Saratoga 40

Assembly Manual

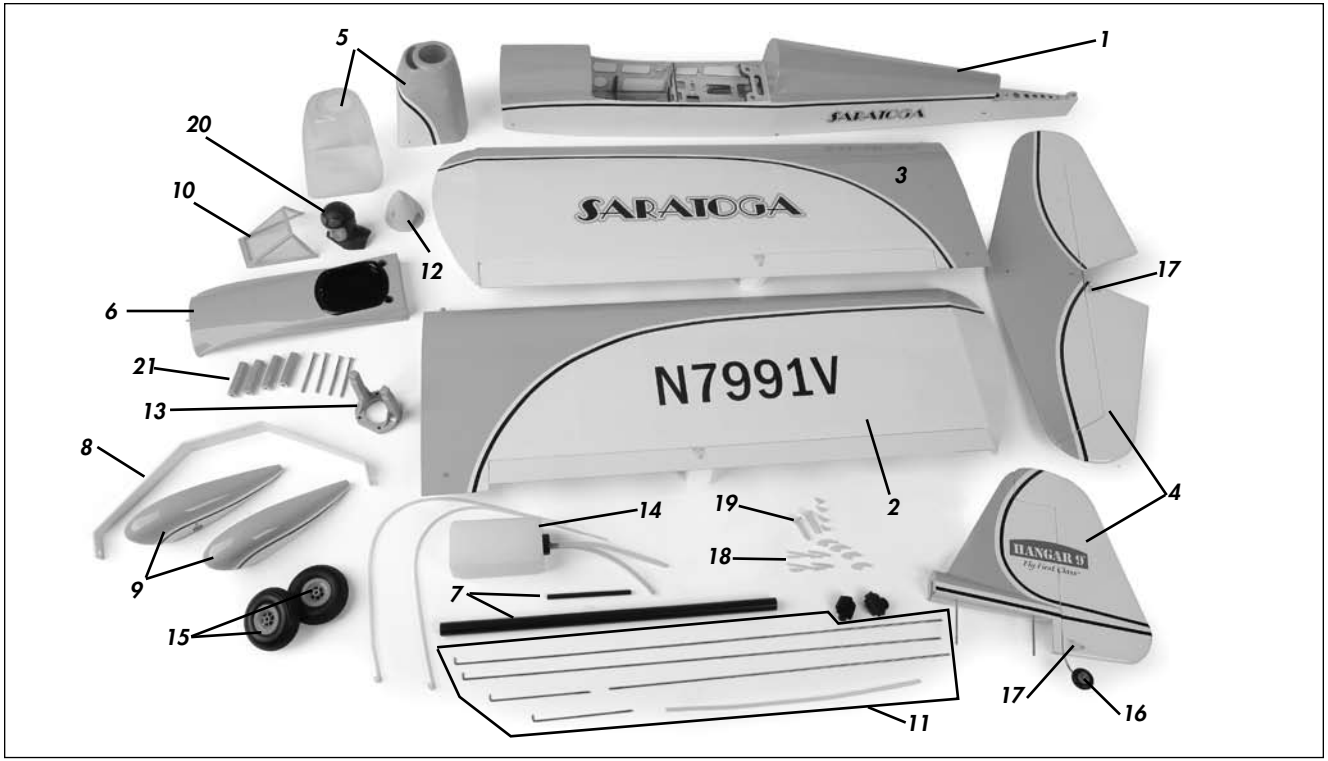
HANGAR 9®

Fly First Class™

Specifications

Wingspan: ..... 64.2 in (1630mm)
Length: ..... 49.25 in (1251.8mm)
Wing Area: ..... 694 sq in (44.77 sq dm)
Weight: ..... 5.5–6.25 lb (2.49–2.83 kg)
Radio: ..... 4-channel w/4–5 servos
Engine: ..... .40–52 2-stroke; .56–82 4-stroke; Power 46

Table of Contents



Contents of Kit and Parts Layout

Replacement Parts

1.	HAN4821	Fuselage without hatch
2.	HAN4822	Right Wing with Aileron
3.	HAN4823	Left Wing with Aileron
4.	HAN4824	Tail Set
5.	HAN4825	Painted Cowling and Clear Cowling Template
6.	HAN4826	Top Hatch
7.	HAN4827	Anodized Wing Tube Set
8.	HAN4828	Aluminum Landing Gear
9.	HAN4829	Wheel Pant Set (right and left)
10.	HAN4830	Windshield
11.	HAN4831	Pushrod Set
12.	HAN4144	2 1/4-inch Spinner (yellow)
13.	HAN40M	Motor Mount: Universal, 40-Size
14.	HAN1986	Fuel Tank, 11oz
15.	HAN305	2 3/4-inch H9 wheels
16.	HAN4042	Replacement Tailwheel: .40 Tail Wheel Assembly
17.	HAN3611	Nylon Control Horn (5)
18.	HAN3610	2-56 Nylon Clevis (5)
19.	HAN320	Nylon Wing Bolt, 2 1/2-inch*
20.	HAN8303	Pilot Bust
21.	HAN4743	48mm EP Engine Standoff

* Will need to be cut down to 1-inch (25mm) for use with this model

Included Hardware

PACKAGED IN KIT

Fuselage	(1)
Left Wing with aileron & control horn	(1)
Right Wing with aileron & control horn	(1)
Vertical fin with rudder & control horn	(1)
Horizontal stab with elevator & control horn	(1)
Top hatch	(1)
Cowl with clear template	(1)
Canopy	(1)
Painted aluminum landing gear	(1)
Wheel pants (pair)	(2)
3/4 x 16-inch anodized wing tube	(1)
1/4 x 4-inch anodized wing tube	(1)

LANDING GEAR BAG

Float mounting block	(1)
Wheel axle, $1^{3}/_{16}$-inch	(2)
Wheel collar, 11/64-inch	(4)
3mm x 5mm machine screw for wheel collars	(4)
#4 self-tapping wood screw	(8)
4-40 x 3/8-inch socket head cap screws	(2)
8-32 x 3/4-inch machine screws for landing gear	(3)
#8 flat washers for landing gear	(3)
Nylon landing gear straps for float mount	(4)
Hangar 9 $2^{3}/_{4}$-inch wheels	(2)
#4 flat washers	(2)

ELEVATOR BAG

Nylon Clevis	(1)
Pushrod keeper	(1)
Silicone clevis retainer	(1)
#4 flat fender washers for bolt-on tail	(2)
Nylon insert lock nuts for bolt-on tail	(2)

RUDDER BAG

Nylon clevis	(1)
Pushrod keeper	(1)
Silicone clevis retainer	(1)

MOTOR MOUNT BAG

Cast aluminum motor mount	(1)
8-32 x 1-inch machine screws	(4)
8-32 x 3/4-inch machine screws	(4)
8-32 x $2^{1}/_{4}$-inch machine screws	(4)
#8 flat washers	(8)
8-32 nylon insert lock nuts	(4)
$1^{7}/_{8}$-inch (48mm) EP standoffs	(4)

WING BAG

$4^{5}/_{8}$-inch pushrod with L bend (aileron)	(2)
1/4-20 x 1-inch nylon wing bolts	(2)
Nylon clevis	(2)
Pushrod keeper	(2)
Silicone clevis retainer	(2)

COWL BAG

4-40 x 1/2-inch socket head cap screw for cowl	(4)
$2^{1}/_{4}$-inch spinner (yellow)	(1)
#4 washers for cowl	(4)
Silicone tubing	(4)
3mm x 10mm sheet metal screw	(2)

FUSELAGE BAG

23-inch pushrod with L bend (elevator)	(1)
$23^{1}/_{2}$-inch pushrod with L bend (rudder)	(1)
$16^{1}/_{2}$-inch throttle pushrod	(1)
Nylon clevis	(1)
Pushrod keeper	(1)
Silicone clevis retainer	(1)
Plywood throttle pushrod support	(1)
12-inch throttle pushrod housing	(1)
4-40 x 3/8-inch socket head screw	(3)
#4 washer	(3)

MISCELLANEOUS BAG

Velcro battery strap	(2)
1.5mm hex wrench	(1)
Foam radio holder	(3)
Pilot figure	(1)

Using the Manual

This manual is divided into sections to help make assembly easier to understand, and to provide breaks between each major section. In addition, check boxes have been placed next to each step to keep track of each step completed. Steps with a single box (☐) are performed once, while steps with two boxes (☐☐) indicate that the step will require repeating, such as for a right or left wing panel, two servos, etc. Remember to take your time and follow the directions.

UltraCote® Covering Colors

• Dark Yellow	HANU889
• Black	HANU874
• White	HANU870
• 2-inch squares, Black/White	HANU941

Before Starting Assembly

Before beginning the assembly of your model, remove each part from its bag for inspection. Closely inspect the fuselage, wing panels, rudder and stabilizer for damage. If you find any damaged or missing parts, contact the place of purchase.

If you find any wrinkles in the covering, use a heat gun or covering iron to remove them. Use caution while working around areas where the colors overlap to prevent separating the colors.

HAN100 – Heat Gun

HAN150 – Covering Glove

HAN101 – Sealing Iron

HAN141 – Sealing Iron Sock

Radio Systems Requirements

Spektrum Radio System

- DX6i 6-channel radio or greater with receiver (SPM6600)
- JRPS821 DS821 Digital Sport Servo (5) (4 required for EP version)
- JSP98110 6-inch Servo Extension (2)
- JSP98020 Y-Harness or JSP98110 6-inch Servo Extension (2) for receiver to aileron servos
- Receiver Battery, 2700mAh
- Deluxe Chargeswitch (JRPA004)

Optional

- JSP98020 Y-Harness or JSP98110 6-inch Servo Extension to connect the float rudder servo to the receiver.

Recommended Setup–2-Stroke Glow

- Evolution® .46NX with Muffler (EVOE0461)
- Evolution Propeller 11 x 5 (EVO11050) to 11 x 6 (EVO11060)

Recommended Setup–4-Stroke Glow

- Saito™ .82 AAC w/Muffler (SAIE082AGK or SAIE082A)
- Evolution Propeller 13 x 8 (EVO13080) or 14 x 6 (EVO14060)

Recommended Setup– Electric Power (EP)

- E-flite® Power 46 BL Outrunner Motor (EFLM4046A)
- 60-Amp Pro Switch-Mode BEC Brushless ESC (EFLA1060)
- Thunder Power 4S 3850–4500mAh Li-Po Battery Pack
- APC Propeller 13x6.5-inch (APC13065E) to 14x7 (APC14070E)

Field Equipment Required

- Fuel (15% recommended)
- Propeller
- Long Reach Glow Plug Wrench (HAN2510)
- Metered Glow Driver w/Ni-Cd & Charger (HAN7101)
- 2-Cycle Sport Plug (EVOGP1)
- Manual Fuel Pump (HAN118)

Optional Field Equipment

- Selfstick weights, 6 oz (HAN3626)
- PowerPro 12V Starter (HAN161)
- 12V 7Ah Sealed Battery (HAN102)
- Power Panel (HAN106)
- Blue Block After Run Oil (EVOX1000)
- Cleaner and towels

Additional Required Tools

Drill	File
Pin drill	Pliers
Ruler	Scissors
Side cutters	Flat blade screwdriver
Medium grit sandpaper	Metric propeller reamer
Hobby knife with #11 blade	
Phillips screwdriver: #1, #2	
Z-bend Pliers (HAN119)	
Box wrench to fit propeller nut	
Box end or open end wrench: 1/4-inch, 7/16-inch, 1/2-inch	
Hex wrench or ball driver: 3/32-inch	
Drill bit: 5/64-inch (2mm), 5/32-inch (4mm)	

Additional Required Adhesives

Canopy Glue	(PAAPT56)
Medium CA	(PAAPT02)
Thin CA	(PAAPT08)
Zap-A-Dap-A-Goo	(PAAPT12)
Threadlock	(PAAPT42)
30-Minute Epoxy	(HAN8002)

FS One®

With FS One (HANS2000) you get more than photorealistic fields, gorgeous skies and realistic-looking aircraft. You get incredibly advanced aerodynamic modeling that simulates every possible aspect of real-world flight.

The first Hangar Pack (HANS4010) will add even more aircraft to FS One. This latest edition includes ten new planes and helis from your favorite brands, including Hangar 9, E-flite and Align. You'll be able to fly aircraft that are only available on FS One such as the T-REX, Blade CX2, Blade CP Pro, Hangar 9 P-51 and F-22 PTS. And as always, with the Hangar Pack, you still get all the same great features that you did with the original aircraft.

HANS2008

HANS4010

Important Information Regarding Warranty Information

Please read our Warranty and Liability Limitations section on Page 37 before building this product. If you as the purchaser or user are not prepared to accept the liability associated with the use of this Product, you are advised to return this Product immediately in new and unused condition to the place of purchase.

Landing Gear Installation

Required Parts

Fuselage	Main landing gear
#4 washer (2)	#8 washer (3)
Wheel axle with nut (2)	Wheel pant (right and left)

4-40 x 3/8-inch socket head screw (2)
11/64-inch wheel collar (4)
$2^{3}/_{4}$-inch (70mm) wheel (2)
3mm x 5mm machine screw (4)
8-32 x 3/4-inch machine screw (3)

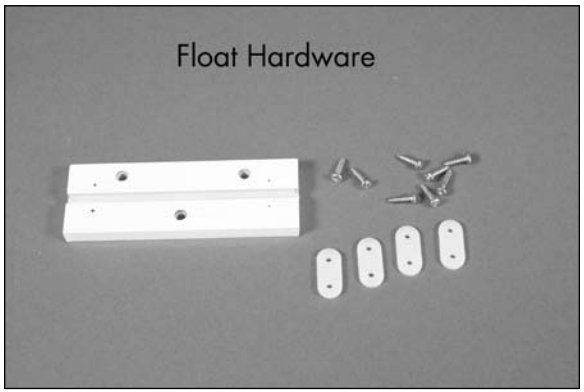
Tools and Adhesives

Phillips screwdriver: #2	Threadlock
File	
Box wrench: 7/16-inch, 1/2-inch	
Ball driver or hex wrench: 3/32-inch	

If you are planning to install floats, you can skip the installation of the fixed gear and begin by attaching the tail in the following section of the manual.

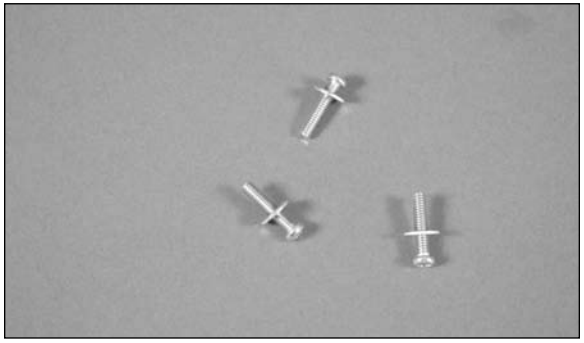
☐ Step 1

Locate and open the bag marked Landing Gear. In the bag are the parts for both the land-based landing gear and float installation. Set aside the forward float mount, four landing gear straps and eight #4 x 1/2-inch sheet metal screws. Keep these in case you will be installing the floats at a later date.



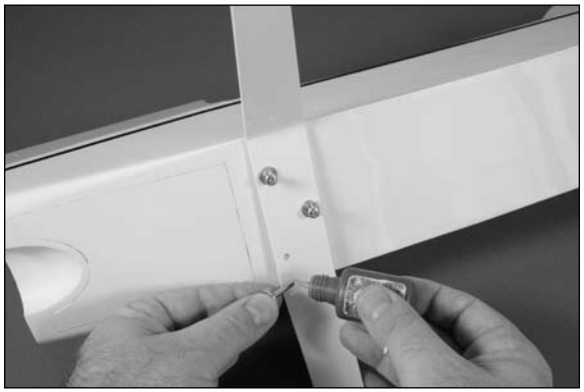
☐ Step 2

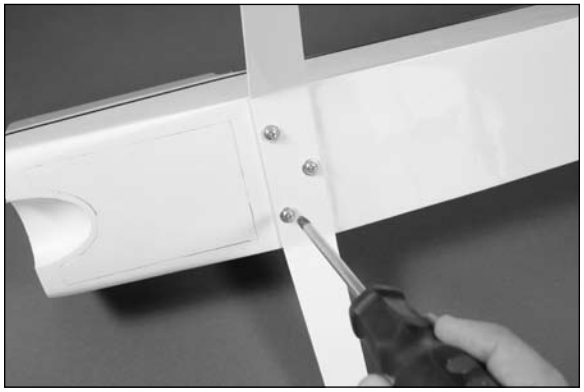
Locate three 8-32 x 3/4-inch machine screws and three #8 washers. Slide the washers onto the screws.



☐ Step 3

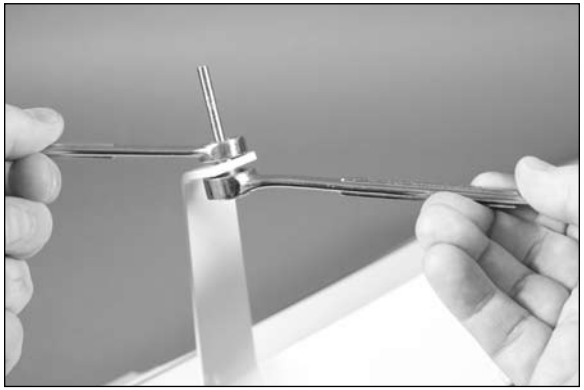
Place a drop of threadlock on each screw. Secure the landing gear on the fuselage using the three screws and a #2 Phillips screwdriver.





