Piper L-4 Grasshopper ARF

Assembly Manual

Specifications

Wingspan:	38.2 in (970mm)
Length:	23.7 in (600mm)
Wing Area:	210 sq in (13.5 sq dm)
Weight w/o Battery:	8.00–8.70 oz (227–247 g)
Weight w/Battery:	9.00–9.70 oz (255–275 g)

E-flite®
ADVANCING ELECTRIC FLIGHT

Table of Contents

Introduction

Combining the compact size of a classic balsa free-flight model with full 4-channel control, the Piper L-4 Grasshopper 250 is an exciting alternative to the usual park flyer experience. Its exceptionally low parts count and time saving features like the magnetically-secured plug-in wings make assembly about as easy as it gets for an ARF.

In the air, its docile flight characteristics and gorgeous scale appearance will reward you with one of the most enjoyable park flying experiences available. Plus, it's small enough and slow enough to fly in a large indoor venue whenever the park isn't an option.

Important Warranty Information

Please read our Warranty and Liability Limitations section on Page 20 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 its completion. Steps with a single circle (○) are performed once, while steps with two circles (○ ○) indicate that the step will require repeating, such as for a right or left wing panel, two servos, etc.

Remember to take your time and follow the directions.

Age Requirements

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

Product Registration

Register your product online at:
www.e-fliterc.com/register/

Contents of Kit/Parts Layout

EFL5026	Fuselage
EFL5027	Wing Panels L&R
EFL5028	Tail Set
EFL5029	Landing Gear
EFL5030	Cowling
EFL5031	Main Wheel Set
EFL5032	Windshields
EFL5033	Hardware
EFL5034	Pushrods
EFL5035	Main Struts

UltraCote® Covering Colors

HANU874	Black
HANU0811	ParkLite™ Olive Drab
HANU0816	ParkLite™ Gray
HANU870	White

Recommended Radio Equipment

You will need a minimum of a 4-channel transmitter, receiver and four servos. You can choose to purchase a complete radio system. If you are using an existing transmitter, just purchase the other required equipment separately. We recommend the crystal-free, interference-free Spektrum™ DX6i 2.4GHz DSM® 6-channel system. If using your own transmitter, we recommend using four 6.0-Gram Super Sub-Micro servos from Spektrum.

If you own a Spektrum radio, just add an AR6300 DSM2™ receiver and four 6.0-Gram Super Sub-Micro servos. The SPMAR6300F flight pack works perfectly for this application. We show the installation of the AR6300 receiver in the manual.

Transmitter
SPMR6600   DX6i 6-Channel Full Range w/o Servos or Receiver

Receiver and Servos
SPMAR6300F   AR6300 DSM2 Nanolite 6-Channel Receiver FlightPack

Servos only
SPMDSP60J   6.0-Gram Super Sub-Micro Digital Programmable Servo JST (4)

Receiver only
SPMAR6300   AR6300 DSM2 Nanolite 6-Channel Receiver, Air

Also required
SPMYHJST3UL   3-inch Y-Harness JST Ultra Lightweight

SPMEXJST3UL   3-inch JST Extension Ultra Lightweight

OR
SPMEXJST6UL   6-inch Y-Harness JST Ultra Lightweight (2)(Optional for computer radios)

Optional Accessories

EFLA110   Power Meter
EFLC3005   Celectra™ 1- to 3-Cell Li-Po Charger
EFLC505   Intelligent 1- to 5-Cell Balancing Charger

Brushless Outrunner Setup

EFLM1130   Park 250 Brushless Outrunner Motor, 2200Kv
GWSEP6050   6 x 5 Slow Flyer Propeller
EFLA1010   10-Amp Pro Brushless ESC
EFLB4302SJ   430mAh 2S 7.4V 20C Li-Po, 20AWG JST

Optional battery:
THP7302SJPL2   730mAh 2S 7.4V 20C Pro Lite V2 Li-Po, JST

Required Tools and Adhesives

Tools & Equipment

Cardstock	Clear tape
Hobby scissors	Hobby knife (#11 blade)
Low-tack tape	Medium grit sandpaper
Pencil	Pin vise
Pliers	Ruler (EFLA264)

Hex wrench: .050-inch
Phillips Screwdriver: #00, #0
Flat blade screwdriver: 1.5mm
Drill bit: 1/16-inch (1.5mm), 5/64-inch (2mm)

Adhesives
Medium CA
Threadlock

Note on Lithium Polymer Batteries

Lithium Polymer batteries are significantly more volatile than alkaline or Ni-Cd/Ni-MH batteries used in RC applications. All manufacturer's instructions and warnings must be followed closely. Mishandling of Li-Po batteries can result in fire. Always follow the manufacturer's instructions when disposing of Lithium Polymer batteries.

Warning

An RC aircraft is not a toy! If misused, it can cause serious bodily harm and damage to property. Fly only in open areas, preferably at AMA (Academy of Model Aeronautics) approved flying sites, following all instructions included with your radio.

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.

Covering Warning

The Piper L-4 Grasshopper is built very light to achieve the best flight performance possible. When using an iron or heat gun to shrink the covering or to tighten up any wrinkles, it is very important that care is taken not to warp any of the surfaces. It is possible to induce warps into the surfaces during this procedure. We suggest taking your time and care to make sure that no warps are caused as this will affect the flight performance of the airplane.

E-tips

During the course of building your model we suggest that you use a soft base for the building surface. Such things as a foam stand, large piece of bedding foam or a thick bath towel will work well and help protect the model from damage during assembly. This is not shown in the assembly photographs to display the detail of the actual building of the model.

E-tips

Your L-4 Grasshopper has been assembled using the techniques that keep the weight as low as possible for the best flight performance. Please handle the airframe with care during assembly and during transportation to keep from damaging it accidentally.
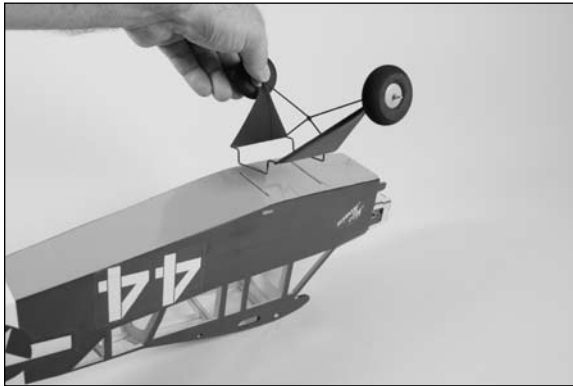
Landing Gear Installation

Required Parts

Fuselage assembly   Landing gear

Required Tools and Adhesives

Medium CA

○   1. Locate the landing gear. The gear will fit in the two slots on the bottom of the fuselage. Note that the straight edge and the wheels will be to the front of the aircraft.


E-tips

Use care not to damage the fuselage when installing the landing gear.

○   2. Press the landing gear in the slots in the bottom of the fuselage. The landing gear should fit flush against the fuselage.
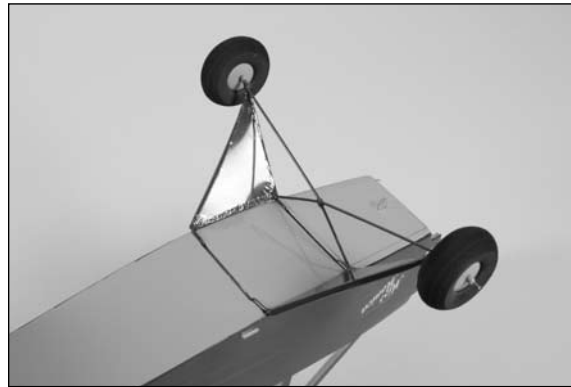
○   3. The landing gear will fit snugly into the slot in the fuselage. If you do not plan to remove the landing gear at any time then we suggest that you tack glue it in the slot with medium CA. If you do not glue the landing gear in, you will need to check it periodically to make sure that it does not become loose over time.
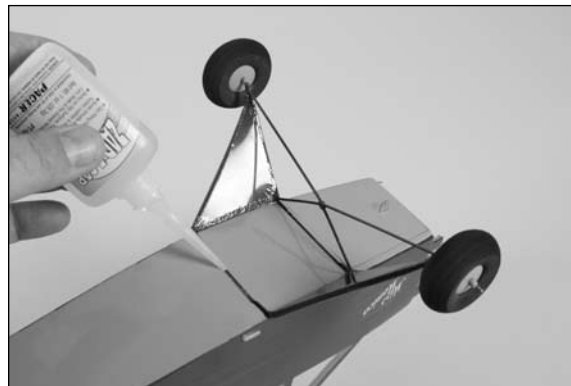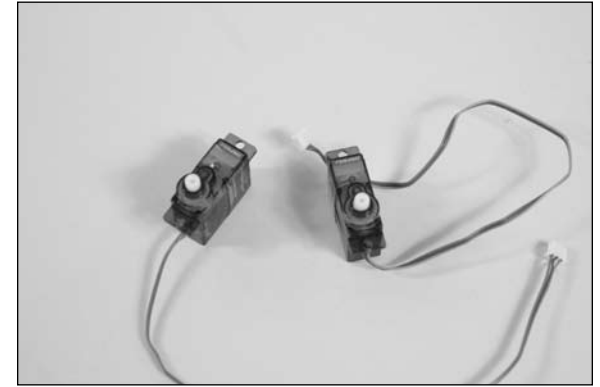

