P-47D-40 Thunderbolt 30cc ARF

Assembly Manual



HANGAR 9®

Notice

All instructions, warranties and other collateral documents are subject to change at the sole discretion of Horizon Hobby, Inc. For up-to-date product literature, visit http://www.horizonhobby.com and click on the support tab for this product.

Meaning of Special Language

The following terms are used throughout the product literature to indicate various levels of potential harm when operating this product:

NOTICE: Procedures, which if not properly followed, create a possibility of physical property damage AND a little or no possibility of injury.

CAUTION: Procedures, which if not properly followed, create the probability of physical property damage AND a possibility of serious injury.

WARNING: Procedures, which if not properly followed, create the probability of property damage, collateral damage, and serious injury OR create a high probability of superficial injury.

WARNING: Read the ENTIRE instruction manual to become familiar with the features of the product before operating. Failure to operate the product correctly can result in damage to the product, personal property and cause serious injury.

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. Do not attempt disassembly, use with incompatible components or augment product in any way without the approval of Horizon Hobby, Inc. This 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 serious injury.

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Introduction

Few subjects are as magnificent in giant-scale as the mighty P-47D Thunderbolt (aka The Jug). Its big, round-cowl nose, stout airframe and wide stance landing gear make for an imposing presence on any flight line. Now you can experience the thrill of owning and flying a giant-scale Jug without spending months at a workbench to do so.

The new Hangar 9® P-47D-40 Thunderbolt 30cc ARF comes assembled and covered with an authentic UltraCote® trim scheme. It also includes a huge list of additional details like functional flaps, wing guns, a dummy radial engine and a painted fiberglass cowl with hidden mounting screws. Three different sets of decals give you your choice of markings. You even have the option of adding extra scale details like a full-depth cockpit, Robart retracts and a retractable tail wheel, all of which are sold separately.

Putting together a beautiful giant-scale warbird really doesn't get much easier than this.

Product Support

For technical assistance with this product, please contact the appropriate Horizon Product Support office. This information is located in the back of this manual.

Specifications

Wingspan	81.25 in (2.1m)
Wing Area	1164 sq in.(75.1 sq dm)
Fuselage Length	71 in (1.8m)
Weight Range	16.0 lb–19.0 lb (7.30–8.60 kg)
Engine/Motor Size:	2-stroke 26–40cc Gas 4-stroke 30–36cc Gas 4-stroke 1.80–2.20 Glow EP Power 160 with EFLB50005S30 (2)
Radio	6+ channel with 8 servos (7 servos for EP)

Included Parts Listing

ITEM	QTY	USE
Fuselage with mounted hatch	1	
Canopy	1	
Wing panels with servo covers	4	
Ailerons	2	
Flaps	2	
Stabilizer	2	
Elevators	2	
Rudder	1	
Cowling	1	
Wing tube	1	
Stabilizer tube	1	
Fuel tank	1	

BAG 1

Landing gear cover, inner	2	Main wheel
Landing gear cover, outer	2	Main wheel
Plastic silver louver	2	Engine exhaust
Plastic silver scoop	1	Lower turbo charger exhaust
Plastic hatch cover	1	Tail wheel cover
Molded plastic silver mast	1	Top of fuselage antenna mast
8mm x 100mm silver tube	1	Wing tip pitot tube

BAG 2

67mm x 138mm plywood plate	1	Tank cover
90mm x 60mm plywood plate	1	Receiver mount
Hook and loop straps 20mm x 250mm	2	Receiver and Battery
154mm x 100mm drill guides	3	Firewall drilling guides

BAG 3

3mm tail wheel wire	1	
$1^{3}/_{4}$-inch tail wheel	1	
Nylon tail wheel support mount	1	Fixed tail wheel mount
Nylon tail wheel support bracket	1	Fixed tail wheel bracket
Metal steering arm with setscrew	1	Fixed tail wheel steering arm
M3 wheel collar with setscrew	4	Tail wheel and tail wire support
4-40 x 1/2-inch socket head screw	6	Tail wheel mount
#4 flat washer	6	Tail wheel mount

BAG 4

6mm x 80mm silver aluminum tube	2	Machine gun
6mm x 60mm silver aluminum tube	2	Machine gun
6mm x 40mm silver aluminum tube	2	Machine gun
6mm x 20mm silver aluminum tube	2	Machine gun
1/2-inch x 13-inch black aluminum tube	1	Stabilizer tube
1/4-inch x 3-inch black aluminum tube	2	Stabilizer ant rotation tube

BAG 5

Hinge point	6	Flaps
Control horn	5	Aileron (2) Elevator (2) Rudder (1)
1/4-20 x 2-inch nylon bolt	2	Wing attachment
CA hinges	17	Aileron (6) Elevator (8) Rudder (3)
Clevis keepers	14	Aileron (4) Flap (4) Elevator (4) Rudder 2)

BAG 6

M2.5 x 10 screw	24	Servo cover Aileron (12), Flap (12)
M2.5 x 10 screw	15	Control horn Aileron (6), Elevator (6) Rudder (3)
M2.5 x 10 screw	5	Tail wheel cover (5)
4-40 x 1/2-inch socket head screw	6	Receiver mount (4), cockpit tub (2)
4-40 x 5/8-inch socket head screw	6	Cowl
#4 flat washer (black)	12	Cowl (6), receiver mount(4),cockpit (2)
8-32 x $1^{1}/_{4}$-inch machine screw	4	Engine to engine mount
8-32 x 1-inch machine screw	4	Engine mount to firewall
8-32 lock nut	4	Engine to engine mount
8-32 blind nut	4	Engine to firewall
#8 flat washer	8	Engine bolts

BAG 7

4-40 metal clevis	14	Aileron (4), Flap (4), Rudder (2), Elevator (4)
2mm x 2-56 ball link	1	Carburetor arm
Pushrod connector with nylon retainer	1	Throttle pushrod to servo arm
M3 x 4 setscrew	1	Throttle
4-40 nut	14	Aileron (4) Flap (4) Elevator (4) Rudder (2)
4-40 x 76mm threaded pushrod	2	Aileron (2)
4-40 x 52mm threaded pushrod	2	Flap (2)
2-56 x 375mm threaded one end	1	Throttle
4-40 x 1135mm threaded pushrod	2	Elevator
4-40 x 1115mm threaded pushrod	1	Rudder
4-40 x $30^{3}/_{16}$ threaded pushrod	1	Tail wheel mechanical retract
8-inch Pushrod housing	1	Throttle

BAG 8

Braided cable	1	Tail wheel steering
Copper tubing crimp	4	Steering cable
4-40 threaded eyelet	2	Steering cable
Wire eyelet	2	Steering cable to servo arm
4-40 metal clevis	2	Steering cable
4-40 nut	2	
Pushrod connector with nylon retainer	2	Rudder cable to servo arm
M3 x 4 setscrew	1	Rudder

BAG 9

6mm wire strut	2	Fixed main landing gear
Metal mounts	2	Fixed landing gear mounting base
4mm setscrew	2	Wire strut to mounting base
6mm wheel collars with setscrew	4	Main wheel to strut
Allen wrench, 2mm	1	
6/32 x 1-inch socket head screw	8	Landing gear
6mm plywood bracket	4	Landing gear door to fixed gear

MISCELLANEOUS

22oz (650cc) fuel tank, unassembled	1	
Plastic cap	1	
Metal disc	1	
M3 x 20 screw	1	
Metal clunk	1	
Copper tubing	2	
Aluminum motor mount (left and right)	2	
1 1/4-inch x 29 3/8-inch anodized tube	1	Main wing tube
5 1/8-inch (130mm) scale wheel	2	
Painted dummy engine and crankcase	1	
3mm plywood assembled tray	1	Retract valve mount
3mm plywood spacer	8	Servo spacers
Plastic painted hub	1	Scale propeller hub
Plastic painted blade	4	Scale propeller blades
Decal sheet	2	

ACCESSORIES

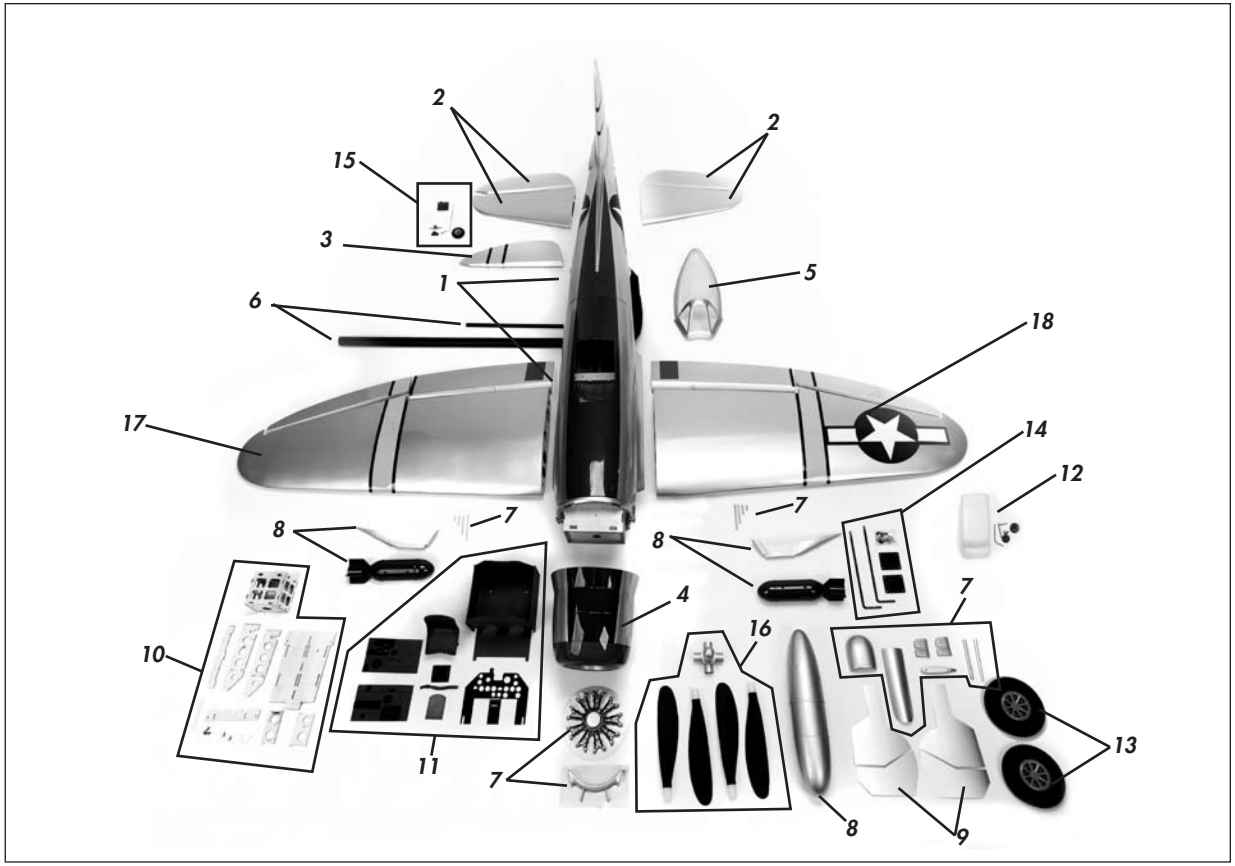
Plastic bomb	2	
Plastic pylon	3	Bomb (2) center fuel tank (1)
Plastic centerline tank	1	
4-40 x 4 1/2-inch thumb bolt	2	Optional centerline tank
4-40 x 1/2-inch socket head screw	4	Bombs to pylons
4-40 x 1-inch socket head screw	4	Pylon to wing

OPTIONAL AVAILABLE PARTS

Cockpit tub		
Plywood tub with seat, dash and side panels	1	
Plywood headrest with plastic cushion	1	

ELECTRIC POWER

EP motor mount	1	
EP plywood battery tray	8	
4-40 x 1/2-inch socket head cap screw	2	
#4 flat washer (black)	2	



Contents of Kit and Parts Listing

Replacement Parts

1. HAN448501	Fuselage with Fin and Hatch
2. HAN448503	Stabilizer Set with Elevator
3. HAN448504	Rudder
4. HAN448505	Fiberglass Cowl
5. HAN448506	Canopy
6. HAN448507	Aluminum Wing and Stabilizer Tube
7. HAN448510	Plastic Scale Detail Set
8. HAN448511	Scale Bomb Set and Scale Fuel Tank with Pylons
9. HAN448512	Landing Gear Doors
10. HAN448514	Optional EP Motor Plywood Standoff and Battery Tray
11. HAN448515	Optional Cockpit Tub with Cockpit kit
12. HAN448516	Fuel tank 22oz
13. HAN448517	5 1/8 inch (130mm) Scale 8-spoke wheel
14. HAN448518	Fixed Wire Gear Struts
15. HAN448519	Tail Wheel Assembly
16. HAN2718	Scale Display Propeller
17. HAN448520	Right Wing Panel with Aileron and Flap
18. HAN448521	Left Wing Panel with Aileron and Flap

Items Not Shown

HAN448508	Pushrod Set
HAN448513	Decal Set
HAN448509	Hardware kit

⚠ Safety Precautions and Warnings

Read and follow all instructions and safety precautions before use. Improper use can result in fire, serious injury and damage to property.

Age Recommendation: Not for children under 14 years. This is not a toy.

COMPONENTS

Use only with compatible components. Should any compatibility questions exist, please refer to the product instructions, the component instructions or contact Horizon Hobby, Inc.

FLIGHT

Fly only in open areas to ensure safety. It is recommended flying be done at AMA (Academy of Model Aeronautics) approved flying sites. Consult local ordinances before choosing a flying location.

PROPELLER

Keep loose items that can get entangled in the propeller away from the prop, including loose clothing or other objects such as pencils and screwdrivers. Especially keep your hands away from the propeller, as injury can occur.

BATTERIES

Notes on Lithium Polymer Batteries

Always follow the manufacturer's instructions when using and disposing of any batteries. Mishandling of Li-Po batteries can result in fire causing serious injury and damage.

SMALL PARTS

This kit includes small parts and should not be left unattended near children as choking and serious injury could result.

Safe Operating Recommendations

- Inspect your model before every flight to ensure it is airworthy.
- Be aware of any other radio frequency user who may present an interference problem.
- Always be courteous and respectful of other users in your selected flight area.
- Choose an area clear of obstacles and large enough to safely accommodate your flying activity.
- Make sure this area is clear of friends and spectators prior to launching your aircraft.
- Be aware of other activities in the vicinity of your flight path that could cause potential conflict.
- Carefully plan your flight path prior to launch.
- Abide by any and all established AMA National Model Aircraft Safety Code.

Important Information Regarding Warranty

Please read our Warranty and Liability Limitations in the back of this manual 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.

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 the steps completed. Steps with a single box (☐) are performed once, while steps with two or more boxes (☐☐) indicate 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

Silver	HANU881
Cub Yellow	HANU884
Olive Drab	HANU904
Black	HANU874
Deep Red	HANU871

Recommended Power Setups

GAS

Evolution® 40GX	EVOE40GX
APC Propeller, 18 x 10	APC18010
Muffler, Inverted, Wraparound	EVO30983400
Fuel Tubing, 3-foot Tygon	DUB574
Chargeswitch	JRPA004
Fuel Filler with T-Fitting and Overflow	HAN116
1½-inch P-47 B-Style Hub	TRUTTH1500B
Adapter Kit, 10 x 1mm	TRU0100
10-32 x 3/4-inch bolt kit	TRUSCF10075
1800mAh 2S 7.4V ProLite Li-Po	THP18002SPLRX
4-Pin Balance Extension	THP4P10E

ELECTRIC

Power 160 Brushless Outrunner, 245Kv	EFLM4160A
Phoenix HV-110 High Voltage ESC	CSEPHX110HV
5S, 18.5V 5000mAh Li-Po Battery (2)	EFLB50005S30
12-inch (305mm) Servo Extension	SPMA3003
EC5™ Battery Series Harness, 10AWG	EFLAEC508
APC Propeller, 19 x 8	APC19080E
1½-inch P-47 B-Style Hub	TRUTTH1500B
10-32 x 3/4-inch bolt kit	TRUSCF10075
Hook and loop tape (2)	
Hook and loop strap (4)	

Optional Retracts

Retract Mechanism, Main, with Air Kit	HANP47
Retract Mechanism, Tail Wheel	ROB160LWC
1/16-inch Threaded Ball Link (2)	DUB190
Scale Straight Tread, 2-inch	DUB110
12-inch (305mm) Servo Extension	SPMA3003

Transmitter Requirements

This model requires a minimum 4-channel radio to operate all the functions of your aircraft. We suggest the following radio systems available through Horizon Hobby or your local hobby distributor.

Spektrum™ DX6i	SPM6610
Spektrum DX7s	SPM7800
Spektrum DX8	SPM8800
JR® DSM2™ or DSMX® Systems	

Radio Equipment Requirements

The following items are recommended when installing the 8-Channel AR8000 (SPMAR8000).

AR8000 8-Channel DSMX Receiver	SPMAR8000
DSMX Remote Receiver	SPM9645
JR Chargeswitch (ignition)	JRPA004
2700mAh Receiver Battery, 6V	JRPB5008
Standard Aircrtaft Servo	SPMSA6050
Digital Aircraft Servo, A6010 (4)	SPMSA6010
Digital Aircraft Servo, A6020 (3)	SPMSA6020
12-inch (305mm) Servo Extension (2)	SPMA3003
18-inch (457mm) Servo Extension (4)	SPMA3004
Heavy-Duty Arms with Screws (2)	JRPA215
JR Chargeswitch	JRPA004

Servo Placement and Extensions:

Aileron:	A6010 Standard Digital Servo (2) 12-inch (305mm) (2) inside wing from servo 18-inch (457mm) (2) inside fuselage from receiver to extensions
Flaps:	A6020 Digital Aircraft Servo (2) Heavy-duty servo horn (2) 18-inch (457mm) (2) inside fuselage from receiver to extensions
Rudder:	A6020 Digital Aircraft Servo Heavy-duty servo horn
Elevator:	A6010 Digital Aircraft Servo (2)
Throttle:	A6050 Standard aircraft servo (not required for EP installations)

Optional Pilot Bust for Included Cockpit Base Floor

1/5-Scale Pilot, Civilian with Headphones and Sunglasses (Green)	HAN9120
1/5-Scale Pilot, Civilian with Headphones and Sunglasses	HAN9127

* Optional pilot used for the full depth cockpit. We used an Elite force 1/6 scale pilot

Optional Equipment

Telemetry for the DX8	SPM9548
6V, 2700mAh Ni-MH Battery	JRPB5008
Y-harness (dual receiver battery)	SPMA3008
Chargeswitch (if using dual receiver batteries)	JRPA004

Field Equipment Required

Ultra Fuel Pump (gas and glow)	HAN155
Evolution Oil	EVOX1001Q

Optional Field Equipment

PowerPro™ 12V Starter	HAN161
Starter Source with 12V Ni-Cd	HAN164
130mA Charger: Starter Source	HAN166
Self-stick weights, 6 oz	HAN3626
Charger	EFL3025
Spray cleaner	
Paper towels	

Required Adhesives

☐ 30-minute Epoxy	PAAPT39
☐ Thin CA	PAAPT08
☐ Medium CA	PAAPT02
☐ Canopy Glue	PAAPT56
☐ Silicone adhesive	DEVS250
☐ Threadlock	PAAPT42

Hardware/Accessory Sizes

Main wheel diameter	$5^{1}/_{8}$ in (130mm)
Tail wheel diameter	$1^{3}/_{4}$ in (44mm)
Fuel tank size	22 oz (650cc)
Wing tube size	$1^{1}/_{4}$-inch x $29^{3}/_{8}$-inch
Wing bolt size	1/4-20 x 2-inch

Required Tools

- ☐ Card stock
- ☐ Covering iron
- ☐ Dental floss
- ☐ Dish washing detergent
- ☐ Drill bit: 1/16-inch (1.5mm), 5/64-inch (2mm), 1/8-inch (3mm), 7/32-inch (5.5mm), 1/4-inch (6mm)
- ☐ Epoxy brushes
- ☐ Felt-tipped pen
- ☐ Flat file
- ☐ Hex wrench: 1.5mm, 3/32-inch, 7/64-inch
- ☐ Hobby knife with #11 blade
- ☐ Hobby scissors
- ☐ Hook and loop tape
- ☐ Isopropyl alcohol
- ☐ Light machine oil
- ☐ Low-tack tape
- ☐ Medium grit sandpaper
- ☐ Mixing cups
- ☐ Mixing sticks
- ☐ Needle nose pliers
- ☐ Paper towels
- ☐ Pencil
- ☐ Petroleum jelly
- ☐ Phillips screwdriver: #1, #2
- ☐ Pin vise
- ☐ Propeller reamer
- ☐ Razor saw
- ☐ Rotary tool
- ☐ Ruler
- ☐ Sanding drum
- ☐ Scissors
- ☐ Side cutters
- ☐ Spray bottle
- ☐ Square
- ☐ Straight edge
- ☐ String
- ☐ Tie wraps
- ☐ Toothpicks
- ☐ T-pins
- ☐ Two-sided tape

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 (HAN100) and covering glove (HAN150) or covering iron (HAN101) with a sealing iron sock (HAN141) to remove them. Use caution while working around areas where the colors overlap to prevent separating the colors.

Binding the Radio System

Before starting the assembly of your model, we recommend preparing your radio system for installation. This includes charging the transmitter and receiver batteries, as well as centering the trims and sticks on your transmitter. If using a computer radio, make sure to reset a model memory and name it for this particular model. We also recommend binding the transmitter and receiver at this time, following the instructions provided with your radio system.

➔ *We highly recommend re-binding the radio system once all the control throws are set. This will keep the servos from moving to their endpoints until the transmitter and receiver connect.*

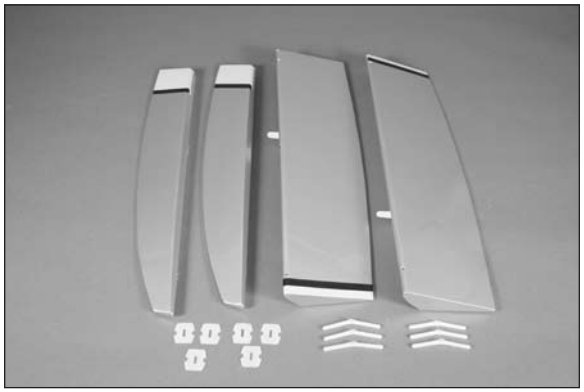
Aileron and Flap Installation

Required Parts

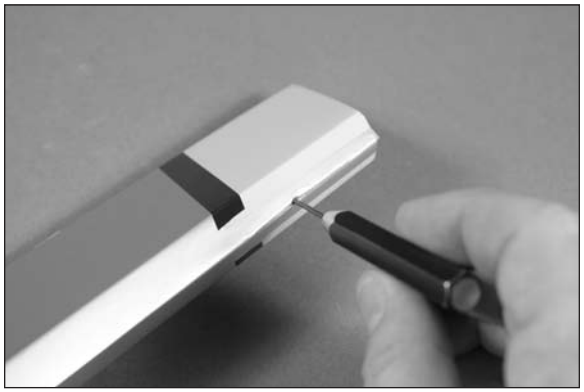
Wing panel (left and right)
Aileron (left and right) Flap (left and right)
CA hinge (6) Pinned hinge (6)

➔ *Make sure to follow the procedure outlined in this manual for hinging the control surfaces. Failure to do so could lead to the control surfaces becoming loose, which may cause a crash.*

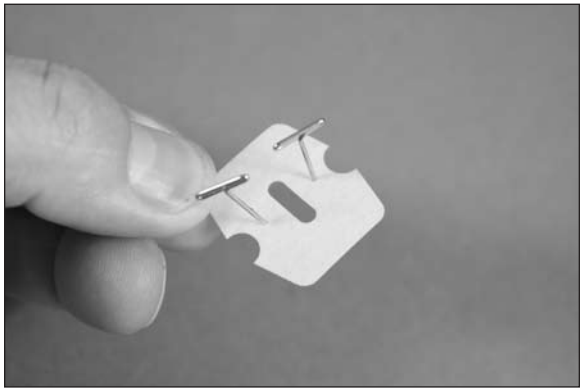
☐ 1. Locate the items for this section of the manual.



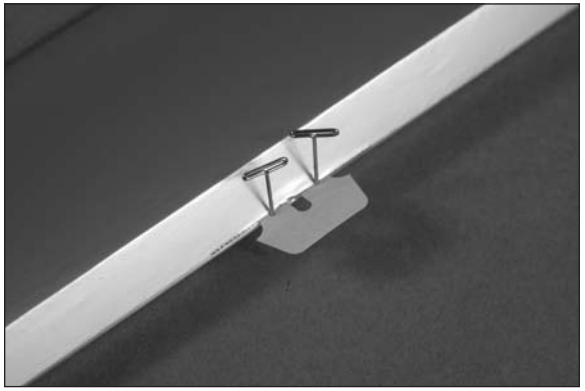
☐☐ 2. Use a pin vise and 1/16-inch (1.5mm) drill bit to drill a hole in the center of the hinges slots. Prepare both the aileron and wing at this time.



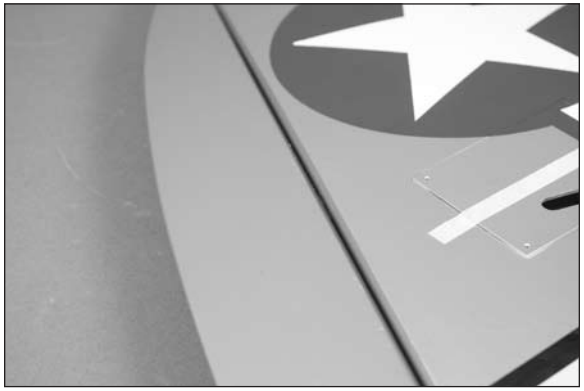
☐☐ 3. Place two T-pins in each of the three CA hinges as shown. This will center the hinge evenly between the wing and aileron when the hinges are installed.



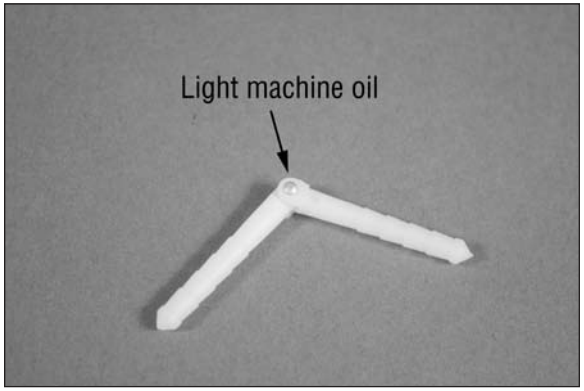
☐☐ 4. Insert the hinge in the aileron hinge slots. Center the opening in the center of the hinge with the hole drilled in step 2. The T-pins will rest on the leading edge of the aileron when the hinge is installed. Install all three hinges at this time.



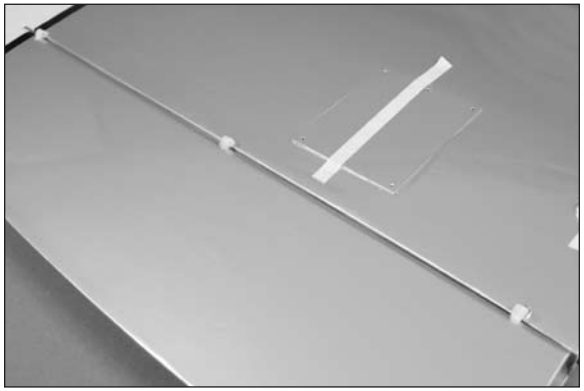
☐☐ 5. Slide the aileron into position, guiding the hinges into the slots in the wing. With the aileron pressed tight against the wing, remove the T-pins. Use a few small pieces of low-tack tape to hold the aileron in position. Do not glue the hinges until instructed to do so.