☐ Step 4

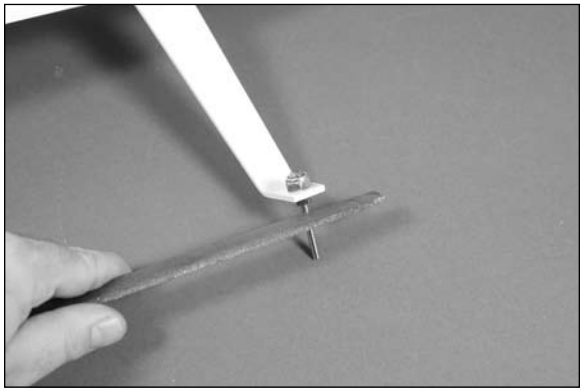
Locate the wheel axle and remove the nut. Slide the threaded end of the axle into the large hole in the landing gear. Make sure the axle faces outward. Thread the nut back onto the axle. Use 1/2-inch (nut) and 7/16-inch (axle) box end wrenches to tighten the nut to secure the axle.



Note: Make sure the hex on the axle is positioned as shown or you will have difficulty installing the wheel pants later.

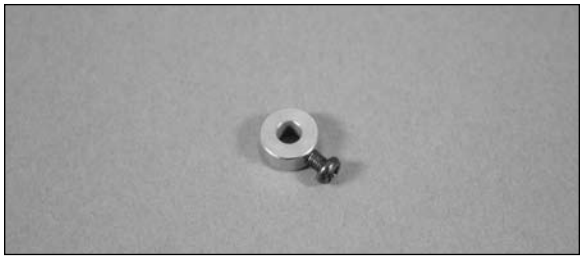
☐ **Step 5**

Use a file to make flat areas on the bottom of the axle. This is necessary so the setscrews from the wheel collars have a surface to bite onto. This will help keep the wheel collars from vibrating loose in flight.



☐ **Step 6**

Place a drop of threadlock on a 3mm x 5mm machine screw. Thread the screw into one of the 11/64-inch wheel collars. Slide the wheel collar onto the axle as shown. Do not tighten the screw at this time.



☐ **Step 7**

Open the bag containing the main $2^{3}/_{4}$-inch (70mm) wheels. Slide one of the wheels onto the axle. Prepare a second wheel collar as described in Step 6 and slide it onto the axle. Position the wheel collar flush with the end of the axle and use a #2 Phillips screwdriver to tighten the screw, securing the wheel collar to the axle. The screw will be tightened down onto the flat made in Step 5.

☐ **Step 8**

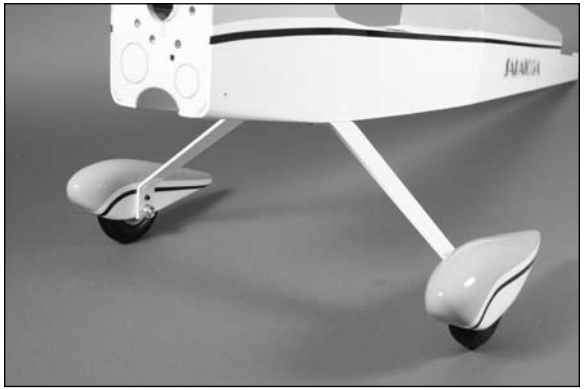
First, slide the wheel against the outer wheel collar. Next slide the wheel collar next to the landing gear so it is almost touching the wheel. Use a #1 Phillips screwdriver to tighten the screw and secure the wheel collar to the axle. The position of the wheel will be fine-tuned later in this section of the manual.

☐ **Step 9**

Slide one of the wheel pants over the wheel and into position on the landing gear. Note there is a right and left wheel pant during the installation. Slide a #4 washer onto a 4-40 x 3/8-inch socket head machine screw. Place a drop of threadlock on the screw then use a 3/32-inch hex wrench to tighten the screw, securing the wheel pant to the landing gear.

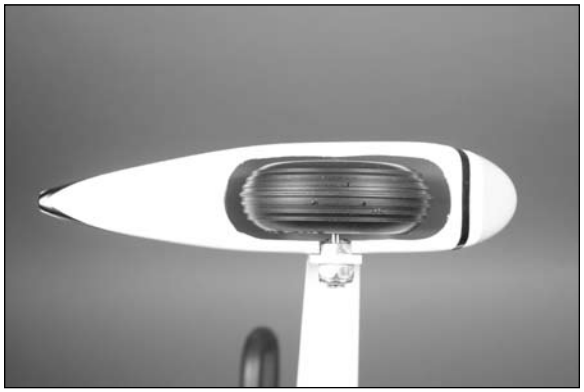
☐ **Step 10**

Repeat Steps 4 through 9 to install the remaining wheel and wheel pant.



☐ **Step 11**

Position the wheels so ther are centered side to side inside the wheel pant. You will need to loosen the wheel collasrs to do so. Also make sure the wheel can rotate freely without binding.



Hint: Apply a small drop of lightweight oil to help to allow the wheels to roll smoothly.

Tail Installation

Required Parts

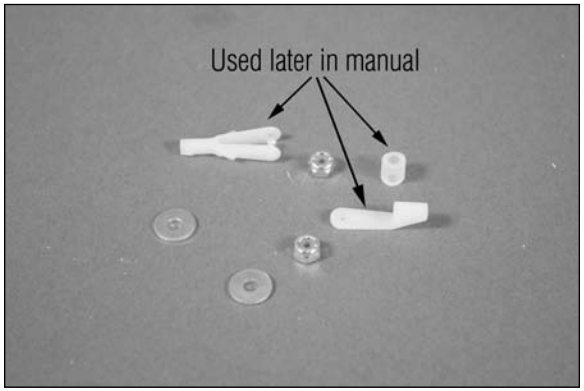
Fuselage assembly	Vertical stabilizer
Horizontal stabilizer	Nylon clevis
Silicone clevis retainer	4-40 lock nut (2)
#4 fender washer (2)	Pushrod keeper

Tools and Adhesives

Box wrench or nut driver: 1/4-inch

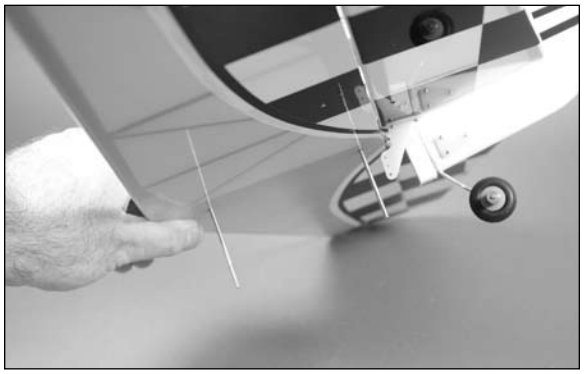
☐ **Step 1**

Locate the bag marked elevator. Use scissors to cut open the bag and place the parts in a tray for use in assembly. The clevis and clevis retainer shown will be used later in the manual when installing the elevator and rudder linkages.



☐ **Step 2**

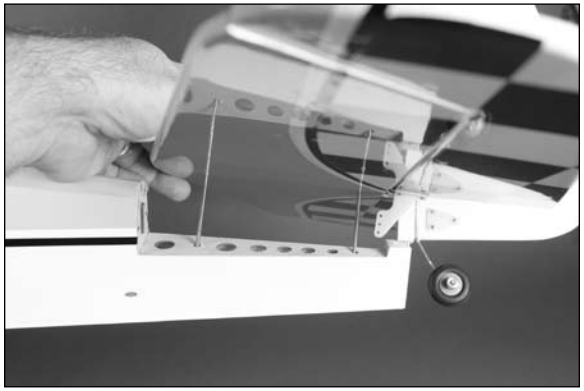
Locate the vertical fin and horizontal stabilizer assemblies. Slide the threaded rods from the vertical fin through the holes in the horizontal stabilizer. Make sure the control horn from the elevator faces down, away from the top of the fin/ rudder.

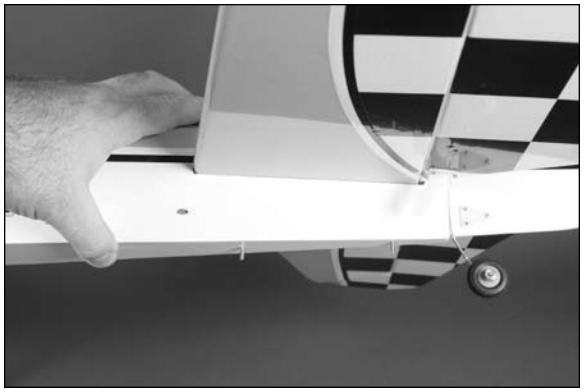


Note: You may need to move the rudder to the left to allow the rudder control horn the clear the elevator.

☐ Step 3

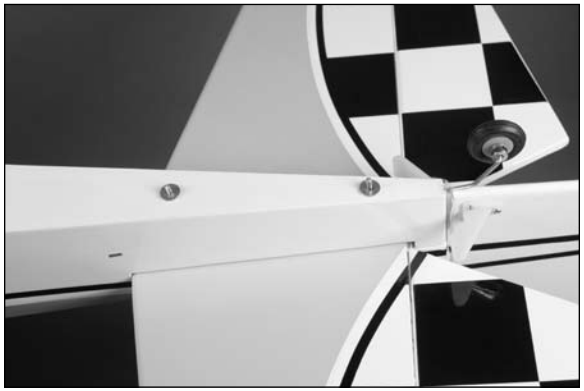
Insert the threaded rods from the fin into the holes in the rear of the fuselage. The tail assembly will sit tight against the fuselage when installed.





☐ Step 4

Slide a #4 washer on each of the threaded rods. Use a 1/4-inch box wrench or nut driver to tighten the 4-40 lock nuts on the threaded rods. Use care not to over-tighten the nuts and accidentally crush the fuselage.



Servo Installation

Required Parts

Fuselage assembly	Servo (3, 2 for electric)
Hook and loop strap	Receiver
Receiver battery	Switch harness
Foam padding	Pushrod keeper (2)
Clevis (2)	Clevis retainer (2)

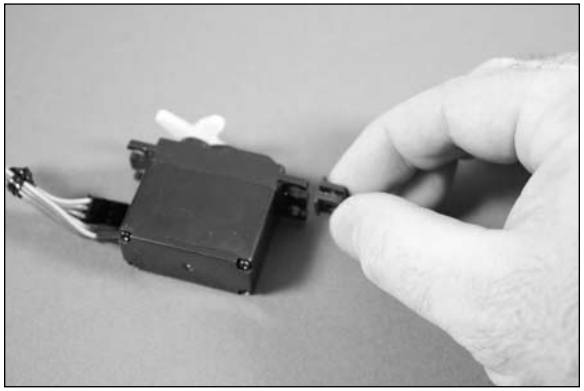
23 1/2-inch (597mm) pushrod wire
23-inch (584mm) pushrod wire
Y-Harness (1) or 6-inch (152mm) servo extension (2)

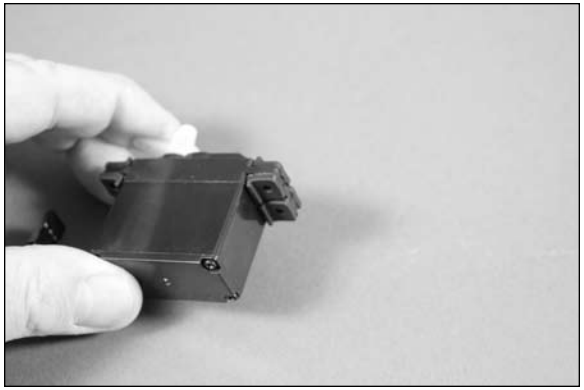
Tools and Adhesives

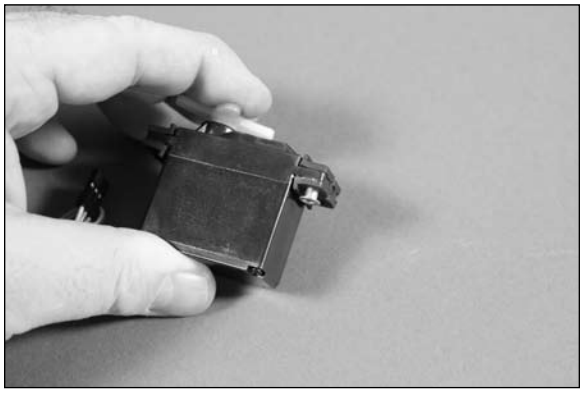
Phillips screwdriver: #1	Thin CA
Scissors	Ruler
Hobby knife with #11 blade	Pin drill
Drill bit: 5/64-inch (2mm)	Pliers

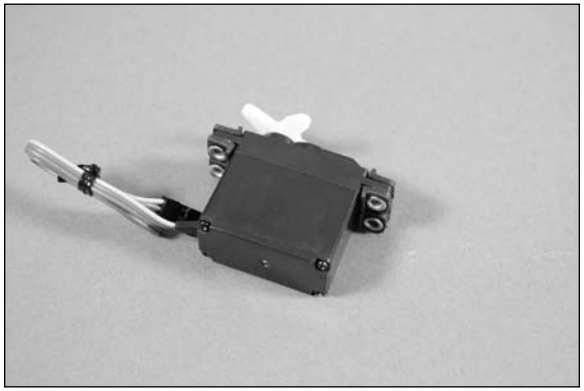
☐ Step 1

Insert the rubber grommets and brass eyelets into the servos. Prepare three servos (two for electric-powered model) at this time.



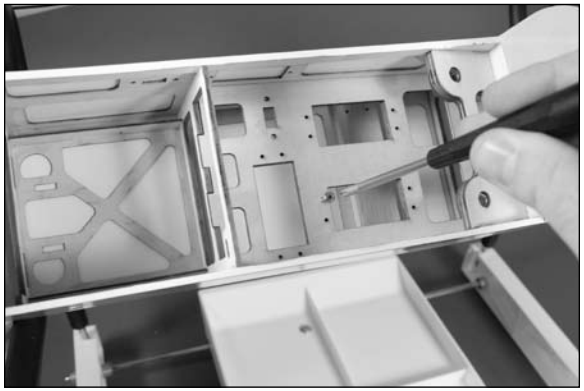






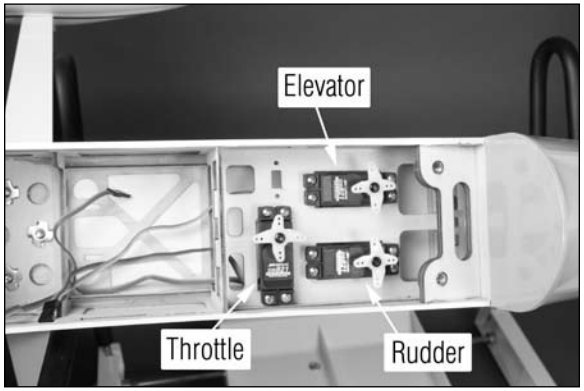
☐ **Step 2**

Use a #1 Phillips screwdriver to thread the servo mounting screws into the pre-drilled holes in the servo tray then remove the screw. Apply 2–3 drops of thin CA into each of the holes to harden the surrounding wood.



☐ **Step 3**

Use a #1 Phillips screwdriver to install the screws that hold the servos in position in the fuselage. If you are building the electric version, you do not have to install the throttle servo. Note the direction of the servos in the image below. Route the leads from the servos forward into the receiver/receiver battery compartment.

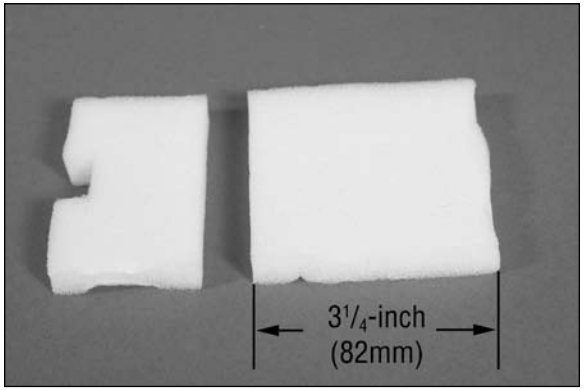


☐ **Step 4**

Open the bag marked Miscellaneous. Remove one of the hook and loop straps and insert it through the strap supports inside the fuselage.

☐ **Step 5**

Measure and cut a 3 1/4-inch piece of foam from the supplied foam blocks using scissors.

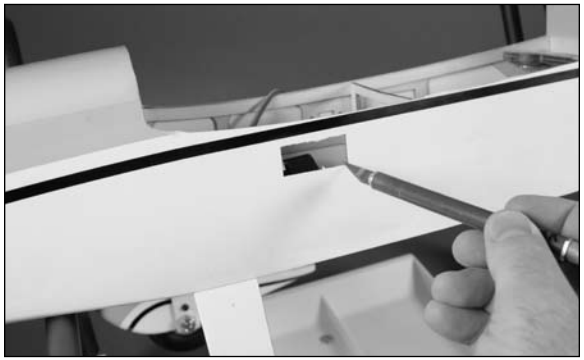


☐ **Step 6**

Move the servo leads away from the battery compartment and back over the servos. Insert the piece of foam into the battery compartment. Make sure the hook and loop strap is centered after installing the foam as shown in the photo.

☐ **Step 7**

Use a hobby knife with a #11 blade to remove the covering from your particular switch mounting hole. Mount the switch in the fuselage using the hardware provided with your switch.

