Cessna 182 370 ARF

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E-flite™

Assembly Manual

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Introduction

Thank you for purchasing the Cessna 182 370 ARF (EFL2200), a vacuum-formed model of the full-scale Cessna 182 Skylane. The Cessna features a vacuum-formed fuselage and wing, scale details, and quick final assembly time, making this a great scale park flyer choice for smooth stable flights.

We provide a 5.33:1 gearbox and a 10 x 7 propeller so you can easily add our E-flite™ Park 370 Inrunner Brushless Motor, 4100Kv for exceptional performance. For a direct drive alternative, try the E-flite Park 400 Outrunner, 920Kv motor.

Specifications

Wingspan:	38 in (965mm)
Length:	30 in (760mm)
Wing Area:	215 sq in (14 sq dm)
Weight w/o Battery:	13–13.5 oz (370–380 g)
Weight w/ Battery:	15.5–17 oz (440–480 g)

Contents of Kit/Parts Layout

Large Replacement Parts:

EFL2201	Main Wing w/Ailerons
EFL2202	Fuselage w/Rudder & Cowl
EFL2203	Horizontal Tail Assembly
EFL2204	Cowl
EFL2205	Landing Gear w/Wheel Pants
EFL2206	Wing Struts
EFL2207	Landing Gear Covers
EFL2208	Fuselage Tail Fairing

Small Replacement Parts

EFL2209	Pushrods
EFLA200	Micro Control Horns
EFLA201	Micro Pushrod Keepers
EFLA203	Micro Control Connectors
EFLA204	Micro Rubber Spinner
EFLA213	E-flite/JR/Horizon Decals
EFLM202	Pinion Gear, 12T 0.4 Module
EFLM216	Gearbox, 5.33:1 (v2)
EFLM217	Spur Gear, 64T w/Shaft
EFLP1070	10 x 7 Slow Flyer Prop (kit includes only 1)

Required Radio Equipment

You will need a 4-channel transmitter, crystals, micro receiver, and four sub-micro servos. You can choose to purchase a complete radio system that includes all of these items or if you are using an existing transmitter, just purchase the other required equipment separately.

JRP14010**   JR Sport 4-CH System, MD2 UL
                 (NOTE: Still need two additional servos)
                 Complete Radio System

Or Purchase Separately

JSP30610   6CH UL FM Receiver w/o Crystal,
                 Positive Shift (JR/AIRZ)

Or

JSP30615   6CH UL FM Receiver w/o Crystal,
                 Negative Shift (HRC/FUT)

JRPXFR**   FM Receiver Crystal
EFLRS75   7.5 gram Sub-Micro Servo (4)
JSP98020   Y-Harness, Standard 6"
JSP98110   Servo Extension 6"

Important Information About Motor Selection

We are recommending the E-flite™ Park 370 Brushless Motor with 4100Kv (EFLM1000) or the Park 400 Outrunner Brushless Motor, 920Kv.

The Park 370 Brushless Motor, 4100Kv provides more than awsome power with a 1200–1320mAh 3-cell Li-Po battery or park flyer power with a 2-cell Li-Po battery. Just use the included 5.33:1 gearbox and 10x7 propeller.

It is extremely important to monitor gearbox wear and motor temperature when using the 4100Kv motor. Lack of proper throttle management using this motor and a 3-cell Li-Po battery may result in damage to the motor, gearbox, ESC, and battery. Adequate motor cooling is very important, so make sure the motor is cooled properly in the cowl.

For a direct-drive Outrunner alternative, use the Park 400 Outrunner, 920Kv, which will also provide plenty of power without worrying about gearboxes.

Sport Setup (stock gearbox)

EFLM1000	Park 370 Inrunner Brushless Motor, 4100 Kv
EFLA311B	20-Amp Brushless ESC (V2)
EFLP1070	10 x 7 Slow Flyer Prop (2) - keep extras on hand
THP13202SPL	1320mAh 2-Cell 7.4V Li-Po, 16GA
WSD1300	Ultra Plug, Male/Female Set
EFLC3005	Celectra 1-3 Cell Li-Po Charger

Use with included 10 x 7 prop, 5.33:1 gearbox, and 12T (0.4 module) pinion. This is a sport flyer setup for smooth and stable flights.

