# OV-10 Bronco 20cc

ARF

**Almost-Ready-To-Fly**

**HANGAR 9®**

Instruction Manual
Bedienungsanleitung
Manuel d'utilisation
Manuale di Istruzioni

HORIZON® HOBBY

## NOTICE

All instructions, warranties and other collateral documents are subject to change at the sole discretion of Horizon Hobby, LLC. For up-to-date product literature, visit horizonhobby.com or www.towerhobbies.com and click on the support or resources 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:

<u>WARNING</u>: 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.

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

<u>NOTICE</u>: Procedures, which if not properly followed, create a possibility of physical property damage AND a little or no possibility of 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. 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, LLC. 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.

**Age Recommendation: Not For Children Under 14 Years. This Is Not A Toy.**

## SAFETY WARNINGS AND PRECAUTIONS

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

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

**Flight**
Fly only in open areas to ensure safety. It is recommended flying be done at radio control flying fields. Consult local ordinances before choosing a flying location.

**Propeller**
Always keep loose items that can become entangled in the propeller away from the prop. This includes loose clothing or other objects such as pencils and screwdrivers. Keep your hands away from the propeller as injury can occur.

**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 accomodate 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.

## BEFORE STARTING ASSEMBLY

- Remove parts from bag.
- Inspect fuselage, wing panels, rudder and stabilizer for damage.
- If you find damaged or missing parts, contact your place of purchase.
- Charge transmitter and receiver batteries.
- Center trims and sticks on your transmitter.
- For a computer radio, create a model memory for this particular model.
- Bind your transmitter and receiver, using your radio system's instructions.

**NOTICE:** Rebind the radio system once all control throws are set. This will keep the servos from moving to their endpoints until the transmitter and receiver connect. It will also guarantee the servo reversal settings are saved in the radio system.

## IMPORTANT FEDERAL AVIATION ADMINISTRATION (FAA) INFORMATION

Use the QR code to learn more about the Recreational UAS Safety Test (TRUST), as was introduced by the 2018 FAA Reauthorization Bill. This free test is required by the FAA for all recreational flyers in the United States. The completed certificate must be presented upon request by any FAA or law enforcement official.

If your model aircraft weighs more than .55lbs or 250 grams, you are required by the FAA to register as a recreational flyer and apply your registration number to the outside of your aircraft. Use the QR code to learn more about registering with the FAA.

According to FAA regulation, all unmanned aircraft flying in United States airspace are required to either fly within an FAA-Recognized Identification Area (FRIA) or continually transmit an FAA-registered remote identification from a Remote ID broadcast module, such as the Spektrum™ Sky™ Remote ID module (SPMA9500). Use the QR code to learn more about the FAA Remote ID regulations.

# TABLE OF CONTENTS

# REPLACEMENT PARTS

| Item # | Description |
|--------|-------------|
| HAN505501 | Fuselage: OV-10 Bronco 20cc |
| HAN505502 | Boom and Boom, LH: OV-10 Bronco 20cc |
| HAN505503 | Boom and Boom, RH: OV-10 Bronco 20cc |
| HAN505504 | Fuselage Sponsons and Parts: OV-10 Bronco 20cc |
| HAN505505 | Wing Panel; Center: OV-10 Bronco 20cc |
| HAN505506 | Wing Panel; LH: OV-10 Bronco 20cc |
| HAN505507 | Wing Panel; RH: OV-10 Bronco 20cc |
| HAN505508 | Horizontal Stabilizer: OV-10 Bronco 20cc |
| HAN505509 | Rudders (2): OV-10 Bronco 20cc |
| HAN505510 | Cowlings (2): OV-10 Bronco 20cc |
| HAN505511 | Fuselage Rear Fairing: OV-10 Bronco 20cc |
| HAN505512 | Gear Door Set: OV-10 Bronco 20cc |
| HAN505513 | Scale Parts: OV-10 Bronco 20cc |
| HAN505514 | Canopy: OV-10 Bronco 20cc |
| HAN505515 | Cockpit Hatch Parts: OV-10 Bronco 20cc |
| HAN505516 | Pushrod Set: OV-10 Bronco 20cc |
| HAN505517 | EP Motor Mounts: OV-10 Bronco 20cc |
| HAN505518 | Wing Tubes: OV-10 Bronco 20cc |
| HAN505519 | Hardware Set: OV-10 Bronco 20cc |
| HAN505520 | Spinners (2); 2.75": OV-10 Bronco 20cc |
| HAN505521 | Decal Sheet: OV-10 Bronco 20cc |
| HAN505522 | Wheels (3): OV-10 Bronco 20cc |
| HAN505523 | Retract Mounting Brackets: OV-10 Bronco 20cc |
| HAN505524 | Retract Set: OV-10 Bronco 20cc |
| HAN505525 | Retract Unit Set: OV-10 Bronco 20cc |
| HAN505526 | Nose Gear Strut: OV-10 Bronco 20cc |
| HAN505527 | Main Gear Struts: OV-10 Bronco 20cc |
| HAN505528 | Nose Wheel Steering Servo Mount: OV-10 Bronco 20cc |
| HAN505529 | Retract Controller: OV-10 Bronco 20cc |
| HAN505530 | Aluminum Spinners (2), 2.75": OV-10 Bronco 20cc |
| HAN505531 | Fuel Tanks and Pylons Set (3): OV-10 Bronco 20cc |
| HAN505532 | Aluminum Hub Wheel Set (3): OV-10 Bronco 20cc |

## REQUIRED FOR COMPLETION, ALL POWER OPTIONS

| # Required | Item # | Description |
|---|---|---|
| 9 | SPMSA6380 | A6380 Standard Digital HV MG Aircraft Servo |
| 1 | SPMSA6330 | A6330 Digital MG HV Brushless Servo |
| 1 | SPMAR14400T | AR14400T 14-Channel PowerSafe Telemetry Receiver |
| 2 | SPMX20002SRX | 7.4V 2000mAh 2S 15C Smart LiPo Receiver Battery: Universal Receiver, IC3 |
| 6 | SPMA3001 | 6" Heavy-Duty Servo Extension Lead |
| 4 | SPMA3002 | 9" Heavy-Duty Servo Extension Lead |
| 6 | SPMA3003 | 12" Heavy-Duty Servo Extension Lead |
| 7 | SPMA3004 | 18" Heavy-Duty Servo Extension Lead |
| 1 | SPMA3005 | 24" Heavy-Duty Servo Extension Lead |
| 1 | SPMA3007 | 48" Heavy-Duty Servo Extension Lead |

## REQUIRED FOR COMPLETION, GAS ENGINE INSTALLATION

| # Required | Item # | Description |
|---|---|---|
| 2 | DLEG0420 | DLE-20RA 20cc Gasoline Rear-Exhaust Engine |
| 2 | SPMSA6380 | A6380 Standard Digital HV MG Aircraft Servo |
| 2 | APC17060 | 17x6 Propeller |
| 2 | HAN116 | Fuel Filler with T Fitting |
| 2 | SPM9530 | Switch Harness |
| 2 | SPMB1300LPRX | 2S LiPo Battery |
| 2 | SPMA3003 | 12" Heavy-Duty Servo Extension Lead |
| 2 | SPMA3004 | 18" Heavy-Duty Servo Extension Lead |

## REQUIRED FOR COMPLETION, ELECTRIC MOTOR INSTALLATION

| # Required | Item # | Description |
|---|---|---|
| 2 | SPMXAM4740 | Avian 5055-500Kv Brushless Outrunner |
| 2 | SPMXAE1100A | Avian 100A Smart ESC; 3S-6S, IC5 |
| 2 | EFLP71764 | 15x8E Propeller |

## REQUIRED ADHESIVES

| Description |
|---|
| 15-minute epoxy |
| 30-minute epoxy |
| Thin CA |
| Medium CA |
| Threadlock, low and high strength |

## TOOLS REQUIRED

| Description |
|---|
| Box or open end wrench: 10mm, 7/16-inch, 1/2-inch |
| Clamps |
| Covering iron |
| Cutoff wheel for rotary tool |
| Drill |
| Drill bit set, metric and english |
| Epoxy brushes |
| Felt-tipped pen |
| Flat blade screwdriver |
| Flat file |
| Flux paste |
| Heat gun |
| Hemostats |
| Hex wrench set, metric and english |
| Hobby knife with #11 blade |
| Hobby scissors |
| Hobby square |
| Hook and loop tape |
| Light machine oil |
| Low tack tape |
| Medium grit sandpaper |
| Mixing cups |
| Mixing sticks |
| Pencil |
| Phillips screwdriver #1, #2 |
| Pin vise |
| Pliers |
| Razor saw |
| Rotary tool |
| Ruler |
| Sanding drum for rotary tool |
| Scissors |
| Side cutter |
| Silver solder |
| Stepped reamer |
| Toothpicks |
| Torch or soldering iron |
| Vise grips |
| Wire cutter |

## REMOVING WRINKLES

The covering of your model may develop wrinkles during shipping. Use a sealing iron (HAN1017) with a sealing iron sock (HAN1018) to remove them. Start with a lower heat setting and use caution while working around areas where the colors overlap to prevent separating the colors. It is also advised to use caution around the canopy as it is plastic and could distort with excessive heat. Avoid using too much heat, which could also separate the colors. Placing a cool damp cloth on adjacent colors will also help prevent the separation of the colors while removing wrinkles. A heat gun (HAN100) can also be used, but with caution as it produces extreme heat and it is easy to damage the covering.

## BUILDING PRECAUTIONS

Prepare the work surface prior to beginning the build. The surface should be soft and free of any sharp objects. We recommend resting the airframe parts on a soft towel or pit mat to prevent scratching or denting the surface of the aircraft.

## TRANSPORTATION AND STORAGE

When transporting and storing your model, you will need a minimum of 85 in (2.2 m) in length, and 29 inches (74cm) in height to accommodate the size of the fuselage. We also recommend the use of wing and stabilizer bags to help protect these surfaces during transport and storage. The control horns and linkages can cause damage to other surfaces even when placed in storage bags. Always transport and store the wings and stabilizer so the linkages do not contact other panels to prevent damage.

## REPLACEMENT COVERING

Your model is covered with UltraCote® film in the following colors. If repairs are required, order these coverings to make those repairs.
White HANU870     Oracover 10
Black HANU874     Oracover 71
True Red HANU866   Oracover 23

## CHECKING BLIND NUTS

When building the aircraft, you will be required to thread machine screws into blind nuts. We recommend pre-threading the screws to make sure the blind nuts are clear of any debris. If the screws do not thread in easily, clear the threads using the appropriate tap and tap handle.