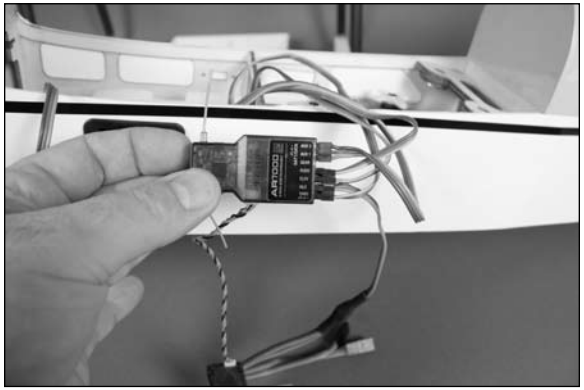


☐ **Step 8**

Place the receiver battery in the fuselage, then place the remaining piece of foam on the battery. Make sure to plug the battery into the switch harness at this time.

☐ **Step 9**

Plug the servos, extension(s) or Y-harness for the aileron servos and the switch harness into the receiver.



☐ **Step 10**

Place the receiver on the foam. Tuck all the servo leads under the servo tray so they will not interfere with the operation of the servos.

☐ **Step 11**

Cut a 3¼-inch piece of foam from the supplied foam blocks using scissors from the second large blank as instructed in Step 5. Place the foam on the receiver, then use the hook and loop strap to secure the position of the receiver and receiver battery. Mount the remote receiver forward in the fuselage as shown.

Note: The antenna on the main receiver must be kept 90 degrees to the receiver. Make sure the foam does not bend the antenna down or the range of the radio may be reduced.

☐ **Step 12**

Use a #1 Phillips screwdriver to remove the servo horns from the elevator and rudder servos.

☐ **Step 13**

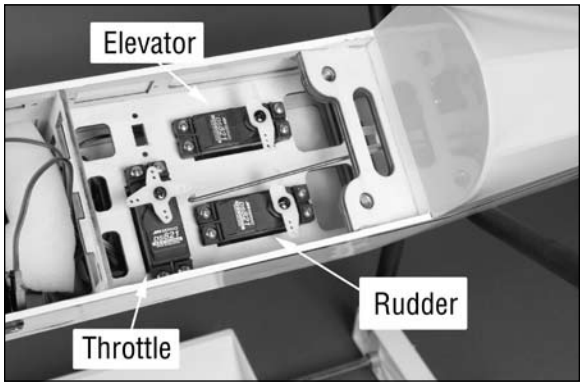
With the radio system on, center the rudder and elevator servos. Make sure all sub-trims (if using a computer radio) have been set to 0. Install a 180-degree servo arm on the rudder and elevator servos so they are perpendicular to the fuselage centerline.

☐ **Step 14**

Use a pin drill and 5/64-inch (2mm) drill bit to enlarge the hole in the servo arm that is 9/16-inch (15mm) from the center of the servo arm as shown in the photo below.

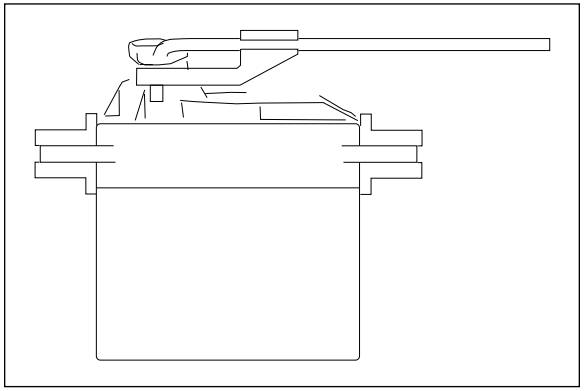
☐ **Step 15**

Open the bag marked Fuselage and remove the two longer pushrod wires. Insert the longer 23½-inch (597mm) pushrod wire into the tube inside the fuselage that exits at the rudder control horn. The remaining 23-inch (584mm) pushrod wire is then inserted in the tube that will exit near the elevator control horn.



☐ **Step 16**

Insert the bent end of the pushrod wires into the holes in the servo arms that were enlarged back in Step 14. The wires will go into the holes from the top side of the servo arm.



☐ **Step 17**

Slide the pushrod keeper onto the pushrod wire from underneath the servo. Rotate the keeper and snap it onto the pushrod wire using pliers to secure the pushrod wire to the servo horn.

☐☐ **Step 18**

Install a pushrod keeper to secure the rudder and elevator pushrods at this time.

☐☐ **Step 19**

Slide a clevis retainer on a clevis. Thread the clevis on the elevator pushrod a few turns so it will not fall off.

☐ Step 20

With the radio system on, thread the clevis on the elevator pushrod so the elevator is in alignment with the stabilizer when the clevis is attached to the center hole of the control horn. Use a ruler to verify the alignment between the stabilizer and elevator. Make sure to slide the clevis retainer onto the clevis prevent it from opening accidentally

☐ Step 21

Repeat Steps 18 and 19 to connect the rudder pushrod to the center hole of the rudder control horn.

Aileron Servo Installation

Required Parts

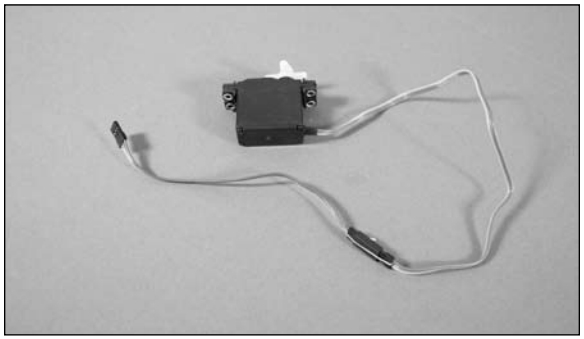
Wing panel (right and left)	Servo w/hardware (2)
Clevis (2)	Clevis retainer (2)
Pushrod keeper (2)	
$4^{5}/_{8}$-inch (117mm) pushrod wire	
6-inch (152mm) servo extension (2)	

Tools and Adhesives

Phillips screwdriver: #1	Thin CA
Drill bit: 5/64-inch (2mm)	Pin drill

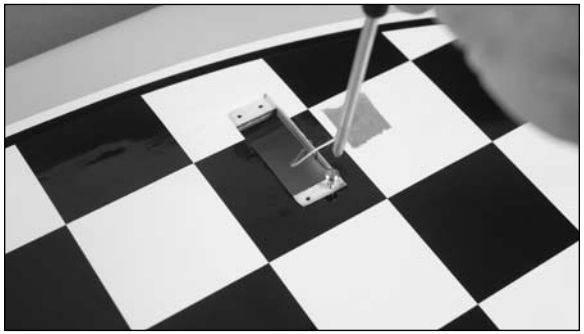
☐☐ Step 1

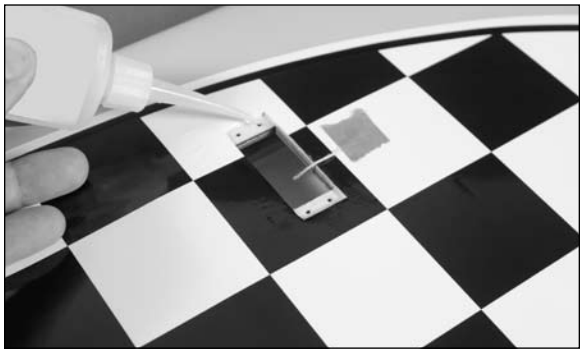
Insert the rubber grommets and brass eyelets into the servos. Prepare two servos at this time. Secure a 6-inch (152mm) servo extension to the servo lead of the aileron servo using string or a commercially available connector.



☐☐ Step 3

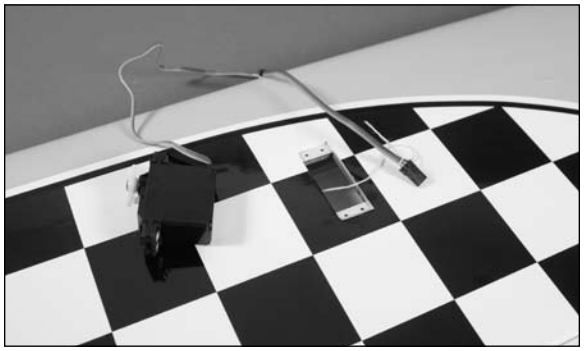
Use a #1 Phillips screwdriver to thread a servo mounting screw into each of the holes, then remove the screw. Apply a drop or two of thin CA in each hole to harden the surrounding wood.





☐☐ Step 4

A string has been pre-installed in the wing so the servo lead and extension can be pulled through the wing. Remove the tape to expose the end of the string at the servo opening. Tie the string around the servo extension so it can be pulled to the center of the wing.

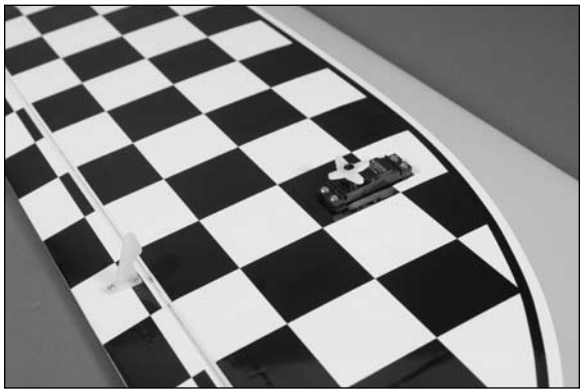


☐☐ Step 5

Use the string to pull the servo extension to the center of the wing. Once at the center, guide it through the hole on the bottom of the wing as shown in the photo.

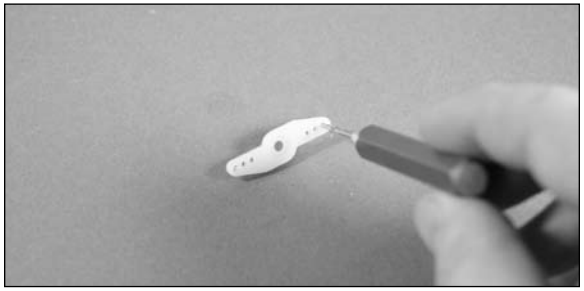
☐☐ Step 6

Place the servo into the opening with the output of the servo facing the aileron. Use the four screws provided with your servo and a #1 Phillips screwdriver to secure the servo in the wing.



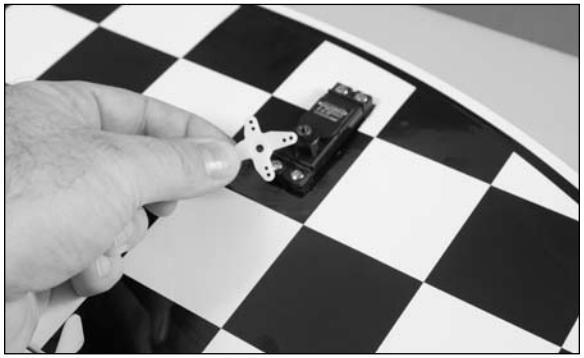
☐☐ Step 7

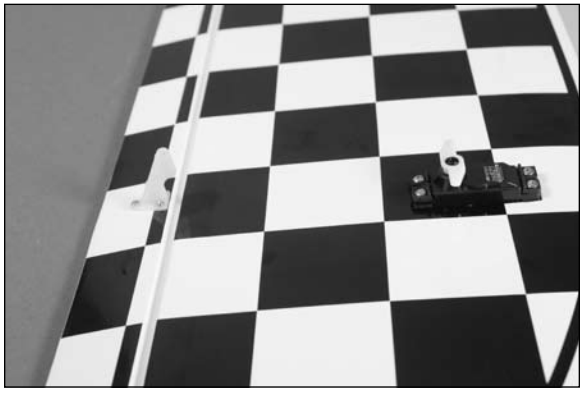
Use a pin drill and 5/64-inch (2mm) drill bit to enlarge the hole in the servo arm that is 9/16-inch (15mm) from the center of a 180-degree servo arm as shown.



☐☐ Step 8

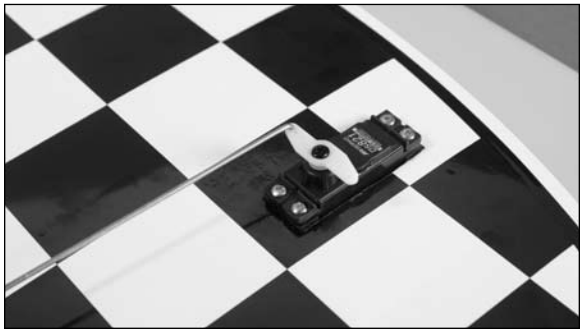
Use a #1 Phillips screwdriver to remove the original servo arm from the aileron servo. After using the radio system to center the aileron servo, install the 180-degree servo arm as shown. Make sure the servo horn is parallel to the aileron hinge line when it is installed.





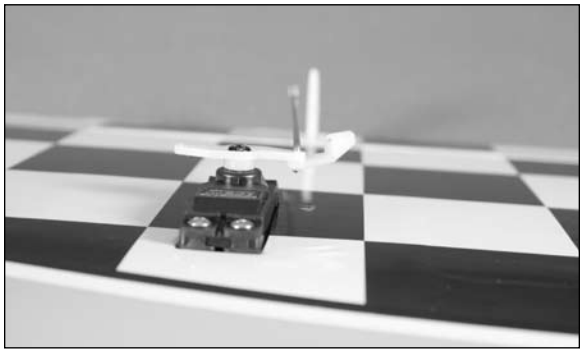
☐☐ Step 9

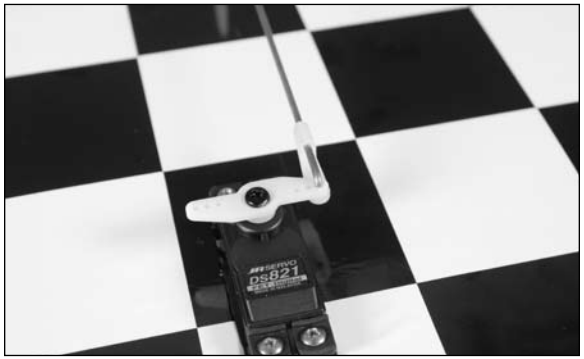
Open the bag marked wing. Insert the bent end of the 4 5/8-inch (117mm) pushrod wire into the outer hole of the servo as shown. The wire will be on the side of the servo horn that is closer to the wing tip.



☐☐ Step 10

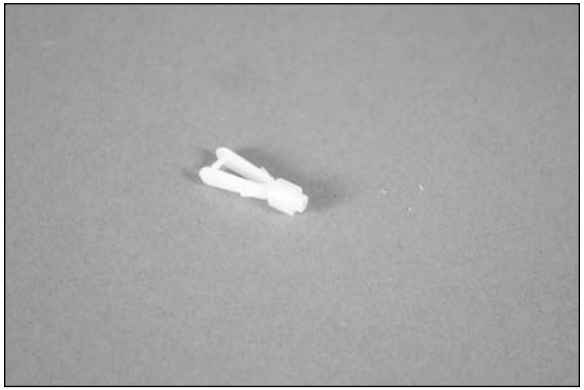
Slide the pushrod keeper onto the bend from the underside of the servo horn. The keeper will then be rotated and snapped onto the pushrod wire to secure the wire to the servo arm.

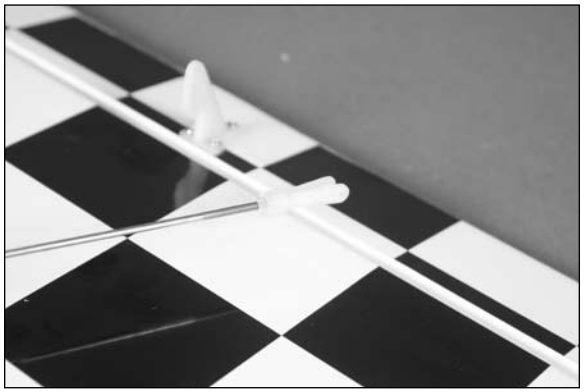




☐☐ Step 11

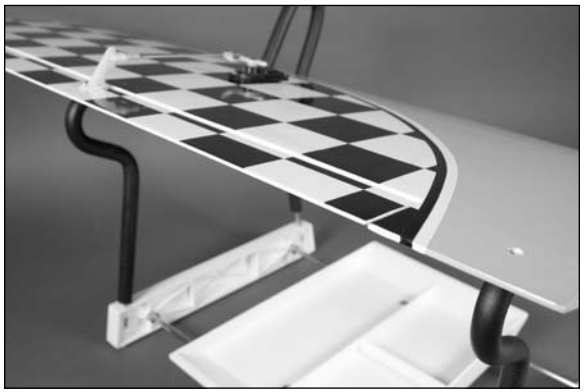
Slide the clevis retainer onto the clevis. Thread the clevis on the pushrod wire a few turn to get it started and secure.

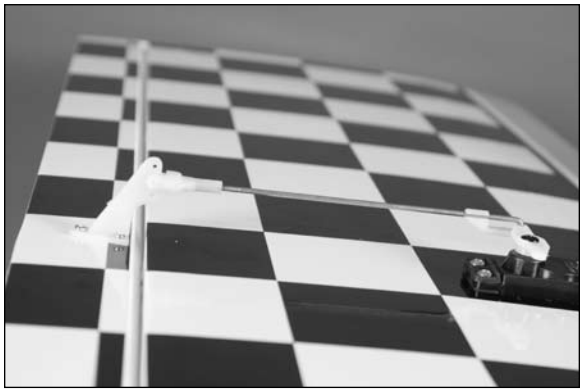




☐☐ Step 12

With the radio system plugged in and on, check that the aileron servo is centered. Thread the clevis on the pushrod wire so when the clevis is connected to the center hole of the control horn the aileron is centered and in alignment with the trailing edge of the wing. Once the adjustments have been made, make sure to slide the clevis retainer onto the clevis so it will not open accidentally.





☐ Step 13

Repeat Steps 1 through 12 to install the remaining aileron servo and linkage.