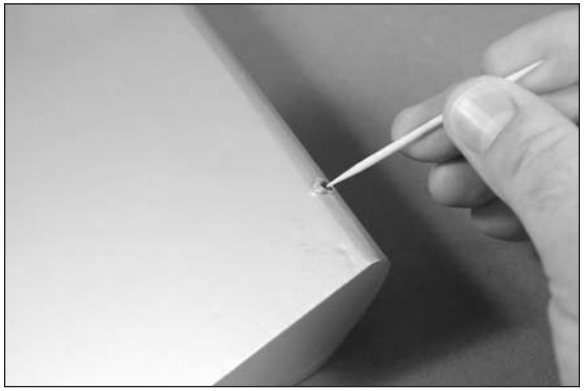
☐☐ 6. Prepare the three pinned hinges by applying light machine oil to the hinge point. This will help prevent the adhesive from entering the hinge and causing it to not move.



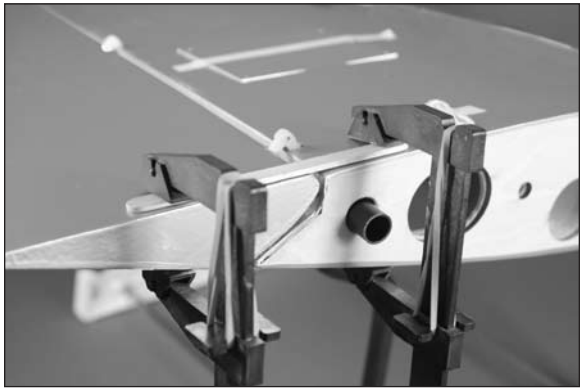
☐☐ 7. Insert the three hinges into the holes in the flap. Test fit the flap to the wing. Position the hinges so the flap is aligned with the wing and can move freely without binding.



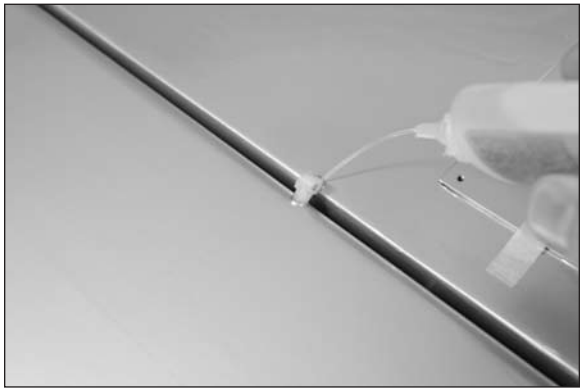
☐☐ 8. Once satisfied with the fit, note the position of the hinges. Remove the flap and hinges. Mix a small amount of 30-minute epoxy and glue each hinge into position in the flap and wing. Use a toothpick to apply epoxy in both the holes for the hinges and to the hinges themselves.



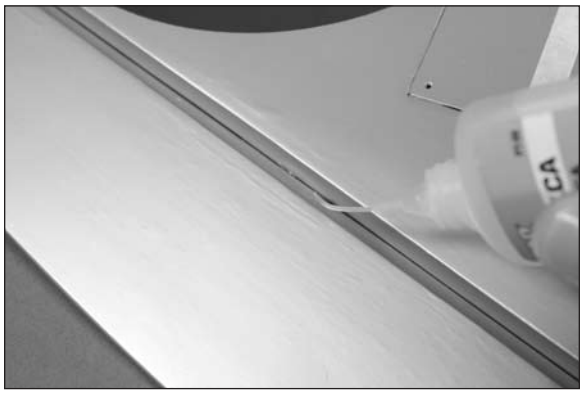
☐☐ 9. Place the flap and hinges back into position and use low-tack tape and a small piece of plywood clamped to the wing to keep the flap in position until the epoxy fully cures. Use a paper towel and isopropyl alcohol to remove any excess epoxy.



☐☐ 10. Once the epoxy has cured, remove the tape and clamps. If any of the flap hinges (only the flap hinges) appear to be loose, apply thin CA to the hinge where it enters the flap and wing to complete the flap hinging process.

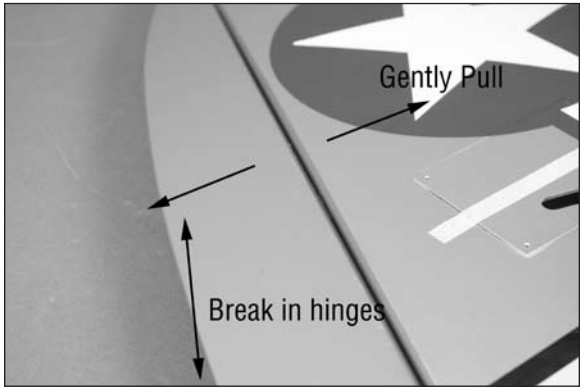


☐☐ 11. Position the aileron so the gap between the wing tip and aileron matches the gap between the aileron and flap. With the aileron pressed tightly against the wing, saturate the top and bottom of each hinge with thin CA so the CA wicks into the hinge and into the surrounding wood.



➔ *Do not use CA accelerator when gluing the hinges. Always allow the CA to soak into the hinge for the best bond between the hinge and surrounding wood.*

☐☐ 12. Once the CA has fully cured, check that the hinges are secure by gently pulling on the control surface. If not, apply thin CA to any loose hinges and recheck. Move the control surface through its range of motion several times to break in the hinges. This will reduce the initial load on the servo during your first flights.



☐ 13. Repeat steps 2 through 12 to install the remaining aileron and flap to the wing panel.

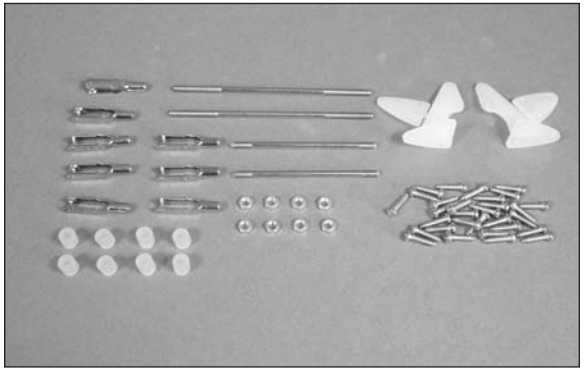
Aileron and Flap Servo Linkage Installation

Required Parts

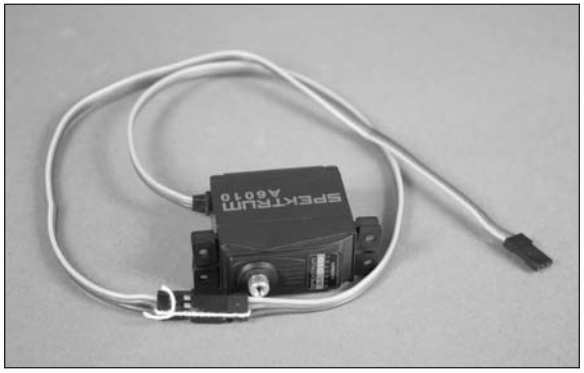
Metal clevis (8)	4-40 nut (8)
Transmitter	Receiver
Nylon control horn (2)	Silicone clevis retainer (8)
Wing panel (left and right)	Flap servo with hardware (2)
Receiver battery	Switch harness

12-inch (305mm) servo extension (2)
Heavy-duty servo arm (JRPA215) (2)
Aileron servo with hardware (2)
M2.5 x 10 sheet metal screw (30)
Flap pushrod: 4-40 x 55mm, threaded both ends (2)
Aileron pushrod: 4-40 x 76mm threaded both ends (2)

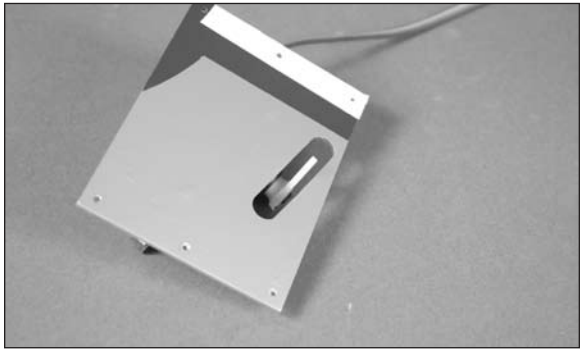
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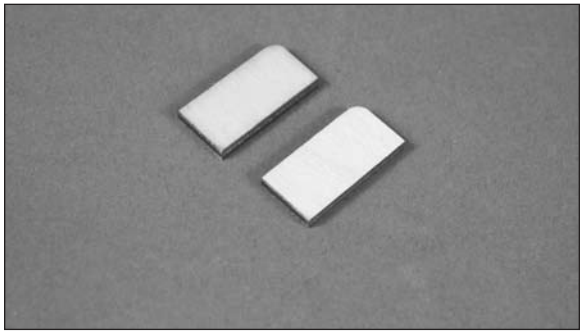


☐☐ 2. Prepare the servo by installing the grommets and brass eyelets. Attach a 12-inch (305mm) servo extension, securing it to the servo lead using string or dental floss.

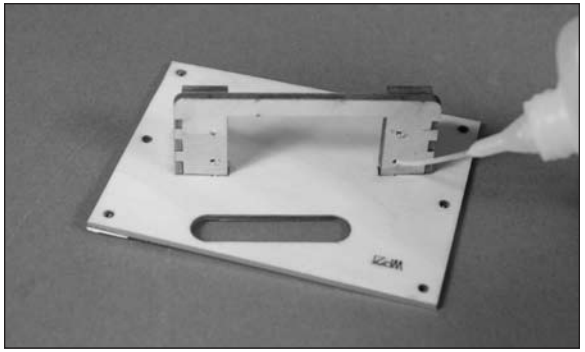


➔ *Check that the servo horn will be centered in the slot when the servo is installed, as some servos have a short upper case. If the servo arm does not center, then you will need to use medium CA to glue the included servo spacer to the mount to move the servo so the arm is centered.*

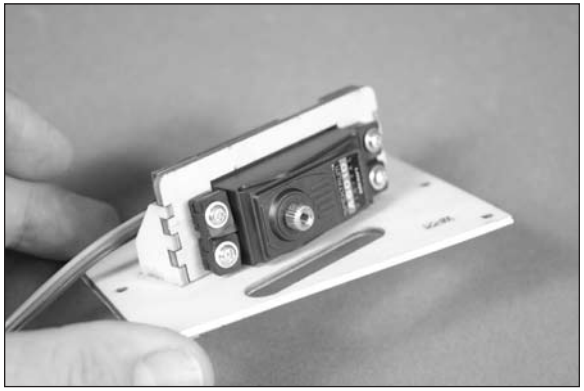




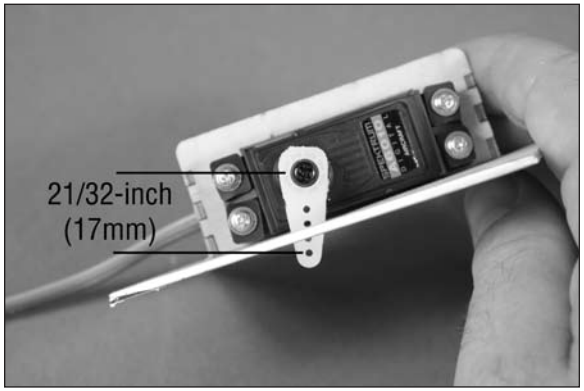
☐☐ 3. Use a pin vise and a 1/16-inch (1.5mm) drill bit to enlarge the holes in the aileron servo cover for mounting the servo. Thread a servo mounting screw in each hole using a #1 Phillips screwdriver. Remove the screw, then apply 1–2 drops of thin CA in each hole to harden the surrounding wood.



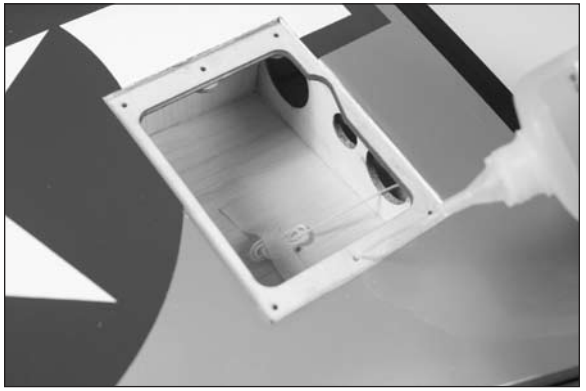
☐☐ 4. Mount the aileron servo to the servo cover using the screws provided with the servo and a #1 Phillips screwdriver.



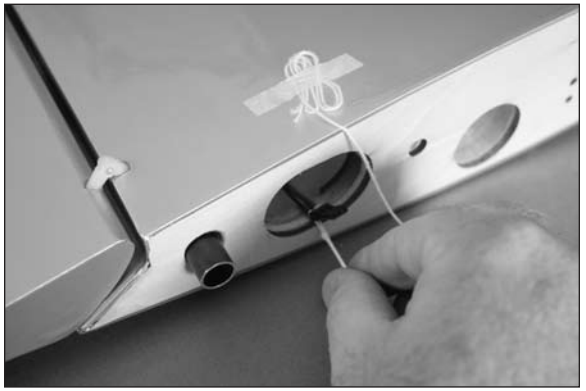
☐☐ 5. Use the radio system to center the aileron servo. Install a servo horn that will allow you to attach the clevis to a hole in the horn that is 21/32 inch (17mm) from the center of the horn. When installing the horn, rotate it one spline towards the leading edge of the wing. This will help improve the aileron pushrod clearance and will also aid in achieving the aileron differential throw listed in the control throw section of the manual. Use side cutters to remove any arms from the horn that could interfere with the operation of the servo.

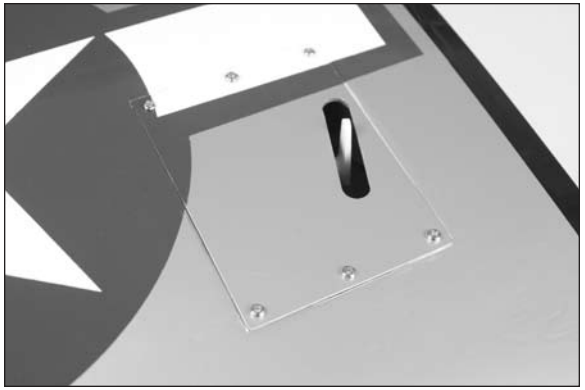


☐☐ 6. Prepare the six holes for the cover mounting screws by threading an M2.5 x 12 sheet metal screw in each hole using a #1 Phillips screwdriver. Remove the screw, then place 1–2 drops of thin CA in each hole to harden the surrounding wood.

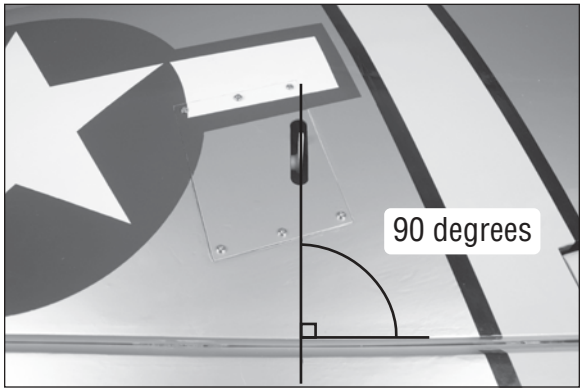


☐☐ 7. Tie the string to the servo extension and use it to pull the extension through the wing. Secure the servo cover in the wing using six M2.5 x 12 sheet metal screws and a #1 Phillips screwdriver.

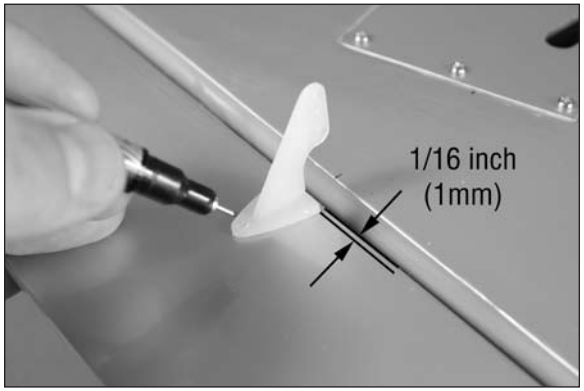




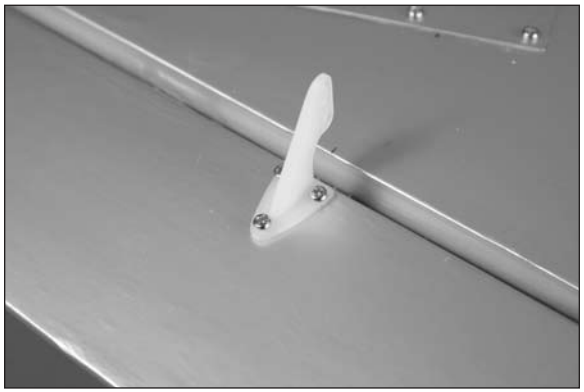
☐☐ 8. When installing the aileron control horn, it must be positioned in-line with the servo horn so the linkage will be square to the aileron hinge line. Use a square and felt-tipped pen to mark the aileron for the proper position for the control horn.



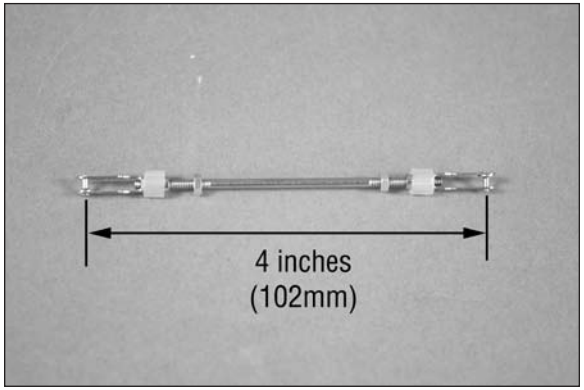
☐☐ 9. Use a hobby knife with a #11 blade to remove the backplate from the control horn. Position the horn on the aileron so it is centered on the mark made in step 8. The front of the horn will be back 1/16 inch (1mm) from the bevel of the aileron. Use a felt-tipped pen to mark the locations for the three control horn mounting screws.



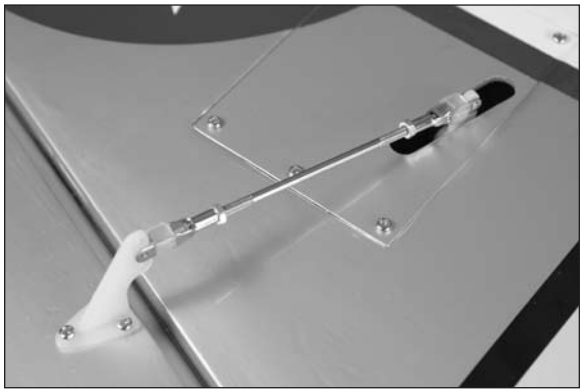
☐☐ 10. Use a drill and a 1/16-inch (1.5mm) drill bit to drill the three holes for the control horn mounting screws. The holes only need to be 3/8 inch (10mm) deep for the screws. Do not drill through the top of the aileron. Use a #1 Phillips screwdriver to thread an M2.5 x 12 sheet metal screw in each hole. Remove the screw and place 1–2 drops of thin CA in each hole to harden the surrounding wood. Attach the control horn using three M2.5 x 12 sheet metal screws and a #1 Phillips screwdriver.



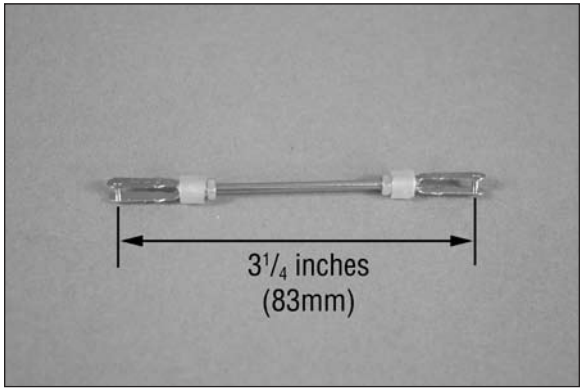
☐☐ 11. Assemble the aileron linkage as shown using a 4-40 x 76mm pushrod, two metal clevises, two 4-40 nuts and two silicone clevis retainers. Adjust the clevises so the pins of the clevises are 4 inches (102mm) apart.



☐☐ 12. Attach the aileron linkage to the servo horn and the center hole of the control horn. With the radio system on and the aileron servo plugged into the receiver, adjust the clevis so the aileron is aligned with the trailing edge at the wing tip. With the threaded rod position evenly in the clevises, use needle nose pliers to tighten the nuts against the clevises and use threadlock on the nuts and clevises to prevent them from vibrating loose. Slide the silicone retainers over the clevises to prevent them from opening during flight.



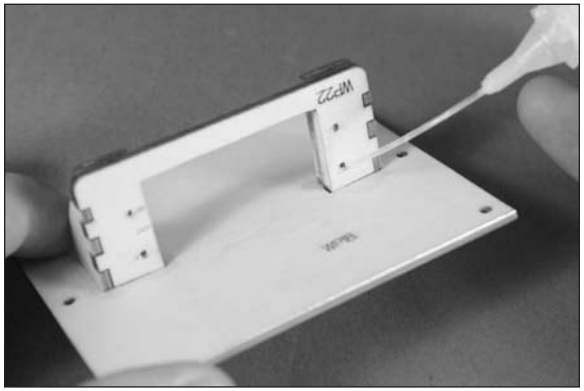
☐☐ 13. Assemble the flap linkage as shown using a 4-40 x 55mm pushrod, two metal clevises, two 4-40 nuts and two silicone clevis retainers. Adjust the clevises so the pins of the clevises are $3^1/_4$ inches (83mm) apart. Leave the nuts and clevises loose so the linkage can be adjusted.



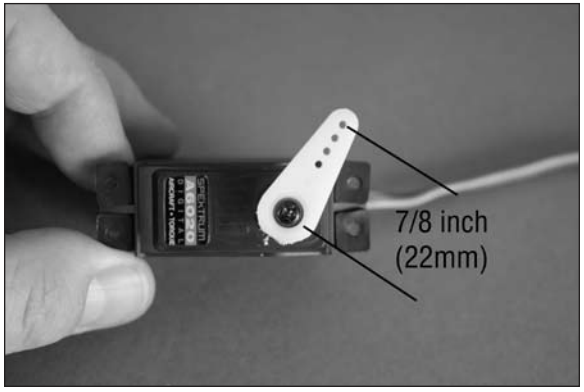
☐☐ 14. Insert the linkage into the opening in the trailing edge near the flap control horn. Attach one of the clevises to the flap control horn. Slide the silicone clevis retainer over the forks of the clevis to keep it from opening accidentally.



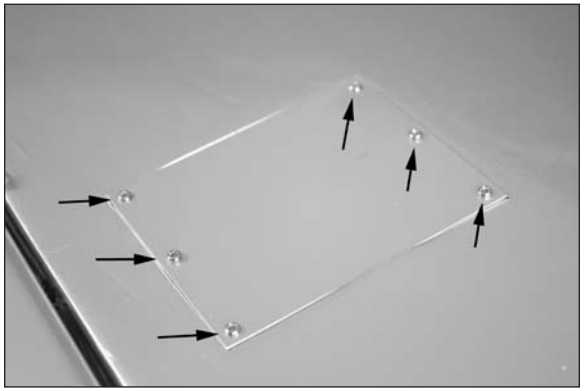
☐☐ 15. Use a pin vise and a 1/16-inch (1.5mm) drill bit to enlarge the holes in the flap servo cover for mounting the servo. Thread a servo mounting screw in each hole using a #1 Phillips screwdriver. Remove the screw, then apply 1–2 drops of thin CA in each hole to harden the surrounding wood.



☐☐ 16. With the radio flap switch and flap servo in the UP position, attach the heavy-duty servo arm that will allow you to attach the clevis to a hole in the horn that is 7/8 inch (22mm) from the center of the horn. When installing the horn, rotate it one spline forward from center toward the leading edge. Use side cutters to remove any arms from the horn that could interfere with the operation of the servo. Mount the servo using the hardware provided with the servo so the output of the servo faces toward the leading edge of the wing.



☐☐ 17. Attach the clevis to the servo horn. Position the servo in the opening. If the servo does not fit because the linkage length is incorrect, adjust the linkage. Do not force the servo into position. With the servo in the wing, check that the flap is in the UP position. Adjust the linkage or travel rate as necessary for UP flap. Once the linkage is set, apply threadlock to the nuts and clevises. Tighten the nuts against the clevises using pliers to keep the clevises from vibrating loose. Follow step six to prepare the holes in the wing for the flap cover screws. The flap cover is then secured to the wing using six M2.5 x 10 sheet metal screws and a #1 Phillips screwdriver.



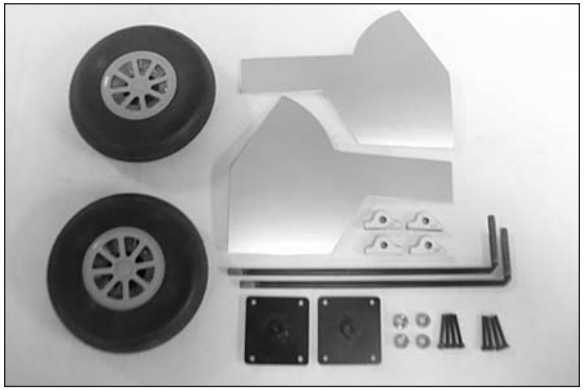
☐ 18. Repeat steps 2 through 17 to install the remaining flap servo and linkage.

Fixed Main Gear Installation

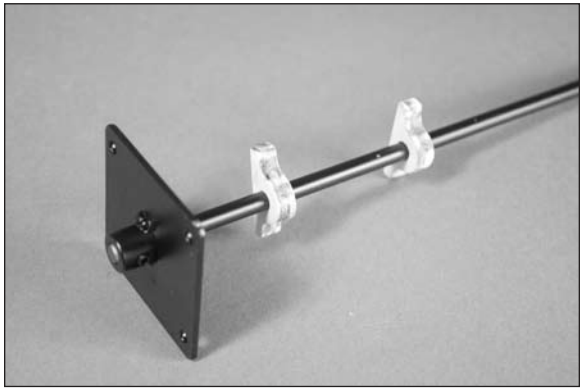
Required Parts

Wing panel (left and right)
6mm wire strut (2) Metal mount (2)
M4 x 4 setscrew (2) 6mm plywood bracket (4)
$5^1/_8$-inch (130mm) main wheel (2)
6mm wheel collar with setscrew (4)
6-32 x 1-inch socket head cap screw (8)
Landing gear cover, outer (left and right)

☐ 1. Locate the items for this section of the manual.

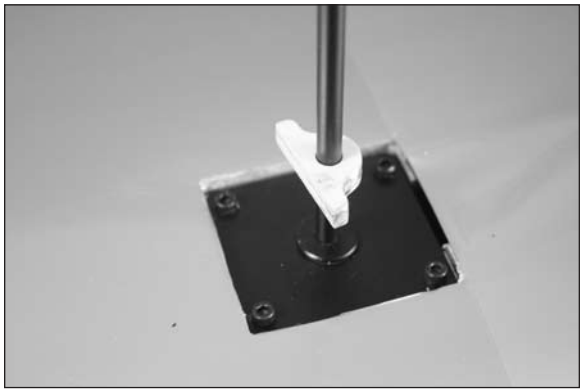


☐☐ 2. Slide two of the 6mm plywood brackets on a 6mm wire strut. Use an M4 x 4 setscrew to secure the wire strut in the metal mount. Use threadlock on the setscrew to prevent it from vibrating loose. The setscrew will tighten on the flat area on the strut using the included hex wrench. You will be building a left and right unit.