## VINYL DECAL SET

If you wish to upgrade the graphics on your model, Callie Graphics offers a vinyl and printed graphics set specifically for this model. https://callie-graphics.com

## ELEVATOR CONTROL HORN AND HINGING

1. Inspect the stabilizer and elevator. Make sure the elevator is centered spanwise in relationship to the stabilizer.
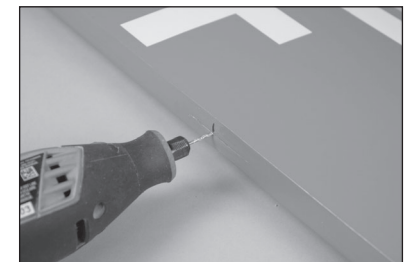




2. Use a felt-tipped pen to mark the center of the slot in the hinges on both the stabilizer and control surface.
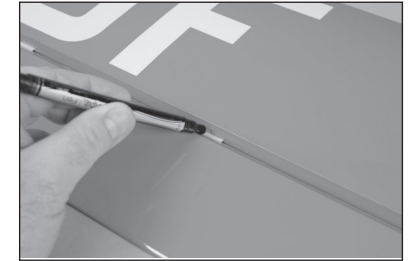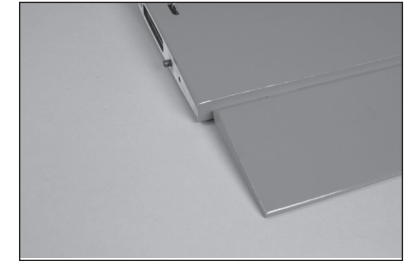


3. Separate the elevator and stabilizer. Set the hinges aside.



4. Use a pin vise or rotary tool and 1/16-inch (1.5mm) drill bit to drill the center location in the trailing edge and control surface previously marked.
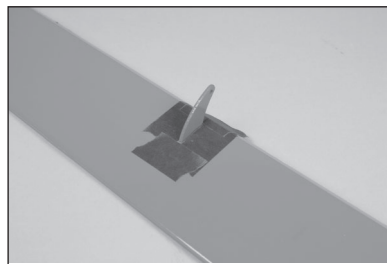
9. Remove the control horn. Mix 1/8oz (3.5cc) of 5-minute epoxy. Apply epoxy to the slot in the control surface. Make sure the epoxy gets into the slot for a good bond between the surfaces and control horn.
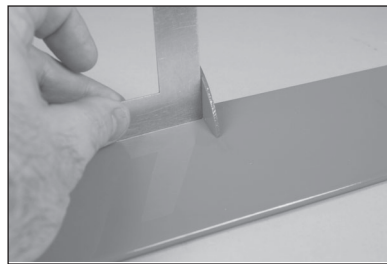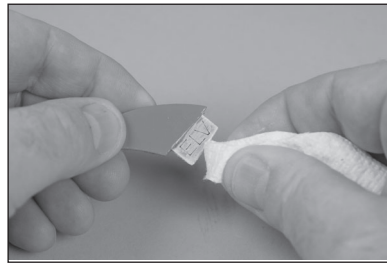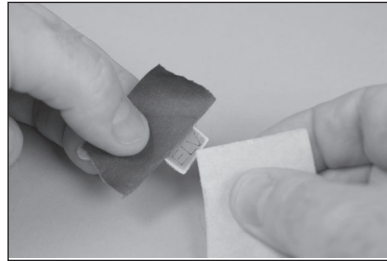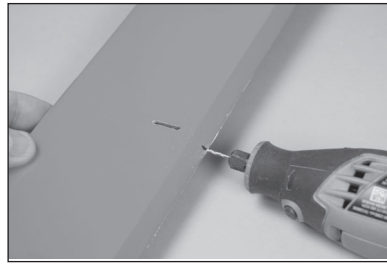


5. Locate the control horn marked ELV. Use medium-grit sandpaper to lightly sand the control horns where they fit into the control surface. Clean the sanded area using a paper towel and isopropyl alcohol to remove any debris or oils.

➜ Use tape on the painted area to help prevent removing the paint from the exposed portion of the control horn. Remove the tape once the control horn has been sanded.



10. Apply epoxy to the area of the control horn that fits into the slot. Apply epoxy to all the surfaces of the control horn that fit into the control surface.



6. Remove any tape, then use a paper towel and isopropyl alcohol to remove any dust or oils from the control horn.



11. Insert the control horn into the slot. Use a paper towel and isopropyl alcohol to remove any excess epoxy.



7. Test fit the control horns in the slots for the elevator. Do not force the control horn into the slot. Use a square to check that the control horn is square to the control surface. The slot in the control surface can be carefully adjusted using a hobby knife.



12. Before the epoxy fully cures, remove the tape from around the control horn. This will allow the epoxy to flow around the control horn, creating a small fillet between the control horn and surface for a finished look and secure bond. Allow the epoxy to fully cure before proceeding.



8. Use low-tack tape around the control horns to prevent epoxy from getting on the control surface.



13. Place a T-pin in the center of each hinge. This will keep the hinges centered when they are installed.
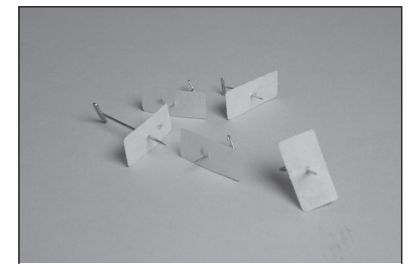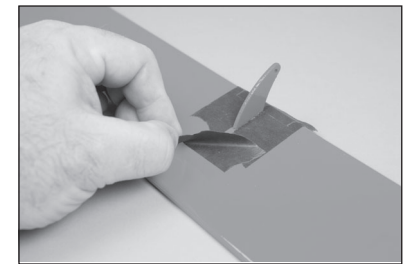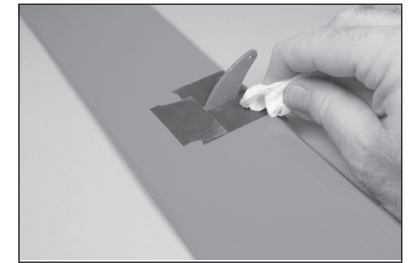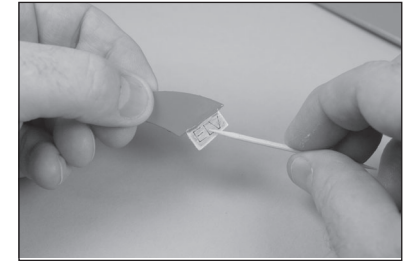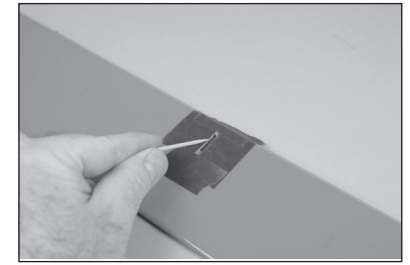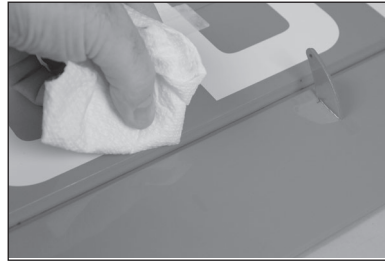
**14.** Fit the hinge in the hinge slot. Align the slot in the hinge with the hole in the stabilizer.
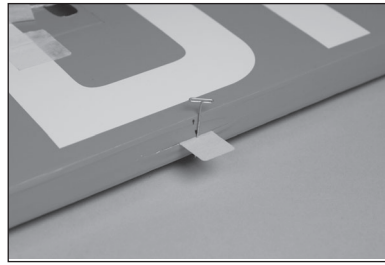


**15.** Fit the elevator into position on the hinges. Remove the T-pins from the hinges.
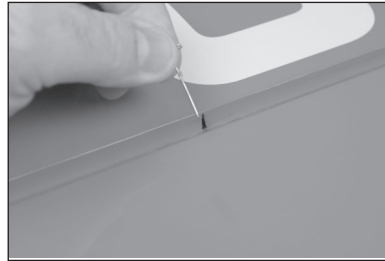


**16.** Check the alignment of the elevator to the stabilizer as shown earlier in Step 1.



**17.** Apply several drops of thin CA to each of the hinges, both on the top and bottom of the hinge.

➜ Do not use accelerator on the hinges. The CA must be allowed to wick into the hinge to provide the best bond between the hinge and surrounding wood.

➜ Check the opposite side of the surfaces to ensure that excess CA hasn't run. If this has occurred, use CA debonder or acetone to remove it before it cures completely.
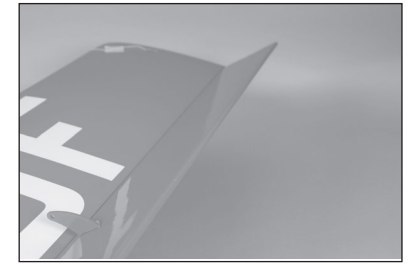


**18.** Once the CA has fully cured, gently pull on the stabilizer and elevator to make sure the hinges are secure.
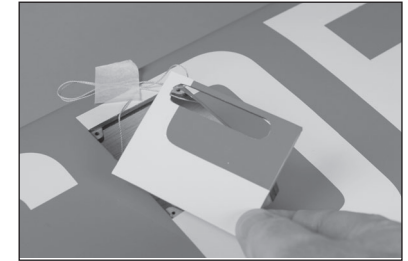
➜ Reapply CA to any hinges that are not glued securely.
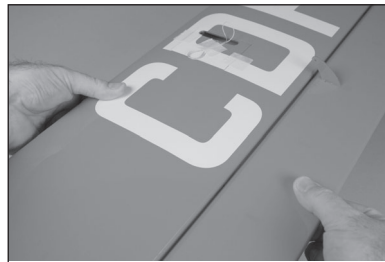


**19.** Break in the hinges by flexing the control surface through its range of motion in both directions.
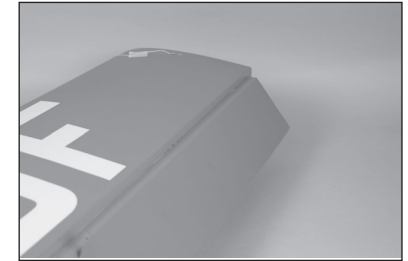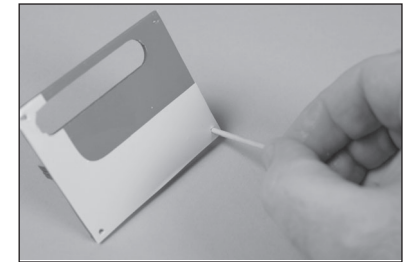




## ELEVATOR SERVO INSTALLATION

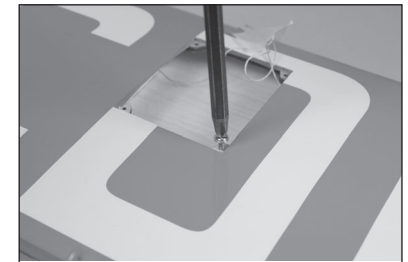**20.** Remove the elevator servo hatch.



**21.** Use a toothpick or hobby knife with a #11 blade to puncture the servo cover for the mounting screws.



**22.** Use a #1 Phillips screwdriver to thread an M2.5 x 10mm self-tapping screw into each of the holes. Remove the screws before proceeding.
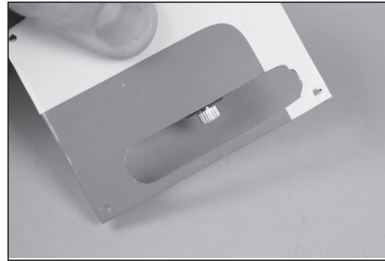
**23.** Apply 1–2 drops of thin CA in each hole to harden the surrounding wood. Allow the CA to fully cure before proceeding.
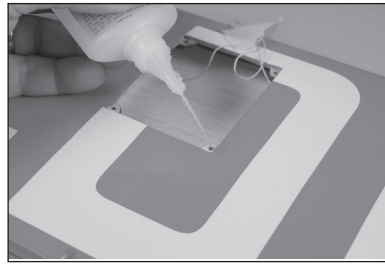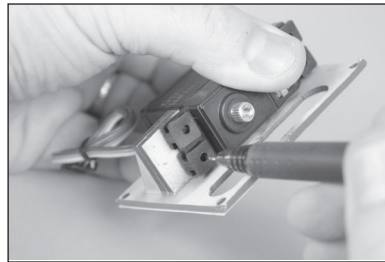
**24.** Install the rubber grommets and eyelets in the servo mounting tabs following the instructions provided with the servo.
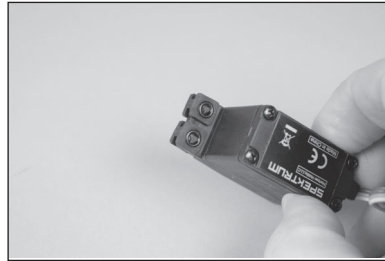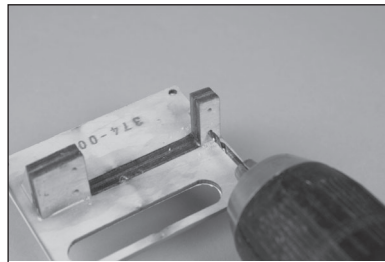
**25.** Position the servo with the servo output shaft centered in the opening for the servo arm.
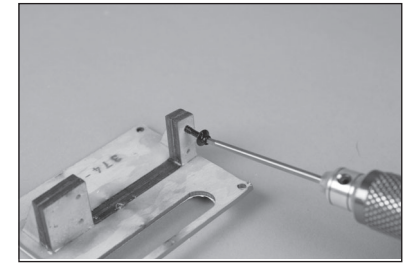
**26.** Mark the locations of the servo mounting screws using a felt-tipped pen.
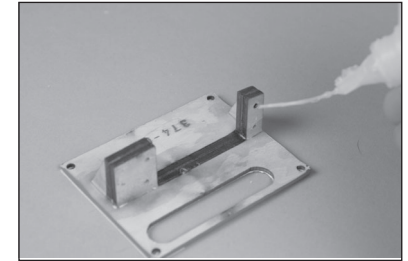
**27.** Use a pin vise or drill and 5/64-inch (2mm) drill bit to drill through the holes in the servo mount.
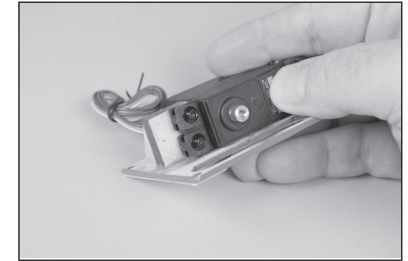
**28.** Thread a servo mounting screw into each hole, then remove all the screws.
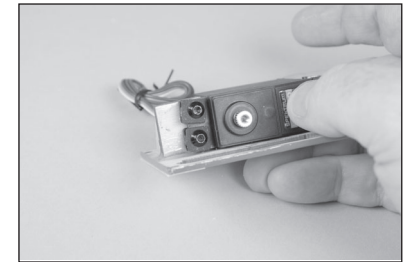
**29.** Apply 1–2 drops of thin CA in each hole to harden the surrounding wood. Allow the CA to fully cure before proceeding.