High Power Setup (stock gearbox)*

EFLM1000	Park 370 Inrunner Brushless Motor, 4100 Kv
EFLA311B	20-Amp Brushless ESC (V2)
EFLP1070	10 x 7 Slow Flyer Prop (2) - keep extras on hand
THP13203SPL	1320mAh 3-Cell 11.1V Li-Po, 16GA
WSD1300	Ultra Plug, Male/Female Set
EFLC3005	Celectra 1-3 Cell Li-Po Charger

* Use with included 10 x 7 prop, 5.33:1 gearbox, and 12T (0.4 module) pinion. Proper throttle management is required when using high performance setups. Using this setup with 3 cells will give you plenty of power for zippy flights.

Sport Outrunner Setup

EFLM1305	Park 400 Outrunner Motor, 920 Kv
EFLA311B	20-Amp Brushless ESC (V2)
EFLM1915	Outrunner Stick Mount
EFLP1070	10 x 7 Slow Flyer Prop (2)
THP13202SPL	1320mAh 2-Cell 7.4V Li-Po, 16GA
WSD1300	Ultra Plug, Male/Female Set
EFLC3005	Celectra 1–3 Cell Li-Po Charger

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* Proper throttle management is required when using high performance setups. Using this setup with 3 cells will give you plenty of power for zippy flights.

Optional Accessories

EFLA110	Power Meter
EFLA212	Gear Puller: 1mm–5mm Shaft

Required Tools and Adhesives

Tools & Equipment

EFLA250	Park Flyer Tool Assortment, 5pc

Or Purchase Separately

EFLA257	Screwdriver, #0 Phillips (or included with EFLA250)
EFLA255	Nut Driver, 5.5mm (or included with EFLA250)
EFLA251	Hex Wrench: 3/32" (or included with EFLA250)

Hobby Knife
Hot Glue Gun
Square
Ruler
Felt Tip Pen
Wax Paper
String

Adhesives

EFLA208	Thick Foam CA/Activator Pack

Or Purchase Separately

EFLA206	Foam Compatible Thick CA (included with EFLA208)
EFLA207	Foam Compatible Activator (included with EFLA208)
EFLA209	Foam Compatible Medium CA

Thread Lock (for mounting motor to gearbox)
Low Temperature Hot Glue

Using the Manual

This manual is divided into sections to help make assembly easier to understand, and to provide breaks between each major section.

Remember to take your time and follow the directions.

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, included loose clothing, or other objects such as pencils and screwdrivers. Especially keep your hands away from the propeller.

Before Starting Assembly

Before beginning the assembly of your Cessna 182, 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.

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.

Warranty Information

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

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

Once assembly of the model has been started, you must contact Horizon Hobby, Inc. directly regarding any warranty question that you have. Please do not contact your local hobby store regarding warranty issues, even if that is where you purchased it. This will enable Horizon to better answer your questions and provide service in the event that you may need any assistance.

If the buyer or user is not prepared to accept the liability associated with the use of this product, they are advised to return this kit immediately in new and unused condition to the place of purchase.
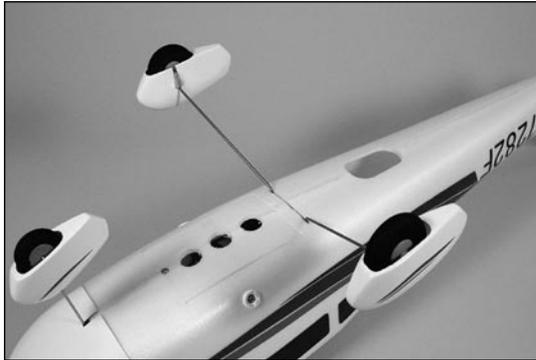
For any additional questions please contact:

Horizon Hobby Product Support
4105 Fieldstone Road
Champaign, Illinois 61822
(877) 504-0233
www.horizonhobby.com

Landing Gear Installation

Required Parts
Fuselage
Landing gear
Landing gear fairing (2)
10mm x 136mm tape (2)

❍ 1. Locate the landing gear. Press the gear into the slot in the bottom of the fuselage.

