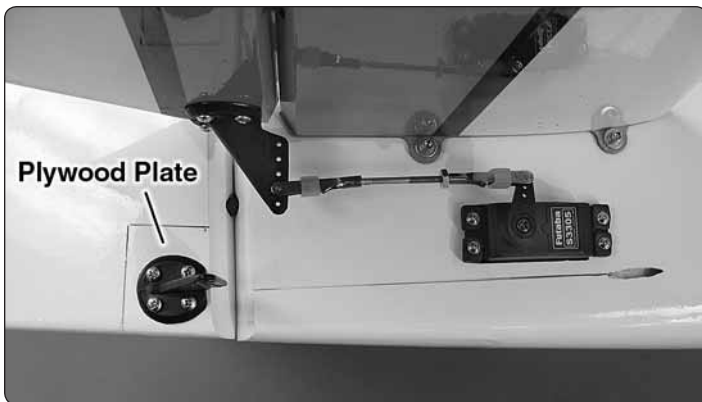
❑ 1. Locate four rudder hinges. Apply a drop of oil to each of the hinge points. This will prevent glue from working into the hinge.



❑ 2. Mix 1/4 ounce [2 drams] of epoxy. Apply it to one half of the hinge and inside the hinge hole in the leading edge of the rudder. Do this for each of the four hinges and then insert each of the four hinges into the holes in the trailing edge of the rudder. Clean any excess epoxy with a paper towel and denatured alcohol. Set the rudder aside until the glue hardens.



❑ 3. Repeat step 2 for the opposite end of the hinge, gluing the rudder to the fuselage.



❑ 4. The rudder has a plywood control horn mounting plate built-in. Place a control horn onto the plate in line with the hole for the pull-pull wire. Drill a 3/32" [2.4mm] hole through each of the four mounting holes, into the plywood plate. DO NOT DRILL THROUGH THE OPPOSITE SIDE OF THE RUDDER!

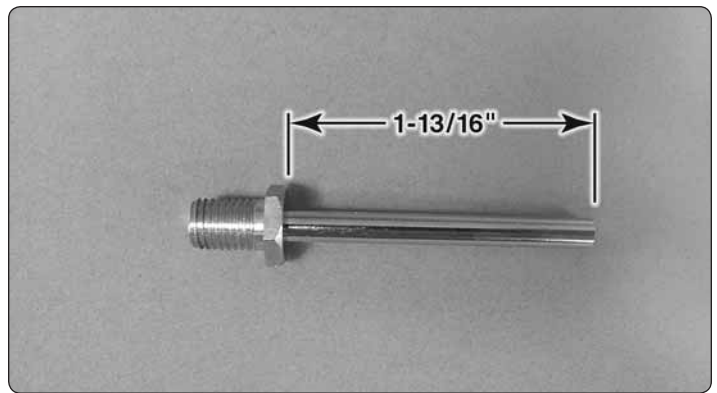
❑ 5. Install and then remove a #4 x 5/8" sheet metal screw into the four holes you drilled. Apply a couple of drops of thin CA glue into the holes to harden the threads. Allow the glue to harden.

❑ 6. Secure the horn to the aileron with four #4 x 5/8" sheet metal screws. Do this on both sides of the rudder.

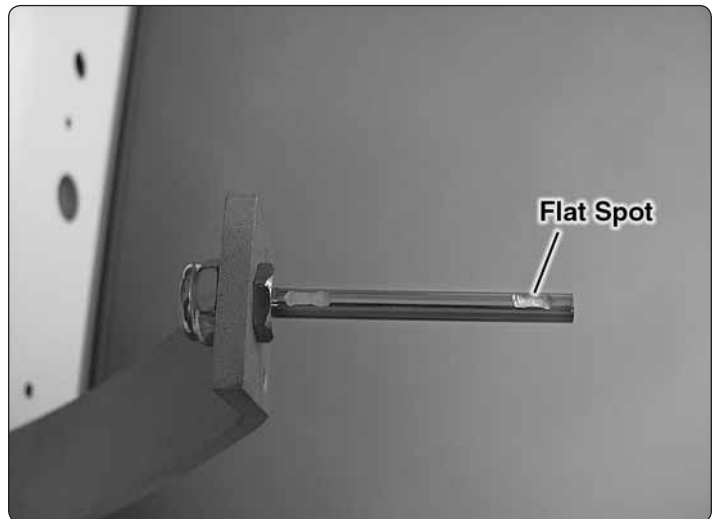
Install the Landing Gear



❑ 1. Attach the landing gear legs to the fuselage using four 8-32 x 1" [25mm] SHCS, four #8 flat washers, four #8 lock washers, and thread locking compound. When installed properly the landing gear sweeps back.

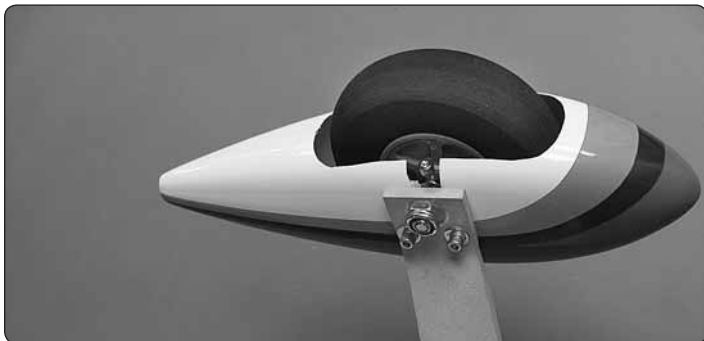
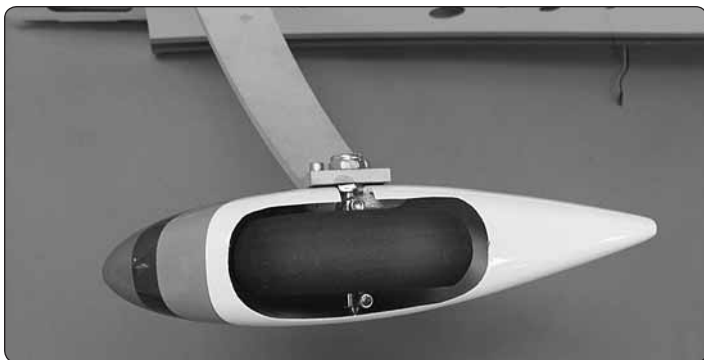


❑ 2. Cut the axles to a length of 1-13/16" [46mm]. Secure the axles to the landing gear legs using the 5/16"-24 nylon lock nuts.

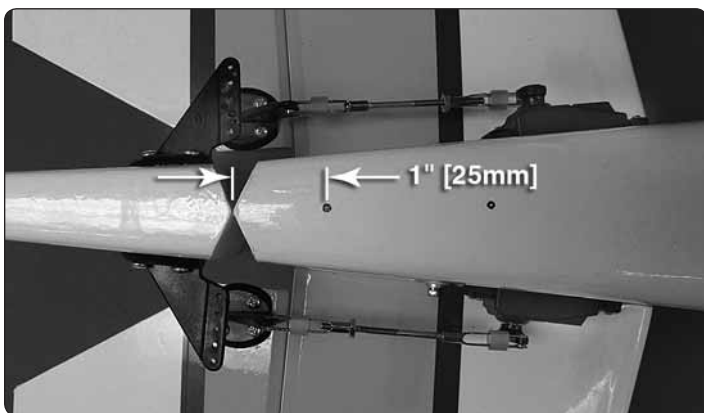


❑ 3. Slide a 3/16" [5mm] wheel collar onto each axle followed by a 3-1/2" [90mm] wheel and then another 3/16" [5mm] wheel collar. Mark the location of the threaded holes in the wheel collars onto the axles. Use a file or rotary tool such as a Dremel to grind flat spots at the marks on the axles.

❑ 4. Reinstall the wheel collars and wheels onto the axles. Thread a 6-32 set screw into each wheel collar and tighten the set screws against the flat spots on the axles. Be sure that the wheel rotates freely on the axle. Oil the axles if necessary.



- □ 5. Attach the wheel pants to the landing gear legs using four 6-32 x 3/4" [19mm] machine screws, four #6 flat washers, four #6 lock washers, and thread locking compound. Adjust the wheel as needed to center the wheel in the wheel pant.



- 6. Locate the aluminum tail wheel bracket. Center it on the fuselage positioning as shown in the photo. Mark the location of the mounting holes onto the fuselage.

- 7. Drill a 3/32" [2.4mm] hole through each of the marks you made. Install and then remove a #4 x 5/8" [16mm] screw into the holes you drilled. Apply a couple of drops of thin CA into the holes to harden the threads. Set the fuselage aside until the glue hardens.