2-Stroke Engine Installation

Required Parts

Fuselage assembly	Engine with hardware
Engine mount	Engine mount plate (2)
#8 washer (8)	8/32 lock nut (4)
Plywood pushrod support	Clevis
Clevis retainer	Pushrod keeper

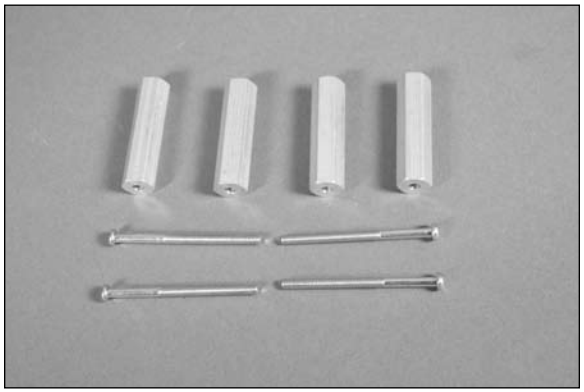
8-32 x 1-inch machine screw (4)
8-32 x 3/4-inch machine screw (4)
16 1/2-inch (419mm) throttle pushrod wire
12-inch (305mm) throttle pushrod housing

Tools and Adhesives

Phillips screwdriver: #2	Threadlock
Medium grit sandpaper	Ruler
Side cutters	Pliers
Drill bit: 5/64-inch (2mm)	Pin drill
Medium CA	30-minute epoxy

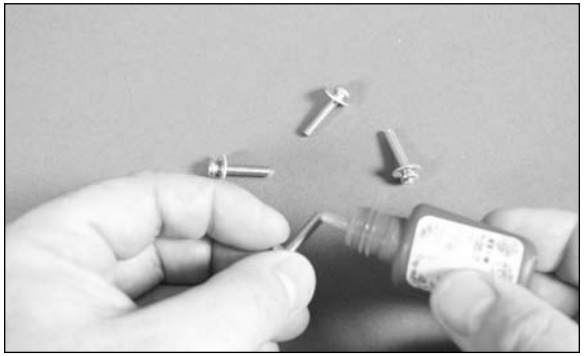
☐ Step 1

Open the bag marked Motor Mount. Set aside the four 48mm standoffs and four 8-32 x 2 1/4-inch machine screws for the Electric Power (EP) version as they will not be used in the engine installation.



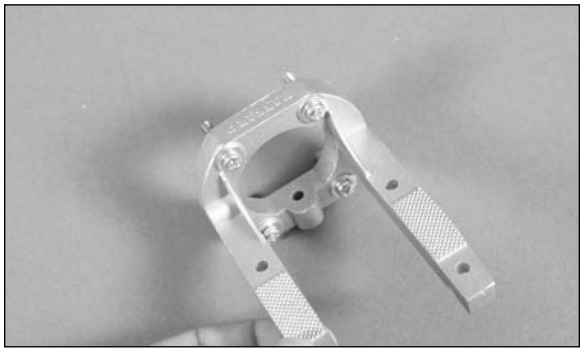
☐ Step 2

Slide a #8 washer onto each of the 8-32 x 3/4-inch machine screws. Apply a drop of threadlock on each screw.



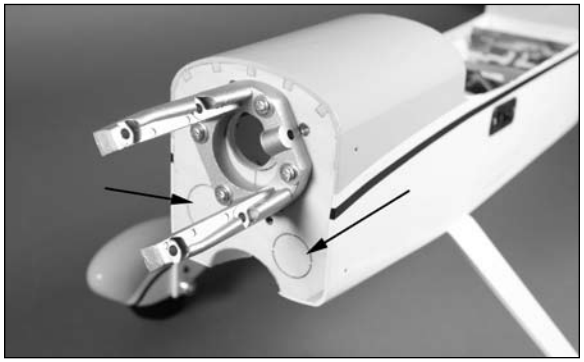
☐ Step 3

Slide the screws into the motor mount as shown.



☐ Step 4

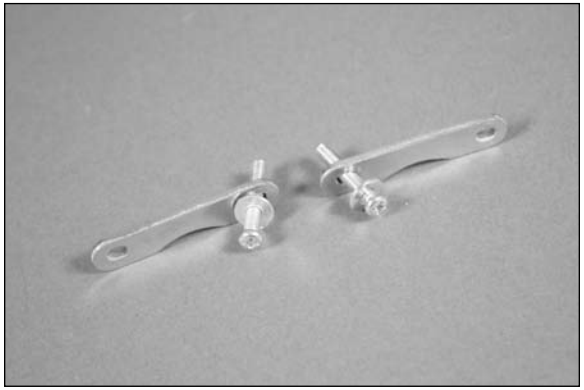
Attach the mount to the fuselage using the screws prepared in the previous step and a #2 Phillips screwdriver. Use 30-minute epoxy to seal the seams for the EP air inlet firewall plugs as shown.



Note: Blind nuts have been installed for both the glow and EP versions. Make sure to install the mount at an angle as shown. The hardware for the glow mount will not match up to the EP blind nut installation.

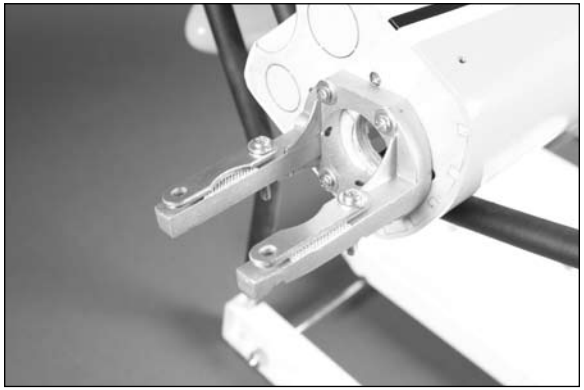
☐ Step 5

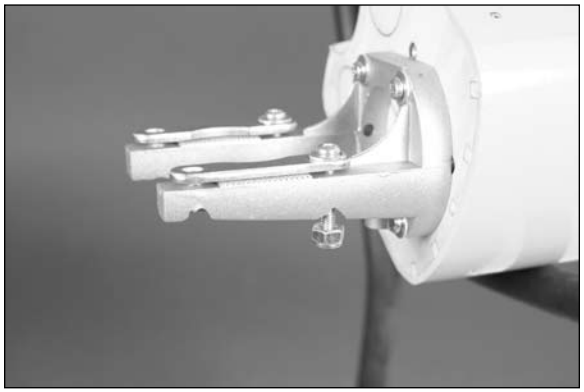
Slide a #8 washer onto an 8-32 x 1-inch machine screw. Slide the screw through the engine mount plate as shown. Prepare two plates: one right and one left at this time.



☐ **Step 6**

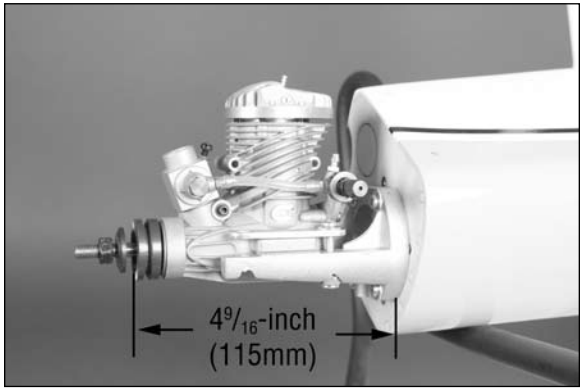
Insert the screws in the holes toward the firewall. Note that the arches on the engine mount plates face to the centerline of the fuselage. Thread an 8-32 lock nut on each screw. Do not tighten the nut: simply thread it on until the screw hits the nylon insert in the nut.





☐ **Step 7**

Lift the engine mount plates up and position the engine so the mounting lugs on the engine are between the engine mount and engine mount plates. Position the engine so the front of the drive washer is $4^{9}/_{16}$ inches (115mm) forward of the firewall.



☐ **Step 8**

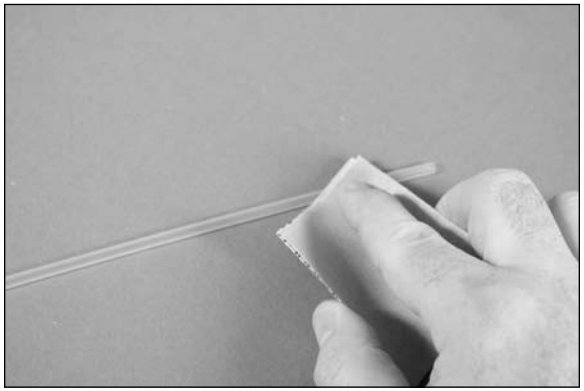
Locate the last two 8-32 x 1-inch machine screws, #8 washers and 8-32 lock nuts. Slide a washer on each screw and then pass the screw through the engine mount plate and engine mount. Thread the lock nut onto the screw.

☐ **Step 9**

Using a #2 Phillips screwdriver, tighten the screws evenly to clamp the engine in position on the engine mount.

☐ **Step 10**

Use a piece of medium grit sandpaper to roughen a 2-inch (52mm) section on each end of the 12-inch (305mm) throttle pushrod housing. This is necessary for the CA to stick to the tube when it is installed in the fuselage.



☐ **Step 11**

Slide the pushrod housing into the hole in the firewall and into the fuselage. Leave roughly $1^{1}/_{4}$-inch (32mm) of the tube forward of the firewall. Do not glue the tube at this time.

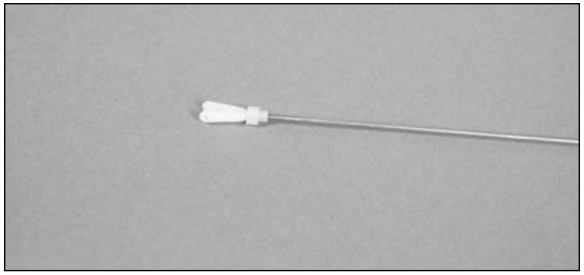
☐ **Step 12**

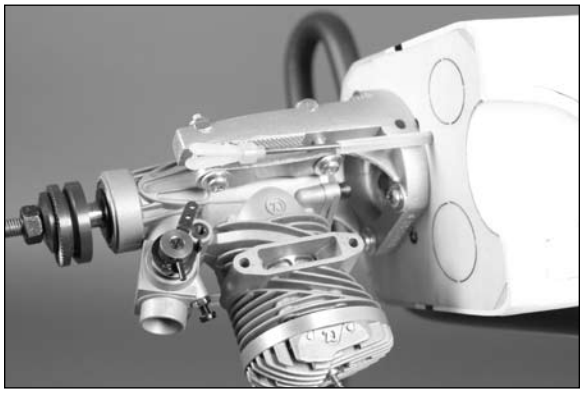
Slide the plywood pushrod support on the tube inside the fuselage. Do not glue the support or tube at this time.

Note: The plywood pushrod support will be glued in position after the fuel tank has been installed.

☐ **Step 13**

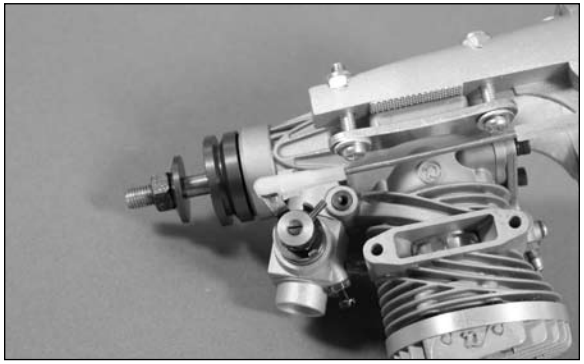
Slide a clevis retainer on the clevis. Thread the clevis 12 turns onto the 16$^{1}/_{2}$-inch (419mm) throttle pushrod wire. Slide the wire into the tube near the engine.





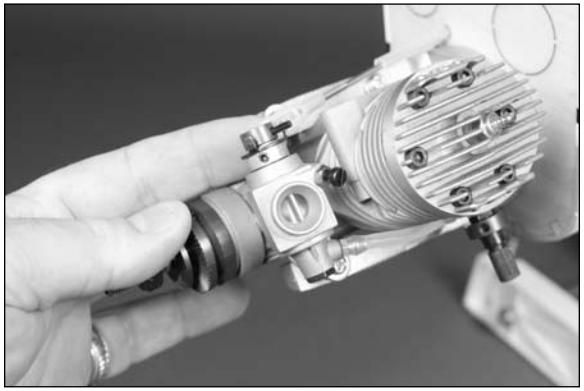
☐ **Step 14**

Connect the clevis to the outer hole of the carburetor arm as shown.



☐ **Step 15**

Move the carburetor and pushrod to the closed position. Use the radio system to move the throttle servo to the low position. Use a felt-tipped pen to mark the pushrod where it crosses the servo arm as shown.



☐ **Step 16**

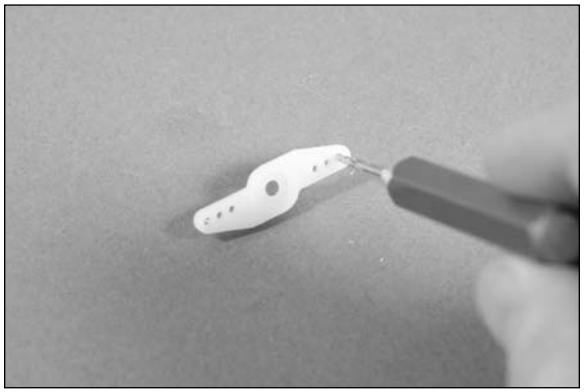
Use the radio system to move the throttle servo to the fully open position. Move the throttle pushrod to move the carburetor to the fully open position. Check that the mark made in the last step is still aligned with the hole in the servo arm used in the last step, or be very close. If not, use isopropyl alcohol to remove the mark. The goal is to have the mark align with the same hole in the servo arm at both the open and closed positions. You may need to remove the arm and rotate it to choose other holes in the servo arm for this to happen. If you are using a computer radio you can also use the ATV function to adjust the throttle throw.

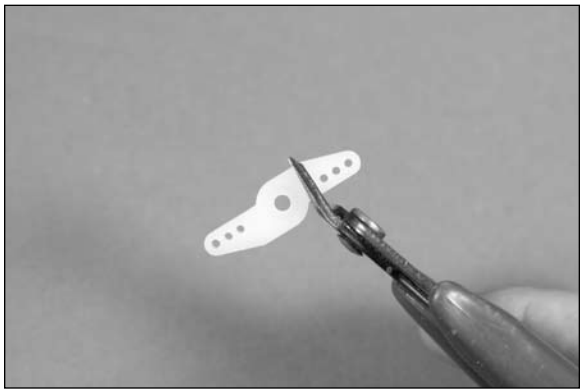
☐ **Step 17**

Once the pushrod has been marked, use pliers to bend the pushrod wire 90 degrees at the mark. Use side cutters to trim the pushrod wire 3/8-inch (10mm) from the bend.

☐ **Step 18**

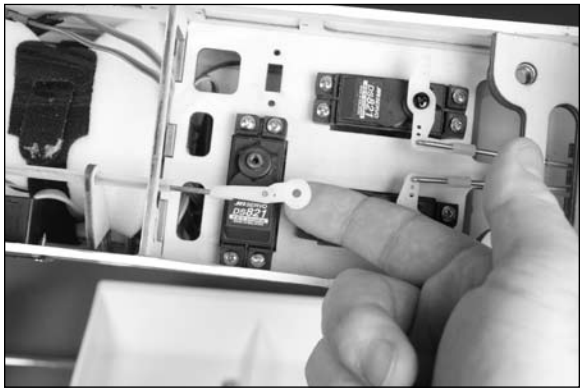
Use a pin drill and 5/64-inch (2mm) drill bit to enlarge the hole in the servo arm for the pushrod wire to fit into. Remove the servo arm and use side cutters to remove any unused arm so they will not interfere with the operation of the throttle servo.





☐ **Step 19**

Insert the bend on the pushrod wire into the hole of the servo arm. Slide the pushrod keeper on the wire then rotate it so it secures the connection between the pushrod and servo arm.



Note: The bend on the pushrod wire goes up through the servo arm to prevent any binding between the pushrod wire, connector and servo.

☐ **Step 20**

Use the radio to move the throttle to the closed position. Move the pushrod to close the carburetor and attach the servo horn back on the throttle servo.

☐ **Step 21**

Check the operation of the throttle from the radio to make sure it goes from fully closed to fully open, and that the servo is not binding at either endpoint as well. If you are using a computer radio, use the endpoint adjustments as necessary to fine-tune the operation of the throttle if necessary.

4-Stroke Engine Installation

Required Parts

Fuselage assembly	Engine with hardware
Engine mount	Engine mount plate (2)
#8 washer (8)	8/32 lock nut (4)
Plywood pushrod support	Clevis
Clevis retainer	Pushrod keeper

8-32 x 1-inch machine screw (4)
8-32 x 3/4-inch machine screw (4)
16 1/2-inch (419mm) throttle pushrod wire
12-inch (305mm) throttle pushrod housing

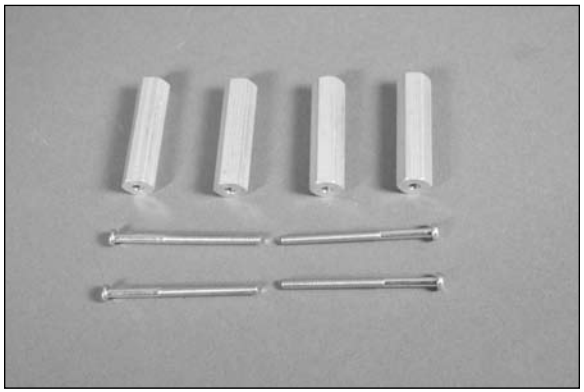
Tools and Adhesives

Phillips screwdriver: #2	Threadlock
Medium grit sandpaper	Ruler
Side cutters	Pliers
Z-bend pliers	Medium CA
30-minute epoxy	

Drill bit: 5/64-inch (2mm), 5/32-inch (4mm)

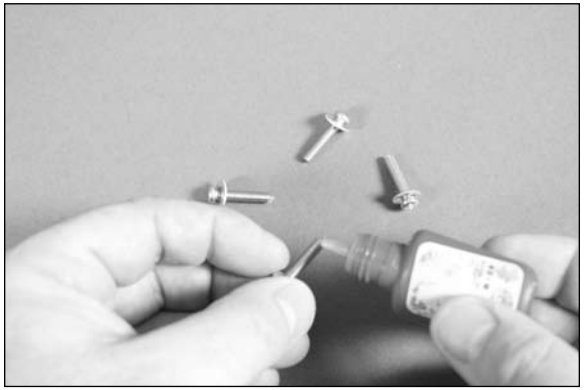
☐ **Step 1**

Open the bag marked Motor Mount. Set aside the four 48mm standoffs and four 8-32 x 2 1/4-inch machine screws for the Electric Power (EP) version as they will not be used in the engine installation.