Servo Installation

Required Parts

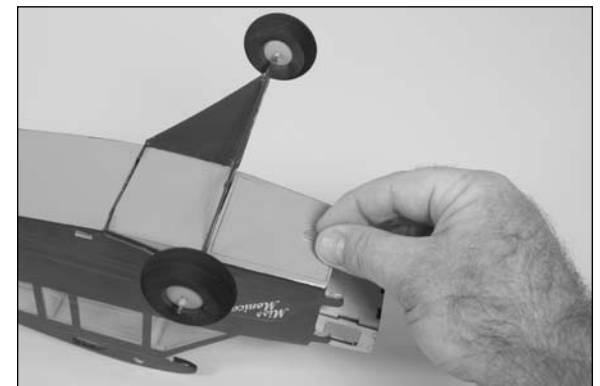Fuselage assembly   Servo with hardware (2)

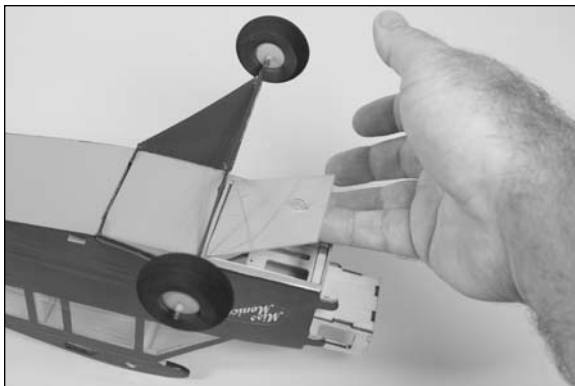**Required Tools and Adhesives**

Phillips screwdriver: #00, #0

○   1. Use a #00 Phillips screwdriver to remove the servo horns from the rudder and elevator servos. Set the horns and screws aside for later.


○   2. Use the tab on the battery hatch to remove it from the fuselage. Set the battery hatch aside in a safe place for later.

❍ 3. Place one of the servos in the fuselage. You will notice a slot in the rear servo rail. This is clearance for the servo wire. The output shaft will face to the rear of the aircraft. Once the servo is set on the rails slide it to one side of the fuselage. Do not secure the servo until instructed to do so.
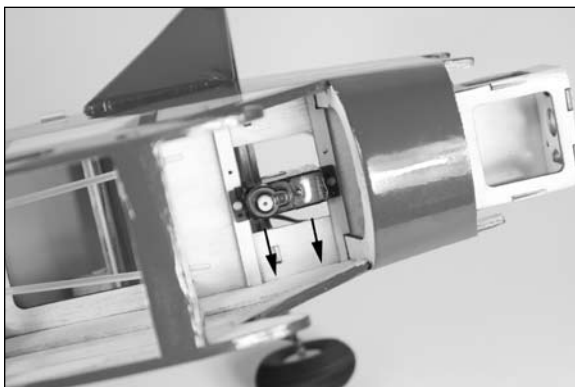
❍ 4. Insert the second servo in the fuselage. Slide it to the other side of the fuselage and align both servos with the predrilled holes in the servo rails.
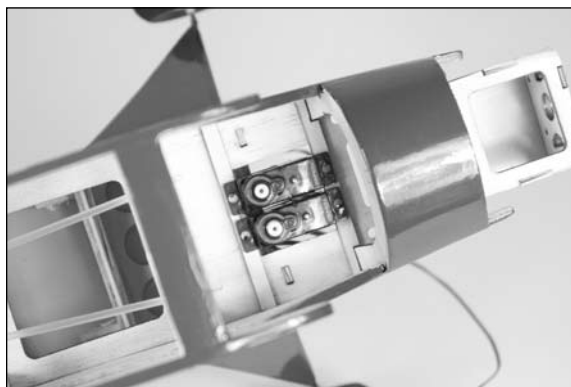
❍ 5. Use a #0 Phillips screwdriver and the screws provided with the servos to secure them in the fuselage.
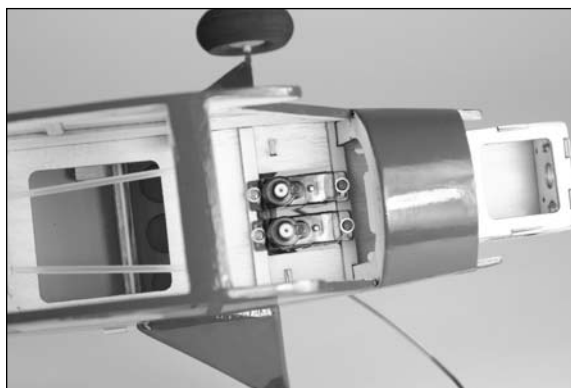
## Receiver and Speed Control Installation

Required Parts

|	
Fuselage assembly	Receiver
Adapter plug	Y-harness
Hook and loop tape	Speed control
Servo extension, 3-inch (76mm)	

Required Tools and Adhesives

Hobby scissors

❍ 1. Plug the 3-inch (76mm) extension into the aileron port of the receiver and the Y-harness into the extension. The adapter will be plugged into the port for the throttle/speed control. It will also be easier to bind the receiver to the transmitter now before installing it in the fuselage.
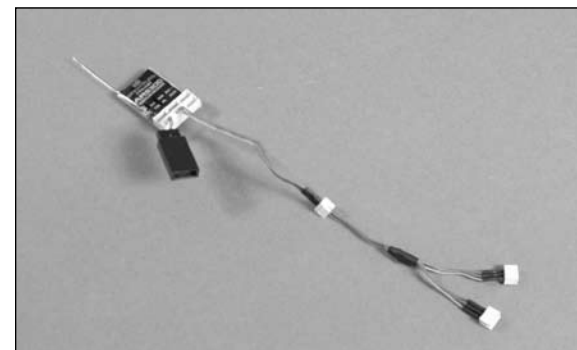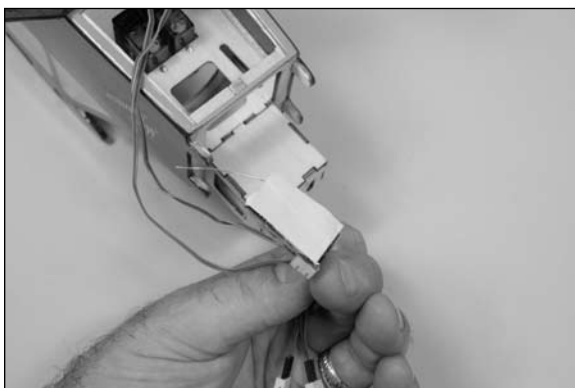

❍ 2. Plug the rudder and elevator servos into their respective ports of the receiver.
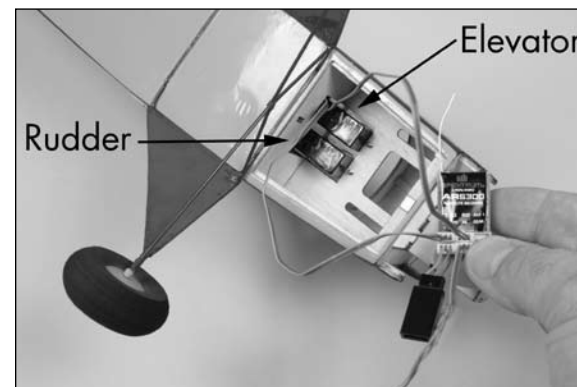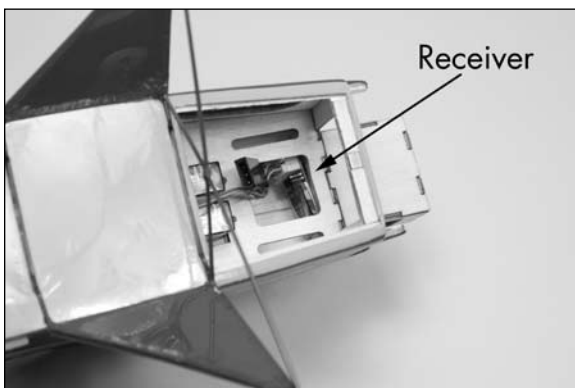
3. Use hobby scissors to cut a piece of hook and loop tape that is the same width as your receiver.
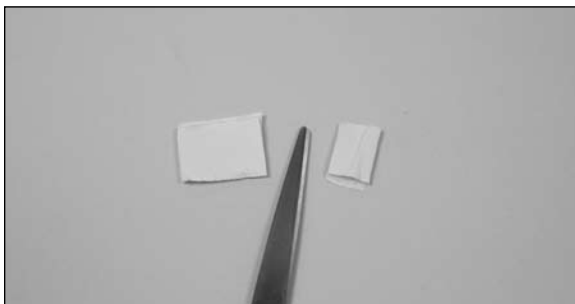
4. Apply the hook and loop tape to the bottom of the receiver.