- 8. Assemble the tail wheel wire as shown with the tail wheel steering arm and a 3mm wheel collar. Install a 3mm x 8mm [5/16"] screw into the steering arm and a 3mm x 5mm screw in the wheel collar. Position the steering arm so it is parallel to the end of the tail wheel wire. Mark the location onto the wire where the screws contact the tail wheel wire. *Tip: Slightly tighten the screws and then rotate the steering arm and the wheel collar back and forth. This will allow the screw to scribe a mark onto the wire.*

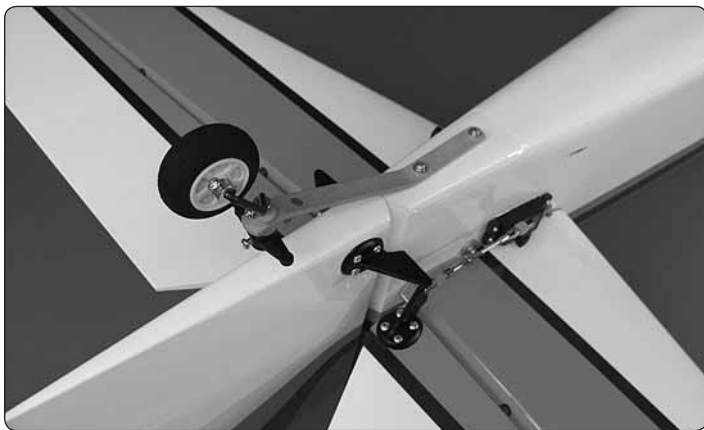


- 9. Using a high speed motor tool or a small file, make a flat spot on the wire where the screws make contact with the wire.

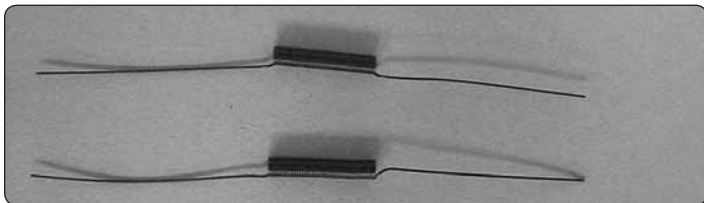


❑ 10. Re-assemble the tail wheel as shown. Be sure that you apply a drop of thread locker onto the screws. The tail wheel should be positioned on the wire between two 3mm wheel collars secured by 3mm x 5mm [3/16"] screws. Before finalizing the tail wheel installation make a mark on the wires where the screws contact the wire. Make a flat spot

on the wires. Secure the tail wheel with the wheel collars and 3mm x 5mm [3/16"] screws. Be sure that you apply thread locker when installing the screws.



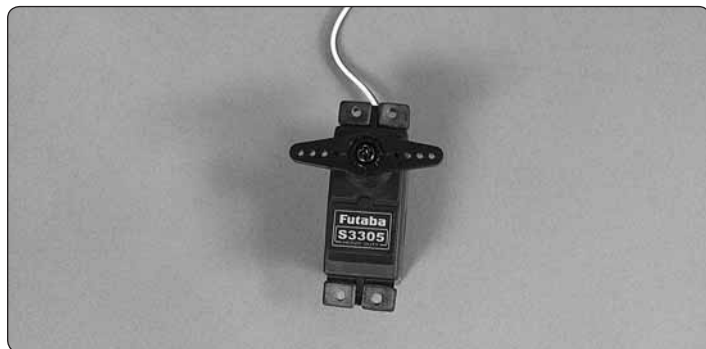
❑ 11. Install the tail wheel assembly to the fuselage with two #4 x 5/8" [16mm] screws, #4 lock washers and #4 flat washers.



❑ 12. Locate the two tail wheel wire springs. With the rudder centered with the vertical fin, attach the springs to each side

of the tail wheel assembly, inserting and twisting the wires into the control horn and steering arm in the holes shown.

Install the Rudder Servo & Pull-Pull Wires



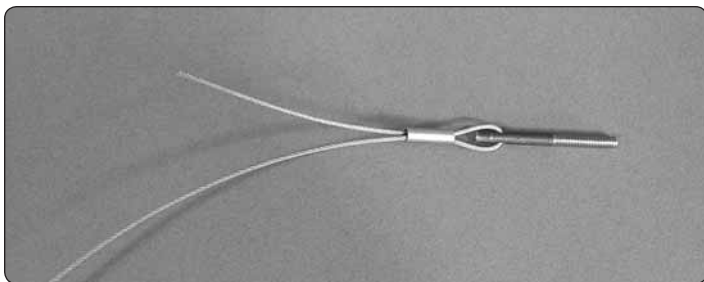
❑ 1. From the servo horns that are included with your servo locate the four arm horn. Remove two of the four arms, center the servo and then install the servo arm onto the servo as shown.



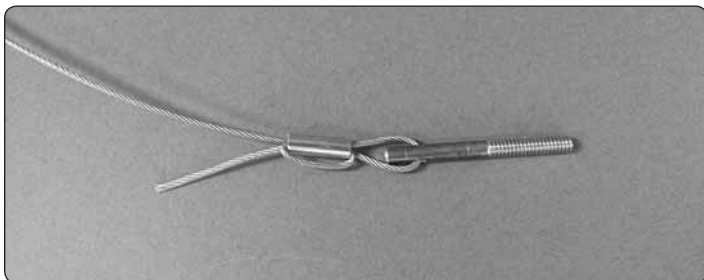
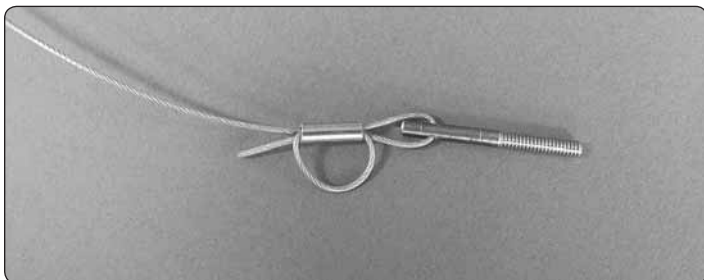
❑ 2. Using the hardware that came with your servo, install the servo in the opening in the fuselage as shown.



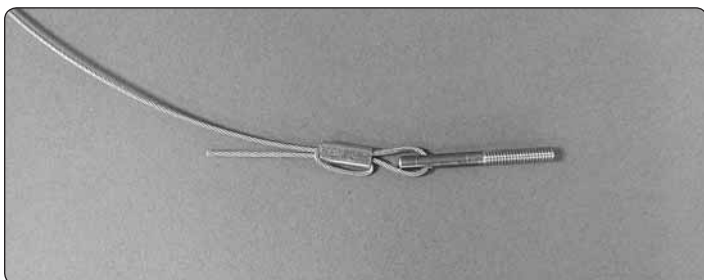
❑ 3. Locate the braided cable, four brass tubes (called a swage) and four threaded brass 4-40 couplers. Use wire cutters to cut the supplied braided cable into two equal lengths.



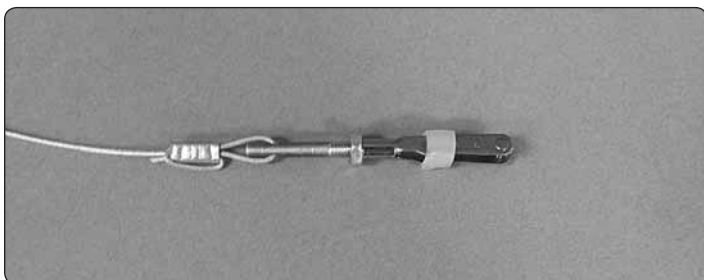
❑ 4. Slide a small swage over one end of the cables and then guide the end of the cable through the hole in the end of the 4-40 threaded brass connector and back through the swage.



❑ 5. Wrap the cable back through the swage, pulling the excess wire tight to the swage.



❑ 6. Squeeze the swage with a pliers to secure the wire. Cut the excess wire from the swage.



❑ 7. Install a 4-40 nut, 4-40 threaded clevis and a silicone clevis keeper onto the brass connector as shown.

❑ 8. Repeat steps 4-7 with the remaining cable.



❑ 9. Install the clevises into the holes of the rudder control horns as shown. Insert the wire into the holes on each side of the fuselage, pushing the wires inside the fuselage.

❑ 10. Install a 4-40 nut, threaded clevis and silicone clevis keeper onto the remaining two threaded brass connectors.

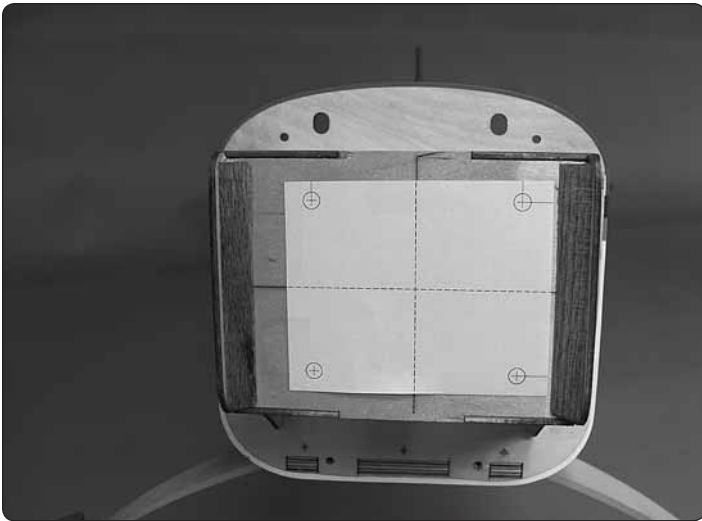


❑ 11. Center the rudder servo and the rudder. (*You may find it helpful to tape the rudder in place for this step*). Install the clevises into the outer holes of the servo arm. Using the same technique used on the opposite end of the wire, slide a small swage over one end of the cable and then guide the end of the cable through the hole in the end of the 4-40 threaded brass connector and back through the swage. Wrap the cable back through the swage, pulling the excess wire tight to the swage. Do this for both cables, adjusting the tension as needed. Once you are satisfied with the tension on the cables, squeeze the swages onto the wire. Cut the excess wire from the swages.

