# ARF® MODEL

## Corvus Racer 70 Electric V2

## Instruction Manual

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Dear Customer,

Thanks for purchasing this newly designed CORVUS 70E V2 aerobatic RC airplane. With an approximate flying weight of 5.5 Lbs., the new Corvus was designed for IMAC and free style flying. It was developed with unique appearance and extreme flight performance in mind. The new Corvus 70E V2 was covered with genuine Monocote film, and equipped with good quality accessories, including carbon fiber wing tube, anodized 6061 aluminum landing gear or carbon fiber landing gear as an upgrade option. We hope you enjoy this plane as much as we do.

The new V2 version of CORVUS 70E has the following improvements from previous versions:

- Control surfaces is larger than V1 version. Up to 50 degrees of throw on all control surfaces. Best for more vibrant aerobatic flight.
- Improved wheels with more durable materials, and filled with rubber.
- High quality cap head screws included.
- Improved ball link assembly.
- Stainless steel wheel axle.
- Newly designed fiberglass control horn assembly
- Side Force Generators (SFG) included
- Air exit opeing behind the rudder servo for electric set-ups.
- Longer tale moment improves tracking of the airplane, giving it rock solid precision flight.

## SAFETY ISSUES OF RADIO CONTROL FLYING MODELS

With radio control aircraft, like any hobby or sport, there are certain risks. The operator of these models is responsible for these risks. If misused or abused, you may cause serious bodily injury and/or damage to property. With this in mind, you will want to be certain that you build your model carefully and correctly. If you are not an experienced flier, have your work checked and ask for help in learning to fly safely. This model aircraft is NOT a toy and must be operated and flown in a safe manner at all times. Always perform a pre-flight check of the model including all control surfaces, proper function of the radio gear, structure, radio range, and any other area relating to the safe operation of this aircraft.

Models are not insurable but operators are. You can obtain coverage through membership in the Academy of Model Aeronautics (AMA). For an AMA information package call 1-800-435-9262, ext. 292 or visit the AMA website at "www.modelaircraft.org"

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***By the act of using the final assembled model, the purchaser/operator accepts all resulting liability***

**ARF MODELS WARRANTY AND RETURN POLICY**

We guarantee that the plane is in perfect condition at purchase. The warranty will be voided after modifications and usages. If you have any questions or find any issues, please contact the distributors in your area. For US customers, please contact General Hobby. Their website is www.generalhobby.com. Their phone number is 909-581-8873. Customers in other areas please contact the sellers you purchased it from.

**Specifications and Recommended Power Setup**

- Wingspan: 59"(1500mm)
- Length: 57"(1450mm)
- Wing Area: 741sq in (47.8sq dm)
- Flying Weight: 4.8-6 lbs. (2200-2700g)

**Electric Power Setup：**

- Hacker A40-10S with 4S 3300-4200mAh, 14x7 prop
- Hacker A40-12S with 5S 3000-3700mAh, 13x6.5 prop
- Hacker A40-12S with 4S 3300-4200mAh, 14x7 prop
- Hacker A40-14S with 5S 3000-3700mAh, 14x7 prop
- DUSKY XM5050EA-9 6S 3300-4400mAh, 15x8prop or other 1000-1200 watt, 300g class electric motors
- ESC：70-100A
- 4 or 5 Mini size high torque servos, Hitec HS5245 or 7245 recommended
  *please note that you may 1 or 2 servos for elevators
- Aircraft radio and receive of your choice, 4 channels minimum

**Features and Photo Gallery**

- Newly designed structure
- Aerofoil tail wings
- Two pieces removable wings
- Carbon fiber wing tube
- PVC canopy

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- Larger ailerons and elevator designed for extreme 3D aerobatic flying


- Air exit opeing for cooling

- Side Force Generator’s (SFG) Included

- Canopy extended into cowl for easier battery access

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- Quick release canopy latch

- Light weight C.F. tail wheel assembly


- High-quality durable rubber wheels


- Improved new wheel axle (stainless steel)