Note: The landing gear is designed for smooth or paved surfaces. It is not recommended for grass surfaces.

❍ 2. Use the 10mm x 136mm tape to attach the landing gear fairings to the landing gear.

Inrunner Motor Installation

Required Parts

Airframe   5.33:1 (64T spur) gearbox
Brushless motor   Brushless speed control
2mm x 8mm screw (2)
12T pinion gear, 0.4 module x 6mm

Required Tools and Adhesives

Phillips screwdriver (small)   Hobby knife
Hook & loop

Important Information about Your Brushless ESC

Make sure your ESC brake is programmed to Off. Also, be sure to use an ESC with the proper 9V cutoff when using 3-Cell Li-Po packs, or 6V cutoff when using 2-cell Li-Po packs.

> *Note*: This section covers the installation of an Inrunner motor and gearbox. Skip to Page 12 for Outrunner Motor Installation.

❍ 1. It may be necessary to attach motor adapters or other accessories to your particular motor at this time.

Note: Use the instructions provided with the motor to install any accessories. Follow the instructions provided with the gearbox for some helpful hints for installing the motor. When installing your motor into the E-flite™ gearbox, it is very important that the gear mesh is set correctly and is smooth with no binding. The E-flite gearbox features adjustable slotted mounting holes to ensure your gear mesh is correct. Remember if the gear mesh is too loose or too tight, it may strip the gears. To extend the life of your gearbox, we also recommend using a small amount of grease, such as lithium grease, on the spur gear.

It is also very important to check to be sure the propeller is balanced before installing onto the shaft. An unbalanced propeller may strip the gears. When installing the propeller, please be sure not to over-tighten the 3mm locknut. The use of the locknut will prevent the propeller from coming loose.

Use the 12-tooth pinion we include with this airplane on the motor.

❍ 2. Attach the motor to the gearbox using the screws provided with the motor.
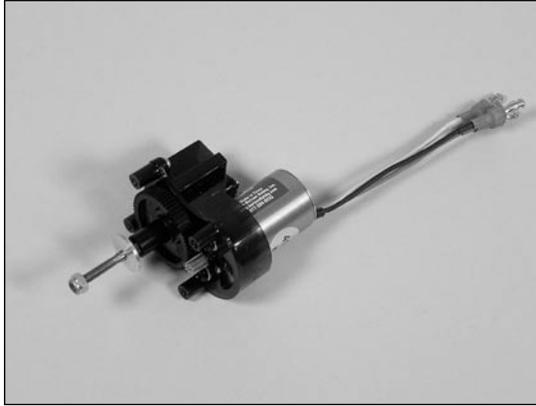
❍ 3. Slide the gearbox onto the motor stick. Use a hobby knife to drill a hole through the plastic and into the motor stick. Secure the gearbox using a 2mm x 8mm wood screw on the top and one or even two in the side.

Hint: You may want to plug in the speed control before installing the gearbox.

❍ 4. Secure the speed control location using hook and loop. Run the lead from the speed control to the receiver. It may be necessary to use a servo extension. Exact speed control location may vary depending on the brand used and the center of gravity. This photo shows the location in the front of the fuse if you are using our E-flite™ 20-amp Brushless ESC.

Outrunner Motor Installation

Required Parts

Airframe
Brushless motor   Brushless speed control
Outrunner Mount (EFLM1915 - sold separately)
2mm x 8mm wood screw (2)

Required Tools and Adhesives

Phillips screwdriver (small)   Hobby knife
Hook & loop

Important Information about Your Brushless ESC

Make sure your ESC brake is programmed to Off. Also, be sure to use an ESC with the proper 9V cutoff when using 3-Cell Li-Po packs, or 6V cutoff when using 2-cell Li-Po packs.

Note: This section covers the installation of an Outrunner. Skip back to Page 10 for Inrunner Motor Installation.

❍ 1. Attach the outrunner stick mount (EFLM1915 - sold separately) to the outrunner motor at this time. Use the hardware provided with your motor to attach it to the mount using at minimum of two screws.

Note: It is also very important to check to be sure the propeller is balanced before installing onto the shaft.