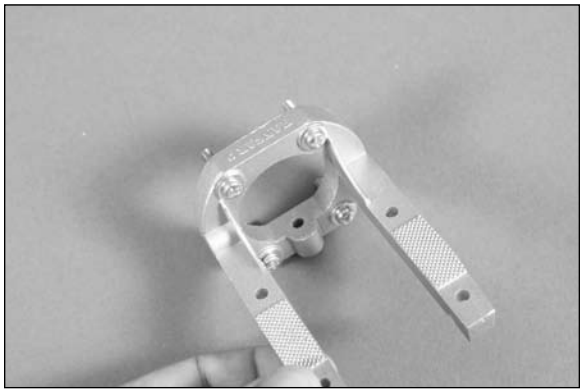
☐ **Step 2**

Slide a #8 washer onto each of the 8-32 x 3/4-inch machine screws. Apply a drop of threadlock on each screw.



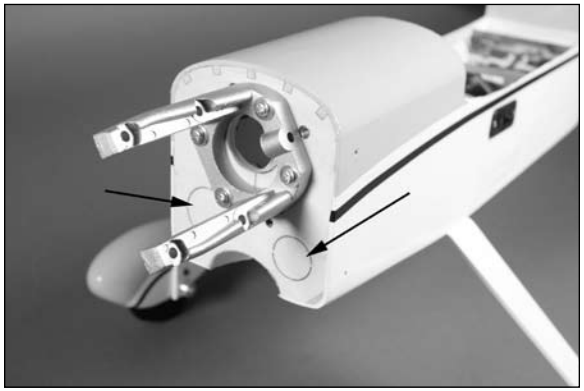
☐ **Step 3**

Slide the screws into the motor mount as shown.



☐ **Step 4**

Attach the mount to the fuselage using the screws prepared in the previous step and a #2 Phillips screwdriver. Use 30-minute epoxy to seal the seams for the EP air inlet firewall plugs as shown.



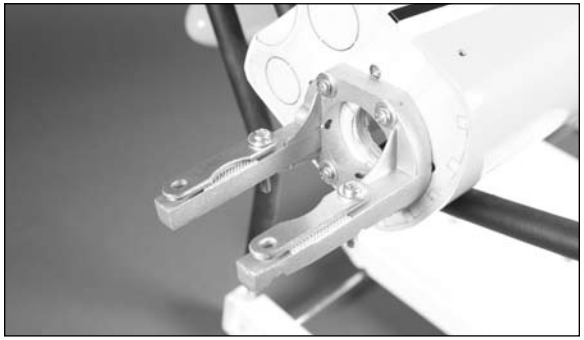
Note: Blind nuts have been installed for both the glow and EP versions. Make sure to install the mount at an angle as shown. The hardware for the glow mount will not match up to the EP blind nut installation.

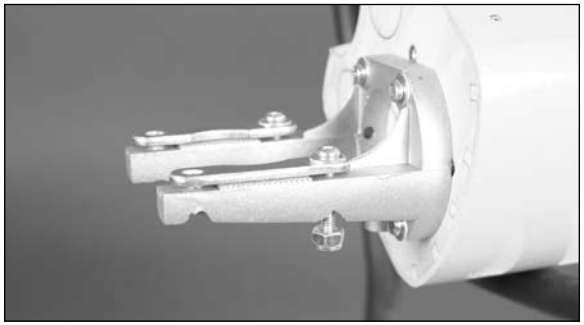
☐ **Step 5**

Slide a #8 washer onto an 8-32 x 1-inch machine screw. Slide the screw through the engine mount plate as shown. Prepare two plates: one right and one left at this time.

☐ **Step 6**

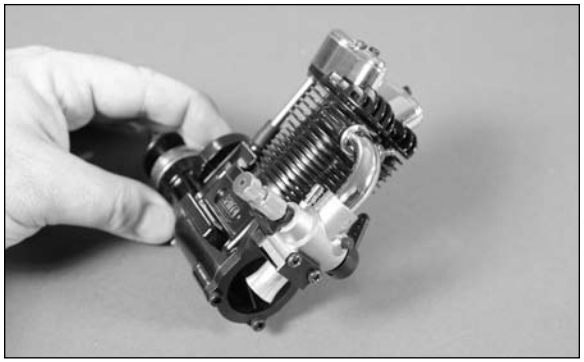
Insert the screws in the holes toward the firewall. Note that the arches on the engine mount plates face to the centerline of the fuselage. Thread an 8-32 lock nut on each screw. Do not tighten the nut: simply thread it on until the screw hits the nylon insert in the nut.





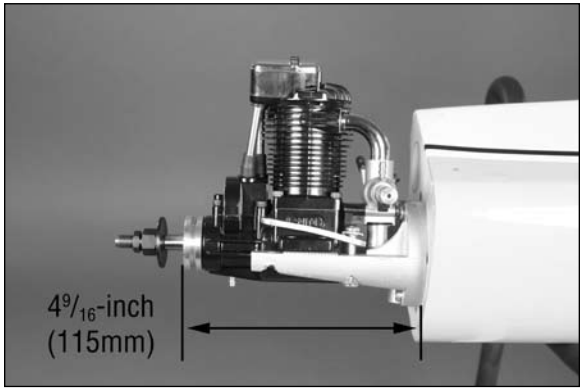
☐ **Step 7**

Check the position of the needle valve in relation to the engine. If it does not match the photo below you may need to remove the carburetor and rotate it so the needle valve faces the correct direction.



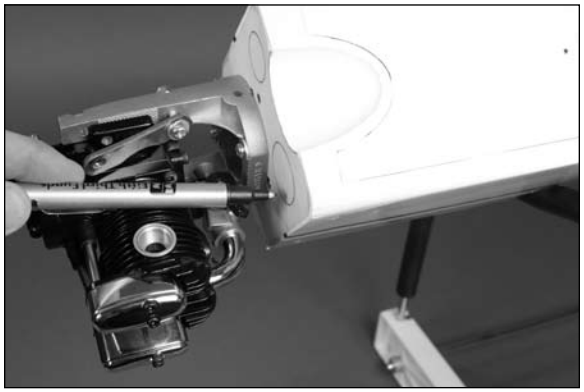
☐ **Step 8**

Lift the engine mount plates up and position the engine so the mounting lugs on the engine are between the engine mount and engine mount plates. Position the engine so the front of the drive washer is $4^{9}/_{16}$ inches (115mm) forward of the firewall.



☐ **Step 9**

Use a felt-tipped pen to mark the firewall for the throttle pushrod tube. Remove the engine from the mount and use a drill and a 5/32-inch (4mm) drill bit to drill the hole in the firewall.

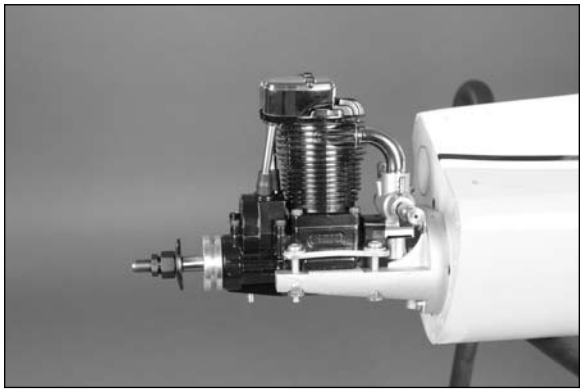


☐ **Step 10**

Slide the engine back into position on the engine mount.

☐ **Step 11**

Locate the last two 8-32 x 1-inch machine screws, #8 washers and 8-32 lock nuts. Slide a washer on each screw and then pass the screw through the engine mount plate and engine mount. Thread the lock nut onto the screw.

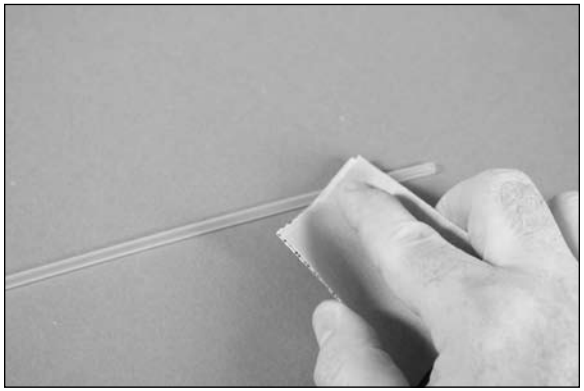


☐ **Step 12**

Using a #2 Phillips screwdriver, tighten the screws evenly to clamp the engine in position on the engine mount.

☐ **Step 13**

Use a piece of medium grit sandpaper to roughen one end of the 12-inch (305mm) throttle pushrod housing. This is necessary for the CA to stick to the tube when it is installed in the fuselage.

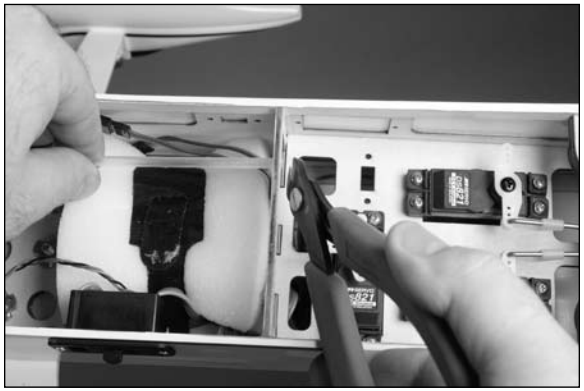


☐ **Step 14**

Slide the pushrod housing into the hole in the firewall and into the fuselage. The end of the tube sanded in the previous step will be almost flush with the firewall. Do not glue the tube at this time.

☐ **Step 15**

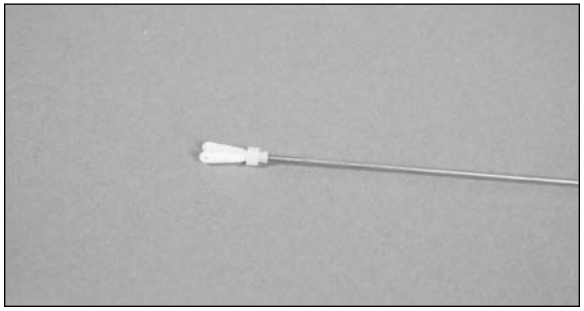
Use side cutters to trim the pushrod tube flush with the former inside the fuselage as shown. Slide the plywood pushrod support on the tube inside the fuselage. Do not glue the support or tube at this time.



Note: The plywood pushrod support will be glued in position after the fuel tank has been installed.

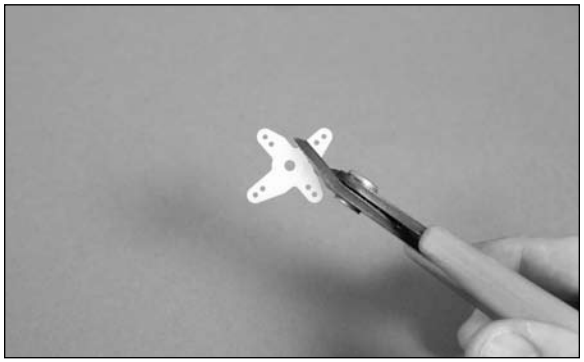
☐ **Step 16**

Slide a clevis retainer on the clevis. Thread the clevis 12 turns onto the 16½-inch (419mm) throttle pushrod wire. Slide the wire into the tube from inside the fuselage.



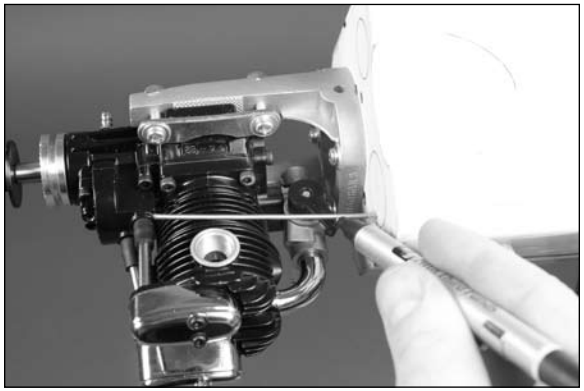
☐ **Step 17**

Remove the servo arm from the throttle servo. Trim three of the four arms from the servo arm as shown. Install the arm back on the servo. Connect the clevis to the outer hole of the servo arm as shown.



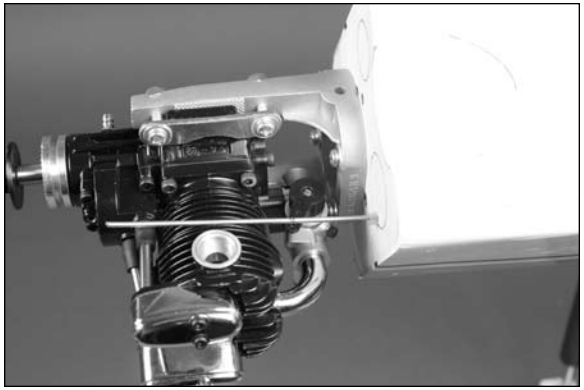
☐ **Step 18**

Move the carburetor to the closed position. Use the radio system to move the throttle servo to the low position. Use a felt-tipped pen to mark the pushrod where it crosses the middle hole of the carburetor arm as shown.



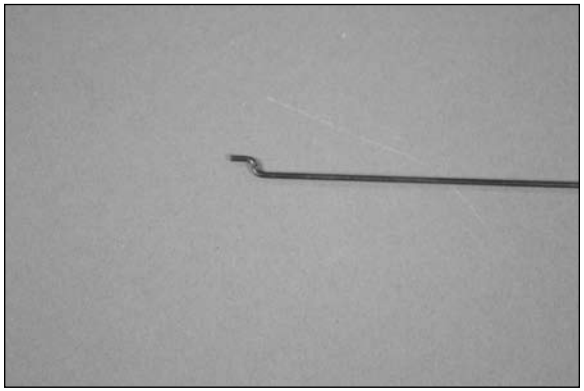
☐ **Step 19**

Use the radio system to move the throttle servo to the fully open position. Move the throttle pushrod to move the carburetor to the fully open position. Check that the mark made in the last step is still aligned with the hole in the carburetor arm used in the last step, or be very close. If not, use isopropyl alcohol to remove the mark. The goal is to have the mark align with the same hole in the carburetor arm at both the open and closed positions.



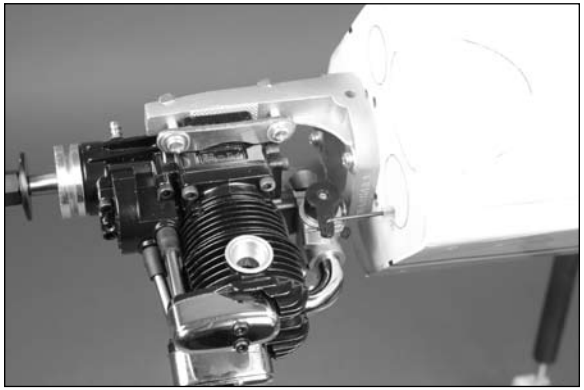
☐ **Step 20**

Once the pushrod has been marked, use pliers to make a "Z" bend at the mark. Use side cutters to trim the pushrod wire 3/8-inch (10mm) from the bend.



☐ **Step 21**

Insert the bend on the pushrod wire into the middle hole of the carburetor arm.



Note: It is necessary to remove the carburetor arm to connect the pushrod.

☐ **Step 22**

Check the operation of the throttle from the radio to make sure it goes from fully closed to fully open, and that the servo is not binding at either endpoint as well. If you are using a computer radio, use the endpoint adjustments as necessary to fine-tune the operation of the throttle if necessary.

Cowling Installation

Required Parts

Fuselage assembly	Clear cowling
Painted cowling	Fuel tank
Tie strap	#4 washer (5)
Spinner cone	Spinner backplate
Propeller	Fuel tubing (4)

3mm x 10mm sheet metal screw (2)
4-40 x 1/2-inch socket head screw (4)
4-40 x 3/8-inch socket head screw

Tools and Adhesives

Phillips screwdriver: #2
Ball driver or hex wrench: 3/32-inch

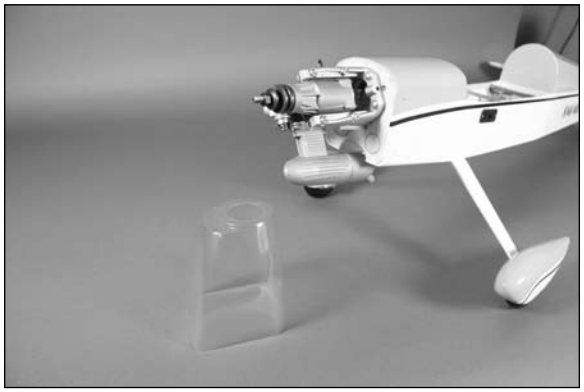
☐ **Step 1**

Use the hardware provided with your engine to attach the muffler to the engine.