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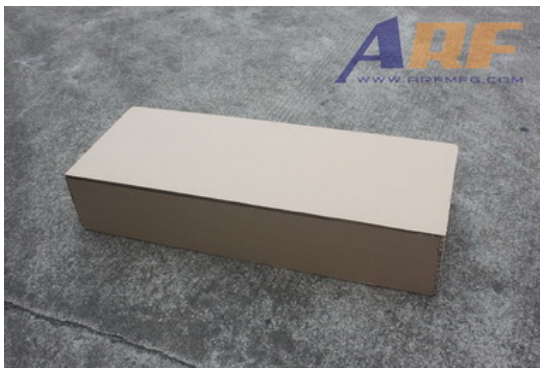
- Landing gear options : anodized 6061 Aluminum or carbon fiber

*Carbon fiber

*Anodized 6061 aluminum

- Honeycomb Board carton packing for safer transportation



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**Scheme A: white/yellow/black**

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**Scheme B:red /white/ / black**






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**Items Required to Complete This Model**

- 1000-1200 Watt, 300g class electric motor
- 70-100A ESC
- 4 or 5 mini size high torque servos (Hitec HS5245 or HS 7245)
  *1 or 2 servos for elevators
- Appropriate servo arms
- Servo wire extensions. two 6", two 12"
- Appropriate Lipo batteries (6S 2600-3300mah)
- Receiver of your choice (minimum 4 channels)
- RC radio of your choice

**Shop Supplies/Tools**

- Covering Iron and heat gun
- Hobby tools such as screwdrivers, hobby knife, drill and drill bits, piers, etc.
- Thick and Thin CA adhesives
- 30 minute Epoxy
- Isopropyl alcohol
- Ruler or tape measure
- Blue thread-lock or equivalent
- Adhesive backed Velcro and Velcro strap for battery retention

*Note: please read all the instructions before you begin construction. Handle the parts of this kit with care so you do not damage any of the structure or covering. Inspect all the parts for any shipping damage and report any issues to as soon as you can. Make sure you have a flat and sturdy workbench and follow all safety advice for the tools and adhesives you plan to use.*

**Aircraft Covering**

Varying temperatures and storage delays can cause covering material to loosen over time and transportation. **We recommend lightly going over all the covering with a covering iron set at medium temperatures**. Be sure to use a soft cover over your iron so you do not scratch the covering surface. Be sure you go over all seams and edges of the covering to assure it is secure to the airframe

and other covering. Be careful not to apply too much heat or you may cause bubbles or damage to the covering. **A heat gun may also be used along with a soft cotton cloth to shrink and adhere the covering**. Again, be extremely careful when using a heat gun.

Some modellers prefer to seal the hinge gaps using strips of appropriate covering or clear trim tape. We have found this to be helpful with models intended for higher speed flight or models with unusually large hinge gaps. Aircrafts that utilize a very tight double beveled hinge line and do not normally require this step. **Sealing the hinge gaps is therefore left as an option formodellers**.

**Please verify the accessories before assemble:**

- 4 fiber glass servo horns: 2 single horns for ailerons, and 2 for elevators (if you choose to use single servo to control elevators, you only need to install one control horn and joint the elevators with a fiber glass bar, please see instruction in “Elevators Assembly” section). 1 dual horns for rudder.

*There is a layer of protection film on the horns. Please remove the film before installation.

- Pushrods: 4 2x65mm pushrods for aileron & elevator.

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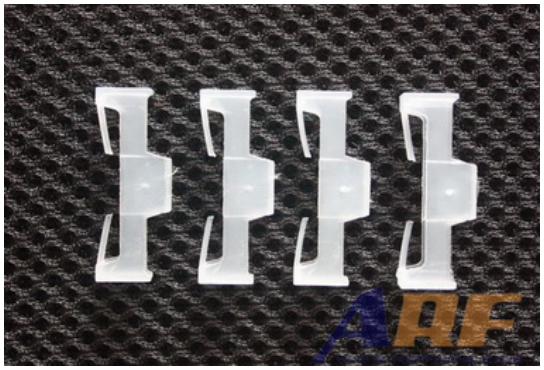
- Pull-pull hardware set for rudder


