Instruction Manual

PHOENIX MODEL®

RAINBOW EP 1600 SCALE 1:7 ARF

SPECIFICATION

- **Wingspan:** 1600mm (62.9in)
- **Length:** 1169mm (46 in)
- **Flying weight:** 2600-2800 gr
- **Wing area:** 42 dm2
- **Wing loading:** 59g/dm2
- **Wing type:** Naca airfoils
- **Covering type:** Genuine ORACOVER®
- **Gear type:** Aluminum main gear and spring tail gear (included)
- **Radio:** 4 channel minimum (not included)
- **Servo:** 4 standard servo: 2 aileron; 1 elevator; 1 rudder (not included)
- **Servo mount:** 21mm x 42 mm
- **Propeller:** suit with your engine
- **Motor:** brushless outrunner (not included)
- **Gravity CG:** 80 mm (3.1 in) Back from the leading edge of the wing, at the fuselage
- **Control throw Ailerons:** Low: 8mm up/down, 10% expo; High: 10mm up/down, 10% expo
- **Control throw Elevators:** Low: 8mm up/down, 12% expo; High: 10mm up/down, 12% expo
- **Control throw Rudder:** Low: 25mm right/left, 15% expo; High: 40mm right/left, 15% expo
- **Experience level:** Beginer
- **Plane type:** Scale Civilian

RECOMMENDED MOTOR AND BATTERY SET UP

- **Motor:** OS motor OMA-3825-750 (not included)
- **Lipo cell:** 4 cells / 4000 – 5000mAh (not included)
- **Esc:** 50-60A (not included)

TOOLS AND SUPPLIES NEEDED

- Medium C/A glue
- 30 minute epoxy
- 6 minute epoxy
- Hand or electric drill
- Assorted drill bits
- Modeling knife
- Straight edge ruler
- 2 bender plier
- Wire cutters
- Masking tape
- Thread lock
- Paper towels
- Rubbing alcohol

SUGGESTION

To avoid scratching your new airplane, do not unwrap the pieces until they are needed for assembly. Cover your workbench with an old towel or brown paper, both to protect the aircraft and to protect the table. Keep a couple of jars or bowls handy to hold the small parts after you open the bag.

NOTE:

Please trial fit all the parts. Make sure you have the correct parts and that they fit and are aligned properly before gluing! This will assure proper assembly. The RAINBOW SCALE 1:7 ARF is hand made from natural materials, every plane is unique and minor adjustments may have to be made. However, you should find the fit superior and assembly simple.

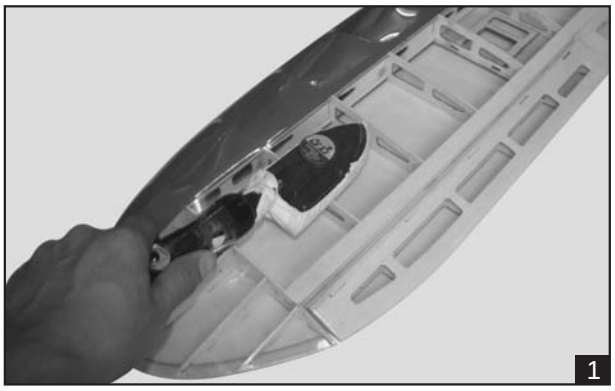
The painted and plastic parts used in this kit are fuel proof. However, they are not tolerant of many harsh chemicals including the following: paint thinner, C/A glue accelerator, C/A glue debonder and acetone. Do not let these chemicals come in contact with the colors on the covering and the plastic parts.

SAFETY PRECAUTION:

- This is not a toy
- Be sure that no other flyers are using your radio frequency.
- Do not smoke near fuel
- Store fuel in a cool, dry place, away from children and pets.
- Wear safety glasses.
- The glow plug clip must be securely attached to the glow plug.
- Do not flip the propeller with your fingers.
- Keep loose clothing and wires away from the propeller.
- Do not start the engine if people are near. Do not stand in line with the side of the propeller.
- Make engine adjustments from behind the propeller only. Do not reach around the spinning propeller.

PREPARATIONS

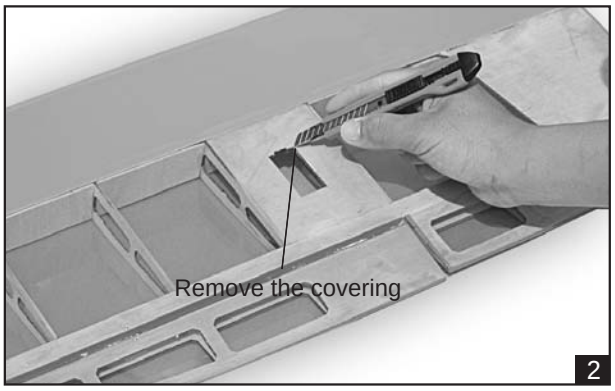
Remove the tape and separate the ailerons from the wing and the elevators from the stab. Use a covering iron with a covering sock on high heat to tighten the covering if necessary. Apply pressure over sheeted areas to thoroughly bond the covering to the wood.