Note: To position the muffler on your Saito closer to the fuselage, purchase the Muffler Manifold, part number SAI8075A. This manifold is for the Saito 65–82 and moves the muffler closer to the fuselage.

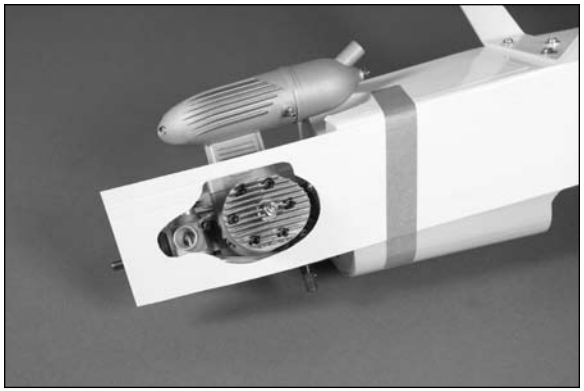
☐ **Step 2**

Locate the clear cowling. Use this to trim and fit to the engine. It can then be used as a template to trim the painted cowling.



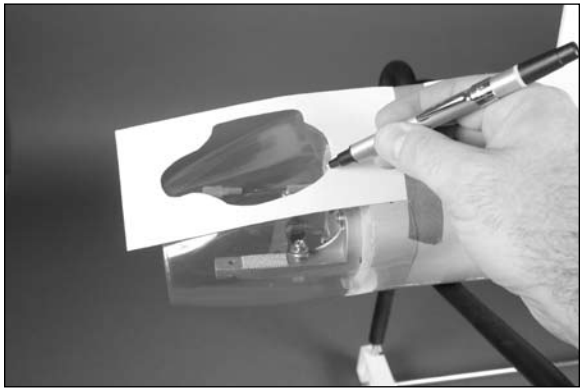
☐ **Step 3**

Use cardstock to make template indicating the needle valve, engine head and muffler, as well as any other items that may protrude through the cowling.



☐ **Step 4**

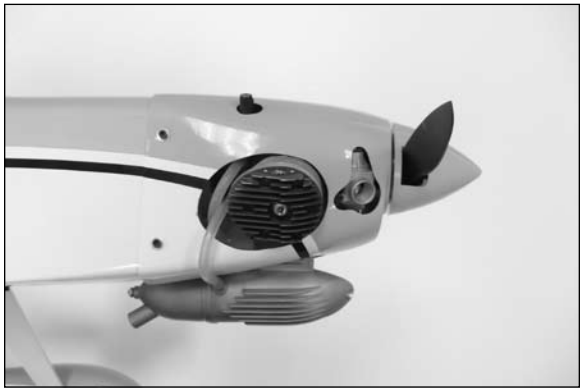
Remove the engine from the firewall and position the clear cowling on the front of the fuselage. Use the templates and a felt-tipped pen to transfer the locations to the clear cowling.

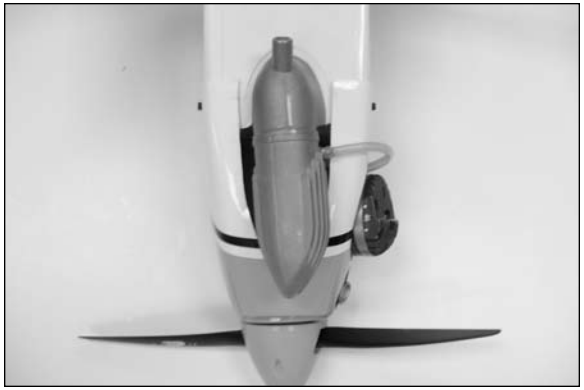


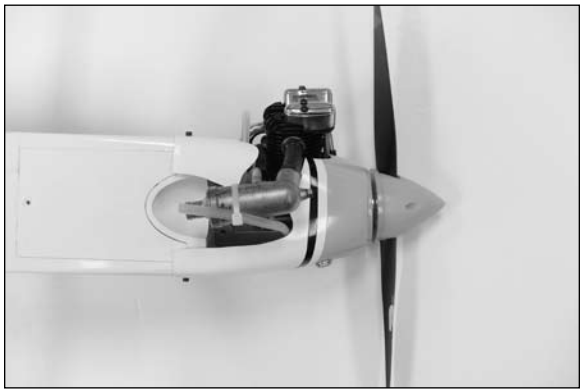
Hint: You only need to remove the two forward screws that secure the engine mount plate to remove the engine.

☐ **Step 5**

After the clear cowl has been trimmed and fit, you can them slide it over the painted cowl and transfer the outlines to the painted cowl.

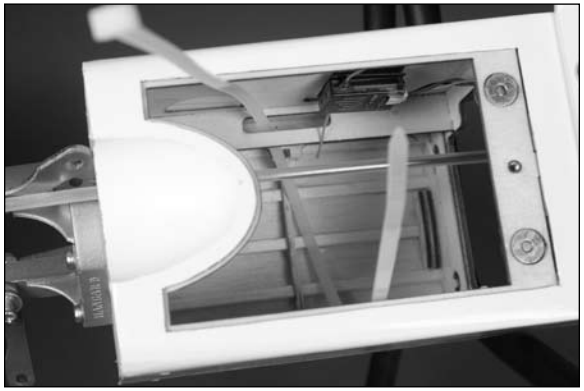






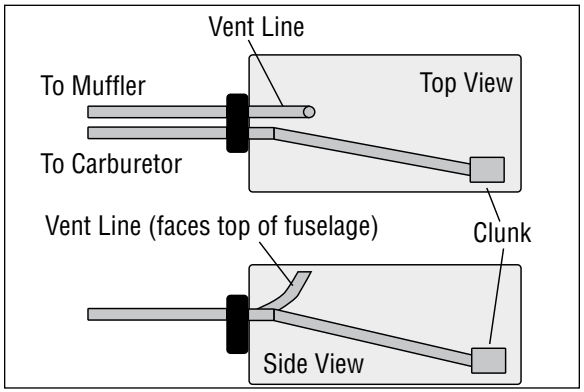
☐ **Step 6**

Remove the hatch from the bottom of the fuselage. Pass a tie strap through the slots in the sides of the fuselage as shown.



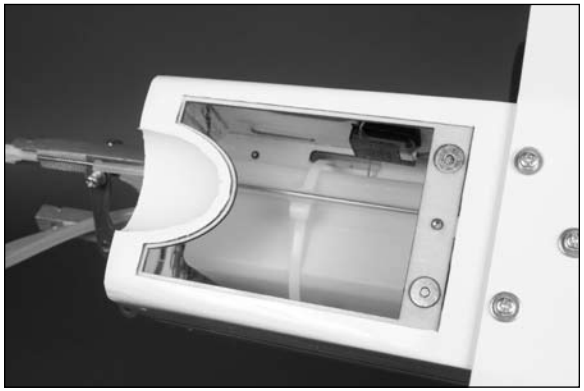
☐ **Step 7**

Inspect the fuel tank to determine the location of the vent and clunk lines as shown in the drawing below. The vent line must face to the top of the fuselage for the engine to run properly.



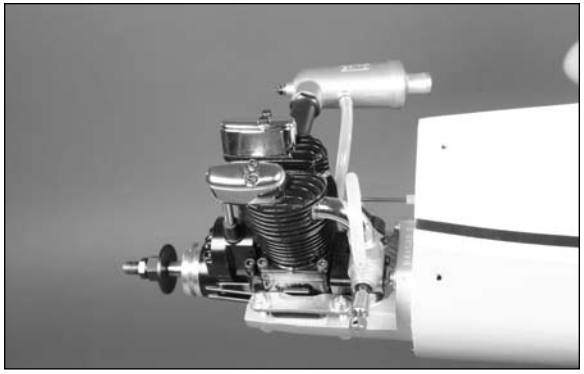
☐ **Step 8**

Slide the fuel tank into the fuselage with the vent line to the top of the fuselage. Use the tie strap to secure the fuel tank in the fuselage. Make sure the tie wrap is under the throttle pushrod tube next to the fuel tank.



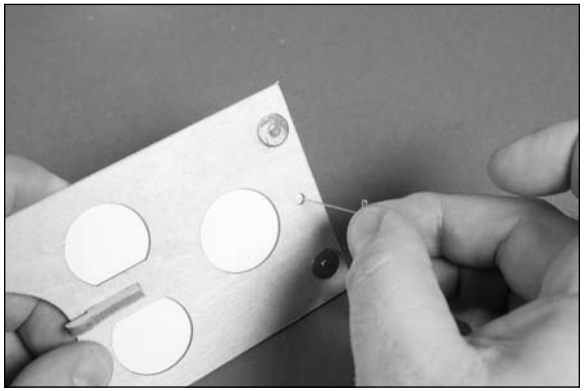
☐ **Step 9**

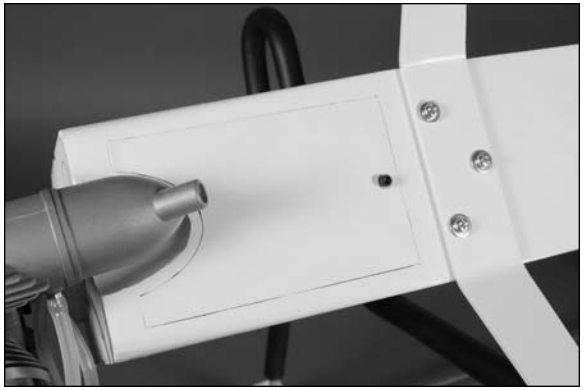
Install the engine back into position on the engine mount. Connect the lines from the fuel tank to the engine. The vent line will connect to the muffler and the line from the clunk will connect to the fuel inlet on the engine.



☐ **Step 10**

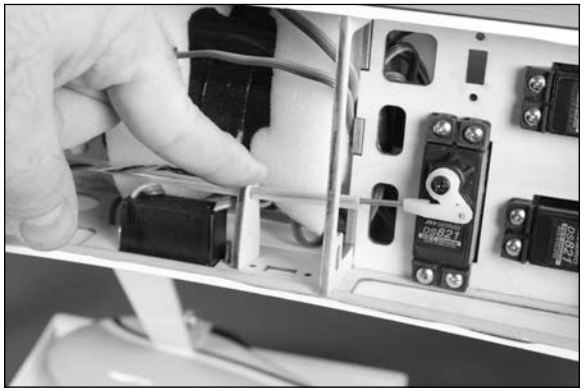
Use a T-pin to poke a hole in the covering on the hatch. Use a 4-40 x 3/8-inch socket head screw and #4 washer to secure the hatch to the fuselage. Use a 3/32-inch ball driver or hex wrench to tighten the screw.





☐ **Step 11**

Use medium CA to glue the plywood pushrod support to the side of the fuselage. Apply CA to the pushrod where it passes through the firewall and through the support at this time as well.



☐ **Step 12**

Prepare the four 4-40 x ½-inch socket head screws by sliding a #4 washer on each screw, then a ¼-inch piece of fuel tubing on the screw. The fuel tubing keeps the screws from vibrating loose without the need for threadlock.

☐ **Step 13**

Use the screws from the previous step to secure the cowl to the fuselage. The screws are tightened using a 3/32-ball driver or hex wrench.

☐ **Step 14**

Secure the propeller to the engine following the instructions provided with the engine. Make sure to place the spinner backplate on the engine before the propeller. The spinner cone is then installed and secured using two 3mm x 10mm sheet metal screws and a #2 Phillips screwdriver.

EP Version Motor and Cowling Installation

Required Parts

Fuselage assembly	Painted cowling
Speed control	Motor with hardware
Hook and loop strap	Plywood battery tray
Hook and loop tape	Motor battery
#4 washer (2)	Spinner backplate
Spinner cone	Propeller
Fuel tubing (4)	

$1^{7}/_{8}$-inch (48mm) standoffs (4)
8-32 x $2^{1}/_{2}$-inch machine screws (4)
3mm x 10mm sheet metal screw (2)
4-40 x 1/2-inch socket head screw (4)
4-40 x 3/8-inch socket head screw (2)

Tools and Adhesives

Drill bit: 5/32-inch (4mm)	Drill
Phillips screwdriver: #1, #2	Threadlock
Hobby knife with #11 blade	Metric propeller reamer

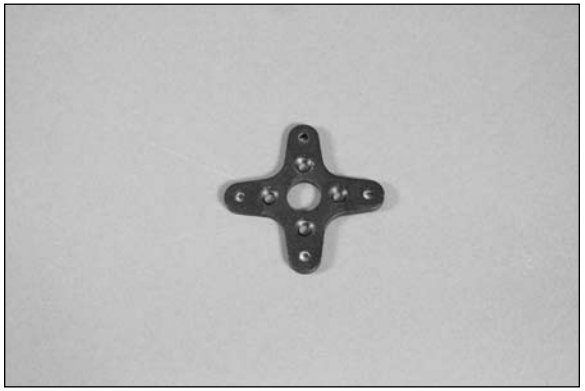
Ball driver or hex wrench: 3/32-inch

☐ **Step 1**

Use a hobby knife and #11 blade to cut the supports to open the cooling hole intakes from the firewall. There are four supports for each.

☐ **Step 2**

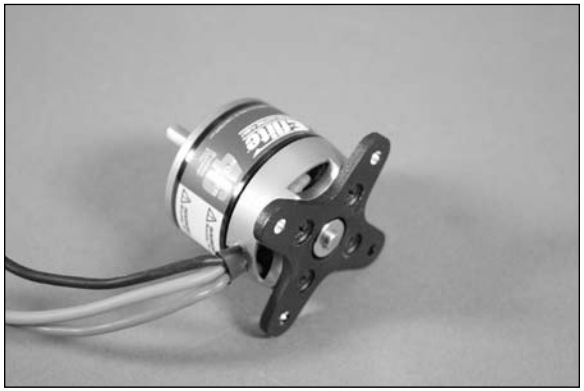
Use a drill and 5/32-inch (4mm) drill bit to enlarge the mounting holes in the motor mount plate.



Note: It is highly recommended to use a drill press and secure the mount. Use caution when using a hand drill as the mount can easily rotate if the drill bit catches on the aluminum during the drilling process.

☐ **Step 3**

Use a #2 Phillips screwdriver to attach the mount to the motor using the hardware included with the motor. Make sure to use threadlock on the screws to prevent them from vibrating loose.



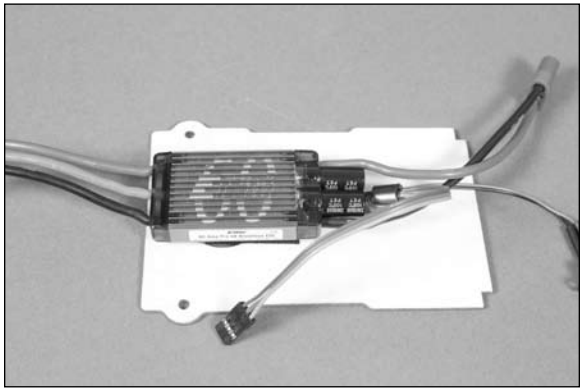
☐ **Step 4**

Attach the motor to the firewall using four 8-32 x $2^{1}/_{4}$-inch machine screws and four $1^{7}/_{8}$-inch (48mm) standoffs. Make sure to use threadlock on the screws so they do not vibrate loose.

Note: Blind nuts have been installed for both the glow and EP versions. Make sure to install the mount at an angle as shown. The hardware for the glow mount will not match up to the EP blind nut installation.

☐ **Step 5**

Use hook and loop tape to attach the speed control to the battery tray as shown. Note that the ESC is mounted to the bottom of the battery tray.



☐ **Step 6**

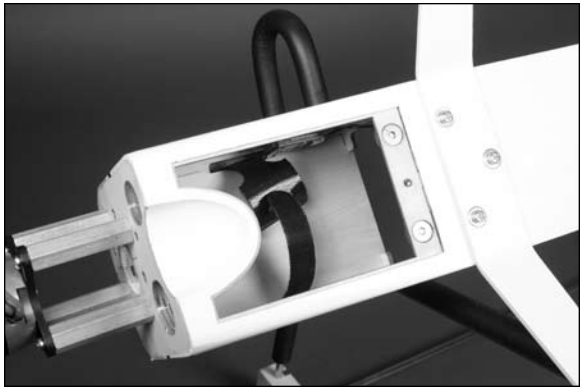
Remove the hatch from the bottom of the fuselage and set it aside.

☐ **Step 7**

Insert the hook and loop strap through the slots on the fuselage side rails as shown.

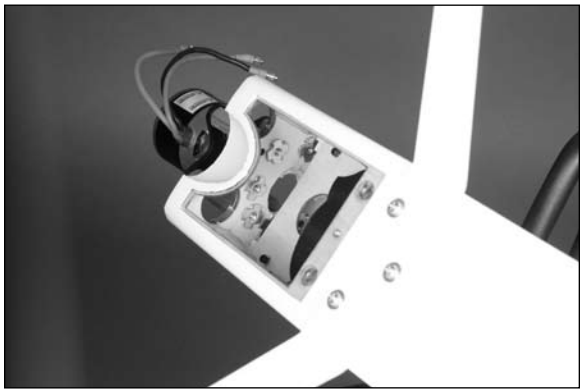
☐ **Step 8**

Slide the battery tray into the fuselage. The rear of the tray will key into the former at the rear of the tray. Make sure to route the leads to the motor through the hole in the firewall as shown.