- Ball links: 8 for aileron and elevator

- 4 Servo extension safety connector clips



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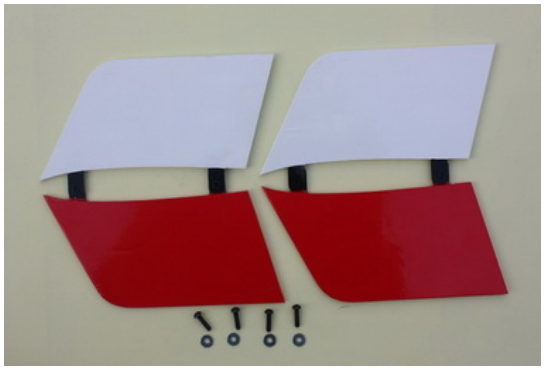
- Main rubber wheels：2 Pcs


- Stainless steel Axle kits: 2 Pcs

- Tail wheel assembly

- Side force generators (mounted with four 3x12mm Hexagon bolts & 2 Washers)



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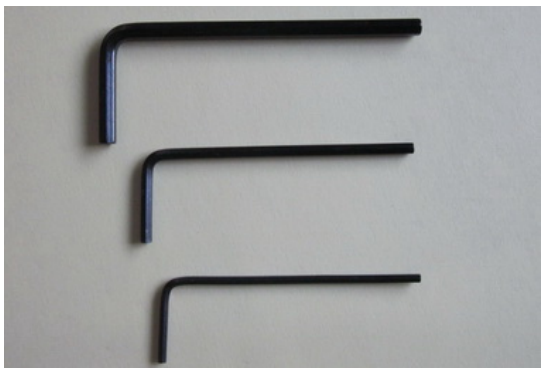
- 4 (3x16mm) hex-head bolts for landing gear mounting

- Screws for cowl: 4(3x12mm) tapping screws

- Motor mounting hardware set

- 3 Hex keys



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## Construction

### 1. Wing Assembly

1.1 Locate two wing panels with ailerons, and two set of control horns and base plates.

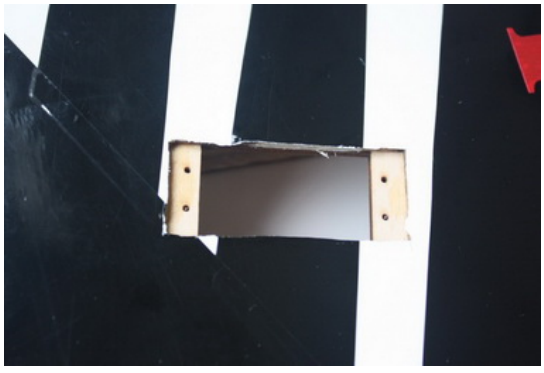
1.2 Locate the slot for control horn on aileron, remove the covering over the slot with heated soldering iron or sharp hobby knife, and make sure you do it on the bottom side of the aileron. Insert control horn into base plate then into the slot, trace the edge of base plate with hobby knife then remove the underlying covering.


1.3 Use some fine sandpaper to roughen up the root of control horn where will be glued into the slot.

1.4 Fill the slot and coat the root of control horn and the bottom of base plate with 30 minute epoxy, insert the horn into the slot, press it down firmly. Wipe off excessive epoxy with alcohol wipes. Set aside until cured.

1.5 The slots for CA hinges are pre-cut. Insert CA hinges half way into the hinge slots on aileron, apply a drop of thin CA to secure the hinges. Then insert all hinges into slots on the wing at once, align aileron with the wing, move the aileron up and down a few times to reach the minimal hinge gap while still allowing full deflection of the aileron. When satisfied, apply more think CA on both top and bottom sides of each hinges.

1.6 Cut the covering from the aileron servo slots from corner to corner and iron down inside the openings. Connect servo wire extensions to your servos and secure the connections with the supplied clips. Feed the servo wires into the wing and out the root. The screw holes for servo mounting are laser pre-drilled, it is advisable to apply some thin CA to strengthen them, Install the servos and screw firmly in place.



1.7 Use your radio to set the centers of each servo and then assemble and adjust the length of each control rod. The servo arm should be as close to perpendicular to the control rod as possible while the aileron is at neutral. Double check all screws, bolts and nuts to assure proper installation and operation without binding.Once satisfied, permanently attach the ball links to the servo arms and horns with the supplied screw and nut.