1

INSTALLING THE AILERON SERVOS

1. Install the rubber grommets and brass eyelets onto the aileron servo.

2. Using a modeling knife, remove the covering from over the pre-cut servo .This hole will allow the servo to pass through when installing the aileron pushrods.



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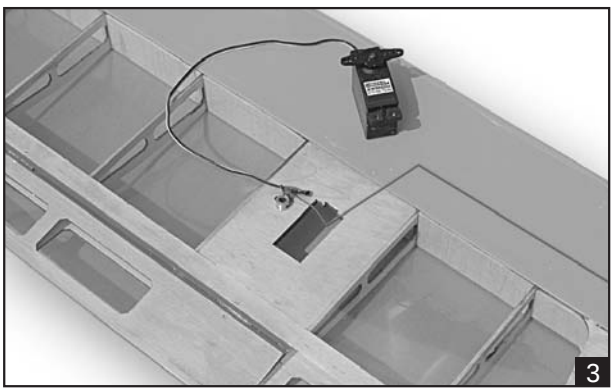
3. Place the servo into the servo tray. Center the servo within the tray and drill 1,6mm pilot holes through the block of wood for each of the four mounting screws provided with the servo, secure the servo.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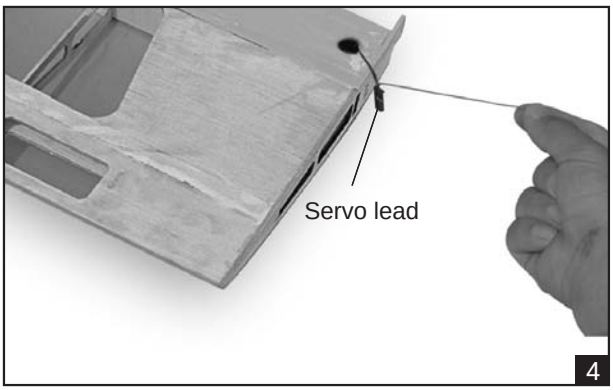
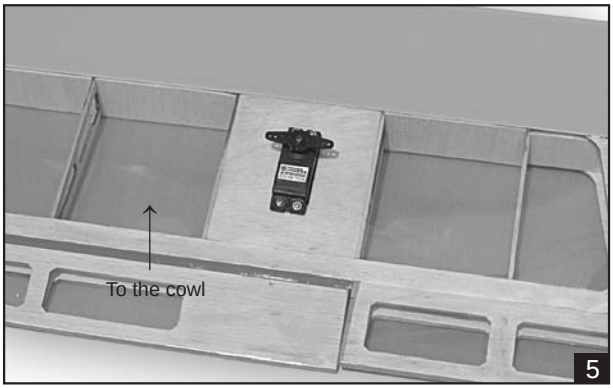
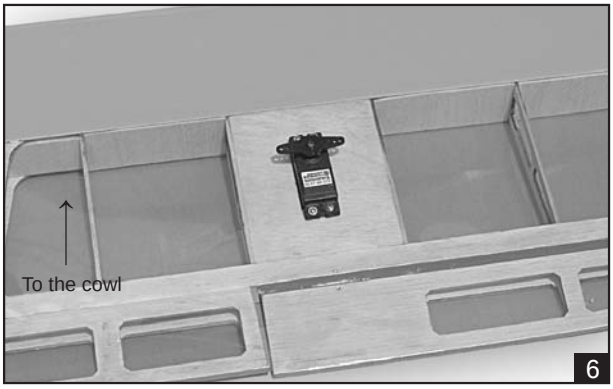
4. Using the thread as a guide and using masking tape, tape the servo lead to the end of the thread: carefully pull the thread out. When you have pulled the servo lead out, remove the masking tape and the servo lead from the thread.