Install the Engine, Fuel Tank & Remaining Servos

The following engine mounting instructions show the installation of the DLE55 gas engine. The installation of other brands of engines will be similar and the following instructions can be used as a guide. The firewall has been positioned for the DLE55 to mount without any additional spacers. You may

have to make spacers or use a proper length stand-off to accommodate your engine. For reference, the distance from the front of the firewall to the front of the drive washer is 6-3/4" [172mm]. Read through these instructions to become familiar with the mounting method.



❑ 1. Locate the DLE engine bolt mounting pattern on page 31 of this manual. Tape the pattern onto the front of the fuselage, aligning the reference marks on the firewall with the reference marks on the pattern.

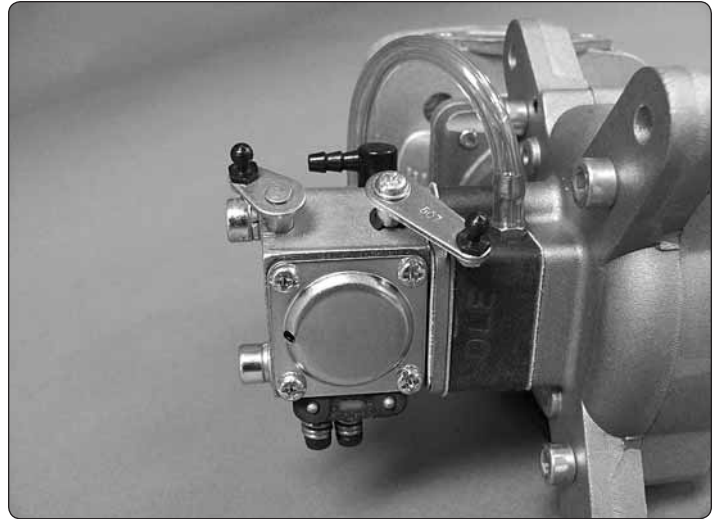
❑ 2. *The DLE engine uses 5mm mounting bolts, (not included with the kit). The drill bit size used here is for the DLE engine. Double check the hole sizes required for your particular engine.*

Drill a pilot hole through each of the marks on the template. Remove the template and then drill a 13/16" [20mm] clearance hole through the firewall on each of the four pilot holes you drilled.

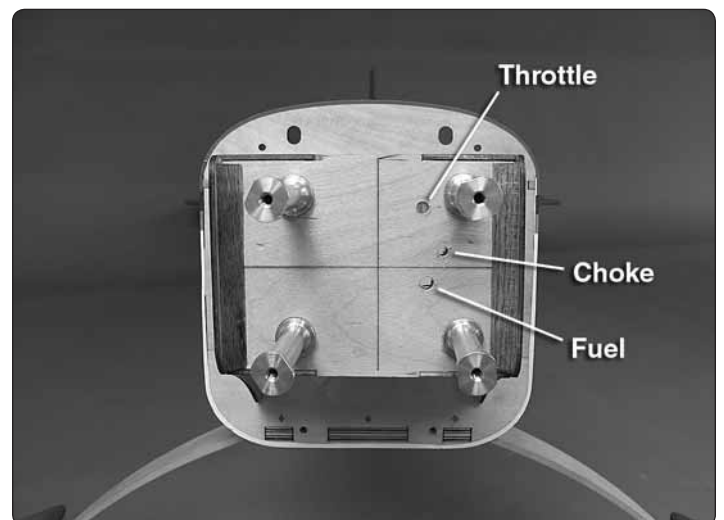


❑ 3. Mount the engine to the firewall with 5mm x 25mm [1"] bolts and fender washers (not included in the kit or with the engine). The stand-offs can be permanently mounted to the firewall. Be sure to use thread locker on the bolts. The bolts that mount the engine to the stand-offs should be snug but not tightened permanently as you will be removing the engine several times during the installation procedure.

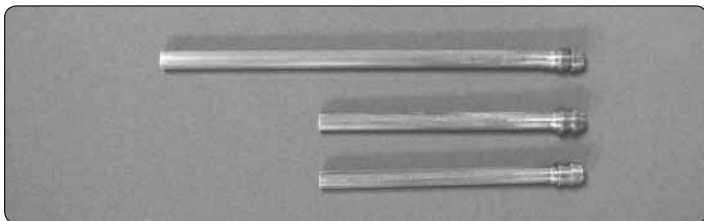
Many modelers have their own opinions for connectors and throttle linkage. We have provided materials for a secure and safe throttle linkage. We have also included a method to connect a linkage to the choke. This will require the use of an additional servo for the choke linkage. Some modelers may prefer a mechanical choke linkage. Review the following procedure and then modify it as you wish to fit your personal preferences.



❑ 4. Install 2-56 ball links and 2-56 nuts to both the throttle and the choke. Be sure to apply a drop of thread locker to the threads on the ball link.



❑ 5. Make marks on the firewall where the throttle, choke and fuel line will pass through. Remove the engine from the stand-offs. Then, drill a 3/16" [4.8mm] hole through the firewall for the throttle and choke. Drill a 1/4" [6.4mm] hole on the mark for the fuel line. (Check the diameter of your fuel line to be sure that a 1/4" [6.4mm] hole is correct).



❑ 6. Locate three brass tubes and five fuel barbs. Solder the barbs to one end of each of the three tubes.



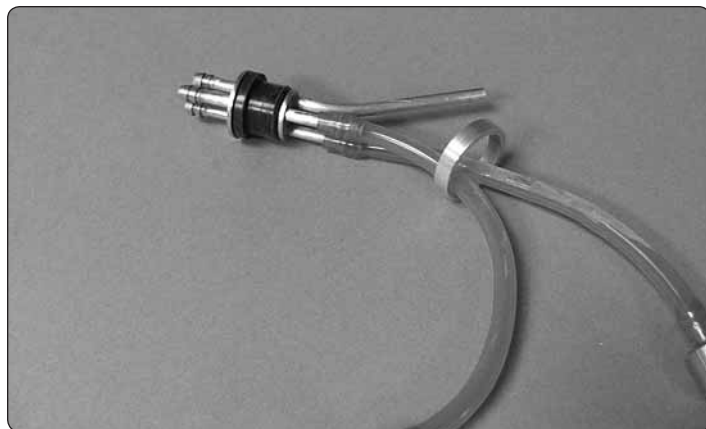
❑ 7. Insert each of the three tubes through the metal plates and the rubber stopper. Note: One of the holes in the stopper is not open and will have to be cut open before the tube can be inserted. Slide the metal plate with the threaded hole over the brass tubes.



❑ 8. Solder a fuel barb on the carburetor fuel tube and the vent line (this is the two shortest tubes)



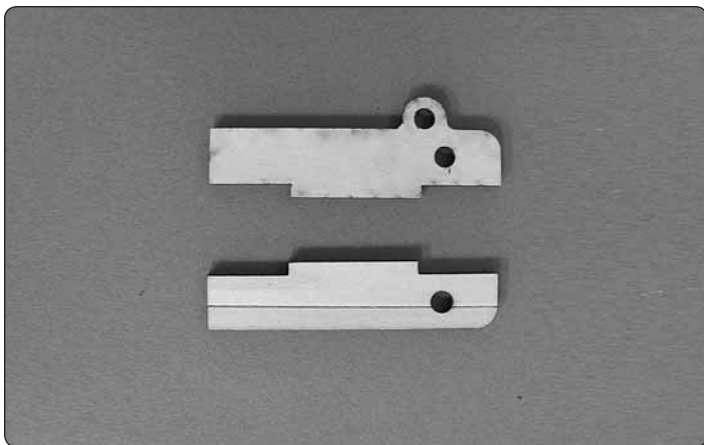
❑ 9. Install fuel lines onto the fuel tubes (not included) and then install the fuel clunks on the fuel line. When determining the length of the fuel line, be sure the clunks are able to move freely in the fuel tank. Bend the vent line upward towards the top of the fuel tank.