5. Insert the receiver into the fuselage. It will fit above the motor box and battery tray as shown in the photo. Route the Y-harness up through the fuselage so that it can be accessed later.


Receiver

6. Use hobby scissors to cut another piece of hook and loop tape to the size of your speed control. Apply the hook and loop tape to the speed control and place the speed control in the motor box as shown.

7. Use hobby scissors to cut a piece of hook and loop tape the size of the battery. Place the hook part of the tape on the bottom of the motor box as shown.

8. Connect the lead from the speed control to the adapter plugged into the throttle channel of the receiver. Tuck the leads neatly inside the fuselage so it doesn't interfere with the battery when it is installed.
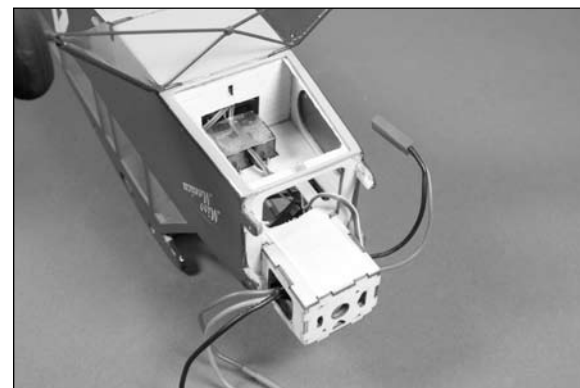
Linkage Installation

Required Parts

Fuselage assembly   Micro pushrod keeper (2)
Radio system   Flight battery
2mm x 4mm machine screw (2)
Micro brass pushrod connector with backplate (2)
Rudder pushrod wire, 17-inch (432mm)
Elevator pushrod wire, $16^3/_4$-inch (425mm)
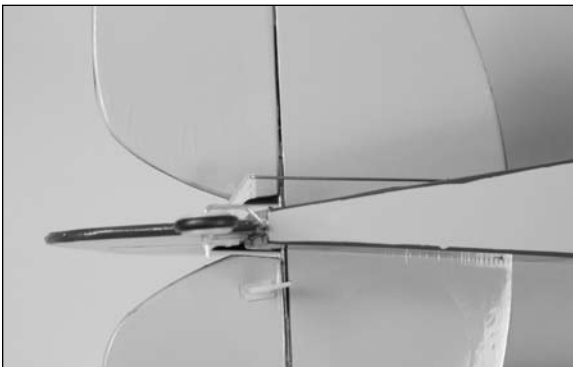
Required Tools and Adhesives

Threadlock   Pin vise
Pliers   Ruler
Phillips screwdriver: #00, #0
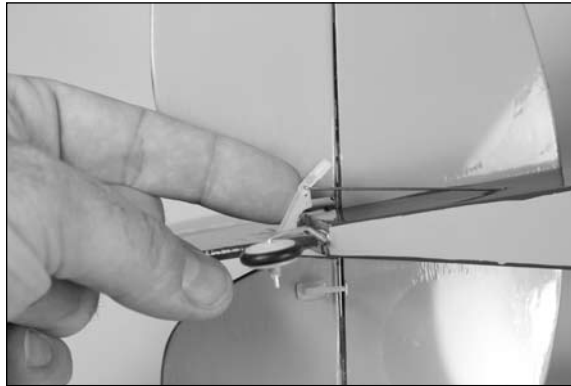Drill bit: 5/64-inch (2mm)

○○ 1. Slide the 17-inch (432mm) rudder pushrod into the tube inside the fuselage.
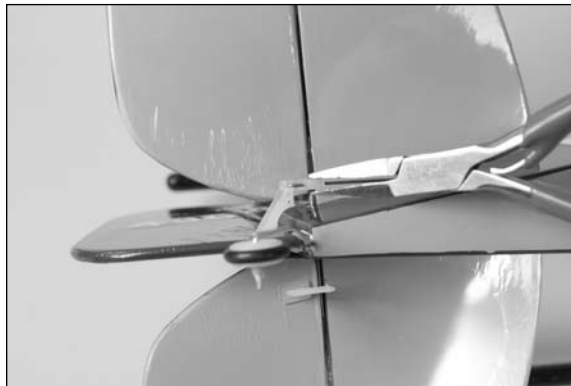

○○ 2. Insert the bend in the pushrod wire through the outer hole of the rudder control horn.

○○ 3. Slide a micro pushrod keeper over the end of the pushrod wire.

○○ 4. Use a small pair of pliers to snap the micro pushrod keeper onto the pushrod wire.

○ 5. Repeat Steps 1 through 4 to install and secure the $16^3/_4$-inch (425mm) elevator pushrod wire to the outer hole of the elevator control horn.

○○ 6. Use a pin vise and 5/64-inch (2mm) drill bit to enlarge the hole on the servo horn that is 7/16-inch (11mm) from the center of the servo horn.
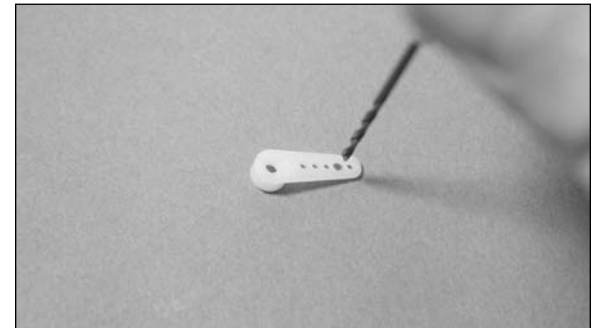
○○ 7. Insert a micro brass pushrod connector into the hole made in the previous step.

8. Use pliers to install the backplate on the connector to secure the connector to the servo horn.

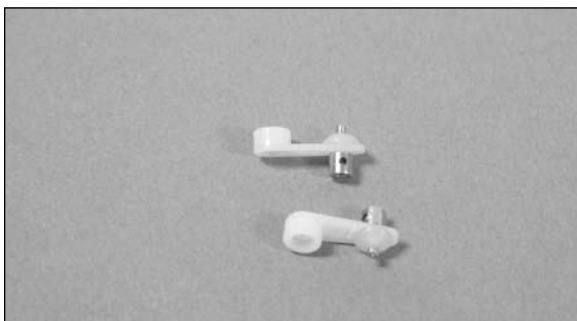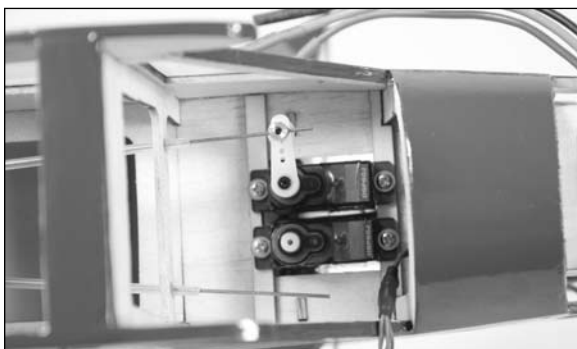9. Repeat Steps 6 through 8 to prepare a second servo horn.

10. Turn the radio system on and check the operation of the rudder and elevator servos. Make sure the sticks and trims for the rudder and elevator are centered. Slide the brass connector on the pushrod wire for the rudder. Secure the servo horn on the rudder servo so it is perpendicular to the rudder servo.

11. Use a ruler to make sure the rudder and fin are in alignment with each other.
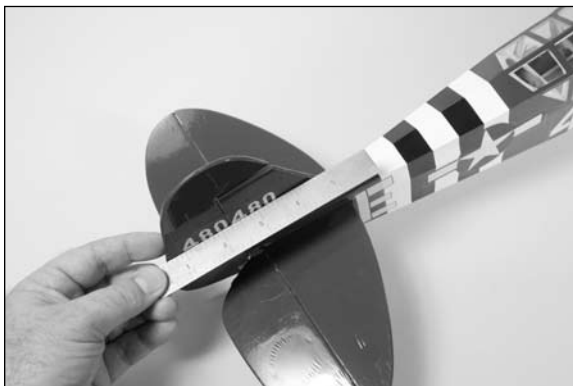
E-tips

Always use threadlock on metal-to-metal fasteners to prevent them from vibrating loose.

12. Use a #00 Phillips screwdriver to install the 2mm x 4mm machine screw to secure the pushrod wire to the brass connector.

13. Repeat Steps 10 through 12 to install the elevator servo horn and secure the pushrod wire to the connector.
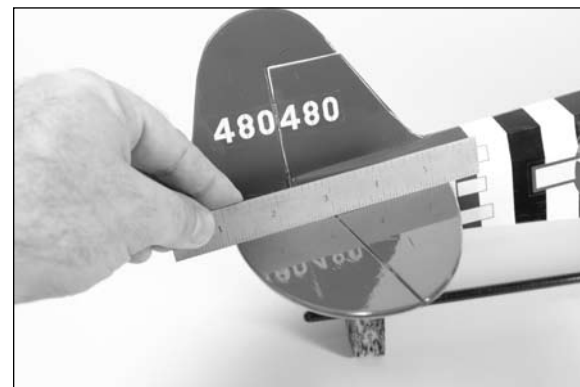
E-tips

Remember to unplug the motor battery and turn off the radio system before proceeding.