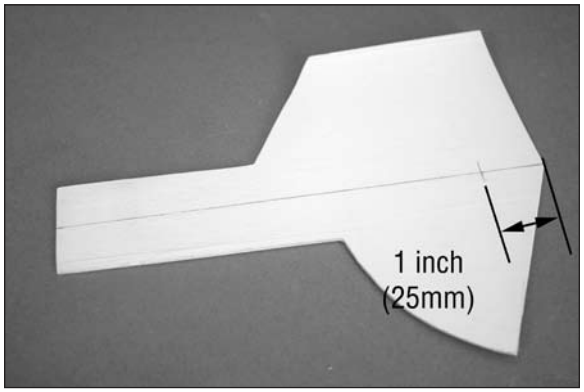


➔ *Paint the 6mm plywood brackets using black or silver paint to make them blend in the with struts of gear doors.*

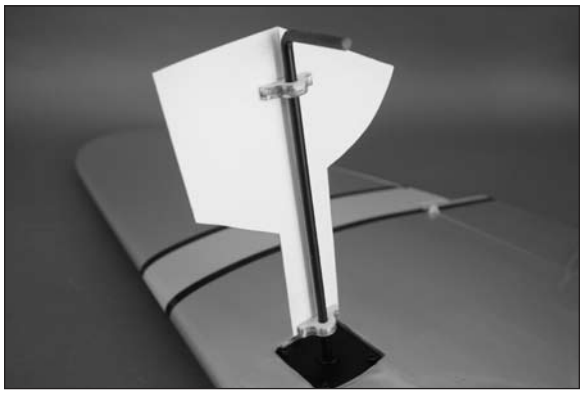
☐☐ 3. Secure the metal mount in the wing using four 6-32 x 1-inch socket head screws and a 7/64-inch hex wrench. Make sure to use threadlock on the screws to prevent them from vibrating loose. The axle will face toward the root of the wing when installed as shown in step 5.



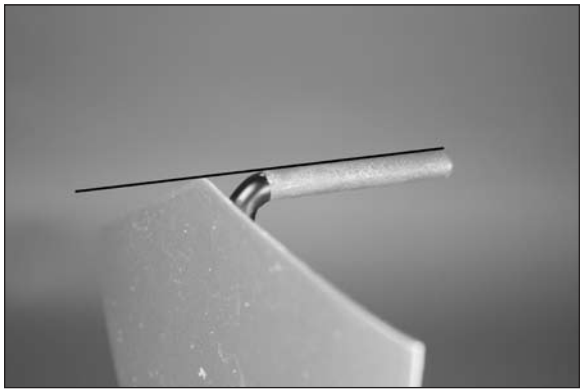
☐☐ 4. Use a pencil to draw a centerline on the back of the gear door. Mark the door 1 inch (25mm) from the bottom for the location of the lower plywood bracket.

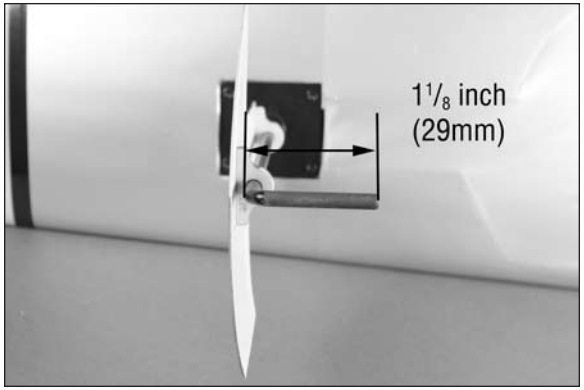


☐☐ 5. The landing gear door is glued to the plywood brackets using medium CA. Glue the upper bracket flush to the edge of the door and the lower bracket at the mark made in the previous step. Use the centerline to position the door with the landing gear wire.

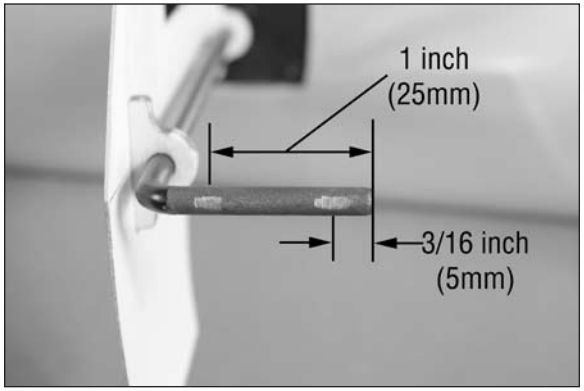


☐☐ 6. Position the door so the bottom edge is aligned with the axle. Also check that the door is perpendicular to the axle. Use silicone adhesive to secure the plywood brackets to the strut so the brackets can't rotate on the strut. Use a rotary tool and cut-off wheel to trim the axle to a length of $1^1/_8$ inch (29mm).

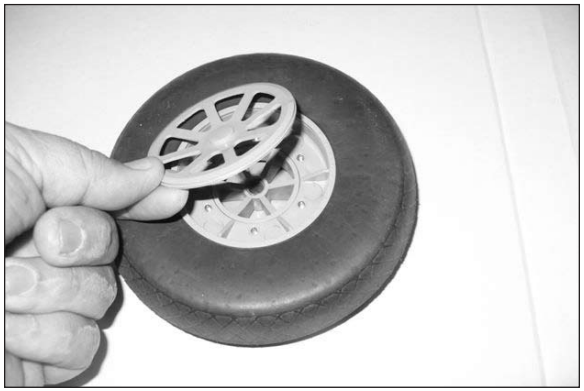




☐☐ 7. Use a flat file to make two flat areas on the bottom of the axle that are 1/4-inch (6mm) wide. The first is centered 3/16 inch (5mm) from the end of the axle, the second is 1 inch (25mm) from the end of the axle.



☐☐ 8. Remove the hub cap from the wheel.



➔ *Place a drop of light machine oil on the axle before installing the wheel so they will rotate freely on the axles.*

☐☐ 9. Slide the inner wheel collar on the axle. Use a 1.5mm hex wrench to tighten the setscrew. Use threadlock on the setscrew to prevent it from vibrating loose. Slide the wheel on the axle.



☐☐ 10. Secure the wheel using another wheel collar that will be flush to the outside edge of the axle. Tighten the setscrews using a 1.5mm hex wrench. Make sure to use threadlock on the setscrews to prevent them from vibrating loose. Install the hub cap back on the wheel once the setscrews are tightened.



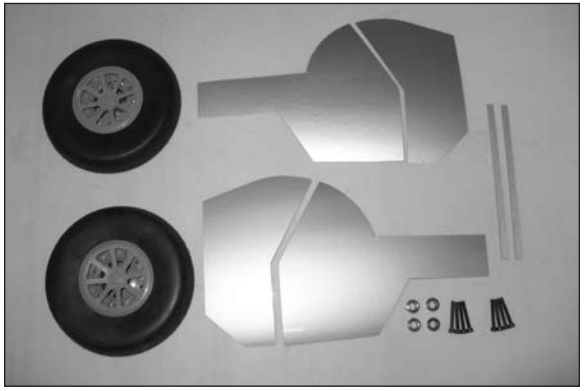
☐ 11. Repeat steps 2 through 10 to install the remaining landing gear and wheel.

Optional Retractable Main Gear Installation

Required Parts

Wing panel (left and right)
Retract mechanism (left and right)
$5^1/_8$-inch (130mm) main wheel (2)
6-32 x 1-inch socket head cap screw (8)
Air line, red and purple
Quick disconnect (2)
4-40 x 1/4-inch socket head screw (4)
#4 washer (4)
Outer landing gear cover stiffener (2)
Landing gear cover, outer (left and right)
Landing gear cover, inner (left and right)

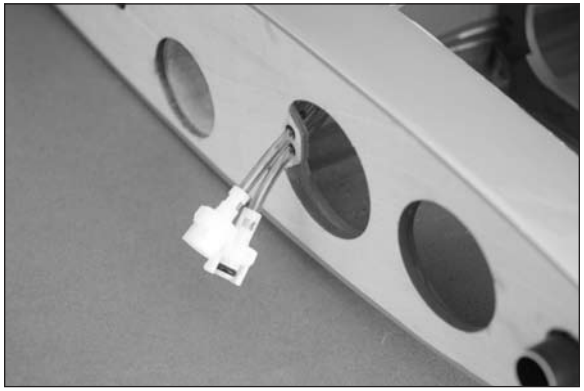
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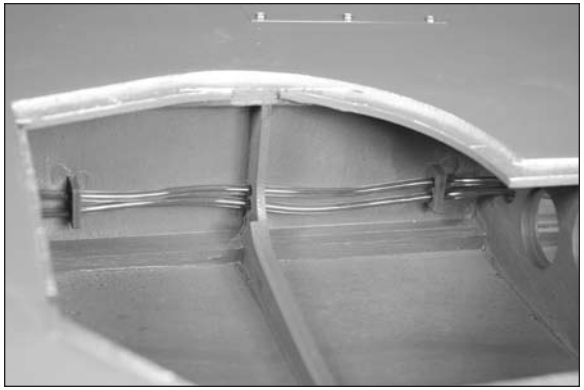


☐☐ 2. Use a hobby knife and #11 blade to remove the covering from the retract opening. Use a trim seal tool to iron the covering around the edge of the opening.

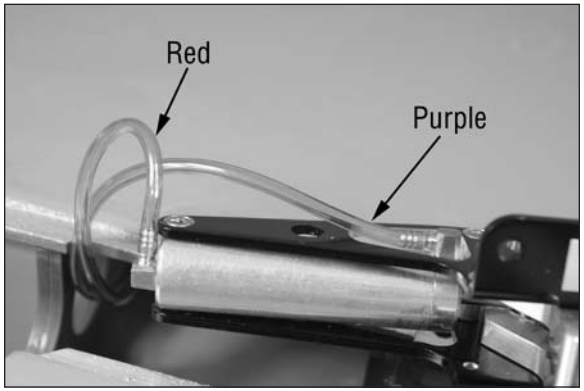


☐☐ 3. Cut a piece of red and purple air line to a length of 15 inches (381mm). Place a quick disconnect on each line. Make sure to use one connector with the O-ring and one without to avoid connecting the lines incorrectly. Guide the air lines through the openings in the wing from the root to the retract mount. Fittings have been installed to route the air line so it doesn't interfere when the retracts are in the UP position.



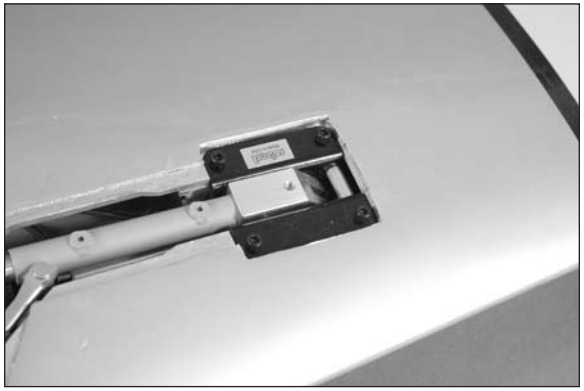


☐☐ 4. Attach the air lines to the retract. Note the orientation of the lines and how they are connected.



➔ *Before securing the main gear, we recommend running a 6/32 x 1-inch socket head screw with a 7/64-inch hex wrench through each of the blind nuts to remove any paint that may have entered the blind nut during the assembly of your model.*

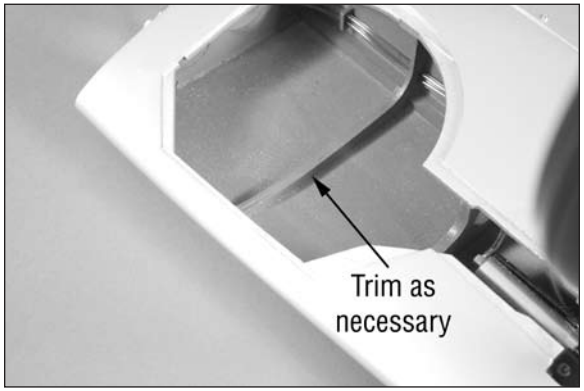
☐☐ 5. Secure the retract mechanism in the wing using four 6-32 x 1-inch socket head cap screws and a 7/64-inch hex wrench. The scissor link will face toward the leading edge of the wing. Make sure to use threadlock on the screws to prevent them from vibrating loose.



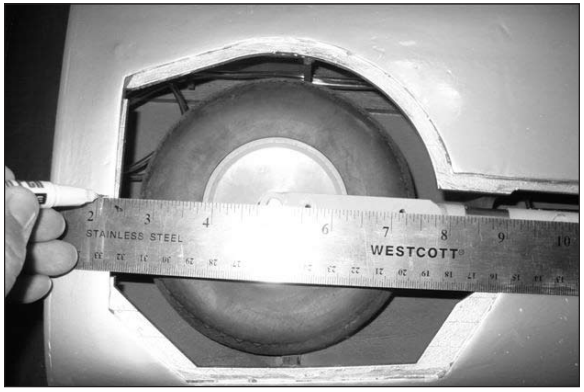
☐☐ 6. Enlarge the hole in the wheel using a drill and 1/4-inch (6mm) drill bit. Secure the wheel to the retract mechanism using the axle and setscrew provided with the retract. Use a rotary tool and cutoff wheel to trim the axle so it is flush with the retract strut. Use a flat file to make a flat area for the setscrew to tighten to so the axle won't come loose. Also use threadlock on the setscrew before tightening it with a 3/32-inch hex wrench.

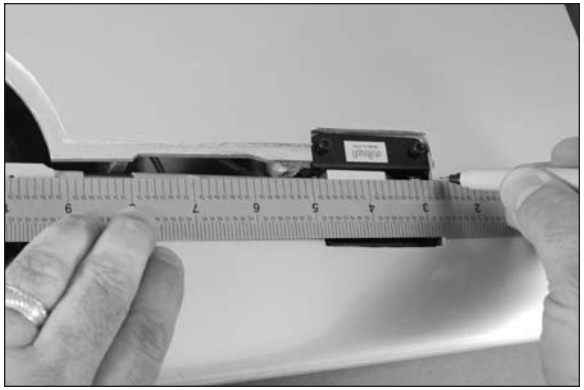


☐☐ 7. Check the operation of the retract. You will find the wing rib requires slight trimming toward the leading edge to clear the wheel and allow the retract to lock in the UP position. This is necessary as the assembly of the wing can not be accomplished if the rib is trimmed to fit the wheel during production.

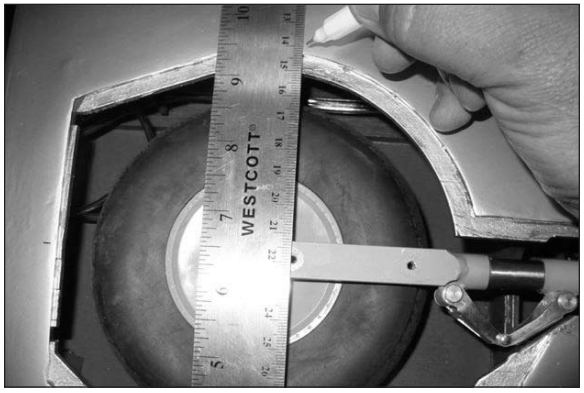


☐☐ 8. Move the retract to the UP position. Make sure the gear is fully retracted and locked into position. Failure to lock the wheel could cause a misalignment of the door in the following steps. Use a straight edge and align it with the holes in the strut for mounting the landing gear cover. Use a felt-tipped pen to mark the wing at the opening and mounting area as alignment points for the cover mounting screws.

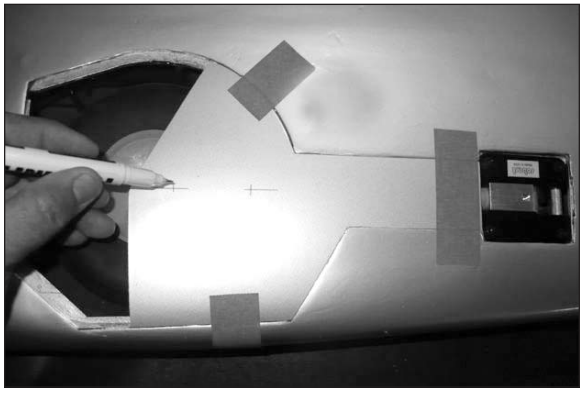




☐☐ 9. Use the same process to make marks at the front and rear of the opening to locate the mounting screw locations.



☐☐ 10. Use low-tack tape to hold the landing gear cover in position. Use a felt-tipped pen to mark the locations for the mounting screws using the lines made on the wing.



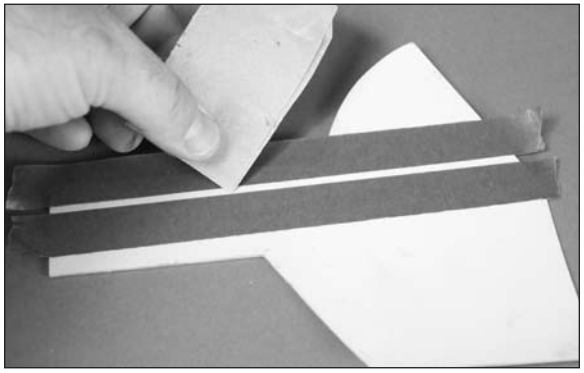
☐☐ 11. Use a 1/8-inch (3mm) drill bit and a pin vise to drill the two holes for the mounting screws. Temporarily secure the cover to the retract using two 4-40 x 1/4-inch socket head screws and two #4 washers. The holes can be enlarged slightly to position the cover so it aligns correctly in the opening.



☐☐ 12. With the retract in the DOWN position, place the stiffener so it almost touches the landing gear strut. This is necessary so it will clear the surrounding structure. Use a felt-tipped pen to mark the location of the stiffener on the gear door.



☐☐ 13. Remove the gear door. Place two pieces of low-tack tape where the stiffener will be positioned. Use sandpaper to roughen the area to provide a surface to glue the stiffener to the gear door. The tape will prevent removing the paint from the surrounding area. Once prepared, use medium CA to glue the stiffener to the gear door.



➔ *The inner gear door can be made operational. Please refer to the tutorial on-line for details on the operational installation of the inner gear door.*

☐☐ 14. Reinstall the gear door. Make sure to use threadlock on the screws to prevent them from vibrating loose. Check the operation of the retracts to make sure the position of the doors is correct. Enlarge the holes that secure the door to the strut if necessary to fine-tune their alignment to the wing. Trim the inner gear door covers to clear the wheel when the gear is retracted. Once trimmed, use canopy glue to glue the inner covers into position. This will make the inner gear door covers easily removable if you want to install removable gear doors in the future.



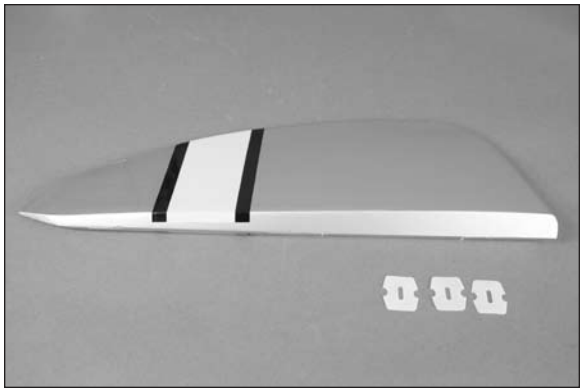
☐ 15. Repeat steps 2 though 14 to install the remaining retract assembly.

Rudder Installation

Required Parts

Fuselage Rudder
CA hinge (3)

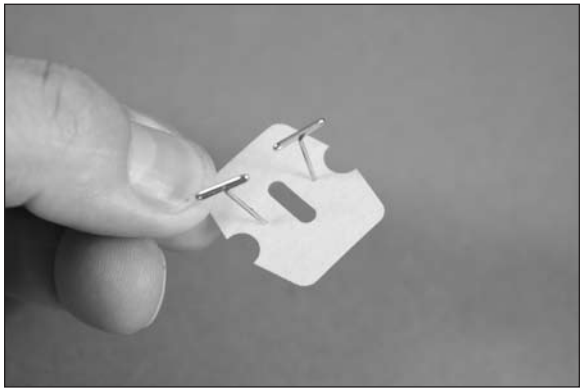
☐ 1. Locate the items for this section of the manual.



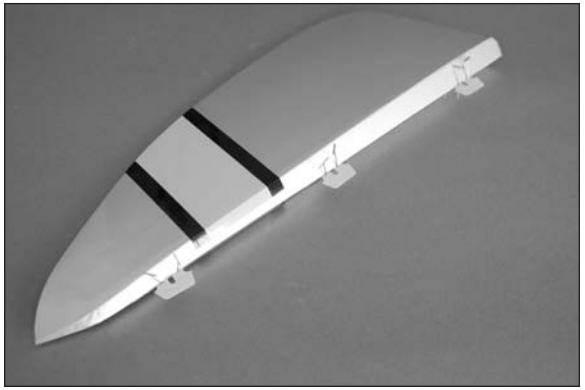
☐ 2. Use a pin vise and 1/16-inch (1.5mm) drill bit to drill a hole in the center of the three hinges slots. Prepare both the rudder and fin at this time.



☐ 3. Place two T-pins in each of the three CA hinges as shown. This will center the hinge evenly between the rudder and fin when the hinges are installed.



☐ 4. Insert the hinge in the rudder hinge slots. Center the opening in the hinge with the hole drilled in step 2. The T-pins will rest on the leading edge of the rudder when the hinge is installed. Install all three hinges at this time.



☐ 5. Slide the rudder into position, guiding the hinges into the slots in the fin. With the rudder pressed tight against the fin, remove the T-pins.

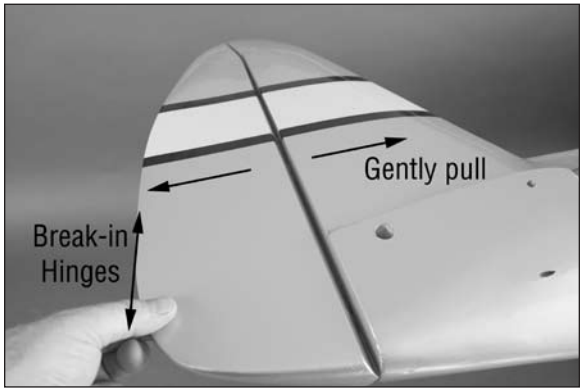


☐ 6. Position the rudder so it is aligned with the bottom of the fuselage. Saturate both sides of the hinges with thin CA so the CA wicks into the hinge and into the surrounding wood.



➔ *Do not use CA accelerator when gluing the hinges. Always allow the CA to soak into the hinge for the best bond between the hinge and surrounding wood.*

☐ 7. Once the CA has fully cured, check that the hinges are secure by gently pulling on the control surface. If not, apply thin CA to any hinges that are not glued and recheck. Move the control surface through its range of motion several times to break in the hinges. This will reduce the initial load on the servo during your first flights.



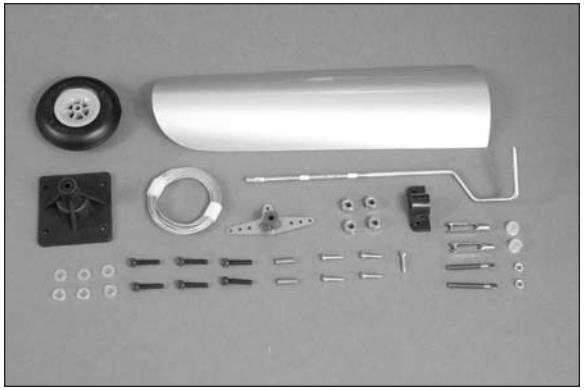
Fixed Tail Wheel Installation

Required Parts

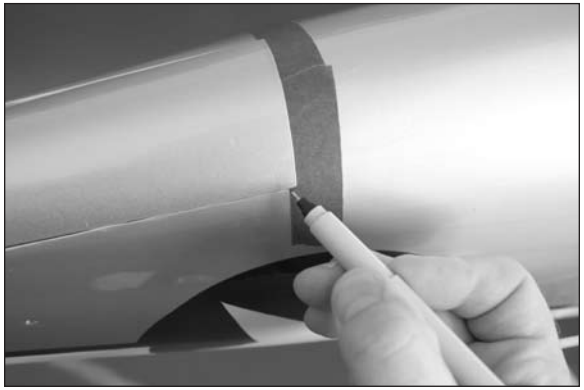
Fuselage	Tail wheel wire, 3mm
Tail wheel, 1.75 inch	Metal steering arm
#4 flat washer (6)	Braided cable
4-40 nut (2)	4-40 metal clevis (2)
4-40 threaded eyelet (2)	Silicone clevis retainer (2)
Tail wheel plastic hatch	Copper tubing crimp (4)

Nylon tail wheel support mount
M2.5 x 12 sheet metal screw (5)
M3 wheel collar with setscrew (4)
Nylon tail wheel support bracket
4-40 x 1/2-inch socket head screw (6)

☐ 1. Locate the items for this section of the manual.



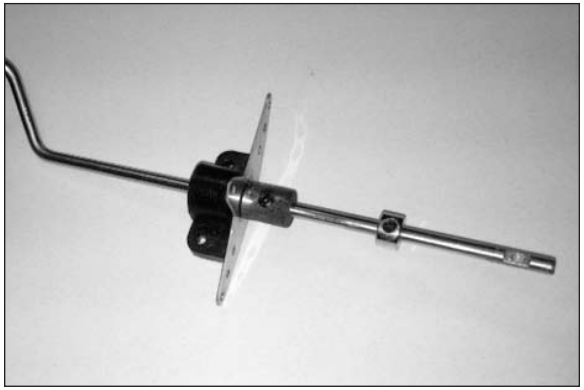
☐ 2. Position the tail wheel hatch over the opening for the tail wheel. We used low-tack tape to indicate the front edge of the opening. Use a felt-tipped pen to mark the cover so it can be trimmed to the correct length.



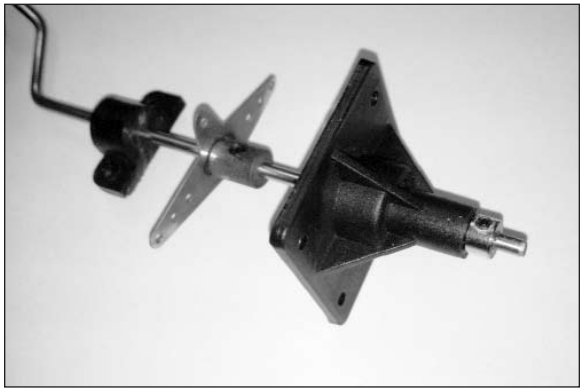
☐ 3. Use hobby scissors, a rotary tool with a sanding drum and medium grit sandpaper to trim the cover to the correct length. Work slowly, fitting the cover to make sure it is not trimmed too much.



☐ 4. Slide the nylon tail wheel support bracket on the tail wheel wire. The rounded corners will face toward the tail wheel. Slide the steering arm and wheel collar on the wire, and secure then to the flat areas of the wire using a setscrew and 1.5mm hex wrench. Use threadlock on the setscrews to prevent them from vibrating loose. Note the orientation of the steering arm in relationship to the wire.



☐ 5. Slide the nylon tail wheel support mount on the wire. The mount is then secured using a wheel collar and setscrew. Make sure the wire can move freely in the mount and that the collars don't allow the wire to move excessively in the mount.



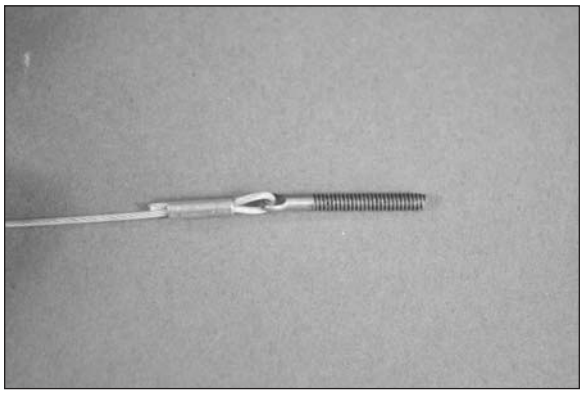
☐ 6. Remove the canopy hatch from the fuselage by pressing the release using a #1 Phillips screwdriver. The canopy will lift at the rear and has tabs at the front. Set the hatch aside until later.