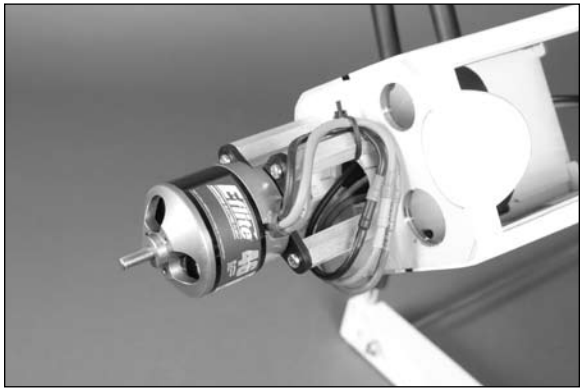
☐ **Step 9**

Use two 4-40 x 3/8-inch socket head screws and two #4 washers to secure the front of the battery tray in the fuselage. Use a 3/32-inch ball driver or hex wrench to tighten the screws after applying a drop of threadlock on each screw.



☐ **Step 10**

Connect the motor and speed control leads. Make sure to secure them so they will not interfere with the operation of the motor.



☐ **Step 11**

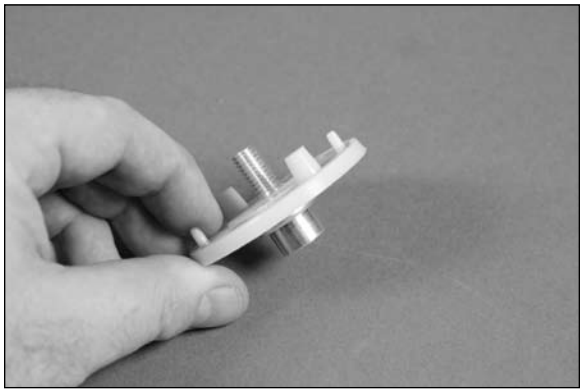
Prepare the four 4-40 x ½-inch socket head screws by sliding a #4 washer on each screw, then a ¼-inch piece of fuel tubing on the screw. The fuel tubing keeps the screws from vibrating loose without the need for threadlock.

☐ **Step 12**

Use the screws from the previous step to secure the cowl to the fuselage. The screws are tightened using a 3/32-ball driver or hex wrench.

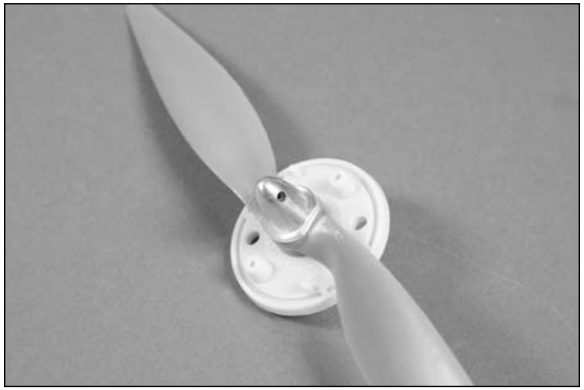
☐ **Step 13**

Slide the propeller adapter into the spinner backplate. It may be necessary to enlarge the hole in the backplate to fit the adapter.



☐ **Step 14**

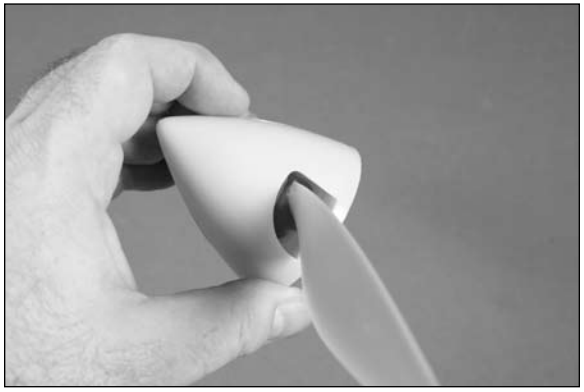
Slide the propeller onto the adapter. Position the propeller so it is centered in the short slot in the backplate. Loosely thread the spinner nut on the adapter. Check the position of the propeller as it should have an equal spacing around the spinner cone as shown.



Note: It may be necessary to enlarge the opening in the spinner for the propeller using a propeller reamer.

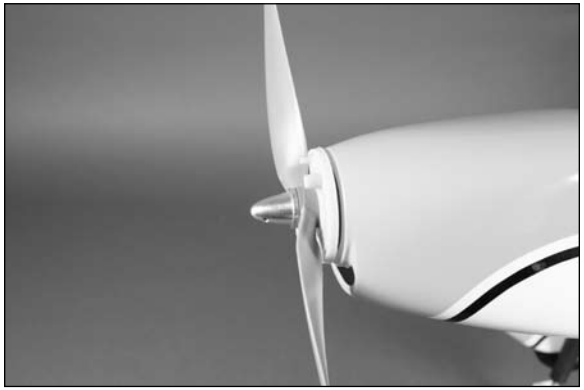
☐ **Step 15**

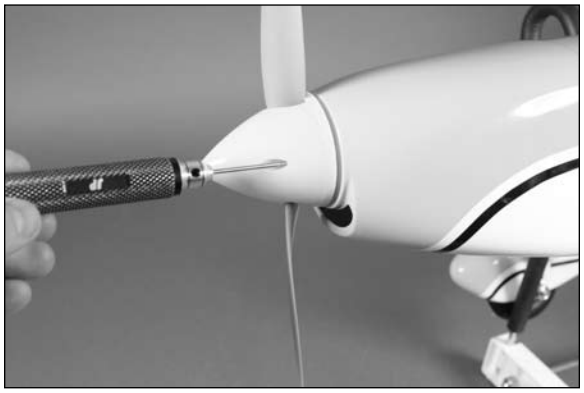
Slide the backplate assembly on the motor shaft. Leave a gap of 3/32-inch (2mm) between the cowl and spinner backplate. Tighten the spinner nut to secure the adapter to the motor shaft.



☐ **Step 16**

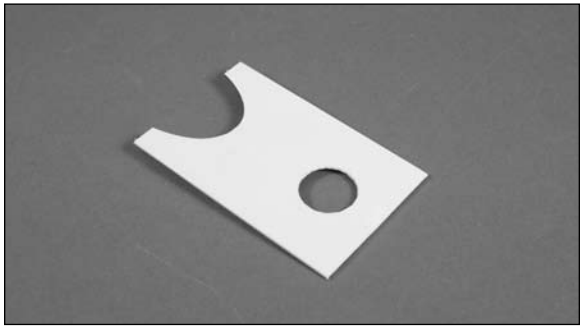
Install the spinner cone using the two 3mm x 10mm sheet metals screws and a #1 Phillips screwdriver.





☐ **Step 17**

Use a hobby knife to remove the covering from the opening in the hatch before placing it back in position on the fuselage.



☐ **Step 18**

Use a hobby knife to remove the covering from the rear opening in the fuselage to allow are to pass through the fuselage and over the motor battery..

Final Assembly

Required Parts

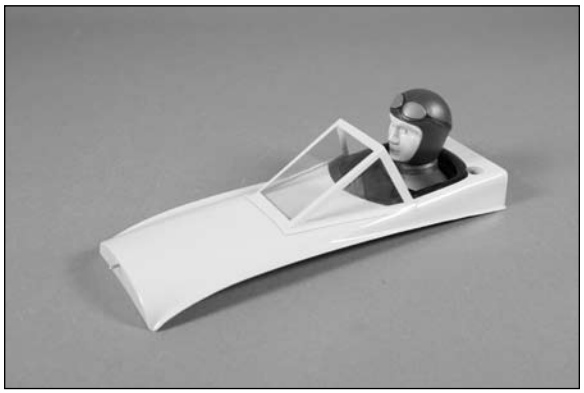
- Fuselage assembly
- Pilot figure
- Wing tube (3/4 x 16 inch)
- Wing panel (left and right)
- 1/4-20 x 1-inch nylon wing bolt (2)
- Canopy hatch
- Windscreen
- Wing tube (1/4 x 4 inch)

Tools and Adhesives

- Zap-A-Dap-A-Goo
- Canopy glue
- Flat blade screwdriver

☐ Step 1

Locate the pilot figure and canopy hatch. Use Zap-A-Dap-A-Goo to glue the pilot figure in the cockpit as shown. Use canopy glue to glue the windscreen to the canopy hatch. Make sure to position the windscreen so the hatch pin can still be operated.



☐ Step 3

Insert the wing tubes into one of the wing panels. Slide the tubes in until they stop. Do not force the tubes in farther than they can easily slide.

☐ Step 4

Slide the remaining wing panel onto the tubes and tight against the opposite wing panel.

☐ Step 5

Connect the leads from the aileron servos to the aileron extension(s) from the receiver.

☐ Step 6

Slide the wing dowels from the wing into the pre-drilled holes in the fuselage. The wing will now rest against the fuselage. Make sure the wires from the receiver and aileron servos are inside the fuselage.

☐ **Step 7**

Place the canopy hatch on the wing by pulling the front catch rearward and sitting it straight down on the wing. The front catch will fit into a hole in the fuselage at the front of the wing.

☐ **Step 8**

Use a flat screwdriver and the two 1/4-20 x 1-inch nylon wing bolts to secure the wing and rear of the hatch.

Optional Float Installation

Required Parts

Fuselage assembly
Float mount adapter
Landing gear strap (4)
Assembled floats (HAN4015)
#4 x 1/2-inch sheet metal screw (8)
6-inch (152mm) servo extension or Y-harness

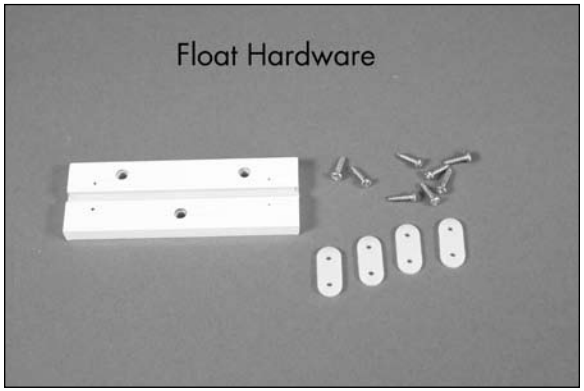
Tools and Adhesives

Zap-A-Dap-A-Goo
Threadlock
Phillips screwdriver: #2
Thin CA
Hobby knife with #11 blade

Before starting the installation of your floats, you will need to assemble them according to the float manual.

☐ **Step 1**

Locate the float mount adapter, four landing gear straps and eight #4 x 1/2-inch sheet metal screws.

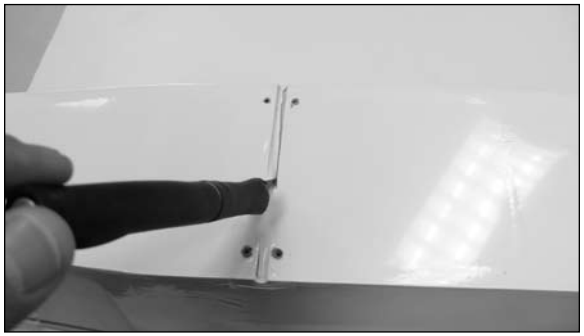


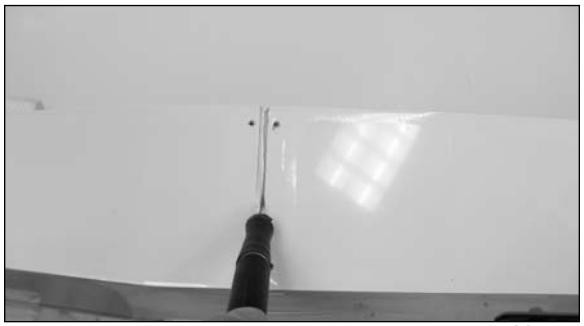
☐ **Step 2**

Remove the landing gear from the fuselage. Use the hardware from the landing gear to attach the float mount adapter. Make sure to use threadlock on the screws to prevent them from vibrating loose.

☐ **Step 3**

Use a hobby knife with a #11 blade to remove the covering on the bottom of the fuselage where the rear mount of the float will fit. Holes have also been pre-drilled for the mounting screws. Use Zap-A-Dap-A-Goo or thin CA to seal the wood and protect it from water.





☐ **Step 4**

Use a #2 Phillips screwdriver to secure the forward mount of the float to the float mount adapter using four #4 x 1/2-inch sheet metal screws and two landing gear straps.

☐ **Step 5**

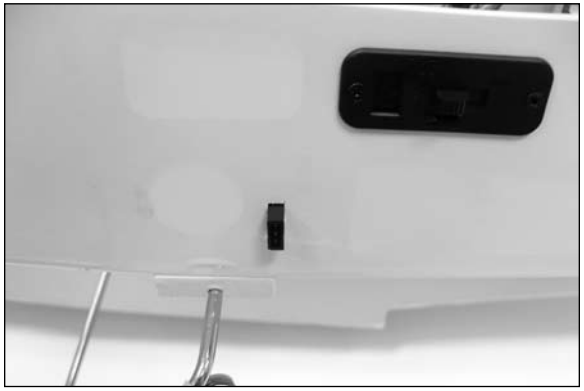
Use a #2 Phillips screwdriver to secure the rear mount of the float to the fuselage using four #4 x 1/2-inch sheet metal screws and two landing gear straps.

☐ **Step 6**

There are two options to operate the float rudder servo from your receiver. The first option is to plug a 6-inch (152mm) servo extension into an unused channel and use your computer radio to mix the rudder channel to this new channel to operate the float servo. The other option is to plug a Y-harness into the rudder channel of the receiver. The rudder servo inside the fuselage will plug into one of the leads from the Y-harness, while the float rudder servo will plug into the remaining lead.

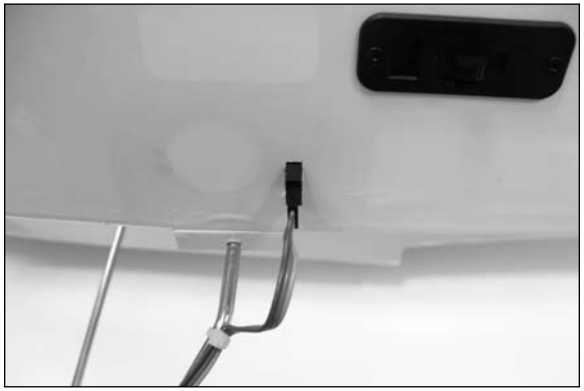
☐ **Step 7**

Use a hobby knife with a #11 blade to cut a hole in the fuselage big enough to fit the end of the servo extension or Y-harness. Use Zap-A-Dap-A-Goo to secure the end in the fuselage.



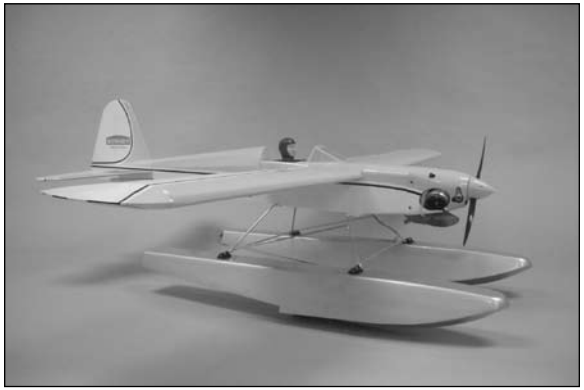
☐ **Step 8**

After the Zap-A-Dap-A-Goo has fully cured you can then plug the lead from the float steering servo into the plug in the fuselage.



IMPORTANT

If you have been flying with wheels and have changed to floats you must check the balance of your aircraft. These different types of landing gear will make a difference in the balance of your aircraft.



Center of Gravity

An important part of preparing the aircraft for flight is properly balancing the model.

Caution: Do not inadvertently skip this step!

The recommended Center of Gravity (CG) location for the your model is $2^{3}/_{4}$-inch (70mm) back, or 25% of the chord, from the leading edge of the wing. Mark the location for the Center of Gravity on the bottom of the wing next to the fuselage as shown. The CG range for your model is $2^{1}/_{2}$ to 3 inches (64mm to 76mm) from the leading edge of the wing

When balancing your model, support the plane upright at the marks made on the bottom of the wing with your fingers or a commercially available balancing stand. This is the correct balance point for your model. You might find you may be required to add a small amount of weight to either the front or back of the fuselage to achieve the correct balance.

After the first flights, the CG position can be adjusted for your personal preference.

Control Throws

☐ **Step 1**

Turn on the transmitter and receiver of your model. Check the movement of the rudder using the transmitter. When the stick is moved right, the rudder should also move right. Reverse the direction of the servo at the transmitter if necessary.

☐ **Step 2**

Check the movement of the elevator with the radio system. Moving the elevator stick toward the bottom of the transmitter will make the airplane elevator move up.

☐ **Step 3**

Check the movement of the ailerons with the radio system. Moving the aileron stick right will make the right aileron move up and the left aileron move down.

☐ **Step 4**

Use a ruler to adjust the throw of the elevator, ailerons and rudder.

Aileron High Rate

Up	5/8-inch	(16mm)	20 Degrees
Down	5/8-inch	(16mm)	20 Degrees

Aileron Low Rate

Up	3/8-inch	(10mm)	12 Degrees
Down	3/8-inch	(10mm)	12 Degrees

Elevator High Rate

Up	$1^{1}/_{8}$-inch	(29mm)	22 Degrees
Down	$1^{1}/_{8}$-inch	(29mm)	22 Degrees

Elevator Low Rate

Up	7/8-inch	(22mm)	14 Degrees
Down	7/8-inch	(22mm)	14 Degrees

Rudder High Rate

Left	$1^{3}/_{4}$-inch	(44mm)	23 Degrees
Right	$1^{3}/_{4}$-inch	(44mm)	23 Degrees

Rudder Low Rate

Left	$1^{1}/_{4}$-inch	(32mm)	15 Degrees
Right	$1^{1}/_{4}$-inch	(32mm)	15 Degrees

Note: Measurements are taken at the inner or widest point on the control surface.