Motor and Cowling Installation for use with Prop Saver

Required Parts

Fuselage assembly   Motor with hardware
Cowling   Propeller
2mm x 16mm sheet metal screw (2)
1.5mm x 7mm sheet metal screw (4)
Plywood motor mount spacer, 5mm (2)

Required Tools and Adhesives

Hobby scissors   Low-tack tape
Cardstock   Phillips screwdriver: #0
Low-tack tape   Pin vise
Drill bit: 1/16-inch (1.5mm)
Flat blade screwdriver: 1.5mm

Note: The following steps are for the use of the prop saver on the park 250. If you choose to use the Prop Adapter option of the Park 250 then you should skip to page 11.

❍   1. Locate the motor mount and two 5mm plywood motor mount spacers.

❍   2. Attach the motor mount to the firewall using the two 5mm plywood spacers and two 2mm x 16mm sheet metal screws. A #0 Phillips screwdriver will be required to tighten the two screws. Note that there are two different hole location/distances on the firewall. The Park 250 will use the upper left and the lower right when looking at the firewall from the front of the airplane.
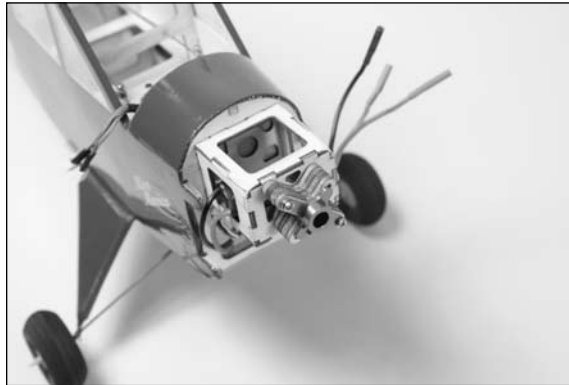

E-tips

Always use threadlock on metal-to-metal fasteners to prevent them from vibrating loose.

❍   3. The motor can now be attached to the mount. Follow the directions provided with the motor and use a 1.5mm flat blade screwdriver to secure the motor to the mount.

❍   4. Connect the leads from the motor to the speed control.
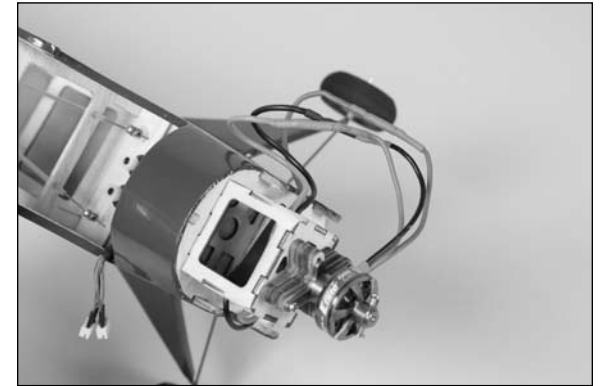
E-tips

If you use all E-flite components in the power system, you can connect the ESC and motor wires by matching the colors and the motor will spin in the correct direction.

❍   5. Secure the motor and speed control leads so they do not interfere with the operation of the motor.

6. Use hobby scissors to cut four pieces of cardstock that are 1/4-inch x 2-inch (6mm x 50mm). Use low-tack tape to attach them on the fuselage so they align with the cowl mounting tabs on the fuselage.

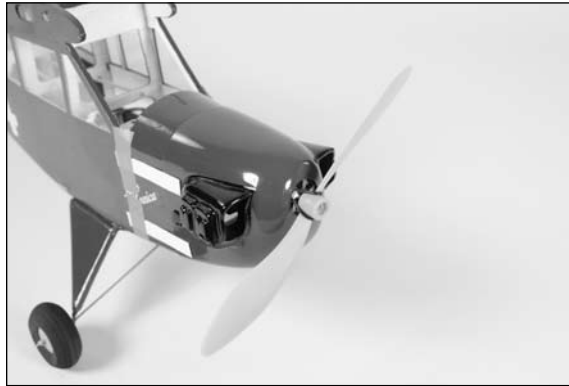7. Slide the cowling in position, making sure the cardstock is on the outside of the cowling.

8. Install the propeller on the adapter. Follow the instructions provided with the motor to secure the propeller to the motor.

E-tips

Use low-tack tape to keep the cowl in position while drilling the holes.

9. Position the cowling so the front of the motor is centered in the opening of the cowl and that the propeller does not rub against the cowl. The cowling should be slid just far enough back that it does not cover the battery tray on the bottom of the plane. If the cowling needs to be located farther back than this, the motor will need to be slid forward in the mount. Sight the cowling from the front and the side to make sure that it is aligned correctly to the fuselage. Use a pin vise and 1/16-inch (1.5mm) drill bit to drill the four holes for the cowl mounting screws.
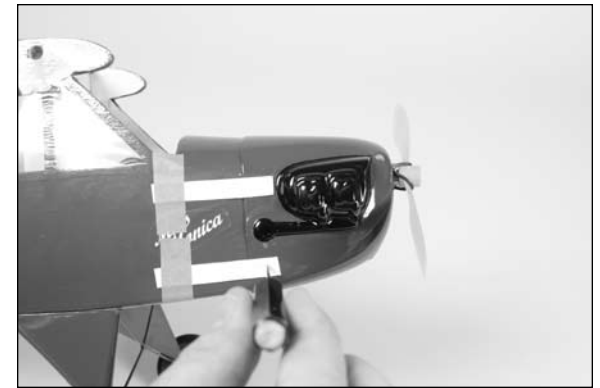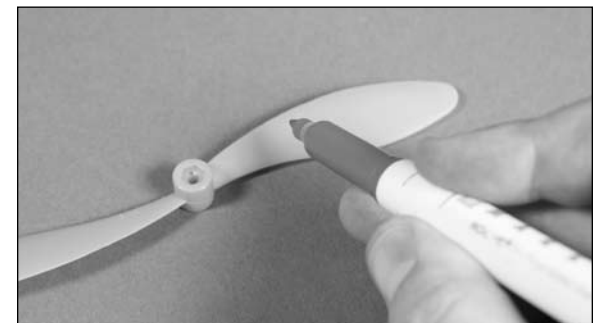

10. Use a #0 Phillips screwdriver to install the four 1.5mm x 7mm sheet metal screws that secure the cowl to the fuselage.

E-tips

Use a brown sharpie marker to go over the orange prop in a smooth curved pattern to get a simulated wood finish on the propeller.

Motor and Cowling Installation for use with Prop Adapter

Required Parts

Fuselage assembly   Motor with hardware
Cowling   Propeller
2mm x 7mm sheet metal screw (2)
1.5mm x 7mm sheet metal screw (4)

Required Tools and Adhesives

Hobby scissors   Low-tack tape
Cardstock   Phillips screwdriver: #0
Pin vise   Hex wrench: .050-inch
Drill bit: 1/16-inch (1.5mm)
Flat blade screwdriver: 1.5mm

❍   1. Attach the motor mount to the firewall using the screws provided with the motor. A #0 Phillips screwdriver will be required to tighten the two screws.

❍   2. The motor shaft must be repositioned to accept the propeller adapter. Follow the instructions provided with the motor to reposition the motor shaft. Use care not to damage the motor.

E-tips

Always use threadlock on metal-to-metal fasteners to prevent them from vibrating loose.

❍   3. The motor can now be attached to the mount. Follow the directions provided with the motor and use a 1.5mm flat blade screwdriver to secure the motor to the mount.
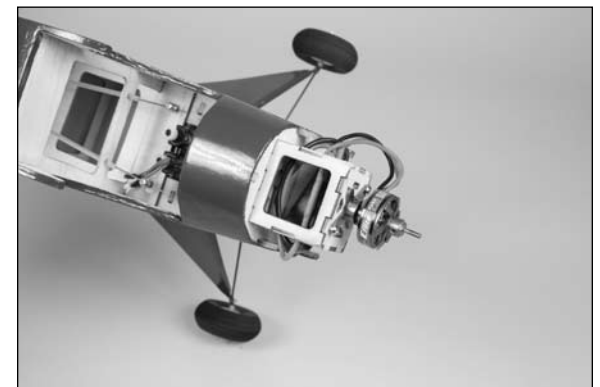

❍   4. Connect the leads from the motor to the speed control.

E-tips

If you use all E-flite components in the power system, you can connect the ESC and motor wires by matching the colors and the motor will spin in the correct direction.

❍   5. Secure the motor and speed control leads so they do not interfere with the operation of the motor.