❍ 2. When using the E-Flite™ outrunner motor and mount, you will need to shorten the motor mount stick by 13/16" (20mm). Use a razor saw to cut the motor mount stick.
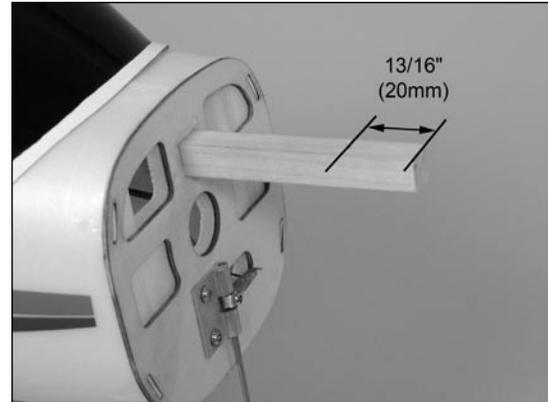
❍ 3. Slide the motor mount and motor onto the motor stick. Use a hobby knife to drill a hole through the plastic and into the motor stick. Secure the gearbox using a 2mm x 8mm wood screw. We suggest adding one or two additional screws to the sides on the outrunner stick mount.
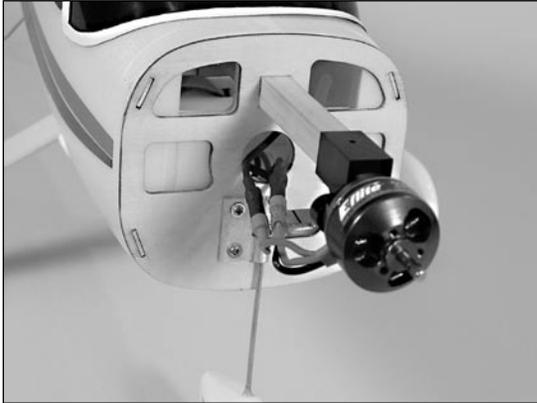
Hint: You may want to plug in the speed control before installing the motor mount.

❍ 4. Secure the speed control location using hook and loop. Run the lead from the speed control to the receiver. It may be necessary to use a servo extension. Exact speed control location may vary depending on the brand used and the center of gravity. This photo shows the location in the front of the fuse if you are using our E-flite™ 20-amp Brushless ESC.

Cowling Installation

Required Parts

Airframe	Rubber spinner or propeller adapter
3mm locknut	3mm washer
10 x 7 propeller	2mm x 5mm screw (4)

Required Tools and Adhesives

Phillips screwdriver (small)	Hobby knife
Hook & loop	

❍ 1. Slide the cowling onto the fuselage, then the propeller. Make sure there is clearance between the cowling and propeller. Drill four locations for the cowling screws.

Note: If you have selected the outrunner motor option, install the propeller adapter onto the motor shaft.
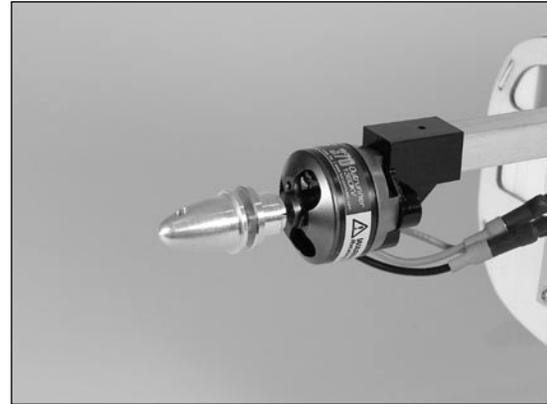
Note: The propeller will have to be drilled out using a 15/64" drill when using the outrunner motor and propeller adapter.

❍ 2. Secure the cowling using four 2mm x 5mm screws. Secure the propeller using the 3mm washer and 3mm locknut.

Note: Simply tighten the adapter when using the outrunner and associated propeller mounting hardware.

❍ 3. Press the spinner into position (if using the Inrunner and gearbox option).