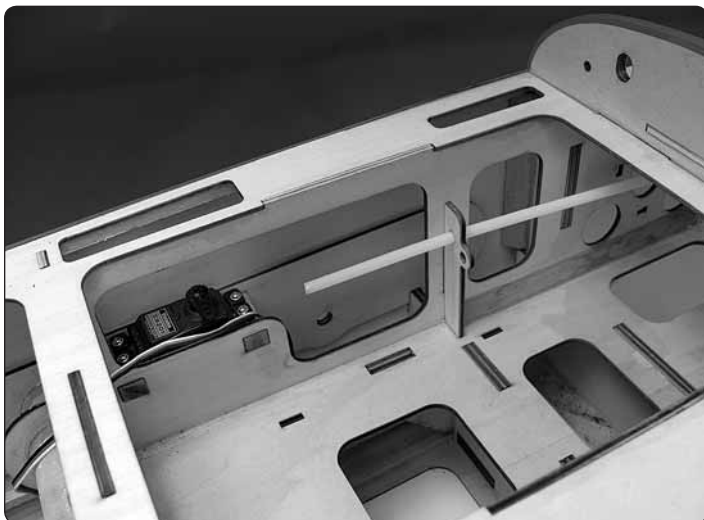
❑ 10. Slide the aluminum ring over the fuel lines before installing the stopper into the fuel tank. Install the stopper into the tank. Slide the aluminum ring onto the neck of the tank. Make sure when you insert the stopper that the vent line is at the top of the tank. Secure the stopper by installing the stopper screw through the center of the metal plate, tightening the stopper to the tank. Set the fuel tank aside.



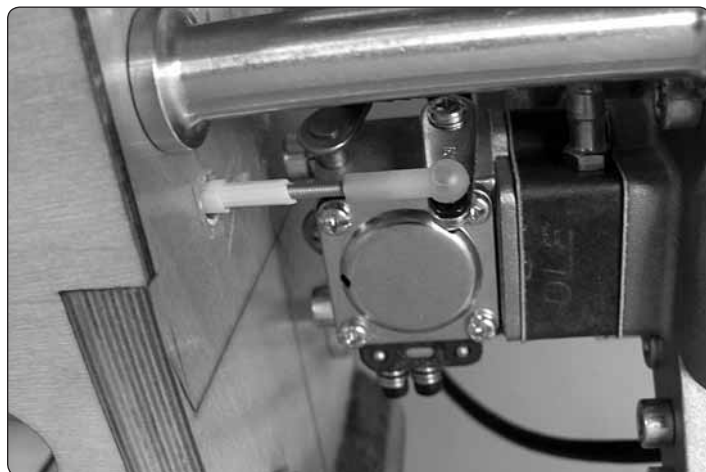
❑ 11. On both sides of the fuselage is a location to mount the throttle servo. The side of your engine that the carburetor is located on will determine which side of the fuselage your servo is mounted. For the DLE engine, mount the servo on the left side of the fuselage. If your engine is on the right side of the engine mount, the servo is on the right side of the fuselage. Use the hardware included with the servo to mount it.



❑ 12. There are two plywood supports that you need to glue into the fuselage. The support with two holes gets installed on the same side of the fuselage as the throttle servo. Glue the two supports into the slots in the side of the fuselage.



❑ 13. Cut one of the 14" [350mm] outer plastic pushrod tubes to a length of 10" [254mm]. Insert it through the hole for the throttle, through the firewall, into the fuselage and into the hole in the plywood support as shown in the photograph. Roughen the tube with sandpaper where the tube contacts the firewall and former. Glue the tube to the firewall and the plywood support.



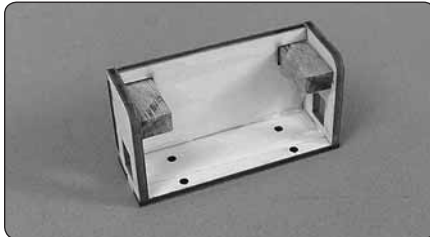
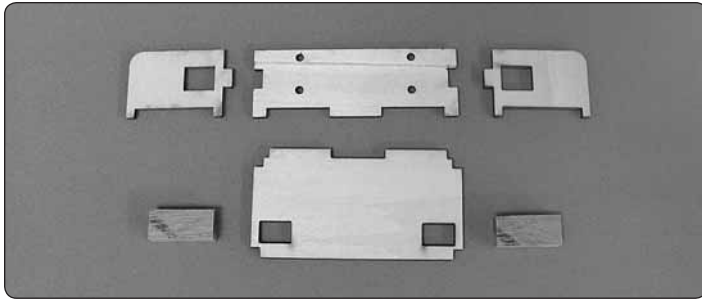
❑ 14. Locate the 36" [914mm] inner pushrod tube and cut a 13" [330mm] piece from it. Screw a 2-56 x 1" [25mm] threaded wire 1/4" [6mm] into the inner pushrod. Screw a nylon ball link onto the threaded wire. Slide the pushrod tube into the tube you installed in the firewall and snap the ball link onto the ball you installed on the throttle arm.



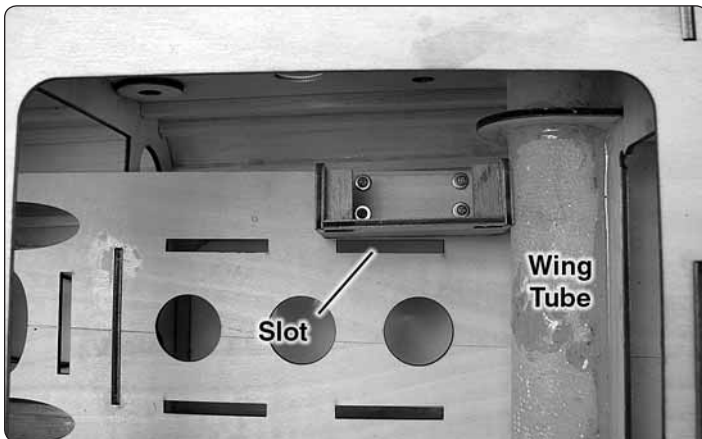
❑ 15. Position the carb fully open and rotate the throttle servo arm to the position to open the throttle. Locate another 2-56 x 1" [25mm] threaded wire, 2-56 nut, 2-56 threaded clevis and silicone clevis retainer. Thread the assembly together. Place the clevis in the outer hole of the servo arm. Cut the inner pushrod to the final length required for the threaded wire to screw into the pushrod. Install the wire, clevis, 2-56 x 1" [25mm] threaded wire, 2-56 nut, 2-56 threaded clevis and silicone clevis retainer into the pushrod tube. Install the clevis into the outer hole of a short, 5/8" [16mm] servo arm.

Building Note: You now need to decide if you are going to use a separate servo to activate the choke. Some modelers like this method while others prefer a manual choke. Either is acceptable. As part of your consideration for installing the

choke servo you should know that the location of the servo will make it a little more difficult to tighten the wing attachment bolt. If you will be using a manual choke skip ahead to step 24.



❑ 16. Locate the plywood choke servo tray parts and the two hardwood blocks. Glue the tray together as shown.



❑ 17. Place the tray on the same side of the fuselage as the throttle servo, against the wing tube and the slot in the battery tray. Drill a 1/16" [1.6mm] hole through the tray. Secure the choke servo tray with four #2 x 3/8" [10mm.] screws and #2 washers.



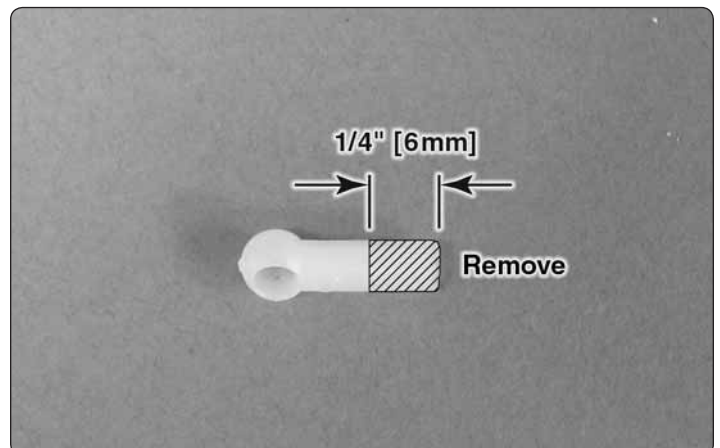
❑ 18. Install the choke servo into the tray using the hardware that came with the servo. Install a short 5/8" [16mm] servo arm on the servo.



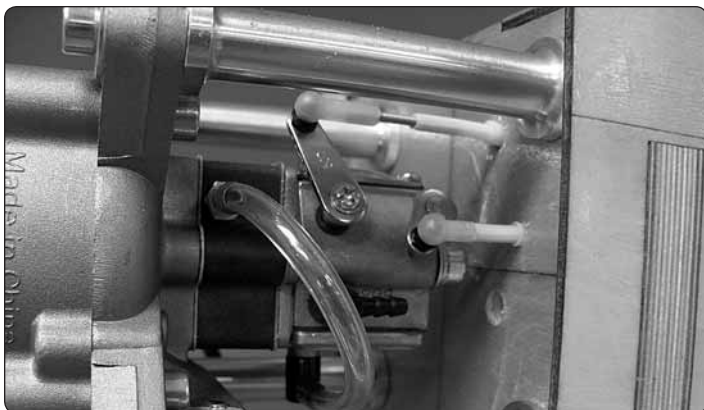
❑ 19. Install the remaining outer pushrod tube through the hole in the firewall in line with the choke, into the fuselage and through the hole in the support former and resting in the notch in the former ahead of the wing tube. Mark the tube where the tube contacts the firewall and formers. Remove the tube and then roughen the tube with sandpaper in the areas that contact the firewall and the formers. Reinstall the tube and glue it to the firewall and formers.