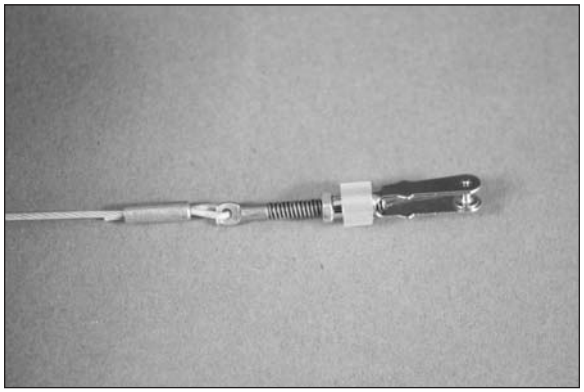
☐ 7. Insert the cable into the two tubes as shown. Pull the cable so equal parts extend outside the fuselage. The tubes are numbered, so insert the cable into tubes 5 and 6.



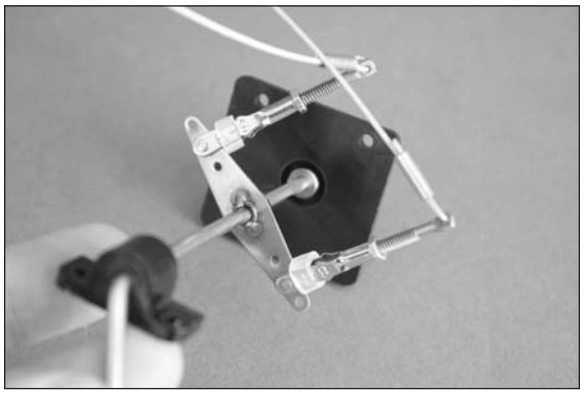
☐ 8. Prepare the cable ends in the tail wheel opening by passing the cable through a copper crimp, then through the hole in the 4-40 threaded eyelet. The cable then goes back through the crimp. Use crimping pliers to compress the crimp, securing the wire. Prepare one end of both wires at this time.



☐ 9. Thread a 4-40 nut on the eyelet. Slide a silicone clevis retainer on the 4-40 clevis, then thread the clevis on the eyelet so the threads are just visible between the forks of the clevis. Tighten the nut against the clevis using pliers to prevent the clevis from vibrating loose. Use threadlock on the clevis and nut as well.

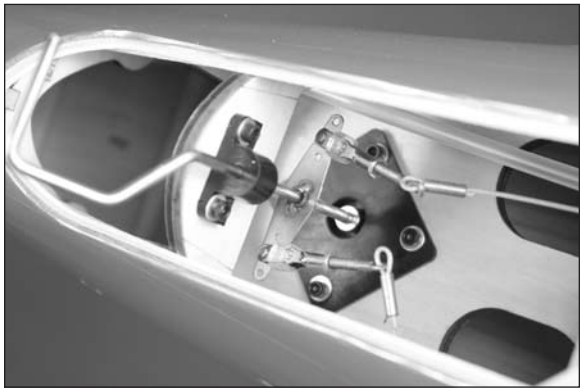


☐ 10. Attach the clevises to the middle holes on the steering arm, then slide the clevis retainers over the forks of the clevis to make sure they don't open accidentally. Check that the cables will not cross in the rear of the fuselage when the tail wheel is installed.



➔ *After initial test flights, you can move the clevis in or out to obtain the desired amount of tail wheel throw. Moving the clevis in will increase the amount of throw, while moving the clevis out will decrease the amount of throw.*

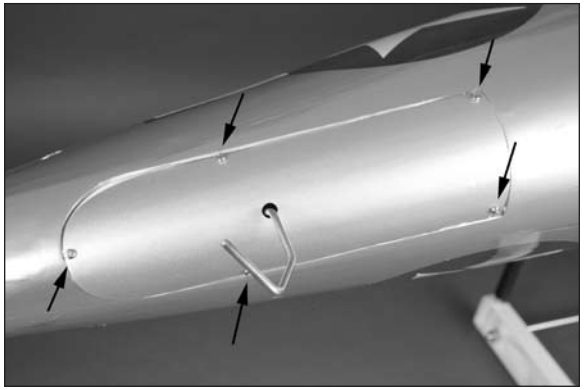
☐ 11. Mount the tail wheel assembly in the fuselage using four 4-40 x 1/2-inch socket head screws and four #4 washers to attach the mount to the fuselage. The mount only fits in one direction, so rotate it until all four holes are aligned. The bracket is attached using two 4-40 socket head screws and two #4 washers. Use threadlock and a 3/32-inch hex wrench to tighten the screws.



☐ 12. Measure from the front edge and the sides of the opening in the fuselage to locate the tail wire. Transfer the measurement to the cover, then use a pin vise and 1/8-inch (3mm) drill bit to drill a hole in the cover. Fit the cover and enlarge the hole using a hobby knife and #11 blade as necessary so the tail wheel wire is centered in the hole when the cover is in position.



☐ 13. The cover is secured to the fuselage using five M2.5 x 12 sheet metal screws. Use a pin vise and 1/16-inch (1.5mm) drill bit to drill the holes. Use a felt-tipped pen to mark the position of the former on the fuselage so the screws can be located when they thread into the former. Use a #1 Phillips screwdriver to install the screws.



☐ 14. Attach the tail wheel to the tail wheel wire using two wheel collars on either side of the tail wheel. Make sure to file a flat on the axle for the wheel collars as described in step 6 of the fixed gear installation. Tighten the setscrews using a 1.5mm hex wrench after applying threadlock to the setscrews.



Retractable Tail Wheel Installation

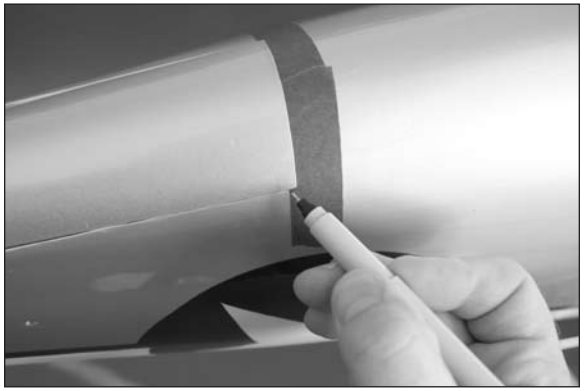
Required Parts

Fuselage	#4 flat washer (4)
Braided cable	Tail wheel plastic hatch
Copper tubing crimps (2)	Ball link, 1/16-inch (2)
M2.5 x 12 sheet metal screw (5)	
Scale tail wheel, 2-inch (52mm) with adapters	
Retract assembly, tail wheel	
Air line, red and purple	

☐ 1. Locate the items for this section of the manual.



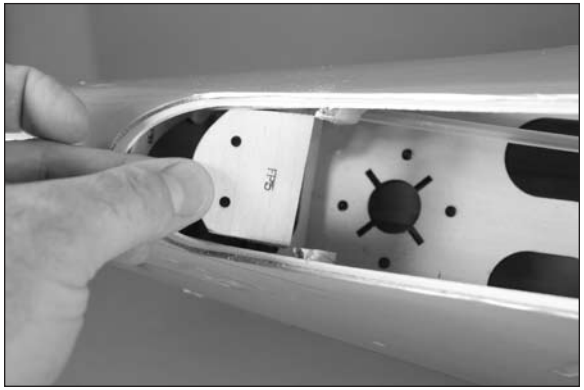
☐ 2. Position the tail wheel hatch over the opening for the tail wheel. We used low-tack tape to indicate the front edge of the opening. Use a felt-tipped pen to mark the cover so it can be trimmed to the correct length.



☐ 3. Use hobby scissors, a rotary tool with a sanding drum and medium grit sandpaper to trim the cover to the correct length. Work slowly, fitting the cover to make sure it is not trimmed too much.



☐ 4. Use a razor saw to remove the former from the rear of the fuselage. Laser-cut lines have been made on the former as a reference for cutting.



☐ 5. Remove the canopy hatch from the fuselage by pressing the release using a #1 Phillips screwdriver. The canopy will lift at the rear and has tabs at the front. Set the hatch aside until later.



☐ 6. Insert the cable into the two tubes as shown. Pull the cable so equal parts extend outside the fuselage. The tubes are numbered, so insert the cable into tubes 5 and 6.



➔ *Before working on the tail gear, make sure to file flat areas on the steering shaft so the setscrews in the tail gear and steering arm have a place to seat. This prevents the steering from accidently changing position.*

☐ 7. Attach a 1/16-inch ball link in the center hole of the steering arm. Use pliers and threadlock to make sure the balls don't vibrate loose.

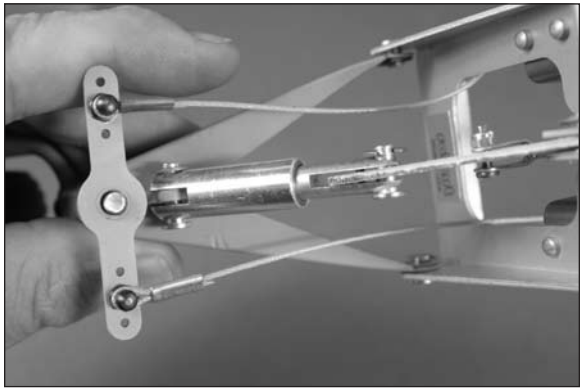


☐ 8. Attach the tail wheel by inserting the correct adapters in the wheel to match the diameter of the shaft. The shaft goes through the wheel, then into the tail gear. Secure the axle using the setscrew in the gear.

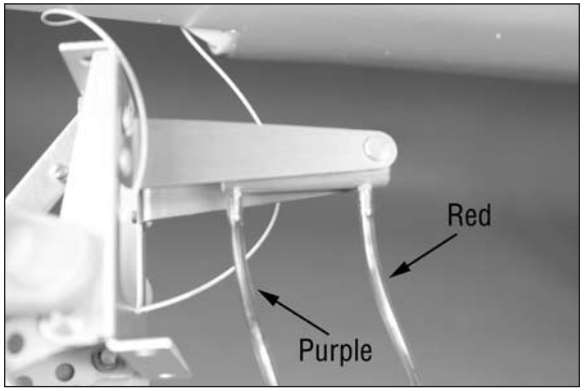


➔ *Remove the excess axle using a rotary tool and cut-off wheel. Make sure to remove the axle so the heat from cutting does not cause the tail wheel adapters to deform.*

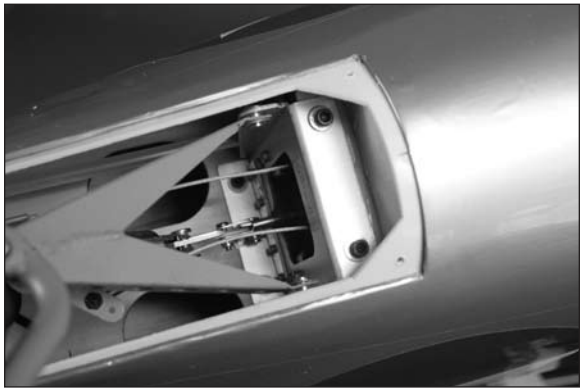
☐ 9. Prepare the cable ends by passing the cable through a copper crimp, then through the hole in the 4-40 threaded eyelet. The cable then loops around the ball. Adjust the cable so it won't slip off the ball, but will rotate easily. Use crimping pliers to compress the crimp, securing the wire. Prepare both ends at this time. Note that the cable goes through the frame of the retract assembly near the air cylinder.



☐ 10. Cut a 24-inch piece of red air line and a 24-inch piece of purple air line. Attach the air lines to the fittings on the air cylinder. Note the position of the air lines in the photo.

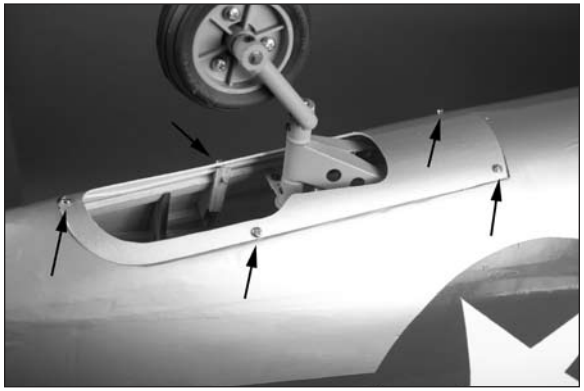


☐ 11. Mount the tail wheel assembly in the fuselage using four 4-40 x 1/2-inch socket head screws and four #4 washers to attach the mount to the fuselage. Use threadlock and a 3/32-inch hex wrench to tighten the screws. Guide the air lines toward the radio compartment along the right side of the fuselage.



➔ *We recommend taping the air lines to a pushrod tube to keep them from falling back into the fuselage.*

☐ 12. Use hobby scissors and a rotary tool with a sanding drum to trim the cover so the tail wheel can operate without hitting the cover. The cover is secured to the fuselage using five M2.5 x 12 sheet metal screws. Use a pin vise and 1/16-inch (1.5mm) drill bit to drill the holes. Use a felt-tipped pen to mark the position of the former on the fuselage so the screws can be located when they thread into the former. Use a #1 Phillips screwdriver to install the screws.



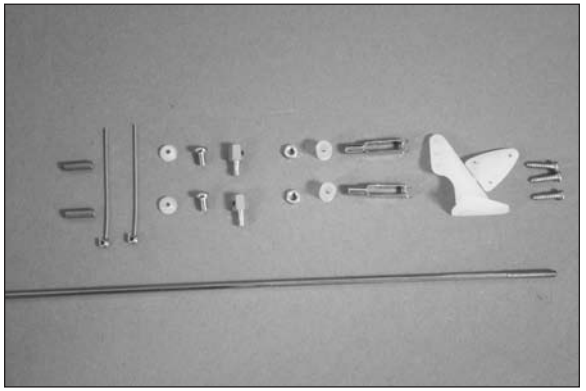
Rudder and Tail Wheel Linkage Installation

Required Parts

Fuselage assembly	4-40 metal clevis (2)
Silicone retainer (2)	4-40 nut (2)
Wire eyelet (2)	M3 x 4 setscrew (2)
Copper tubing crimp (2)	Nylon control horn
Servo with hardware	Transmitter
Receiver	Receiver battery

4-40 x 1115mm pushrod, threaded both ends
Heavy-duty servo arm (JRPA215)
M2.5 x 10 sheet metal screw (3)
Brass pushrod connector with nylon retainer (2)

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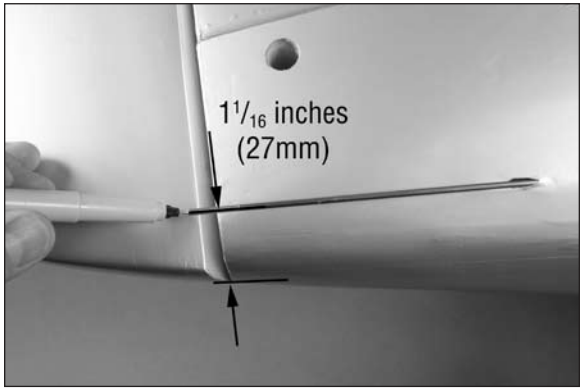


☐ 2. Prepare the rudder servo by installing the grommets and eyelets. Mount the ruder servo into the fuselage following the procedure as outlined in the aileron servo installation. The output of the servo faces to the rear of the fuselage.

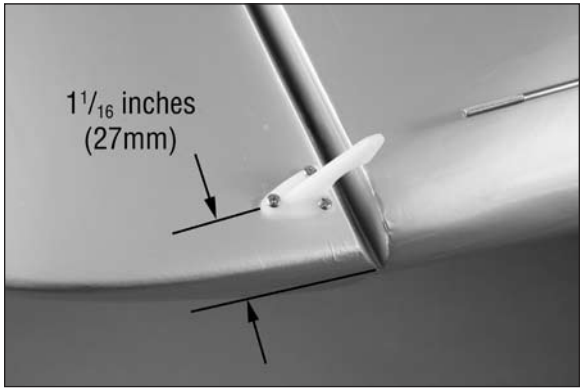


➔ *Should the laser cut holes not align with your servo, you will need to use a pin vise and 1/16-inch (1.5mm) drill bit to drill new holes to mount the rudder servo.*

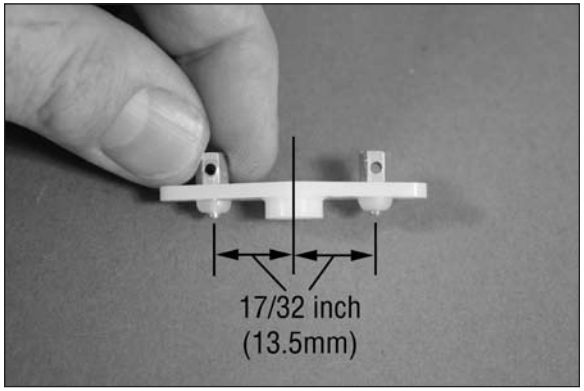
☐ 3. Slide the 4-40 x 1115mm pushrod into the pushrod tube for the rudder. Use the pushrod to mark the position for the rudder control horn. This will set the height of the control horn so the pushrod does not bind. Mark the location for the control horn using a felt-tipped pen.



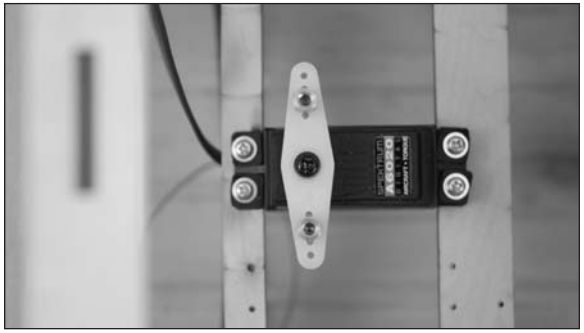
☐ 4. Mount the control horn to the rudder using three M2.5 x 12 sheet metal screws. Follow the procedure in the "Aileron Linkage" section of the manual. Make sure to prepare the holes and use thin CA to harden the wood before installing the screws using a #1 Phillips screwdriver.



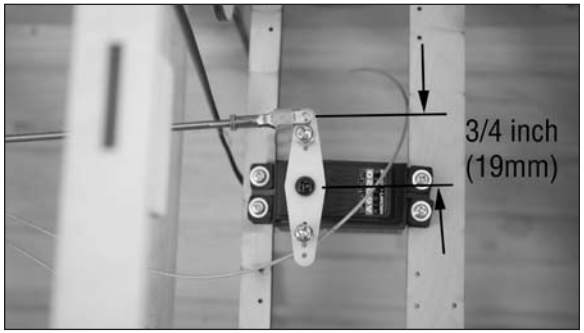
☐ 5. Prepare the rudder servo horn by installing the two brass pushrod connectors. You will need to enlarge the holes that are 17/32 inch (13.5mm) from the center of the horn using a 5/64-inch (2mm) drill bit. The connectors are secured by pressing the nylon backplate onto the bottom of the connector.

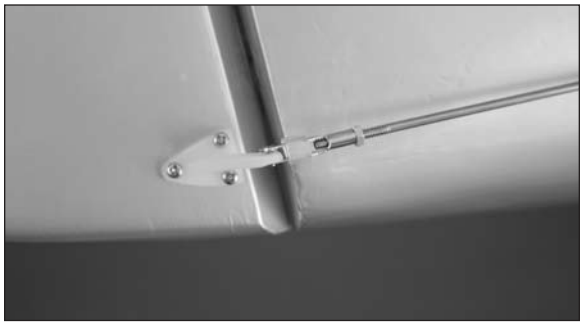


☐ 6. Attach the servo arm to the rudder using a #1 Phillips screwdriver and the screw provided with the servo. Make sure the arm is perpendicular to the servo centerline when the radio system is on.



☐ 7. Thread a 4-40 nut on **each end** of the rudder pushrod. Slide a clevis retainer on two 4-40 metal clevises, then thread the clevises on **each end** of the rudder pushrod. With the servo centered, attach the clevises to the rudder servo horn so it is 3/4 inch (19mm) from the center of the servo arm. Connect the clevis to the center hole of the rudder control horn. Adjust the linkage length so the rudder is centered. Place a drop of threadlock near the clevis, then use pliers to tighten the 4-40 nut against the clevis. This will keep the clevis from vibrating and changing position.

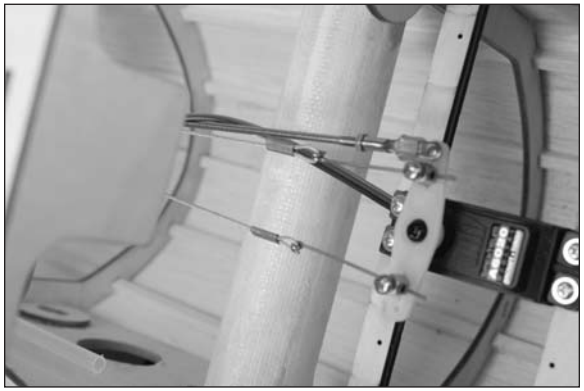




☐ 8. Center the tail wheel. Use side cutters to trim the cable so there are equal parts of cable for the steering inside the fuselage. Use the M3 x 4 setscrews to secure the wire eyelets in the pushrod connectors. Leave 3/8 inch (9mm) of the eyelets extending through the connectors. The screws only need to be snug at this time.



☐ 9. Pass the cable through a copper crimp, then through the hole in the eyelet, then pass it back through the copper crimp. With both cables installed, tighten the cables so the tail wheel is centered when the rudder servo is centered. With light tension on the cables, use crimping pliers to secure the crimps. Apply threadlock to the M3 x 4 machine screws and tighten them using a #1 Phillips screwdriver. Use side cutters to trim the unnecessary cable so it doesn't interfere with the operation of your radio system.



➔ *We recommend removing the eyelets when crimping the brass tubing and trimming the cables.*

➔ *If you are using a retractable tail wheel, make sure the retract is down and locked before securing the steering cables.*

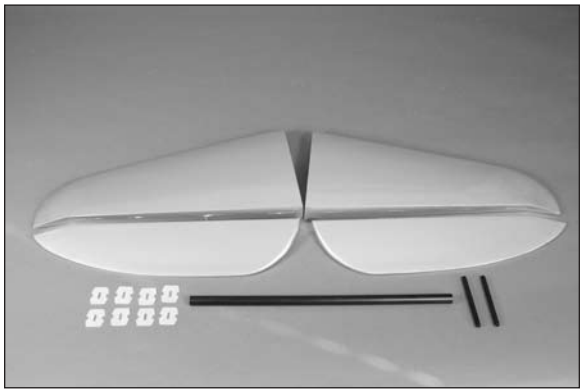
➔ *Periodically check the tension of the cable. If they are slack, you can add tension by repositioning the eyelets in the pushrod connectors. This can also be used to adjust the tracking of your model during take-off and landing.*

Stabilizer and Elevator Installation

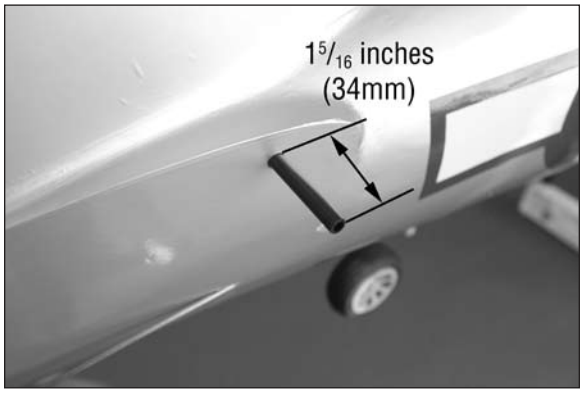
Required Parts

Fuselage assembly — Stabilizer (right and left)
Elevator (right and left) — CA hinge (8)
3-inch x 1/4-inch black aluminum tube (2)
13-inch x 1/2-inch black aluminum tube

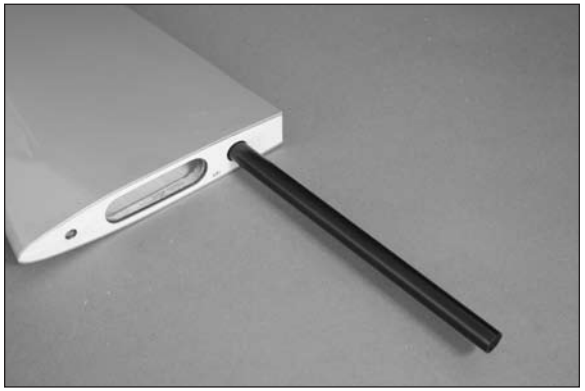
☐ 1. Locate the items for this section of the manual.



☐☐ 2. Slide one of the 3-inch x 1/4-inch black aluminum tubes into the smaller hole of the fuselage. Leave $1^{5}/_{16}$ inches (34mm) of the tube extending out of the fuselage.

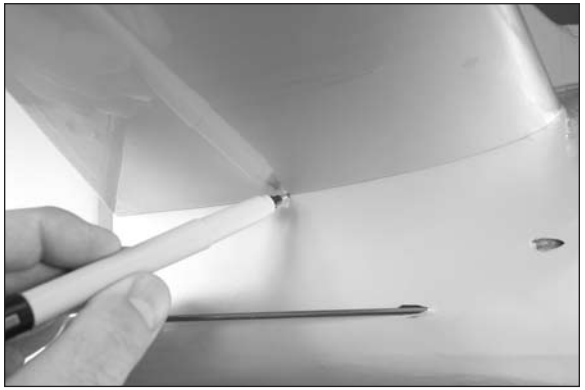


☐☐ 3. Slide the 13-inch x 1/2-inch aluminum tube into the stabilizer. The tube socket has a cap on it, so do not force the tube in any farther than it will easily slide.



➔ *Make sure the stabilizers are mounted correctly. The top covering will overlap onto the bottom covering, which can be seen along the outside edge of the stabilizers.*

☐☐ 4. Slide the tube and stabilizer into position, guiding the smaller tube into the hole near the leading edge of the stabilizer. With the stabilizer pressed tightly against the fuselage, use a felt-tipped pen to transfer the outline of the stabilizer onto the fuselage.

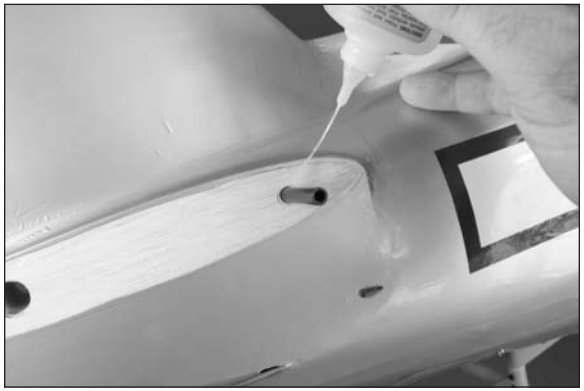


☐☐ 5. Remove the stabilizer and tubes from the fuselage. Use a hobby knife and #11 blade to carefully trim the covering from the fuselage. Trim the covering 1/16-inch (1.5mm) INSIDE the line drawn in the previous step. The stabilizer must be glued directly to the fuselage, so the covering must be removed from the fuselage to expose this wood.



☐ 6. Repeat steps 2 through 5 to prepare the opposite side of the fuselage for the installation of the stabilizer. Use a paper towel and isopropyl alcohol to remove the lines from the fuselage once the covering has been trimmed.

☐ 7. Slide the 3-inch x 1/4-inch black aluminum tubes into position. With $1^{5}/_{16}$ inches (33mm) of the tube extending out of the fuselage, wick a few drops of thin CA at the joint between the tube and fuselage to keep them in position when installing the stabilizer.



➔ *Read through the following steps before mixing any epoxy. You must be able to complete these steps before the epoxy begins to cure.*

☐ 8. Mix 1/2 ounce (15mL) of 30-minute epoxy. Apply a thin coat of epoxy to the aluminum tube, and a small amount of epoxy inside the socket of the stabilizer. Slide the tube into position. Use an epoxy brush to apply a thin coat of epoxy to the exposed wood at the root of the stabilizer.