5. Repeat step # 2 - # 4 to install the second aileron servo in the opposite wing half.

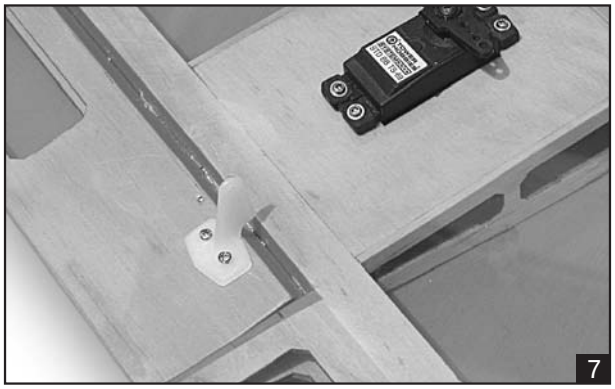




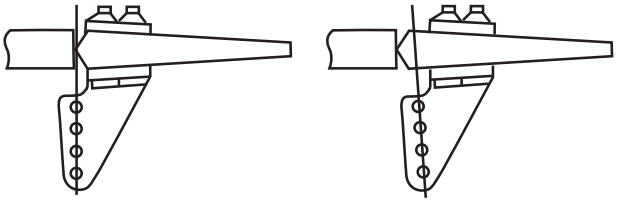
INSTALLING THE CONTROL HORNS

1. One aileron control horn in positioned on each aileron. Using a ruler and a pen, locate and mark the location of the control horn. It should be mounted on the bottom side of the aileron at the leading edge, in line with the aileron pushrod.

2. Drill two holes through the aileron using the control horn as a guide and screw the control horn in place.

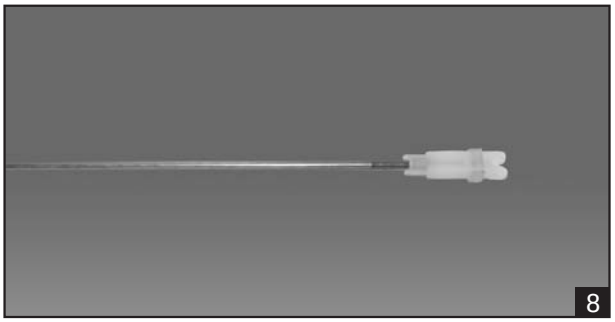


3. Repeat step # 1 - # 2 to install the control horn on the opposite aileron.



INSTALLING THE AILERON LINKAGES

1. Working with the aileron linkage for now, thread one nylon clevis at least 14 turns onto one of the 2mm x 180mm threaded wires.



2. Attach the clevis to the outer hole in the control horn. Install a silicone tube on the clevis.

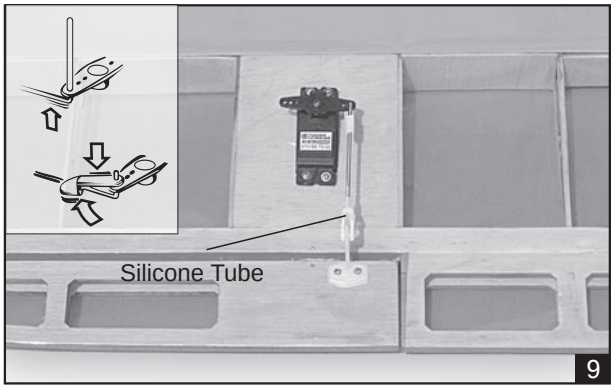
3. Locate one nylon servo arm, and using wire cutters, remove all but one of the arms. Using a 2mm drill bit, enlarge the third hole out from the center of the arm to accommodate the aileron pushrod wire.

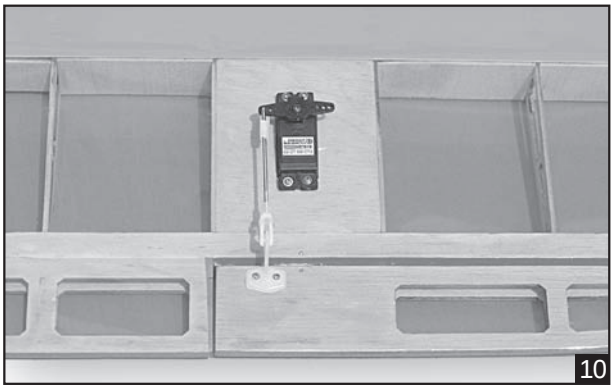
4. Plug the aileron servo into the receiver and center the servo. Install the servo arm onto the servo. The servo arm should be perpendicular to the servo and point toward the middle of the wing.

5. Center the aileron and hold it in place using a couple of pieces of masking tape.

6. With the aileron and aileron servo centered, carefully place a mark on the aileron pushrod wire where it crosses the hole in the servo arm.

7. Using pliers, carefully make a 90 degree bend down at the mark made. Cut off the excess wire, leaving about 4mm beyond the bend.