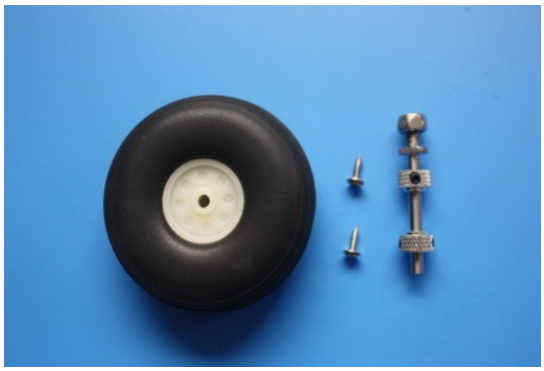
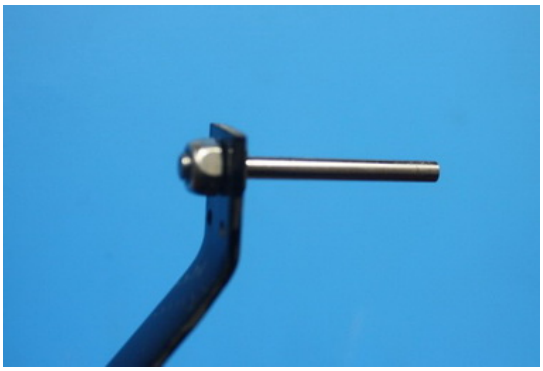
1.8 Check the final radio operation of the ailerons and make sure there is no binding or servo fighting of each other. Also check to make sure all linkage bolts and nuts are secure.

1.9 Repeat this process for the other wing half.

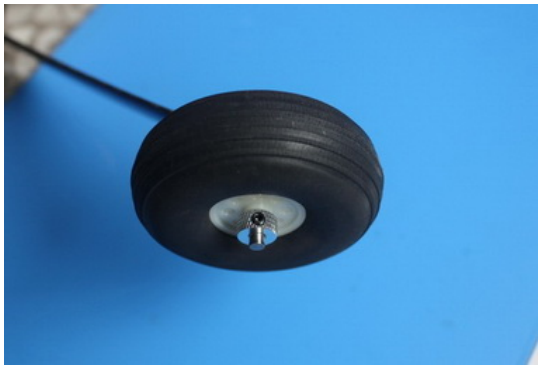
## 2. Landing Gear Installation

2.1 Locate the landing gear set

2.2 Install the wheel axles to the landing gear and tighten the nylon-insert lock nut. Install one wheel collar onto the axle. Use a second wheel collar as a guide to leave a gap on the inboard of the axle. Use a small drop of thread-lock and tighten in place. Slide the wheel onto the axle and install a second wheel collar also using thread-lock on the set screw.





2.3 Fit the wheel pant in place and install using the two supplied screws. Use thread-lock to secure the screws in place. Repeat the above steps for the other main gear.

2.4 Bolt the main gear to the bottom of the fuselage using the supplied bolts


## 3. Elevators Assembly

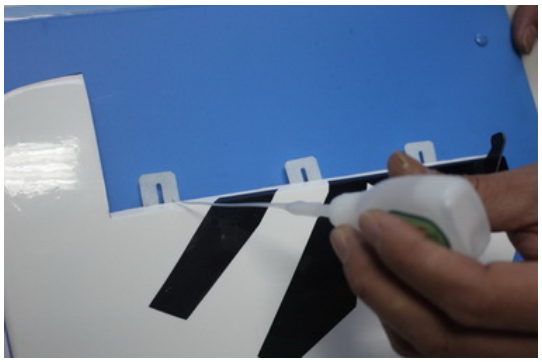
3.1 Find the control horn slots on bottom side the elevators, use the method described in 1.2-1.4 to install control horns for elevators. **Please note that if you are using dual servos, you need to install horns on both elevator halves, if you are using signal servo, install horns on one side only.**

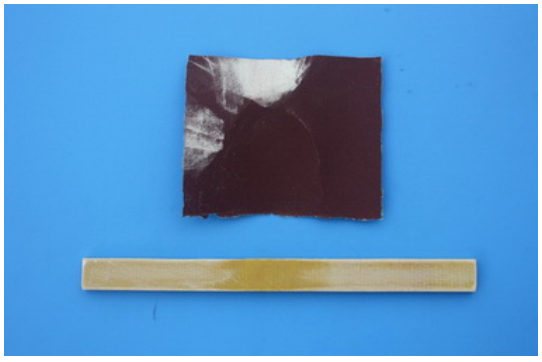
3.2 Remove covering over the hole for horizontal stabilizer on fuselage. Removing covering on the central part of horizontal stabilizer is recommended for better glue bonding. Insert the horizontal stabilizer into fuselage, make sure it's centered. Apply thin and gap-filling medium CA to glue it in place.