These are general guidelines measured from our own flight tests. You can experiment with higher rates to match your preferred style of flying.

Note: Travel Adjust, Sub Trim and Dual Rates are not listed and should be adjusted according to each individual model and preference.

Flight Preparations

Flight preparations must be checked each time you travel to the flying field. Because your model will encounter a variety of situations, it is best to keep an eye on the various components of your model to keep it in the best flying condition.

☐ Checking the Frequency

When using a Spektrum radio system, follow the guidelines for use of DSM radio systems at your particular field.

☐ Checking the Controls

Before starting your engine, check to make sure the controls are operating in the correct directions and the linkages and surfaces are not binding anywhere. Also look at the clevises and clevis retainers to make sure they are secure and will not come loose or fail in flight.

☐ Fueling your Model

Fill the fuel tank with the proper fuel. Fill the tank by connecting the fuel pump to the line going to the needle valve or to the fuel dot on the side of the cowling. Disconnect the fuel line attached to the pressure fitting of the muffler; your tank is full when fuel begins to run out of the pressure line. Reconnect the fuel lines to the needle valve assembly or insert the plug into the fuel dot and connect the line to the muffler.

Note: It is very important to reconnect the lines to the correct place. If they are reconnected incorrectly, the engine will not run properly.

Maintaining Your Model

The following is a check list that you should follow every time you have completed a flying session with your model. Doing so will keep your aircraft in the best flying condition.

Clean Up

After a long flying session with your model, you will want to clean it up before loading it into your vehicle to head home. Use a cleaner and a paper towel to wipe down the exterior of your plane, removing the fuel residue. Remember, a clean plane will last longer since the fuel won't be allowed to soak into any exposed wood.

Checking the Propeller

Check to make sure the propeller is tightly secured to the engine. If not, remove the spinner and use a crescent wrench to tighten it back down. If you have had any not so great landings, you will want to inspect the propeller for any damage. Small nicks and scratches can quickly become fractures, causing the propeller to be unsafe for flight. Always carry a few spare propellers so a damaged propeller can be replaced at the field, increasing your flying time per trip to the field.

Checking the Clevises

Inspect the aileron, elevator and rudder clevises to make sure they are connected and in good working order. If you find a clevis that is showing signs of wear or is broken, replace it with a new clevis. Also check the nylon connectors at the servo for any wear or damage. If they look worn or in bad shape, replace them as well.

Checking the Control Horns

Inspect the control horns to make sure they have not crushed the wood of the control surface. If so, remove the control horn screws to remove the control horn. Place 2–3 drops of thin CA into each of the screw holes. In addition, use a T-pin to poke small holes in the covering in the area where the control horn mounts, then saturate the area with thin CA. This will harden the wood and give the control horns a solid surface to be mounted to.

Checking the Wheel Collars

Check the setscrews on the wheel collars for the main and tail wheel to make sure they are not loose. Use a 1.5mm hex wrench to tighten the setscrews. It is suggested if they loosen frequently to remove them, apply threadlock to the setscrews, then secure the wheel collars back into position. The threadlock and hex wrench are included in the kit for this purpose.

Check the Muffler Bolts

Use a 2.5mm hex wrench (Evolution 2-stroke) or box wrench (Saito 4-stroke) to make sure the hardware holding the muffler onto the engine is tight and has not vibrated loose during flight.

Check the Engine Mount Bolts

Remove the spinner and propeller from the engine. Remove the exhaust stacks from the fuselage, and then remove the cowling from the fuselage. Remove the muffler from the engine, and then use a Phillips screwdriver to make sure the four bolts securing the engine to the mount are tight.

Safety Do's and Don'ts for Pilots

- Ensure that your batteries have been properly charged prior to your initial flight.
- Keep track of the time the system is turned on so you will know how long you can safely operate your system.
- Perform a ground range check prior to the initial flight of the day. See the "Daily Flight Checks Section" for information.
- Check all control surfaces prior to each takeoff.
- Do not fly your model near spectators, parking areas or any other area that could result in injury to people or damage of property.
- Do not fly during adverse weather conditions. Poor visibility can cause disorientation and loss of control of your aircraft. Strong winds can cause similar problems.
- Do not point the transmitter antenna directly toward the model. The radiation pattern from the tip of the antenna is inherently low.
- Do not take chances. If at any time during flight you observe any erratic or abnormal operation, land immediately and do not resume flight until the cause of the problem has been ascertained and corrected. Safety can never be taken lightly.

Dual Rate Recommendations

- We recommend that the rudder dual rate be set to Low for takeoff to help minimize overcorrection during the takeoff roll.
- We recommend the rudder dual rate be set to High for landing to help maintain heading as the model transitions from flying speed to taxi speeds.
- Elevator and Aileron dual rates should be adjusted for personal feel and also if there is any unusual wind conditions.

Daily Flight Checks

☐ **Step 1**

Check the battery voltage on both the transmitter and the receiver battery packs. Do not fly below 4.3V on the transmitter if you are using a Spektrum transmitter that uses 4-cells to power the transmitter. Do not fly below 9.5V on the transmitter if you are using a JR or Spektrum transmitter that uses 8-cells to power the transmitter. Do not fly if the receiver pack is at or below 4.7V. To do so can crash your aircraft.

Note: When you check these batteries, ensure that you have the polarities correct on your expanded scale voltmeter.

☐ **Step 2**

Check all hardware (linkages, screws, nuts, and bolts) prior to each day's flight. Be sure that binding does not occur and that all parts are properly secured.

☐ **Step 3**

Ensure that all surfaces are moving in the proper manner.

☐ **Step 4**

Perform a ground range check before each day's flying session.

☐ **Step 5**

Prior to starting your aircraft, turn off your transmitter, then turn it back on. Do this each time you start your aircraft. If any critical switches are on without your knowledge, the transmitter alarm will warn you at this time.

☐ **Step 6**

Check that all trim levers are in the proper location.

☐ **Step 7**

All servo pigtails and switch harness plugs should be secured in the receiver. Make sure that the switch harness moves freely in both directions.

Age requirements

Age Recommendation: 14 years or over. This is not a toy. This product is not intended for use by children without direct adult supervision.

Safety, Precautions and Warnings

As the user of this product, you are solely responsible for operating it in a manner that does not endanger yourself and others or result in damage to the product or the property of others.

Carefully follow the directions and warnings for this and any optional support equipment (chargers, rechargeable battery packs, etc.) that you use.

This model is controlled by a radio signal that is subject to interference from many sources outside your control. This interference can cause momentary loss of control so it is necessary to always keep a safe distance in all directions around your model, as this margin will help to avoid collisions or injury.

- Always operate your model in an open area away from cars, traffic or people.
- Avoid operating your model in the street where injury or damage can occur.
- Never operate the model out into the street or populated areas for any reason.
- Never operate your model with low transmitter batteries.
- Carefully follow the directions and warnings for this and any optional support equipment (chargers, rechargeable battery packs, etc.) that you use.
- Keep all chemicals, small parts and anything electrical out of the reach of children.
- Moisture causes damage to electronics. Avoid water exposure to all equipment not specifically designed and protected for this purpose.

Warranty Information

WARRANTY PERIOD

Exclusive Warranty- Horizon Hobby, Inc., (Horizon) warranties that the Products purchased (the "Product") will be free from defects in materials and workmanship at the date of purchase by the Purchaser.

LIMITED WARRANTY

(a) This warranty is limited to the original Purchaser ("Purchaser") and is not transferable. REPAIR OR REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE EXCLUSIVE REMEDY OF THE PURCHASER. This warranty covers only those Products purchased from an authorized Horizon dealer. Third party transactions are not covered by this warranty. Proof of purchase is required for warranty claims. Further, Horizon reserves the right to change or modify this warranty without notice and disclaims all other warranties, express or implied.

(b) Limitations- HORIZON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCT. THE PURCHASER ACKNOWLEDGES THAT THEY ALONE HAVE DETERMINED THAT THE PRODUCT WILL SUITABLY MEET THE REQUIREMENTS OF THE PURCHASER'S INTENDED USE.

(c) Purchaser Remedy- Horizon's sole obligation hereunder shall be that Horizon will, at its option, (i) repair or (ii) replace, any Product determined by Horizon to be defective. In the event of a defect, these are the Purchaser's exclusive remedies. Horizon reserves the right to inspect any and all equipment involved in a warranty claim. Repair or replacement decisions are at the sole discretion of Horizon. This warranty does not cover cosmetic damage or damage due to acts of God, accident, misuse, abuse, negligence, commercial use, or modification of or to any part of the Product. This warranty does not cover damage due to improper installation, operation, maintenance, or attempted repair by anyone other than Horizon. Return of any goods by Purchaser must be approved in writing by Horizon before shipment.

DAMAGE LIMITS

HORIZON SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCT, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY. Further, in no event shall the liability of Horizon exceed the individual price of the Product on which liability is asserted. As Horizon has no control over use, setup, final assembly, modification or misuse, no liability shall be assumed nor accepted for any resulting damage or injury. By the act of use, setup or assembly, the user accepts all resulting liability.

If you as the Purchaser or user are not prepared to accept the liability associated with the use of this Product, you are advised to return this Product immediately in new and unused condition to the place of purchase.

Law: These Terms are governed by Illinois law (without regard to conflict of law principals).

SAFETY PRECAUTIONS

This is a sophisticated hobby Product and not a toy. It must be operated with caution and common sense and requires some basic mechanical ability. Failure to operate this Product in a safe and responsible manner could result in injury or damage to the Product or other property. This Product is not intended for use by children without direct adult supervision. The Product manual contains instructions for safety, operation and maintenance. It is essential to read and follow all the instructions and warnings in the manual, prior to assembly, setup or use, in order to operate correctly and avoid damage or injury.

QUESTIONS, ASSISTANCE, AND REPAIRS

Your local hobby store and/or place of purchase cannot provide warranty support or repair. Once assembly, setup or use of the Product has been started, you must contact Horizon directly. This will enable Horizon to better answer your questions and service you in the event that you may need any assistance. For questions or assistance, please direct your email to productsupport@horizonhobby.com, or call 877.504.0233 toll free to speak to a service technician.

INSPECTION OR REPAIRS

If this Product needs to be inspected or repaired, please call for a Return Merchandise Authorization (RMA). Pack the Product securely using a shipping carton. Please note that original boxes may be included, but are not designed to withstand the rigors of shipping without additional protection. Ship via a carrier that provides tracking and insurance for lost or damaged parcels, as Horizon is not responsible for merchandise until it arrives and is accepted at our facility. A Service Repair Request is available at www.horizonhobby.com on the "Support" tab. If you do not have internet access, please include a letter with your complete name, street address, email address and phone number where you can be reached during business days, your RMA number, a list of the included items, method of payment for any non-warranty expenses and a brief summary of the problem. Your original sales receipt must also be included for warranty consideration. Be sure your name, address, and RMA number are clearly written on the outside of the shipping carton.

WARRANTY INSPECTION AND REPAIRS

To receive warranty service, you must include your original sales receipt verifying the proof-of-purchase date. Provided warranty conditions have been met, your Product will be repaired or replaced free of charge. Repair or replacement decisions are at the sole discretion of Horizon Hobby.

NON-WARRANTY REPAIRS

Should your repair not be covered by warranty the repair will be completed and payment will be required without notification or estimate of the expense unless the expense exceeds 50% of the retail purchase cost. By submitting the item for repair you are agreeing to payment of the repair without notification. Repair estimates are available upon request. You must include this request with your repair. Non-warranty repair estimates will be billed a minimum of 1/2 hour of labor. In addition you will be billed for return freight. Please advise us of your preferred method of payment. Horizon accepts money orders and cashiers checks, as well as Visa, MasterCard, American Express, and Discover cards. If you choose to pay by credit card, please include your credit card number and expiration date. Any repair left unpaid or unclaimed after 90 days will be considered abandoned and will be disposed of accordingly. Please note: non-warranty repair is only available on electronics and model engines.

United States:

Electronics and engines requiring inspection or repair should be shipped to the following address:

Horizon Service Center
4105 Fieldstone Road
Champaign, Illinois 61822

All other Products requiring warranty inspection or repair should be shipped to the following address:

Horizon Product Support
4105 Fieldstone Road
Champaign, Illinois 61822

Please call 877-504-0233 or e-mail us at productsupport@horizonhobby.com with any questions or concerns regarding this product or warranty.

United Kingdom:

Electronics and engines requiring inspection or repair should be shipped to the following address:

Horizon Hobby UK
Units 1-4 Ployters Rd
Staple Tye
Harlow, Essex
CM18 7NS
United Kingdom

Please call +44 (0) 1279 641 097 or e-mail us at sales@horizonhobby.co.uk with any questions or concerns regarding this product or warranty.

Germany:

Electronics and engines requiring inspection or repair should be shipped to the following address:

Horizon Technischer Service
Hamburger Strasse 10
25335 Elmshorn
Germany

Please call +49 4121 46199 66 or e-mail us at service@horizonhobby.de with any questions or concerns regarding this product or warranty.

CE Compliance Information for the European Union

INSTRUCTIONS FOR DISPOSAL OF WEEE BY USERS IN THE EUROPEAN UNION

This product must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of their waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or where you purchased the product.

2009 Official Academy of Model Aeronautics Safety Code

GENERAL

1. A model aircraft shall be defined as a non-human-carrying device capable of sustained flight in the atmosphere. It shall not exceed limitations established in this code and is intended to be used exclusively for recreational or competition activity.
2. The maximum takeoff weight of a model aircraft, including fuel, is 55 pounds, except for those flown under the AMA Experimental Aircraft Rules.
3. I will abide by this Safety Code and all rules established for the flying site I use. I will not willfully fly my model aircraft in a reckless and/or dangerous manner.
4. I will not fly my model aircraft in sanctioned events, air shows, or model demonstrations until it has been proven airworthy.
5. I will not fly my model aircraft higher than approximately 400 feet above ground level, when within three (3) miles of an airport without notifying the airport operator. I will yield the right-of-way and avoid flying in the proximity of full-scale aircraft, utilizing a spotter when appropriate.
6. I will not fly my model aircraft unless it is identified with my name and address, or AMA number, inside or affixed to the outside of the model aircraft. This does not apply to model aircraft flown indoors.
7. I will not operate model aircraft with metal-blade propellers or with gaseous boosts (other than air), nor will I operate model aircraft with fuels containing tetranitromethane or hydrazine.
8. I will not operate model aircraft carrying pyrotechnic devices which explode burn, or propel a projectile of any kind. Exceptions include Free Flight fuses or devices that burn producing smoke and are securely attached to the model aircraft during flight. Rocket motors up to a G-series size may be used, provided they remain firmly attached to the model aircraft during flight. Model rockets may be flown in accordance with the National Model Rocketry Safety Code; however, they may not be launched from model aircraft. Officially designated AMAAir Show Teams (AST) are authorized to use devices and practices as defined within the Air Show Advisory Committee Document.

9. I will not operate my model aircraft while under the influence of alcohol or within eight (8) hours of having consumed alcohol.
10. I will not operate my model aircraft while using any drug which could adversely affect my ability to safely control my model aircraft.
11. Children under six (6) years old are only allowed on a flightline or in a flight area as a pilot or while under flight instruction.
12. When and where required by rule, helmets must be properly worn and fastened. They must be OSHA, DOT, ANSI, SNELL or NOCSAE approved or comply with comparable standards.

RADIO CONTROL

1. All model flying shall be conducted in a manner to avoid over flight of unprotected people.
2. I will have completed a successful radio equipment ground-range check before the first flight of a new or repaired model aircraft.
3. I will not fly my model aircraft in the presence of spectators until I become a proficient flier, unless I am assisted by an experienced pilot.
4. At all flying sites a line must be established, in front of which all flying takes place. Only personnel associated with flying the model aircraft are allowed at or in front of the line. In the case of airshows demonstrations straight line must be established. An area away from the line must be maintained for spectators. Intentional flying behind the line is prohibited.
5. I will operate my model aircraft using only radio-control frequencies currently allowed by the Federal Communications Commission (FCC). Only individuals properly licensed by the FCC are authorized to operate equipment on Amateur Band frequencies.
6. I will not knowingly operate my model aircraft within three (3) miles of any preexisting flying site without a frequency-management agreement. A frequencymanagement agreement may be an allocation of frequencies for each site, a day-use agreement between sites, or testing which determines that no interference exists. A frequency-management agreement may exist between two or more AMA chartered clubs, AMA clubs and individual AMA members, or individual AMA members. Frequency-management agreements, including an interference test report if the agreement indicates no interference exists, will be signed by all parties and copies provided to AMA Headquarters.
7. With the exception of events flown under official AMA rules, no powered model may be flown outdoors closer than 25 feet to any individual, except for the pilot and located at the flightline.
8. Under no circumstances may a pilot or other person touch a model aircraft in flight while it is still under power, except to divert it from striking an individual.
9. Radio-controlled night flying is limited to low-performance model aircraft (less than 100 mph). The model aircraft must be equipped with a lighting system which clearly defines the aircraft's attitude and direction at all times.
10. The operator of a radio-controlled model aircraft shall control it during the entire flight, maintaining visual contact without enhancement other than by corrective lenses that are prescribed for the pilot. No model aircraft shall be equipped with devices which allow it to be flown to a selected location which is beyond the visual range of the pilot.

Building and Flying Notes

HANGAR 9®

Fly First Class™

HORIZON HOBBY

4105 Fieldstone Road
Champaign, Illinois 61822
(877) 504-0233
horizonhobby.com
Hangar-9.com

13819