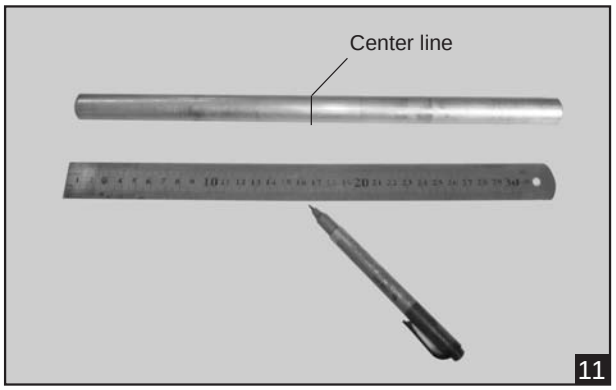


8. Insert the 90 degree bend down through the hole in the servo arm. Install one nylon snap keeper over the wire to secure it to the arm. Install the servo arm retaining screw and remove the masking tape from the aileron.

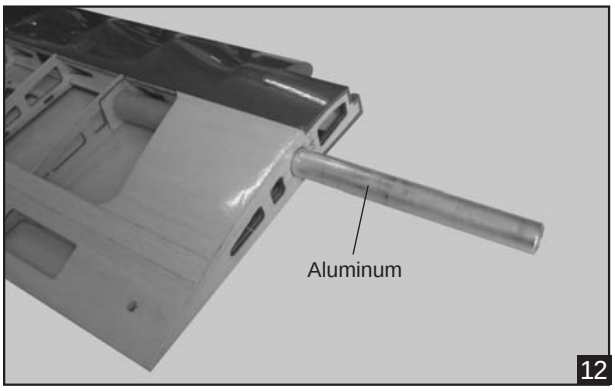
9. Repeat step # 4 - # 8 to install the second aileron linkage. After both linkages are completed, connect both of the aileron servo leads using a Y-harness you have purchased separately.

WING ASSEMBLY

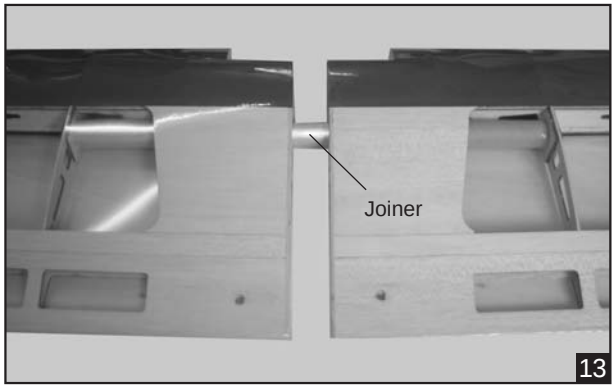
1. Draw a center line on the wing joiner.



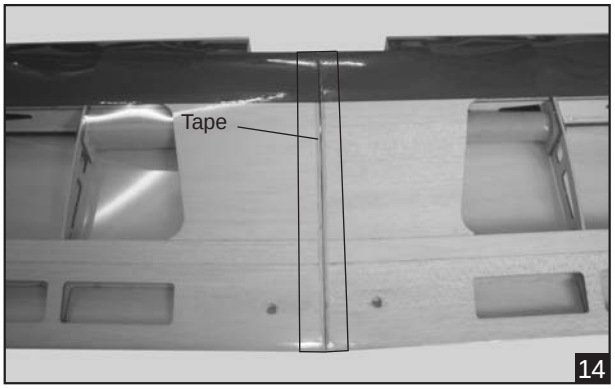
2. Glue wing joiner in wing halves with 30 minute epoxy. Put epoxy on wing joiner and in wing joiner pocket. Wipe off excess epoxy with a paper towel and alcohol.



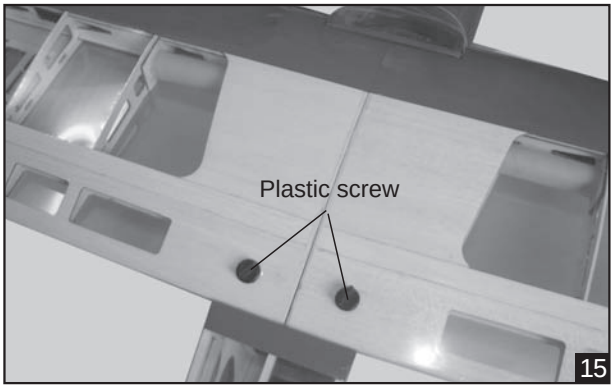
3. Hold wing halves together with tape while epoxy cures.