❍ 6. Slide the propeller adapter on the motor and use a .050-inch hex wrench to tighten the setscrew that secures the adapter to the motor shaft.
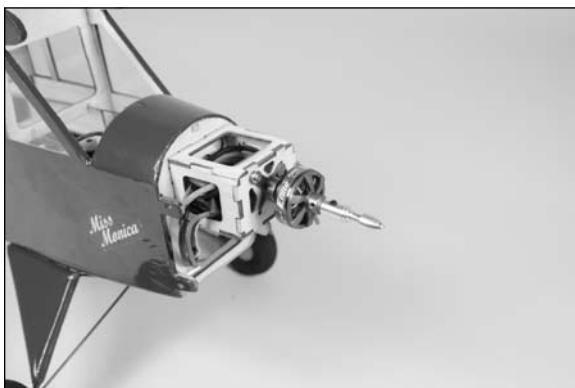

❍ 7. Use hobby scissors to cut four pieces of cardstock that are 1/4-inch x 2-inch (6mm x 50mm). Use low-tack tape to attach them on the fuselage so they align with the cowl mounting tabs on the fuselage.
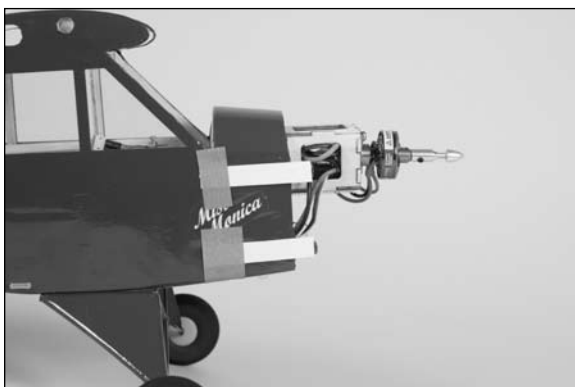
❍ 8. Slide the cowling in position, making sure the cardstock is on the outside of the cowling.

❍ 9. Install the propeller on the adapter. Follow the instructions provided with the motor to tighten the adapter to secure the propeller.
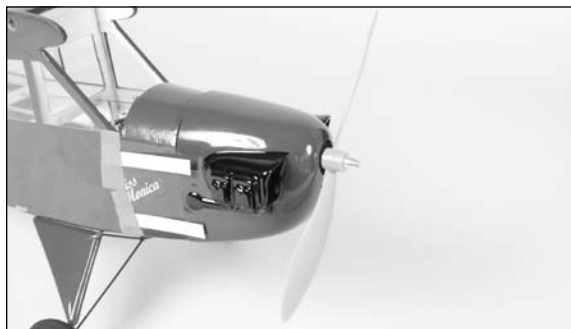
E-tips

Use a brown sharpie marker to go over the orange prop in a smooth curved pattern to get a simulated wood finish on the propeller.
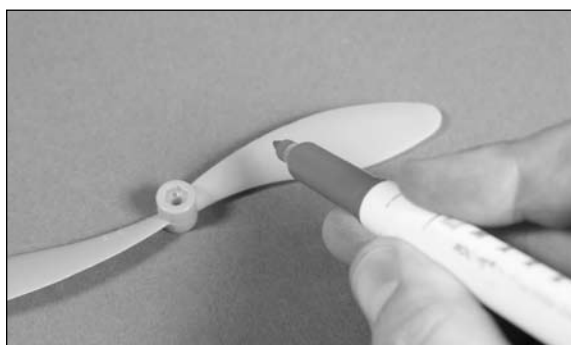
E-tips

Use low-tack tape to keep the cowl in position while drilling the holes.

❍ 10. Position the cowling so the adapter is centered in the opening of the cowl and that the propeller does not rub against the cowl. The cowling should be slid just far enough back that it does not cover the battery tray on the bottom of the plane. If the cowling needs to be located farther back than this the motor will need to be slid forward in the mount. Sight the cowling from the front and the side to make sure that it is aligned correctly to the fuselage. Use a pin vise and 1/16-inch (1.5mm) drill bit to drill the four holes for the cowl mounting screws.

❍ 11. Use a #0 Phillips screwdriver to install the four 1.5mm x 7mm sheet metal screws that secure the cowl to the fuselage.

Battery Installation

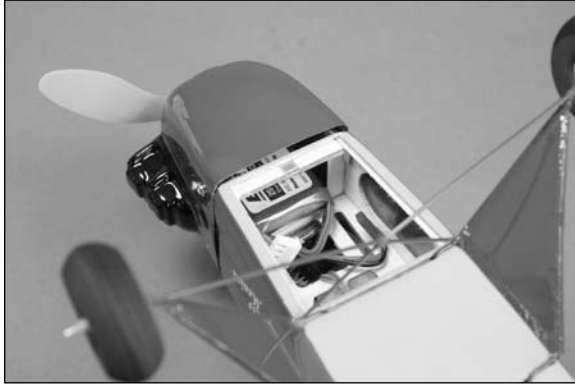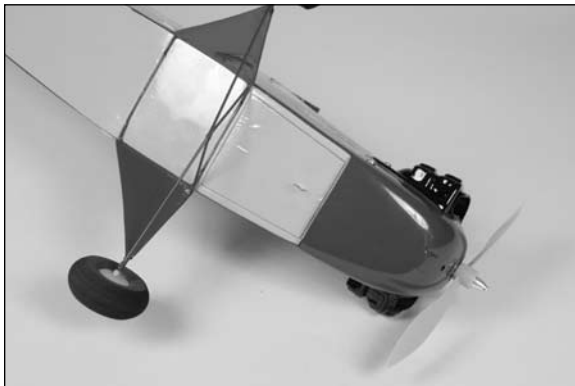### Required Parts

Fuselage assembly   Motor battery
Battery hatch

❍   1. Position the battery in the battery compartment as shown. Using the recommended equipment the battery will be located all the way forward against the cowling for the correct CG.

❍   2. Reposition the battery hatch on the bottom of the fuselage. Magnets will keep the hatch in position during flight.

Front Windscreen Installation

Required Parts

Fuselage assembly   Front windscreen
Windscreen support (2)

Required Tools and Adhesives

Hobby scissors   Medium CA
Clear tape

❍   1. Route the Y-harness to the root ribs of the fuselage as shown.
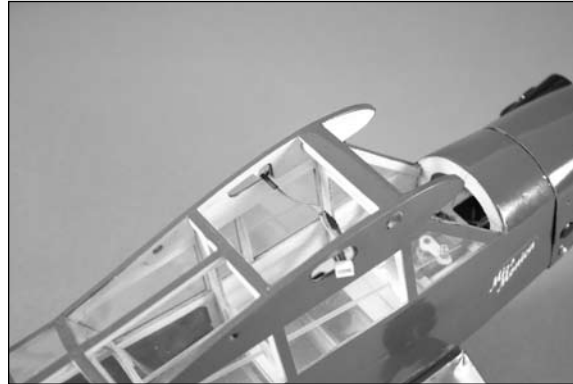
❍   2. Use medium CA to glue the windscreen supports in position. Make sure to center the supports at the top as shown.

❍   3. Fit the front windscreen to the fuselage. If the windscreen needs trimmed, use hobby scissors to do so. The outer edges of the windscreen under the root rib can be cut at this time for a better fit.

❍   4. Use clear tape in small pieces at the top and on the sides to hold the windscreen in place. You can glue the windscreen on if you would like but it is not suggested just in case you need to do any maintenance to the airplane at a later date.

Aileron Servo Installation

Required Parts

Fuselage assembly   Flight battery
Radio system
Wing panel (right and left)
Hardwood servo mounting block (4)
Servo with hardware (2)
Aileron pushrod wire, $2^3/_8$-inch (61mm)
1.5mm x 5mm sheet metal screw (8)
2mm x 4mm machine screw (2)
Micro brass pushrod connector with backplate (2)

### Required Tools and Adhesives

Threadlock   Pencil
Pin vise   Phillips screwdriver: #00, #0
Medium CA   Medium grit sandpaper
Hobby knife with #11 blade
Drill bit: 1/16-inch (1.5mm), 5/64-inch (2mm)

○○ 1. Remove the aileron servo cover from one wing panel. Place the aileron servo on the cover so the servo arm is aligned with the edge of the cover and centered in the slot as shown. Make sure the servo does not hang over the edges of the servo cover.
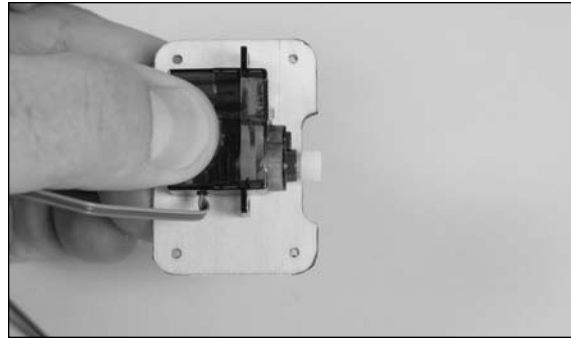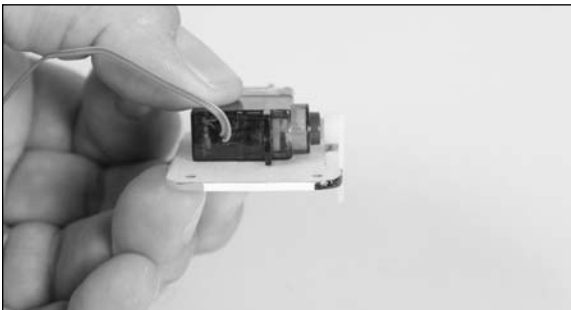
E-tips

It may be necessary to remove the servo horn from the servo so it can be properly positioned on the servo cover. Use a #00 Phillips screwdriver to remove and reposition the servo horn if necessary.