**30.** Mount the servo using the screws provided with the servo. Note the orientation of the servo on the servo cover

**31.** Secure a 9-inch (225mm) servo extension to the servo lead using a commercially available retainer (Servo Connector Clips, SPMA3054).

**32.** Center the servo using the radio system. Place the control horn on the servo so it is perpendicular to the servo. Remove any arms from the servo horn that will interfere with the operation of the servo.
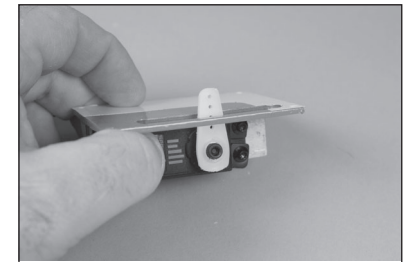
**33.** When attaching the linkage to the servo arm, use the hole that is 5/8 inch (16mm) from the center of the servo horn. This hole will need to be enlarged using a pin vise and 5/64-inch (2mm) drill bit.



5/8 inch
(16mm)
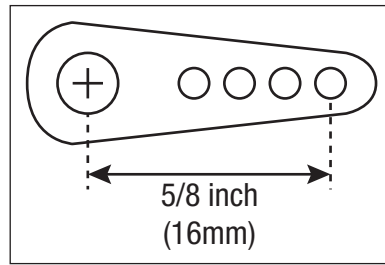
**34.** Tie or tape the string located inside the stabilizer to the end of the servo lead.
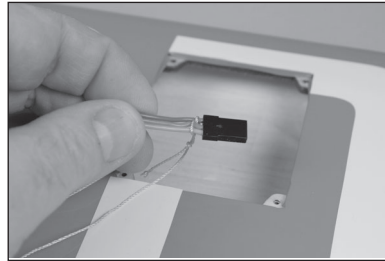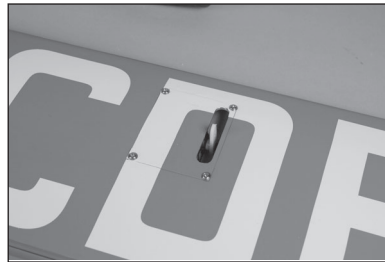


**35.** Guide the servo lead for the elevator through the stabilizer to the stabilizer root.

➜ The servo lead can exit with the right or left of the stabilizer. Make note of this so the elevator servo extension in installed in the correct boom later.
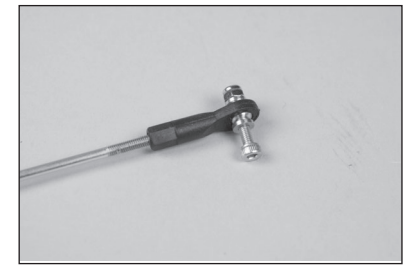


**36.** Secure the elevator servo cover using a #1 Phillips screwdriver and four M2.5 x 10mm self-tapping screws.
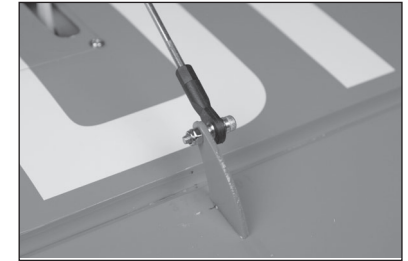


**37.** Slide a silicone retainer on the metal clevis. Thread the clevis on the 3³/₄ inch (95mm) threaded rod until the end of the threaded rod is visible between the forks of the clevis.
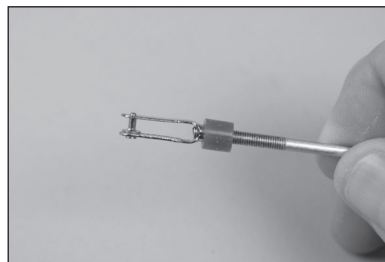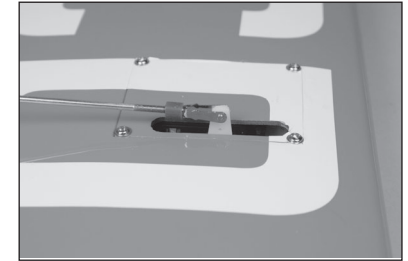


**38.** Thread the ball 14 turns onto the threaded rod.



**39.** Attach the ball end to the control horn.



**40.** Attach the clevis to the servo arm. With the radio system on and the elevator servo centered, adjust the linkage to center the elevator. Once adjusted, slide the silicone retainer over the forks of the clevis.



## AILERON AND FLAP INSTALLATIONS

**41.** Locate the control horns marked LAP for the flaps and AIL for the ailerons. Use epoxy to glue the control horns in position. Allow the adhesive to fully cure before proceeding.

➜ The control horns for the flaps in the wing center section can be installed at this time.
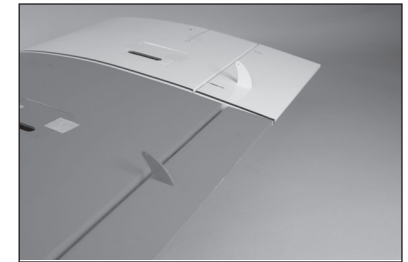


**42.** Prepare and hinge the aileron to the wing. Follow the same procedure as hinging the elevator to the stabilizer. Make sure the aileron is centered between the flap and wing tip before gluing the hinges. Make sure to verify the hinges are securely glued before proceeding.

**43.** Mount the aileron servo following the instructions in the elevator servo installation. Center the servo using the radio system. Place the control horn on the servo so it is perpendicular to the servo. Remove any arms from the servo horn that will interfere with the operation of the servo.



**44.** When attaching the linkage to the servo arm, use the hole that is 13/16 inch in (21mm) from the center of the servo horn. This hole will need to be enlarged using a pin vise and 1/8-inch (3mm) drill bit.



13/16 inch
(21mm)

**45.** Tie or tape the string located inside the wing to the end of the servo lead. Guide the servo lead for the aileron through the wing to the wing root.



**46.** Install the servo in the wing and secure the servo cover using M2.5 x 10mm self-tapping screws. Make sure to prepare and harden the threads in the wood as outlined for the stabilizer servo covers.



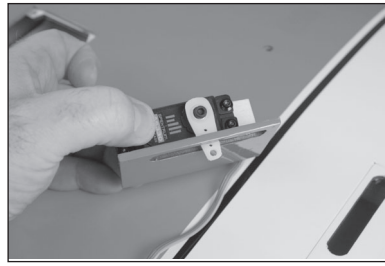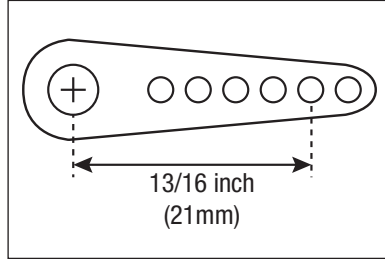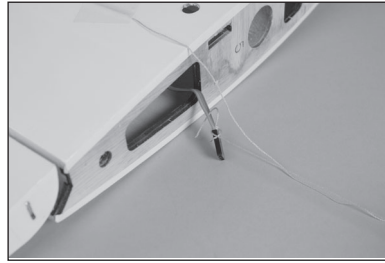**47.** Assemble the aileron linkage using two ball ends and a $3^{11}/_{32}$ inch (85mm) threaded rod. Attach the linkage to the servo and control horn. With the radio system on and the aileron servo centered, adjust the linkage to center the aileron.



**48.** Mount the flap servo following the instructions in the elevator servo installation. Center the servo using the radio system. Place the control horn on the servo so it is perpendicular to the servo. Remove any arms from the servo horn that will interfere with the operation of the servo.
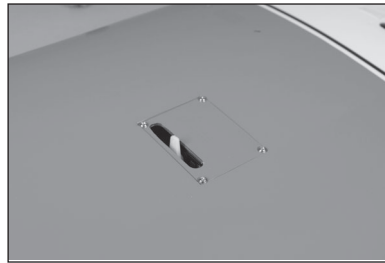


**49.** When attaching the linkage to the servo arm, use the hole that is 13/16 inch in (21mm) from the center of the servo horn. This hole will need to be enlarged using a pin vise and 5/64-inch (2mm) drill bit.
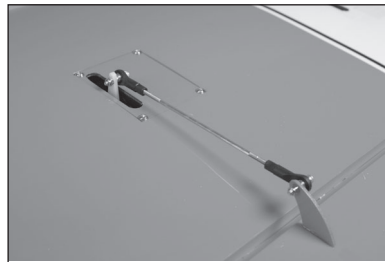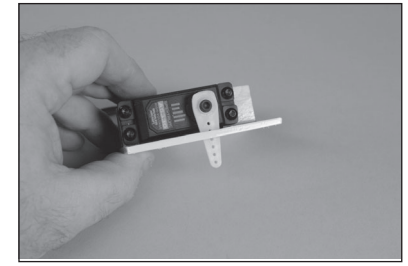


13/16 inch
(21mm)
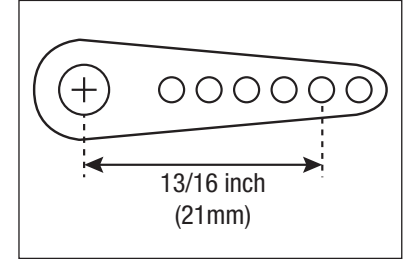
**50.** Tie or tape the string located inside the wing to the end of the servo lead. Guide the servo lead for the flap through the wing to the wing root.
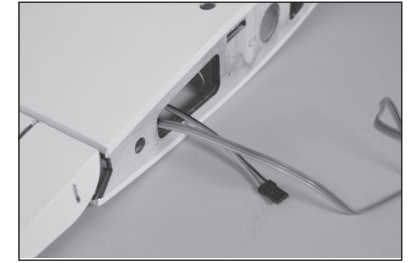


**51.** Slide a silicone retainer on the metal clevis. Thread the clevis on the $3^{11}/_{32}$ inch (85mm) threaded rod until the end of the threaded rod is visible between the forks of the clevis.
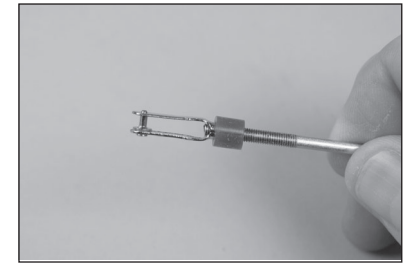


**52.** Thread the ball 14 turns onto the threaded rod.

➜ Before installing the flap linkage, set the throw for the flap to 0 at the transmitter.