❑ 20. Locate the 3mm plywood half ring plate. Glue it in place to the pushrod tube, securing it to the former.



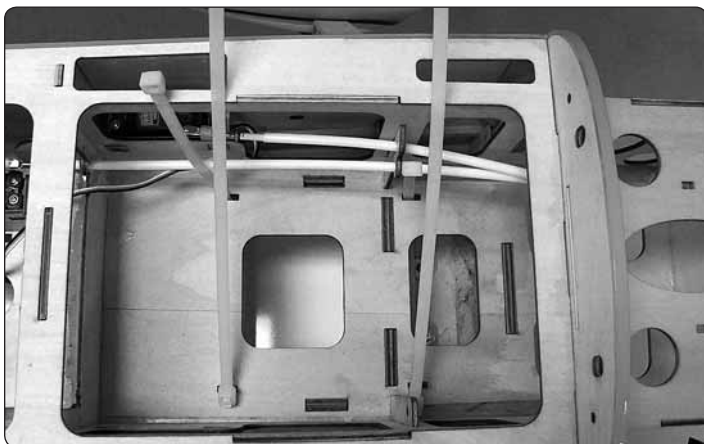
❑ 21. Locate the remaining nylon ball link. Cut 1/4" [6mm] from the end of the ball link.



❑ 22. Screw a 2-56 x 1" [25mm] threaded wire 1/4" [6mm] into the remaining inner pushrod. Screw the nylon ball link you cut onto the threaded wire. Slide the pushrod tube into the tube you installed in the firewall and snap the ball link onto the ball you installed on the choke arm.



❑ 23. Position the choke fully open and rotate the choke servo arm to the position to open the choke. Locate another 2-56 x 1" [25mm] threaded wire, 2-56 nut, 2-56 threaded clevis and silicone clevis retainer. Thread the assembly together. Place the clevis in the outer hole of the servo arm. Cut the inner pushrod to the final length required for the threaded wire to screw into the pushrod. Install the wire, clevis, 2-56 x 1" [25mm] threaded wire, 2-56 nut, 2-56 threaded clevis and silicone clevis retainer into the pushrod tube. Install the clevis into the outer hole of a short, 5/8" [16mm] servo arm.



❑ 24. Locate the four 16" [406mm] nylon tie wraps. Insert one into each of the slots in the plywood plate as shown. After you have inserted one into each slot, attach a second tie wrap to both of the first tie wraps.

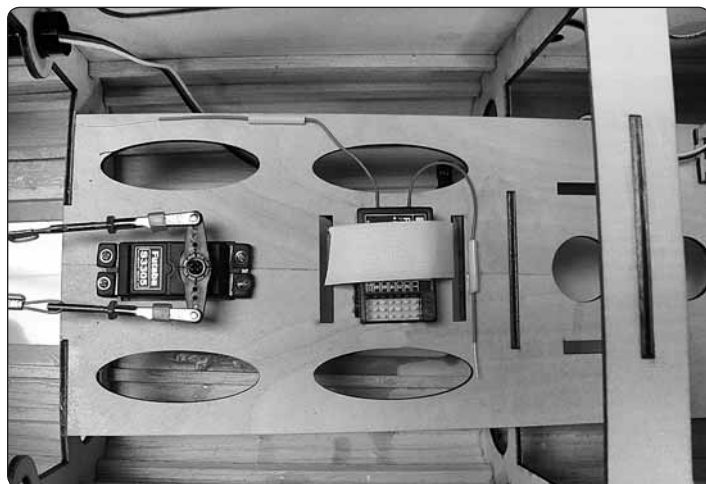


❑ 25. Install fuel lines onto each of the lines coming out of the fuel tank. Once the lines have been installed feed the lines through opening in the front of the fuselage. The carburetor line should be inserted through the hole you drilled for it in the firewall. The vent and fill line can be inserted through the openings in the bottom of the firewall box. Place the tank between the tie wraps. Secure the tank by tightening the tie wraps against the tank. Trim off the excess tie wrap strap.



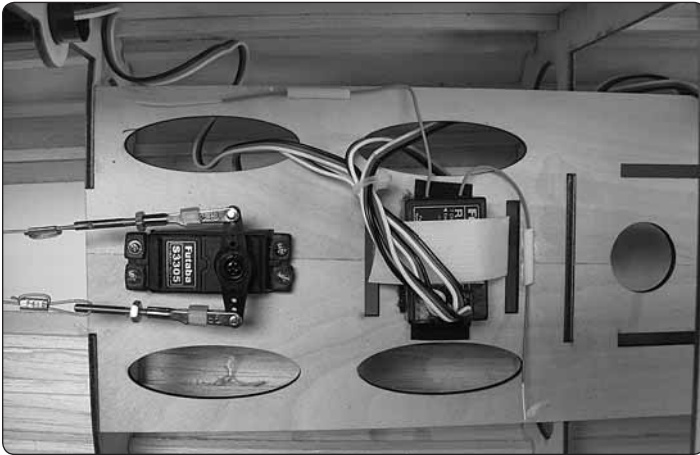
❑ 26. Trim the carburetor fuel line to the proper length and install it onto the fuel inlet.

Install the Radio System

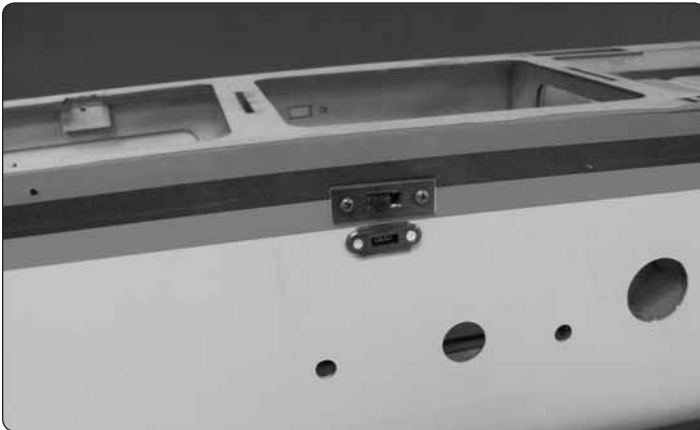


❑ 1. Install your receiver with a piece of R/C foam under it and secure it in place with the included Velcro strap.

- ❑ 2. Install a 6" [152mm] extension on the choke servo and a 12" [305mm] extension on the throttle servo. Secure the connections with heat shrink tubing, tape or some other method to secure the connectors.



- ❑ 3. Plug the servos into the correct channels on your receiver.



- ❑ 4. Located on both sides of the fuselage are pre-cut openings for the switch harness and charge receptacle. Cut away the covering from the openings you choose to use and then install the switch and charge receptacles into the fuselage.



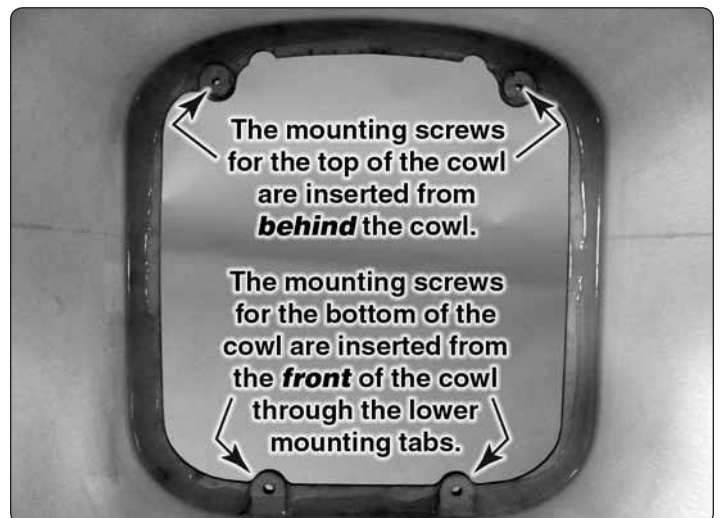
- ❑ 5. Install your battery and R/C foam into the fuselage, securing it with the included Velcro. Plug the battery into the switch harness and receiver. Be sure to secure the battery connection with heat shrink tubing, tape or some other method to secure the connection.