○○ 2. Use a pencil to trace the outline of the edges of the servo and tabs onto the aileron servo cover.
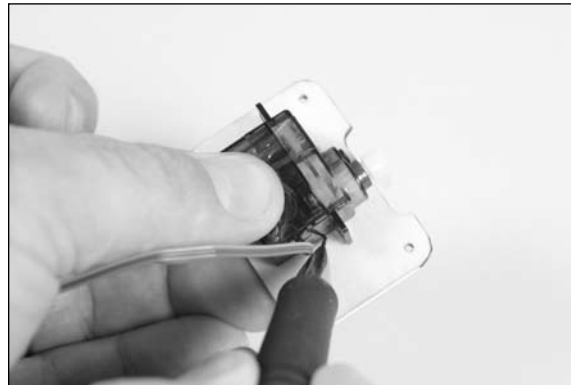
○○ 3. Use medium grit sandpaper to roughen the end of the servo mounting blocks that will fit against the aileron servo cover.

○○ 4. Use medium CA to glue two servo mounting blocks to the aileron servo cover against the outside of the lines that were drawn. Allow the CA to fully cure before proceeding.

○○ 5. Use a hobby knife with a #11 blade to trim the servo mounting block to provide clearance for the aileron servo lead.
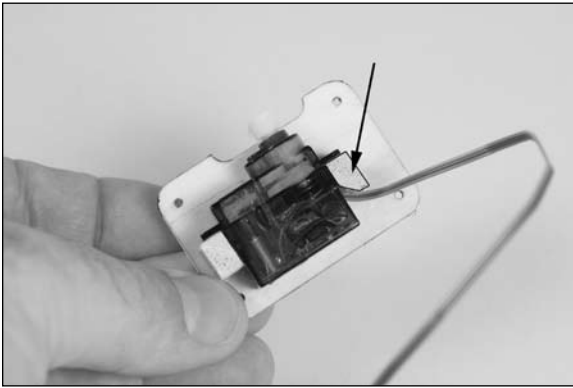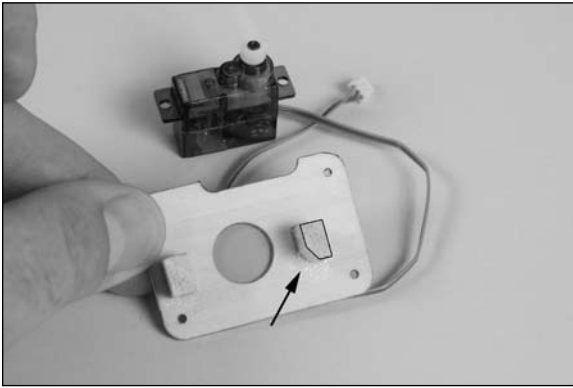
○○ 6. Use a pin vise and 1/16-inch drill bit to drill the holes in the servo mounting block for the servo mounting screws.
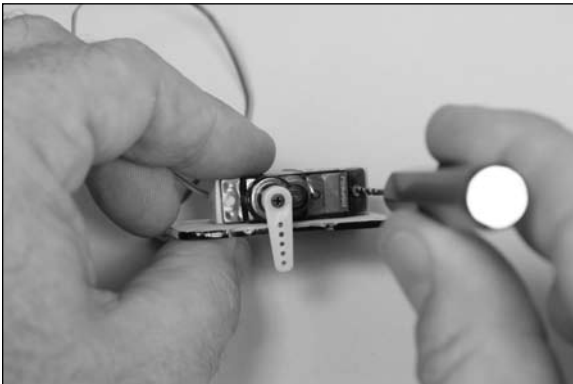
○○ 7. Use the screws provided with the servo and a #0 Phillips screwdriver to secure the servo to the servo mounting blocks.
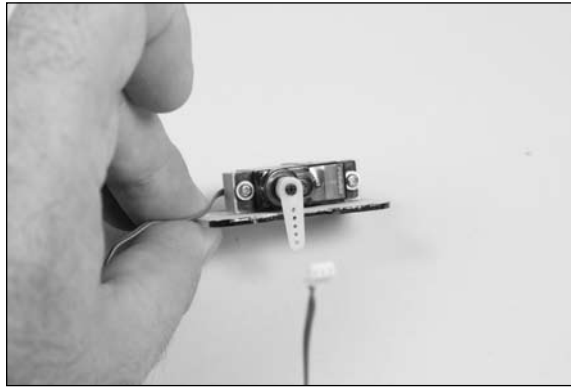
○○ 8. Use a #00 Phillips screwdriver to remove the servo horn from the aileron servo. Use a pin vise and 5/64-inch (2mm) drill bit to enlarge the hole on the servo horn that is 7/16-inch (11mm) from the center of the servo horn.
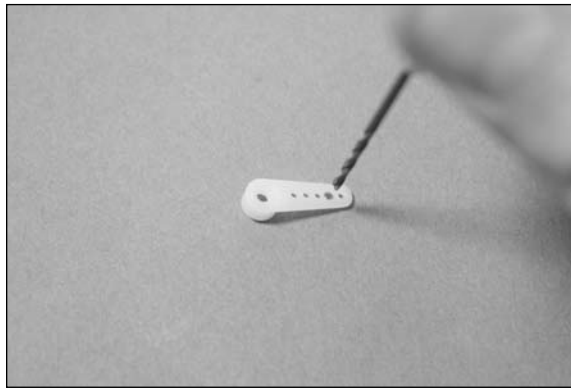
○○ 9. Insert a micro brass pushrod connector into the hole made in the previous step.
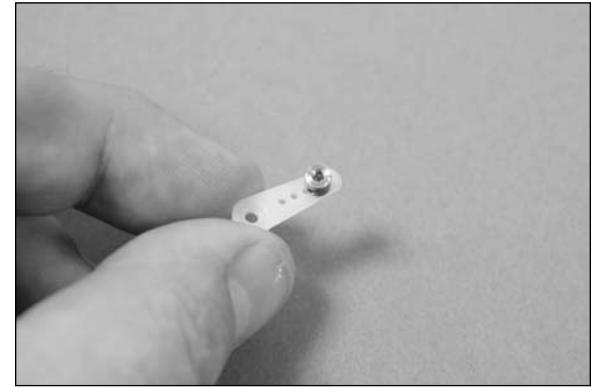
○○ 10. Use pliers to install the backplate on the connector to secure the connector to the servo horn.
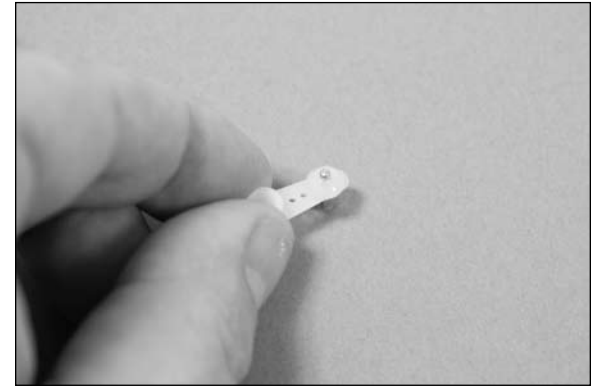
○○ 11. Turn the radio system on and check the operation of the aileron servo. Make sure the stick and trim for the aileron are centered. Use a #00 Phillips screwdriver and the screw that was removed from the servo to attach the servo horn perpendicular to the servo centerline as shown.
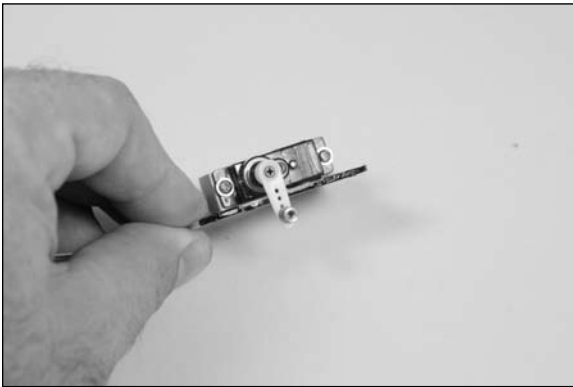
○○ 12. Tie the string located in the wing around the end of the servo lead.

○○ 13. Carefully pull the string to pull the servo lead through the wing.