3.3 Glue the CA hinge for the elevator the same way as the main wings


3.4 There is an option to use one servo or two servos for the elevator. If using one servo, the twohalves of the elevator need to be connected by the included fiberglass bar with glue as shown below. The picture is for illustration only. Actually, the connection of the 2 parts needs to be performed before the hinges are connected.





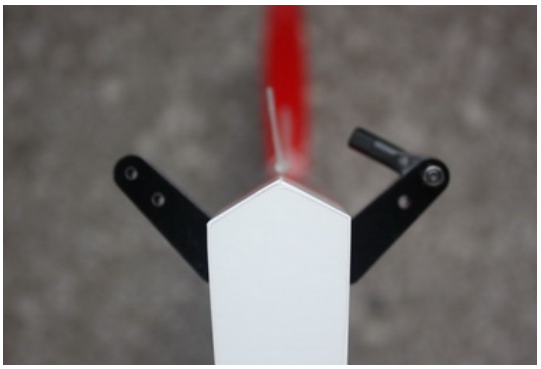

3.5 Locate the slots for elevator servo(s), remove covering. Connect wire extension to your servos before feeding the wire into fuselage. Install servo(s) with screws supplied by servo manufacturer.

3.6 Use your radio to set the servo center position and install the large control horn onto the servo. Assemble the control rod and ball links and adjust the control linkage for proper geometry. When satisfied, screw the ball link to the servo arm and control horn. The servo arm should be as close to perpendicular to the control rod as possible while the elevator is at neutral. Double check all screws, bolts and nuts to assure proper installation and operation without binding.

**4. Rudder Assembly**

4.1 Locate pull-pull linkage set for rudder.

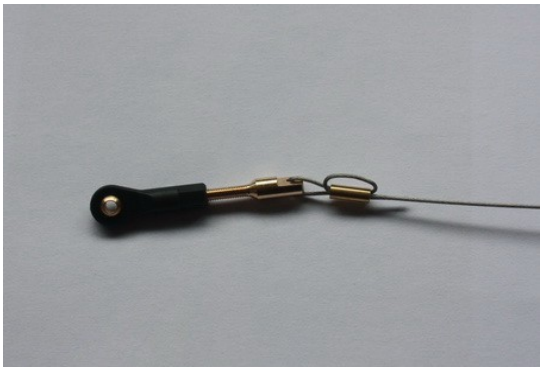
4.2 Install the double-arm fiberglass control horns in the same way as you did the elevator and aileron horns.



4.3 Connect CA hinges for rudder.


4.4 Locate the pull-pull cable set, threaded couplers, brass swaging tubes, and ball-links. If the cable is one long piece, cut it into two equal length pieces. Thread one end of the one cable through a brass tube and then through one of the threaded couplers. Run the cable back through the brass tube and then loop it back through a second time. Using a set of crimping pliers, crimps the brass tubetight enough to securely hold the wire in place. Cut off the excess cable with wire cutters. Wick thin CA into the brass tube to help hold the cable secure. Repeat for the other cable.

4.5 Thread the couplers about half way into the ball links of the rudder. Hint: remove the ball links from the rudder horn first to make this step easier and then re-install once the couplers are threaded on. Feed the loose end of each cable into the cable slots at the rear of the fuselage and feed them forward towards the servo mount location. A coat hanger with a hook on the end can be useful here if you can’t reach the cable