Radio Installation

Required Parts

Fuselage
Wing
Micro control connector (5)
Control connector backplate (5)
2mm x 8mm screw (8)
Aileron servo cover (2)
3" linkage (2)
Y-harness, standard 6"
Servo extension 6"
Double-sided tape (2)

Required Tools and Adhesives

Phillips screwdriver (small)
Hobby knife
Hook & loop
String
Hot glue gun

❍ 1. Attach a micro control connector to the servo arm for the elevator. Use the connector backplate to secure the connector.
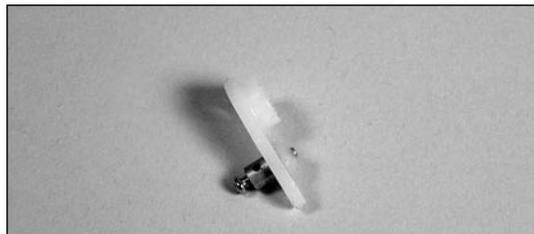
❍ 2. Plug the elevator servo into the receiver and turn on the radio. Make sure the trim has been centered, and then attach the servo arm to the servo as shown.
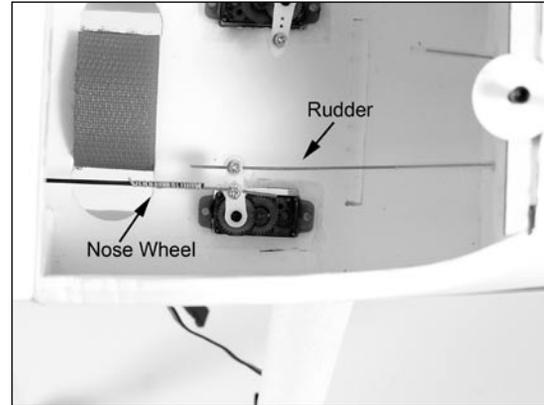
❍ 3. Repeat Steps 1 and 2 for the rudder servo, but install two connectors instead of one.
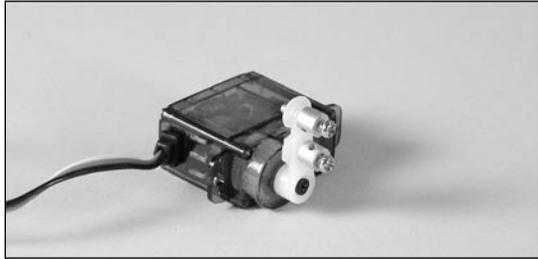
❍ 4. Use hot glue to install the rudder and elevator servos into the fuselage.

❍ 5. Pass the pushrods for the rudder and nose wheel through the connectors. With the radio on, physically center the rudder and nose wheel. Tighten the screw in the connector to secure the pushrod wires.

Note: Use the rudder trim for trimming flight conditions. Do not use the trim if your plane does not taxi straight. Loosen the screw in the connector and change the position of the wire to correct any taxi problems.

○ 6. Attach the receiver to the side of the fuselage using a piece of hook and loop. Plug the servo leads into the receiver at this time. Route the antenna wire through the fuselage.
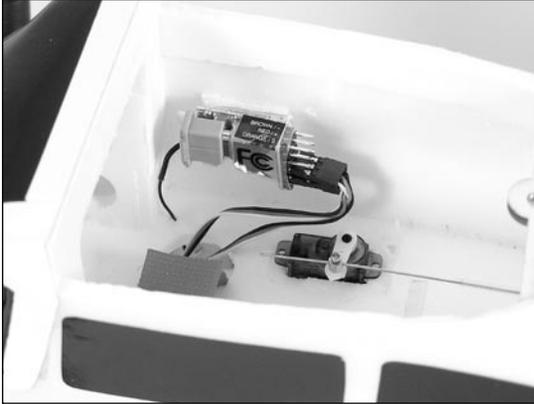