☐ 9. Apply a thin coat of epoxy to the exposed wood of the fuselage. Also apply a small amount of epoxy to the smaller tubes installed in step 7.



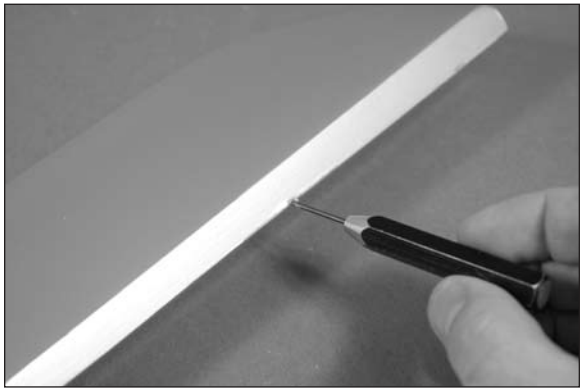
☐ 10. Slide the stabilizer into position, fitting it tightly against the fuselage. Use a paper towel and isopropyl alcohol to remove any excess epoxy before it can cure.



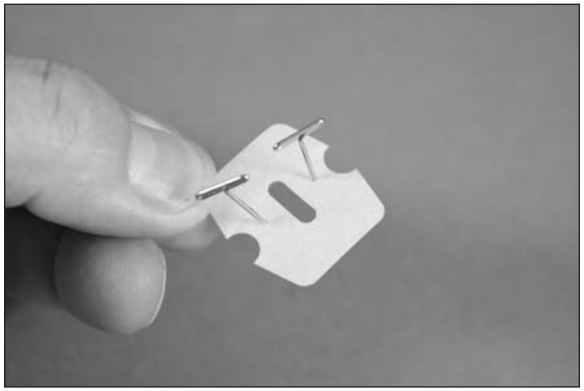
☐ 11. Apply epoxy to the stabilizer tube on the opposite side of the fuselage and the stabilizer as described in steps 8 and 9. Slide the remaining stabilizer into position and use a paper towel and isopropyl alcohol to remove any excess epoxy. Allow the epoxy to fully cure before proceeding.



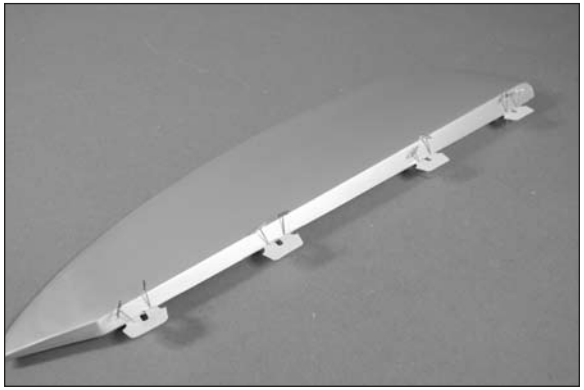
☐☐ 12. Use a pin vise and 1/16-inch (1.5mm) drill bit to drill a hole in the center of the four hinges slots. Prepare both the elevator and stabilizer at this time.



☐☐ 13. Place two T-pins in each of the four CA hinges as shown. This will center the hinge evenly between the stabilizer and elevator when the hinges are installed.



☐☐ 14. Insert the hinge in the elevator hinge slots. Center the opening in the hinge with the hole drilled in step 12. The T-pins will rest on the leading edge of the elevator when the hinge is installed. Install all four hinges at this time.



➔ *Make sure the elevators are mounted correctly, as there is a hardwood block installed in the bottom-side for mounting the control horn. The top covering will overlap onto the bottom covering, which can be seen along the outside edge of the elevators.*

☐☐ 15. Slide the elevator into position, guiding the hinges into the slots in the stabilizer. With the elevator pressed tight against the stabilizer, remove the T-pins. Position the elevator so the tip aligns with the tip of the stabilizer. Saturate both sides of the hinges with thin CA so the CA wicks into the hinge and into the surrounding wood.



➔ *Do not use CA accelerator when gluing the hinges. Always allow the CA to soak into the hinge for the best bond between the hinge and surrounding wood.*

☐☐ 16. Once the CA had fully cured, check that the hinges are secure by gently pulling on the control surface. If not, apply thin CA to any hinges that are not glued and recheck. Move the control surface through its range of motion several times to break in the hinges. This will reduce the initial load on the servo during your first flights.



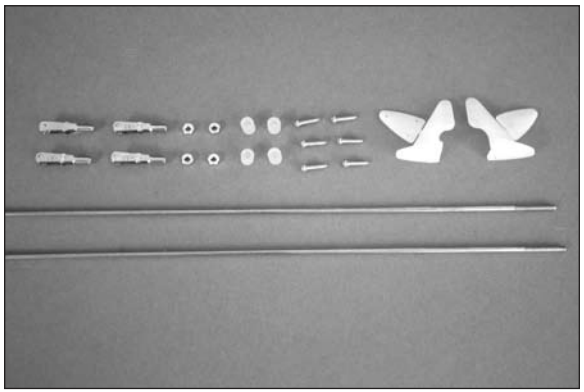
☐ 17. Repeat steps 12 through 16 to hinge the remaining elevator.

Elevator Linkage Installation

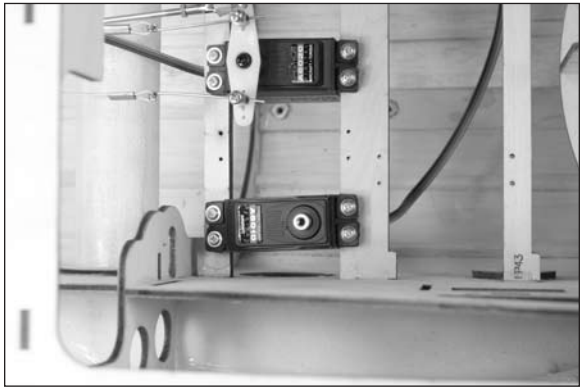
Required Parts

Fuselage assembly
4-40 nut (4)
Control horn (2)
Transmitter
Receiver
4-40 metal clevis (4)
Silicone clevis retainer (4)
Servo with hardware (2)
Receiver battery
4-40 x 1135mm pushrod, threaded both ends (2)
M2.5 x 10 sheet metal screw (6)

☐ 1. Locate the items for this section of the manual.

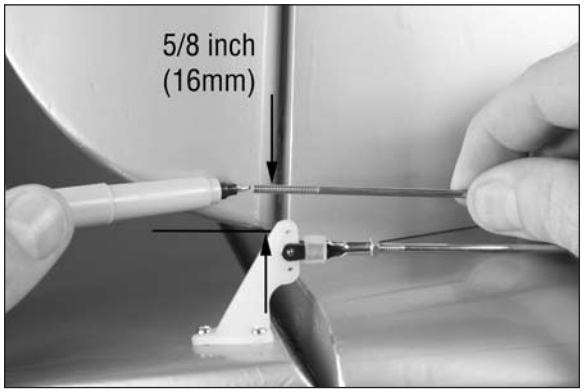


☐☐ 2. Prepare the elevator servo by installing the grommets and eyelets. Mount the elevator servo in the fuselage following the procedure as outlined in the aileron servo installation. The output of the servo faces to the front of the fuselage.

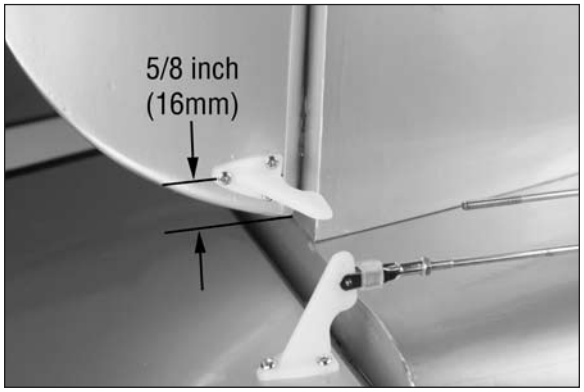


➔ *Should the laser cut holes not align with your servo, you will need to use a pin vise and 1/16-inch (1.5mm) drill bit to drill new holes to mount the elevator servos.*

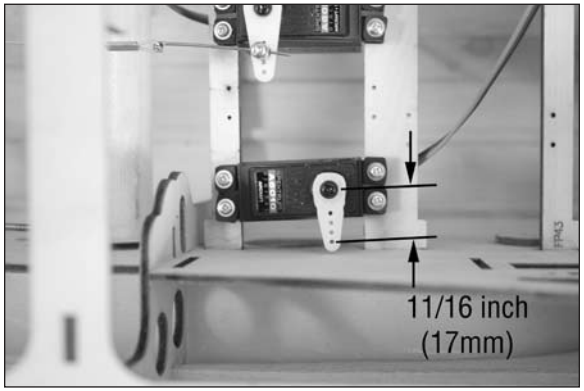
☐☐ 3. Slide the 4-40 x 1135mm pushrod into the pushrod tube for the elevator. Use the pushrod to mark the position for the elevator control horn. This will set the position of the control horn so the pushrod does not bind. Mark the location for the control horn using a felt-tipped pen.



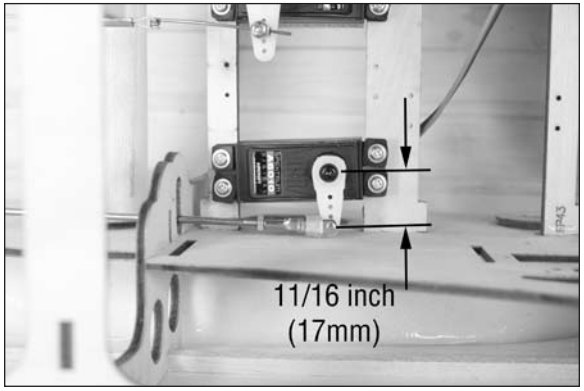
☐☐ 4. Mount the control horn to the elevator using three M2.5 x 10 sheet metal screws. Follow the procedure in the "Aileron Linkage" section of the manual. Make sure to prepare the holes and use thin CA to harden the wood before installing the screws using a #1 Phillips screwdriver.

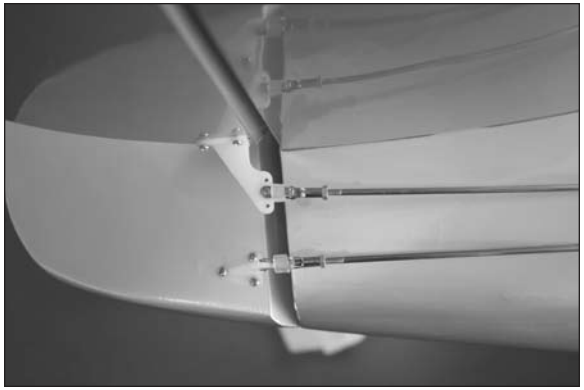


☐☐ 5. Attach the servo arm to the elevator servo using a #1 Phillips screwdriver and the screw provided with the servo. Make sure the arm is perpendicular to the servo centerline when the radio system is on. The clevis will attach to a hole that is 11/16 inch (17mm) from the center of the arm.



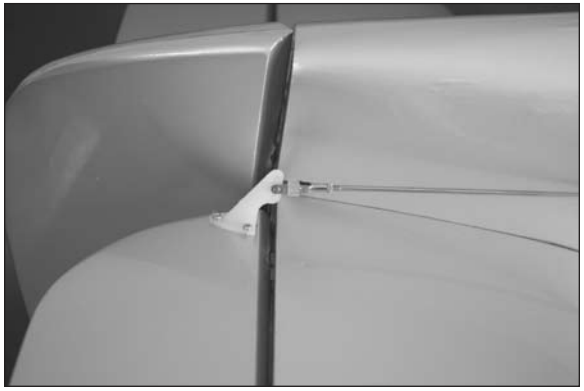
☐☐ 6. Thread a 4-40 nut on **each end** of the elevator pushrod. Slide a clevis retainer on two 4-40 metal clevises, then thread the clevises on **both ends** of elevator pushrod. With the servo centered, attach the clevises to the servo arm so it is 11/16 inch (17mm) from the center of the arm. Connect the clevis to the center hole of the elevator control horn. Adjust the linkage length so the elevator is centered. Place a drop of threadlock near the clevis, then use pliers to tighten the 4-40 nut against the clevis. This will keep the clevis from vibrating and changing position.





☐ 7. Repeat steps 2 through 6 to install the remaining elevator servo and linkage.





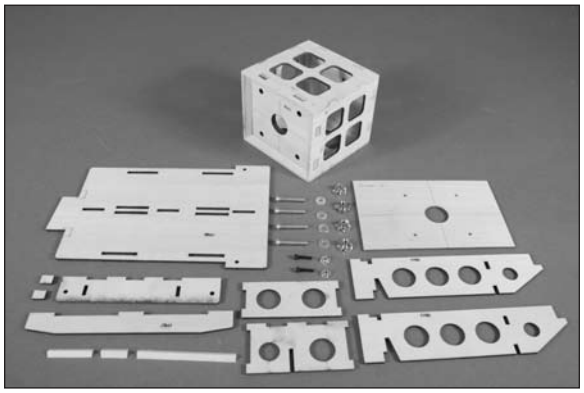
Optional Electric Motor Installation

Required Parts

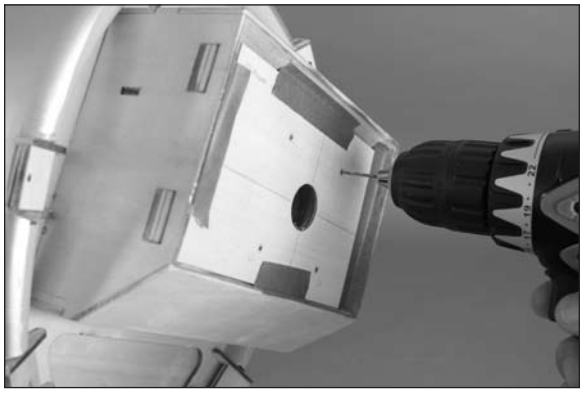
Fuselage assembly	Plywood template, Power 160
#8 washer (4)	8-32 blind nut (4)
EP motor mounting kit	Power 160 with accessories
Motor battery (2)	Electronic speed control (ESC)

EC5™ Battery Series Harness
8-32 x 1-inch machine screw (4)
12-inch (305mm) servo extension
Hook and loop tape (2) (not included)
Hook and loop strap (4) (not included)

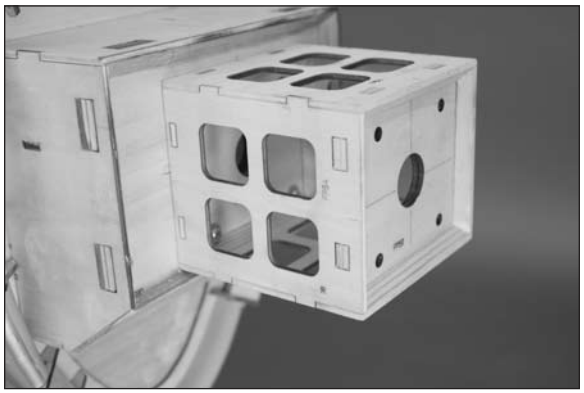
☐ 1. Locate the items for this section of the manual.



☐ 2. Use low-tack tape to secure the plywood template to the firewall. Use a drill and 1/16-inch (1.5mm) drill bit to drill the pilot holes for the motor box mounting screws. Use the hole in the firewall and template to assist in aligning the template to the firewall.



☐ 3. Use a drill and 7/32-inch (5.5mm) drill bit to enlarge the holes. Use four 8-32 x 1-inch machine screws, four #8 washers and four 8-32 blind nuts to secure the motor box to the firewall. Make sure to use threadlock on the screws to keep the hardware from vibrating loose.



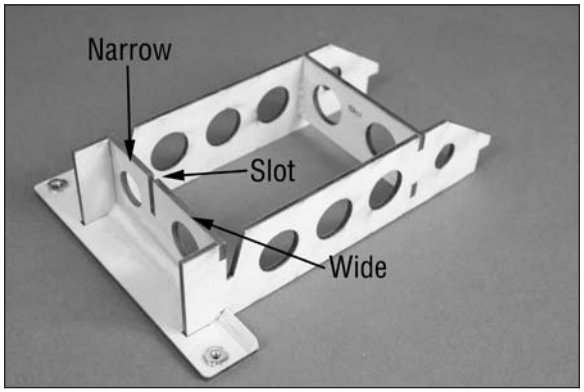
☐ 4. Prepare the motor by installing the mount and propeller adapter. Attach the motor to the motor box using the hardware included with the motor. Make sure to use threadlock on all metal-to-metal fasteners.



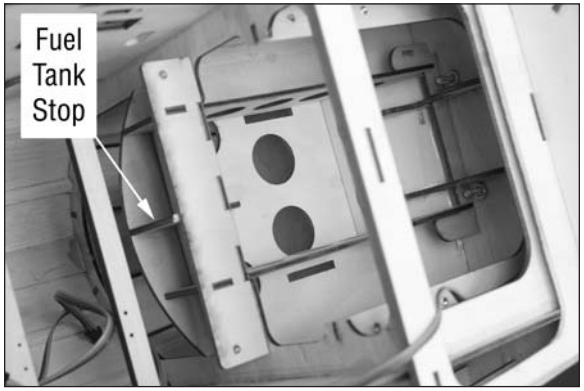
☐ 5. Make a hole in the fuselage for the battery and receiver lead from the electronic speed control to pass into the fuselage. Secure a 12-inch (305mm) servo extension to the receiver lead on the ESC using string or dental floss. Use hook and loop tape (not included) and tie wraps (not included) to secure the speed control to the motor box. Connect the leads from the motor and speed control, securing them with tie wraps (not included) so they don't interfere with the operation of the motor or installation of the cowling.



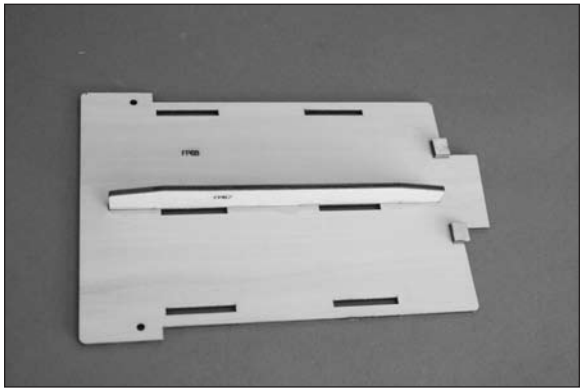
☐ 6. Assemble the battery tray support using medium CA. Note the position of the slot in the rear support, as it must be positioned correctly to fit over the fuel tank stop inside the fuselage. Also install the two 4-40 blind nuts using pliers. Place a drop of thin CA on the prongs of the blind nuts to keep them from accidentally falling out, making sure not to get CA in the threads.



☐ 7. Test fit the battery tray support in the fuselage. The bottom of the supports must contact the tray inside the fuselage. If not, slightly trim the fuel tank stop at the rear as necessary so it fits tightly into position. Once fit, use 30-minute epoxy to glue the support in the fuselage. Apply epoxy to all the contact points between the fuselage and tray to make sure it is secure. Allow the epoxy to fully cure before installing the battery tray.



☐ 8. Use medium CA to glue the two tabs and the center rail to the battery tray. The positions for the tabs are laser etched into the tray. All items will be on the top of the battery tray when it is installed.



☐ 9. Secure the motor batteries to the battery tray using hook and loop straps (not included). We also used hook and loop tape (not included) to keep the batteries from sliding on the tray.



☐ 10. The battery tray can now be installed in the fuselage. The front will fit under the tabs in the structure behind the firewall. The rear is held in position using two 4-40 x 1/2-inch socket head screws. The batteries connect to the speed control using a Y-harness.



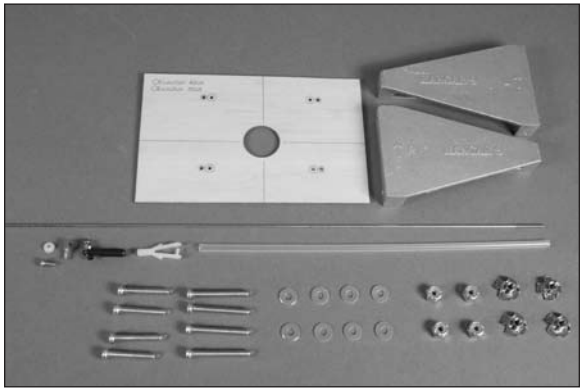
Gas Engine Installation

Required Parts

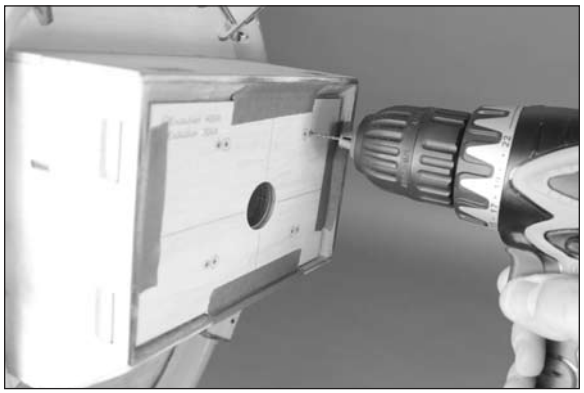
Fuselage assembly	Engine mount (left and right)
#8 washer (8)	8-32 lock nut (4)
8-32 blind nut (4)	Servo with hardware
Transmitter	Receiver
Receiver battery	Engine with accessories

Brass pushrod connector with nylon retainer
M3 x 4 setscrew
8-32 x 1-inch machine screw (4)
M2 x 4-40 ball link with hardware
Plywood template, EVO 30GX/40GX
8-iinch (203mm) pushrod tube, clear
8-32 x 1 1/4-inch machine screw (4)
2-56 x 375mm pushrod, threaded/Z-bend

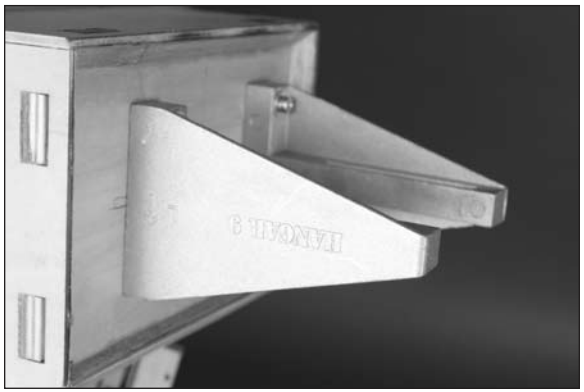
☐ 1. Locate the items for this section of the manual.



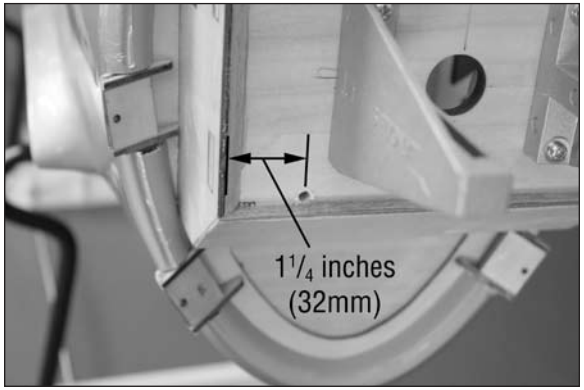
☐ 2. Use low-tack tape to hold the plywood engine template to the firewall. Use a drill and 1/16-inch (1.5mm) drill bit to drill the pilot holes for your particular engine. Use the hole in the firewall and template to assist in aligning the template to the firewall.



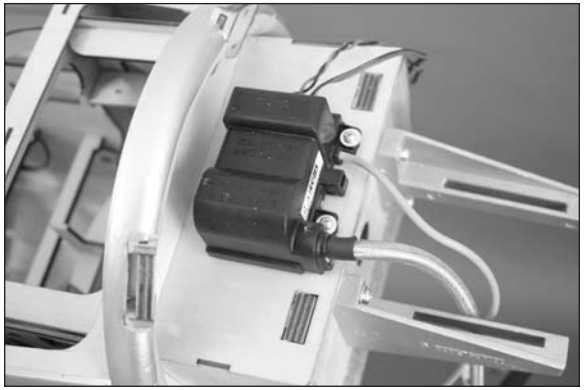
☐ 3. Use a drill and 7/32-inch (5.5mm) drill bit to enlarge the holes in the firewall. Attach the engine mounts using four 8-32 x 1-inch machine screws, four #8 washers and four 8-32 blind nuts. Tighten the screws using a #2 Phillips screwdriver after applying threadlock to the screws.



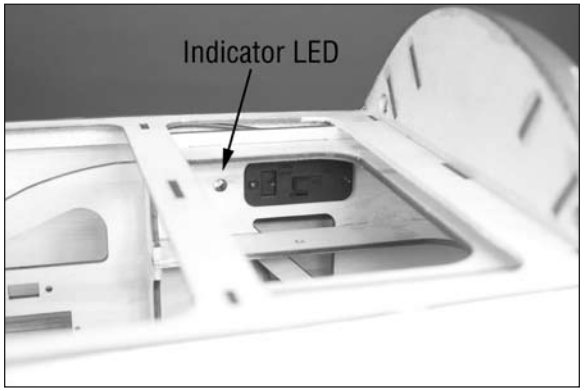
☐ 4. Use a drill and 5/32-inch (4mm) drill bit to drill a hole along the bottom edge of the firewall that is 1 1/4 inches (32mm) from the inside and flush with the bottom of the firewall for the throttle pushrod tube.



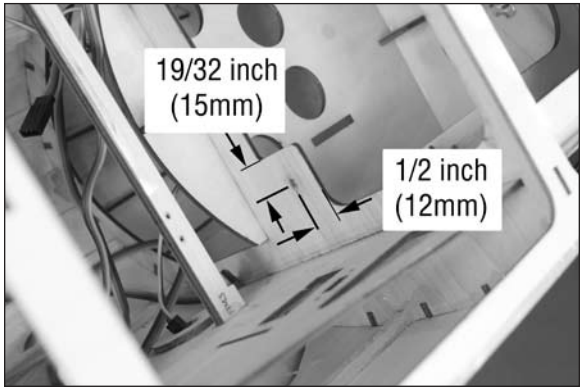
☐ 5. Secure the ignition module to the top of the engine box using the screws provided with your engine. Note that the module is centered.



☐ 6. Route the lead for the ignition battery and indicator light into the fuselage. You will need to make a hole for these items to enter the fuselage. Connect the lead for the ignition battery to the switch harness, then secure the switch in the fuselage. The indicator light can be mounted in the fuselage using silicone adhesive.



☐ 7. Use a drill and 5/32-inch (4mm) drill bit to drill a hole for the throttle pushrod. The hole is located 1/2 inch (12mm) down and 19/32 inch (15mm) over from the edges of the former.

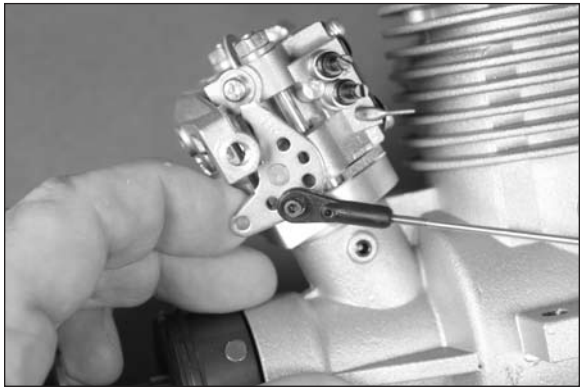


☐ 8. Lightly sand a 1/4-inch (6mm) wide section 1 inch (25mm) from either end of the tube. Slide the tube into position, leaving 7/8 inch (22mm) protruding from the firewall. Use medium CA to glue the tube to the firewall and the former inside the fuselage.