Complete the Engine Installation, Mount the Cowl, Prop & Spinner

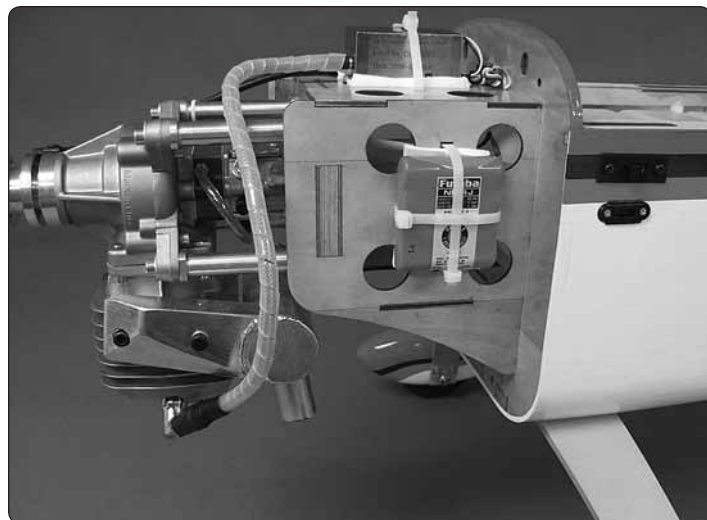
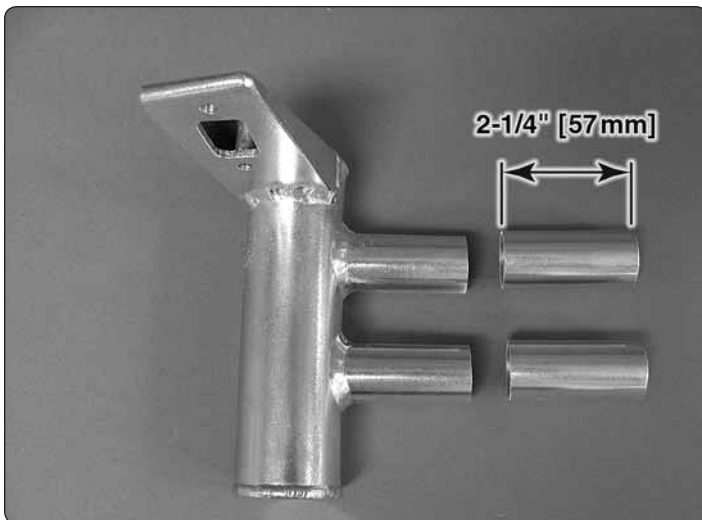
- ❑ 1. Slide the cowl over the engine and onto the fuselage. The cowl will not center properly because you will need to remove some of the cowl to make clearance for the engine. Place the cowl over the engine as far as you can. You should be able to get it almost completely over the engine. With a felt tip marker, mark inside of the cowl the area where the engine makes contact with the cowl. After marking the cowl remove it from the fuselage. Use a high speed motor tool and appropriate cutting tool to remove the area of the cowl where it contacts the engine. Remove small amounts at a time, test fitting the cowl as you go. You do not want to remove more of the cowl than is needed to create engine clearance. Continue with this until the cowl rests tightly against the front of the fuselage.



- ❑ 2. Locate two 6-32 x 3/4" [19mm] socket head cap screws, #6 lock washers and #6 flat washers. Secure the cowl to the fuselage from behind the cowl with the bolts and washers.

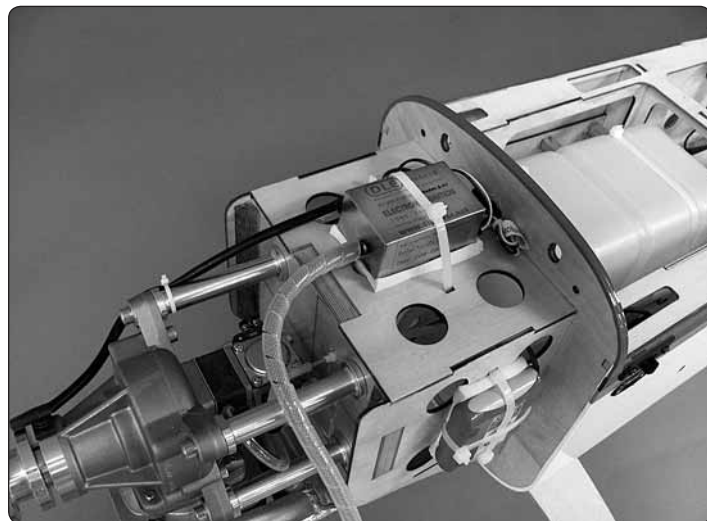


- ❑ 3. Securing the bottom of the cowl to the fuselage is done from the front of the cowl but will remain inaccessible until you complete cutting the cowl for the engine and muffler clearance. With the cowl secured with the top two cowl mounting bolts, mark the rest of the cowl to indicate the final area that needs to be cut for engine clearance. Cut away those areas from the cowl.



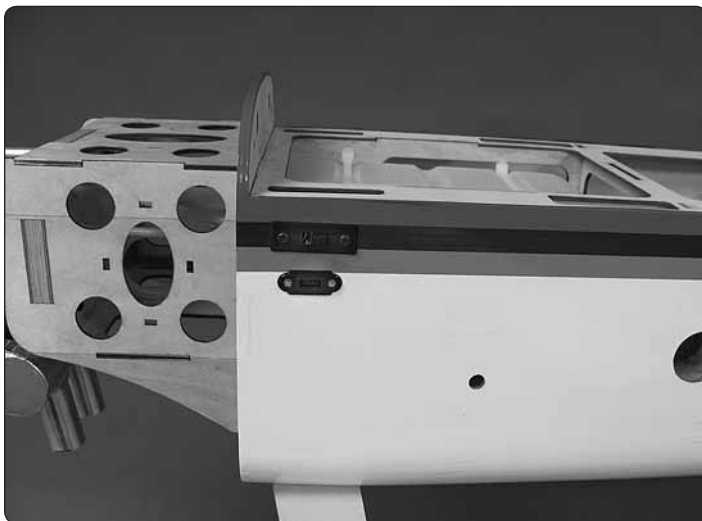
❑ 4. In order to fit the cowl over the engine and muffler you will need to shorten the exhaust pipes of the muffler. If you are installing the DLE 55 and the recommended J-Tec muffler you will need to shorten the pipes by approximately 2-1/4" [57mm]. You can do this with a hack saw or a high speed motor tool and cut-off wheel. Shorten the exhaust pipes as needed.

❑ 5. Install the muffler and cowl. Mark the areas of the cowl that need to be removed for muffler clearance and remove those areas.

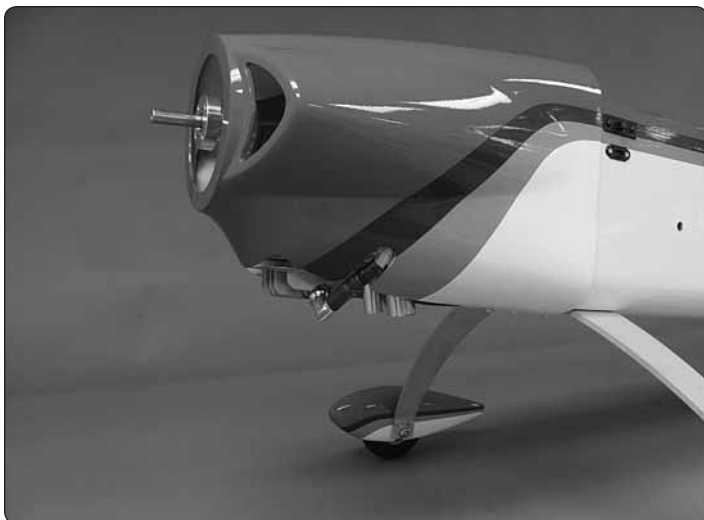


❑ 7. Following the instructions with the engine, install the ignition module and battery. We have provided room on the side of the fuselage for the battery and you will be able to fit the ignition module on top of the fuselage. The battery and the ignition module should be mounted with foam underneath them and secured with the included tie-wraps.

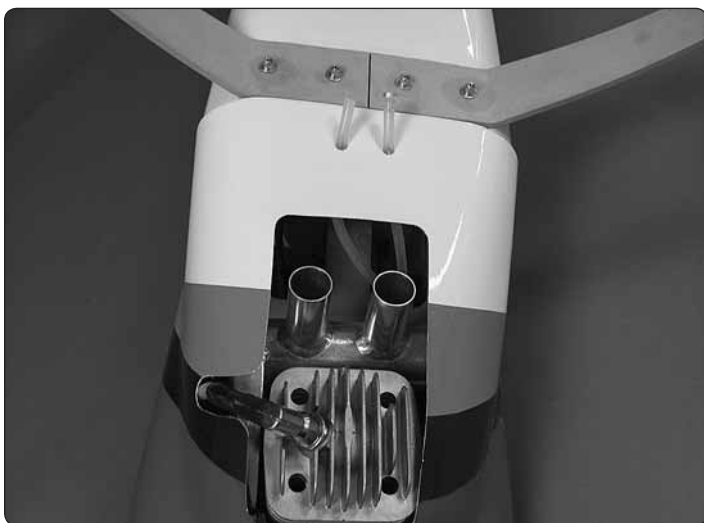
❑ 8. Make all of the connections between the switch, charge jack, battery and the ignition module. Secure the connections with heat shrink tubing, tape or some other method for securing the connections. If you have not already secured the engine, secure the engine to the stand-offs with the bolts that came with the engine. Be sure you apply thread locking compound to the bolts before tightening them.



6. Install the switch and charge jack for the engine ignition module. We installed them near the front of the fuselage to maintain separation between the ignition and radio system.