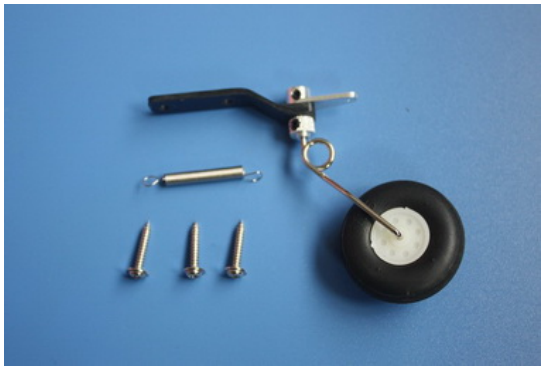


4.6 Use your radio system to center the rudder servo and attach either the supplied arm or an appropriate arm for your servo. Thread one of the ball links about half way onto one of the threaded couplers. Feed the loose end of one of the cables through a brass tube and then through the threaded coupler. Holding the rudder centered, adjust the cable length as tight as possible while checking the ball link position over the servo arm. When satisfied with the position, pinch the cable around the threaded coupler and then feed the loose end back through the brass tube. Loop the cable back through the brass tube as before and crimp the brass tube three times just tight enough not to cut the brass tube but enough to securely hold the wire in place. Cut off the excess cable with wire cutters. Wick thin CA into the brass tube to help hold the cable secure. Repeat for the other cable. Hint: Once you have established the position of the threaded coupler on the cable, you can remove the ball link from the rudder horn to give you more working slack in the fuselage. Re-install the ball link prior to setting the other cable.

4.7 Check the operation of the rudder using your radio and make sure there is no binding and the cables are adjusted properly. You may have to tighten the cables after a few flights as they may stretch slightly from the initial installation.

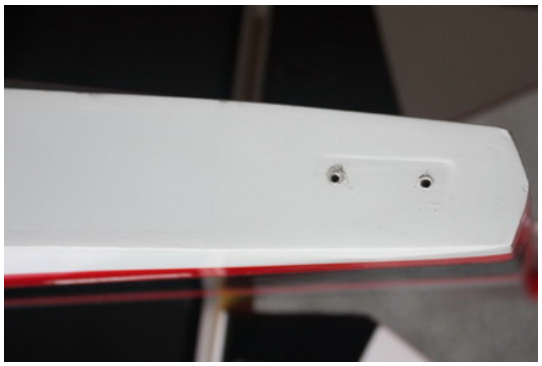
## 5. Tail Wheel Installation

5.1 Tail wheel assembly for electric airplanes.

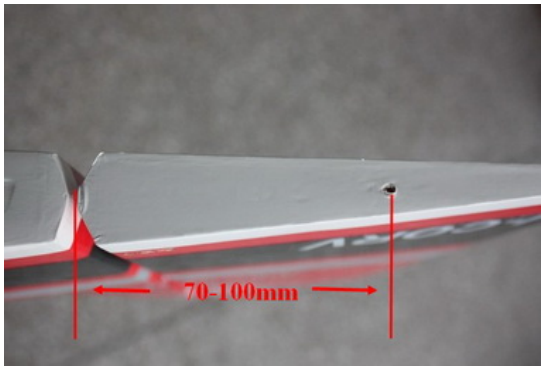


5.2 Tail wheel kit is pre-assembled in factory, for safety, please remove all screws and then re-assemble with thread locker.


5.3 Drill 2 mm holes on the bottom rear of the fuselage, secure the tailwheel bracket with the provided screws. For best results, the pivot point of the assembly should be over the hinge line of the rudder.



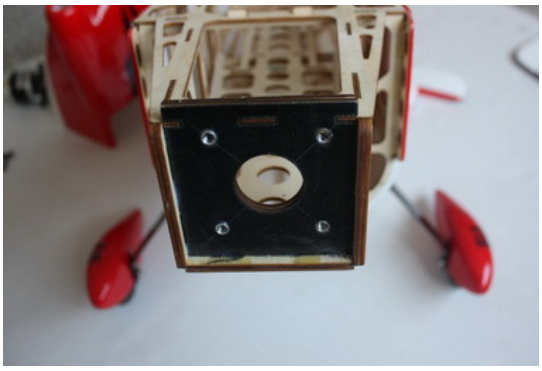
5.4 Drill a hole on the bottom of rudder, 70-100mm away for the hinge line. Secure the tail wheel spring with provided self-threading screw.