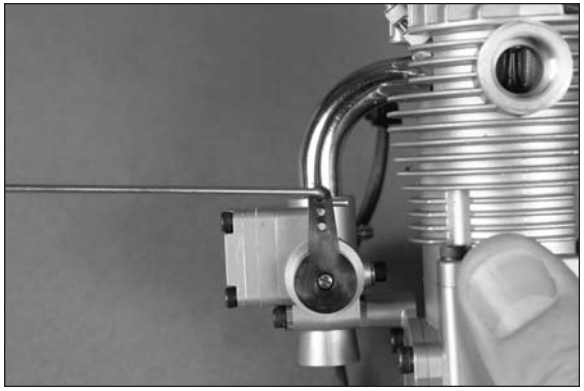




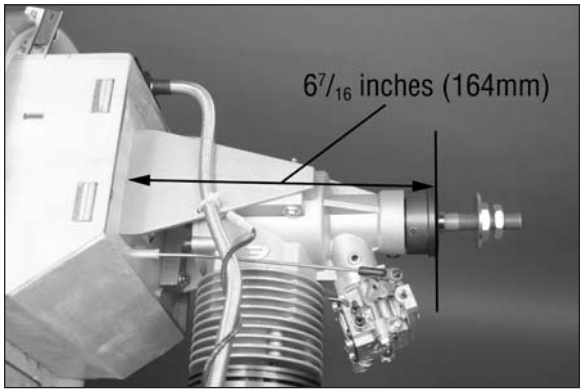
☐ 9. Attach the ball end to the carburetor throttle arm using the hardware included with the ball end. It will be necessary to shorten the bolt to clear the carburetor body, allowing the throttle to work properly. Make sure to use threadlock on the nut to prevent it from vibrating loose. Thread the 2-56 x 375mm pushrod 15 turns in the ball end. Use side cutters to trim the Z-bend from the pushrod.



➔ *We have prepared the throttle pushrod with a Z-bend when using carburetors with nylon carburetor arms, or when the carburetor is close to the firewall. Insert the Z-bend in the carburetor arm as shown.*

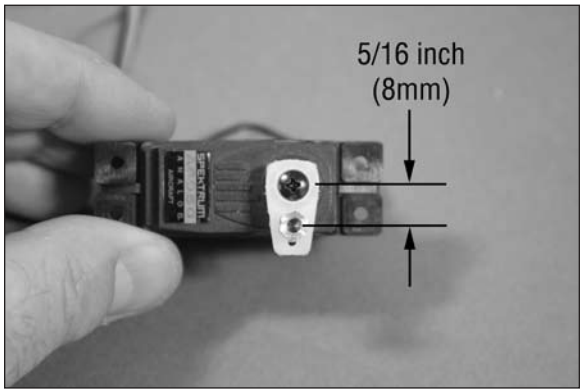


☐ 10. Position the engine between the mounting rails, guiding the pushrod into the pushrod tube. Use four 8-32 x 11/4-inch machine screws, four #8 washers and four 8-32 lock nuts to secure the engine to the rails. Check that the drive washer is $6^{7}/_{16}$ inches (164mm) forward of the firewall before fully tightening the hardware using a #2 Phillips screwdriver and 11/32-inch nut driver. Note the position for the ignition system ground lug. We also drilled 1/8-inch (3mm) holes in the engine mount to secure the spark plug lead with a tie wrap. Connect any additional leads from the ignition to the engine at this time.



➔ *When drilling the holes in the mount, make sure to cover the carburetor and exhaust openings with low-tack tape to prevent metal from entering the engine. Remove any debris from the engine before removing the tape.*

☐ 11. Center the throttle stick and trim at the transmitter. With the servo plugged into the receiver, attach the servo horn to the servo using the screw provided with the servo and a #1 Phillips screwdriver. Use a 5/64-inch (2mm) drill bit to enlarge a hole that is 5/16 inch (8mm) from the center of the horn. Install the pushrod connector and secure it using a pushrod connector backplate. Remove any arms from the horn that may interfere with the operation of the throttle servo.



☐ 12. Mount the servo in the fuselage using the techniques outlined earlier in this manual. The output shaft of the servo faces to the front of the fuselage. Use the transmitter to move the servo to the low throttle position. Use a #1 Phillips screwdriver and the M3 x 4 setscrew to secure the pushrod in the connector. You may need to remove the servo horn from the servo to fit the wire through the connector. Check the operation of the throttle using the radio system. It may be necessary to adjust the end points at the transmitter to prevent any binding when the throttle is in the open or closed positions.



Fuel Tank Installation

Required Parts

Fuselage assembly	Fuel tank
Metal disk	M3 x 20 machine screw
Metal clunk	Gas fuel line, 120mm
Copper tubing, bent	Copper tubing, straight
Rubber stopper	Plastic cap
#4 washer (4)	Plywood fuel tank tray
4-40 x 1/2-inch socket head screw (4)	

➔ *The stopper and fuel tubing included are compatible with gasoline fuel only.*

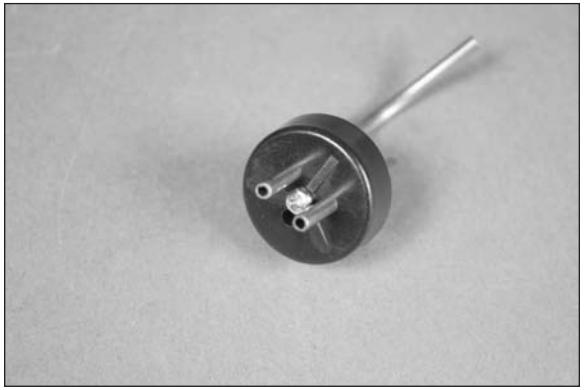
☐ 1. Locate the items for this section of the manual.



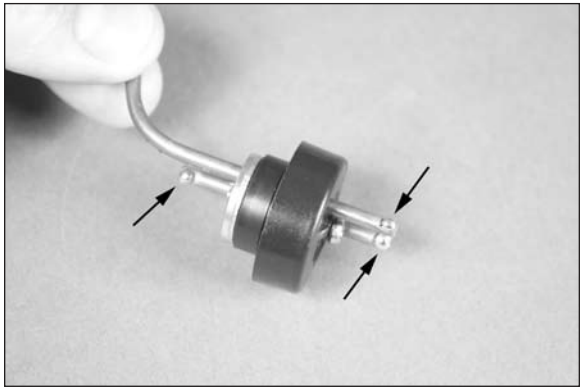
☐ 2. Use a hobby knife and #11 blade to remove the material so two of the three holes in the stopper pass completely through. Slide the straight and pre-bent brass tubes through the smaller stopper plate. Position the front of the tubes even with each other.



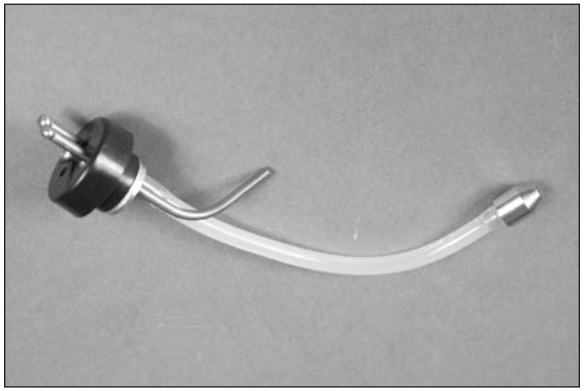
☐ 3. Slide the plastic cap over the tubing at the front. Start the M3 x 20 machine screw using a #1 Phillips screwdriver. The screw only needs to be in far enough to keep the large stopper plate from falling off.



☐ 4. Use solder and a soldering iron to create a small barb for the fuel line. This is necessary as the tubing will need to be wired on to prevent it from sliding loose.



☐ 5. Slide the fuel tubing on the straight piece of brass tubing. The clunk will be placed on the opposite end of the fuel tubing.



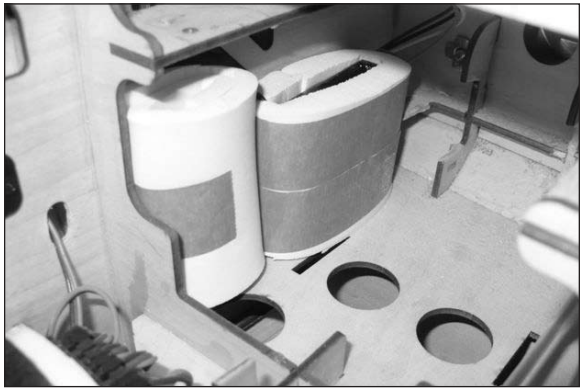
☐ 6. Insert the stopper assembly into the fuel tank. Make sure the vent line faces to the top of the tank as shown. Check to make sure the clunk can move freely inside the tank. If not, trim the length of the tubing as necessary so it can move and is as close to the end of the tank as possible. Once the length of the tubing is set, remove the assembly from the tank. Use a piece of small music wire to secure the line to the clunk and the brass tubing. If the tubing is not wired on, the oils in the fuel will decrease the friction fit between them and they will slide free.



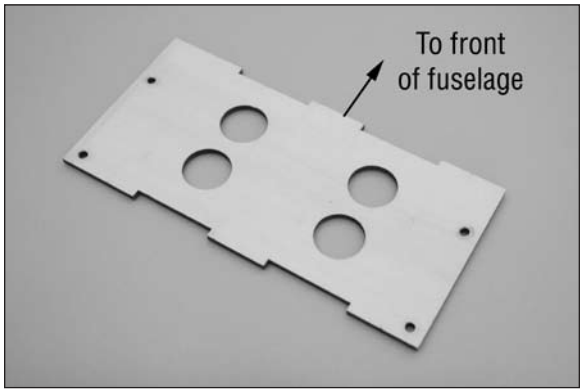
☐ 7. Place the stopper back in the tank. Use a #1 Phillips screwdriver to tighten the M3 x 20 machine screw to secure the stopper. Don't over-tighten the screw as you could damage the fuel tank. It needs to be tight enough to create a seal between the tank and stopper. Slide the fuel tubing onto the brass tubes outside the tank. Make sure to wire the tubing to the brass tubes so it will remain attached during the operation of your model.



☐ 8. Wrap the ignition battery in 1/4-inch (6mm) foam and place it inside the fuselage. Add wrapped 1/4-inch (6mm) foam to keep the battery from moving inside the fuselage when the fuel tank is installed. Route the lead to the switch harness. Connect the leads and secure them using dental floss or string. We also recommend using a balancer extension and securing it to the fuselage using a tie wrap (not included) so the battery can be charged without removing the fuel tank.



☐ 9. Slide the fuel tank into the fuselage. Guide the lines from the tank through the hole in the firewall. With a piece of 1/2-inch (12mm) foam between the fuel tank tray and tank, insert the tray into the fuselage down from the top of the fuselage, angling the tray slightly into position. It will not slide in from the rear of the radio compartment. Use four 4-40 x 1/2-inch socket head cap screws and four #4 washers to secure the plywood fuel tank tray. Note the direction of the tray as shown in the first photo. Make sure to use threadlock on the screws before tightening them with a 3/32-inch hex wrench.





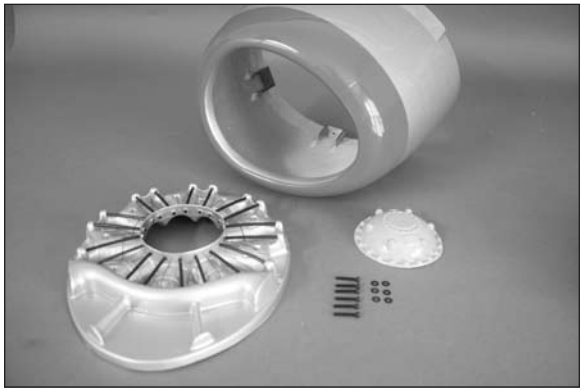
Dummy Radial, Muffler and Cowling Installation

Required Parts

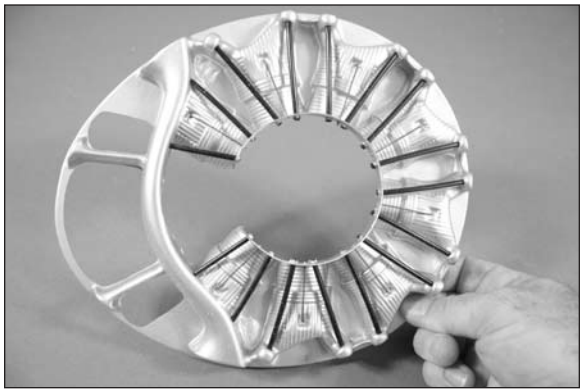
Fuselage assembly	Cowling
Dummy radial engine	Muffler with hardware
Propeller	Propeller adapter
Spinner	Fuel filler
#4 washer (6)	Dummy engine front

4-40 x 5/8-inch socket head cap screw (6)

☐ 1. Locate the items for this section of the manual.



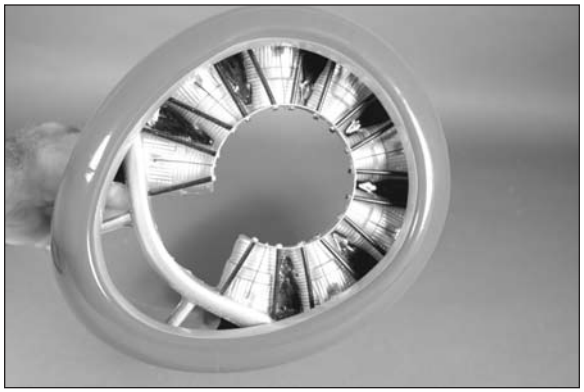
☐ 2. Use hobby scissors and a rotary tool with a sanding drum to remove the material from the dummy radial engine when using a gas or glow engine. Remove the bottom cylinder as well as a start to fit the dummy radial over the engine and carburetor.



➔ *Remove only the amount of material shown. Removing additional material will only increase the pressure inside the cowling, causing the engine to overheat.*

➔ *We painted the area between the dummy cylinders black to enhance the look. If desired, do this prior to installing the engine into the cowl.*

☐ 3. Use silicone adhesive to glue the radial engine in the cowling. Make sure to slide the engine as far forward in the cowl as possible.



☐ 4. Fit the cowling over the engine. Use a rotary tool with a sanding drum to slowly remove the material from the radial engine so it fits over the carburetor. Once fit, use six 4-40 x 5/8-inch socket head cap screws and six #4 washers to secure the cowl to the fuselage. Use a 3/32-inch hex wrench to tighten the screws.

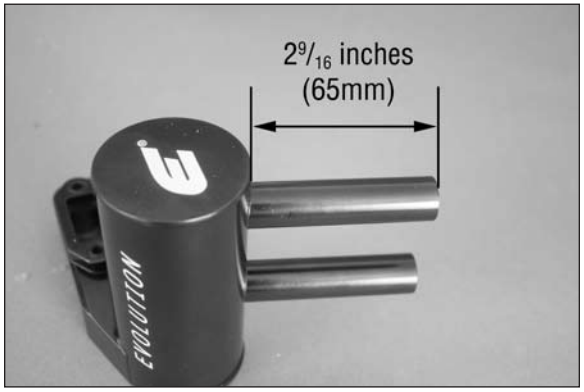


➔ *Place a drop of canopy glue on the cowl screws prior to installation. This will keep the screws from vibrating loose, yet easily removable if necessary. Do not use threadlock as it will make the screws difficult to remove.*

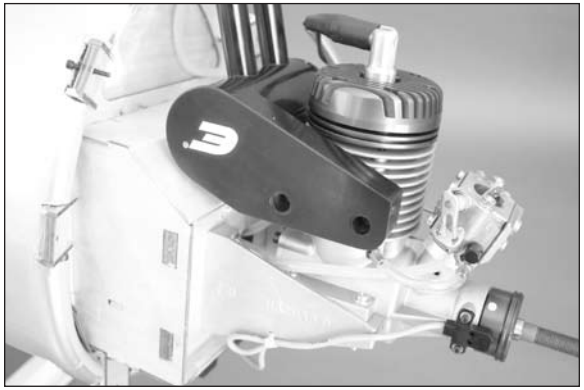
☐ 5. Use hobby scissors and a rotary tool with a sanding drum to trim the dummy engine front to fit into position. The dummy engine front will fit on the lip of the dummy radial engine. Note that the circle is at the top and the square at the bottom. Once fit, use silicone adhesive to secure the dummy engine front to the dummy radial engine.



☐ 6. Before installing the muffler, measure the length of the exhaust stacks. If necessary, trim the length of the exhaust stacks to $2^{9}/_{16}$ inches (65mm) so the cowling can be installed without the need to flex it over the stacks.



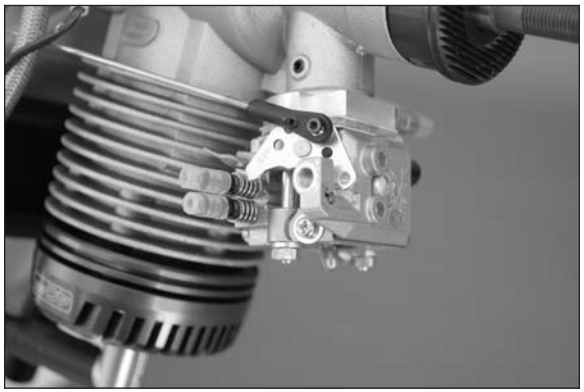
☐ 7. Remove the cowl and install the muffler fuel lines. Connect the lines from the tank to the engine and muffler. Route the vent line to the bottom of the fuselage. We used a fuel dot and a T-fitting on the line to the carburetor so the tank can be fueled without removing the cowling. Make sure to use tie-wraps at the carburetor and at the T-fitting to prevent the fuel lines from disconnecting.



☐ 8. Mount the fuel dot in the cowling on the side of the fuselage. If mounting to the fuselage, make sure to reinforce the area around the fuel dot to prevent damage to the fuselage sheeting.



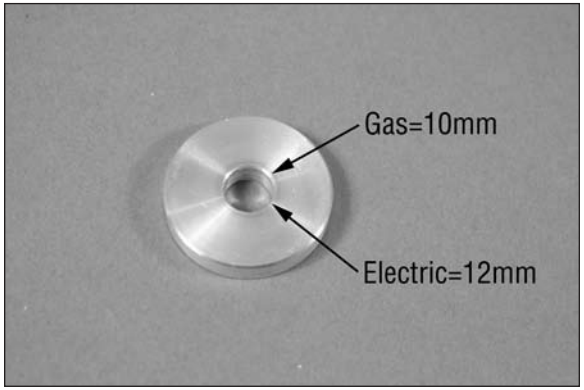
➔ *We added two short pieces of fuel tubing to the carburetor needles to help align the screwdriver during adjustments.*



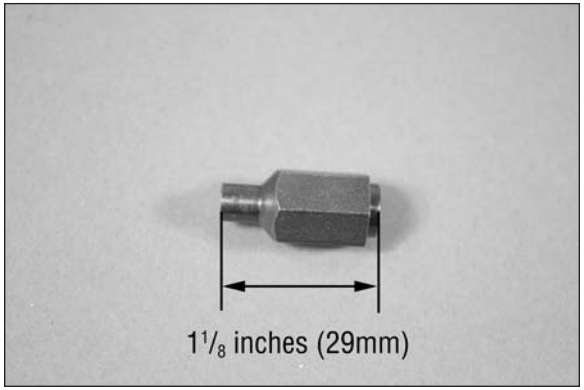
☐ 9. Use hobby scissors and a rotary tool with a sanding drum to cut an opening in the bottom of the cowl to allow the exhaust to exit and for cooling air to pass through the cowl over the engine. Mount the cowling to the fuselage using six 4-40 x 5/8-inch socket head cap screw and six #4 washers. Use a 3/32-inch hex wrench to tighten the screws.



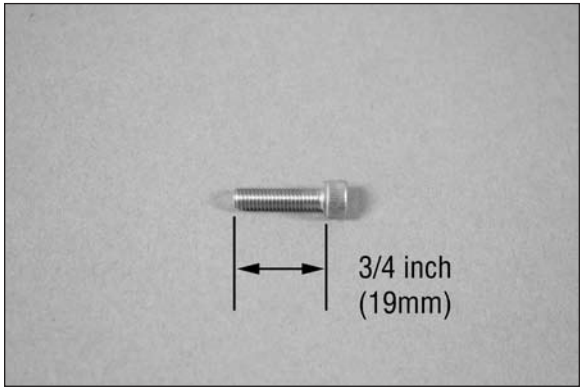
☐ 10. Enlarge the hole in the spinner backplate to fit the motor shaft. The recommended gas engine will require a 10mm hole, while the recommended E-flite® motor will require a 12mm hole.



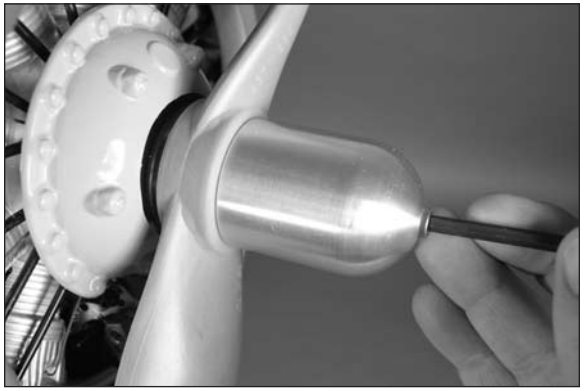
☐ 11. Use a rotary tool and cut-off wheel to reduce the overall length of the adapter by 1/8 inch (3mm). The finished length will be $1^1/_8$ inches (29mm).



☐ 12. The bolt included with the adapter kit will be too long for this application. You can either purchase a 10-32 x 3/4-inch socket head bolt, or use a rotary tool and cut-off wheel to shorten the bolt to a length of 3/4 inch (19mm).



☐ 13. Install the propeller and spinner. Make sure the spinner seats to the spinner backplate. You may need to adjust as necessary by either adding washers or trimming the length of the adapter, depending on your propeller selection.



Retract Servo Installation

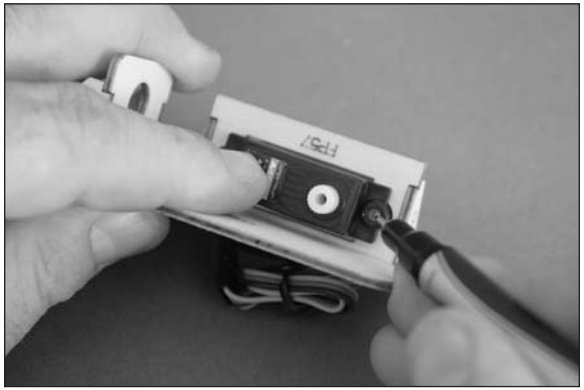
Required Parts

Fuselage assembly
Retract servo tray
Retract installation kit
12-inch (305mm) servo extension

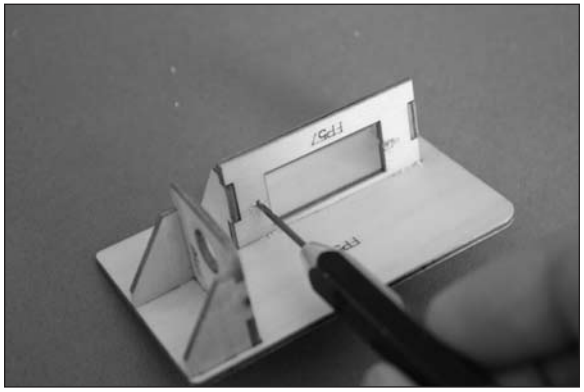
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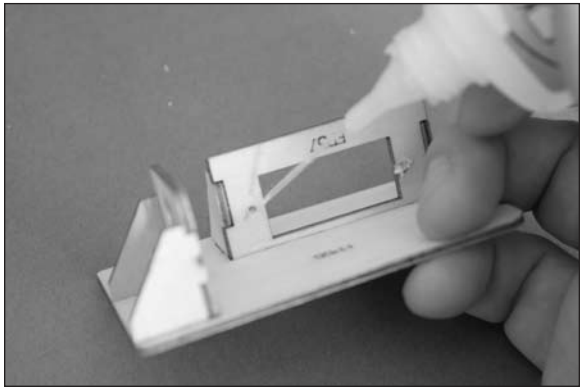
☐ 2. Prepare the retract servo by installing the brass eyelets and grommets. Position the servo in the tray and use a pencil to mark the location for the servo mounting screws.



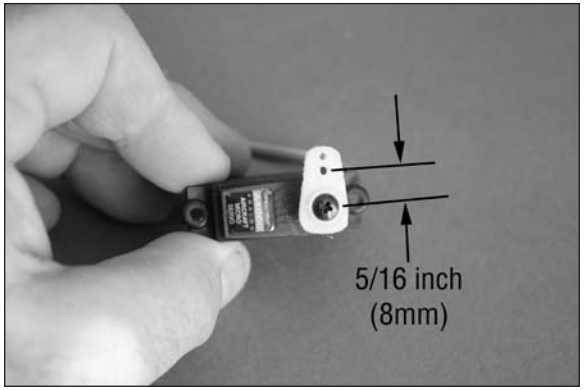
☐ 3. Remove the servo and use a pin vise with a 1/16-inch (1.5mm) drill bit to drill the holes for the servo mounting screws.



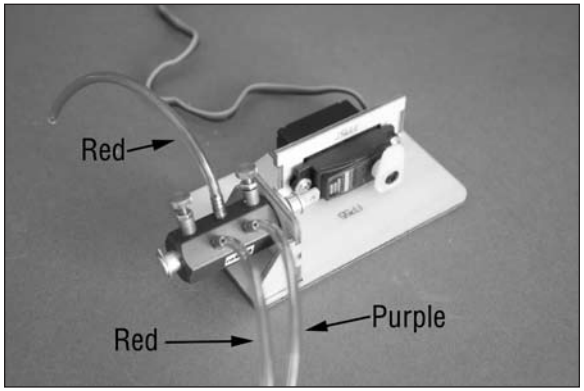
☐ 4. Thread a servo mounting screw in each of the holes using a #1 Phillips screwdriver. Remove the screw, then apply 2–3 drops of thin CA in each hole to harden the surrounding wood.



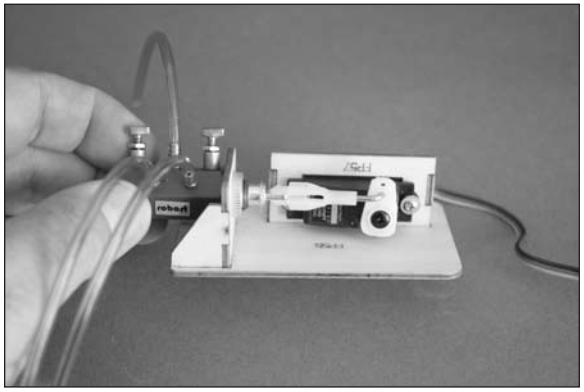
☐ 5. Use the radio system to center the servo. This is done by setting the throws to 0% in both directions. Install the servo horn perpendicular to the servo. Use a pin vise and 5/64-inch (2mm) drill bit to enlarge a hole in the arm that is 5/16 inch (8mm) from the center of the horn. Use side cutters to remove any arms that may interfere with the operation of the servo.



☐ 6. Secure the retract servo using the servo mounting screws and a #1 Phillips screwdriver. Note that the servo output faces away from the valve mount. Attach the retract valve to the retract servo tray. Attach 4-inch (101mm) air lines to the retract valve.



☐ 7. Assemble a linkage (not included) to operate the retract valve. Adjust the linkage so the valve is centered when the servo is centered.

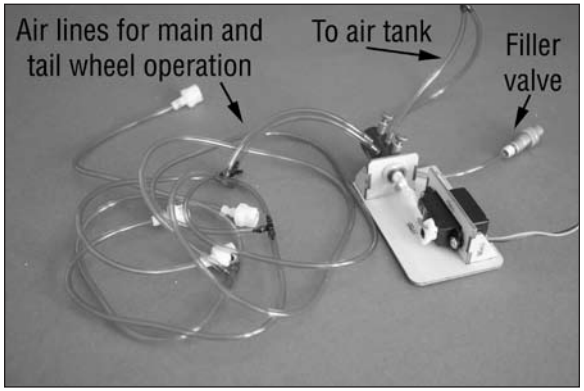


☐ 8. Use the end points of the radio to set the throw of the servo to operate the retract valve. Increase the throw from 0% (as set in step 5) in 1% increments to prevent damage to the retract tray, servo or retract valve. Set both the up and down throws at this time.