❑ 9. Put the cowl back onto the fuselage. You will need to make some clearance in the cowl for the spark plug lead. Make final adjustments to the cowl as needed. When you have finished, mount the cowl with the two 6-32 x 3/4" [19mm] socket head cap screws, #6 lock washers and #6 flat washers. Secure the bottom of the cowl with 6-32 x 1" [25mm] socket head cap screws, #6 lock washers and #6 flat washers. Now that you have cut open the cowl for the engine and muffler clearance you will be able to insert the lower bolts into the lower mounting holes in the bottom of the cowl.



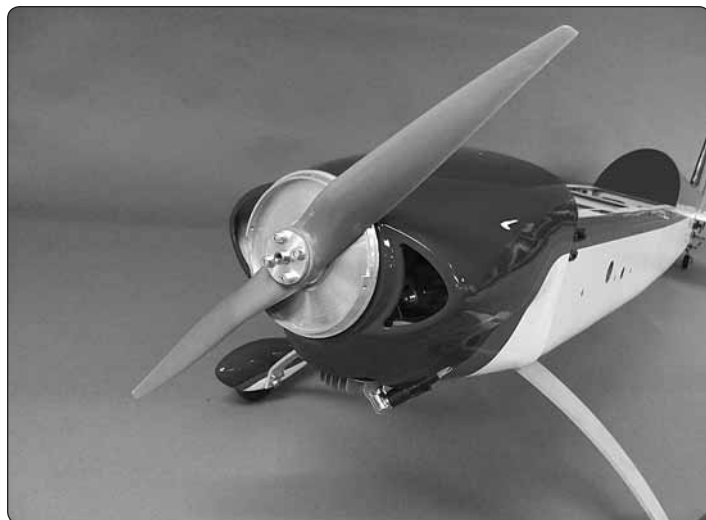
❑ 10. Cut two holes in the bottom of the fuselage sized to fit your fuel line. Feed the vent and fill line through the holes. Install the fuel plug in the fuel line.



❑ 11. Rotate the prop shaft until the engine is on compression (the piston is at the top of the cylinder). Slide your prop onto the engine shaft. (You may need to drill the center of the prop to fit the engine). Once the prop fits the shaft set your prop somewhere near the 1 o'clock and 2 o'clock position. This is the position most modelers prefer. If you prefer a different position set the prop there. Make a reference mark on the prop that aligns with one of the holes in the drive washer.



❑ 12. Drill the prop for the bolt holes required for your engine. Many manufacturers sell a drill gauge guide specifically for this purpose (DLEQ0551 for the DLE 55). If you do not own a drill guide you can also use the prop washer as your guide. For accuracy it is best to use a drill press when drilling the holes. After drilling the holes be sure to check that the prop matches the drive washer and that it is positioned correctly.



❑ 13. Slide the spinner back plate onto the prop shaft followed by the newly drilled prop. Set the prop so it is positioned properly. Without moving the prop rotate the back plate until the prop is over the cut outs in the back plate. Place the spinner cone on the back plate (do not secure the spinner cone with screws). Using the spinner cone as your guide, position the prop. Adjust the position of the back plate and spinner cone, making sure there is clearance around the prop blade. Once you are satisfied that all of the parts are properly aligned, carefully remove the spinner cone without disturbing the prop and back plate. Transfer the hole locations in the prop to the back plate. Drill the prop holes in the back plate.

❑ 14. Mount the back plate, prop and prop washer with the engine bolts to be sure everything aligns. Make adjustments as needed.



❑ 15. Install the spinner with the eight screws and washers included with the spinner. When you do the final installation of the screws ***you must use thread locking compound*** to prevent them from vibrating free.



❑ 12. Install the wing tube through the hole in the fuselage.



- ☐ 13. Slide the wings onto the tube, making sure to feed the servo lead from the wing through the hole in the side of the fuselage. Slide the wing snug to the fuselage sides.



- ☐ 14. Locate the two nylon wing bolts. Secure the wing to the fuselage by tightening the bolts to the fuselage.



- ☐ 15. Install the canopy onto the top of the fuselage, aligning the pins in the front of the canopy with the holes behind the cowl. Secure the canopy with four 4-40 x1" [25mm] screws, #4 flat washers and #4 lock washers.

Apply the Decals

Use the photos on the box to determine where to place your decals.

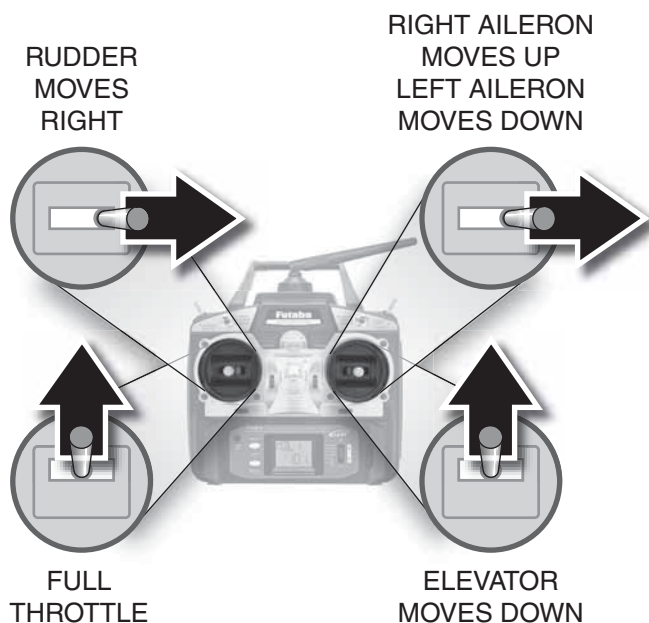
- ☐ 1. Remove the decals from the sheet.
- ☐ 2. Be certain the model is clean and free from oily fingerprints and dust. Prepare a dishpan or small bucket with a mixture of liquid dish soap and warm water—about one teaspoon of soap per gallon of water. Submerge the decal in the soap and water and peel 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.
- ☐ 3. Position decal on the model where desired. Holding the decal down, use a paper towel to wipe most of the water away.
- ☐ 4. Use a piece of soft balsa or something similar to squeegee 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 SETUP (STANDARD MODE 2)

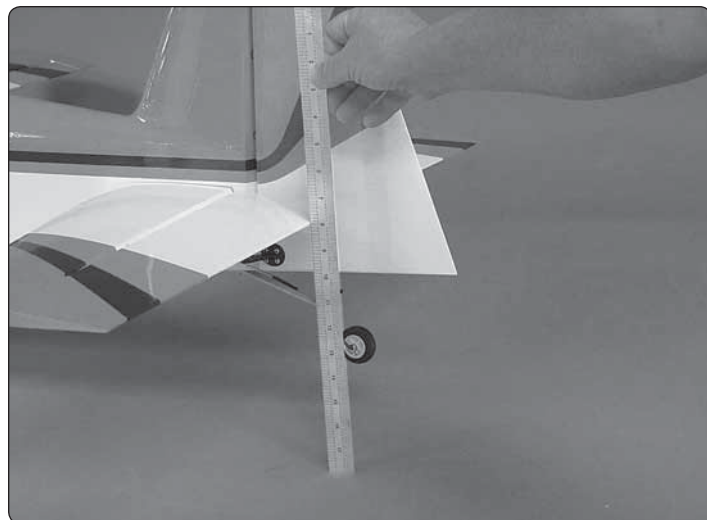


- ❑ 3. Make certain that the control surfaces and the carburetor respond in the correct direction as shown in the diagram. If any of the controls respond in the wrong direction, use the servo reversing in the transmitter to reverse the servos connected to those controls. Be certain the control surfaces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

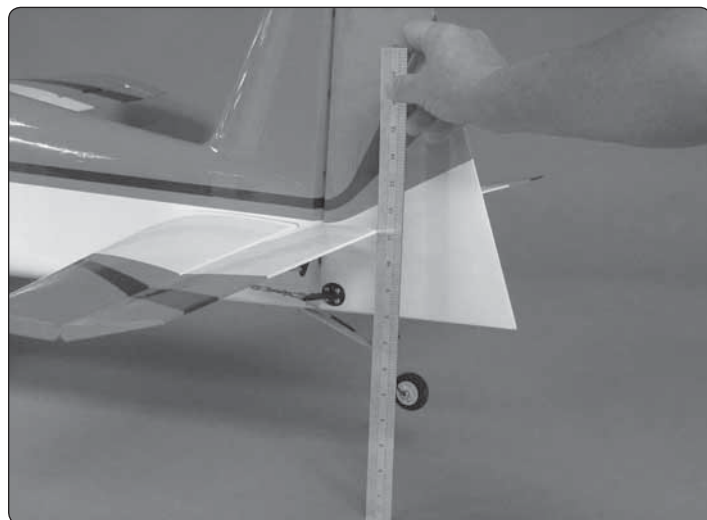
Set the Control Throws

To ensure a successful first flight, set up your Revolver according to the control throws specified in this manual. The throws have been determined through actual flight testing and accurate record-keeping allowing the model to perform in the manner in which it was intended. If, after you have become accustomed to the way the Revolver .50 flies, you would like to change the throws to suit your taste, that is fine. However, too much control throw could make the model too responsive and difficult to control, so remember, "more is not always better."