○ 7. Attach a micro control connector to the servo arm for the aileron. Use the connector backplate to secure the connector. Plug the aileron servo into the receiver and turn on the radio. Make sure the trim has been centered, and then attach the servo arm to the servo as shown.
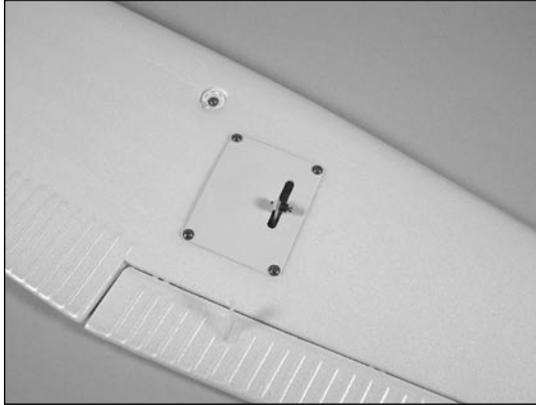
❍ ❍ 8. Center the aileron servo using the radio by attaching the male side of the Y-harness to the receiver and attaching the servo arm to the servo. Center the servo arm in the opening in the servo cover. Use two-sided tape to attach the servo to the cover.
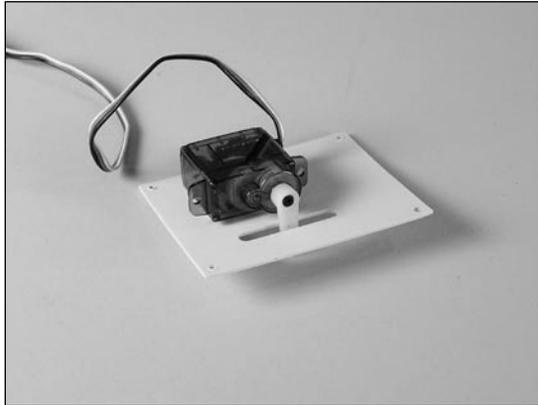
❍ ❍ 9. Route one end of the female side of the 6" Y-harness to the aileron servo location using string. Connect the Y-harness to the aileron servo wire.
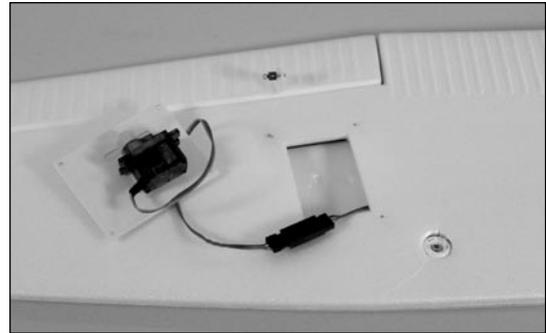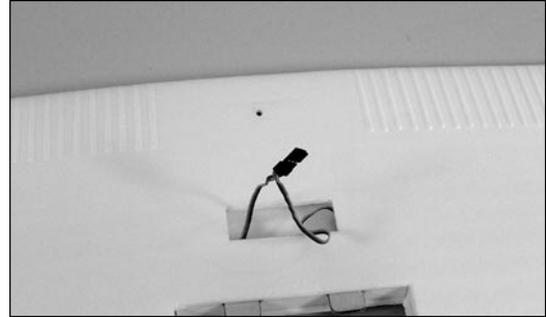
❍ ❍ 10. Secure the cover to the wing using four 2mm x 8mm screws.

❍ ❍ 11. Attach the "Z" bend of the 3" control linkage to the control horn. Slide the wire through the connector on the servo arm. Center the servo using the radio, and physically center the aileron. Secure the wire by tightening the screw in the connector.

❍ 12. Repeat Steps 7 through 11 for the remaining aileron servo.

Wing and Stabilizer Installation

Required Parts

|	
Wing	Fuselage
Stabilizer	3mm x 12mm socket head bolt
3mm plastic washer	Wing strut (2)

Required Tools and Adhesives

Foam-compatible CA
Ruler
Hex wrench: 3/32"
Phillips screwdriver (small)

❍ 1. Plug the aileron extension into the receiver. Slide the wing into position and secure it using the 3mm x 12mm socket head bolt and 3mm plastic washer. Be careful not to over-tighten the wing bolt.