○○ 14. Place the aileron servo cover in position. Use four 1.5mm x 5mm sheet metal screws and a #00 Phillips screwdriver to secure the cover in the wing.
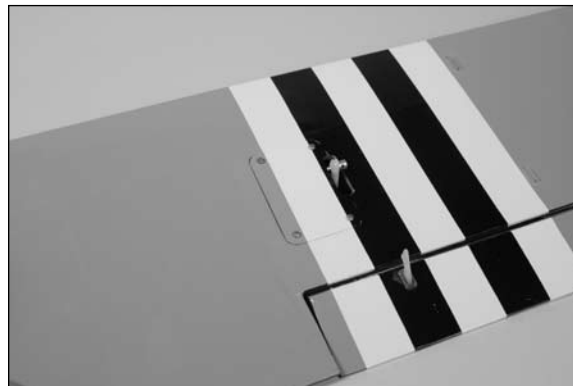
○○ 15. Insert the Z-bend on the $2^3/_8$-inch (61mm) aileron pushrod wire through the center hole of the aileron control horn. The wire should be inserted through the inside or wing root end of the horn first.
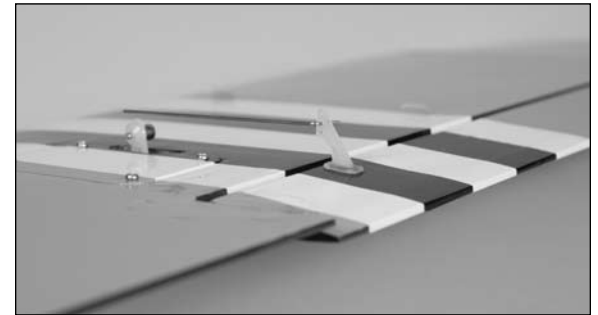
E-tips

Always use threadlock on metal-to-metal fasteners to prevent them from vibrating loose.

○○ 16. Turn the radio system on and check the operation of the aileron servo. Make sure the stick and trim for the aileron is centered. Slide the pushrod wire through the brass connector. Center the aileron so it is aligned with the trailing edge of the wing. Secure the pushrod wire to the brass connector using a 2mm x 4mm machine screw and a #0 Phillips screwdriver.
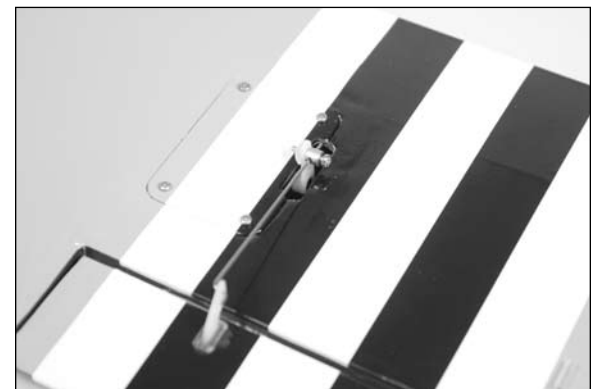
○ 17. Repeat Steps 1 through 16 to install the remaining aileron servo and linkage.

Wing Attachment, Struts and Top Windscreen Installation

Required Parts

Assembled fuselage   Carbon wing tube
Wing strut (right and left)
Top windscreen
Assembled wing panel (right and left)

Required Tools and Adhesives

Clear tape   Hobby scissors

○ 1. Slide the carbon wing tube into the socket in one of the wing panels. The tube will slide easily into the socket. Do not force the tube farther than it will easily slide.

○ 2. Slide the tube into the socket in the fuselage.

○○ 3. Continue sliding the wing into position, guiding the aileron servo lead in the fuselage. Now is a good time to plug the aileron leads into the Y-harness. The wing will fit tight against the fuselage and snap into position. It is held in position by a magnet and the wing struts.

IMPORTANT NOTE

The wings struts for the Piper L-4 are functional and must be used.

○○ 4. Make sure you have the correct strut on the correct side. The wider strut will always face forward. The strut should naturally align with the fittings on the wing. If not, you will need to use the opposite strut.

Incorrect strut

Correct Strut
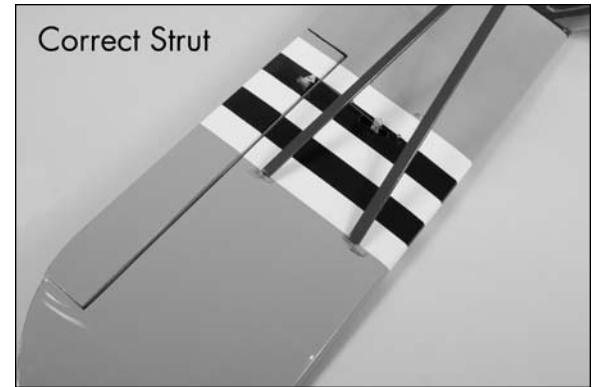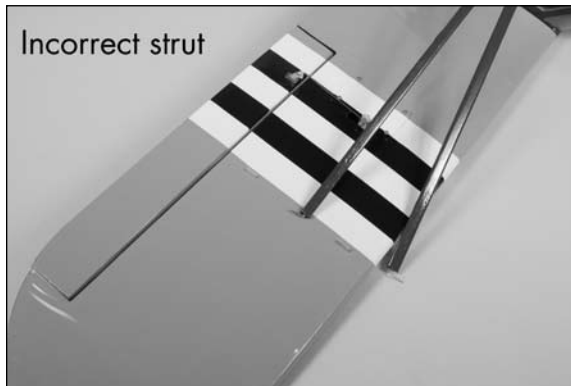
○○ 5. Position the wing strut in the fitting at the fuselage. The strut slides rearward into the fitting.
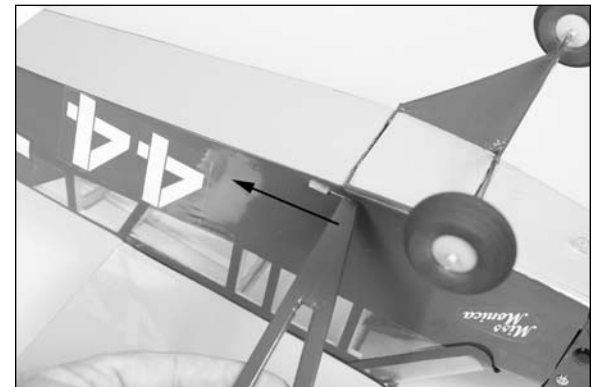
6. Gently squeeze the strut inward so it can be installed in the fittings on the wing.

Gently Squeeze Inward

7. Make sure that the strut is installed in both fittings on the wing.
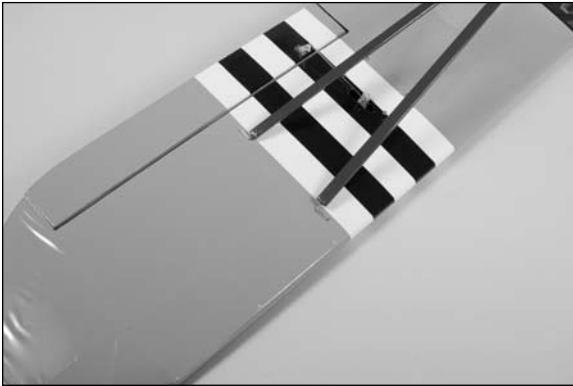
8. Repeat Steps 3 through 7 to install the remaining wing panel and strut.
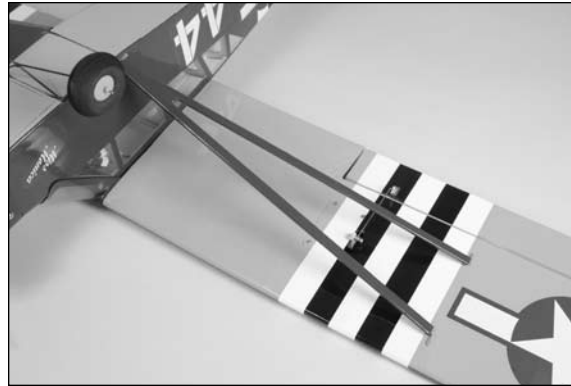
9. If you have not already done so, connect the aileron servo leads to the Y-harness from the receiver. Fit the top windscreen to the fuselage. Trim with hobby scissors as necessary to fit it to the fuselage. For a better fit you can trim the side edges off of the top windscreen. Use clear tape at the front and rear to hold the windscreen on.

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 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 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 Low Rate			*Exponential*
Up	3/8-inch	(10mm)	0%
Down	5/16-inch	(8mm)	0%

Aileron High Rate

Up	1/2-inch	(12mm)	10%
Down	3/8-inch	(10mm)	10%

Elevator Low Rate

Up	9/32-inch	(7mm)	0%
Down	9/32-inch	(7mm)	0%

Elevator High Rate

Up	3/8-inch	(10mm)	10%
Down	3/8-inch	(10mm)	10%

Rudder Low Rate

Left	1/2-inch	(12mm)	5%
Right	1/2-inch	(12mm)	5%

Rudder High Rate

Left	13/16-inch	(20mm)	15%
Right	13/16-inch	(20mm)	15%

E-tips

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

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

E-tips

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

Center of Gravity

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

Caution: Do not inadvertently skip this step!