**53.** Attach the linkage to the servo arm and control horn. With the flap servo centered using the radio system, adjust the linkage to achieve the $1^1/_4$ inch (32mm) mid-flap travel.
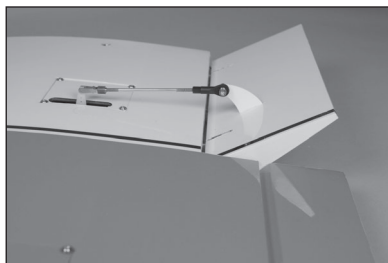


**54.** Move the control at the transmitter to the raised flap position. Adjust the throw percentage of travel at the radio to align the flap with the aileron.



**55.** Move the control at the transmitter to the full flap position. Adjust the throw percentage of throw at the radio to achieve the $2^1/_2$ inch (64mm) full-flap travel.
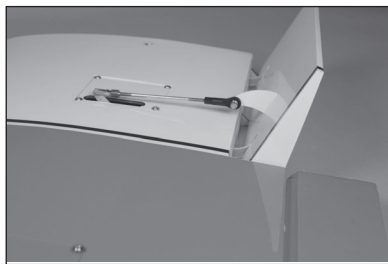


## RUDDER SERVO INSTALLATION

**56.** Locate the control horn marked RUD for the rudder. Use epoxy to glue the control horn in position. Allow the adhesive to fully cure before proceeding.
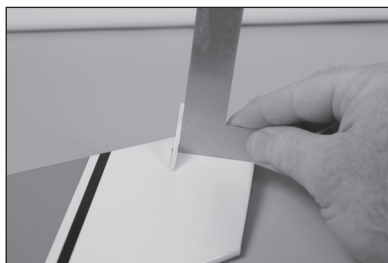


**57.** Prepare and hinge the rudder to the fin. Follow the same procedure as hinging the elevator to the stabilizer. Make sure the gap between the rudder and fin at the top is as close as possible, but allows for free movement of the rudder without any binding.



**58.** Thread a ball link on one of the $28^1/_2$ inch (725mm) pushrod. Secure the ball and to the servo horn in the position shown in the following step.
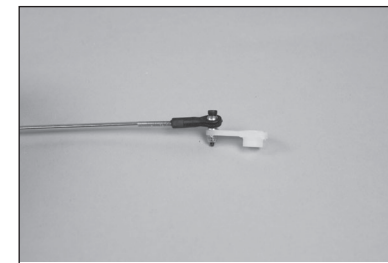


**59.** When attaching the linkage to the servo arm, use the hole that is 13/16 inch in (21mm) from the center of the servo horn. This hole will need to be enlarged using a pin vise and 5/32-inch (2mm) drill bit.



13/16 inch (21mm)
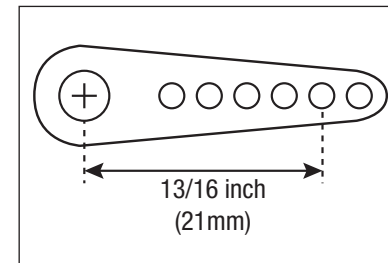
**60.** Slide the pushrod into the pushrod tube from inside the boom that corresponds to the same side as the rudder control horn. Thread a ball end onto the pushrod, then secure the ball end to the rudder control horn.



**61.** Mount the servo in the boom with the output facing toward the front of the aircraft. Place the servo arm on the servo. With the radio system on and the rudder servo centered, adjust the linkage to center the rudder. Once centered, secure the servo arm to the servo using the hardware provided with the servo.



**62.** Tie a string to the end of a 48 inch (1200mm) extension, noting the end that will be required to connect to the elevator servo.

➜ Make sure the servo extension is on the same side as the elevator servo lead.
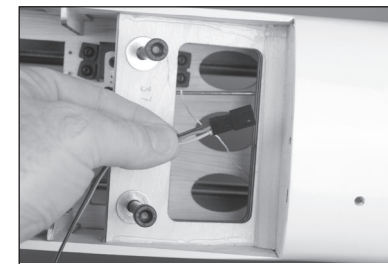
**63.** Use the string to pull the extension through the boom to the fin.



## ENGINE INSTALLATION

**64.** Attach the engine mount to the firewall using four M4 x 30mm socket head screws and four M4 washers. Place a drop of threadlock on each screw before their installation. Use a 3mm hex wrench to tighten the screws once both mounts have been positioned correctly on the firewall.



**65.** Fit the center section to the boom, guiding the dowels into the holes in the upper section of the boom.



**66.** Secure the center section using two M6 x 20mm socket head screws and 6mm washers.



**67.** Position the engine in the mounts so the drive washer is $5\frac{1}{2}$ inches (139mm) forward of the firewall.
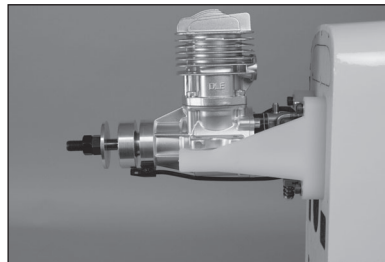


**68.** Use a clamp to hold the engine in position to verify the correct positioning of the engine on the mounts.
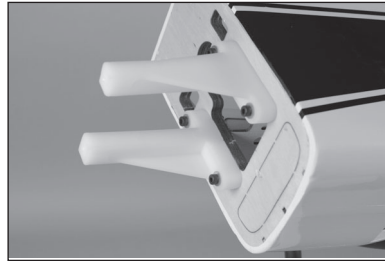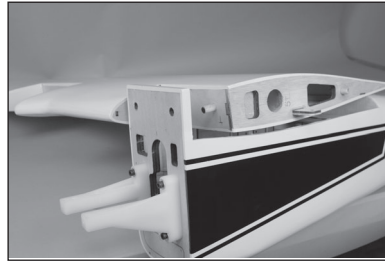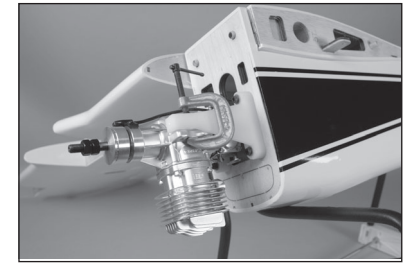


**69.** Fit the cowling into position. The cowling will require trimming to fit the head of the engine.
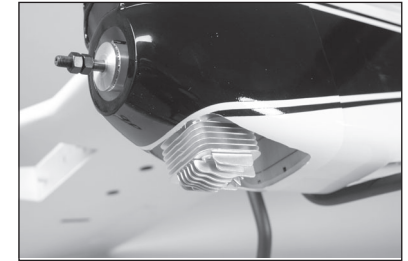


**70.** Slide the cowling back so it lightly contacts the leading edge of the wing.

➔ A piece of low-tack tape can be used to hold the cowling in position for the following steps.



**71.** Slide the spinner backplate and propeller on the engine shaft. Secure the items using the washer and nut included with the engine. There must be a slight gap between the cowling and spinner backplate. Adjust the position of the engine if necessary.



**72.** Remove the propeller, spinner and cowling from the boom. Use a felt-tipped pen to mark the location for the four engine mounting bolts on the engine mount.

➔ The wing center section can also be removed.
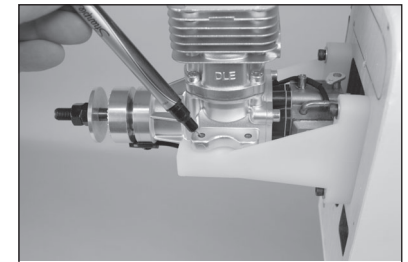
**73.** Remove the engine from the mounts. Use a drill and 11/64-inch (4.5mm) drill bit to drill the holes for the engine mounting screws. Once drilled, reattach the engine mounts to the firewall.

➜ We recommend removing the mounts from the firewall and using a drill press to drill the holes for best results.



➜ Enlarge the hole in the carburetor arm using a drill a 5/64 inch (2mm) drill bit. Attach the nylon clevis to the carburetor arm.



**74.** Attach the muffler to the engine using the hardware included with the engine.



**75.** Attach the carburetor arm to the engine using the hardware included with the engine. Make sure the carburetor operates without binding.



**76.** Secure a 5 inch (127mm) piece of fuel tubing to the fuel inlet on the carburetor. Secure the tubing using wire or a cable tie.
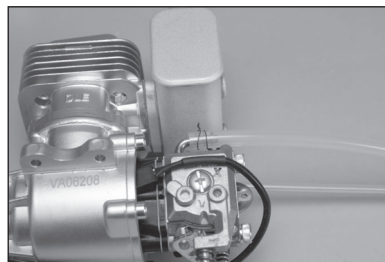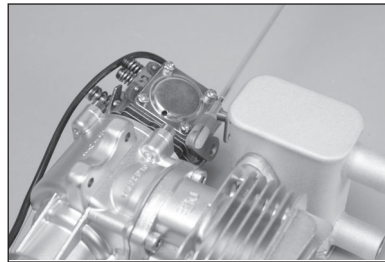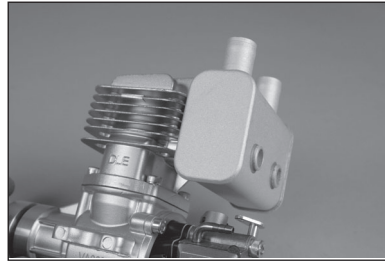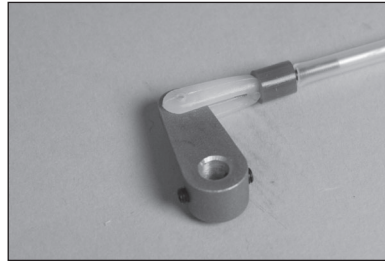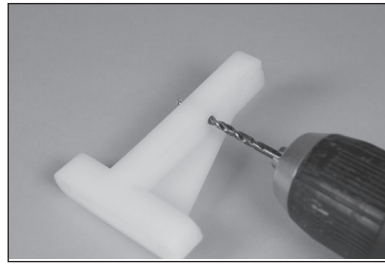


**77.** Slide the engine into position. Guide the pushrod through the hole in the fuel tank tray as shown.



**78.** Slide an M4 washer on each M4 x 30mm machine screw, then place an M4 locknut on each screw. Use a #2 Phillips screwdriver and 7mm hex driver to tighten all four screws, securing the engine to the engine mount.



**79.** Install the throttle servo in the boom using the hardware included with the servo. The output of the servo faces toward the rear of the fuselage. Make sure to prepare the screw holes following steps outlined earlier on this manual.



**80.** Use side cutters to trim the pushrod flush with the aft edge of the servo.



**81.** Cut the throttle pushrod tube to 5 inches (127mm). slide the tube onto the pushrod.
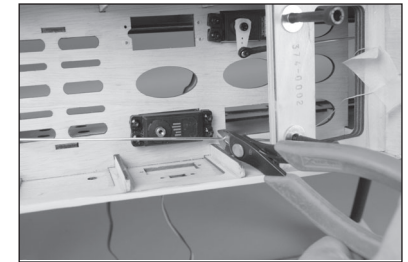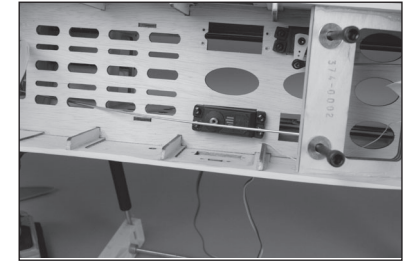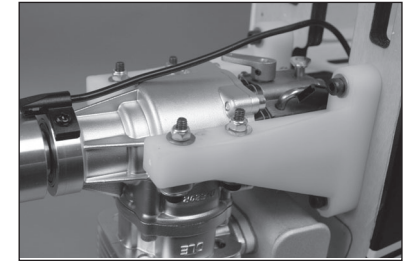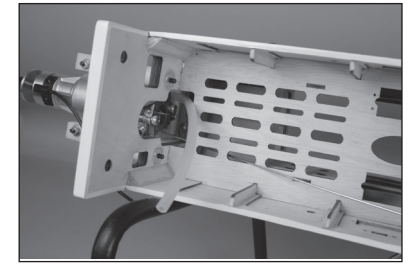
**82.** Place the servo arm on the servo so the arm closest to the side of the boom is perpendicular to the servo. Remove the remaining arms using side cutters.