4. Cover wing joint with self adhesive trim strip.

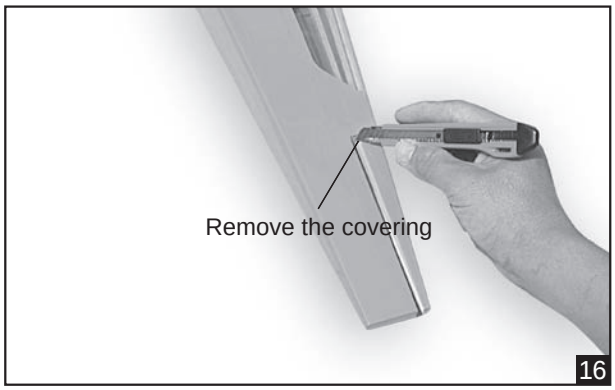


INSTALLING THE WING TO THE FUSELAGE

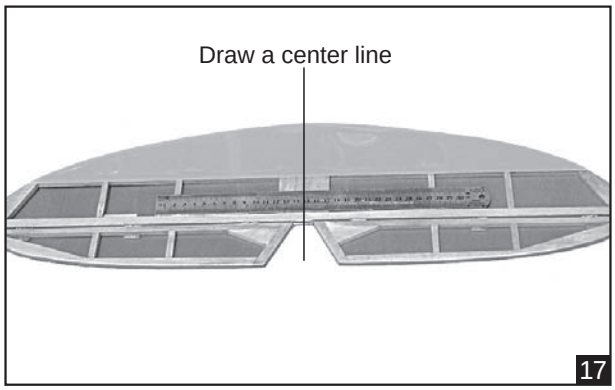


HORIZONTAL STABILIZER INSTALLATION

1. Using a modeling knife, cut away the covering from the fuselage for the stabilizer and remove it.

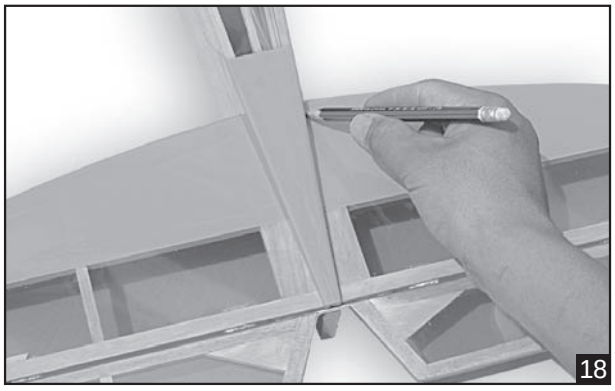


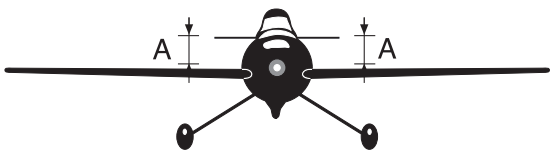
2. Draw a center line onto the horizontal stabilizer.

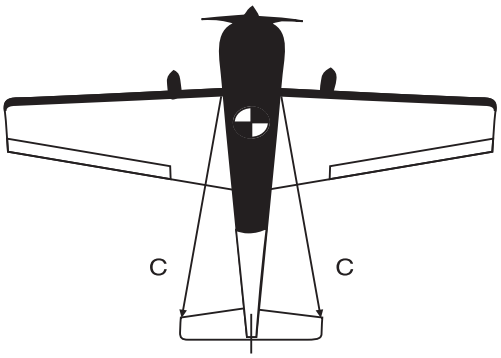


3. Check the fit of the horizontal stabilizer in its slot. Make sure the horizontal stabilizer is square and centered to the fuselage by taking measurements, but don't glue anything yet.

4. With the horizontal stabilizer correctly aligned, mark the shape of the fuselage on the top and bottom of the tail plane using a water soluble / non-permanent felt-tip pen.