The recommended Center of Gravity (CG) location for your model is $1^9/_{16}$- to $1^{15}/_{16}$-inches (40–50mm) back from the leading edge of the wing at the root. Make sure to measure from the farthest point forward for accuracy. Mark the location for the Center of Gravity on the bottom of the wing next to the fuselage as shown.

With the model upright, adjust components as necessary so the model hangs level or slightly nose down. This is the correct balance point for your model. You might find that you need to shift the battery slightly to either the front or back of the fuselage to achieve the correct balance.

It may be necessary to add a small amount of weight (0.25–0.6 ounces) inside the cowling to correctly balance your model. Using the optional Thunder Power 730mAh battery will not require the addition of any weight to your model.

$1^9/_{16}$- to $1^{15}/_{16}$-inches (40–50mm)
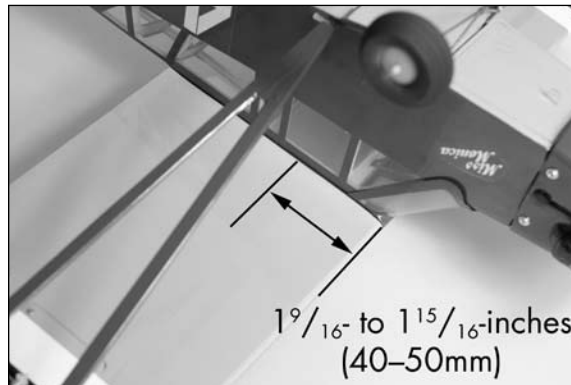
After the first flights, the CG position can be adjusted for your personal preference.

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.

❍   1. With the model resting on the ground, stand 30 paces (approximately 90 feet) away from the model.

❍   2. Face the model with the transmitter in your normal flying position. Be sure the throttle is in the full down position and plug the flight battery into the speed control.

❍   3. As you move the controls, watch to be sure the airplane's motor and controls operate smoothly. You should have total control of the model at 30 paces (90 feet).

❍   4. If control issues exist, call the Horizon Support Team at 1 877 504 0233 or go to ***horizonhobby. com*** to find a local Spektrum distributor in your country for service if you are using a Spektrum radio system.

Flying Your L-4 Grasshopper

Flying the Piper L-4 Grasshopper is a pleasure. With the lightweight construction and low wing loading takeoffs are easy as well as landings. Low level reconnaissance passes across the field are a breeze. The L-4 is not meant for aerobatics but the occasional loops or wing overs are not a problem.

The L-4 Grasshopper is capable of flying in light winds up to 7 mph. The optional 730mAh battery pack will add that little extra weight to help penetrate mild winds and extend the flight time. Touch and go's are a blast. The L-4 Grasshopper carries itself very well on final approach. It is happy with a descending approach to maintain the speed during final. Touch downs are easily accomplished in a main wheels first or three-point state.

We hope you enjoy flying your L-4 Grasshopper as much as we do.

Happy Landings!

Safety Do's and Don'ts for Pilots

- Check all control surfaces prior to each takeoff.

- Do not fly your model near spectators, parking areas or any other area that could result in injury to people or damage of property.

- Do not fly during adverse weather conditions. Poor visibility can cause disorientation and loss of control of your aircraft. Strong winds can cause similar problems.

- Do not 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.

E-tips

When you check these batteries, ensure that 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. Be sure that binding does not occur and that all parts are properly secured.

❍ 3. Ensure that 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 at this time.

❍ 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 that the switch harness moves freely in both directions.

Warranty Information

DAMAGE LIMITS

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

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

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

SAFETY PRECAUTIONS

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

QUESTIONS, ASSISTANCE, AND REPAIRS

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

INSPECTION OR REPAIRS

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

WARRANTY INSPECTION AND REPAIRS

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

NON-WARRANTY REPAIRS

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

United States:

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

Horizon Service Center
4105 Fieldstone Road
Champaign, Illinois 61822
USA

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

Horizon Product Support
4105 Fieldstone Road
Champaign, Illinois 61822
USA

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

United Kingdom:

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

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

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

Germany:

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

Horizon Technischer Service
Hamburger Strasse 10
25335 Elmshorn
Germany

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

CE Compliance Information for the European Union

INSTRUCTIONS FOR DISPOSAL OF WEEE BY USERS IN THE EUROPEAN UNION

This product must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of their waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or where you purchased the product.
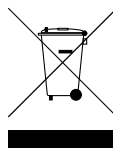
Age Recommendation: 14 years or over. Not a toy. Not intended for use by children without direct adult supervision.

2009 Official Academy of Model Aeronautics Safety Code

GENERAL

1. A model aircraft shall be defined as a non-human-carrying device capable of sustained flight in the atmosphere. It shall not exceed limitations established in this code and is intended to be used exclusively for recreational or competition activity.

2. The maximum takeoff weight of a model aircraft, including fuel, is 55 pounds, except for those flown under the AMA Experimental Aircraft Rules.

3. I will abide by this Safety Code and all rules established for the flying site I use. I will not willfully fly my model aircraft in a reckless and/or dangerous manner.

4. I will not fly my model aircraft in sanctioned events, air shows, or model demonstrations until it has been proven airworthy.

5. I will not fly my model aircraft higher than approximately 400 feet above ground level, when within three (3) miles of an airport without notifying the airport operator. I will yield the right-of-way and avoid flying in the proximity of full-scale aircraft, utilizing a spotter when appropriate.

6. I will not fly my model aircraft unless it is identified with my name and address, or AMA number, inside or affixed to the outside of the model aircraft. This does not apply to model aircraft flown indoors.

7. I will not operate model aircraft with metal-blade propellers or with gaseous boosts (other than air), nor will I operate model aircraft with fuels containing tetranitromethane or hydrazine.

8. I will not operate model aircraft carrying pyrotechnic devices which explode burn, or propel a projectile of any kind. Exceptions include Free Flight fuses or devices that burn producing smoke and are securely attached to the model aircraft during flight. Rocket motors up to a G-series size may be used, provided they remain firmly attached to the model aircraft during flight. Model rockets may be flown in accordance with the National Model Rocketry Safety Code; however, they may not be launched from model aircraft. Officially designated AMA Air Show Teams (AST) are authorized to use devices and practices as defined within the Air Show Advisory Committee Document.

9. I will not operate my model aircraft while under the influence of alcohol or within eight (8) hours of having consumed alcohol.

10. I will not operate my model aircraft while using any drug which could adversely affect my ability to safely control my model aircraft.

11. Children under six (6) years old are only allowed on a flightline or in a flight area as a pilot or while under flight instruction.

12. When and where required by rule, helmets must be properly worn and fastened. They must be OSHA, DOT, ANSI, SNELL or NOCSAE approved or comply with comparable standards.

RADIO CONTROL

1. All model flying shall be conducted in a manner to avoid over flight of unprotected people.

2. I will have completed a successful radio equipment ground-range check before the first flight of a new or repaired model aircraft.

3. I will not fly my model aircraft in the presence of spectators until I become a proficient flier, unless I am assisted by an experienced pilot.

4. At all flying sites a line must be established, in front of which all flying takes place. Only personnel associated with flying the model aircraft are allowed at or in front of the line. In the case of airshows demonstrations straight line must be established. An area away from the line must be maintained for spectators. Intentional flying behind the line is prohibited.

5. I will operate my model aircraft using only radio-control frequencies currently allowed by the Federal Communications Commission (FCC). Only individuals properly licensed by the FCC are authorized to operate equipment on Amateur Band frequencies.

6. I will not knowingly operate my model aircraft within three (3) miles of any preexisting flying site without a frequency-management agreement. A frequency management agreement may be an allocation of frequencies for each site, a day-use agreement between sites, or testing which determines that no interference exists. A frequency-management agreement may exist between two or more AMA chartered clubs, AMA clubs and individual AMA members, or individual AMA members. Frequency-management agreements, including an interference test report if the agreement indicates no interference exists, will be signed by all parties and copies provided to AMA Headquarters.

7. With the exception of events flown under official AMA rules, no powered model may be flown outdoors closer than 25 feet to any individual, except for the pilot and located at the flightline.

8. Under no circumstances may a pilot or other person touch a model aircraft in flight while it is still under power, except to divert it from striking an individual.

9. Radio-controlled night flying is limited to low-performance model aircraft (less than 100 mph). The model aircraft must be equipped with a lighting system which clearly defines the aircraft's attitude and direction at all times.

10. The operator of a radio-controlled model aircraft shall control it during the entire flight, maintaining visual contact without enhancement other than by corrective lenses that are prescribed for the pilot. No model aircraft shall be equipped with devices which allow it to be flown to a selected location which is beyond the visual range of the pilot.

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