**83.** Mount the throttle servo connector in the throttle servo arm. Place a drop of canopy glue on the M2 nut, then install it on the underside of the arm to secure the connector.
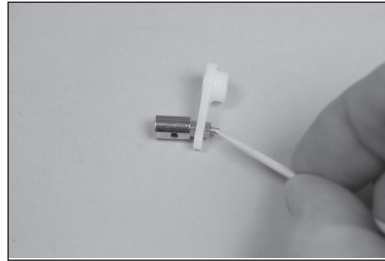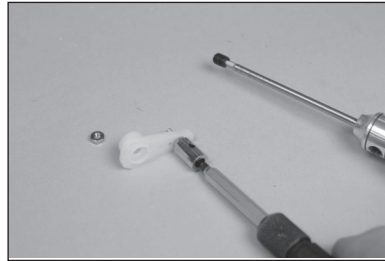




**84.** Pass the throttle pushrod through the connector, then place the servo arm on the servo.
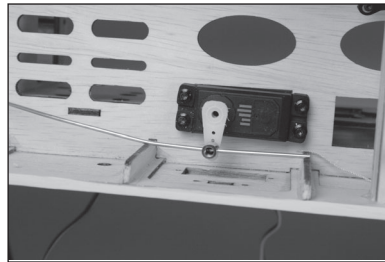


**85.** Move the carburetor and servo to the low-throttle position and tighten the setscrew securing the pushrod to the connector at the servo. Use side cutters to trim the excess wire.



**86.** Check the operation of the carburetor using the radio system. Make any adjustments necessary to fully open and close the carburetor using the radio system.
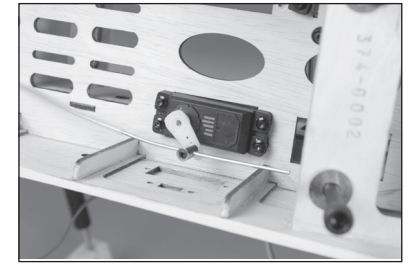


**87.** Once the operation has been checked, use the hardware included with the servo to secure the arm to the servo.



## FUEL TANK ASSEMBLY AND INSTALLATION

**88.** Prepare the brass tubes by placing small amounts of solder on the end of the tubes shown. This will help keep the fuel lines secure when installed.

➔ Use hemostats to act as a heat-sink to avoid melting the rubber stopper.
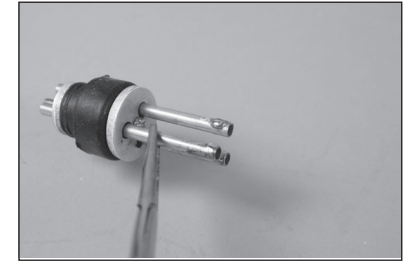


**89.** Cut a piece of fuel tubing that will result in the end of the clunk being $4^7/_8$ inches (124mm) from the back of the aluminum plate. Secure the tubing to the clunk and stopper using thin wire. This will keep the tubing from sliding loose inside the tank.

➔ A second clunk can be installed to provide a line to fuel/defuel your aircraft.
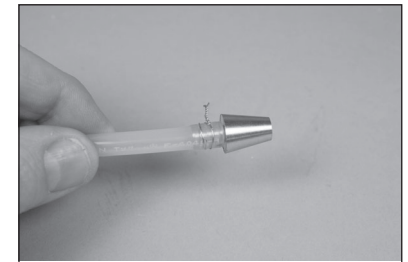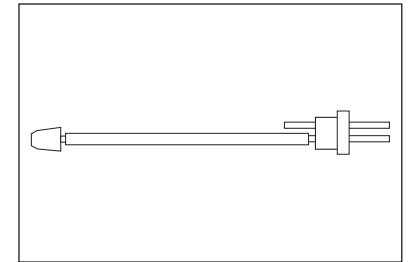
90. Carefully bend the remaining brass tubes so they will be close to the top and bottom of the tank when the stopper has been installed. Mark the lines on the front of the stopper so they can be identified from outside the tank.
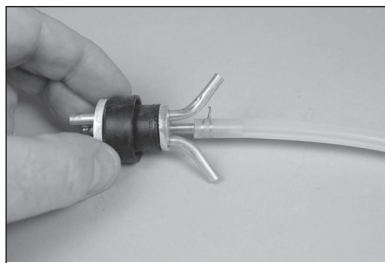


91. Insert the stopper into the tank. Tighten the screw in the stopper using a #1 Phillips screwdriver.

➜ Check that the clunk can move freely inside the tank. If not, adjust the tubing from outside the tank so it can move freely to ensure consistent fuel flow to the engine.



92. Secure a $9^1/_2$-inch (241mm) fuel line to the fill, vent and clunk tubes of the fuel tank. Tie wraps can be used to secure the fuel lines as an alternative to wire ties on the outside of the fuel tank.



93. Use tie wraps to secure the fuel tank to the fuel tank tray.
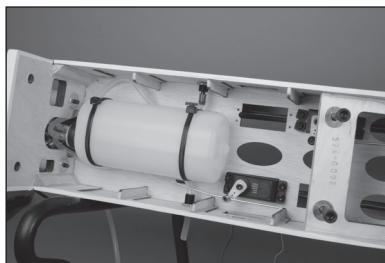


94. Install a fuel filler in the side of the fuselage and route the fuel fill line.



95. Mount a switch on the side of the fuselage for the ignition system. Make sure its location does not interfere with the operation of the rudder or throttle servos.
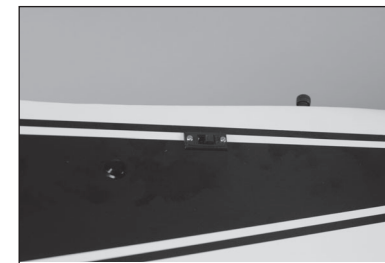


96. Complete the installation of the gas engine by installing the ignition module and ignition battery. Make sure all items are secure in the boom, and the connection between the switch, battery and module are sure as well.
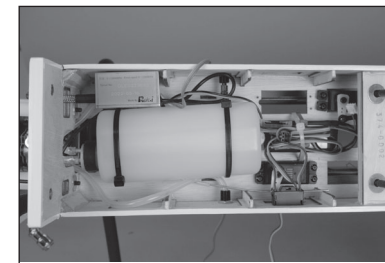


## ELECTRIC MOTOR INSTALLATION

97. Attach the motor box to the firewall using four M4 washers and four M4 x 25mm socket head cap screws. Use threadlock on the blind nuts to prevent them from vibrating loose.
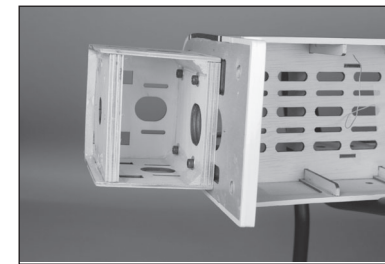


98. Use a #2 Phillips screwdriver to attach the X-mount to the rear of the motor. Use a 2.5mm hex wrench to attach the propeller adapter to the front of the motor. Use threadlock on all metal-to-metal fasteners to prevent them from vibrating loose.



99. Place a 3mm washer on a M3 x 15mm socket head cap screw. Use the screw to draw the blind nut into the back of the motor box firewall. Install all four blind nuts and remove the screws.
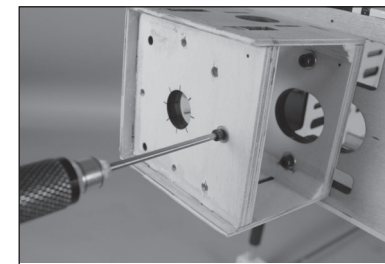
**100.** Attach the motor to the motor box using four 3mm washers and four M3 x 15mm socket head cap screws. Make sure to place a drop of threadlock on each screw before their installation to prevent them from vibrating loose.

➜ Repeat this section of the manual to install the remaining motor.

➜ The ESCs will be mounted in the fuselage. Leads must be assembled to connect the motors to the ESCs.
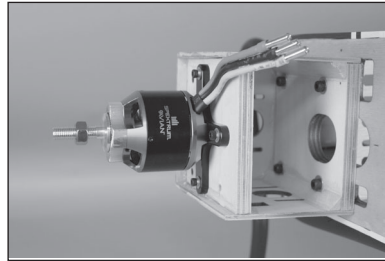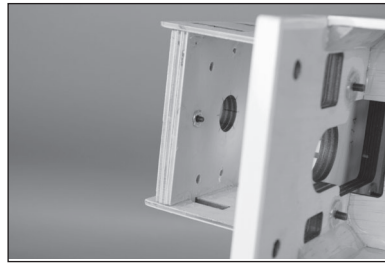




## RETRACT INSTALLATION

**101.** Remove the wheel collars from the main gear axle. Use a flat file to create a flat area at the end of the axle that is 1/4 inch (6mm) in width.
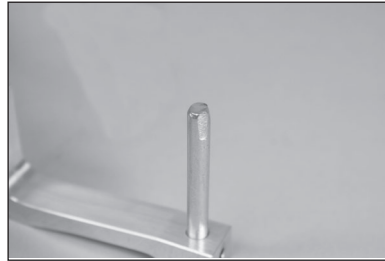


**102.** Slide one of the wheel collars against the retract strut and tighten the setscrew. Apply a drop of light machine oil to the axle.



**103.** Slide the wheel on the axle. Secure the wheel using the remaining wheel collar, tightening the setscrew onto the flat area. Apply a drop of threadlock to the threads of the setscrew before tightening.



➜ The wheel hub is slightly offset. The deeper side will face toward the strut.
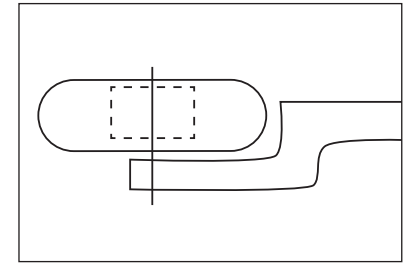


**104.** Secure the retract mounting plates in the boom using four M4 x 15mm socket head screws. Apply a drop of threadlock on each screw before their installation.
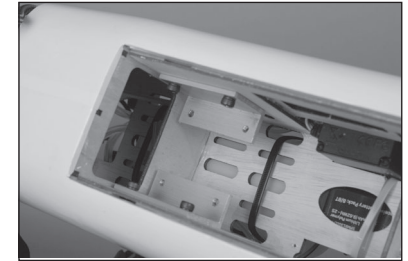


**105.** Mount the retract to the mounting plates using four M4 x 15mm socket head screws that are included with the retracts.

➜ There is a right and left retract. When installing the retract in the boom, the strut for the retract will face toward the fuselage.
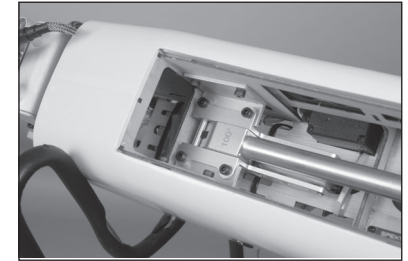


**106.** Use the retract module to test the retraction and extension of the retract with the strut and wheel attached before tightening any of the hardware.

➜ Tighten the screws evenly. Completely tightening one at a time fully may distort the retract frame slightly and cause operational issues.
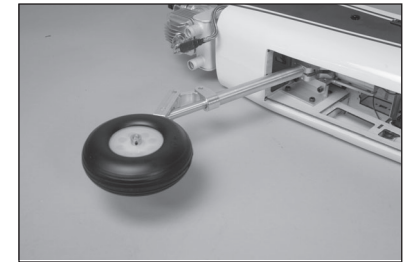


**107.** Assemble the nose wheel steering linkage using the hardware included with the retracts.

**108.** Mount the steering servo in the retract servo opening using four M3 x 12mm button head screws. Apply a drop of threadlock on each screw, then tighten the screws using a 2mm hex wrench.
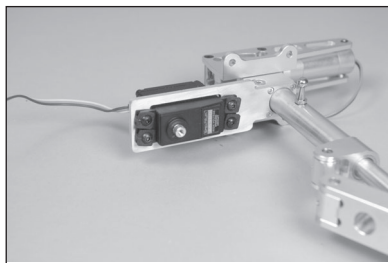


**109.** Center the steering servo and install a servo arm perpendicular to the servo centerline. Attach the linkage to the servo arm and retract. Center the steering servo and adjust the length of the linkage to center the nose gear.