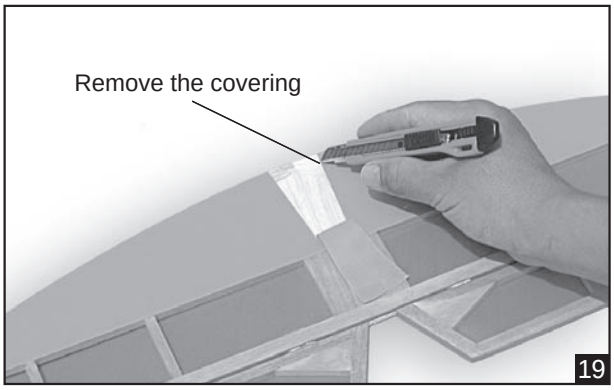




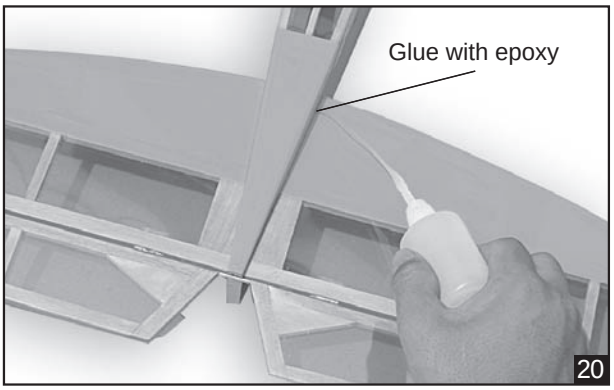


5. Remove the stabilizer. Using the lines you just drew as a guide, carefully remove the covering from between them using a modeling knife.

When cutting through the covering to remove it, cut with only enough pressure to only cut through the covering it's self. Cutting into the balsa structure may weaken it. This could lead to possible failure during flight.



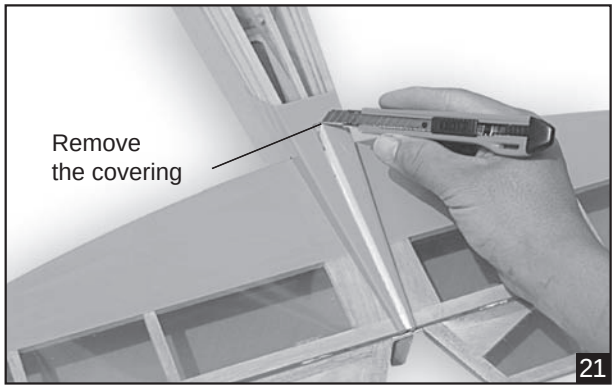
6. When you are sure that everything is aligned correctly, mix up a generous amount of 30 minute epoxy. Apply a thin layer to the top and bottom of the stabilizer mounting area and to the stabilizer mounting platform sides in the fuselage. Slide the stabilizer in place and re-align. Double check all of your measurements one more time before the epoxy cures. Remove any excess epoxy using a paper towel and rubbing alcohol and hold the stabilizer in place with T-pins or masking tape.



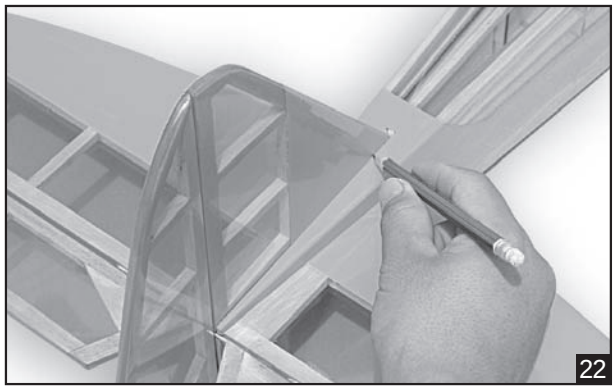
7. After the epoxy has fully cured, remove the masking tape or T-pins used to hold the stabilizer in place and carefully inspect the glue joints. Use more epoxy to fill in any gaps that were not filled previously and clean up the excess using a paper towel and rubbing alcohol.

VERTICAL STABILIZER INSTALLATION

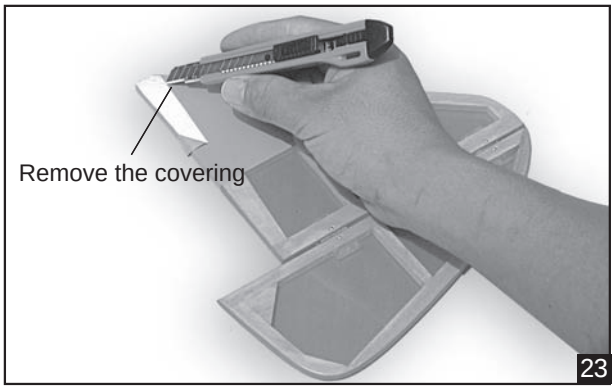
1. Using a modeling knife, remove the covering on the top of the fuselage for the vertical stabilizer.



2. Slide the vertical stabilizer into the slot in the mounting platform in the top of the fuselage. Mark the shape of the fuselage on the left and right sides of the vertical stabilizer using a felt-tip pen.