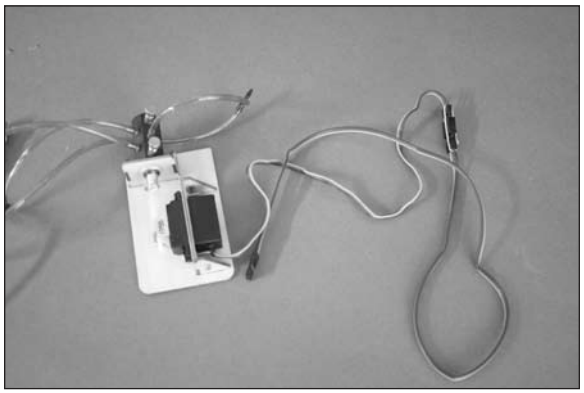




☐ 9. Attach the air lines as shown in the back of the manual. Make sure to place the correct quick disconnects so they match the ones from the retracts in the wing panels.



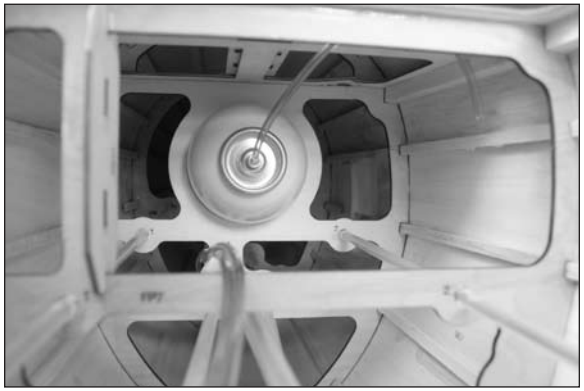
☐ 10. Secure an 12-inch (305mm) servo extension to the retract servo lead using string or dental floss.



☐ 11. Attach a 6-inch (152mm) purple air line to the retract air tank.



☐ 12. Place a drop of silicone adhesive on the air tank. Slide the tank into the fuselage. It only takes a small amount of adhesive to keep the tank in the fuselage.



☐ 13. Use medium CA to glue the retract servo tray in the fuselage. Make sure to position the tray so the retract valve will hot hit the canopy hatch when it is installed. Connect the air lines from the tail wheel retract at this time as well.



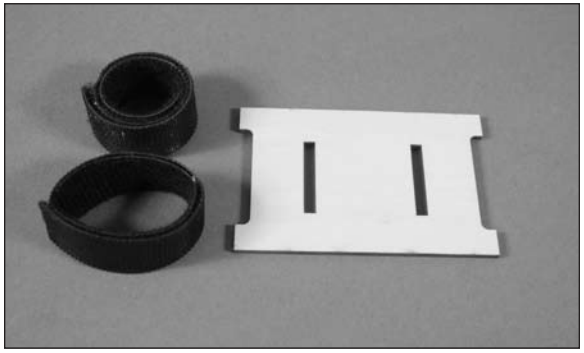
Receiver, Receiver Battery and Switch Harness Installation

Required Parts

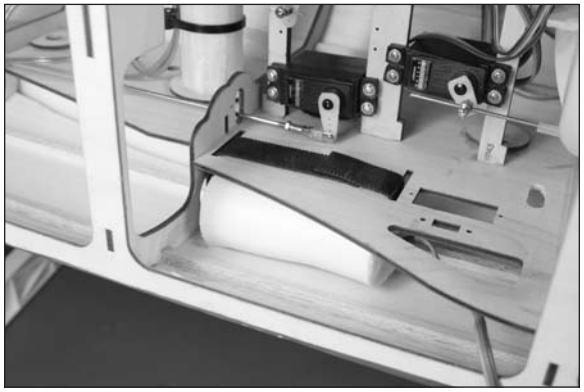
Fuselage assembly	Receiver battery (1 or 2)
Switch harness (1 or 2)	Receiver
Plywood receiver tray	Hook and loop strap (2)

Hook and loop tape (not included)
Y-harness (when using dual receiver batteries)
1/4-inch (6mm) foam rubber (not included)
Additional remote receiver (optional)
18-inch (457mm) servo extension (4)

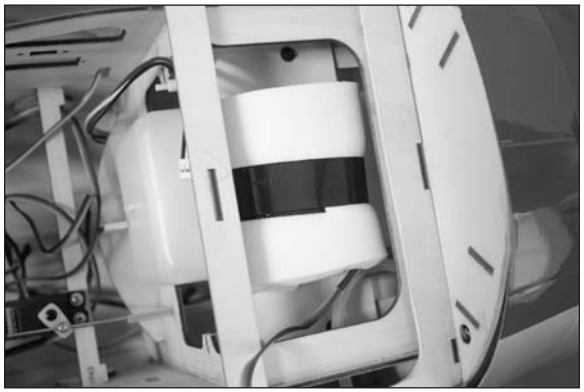
☐ 1. Locate the items for this section of the manual.



☐ 2. Wrap the receiver battery (or batteries) in 1/4-inch (6mm) foam. When using a single receiver battery, secure it to the tray above the fuel tank. When using dual batteries, secure them in the area shown on the sides of the fuselage. An additional hook and loop strap (not included) will be required.



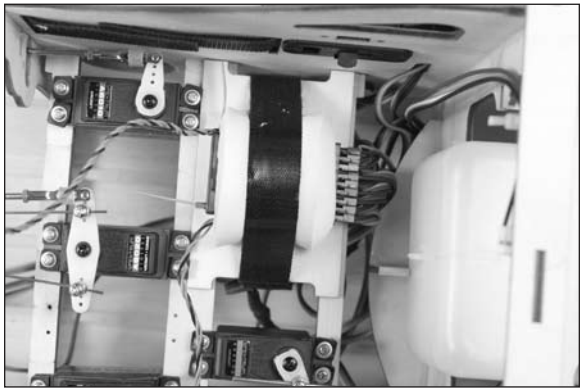
➔ *The receiver battery should only be mounted above the fuel tank ONLY when using glow engines.*



☐ 3. Mount the switch harness(es) to the side of the fuselage. Plug the receiver battery into the harness, securing it with dental floss or string so it doesn't disconnect accidentally. Install two switches when using dual receiver batteries.

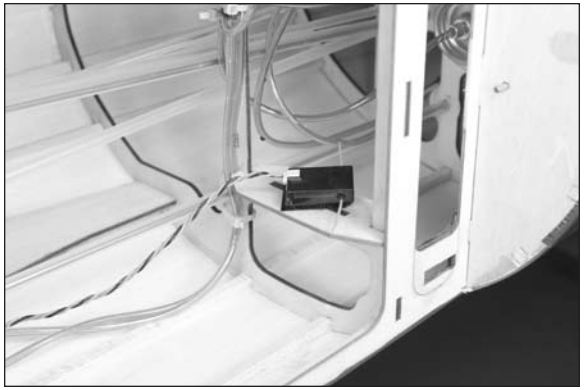


☐ 4. Connect the leads to the receiver, including the 18-inch (457mm) extensions for the flaps and ailerons and the switch harness for the receiver battery. When using dual receiver batteries, connect the switches to a Y-harness, then the Y-harness into the battery port of the receiver. Wrap the receiver in 1/4-inch (6mm) foam and secure it to the plywood receiver tray using a hook and loop strap. Use medium CA to glue the plywood receiver tray to the servo mounting rails.



☐ 5. Secure the remote receiver(s) in the fuselage using hook and loop tape (not included). Note the orientation of the antenna on the remote receivers. When mounting the optional remote receiver, it is mounted so the antenna are oriented differently than the main and remaining remote receiver for best reception.





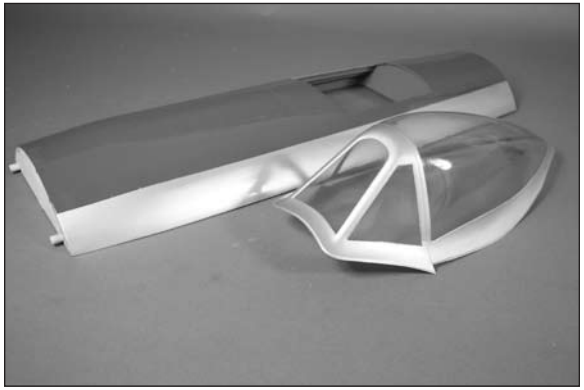
➔ *When using two receiver batteries, disconnect them from the Y-harness before charging. Charge each battery using a separate charger for each battery.*

Canopy Installation

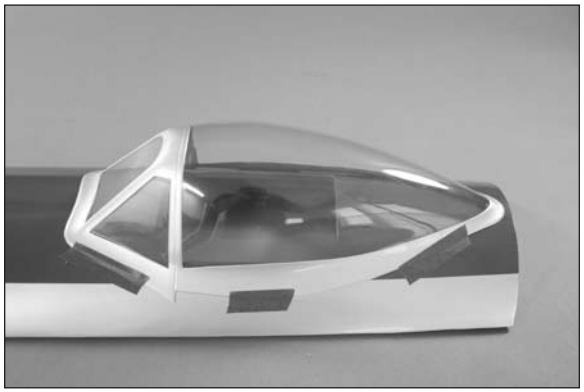
Required Parts

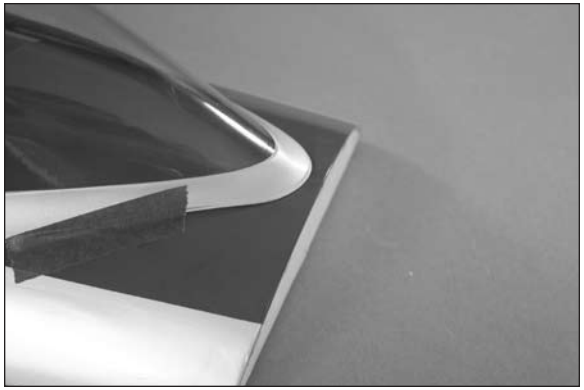
Canopy hatch Clear canopy

☐ 1. Locate the items for this section of the manual.



☐ 2. Lightly scuff the inside edge of the canopy using medium grit sandpaper. Use a paper towel and rubbing alcohol to remove any dirt or oils from the gluing surfaces. Use canopy glue to secure the canopy to the canopy hatch. Use low-tack tape to hold the canopy in position until the glue cures. Note that the rear of the canopy is positioned 1/4-inch (6mm) forward of the rear edge of the canopy hatch.



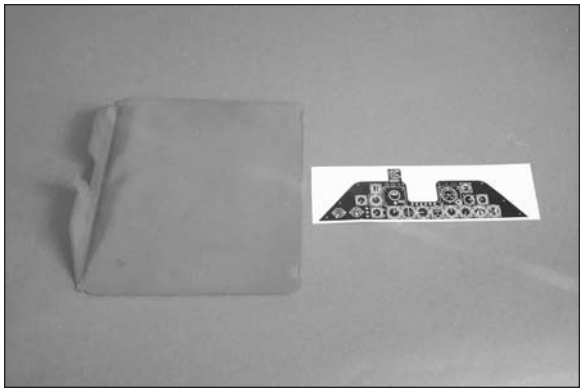


Canopy and Basic Interior Installation

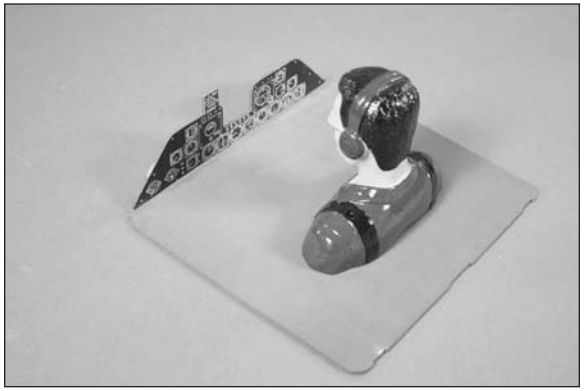
Required Parts

Canopy hatch assembly Cockpit floor
Instrument panel decal Pilot figure (optional)

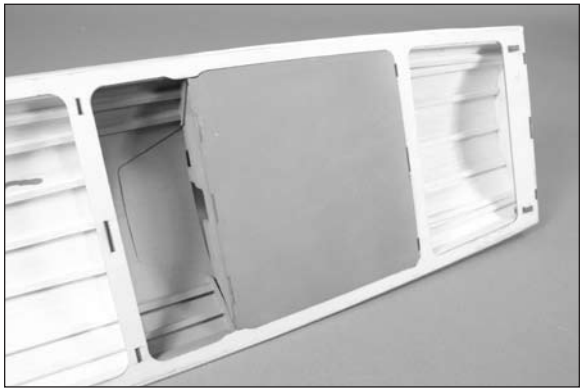
☐ 1. Locate the items for this section of the manual.



☐ 2. Trim the instrument panel decal using a hobby knife and #11 blade. Place the instrument panel decal into position. A pilot figure can be installed at this time using medium CA.



☐ 3. Use medium CA to glue the cockpit floor into the canopy hatch. Allow the CA to fully cure before placing the canopy hatch on the fuselage.



Optional Cockpit Kit Installation

Required Parts

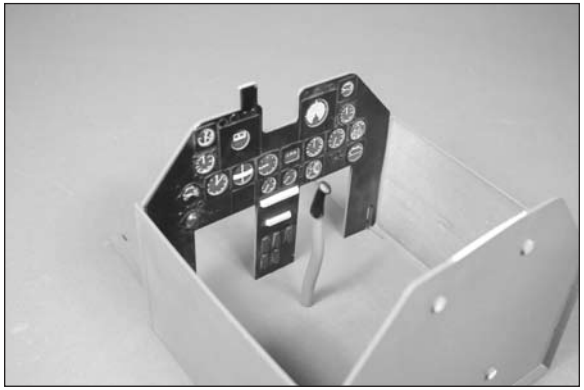
Fuselage assembly Cockpit kit

☐ 1. Install the control stick using the hole in the cockpit floor as a reference. Use medium CA to glue the control stick to the cockpit floor.



➔ *We drilled a small hole in the bottom of the stick and used a #2 x 1/4-inch sheet metal screw to secure the control stick to the cockpit floor.*

☐ 2. Prepare the instrument panel. Fit the instrument panel in the cockpit, then use medium CA to glue the instrument panel into position.

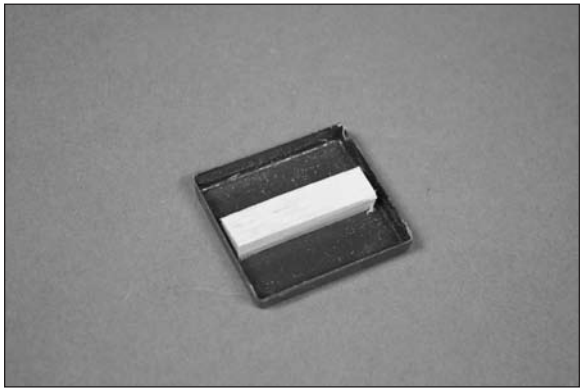


☐ 3. Fit the side panels in the cockpit. Once fit, use medium CA to glue the side panels into position. Glue the seat into the cockpit using medium CA. Position the seat so it is centered behind the control stick.

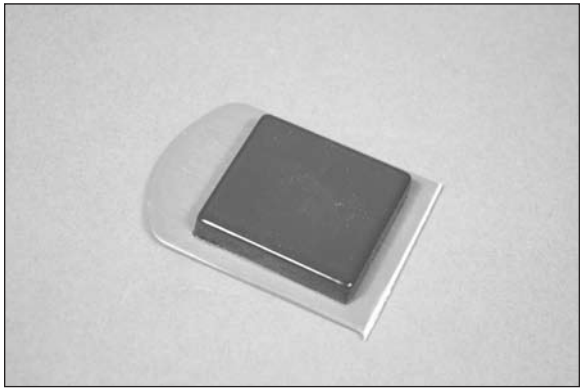




☐ 4. Prepare the headrest by trimming the excess material around the headrest using hobby scissors. Glue a balsa block (not included) in the headrest so it can be attached to the headrest mount.



☐ 5. Use medium CA to glue the balsa block to the headrest mount.



☐ 6. Use medium CA to glue the headrest mount to the rear of the cockpit. Make sure to center the headrest mount with the seat.



☐ 7. Mount the cockpit kit in the fuselage using two 4-40 x 1/2-inch socket head cap screws and two #4 washers. The front of the cockpit keys into the former in the fuselage. Use a 3/32-inch hex wrench to tighten the screws.



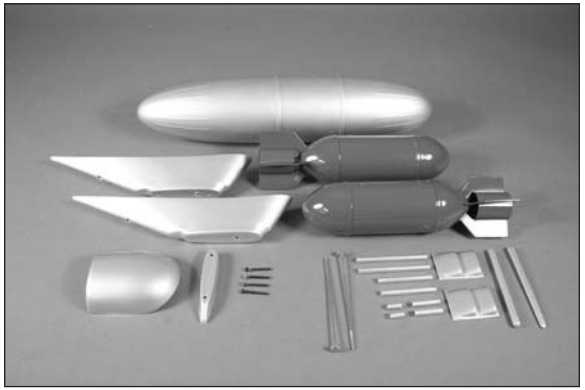
Accessory Installation

Required Parts

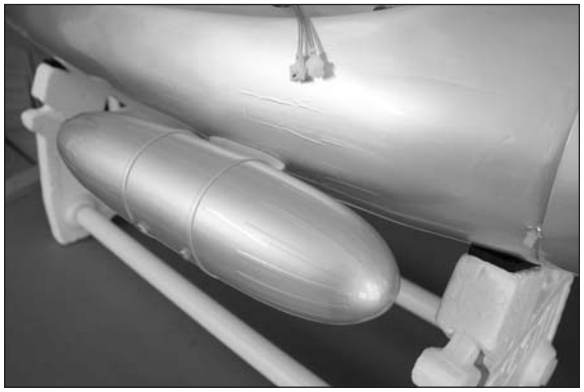
Fuselage assembly	Wing assembly (left and right)
Bomb (2)	Bomb pylon (2)
Centerline tank	Centerline tank fairing
Exhaust details (2)	Turbo charger lower scoop
Antenna mast	Pitot tube

$4^1/_2$-inch thumb bolts (2)
4-40 x 1/2-inch socket head cap screw (4)
4-40 x 1-inch socket head cap screw (4)
M6 x 80 aluminum tube (2)
M6 x 60 aluminum tube (2)
M6 x 40 aluminum tube (2)
M6 x 20 aluminum tube (2)

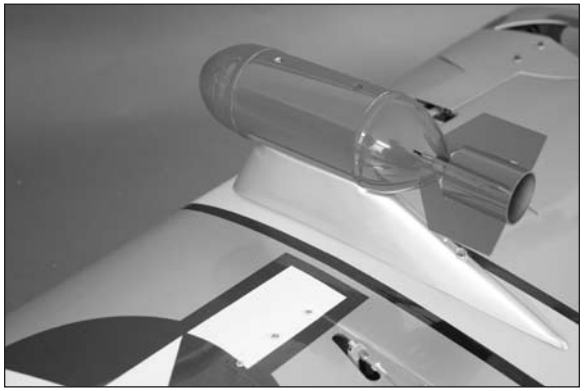
☐ 1. Locate the items for this section of the manual.



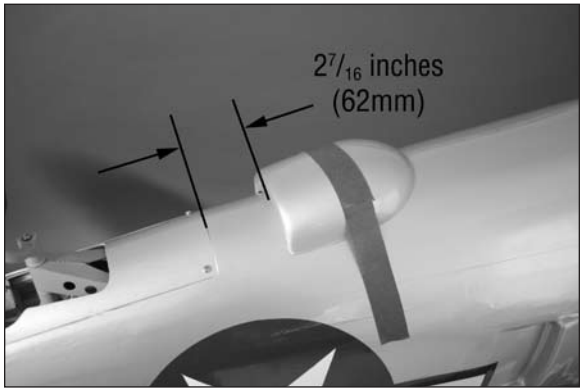
☐ 2. Locate the pre-installed blind nut in the bottom of the fuselage. Remove the covering so they can be accessed using a hobby knife and #11 blade. Secure the centerline tank using the two $4^1/_2$-inch thumb bolts and the centerline tank fairing.



☐ 3. Locate the pre-installed blind nut in the bottom of the wing. Remove the covering so the blind nuts can be accessed using a hobby knife and #11 blade. Secure the bomb pylon using two 4-40 x 1-inch socket head cap screws. The bomb is then attached to the pylon using two 4-40 x 1/2-inch socket head cap screws. Make sure to use threadlock on the screws before tightening them using a 3/32-inch hex wrench. Install both bombs and pylons at this time.

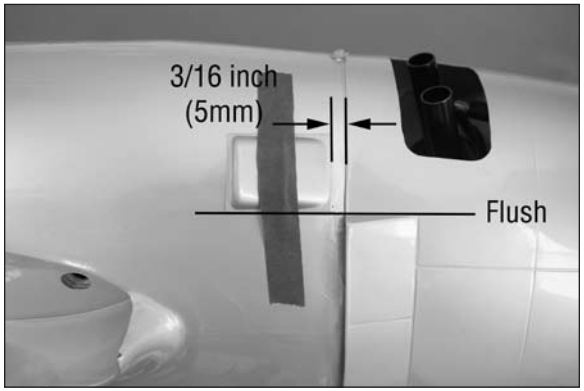


☐ 4 Use canopy glue to attach the turbo charger lower scoop to the fuselage. Use low-tack tape to hold the scoop tightly against the fuselage until the glue fully cures.

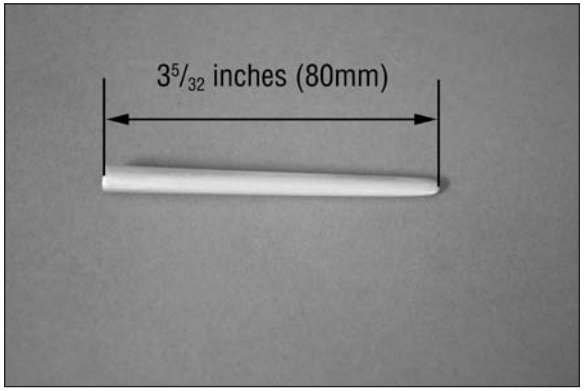


➔ *Hold a sheet of sandpaper tightly against the bottom of the fuselage, then slide the scoop on the sandpaper to sand it to fit the contour of the fuselage before gluing it to the fuselage.*

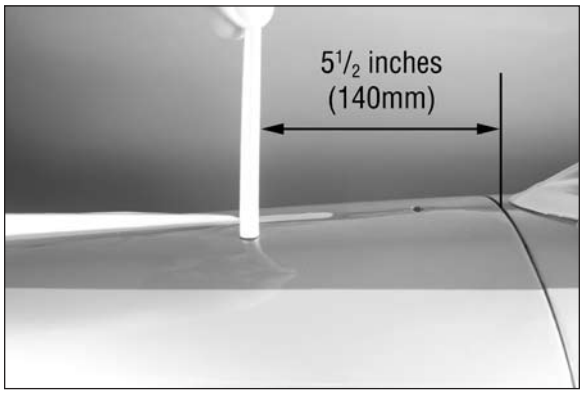
☐ 5. Use canopy glue to secure the exhaust details to the bottom of the fuselage. Use low-tack tape to hold the exhaust details tightly against the fuselage until the adhesive cures. Glue both exhausts to the fuselage at this time.



☐ 6. Use a razor saw to cut the antenna mast so it is $3^5/_{32}$ inches (80mm) in height.

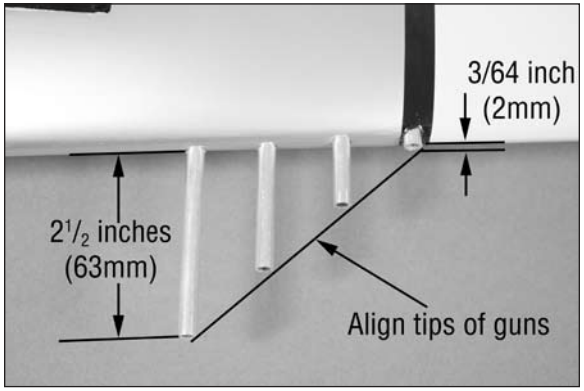


☐ 7. Use canopy glue to glue the antenna mast to the fuselage. The mast is positioned to the right of the dorsal fin and near the tip of the fin as shown.



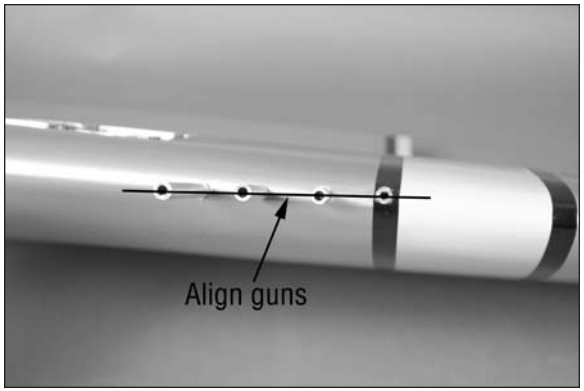
➔ *Visit www.horizonhobby.com for an alternate method of mounting the antenna mast so it can be removed and used to open the canopy hatch.*

☐ 8. Use a piece of music wire heated with a small torch to remove the covering from the leading edge for the machine guns. This will leave a clean edge around the openings. Position the inboard and outboard guns using the measurement shown. The two guns in the center are aligned by placing a straight edge between the inboard and outboard guns and sliding the inner guns so they touch the straight edges



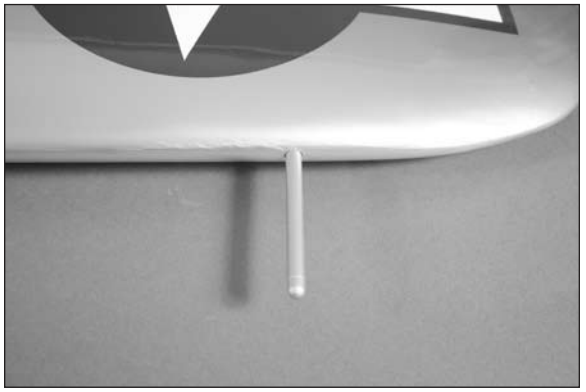
⚠ ***CAUTION:*** *Use a pair of pliers to hold the music wire when removing covering to avoid direct contact with the heated wire. Touching a hot wire can lead to burns.*

☐ 9. Check that the guns are also aligned with each other. They should also be parallel as shown in the previous step. Glue the guns into position using a small amount of thin CA wicked into the opening for the guns.



➔ *The guns can be polished using metal polish and a hand drill. Make sure to mount the guns partially in the drill to avoid scratching any part of the gun that may be visible when installed.*

☐ 10. Use a piece of music wire heated with a small torch to remove the covering from the leading edge for the pitot tube. Glue the pitot tube in the leading edge using thin CA.



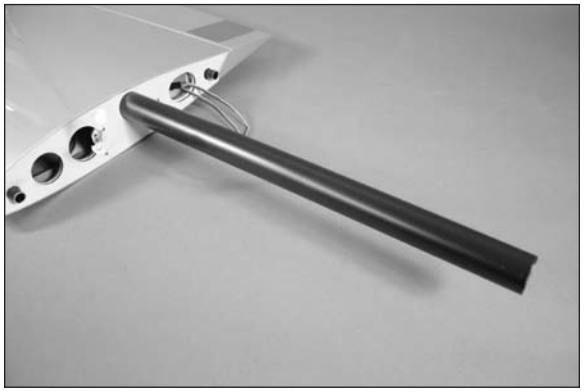
➔ *Visit www.horizonhobby.com for an alternate method of mounting the pitot tube so it can be removed during transportation of the model.*

Wing Installation

Required Parts

Fuselage assembly Wing assembly
1/4-20 x 2-inch nylon wing bolt (2)
$1^{1}/_{4}$-inch x $29^{3}/_{8}$-inch anodized tube

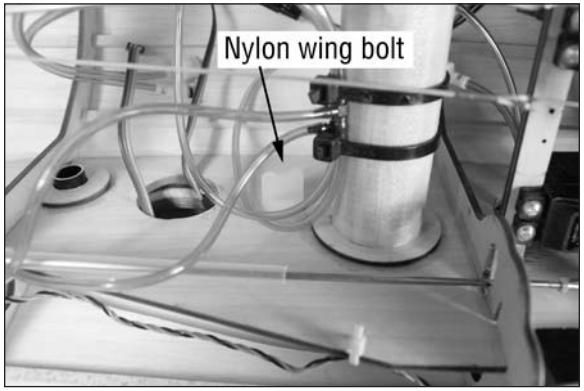
☐ 1. Slide the wing tube into one of the wing panels. Only slide the tube in as far as it will easily slide. Forcing the tube could possibly damage the wing.