➔ Make sure to adjust the servo travel so equal defection is achieved in each direction. Also make sure the servo is not over traveling as this may damage the ball attached to the nose strut.
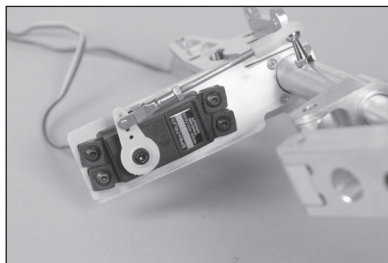


**110.** Install the wheel in the retract strut. The spacers will be located on each side of the wheel.



**111.** Remove the hatch from the fuselage.



**112.** Secure the retract mounting plates in the fuselage using four M4 x 15 socket head screws. Apply a drop of threadlock on each screw before their installation. Mount the retract to the mounting plates using four M4 x 15mm socket head screws that are included with the retracts.

➔ Use the retract module to test the retraction and extension of the retract with the strut and wheel attached before tightening any of the hardware.

➔ If the retracts do not operate in unison (up and down), the connection of the retract leads at the retract module can be reversed without damage to the retracts or retract module.

➔ Tighten the screws evenly. Tightening one at a time fully may distort the retract frame slightly and cause operational issues.
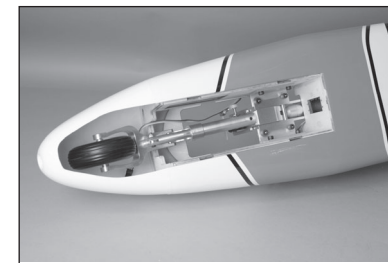


## RADIO INSTALLATION

**113.** Mount the radio components in the fuselage and connect the extensions to the receiver.

➔ Install any extensions required in the wing center section at this time.



➔ A switch must be used between the battery and retract module. When the radio system is turned on, the retracts must remain off so they do not cycle. Once the radio system is on and connected, the retracts can then be powered on.
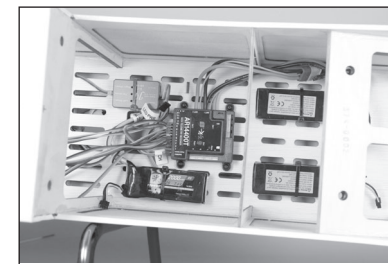
**114.** Mount the remote receivers (if required) using the receiver instructions as a guide.
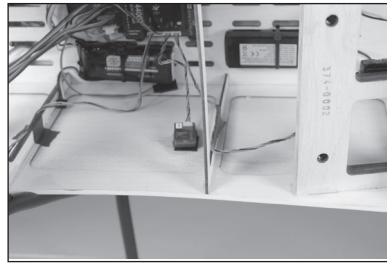
**116.** Apply hook and loop tape to the battery tray. Use the hook and loop straps and tape to secure the batteries to the battery tray.

➜ Make sure not to cover any warning labels on the battery.
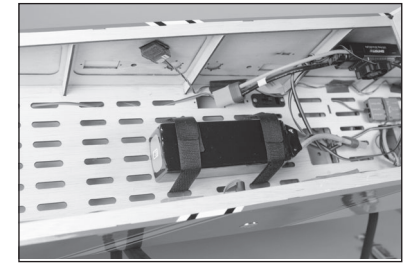


**Gas Engine Installation Option**

The radio components can also be mounted to the underside of the wing center section when using gas engines. This keeps the overall amount of connections at the field lower for quicker assembly.

➜ The receiver battery or batteries can also be placed on the underside of the wing. Make sure all components are secure.
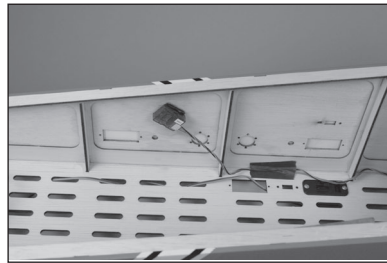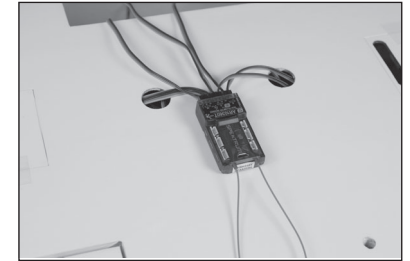




**117.** Fit the tail cone to the fuselage. Use four M3 x 12 socket head screws and four 3mm washers to secure the tail cone to the fuselage. Apply a drop of threadlock on the threads of each screw prior to installation to prevent them from vibrating loose.
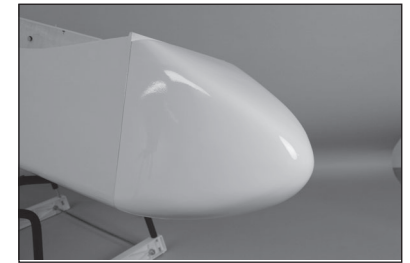




## COCKPIT DETAILS

**118.** Use a hobby knife with a #11 blade and hobby scissors to trim the radio box. Use contact adhesive to secure the radio box in the cockpit.
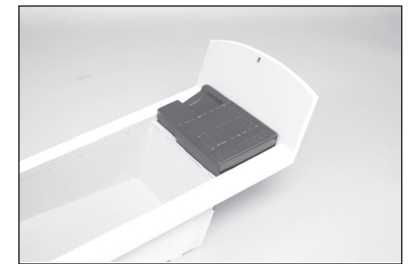


**Electric motor option only**

**115.** Mount the speed controllers to the sides of the fuselage where they won't interfere with the operation of the model.
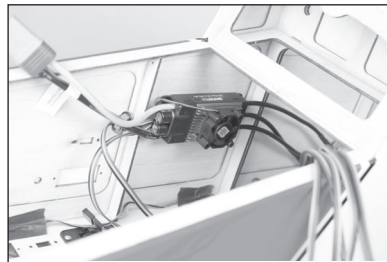


**119.** Apply a thin coat of 30-minute epoxy to the locations for the instrument panels. This provides a smooth surface for the instrument panel decal to adhere. Allow the epoxy to fully cure before proceeding.

➜ A heat gun can be used to carefully warm the epoxy to provide an even flow over the surface.
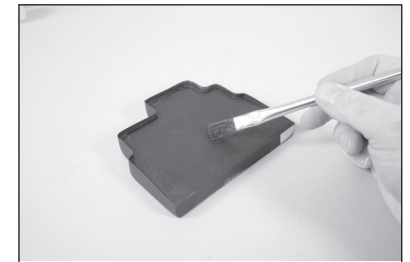
**120.** Apply the forward instrument panel decal.
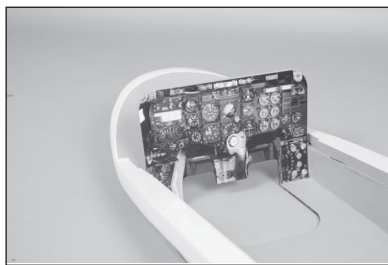


**121.** Attach the pilot to the seat using 30-minute epoxy. Make sure the pilot fully engages the seat. Allow the epoxy to fully cure before proceeding.

➜ The pilots legs should not protrude below the bottom the hatch or the hatch may not install easily..



**122.** The seat can now be secured in the cockpit using 30-minute epoxy. Make sure the seat if flat on the cockpit floor as the pilots feet will extend through the cockpit floor.



**123.** Apply a small amount of epoxy to adhere the pilots legs to the cockpit floor. This will help prevent the weight of the pilot from damaging the seat.
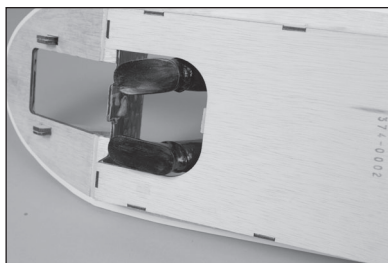


**124.** Use medium CA to glue the control stick to the cockpit floor.



**125.** Use a hobby knife with a #11 blade and hobby scissors to trim the front instrument panel hood. The hood will extend over the instrument panel as shown in the following step.

➜ The areas that are exposed can be painted using flat black paint. Make sure to test the paint on the pieces that were trimmed away to guarantee there are no adverse reactions between the paint and plastic.



**126.** Test fit the hood to the cockpit. Trim as necessary so it fits properly in position. Use contact adhesive to glue the hood into position.
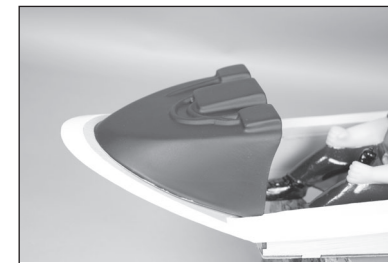


**127.** The rear seat and control stick can be glues into the cockpit using medium CA.



**128.** Secure the rear instrument panel in the cockpit using medium CA.
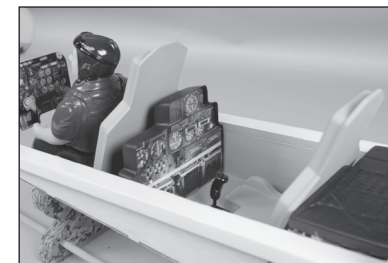


**129.** Use canopy glue or contact adhesive to glue the canopy to the canopy hatch. Use tape to hold the canopy in position until the adhesive fully cures.

➜ Place a piece of waxed paper between the canopy hatch and fuselage to the hatch is not accidentally glued to the fuselage.

➜ Do not use CA when gluing the canopy. When CA cures, it releases gases that can fog the canopy and detract from its appearance.
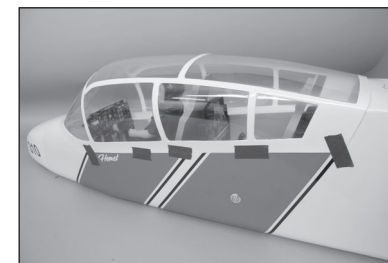
## CENTER SECTION COVER INSTALLATION

**130.** Attach the fuselage to the wing center section using two M6 x 50mm socket head screws and two 6mm washers.
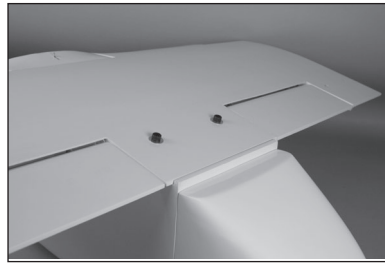
**131.** Use hobby scissors to trim the fuselage cover. Leave a slight lip around the bevel as a gluing area.
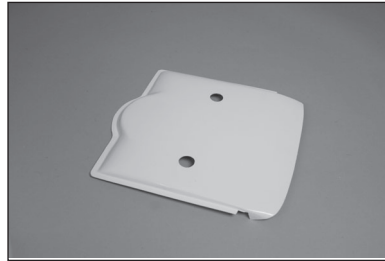
**132.** Use contact adhesive to glue the fuselage cover into position. Use low-tack tape to hold the cover in position until the adhesive fully cures.
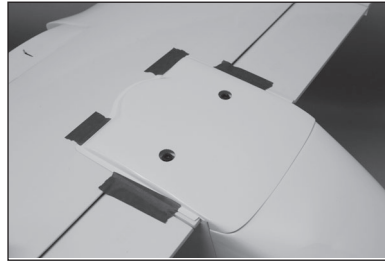
**133.** Position the boom under the wing center section. Use a piece of low-tack tape to indicate the location of the screws.
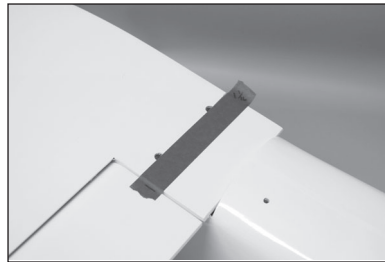
**134.** Secure the center section to the boom using two M6 x 50mm socket head screws and two 6mm washers.
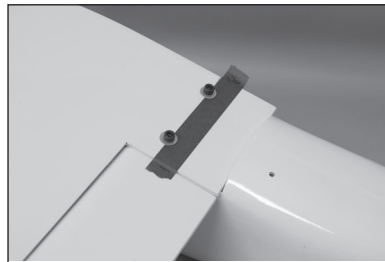
**135.** Position the boom cover and use a ruler and felt-tipped pen to mark the center line on the cover. Measure in and mark the locations of the screw heads on the cover.
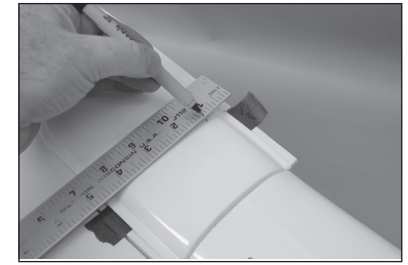
**136.** Remove the cover from the wing center section. Use a pin vise and 1/8-inch (3mm) drill bit to drill pilot holes for the screws in the cover.
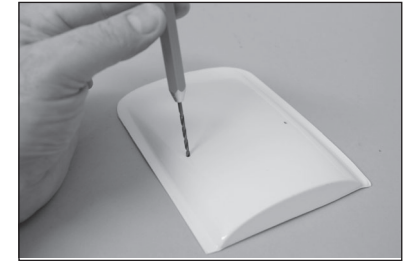
**137.** Position the cover on the wing, and check that the screws can be accessed easily using a hex wrench. Slowly enlarge the holes using a drill bit or tapered reamer to the size necessary to allow access to the screws.
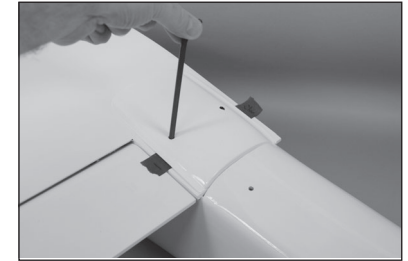
**138.** Use contact adhesive to glue the boom cover into position. Use low-tack tape to hold the cover in position until the adhesive fully cures.
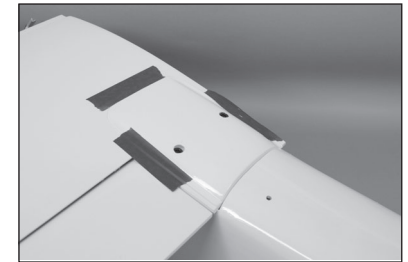
➜ The fuselage can be removed from the center section at this time. Leave the boom attached for the following section of the manual.