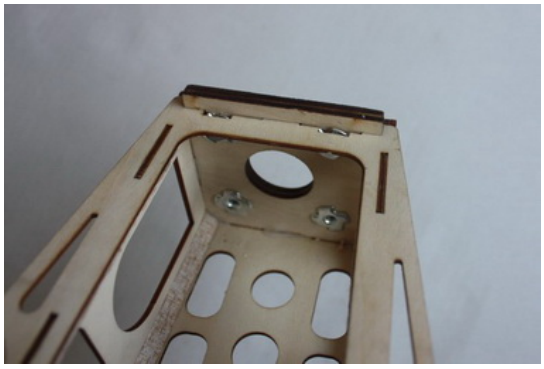



## 6. Motor Mounting

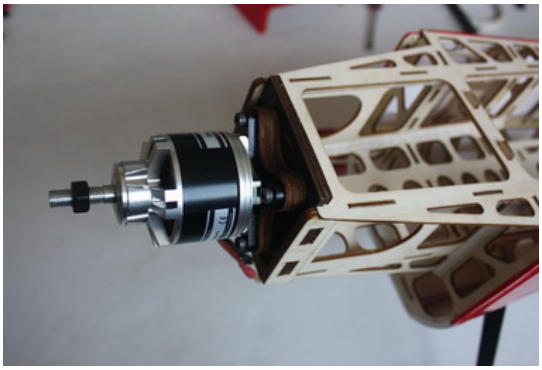
6.1 Find the hardware set for motor installation in the hardware package.

6.2 Drill holes on firewall with 5 mm drill bit, install blind nuts behind the firewall.





6.3 Since the position of cowl is fixed and length of motors vary, you may need to use provided washers and wood crosses to position you motor properly.

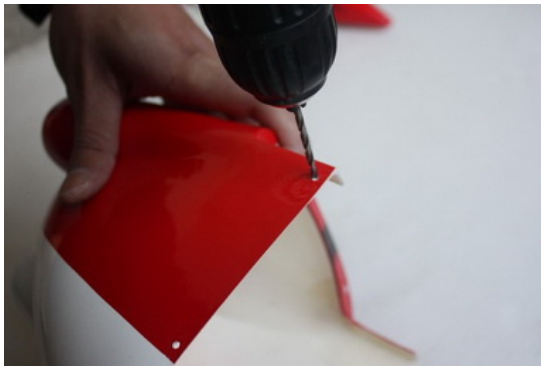


## 7. Cowl Installation

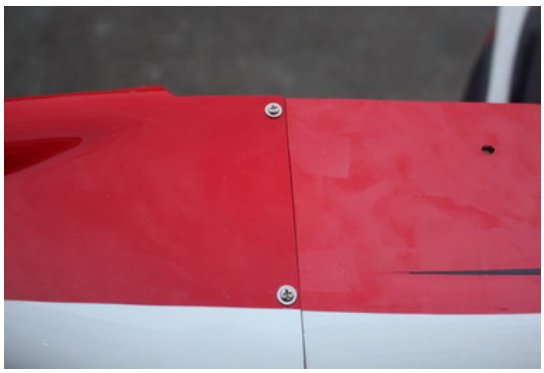
7.1 Test fit the cowl first, make sure it fits well with canopy and fuselage.

7.2 Drill 2mm holes on cowl and fuselage.


7.3 Enlarge the holes on cowl with 3mm drill bit.



7.4 Secure the cowl with 3X12mm self-threading screws.




## 8. Final Radio System Installlation

8.1 Whether you 72 MHz systems or the newer 2.4 GHz systems, proper radio installation and care is vital to the safe and reliable operation of your aircraft. Follow the manufacturer's instruction for installation guidance of receivers and batteries paying attention to factors such as vibration isolation, adequate cooling, and clearances.

8.2 Mount your reciever(s) securely in a location which provides a clean and maintenance free solution to your setup. All servo wires should be neatly routed and secured in place so they will not come loose or flop around during flight.

8.3 The fuselage ply sides provide space to mount your switches just below the canopy. Mount your switches according to the manufacturer's instructions and route your wires safely and securely as above.

8.4 Your receiver battery(s) can be mounted in a variety of locations depending on your balance needs. Regardless of where you mount your batteries it is vital that they are very secure with no possibility of coming loose. Use double sided velcro to hold the batteries from sliding around and then use zip ties or velcro straps to secure them tightly in place.