☐☐ 2. Slide the wing panel and tube into position on the fuselage. Make sure to guide the aileron and flap servo leads into the fuselage. Also connect the air lines for the retracts if retracts have been installed.



☐☐ 3. Secure the wing using a 1/4-20 x 2-inch nylon wing bolt.



➔ *We used a razor saw to cut the nylon wing bolts to a length of 1¼ inches to make them easier to install.*

☐ 4. Repeat steps 2 and 3 to install the remaining wing panel. Once the panels are installed, the canopy hatch can be installed to complete your model.

Decal Installation

Required Parts

Fuselage assembly Wing assembly
Decal sheet (Wicked Wabbit, Hun Hunter or Lil Abner)

☐ 1. Apply the decals to your model using the photos located in this section of the manual and the box art from your model. Use a spray bottle and a drop of dish washing liquid sprayed onto the model in the location of the decal to allow repositioning. Use a paper towel as a squeegee to remove excess water from under the decal. Allow the model to rest overnight so the remaining water can evaporate.

Use the following photos as a reference when installing the decals. Three different trim schemes have been provided.

DECAL INSTALLATION: WICKED WABBIT











DECAL INSTALLATION: HUN HUNTER





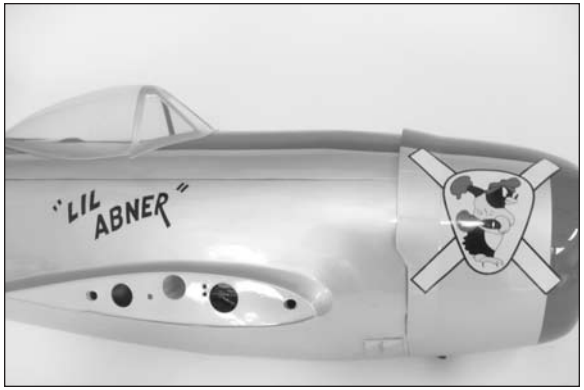


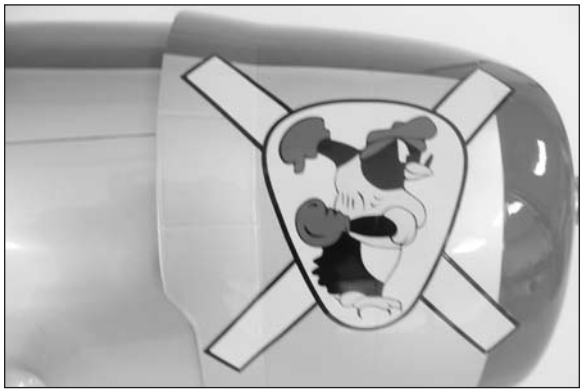




DECAL INSTALLATION: LIL ABNER









Center of Gravity

Required Parts

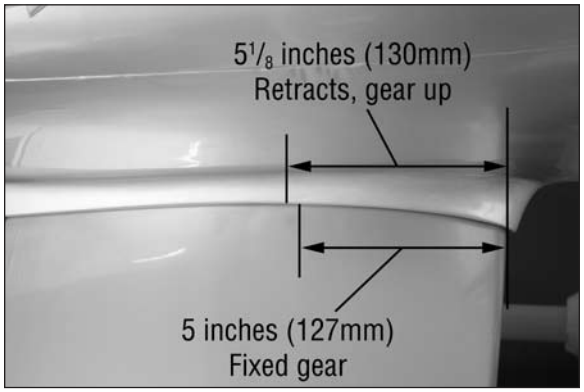
Fuselage assembly

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

CAUTION: Do not inadvertently skip this step!

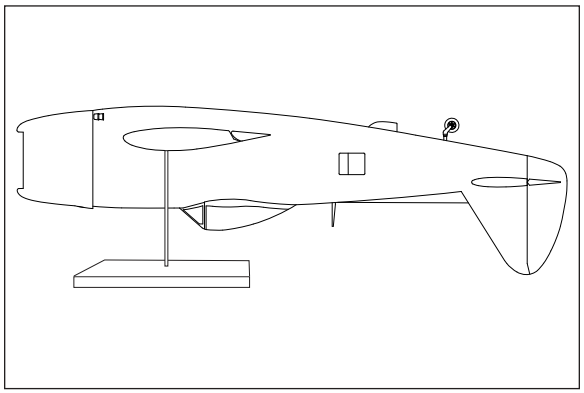
☐ 1. Attach the wing panels to the fuselage. Make sure to connect all the leads from the wing to the appropriate leads from the receiver.

☐ 2. The recommended Center of Gravity (CG) location for your model is 5 1/8 inches (130mm) back from the leading edge of the top wing at the center. This measurement is to be used with retracts, and the gear in the UP position. When flying with fixed gear, balance your model at 5 inches (127mm) back from the leading edge of the wing. Mark the location of the CG on the top of the wing with a felt-tipped pen.



➔ *The same 5 1/8 inches (130mm) balance point can be measured at the wing tip by measuring forward 3 1/2 inches (89mm) from the inside corner of the aileron hinge line.*

☐ 3. When balancing your model, make sure it is assembled and ready for flight. Support the plane inverted at the marks made on the wing with your fingers, or use a commercially available balancing stand. This is the correct balance point for your model.



☐ 4. You should find the CG to be very close with the components installed as shown in this manual. If the nose of your aircraft hangs low, add weight to the rear of the aircraft. If the tail hangs low, add weight to the nose of the aircraft. Self-stick weights (HAN3626) are available at your local hobby store and work well for this purpose.

After the first flights, the CG position can be adjusted for your personal preference. Use a balance point between 5–5 1/2 inches (127mm–140mm) to maintain great flying characteristics.

Control Throws

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

☐ 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.

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

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

Aileron:

High Rate: (30% Exponential)			
Up:	3/4 inches	19mm	17 degrees
Down:	9/16 inches	14mm	14 degrees
Low Rate: (20% Exponential)			
Up:	9/16 inches	14mm	13 degrees
Down:	7/16 inches	11mm	10 degrees

Elevator:

High Rate: (40% Exponential)			
Up:	1 1/8 inches	29mm	18 degrees
Down:	1 1/8 inches	29mm	18 degrees
Low Rate: (20% Exponential)			
Up:	3/4 inches	19mm	12 degrees
Down:	3/4 inches	19mm	12 degrees

Rudder:

High Rate: (25% Exponential)			
Right:	1 1/8 inches	29mm	18 degrees
Left:	1 1/8 inches	29mm	18 degrees
Low Rate: (20% Exponential)			
Right:	3/4 inches	19mm	12 degrees
Left:	3/4 inches	19mm	12 degrees

Flap:

Mid	1 1/2 inches	38mm	20 degrees
Elevator compensation:			
	1/16 inch (1.5mm) down elevator		
Full	3 3/8 inches	86mm	40 degrees
Elevator compensation:			
	1/8 inch (3mm) down elevator		

➔ *The flap servo speed can be reduced at the transmitter to help reduce the ballooning effect when applying the flaps.*

➔ *We have provided a flap throw gauge at the back of the manual. Use the template to cut a piece of cardstock. Placing it under the wing to set the amount of flap throw.*

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

➔ *Travel Adjust and Sub-Trims are not listed and should be adjusted according to each individual model and preference. Always install the control horns 90 degrees to the servo centerline. Use sub-trim as a last resort to center the servos.*

➔ *We highly recommend re-binding the radio system once all the control throws are set. This will keep the servos from moving to their endpoints until the transmitter and receiver connect.*

Before your first flight

Prior to your first flight, we recommend that you do some low speed taxi tests. Use these tests to center the tail wheel steering by adjusting the pull/pull cables to allow for a takeoff straight down the runway. Once you have finished, be sure and take a minute to refuel the fuel tank ,fill the Retract air tank, and take one last look at the airframe to be sure all screws and control linkages are secure.

Until you have the model trimmed and have adjusted the elevator compensation mix during the first flights, it is recommend that you do not use the flaps for the first takeoff. Once you have the model trimmed for straight and level flight, you then can proceed to adjust the elevator compensation mix.

Start with the recommended settings in this manual to begin the process of adjusting the elevator compensation. Take off and adjust the elevator trim for level flight with the gear retracted. Next, slow the model to approximately half throttle and lower the landing gear. Once the landing gear has been lowered, move the flaps to the MID/ takeoff position and observe how the model maintains altitude, making note of any adjustments needed to keep the model level or of any tendencies of the model to roll. Next, lower the flaps to the FULL/landing position and then reduce the throttle to what would be considered a slow landing approach speed. Observe how the model maintains altitude and make note of any adjustments needed to the keep the model level, noting any tendencies of the model to roll.

TAKEOFF

For subsequent flights with the P-47D-40 Thunderbolt using MID flaps for take off, maintain a shallow rate of climb and allow the model to gain speed prior to making the first turn. The flaps should be retracted at this point and you should be entering into the normal traffic pattern. If you are using retracts, we suggest that you retract the landing gear prior to retracting the flaps.

LANDING

To set up for a landing, enter an upwind leg to the runway at a comfortable altitude. As soon as you establish yourself on approach, reduce power, extend the landing gear, and extend the flaps to MID/takeoff to allow plenty of time for them to cycle fully and the airspeed to stabilize. This gives you the added benefit of verifying that you have all three wheels down and locked prior to entering the downwind leg. Make a gentle turn to align yourself parallel with the runway at a comfortable distance out. Once you are nearing the approach end of the runway on your downwind leg, fully extend the flaps to the FULL/landing position and allow the airspeed to stabilize prior to turning base and final. Once you are on final, use the elevator to control airspeed and the throttle to control your altitude. Once you pass over the runway threshold, reduce the power completely and begin to flatten out your descent to flare for landing. Should you overshoot the runway, gradually increase power to full and use the rudder to keep the airplane tracking straight for a second attempt.

Preflight

Check Your Radio

Before going to the field, ensure your batteries are fully charged per your radio's instructions. Charge the transmitter and motor battery for your airplane. Use the recommended charger supplied with your radio system, following the instructions provided. In most cases, the radio should be charged the night before going out flying.

Prior to each flying session, make sure to range check your radio. See your radio manual for the recommended range and instructions for your radio system. Each radio manufacturer specifies different procedures for their radio systems. Next, run the motor. With the model securely anchored, check the range again. The range test should not be significantly affected. If it is, don't attempt to fly! Have your radio equipment checked out by the manufacturer.

Double-check that all controls (aileron, elevator, rudder and throttle) move in the correct direction.

Check the radio installation and make sure all control surfaces are moving correctly (i.e., the correct direction and with the recommended throws).

Check all the control horns, servo horns and clevises to make sure they are secure and in good condition.

Range Test Your Radio

Before each flying session, and especially with a new model, it is important to perform a range check. It is helpful to have another person available to assist during the range check. If you are using a Spektrum™ transmitter, please refer to your transmitter's manual for detailed instructions on the range check process.

Safety Do's and Don'ts for Pilots

- Consult local laws and ordinances before choosing a location to fly your aircraft.
- 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 to property.
- Do not fly during adverse weather conditions. Poor visibility or strong winds can cause disorientation and loss of control of your aircraft.
- 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.
- Do not fly near power lines.

Daily Flight Checks

- 1. Check the battery voltage of the transmitter battery. Do not fly below the manufacturer's recommended voltage. To do so can crash your aircraft.

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

- 2. Check all hardware (linkages, screws, nuts, and bolts) prior to each day's flight. Ensure that binding does not occur and that all parts are properly secured.
- 3. Ensure all surfaces are moving in the proper manner.
- 4. Perform a ground range check before each day's flying session.
- 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 sound a warning.
- 6. Check that all trim levers are in the proper location.
- 7. All servo pigtails and switch harness plugs should be secured in the receiver. Make sure the switch harness moves freely in both directions.

Limited Warranty

WHAT THIS WARRANTY COVERS

Horizon Hobby, Inc. ("Horizon") warrants to the original purchaser that the product purchased (the "Product") will be free from defects in materials and workmanship at the date of purchase.

WHAT IS NOT COVERED

This warranty is not transferable and does not cover (i) cosmetic damage, (ii) damage due to acts of God, accident, misuse, abuse, negligence, commercial use, or due to improper use, installation, operation or maintenance, (iii) modification of or to any part of the Product, (iv) attempted service by anyone other than a Horizon Hobby authorized service center, or (v) Products not purchased from an authorized Horizon dealer.

OTHER THAN THE EXPRESS WARRANTY ABOVE, HORIZON MAKES NO OTHER WARRANTY OR REPRESENTATION, AND HEREBY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE PURCHASER ACKNOWLEDGES THAT THEY ALONE HAVE DETERMINED THAT THE PRODUCT WILL SUITABLY MEET THE REQUIREMENTS OF THE PURCHASER'S INTENDED USE.

PURCHASER'S REMEDY

Horizon's sole obligation and purchaser's sole and exclusive remedy shall be that Horizon will, at its option, either (i) service, or (ii) replace, any Product determined by Horizon to be defective. Horizon reserves the right to inspect any and all Product(s) involved in a warranty claim. Service or replacement decisions are at the sole discretion of Horizon. Proof of purchase is required for all warranty claims. SERVICE OR REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE PURCHASER'S SOLE AND EXCLUSIVE REMEDY.

LIMITATION OF LIABILITY

HORIZON SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY, REGARDLESS OF WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, TORT, NEGLIGENCE, STRICT LIABILITY OR ANY OTHER THEORY OF LIABILITY, EVEN IF HORIZON HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. 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 the Product, purchaser is advised to return the 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). This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Horizon reserves the right to change or modify this warranty at any time without notice.

Warranty Services

QUESTIONS, ASSISTANCE, AND SERVICES

Your local hobby store and/or place of purchase cannot provide warranty support or service. 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 Product Support representative. You may also find information on our website at www.horizonhobby.com.

INSPECTION OR SERVICES

If this Product needs to be inspected or serviced, please use the Horizon Online Service Request submission process found on our website or call Horizon to obtain a Return Merchandise Authorization (RMA) number. 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. An Online Service Request is available at http://www.horizonhobby.com under the Support tab. If you do not have internet access, please contact Horizon Product Support to obtain a RMA number along with instructions for submitting your product for service. When calling Horizon, you will be asked to provide your complete name, street address, email address and phone number where you can be reached during business hours. When sending product into Horizon, please include your RMA number, a list of the included items, and a brief summary of the problem. A copy of your original sales receipt must be included for warranty consideration. Be sure your name, address, and RMA number are clearly written on the outside of the shipping carton.

Notice: Do not ship LiPo batteries to Horizon. If you have any issue with a LiPo battery, please contact the appropriate Horizon Product Support office.

WARRANTY REQUIREMENTS

For Warranty consideration, you must include your original sales receipt verifying the proof-of-purchase date. Provided warranty conditions have been met, your Product will be serviced or replaced free of charge. Service or replacement decisions are at the sole discretion of Horizon.

NON-WARRANTY SERVICE

Should your service not be covered by warranty service 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 service you are agreeing to payment of the service without notification. Service estimates are available upon request. You must include this request with your item submitted for service. Non-warranty service estimates will be billed a minimum of ½ hour of labor. In addition you will be billed for return freight. Horizon accepts money orders and cashiers checks, as well as Visa, MasterCard, American Express, and Discover cards. By submitting any item to Horizon for service, you are agreeing to Horizon's Terms and Conditions found on our website http://www.horizonhobby.com/Service/Request.

UNITED STATES

(Electronics and engines)
Horizon Service Center
4105 Fieldstone Rd
Champaign, Illinois
61822 USA
productsupport@horizonhobby.com
877-504-0233
Online Repair Request visit:
www.horizonhobby.com/service

(All other products)
Horizon Product Support
4105 Fieldstone Rd
Champaign, Illinois
61822 USA
productsupport@horizonhobby.com
877-504-0233

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14 Rue Gustave Eiffel
Zone d'Activité du Réveil Matin
91230 Montgeron
+33 (0) 1 60 47 44 70

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.

Academy of Model Aeronautics National Model Aircraft Safety Code

Effective January 1, 2011

A. GENERAL

A model aircraft is a non-human-carrying aircraft capable of sustained flight in the atmosphere. It may not exceed limitations of this code and is intended exclusively for sport, recreation and/or competition. All model flights must be conducted in accordance with this safety code and any additional rules specific to the flying site.

1. Model aircraft will not be flown:
   (a) In a careless or reckless manner.
   (b) At a location where model aircraft activities are prohibited.
2. Model aircraft pilots will:
   (a) Yield the right of way to all man carrying aircraft.
   b) See and avoid all aircraft and a spotter must be used when appropriate. (AMA Document #540-D-See and Avoid Guidance.)
   (c) Not fly higher than approximately 400 feet above ground level within three (3) miles of an airport, without notifying the airport operator.
   (d) Not interfere with operations and traffic patterns at any airport, heliport or seaplane base except where there is a mixed use agreement.
   (e) Not exceed a takeoff weight, including fuel, of 55 pounds unless in compliance with the AMA Large Model Aircraft program. (AMA Document 520-A)
   (f) Ensure the aircraft is identified with the name and address or AMA number of the owner on the inside or affixed to the outside of the model aircraft. (This does not apply to model aircraft flown indoors).
   (g) Not operate aircraft with metal-blade propellers or with gaseous boosts except for helicopters operated under the provisions of AMA Document #555.
   (h) Not operate model aircraft while under the influence of alcohol or while using any drug which could adversely affect the pilot's ability to safely control the model.
   (i) Not operate model aircraft carrying pyrotechnic devices which explode or burn, or any device which propels a projectile or drops any object that creates a hazard to persons or property.

Exceptions:

- Free Flight fuses or devices that burn producing smoke and are securely attached to the model aircraft during flight.
- Rocket motors (using solid propellant) up to a G-series size may be used provided they remain attached to the model during flight. Model rockets may be flown in accordance with the National Model Rocketry Safety Code but may not be launched from model aircraft.
- Officially designated AMA Air Show Teams (AST) are authorized to use devices and practices as defined within the Team AMA Program Document (AMA Document #718).
  (j) Not operate a turbine-powered aircraft, unless in compliance with the AMA turbine regulations. (AMA Document #510-A).

3. Model aircraft will not be flown in AMA sanctioned events, air shows or model demonstrations unless:
   (a) The aircraft, control system and pilot skills have successfully demonstrated all maneuvers intended or anticipated prior to the specific event.
   (b) An inexperienced pilot is assisted by an experienced pilot.
4. 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.

B. RADIO CONTROL (RC)

1. All pilots shall avoid flying directly over unprotected people, vessels, vehicles or structures and shall avoid endangerment of life and property of others.
2. A successful radio equipment ground-range check in accordance with manufacturer's recommendations will be completed before the first flight of a new or repaired model aircraft.
3. At all flying sites a safety line(s) must be established in front of which all flying takes place (AMA Document #706-Recommended Field Layout):
   (a) Only personnel associated with flying the model aircraft are allowed at or in front of the safety line.
   (b) At air shows or demonstrations, a straight safety line must be established.
   (c) An area away from the safety line must be maintained for spectators.
   (d) Intentional flying behind the safety line is prohibited.
4. RC model aircraft must use the 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.
5. RC model aircraft will not operate within three (3) miles of any pre-existing flying site without a frequency-management agreement (AMA Documents #922- Testing for RF Interference; #923- Frequency Management Agreement)

6. With the exception of events flown under official AMA Competition Regulations, excluding takeoff and landing, no powered model may be flown outdoors closer than 25 feet to any individual, except for the pilot and the pilot's helper(s) located at the flight line.
7. 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. This does not apply to model aircraft flown indoors.
8. RC night flying requires a lighting system providing the pilot with a clear view of the model's attitude and orientation at all times.
9. The pilot of a RC model aircraft shall:
   (a) Maintain control during the entire flight, maintaining visual contact without enhancement other than by corrective lenses prescribed for the pilot.
   (b) Fly using the assistance of a camera or First-Person View (FPV) only in accordance with the procedures outlined in AMA Document #550.

C. FREE FLIGHT

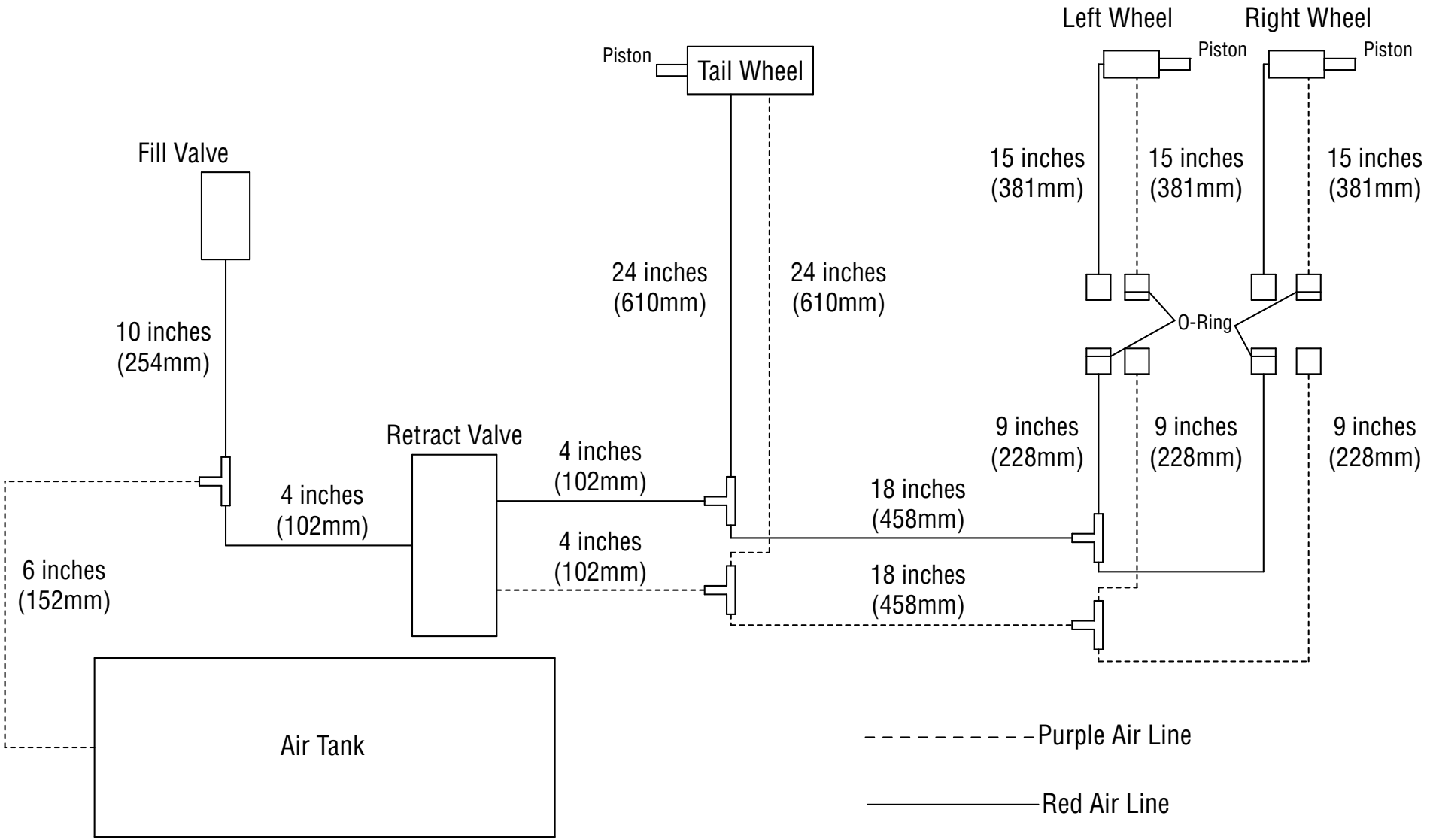
1. Must be at least 100 feet downwind of spectators and automobile parking when the model aircraft is launched.
2. Launch area must be clear of all individuals except mechanics, officials, and other fliers.
3. An effective device will be used to extinguish any fuse on the model aircraft after the fuse has completed its function.

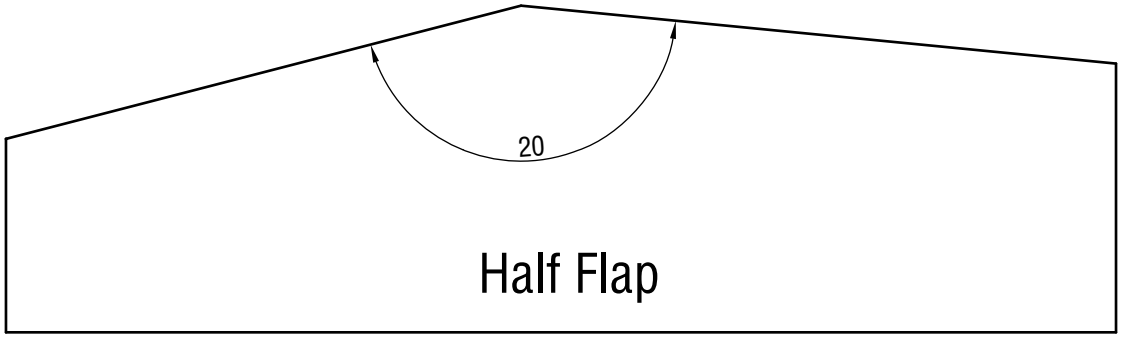
D. CONTROL LINE

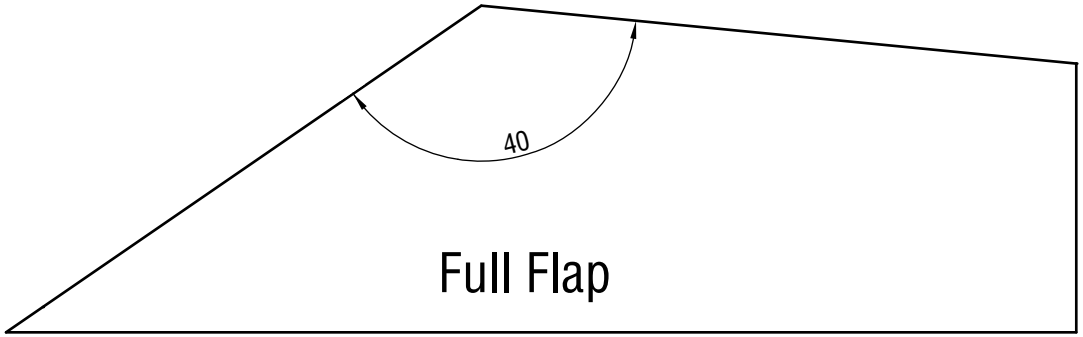
1. The complete control system (including the safety thong where applicable) must have an inspection and pull test prior to flying.
2. The pull test will be in accordance with the current Competition Regulations for the applicable model aircraft category.
3. Model aircraft not fitting a specific category shall use those pull-test requirements as indicated for Control Line Precision Aerobatics.
4. The flying area must be clear of all utility wires or poles and a model aircraft will not be flown closer than 50 feet to any above-ground electric utility lines.
5. The flying area must be clear of all nonessential participants and spectators before the engine is started.

Building and Flying Notes

Air Line Installation Guide




20
Half Flap


40
Full Flap

HANGAR 9®

HORIZON™ HOBBY

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