## COWLING INSTALLATION

**139.** Slide the wing tube into the wing tube socket. An equal amount of wing tube will protrude from the root ends of the center section.
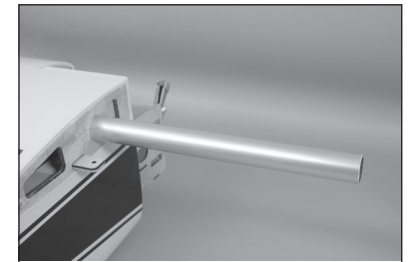
➜ The wing tubes may be a tight fit in the socket. Polishing the wing tube with fine sandpaper or steel wool will help ease the installation of the wing tube. Do not force the wing tubes in the sockets as it can damage the structure inside the wing.

**140.** Slide the outer panel on the wing tube and tightly against the center section.

➜ When assembling your model for flight, make sure to connect the servo leads while installing the outer panel.
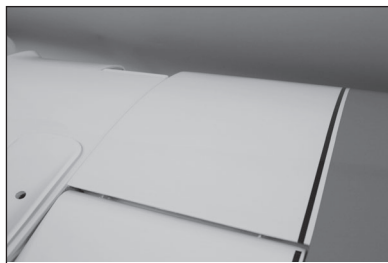


**141.** Secure the outer panel using an M4 x 15mm socket head screw and 4mm washer.
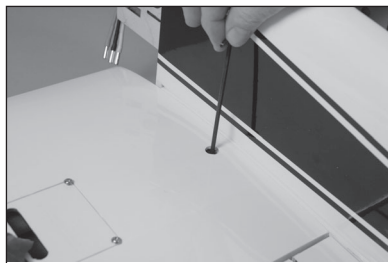


**142.** Slide the cowling into position so it is tight against the wing panels.



**143.** Slide the spinner backplate on the motor shaft, then secure the backplate with the nut and washer included with the engine/motor.

➜ It may be necessary to place the propeller in position to properly hold the backplate.
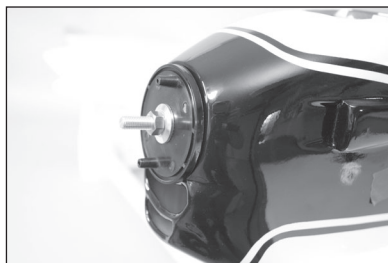


**144.** Use a drill and 1/16-inch (1.5mm) drill bit to drill two holes on wither side of the cowling and into the firewall.



**145.** Remove the cowling and enlarge the holes using a 1/8-inch (3mm) drill bit. Prepare the holes for the cowl mounting screws by threading an M2.5 x 10mm self-tapping screw into each hole. Remove the screws, then place 2 to 3 drops of thin CA in each hole to harden the surrounding wood. Once the CA has fully cured, fit the cowl back on the boom and secure it using four M2.5 x 10mm self-tapping screws.
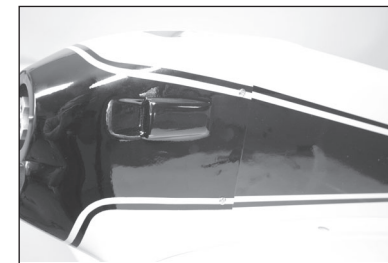


**146.** Secure the propeller and spinner backplate to the engine shaft.



**147.** Attach the spinner cone using the screws provided with the spinner. Trim the openings around the propeller, if necessary, as the propeller must not come in contact with the spinner cone when installed.

**Gas Engine**

➜ Use your preferred method to operate the choke from outside the cowling if a choke servo has not been installed.



## FINAL ASSEMBLY

➜ The various assembly items have been covered, other than the installation of the stabilizer. To assemble your model for flight, we have found the following sequence to work best. Attach the fuselage to the wing center section. The booms are then temporarily attached, then the stabilizer installed. This allows the booms to be moved to fit the stabilizer.

➜ Connect the lead for the elevator servo. Make sure to use a retaining clip to prevent it from becoming disconnected.

**148.** Secure the stabilizer to each fin using two M3 x 15mm socket head cap screws and two M3 washers. Tighten the screws using a 2.5mm hex wrench.

➜ Do not over-tighten these screws as it could damage the wooden structure in the fin.

➔ Once the stabilizer has been installed, tighten the screws to secure the booms to the center wing panel. The final step is to attach the outer wing panels, the sponsons, and tanks.

## ACCESSORY INSTALLATION

**149.** Use contact adhesive to glue the exhaust stack to the outside on the boom near the cowling. Use the photos on the box to aid in the location of the exhaust.

**150.** Thread the antenna into the fitting on the top of the boom.
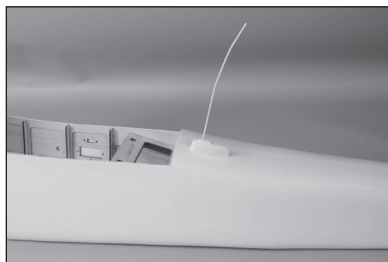
➔ CDF OV-10 Broncos do not have sponsons fitted and their installation on the model is optional.

**151.** The sponsons are attached to the fuselage using contact adhesive. Use low-tack tape to hold the sponsons in position until the adhesive fully cures.

**152.** The guns can be glued into the sponsons using medium CA. Test fit the guns and trim the opening if necessary before using any adhesive.
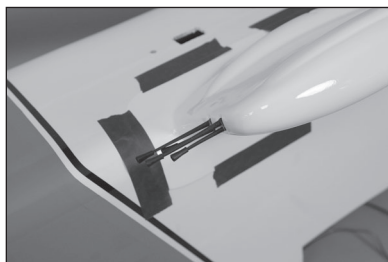
**153.** Attach the center fuel tank to the pylon using two M4 x 15 socket head screws.

➔ Do not overtighten the hardware. Doing so may damage the pylon or the mounting area within the fuel tank. Check alignment of screws as it is possible to cross thread the screws into the blind nuts in pylon. Adjust as required: these screws should tighten easily.

**154.** The fuel tank pylon is then attached to the fuselage using two M4 x 20mm button head screws and two 4mm washers.

➔ Do not overtighten the hardware. Doing so may damage the pylon or the fuselage.

**155.** Attach the outer drop tank pylon to the bottom of the outer wing panel using two M4 x 20mm socket head cap screws and two M4 lock washers.

➔ Do not overtighten the hardware. Doing so may damage the pylon or the mounting area within the wing.

➔ A long 3mm hex wrench will be required to tighten these screws.
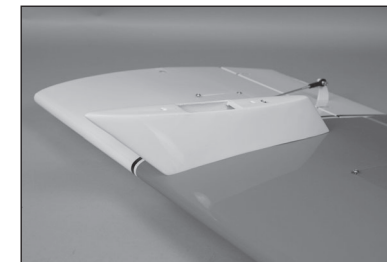
**156.** Attach the outer drop tank to the pylon using two M4 x 15mm socket head screws.

➔ Do not overtighten the hardware. Doing so may damage the pylon or the mounting area within the drop tank. Check alignment of screws as it is possible to cross thread the screws into the blind nuts in pylon. Adjust as required: these screws should tighten up easily.
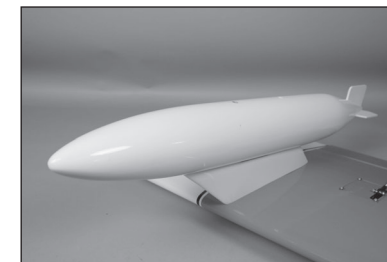
## DECAL INSTALLATION

**157.** Apply the decals to your model using the box art from your model as a guide to location. The internet is also a great resource for decal placement. Use a spray bottle and a drop of dish washing liquid or glass cleaner sprayed in the location of the decal to allow repositioning of the decal. 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.

➔ When cleaning your model, do not use harsh chemicals on the provided decals. Test on unused decals first.

**Decal Key:**

| N Number | Nose Number | City |
|----------|-------------|------|
| N409DF | 330 | Ramona |
| N414DF | 140 | Sonoma |
| N429DF | 310 | Hemet |

## CENTER OF GRAVITY

> ⚠ CAUTION: You must adjust your aircraft's center of gravity and balance your model properly before attempting flights.

An important part of preparing the aircraft for flight is properly balancing the model. The Center of Gravity range supplied here is a guideline based on testing. Deviation from the measurements we provide is possible and may result in a model that suits your flying style better. Start with the recommended Center of Gravity, then feel free to experiment with different balance points. We advise adjusting progressively and cautiously.

1. Attach the wing panels to the fuselage. Make sure to connect the leads from the aileron and flaps to the appropriate leads from the receiver. Make sure the leads are not exposed outside the fuselage before tightening the wing bolts. Your model should be flight-ready before balancing.

2. The recommended Center of Gravity (CG) location for your model is 4.0 inches (100mm) behind the leading edge of the wing against the fuselage for sport flying.

3. When balancing your model, make sure it is assembled and ready for flight. Support the plane upright at the marks made on the wing with your fingers or a commercially available balancing stand. Use the radio system to move the gear to the up position.

➜ The overall CG range for this model is $3^{13}/_{16}$–$4^{13}/_{32}$ inches (96–112mm) as shown below. We recommend starting at the measurement listed above, then adjusting to suit your particular flying style.

➜ Nose weight may be required when using lighter engines. Move the batteries as far forward in the fuselage to help reduce the amount of weight required.