❍ 2. Snap the wing struts into position on the wing and fuselage. Slide the fairing in the strut into place.
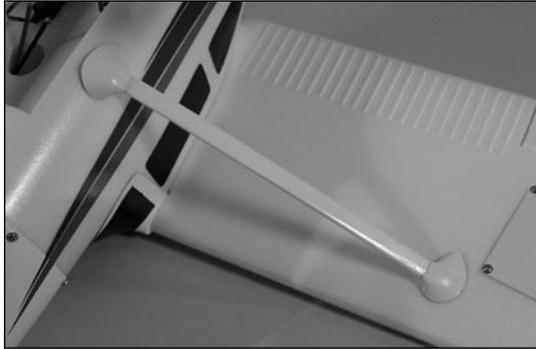
Caution: Always be careful when snapping the wing struts into place to avoid damaging this area of the wing and fuse.

Note: The struts are functional and **NOT** optional. They **must** be installed before flight, ensuring that the mounts in the fuse and wing are also secure. Failure to use the struts securely mounted to the model could result in a crash due to wing failure.

❍ 3. Slide the stabilizer into position. Use a ruler to check that the distance between the stabilizer tips and wing tips are the same. Adjust as necessary.
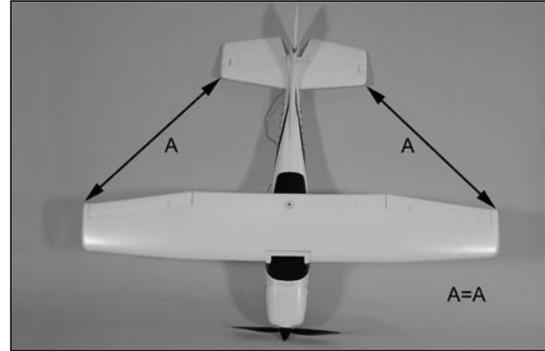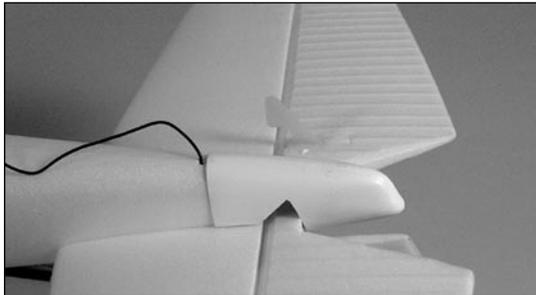

❍ 4. Check that the stabilizer is parallel to the wing. Sand the fuselage lightly to make any corrections.

❍ 5. Once the stabilizer has been aligned, use foam-compatible CA to glue the stabilizer to the fuselage.

❍ 6. Use foam-compatible CA to glue the tail cone onto the fuselage.

❍ 7. Slide the elevator pushrod wire through the micro control connector. Attach the "Z" bend to the elevator control horn. With the radio on and elevator trim centered, physically center the elevator. Tighten the screw in the connector to secure the pushrod wire.
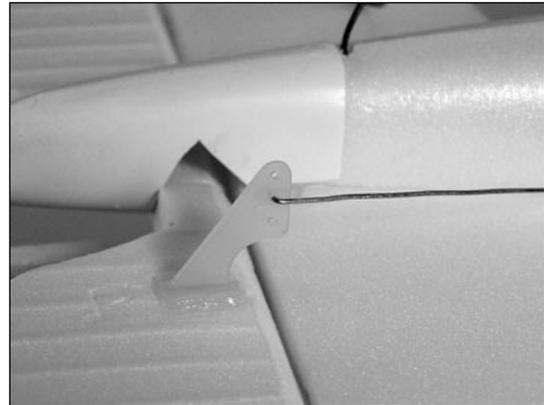
Battery Installation

Required Parts

Assembled airframe   Battery
Battery door

Required Tools and Adhesives

Foam-compatible CA

❍ 1. With the aircraft fully assembled, install the
battery into the battery compartment. Secure the
battery using the hook and loop material.

❍ 2. Install the battery door to the bottom of the
fuselage. The magnet will hold the battery hatch
in place.

Control Throws

❍ 1. Turn on the transmitter and receiver of your Cessna 182. 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 down will make the airplane elevator move up.

❍ 3. Use a ruler to adjust the throw of the elevator, ailerons and rudder. Adjust the position of the pushrod at the control horn to achieve the following measurements when moving the sticks to their endpoints.

Ailerons:
1/4" (6mm) Up/Down

Elevator:
5/8" (16mm) Up/Down

Rudder:
1/2" (12mm) Right/Left

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

Center of Gravity

Caution: Do not inadvertently skip this step!