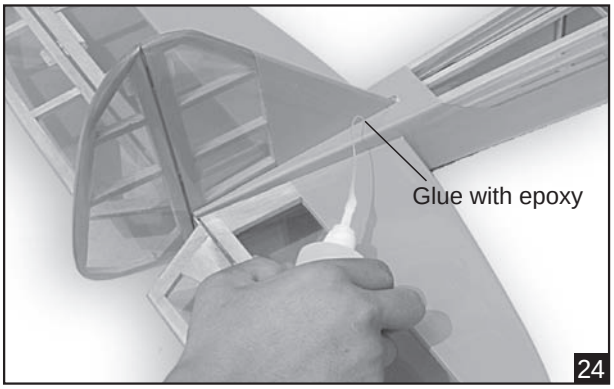


3. Now, remove the vertical stabilizer and using a modeling knife, carefully cut just inside the marked lines and remove the film on both sides of the vertical stabilizer. Just as you did with the horizontal stabilizer, make sure you only press hard enough to cut the film, not the balsa vertical stabilizer.



4. Slide the vertical stabilizer back in place. Using a triangle, check to ensure that the vertical stabilizer is aligned 90 degree to the horizontal stabilizer.

5. When you are sure that everything is a aligned correctly, mix up a generous amount of 30 minute epoxy. Apply a thin layer to the slot in the mounting platform and to the vertical stabilizer mounting area. Apply epoxy to the lower rudder hinge. Set the stabilizer in place and re-align. Double check all of your measurements once more before the epoxy cures. Remove any excess epoxy using a paper towel and rubbing alcohol and hold the stabilizer in place with T-pins or masking tape. Allow the epoxy to fully cure before proceeding.



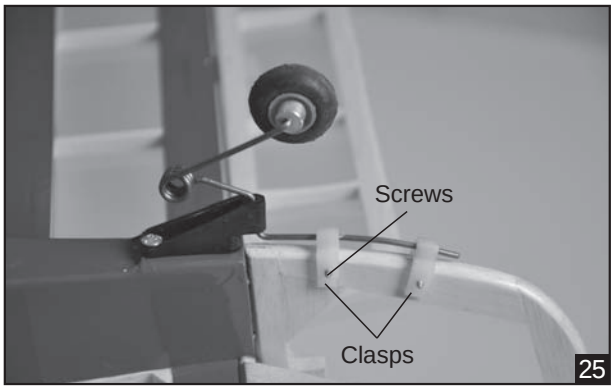
TAIL WHEEL INSTALLATION

1. Set the tail wheel assembly in place on the plywood plate.

2. Drill 2,6mm pilot holes through the plywood plate.

3. Secure the tail wheel bracket in place using two 3mm x 12mm screw.

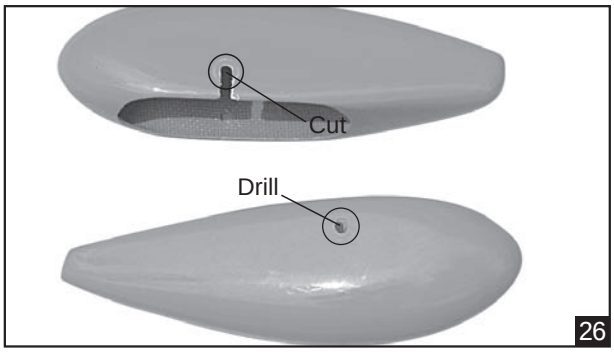
4. Align the tail wheel wire so that the wire is parallel with the bottom of the rudder. The control clasp has a pre-drilled hole through the top of it. Slide this hole on to the tail wheel wire while sliding the clasp over the bottom of the rudder.



INSTALLING THE WHEEL PANTS

1. Locate the wheel pants from the hardware bag. Mark the locations of the mounting axles onto the wheel pants. The locations of the two mounting holes are the middle of the wheel opening, on right side, left side and 10mm from the bottom of the wheel pant.

2. Using a 5mm drill bit, carefully drill two pilot holes through the wheel pant at the TWO marks you made.



3. Using a modeling knife, carefully cut out two line from the margin of the hole onto the wheel pant.

   Just cut only one side of the wheel pant, where the main gear will install. Be sure to make a left and right wheel pant.

4. Slide a 4.5mm nut/ two 16mm flat washers / 4.5mm nut / collar / wheel / collar onto the axle.

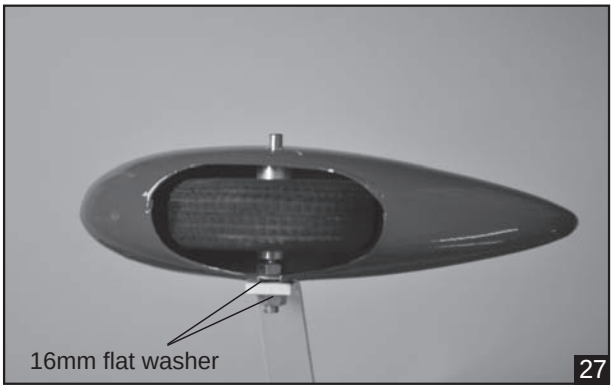
5. Slide the axle assembly into the wheel pant.