$3^{13}/_{16}$–$4^{13}/_{32}$ Inches
96–112 mm
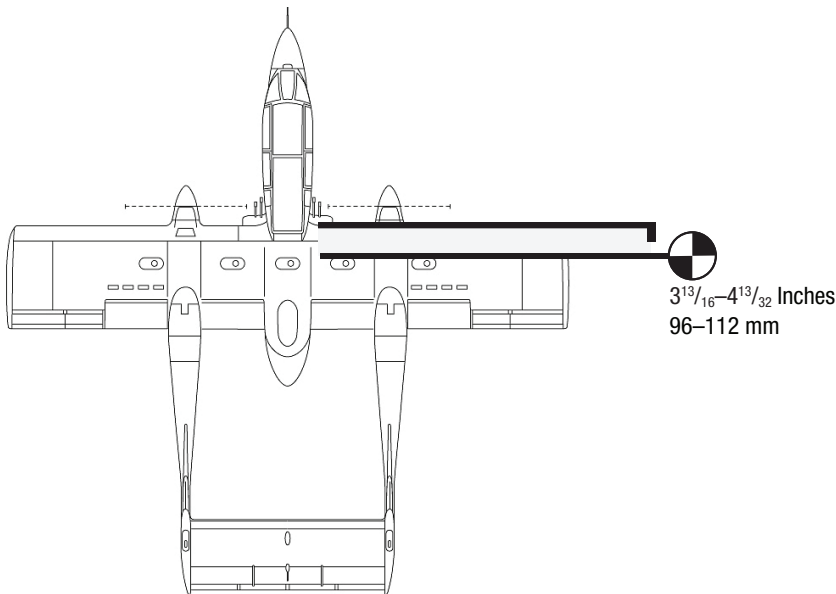
## CONTROL THROWS

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.

| Surface | Rate | Direction | Throw |
|---|---|---|---|
| Aileron | High | Up | 1 inch (25 mm) |
| Aileron | High | Down | 3/4 inches (19 mm) |
| Aileron | Low | Up | 3/4 inches (19 mm) |
| Aileron | Low | Down | 5/8 inches (16 mm) |
| Elevator | High | Up | $1^1/_4$ inches (32 mm) |
| Elevator | High | Down | $1^1/_4$ inches (32 mm) |
| Elevator | Low | Up | 3/4 inches (19 mm) |
| Elevator | Low | Down | 3/4 inches (19 mm) |
| Rudder | High | Left | $1^1/_4$ inches (32 mm) |
| Rudder | High | Right | $1^1/_4$ inches (32 mm) |
| Rudder | Low | Left | 3/4 inches (19 mm) |
| Rudder | Low | Right | 3/4 inches (19 mm) |
| Flaps | | Partial | $1^1/_4$ inches (32 mm) |
| Flaps | | Full | $2^1/_2$ inches (64 mm) |
| Flap Mixing | | Partial | 5/16 inch (8 mm) Down elevator |
| Flap Mixing | | Full | 1/2 inch (12 mm) Down elevator |

**Flap to Elevator Mixing:**
Mixing the elevator to the flaps will reduce any pitch changes when the flaps are applied. This will make flap application much smoother. Use the values in the table as a starting point and adjust to suit your preferences.

These are guidelines from general flying from our own flight tests. You can experiment with higher or lower 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 pushrod at the servo. Use sub-trim as a last resort to center the servos.
Always re-bind the radio system once all the control throws are set to keep the servos from moving to their endpoints until the transmitter and receiver connect.

## PREFLIGHT CHECKLIST

• Charge the transmitter, receiver and motor batteries. Follow the instructions provided with the charger. Follow all manufacturer's instructions for your electronic components.
• Check the radio installation and make sure all control surfaces (aileron, elevator, rudder, and flaps) move correctly (i.e., the correct direction and with the recommended throws).
• Check all the hardware (control horns, servo horns, and clevises) to make sure they are secure and in good condition.
• Prior to each flying session (and especially with a new model), perform a range check of your radio system. See your radio manual for the recommended range and instructions for your particular radio system.

## DAILY FLIGHT CHECKS

• Check the battery voltage of the transmitter battery. Do not fly below the manufacturer's recommended voltage. Doing so can cause your aircraft to crash.
• 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.
• Ensure all surfaces are moving in the proper manner.
• Perform a ground range check before each day's flying session.
• All servo leads and switch harness plugs should be secured in the receiver.

## LIMITED WARRANTY

**What this Warranty Covers**
Horizon Hobby, LLC, (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, (v) Product not purchased from an authorized Horizon dealer, (vi) Product not compliant with applicable technical regulations, or (vii) use that violates any applicable laws, rules, or regulations.
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 your local distributor or 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 visit our website at www.horizonhobby.com, submit a Product Support Inquiry, or call the toll free telephone number referenced in the Warranty and Service Contact Information section to speak with a Product Support representative.

**Inspection or Services**
If this Product needs to be inspected or serviced and is compliant in the country you live and use the Product in, 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/content/service-center_render-service-center. 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 cashier's 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/content/service-center_render-service-center.

ATTENTION: Horizon service is limited to Product compliant in the country of use and ownership. If received, a non-compliant Product will not be serviced. Further, the sender will be responsible for arranging return shipment of the un-serviced Product, through a carrier of the sender's choice and at the sender's expense. Horizon will hold non-compliant Product for a period of 60 days from notification, after which it will be discarded.

10/15

## WARRANTY AND SERVICE CONTACT INFORMATION

| Country of Purchase | Horizon Hobby | Contact Information | Address |
|---|---|---|---|
| United States of America | Horizon Service Center (Repairs and Repair Requests) | servicecenter.horizonhobby.com/RequestForm/ | 2904 Research Road Champaign, IL 61822 |
| | Horizon Product Support (Product Technical Assistance) | productsupport@horizonhobby.com | |
| | | 877-504-0233 | |
| | Sales | websales@horizonhobby.com | |
| | | 800-338-4639 | |
| European Union | Horizon Technischer Service | service@horizonhobby.eu | Hanskampring 9 D 22885 Barsbüttel, Germany |
| | Sales: Horizon Hobby GmbH | +49 (0) 4121 2655 100 | |

## WEEE NOTICE

This appliance is labeled in accordance with European Directive 2012/19/EU concerning waste of electrical and electronic equipment (WEEE). This label indicates that this product should not be disposed of with household waste. It should be deposited at an appropriate facility to enable recovery and recycling.

## ACADEMY OF MODEL AERONAUTICS NATIONAL MODEL AIRCRAFT SAFETY CODE

**Effective January 1, 2018**

**A model aircraft is a non-human-carrying device capable of sustained flight within visual line of sight of the pilot or spotter(s). It may not exceed limitations of this code and is intended exclusively for sport, recreation, education and/or competition. All model flights must be conducted in accordance with this safety code and related AMA guidelines, any additional rules specific to the flying site, as well as all applicable laws and regulations.**
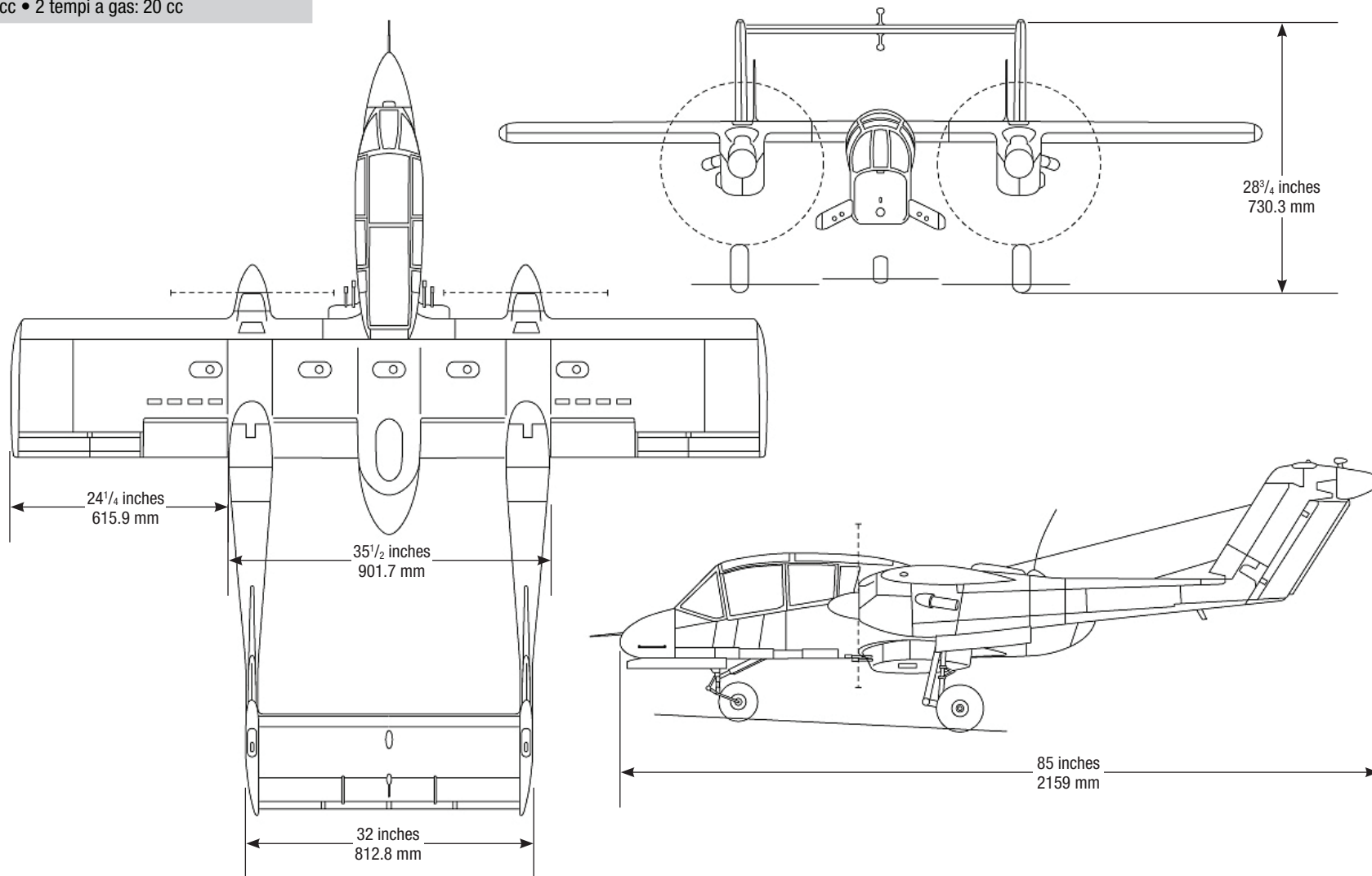
**As an AMA member I agree:**
- I will not fly a model aircraft in a careless or reckless manner.
- I will not interfere with and will yield the right of way to all human-carrying aircraft using AMA's See and Avoid Guidance and a spotter when appropriate.
- I will not operate any model aircraft while I am under the influence of alcohol or any drug that could adversely affect my ability to safely control the model.
- I will avoid flying directly over unprotected people, moving vehicles, and occupied structures.
- I will fly Free Flight (FF) and Control Line (CL) models in compliance with AMA's safety programming.
- I will maintain visual contact of an RC model aircraft without enhancement other than corrective lenses prescribed to me. When using an advanced flight system, such as an autopilot, or flying First-Person View (FPV), I will comply with AMA's Advanced Flight System programming.
- I will only fly models weighing more than 55 pounds, including fuel, if certified through AMA's Large Model Airplane Program.
- I will only fly a turbine-powered model aircraft in compliance with AMA's Gas Turbine Program.
- I will not fly a powered model outdoors closer than 25 feet to any individual, except for myself or my helper(s) located at the flightline, unless I am taking off and landing, or as otherwise provided in AMA's Competition Regulation.
- I will use an established safety line to separate all model aircraft operations from spectators and bystanders.

For a complete copy of AMA's Safety Handbook please visit:
www.modelaircraft.org/files/100.pdf

83.8 in (2.13 m)

1277 sq in (82.4 dm2)

85 in (2.16 m)

24–29 lbs (10.9–13.1 kg)

2-Stroke Gas: 20cc • 2-Takt Benzin: 20cc
Essence à deux temps : 20 cc • 2 tempi a gas: 20 cc

5055-500Kv Brushless Outrunner • 5055–500 Kv bürstenloser
Außenläufer • Cage tournante sans balais 5055-500 Kv
5055-500 Kv Brushless Outrunner

10+-channel (or greater) with 10–12 servos • 10 Kanäle (oder mehr)
mit 10–12 Servos • 10+ canaux (ou plus) avec 10 à 12 servos
10 canali (o più) con 10-12 servo

5$^1$/$_2$ inches (139mm) ±1/16 inch (1.5mm)

28$^3$/$_4$ inches
730.3 mm

24$^1$/$_4$ inches
615.9 mm

35$^1$/$_2$ inches
901.7 mm

32 inches
812.8 mm

85 inches
2159 mm

# HANGAR 9®