8.5 Servo and battery leads are the life blood of your aircraft. Make sure all wires are top quality and connectors are tight and display no loose pins or frayed wires. Servo clips are provided in the kit for your convenience. These servo clips can even be glued to the wood structure using CA if desired.

8.6 Check all radio programming and control surface operations thouroughly before your initial flight. Check your radio range according to the radio manufacturer's instructions both with the engine off and running.

## 9. Balancing and Pre-Flight

Most state of the art aerobatic aircraft allow for a wide margin for balancing depending on what level of precision or freestyle the pilot prefers. To perform properly without being too pitch sensitive, you must not go too aft on the CG. We recommends an initial CG setting of **92-109mm(3.6-4.3inches)** behind the leading edge of the wing at the root. More experienced pilots may want to set the CG further aft for more 3D capability. Varying weights of motor and radio gear will dictate how you should install each.

Note: The best way to check your balance is to trim for level flight at about 1/2 to 3/4 throttle and then roll inverted. The aircraft should maintain level flight with very little to no down elevator input. If the aircraft climbs when inverted then you've probably got your CG too far aft. If the nose drops more than slightly, then you are most likely nose heavy.

Recommended control surface deflections:

| | **Low Rate** | **High Rate** |
|---|---|---|
| **Elevator** | **15 degrees** | **45-50 degrees** |
| **Rudder** | **25 degrees** | **40-45 degrees** |
| **Ailerons** | **25 degrees** | **35-40 degrees** |

## 10.Final Assembly and Pre-Flight Inspections

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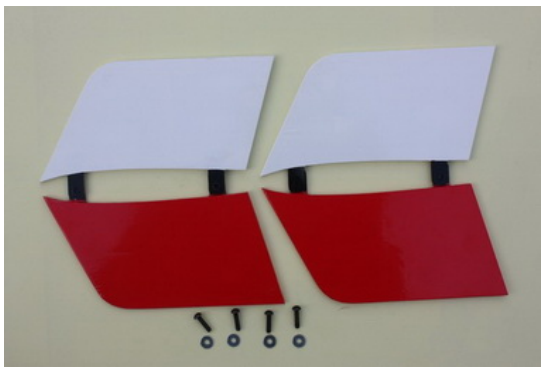
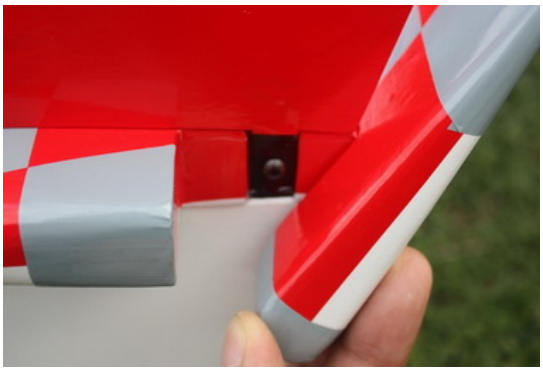
10.1 Before arriving at your flying field, be sure all your batteries are properly charged and all radio systems are in proper working order.

10.2 Install the wings onto the fuselage being careful to align the wing tube with the wings and not force it. The wing tube may be initially tight but will loosen some with use. Guide your servo wires into the fuselage openings and connect to the proper aileron channels. Servo clips are recommended. Once you have the wings fully seated in the fuselage tighten the wing bolts inside the fuselage.


10.3 Side force generators Assembly, cut the wing film needed to be instal the SFG. Fixed the SFG Use M3X12 Hexagon socket screw and washers.




10.4 If you have removed your horizontal stabilizers, install them once again and check all bolts and connections.

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10.5 Check all control surfaces for secure hinges by performed a slight tug on the control surfaces and observing if there is any give in the hinges. Check all control rods, ball links, servo screws, etc. for proper operation and installation.

10.6 Check your batteries and perform a proper range check once again with the engine off and running. Be sure all surfaces are moving in the correct direction and the proper amount for your flying setup.

## Accessories

*Wingbags for 70E ORANGE/SILVER (Not included)



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*2 -1/4in CF spinner (Not Included)