The recommended Center of Gravity (CG) location for the Cessna 182 is $1^1/_2$" (38mm) behind the leading edge of the upper wing against the fuselage.

Range Testing the Radio

❍ 1. Before each flying session, be sure to range check your radio. This is accomplished by turning on your transmitter with the antenna collapsed. Turn on the receiver in your airplane. With your airplane on the ground and the engine running, you should be able to walk 30 paces (approximately 100 feet) away from your airplane and still have complete control of all functions. If not, don't attempt to fly! Have your radio equipment checked out by the manufacturer.

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

❍ 3. Be sure that your transmitter batteries are fully charged, per the instructions included with your radio.

Preflight

Check Your Radio

❍ Before going to the field, be sure that your batteries are fully charged, per the instructions included with your radio. Charge both the transmitter and receiver pack for your airplane. Use the recommended charger supplied with your particular radio system, following the instructions provided with the radio. In most cases the radio should be charged the night before going out flying.

❍ Before each flying session, be 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, start 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.

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

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

❍ Check the radio installation and make sure all the control surfaces are moving correctly (i.e. the correct direction and with the recommended throws). Test run the motor and make sure it transitions smoothly from off to full throttle and back. Also ensure the engine is installed according to the manufacturer's instructions, and it will operate consistently.

❍ Check all the control horns, servo horns, and clevises to make sure they are secure and in good condition. Replace any items that would be considered questionable. Failure of any of these components in flight would mean the loss of your aircraft.

2005 Official AMA
National Model Aircraft Safety Code

GENERAL

1) I will not fly my model aircraft in sanctioned events, air shows or model flying demonstrations until it has been proven to be airworthy by having been previously, successfully flight tested.

2) I will not fly my model higher than approximately 400 feet within 3 miles of an airport without notifying the airport operator. I will give right-of-way and avoid flying in the proximity of full-scale aircraft. Where necessary, an observer shall be utilized to supervise flying to avoid having models fly in the proximity of full-scale aircraft.

3) Where established, I will abide by the safety rules for the flying site I use, and I will not willfully or deliberately fly my models in a careless, reckless and/or dangerous manner.

4) The maximum takeoff weight of a model is 55 pounds, except models flown under Experimental Aircraft rules.

5) I will not fly my model unless it is identified with my name and address or AMA number on or in the model. (This does not apply to models while being flown indoors.)

6) I will not operate models with metal-bladed propellers or with gaseous boosts, in which gases other than air enter their internal combustion engine(s); nor will I operate models with extremely hazardous fuels such as those containing tetranitromethane or hydrazine.

RADIO CONTROL

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

2) I will not fly my model aircraft in the presence of spectators until I become a qualified flier, unless assisted by an experienced helper.

3) At all flying sites a straight or curved line(s) must be established in front of which all flying takes place with the other side for spectators. Only personnel involved with flying the aircraft are allowed at or in front of the flight line. Intentional flying behind the flight line is prohibited.

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

5) Flying sites separated by three miles or more are considered safe from site-to-site interference, even when both sites use the same frequencies. Any circumstances under three miles separation require a frequency management arrangement, which may be either an allocation of specific frequencies for each site or testing to determine that freedom from interference exists. Allocation plans or interference test reports shall be signed by the parties involved and provided to AMA Headquarters. Documents of agreement and reports may exist between (1) two or more AMA Chartered Clubs, (2) AMA clubs and individual AMA members not associated with AMA Clubs, or (3) two or more individual AMA members.

6) For Combat, distance between combat engagement line and spectator line will be 500 feet per cubic inch of engine displacement. (Example: .40 engine = 200 feet.); electric motors will be based on equivalent combustion engine size. Additional safety requirements will be per the RC Combat section of the current Competition Regulations.

7) At air shows or model flying demonstrations, a single straight line must be established, one side of which is for flying, with the other side for spectators.

8) With the exception of events flown under AMA Competition rules, after launch, except for pilots or helpers being used, no powered model may be flown closer than 25 feet to any person.

9) Under no circumstances may a pilot or other person touch a powered model in flight.

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