- ❑ 1. Use a box or something similar to prop up the bottom of the fuselage so the horizontal stabilizer and wing will be level.



- ❑ 2. Hold a ruler vertically on your workbench against the widest part (front to back) of the trailing edge of the elevator. Note the measurement on the ruler.



- ❑ 3. Move the elevator up with your transmitter and move the ruler forward so it will remain contacting the trailing edge. The distance the elevator moves up from center is the "up" elevator throw. Measure the down elevator throw the same way.

- ❑ 4. If necessary, adjust the location of the pushrod on the servo arm or on the elevator horn, or program the ATVs in your transmitter to increase or decrease the throw according to the measurements in the control throws chart.

If your radio does not have dual rates, we recommend setting the throws at the high rate settings.

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

These are the recommended control surface throws:		
	LOW RATE	HIGH RATE
ELEVATOR	Up & Down 1/2" [13mm] 6°	Up & Down 3/4" [19mm] 10°
RUDDER	Right & Left 2-3/4" [70mm] 19°	Right & Left 3-1/4" [83mm] 22°
AILERONS	Up & Down 5/8" [16mm] 12°	Up & Down 7/8" [22mm] 17°

Balance the Model (C.G.)

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

At this stage the model should be in ready-to-fly condition with **all** of the components in place including the complete radio system, engine, muffler, propeller, spinner and pilot.

- ❑ 1. If using a Great Planes C.G. Machine, set the rulers to 7-7/8" [200mm]. If not using a C.G. Machine, use a fine-point felt tip pen to mark lines on the top of the wing at both sides of the fuselage 7-7/8" [200mm] back from the leading edge. Apply narrow (1/16" [2mm]) strips of tape over the lines so you will be able to feel them when lifting the model with your fingers.

This is where your model should balance for the first flights. Later, you may experiment by shifting the C.G. 5/8" [16mm] forward or 5/8" [16mm] back to change the flying characteristics. Moving the C.G. forward will improve the smoothness and stability, but the model will then be less aerobatic (which may be fine for less-experienced pilots). Moving the C.G. aft makes the model more maneuverable and aerobatic for experienced pilots. 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 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." If possible, move the battery pack and/or receiver forward to get the model to balance. If the nose drops, the model is "nose heavy." If possible, move the battery pack and/or receiver aft. If the receiver and/or battery cannot be moved, or if additional weight is still required, nose weight or tail weight may be easily added by using Great Planes "stick-on" lead (GPMQ4485). To find out how much weight is required, place incrementally increasing amounts of weight on the bottom of the fuselage over the location where it would be mounted inside until the model balances. A good place to add stick-on nose weight is to the firewall. Do not attach weight to the cowl—this will cause the mounting screws to open up the holes in the cowl. Once you have determined the amount of weight required, it can be permanently attached.

Note: If mounting weight where it may be exposed to fuel or exhaust, do not rely upon the adhesive on the back to permanently hold it in place. Over time, fuel and exhaust residue may soften the adhesive and cause the weight to fall off. Instead, permanently attach the weight with glue or screws.

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

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

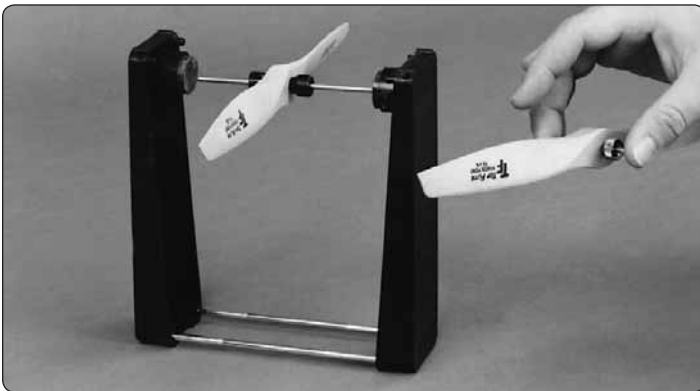
No matter if you fly at an AMA sanctioned R/C club site or if you fly somewhere on your own, you should always have your name, address, telephone number and AMA number on or inside your model. It is **required** at all AMA R/C club flying sites and AMA sanctioned flying events. Fill out the identification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

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

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 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 & Range Check

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

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. Fuelproof all areas exposed to fuel or exhaust residue such as the cowl ring, cowl mounting blocks, wing saddle area, etc.
- ☐ 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 (*only for non 2.4 systems*)
- ☐ 5. Balance your model *laterally* as explained in the instructions.
- ☐ 6. Use threadlocking compound to secure critical fasteners such as the set screws that hold the wheel axles to the struts, screws that hold the carburetor arm (if applicable), screw-lock pushrod connectors, etc.
- ☐ 7. Add a drop 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 according to the 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 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. Range check your radio when you get to the flying field.

FLYING

The Revolver is a great-flying model that flies smoothly and predictably. The Revolver 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 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, 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, 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.

You will find that the Revolver 50cc flies like a much lighter airplane. It has a wide speed envelope and a light wing loading. Though not a 3D airplane, the Revolver is very aerobatic and capable of snaps, spins rolls, lomcevak and knife edge flight. If you are new to giant scale models you will find the Revolver a great plane to make your foray into large airplanes.

Take it easy with the Revolver 50cc 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.

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.

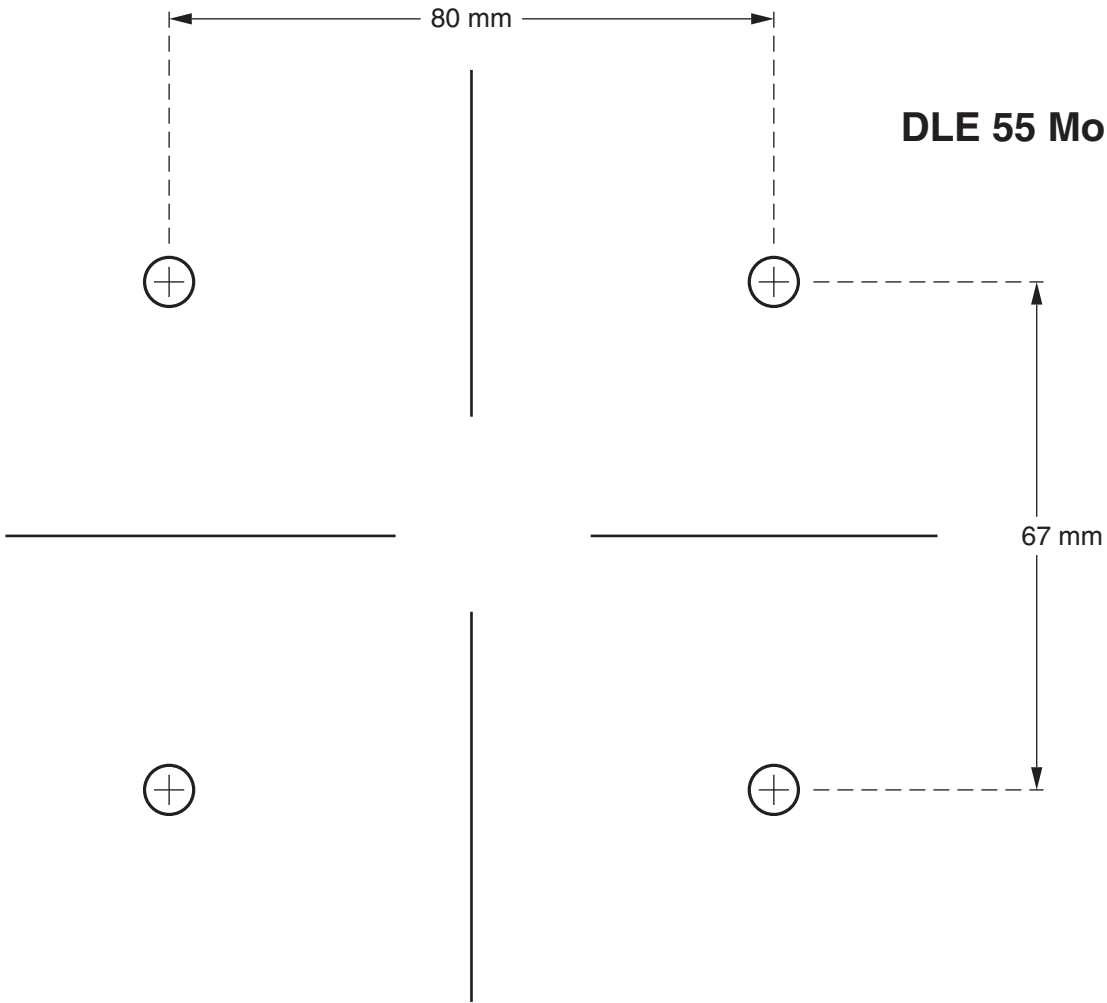
One final note about flying your model. Have a goal or flight plan in mind for **every** flight. This can be learning a new maneuver(s), improving a maneuver(s) you already know, or learning how the model behaves in certain conditions (such as on high or low rates). This is not necessarily to improve 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!

DLE 55 Mounting Pattern



This model belongs to:

Name

Address

City, State, Zip

Phone Number

AMA Number