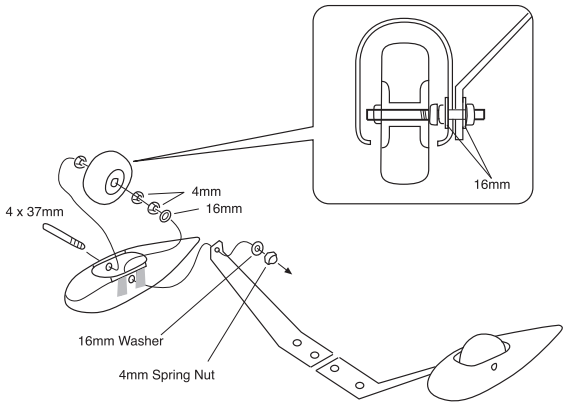
There are just one nut and two flat washers outside of the wheel pant.

6. Remove one nut, one flat washer. Attach the main landing gear to the axle.

7. Center both collars and wheel in the middle of the wheel pant, lock both collars in place using a hexagon 2mm screw.

8. With the landing gear in place, tighten two nuts.





After installing the wheel pant, apply a small drop of thin C/A to the bottom nut.

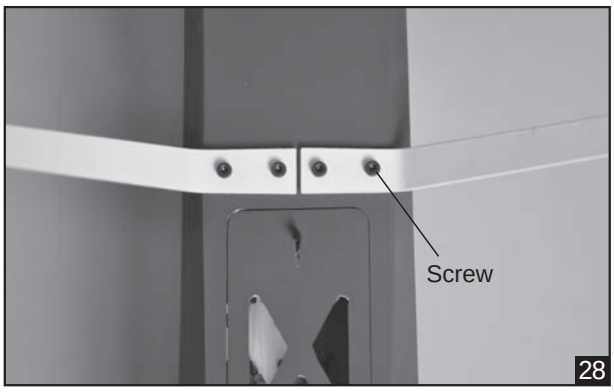
9. Repeat step # 1-8 to install the second wheel pant assembly.

MAIN GEAR INSTALLATION

INSTALLING THE MAIN LANDING GEAR

1. Four nuts have been installed at the factory.

2. Install main landing gear into the fuselage using (4) 4mm x 20mm machine screws and 16mm flat washers provided in the kit.

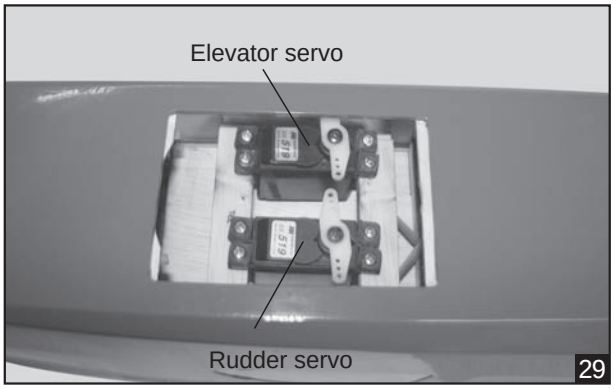


SERVO INSTALLATION

INSTALLING THE FUSELAGE SERVOS

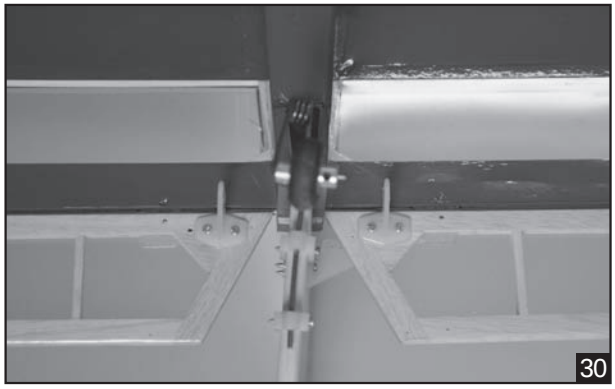
1. Install the rubber grommets and brass collets into the elevator, rudder. Test fit the servos into the servo tray. Trim the tray if necessary to fit your servos

2. Mount the servos to the tray using the mounting screws provided with your radio system.



INSTALLING THE ELEVATOR PUSHROD

1. Locate the pushrod exit slot on the right side and left side of the fuselage. It is located slightly ahead and below the horizontal stabilizer.
2. Carefully cut away the covering material from the slot.
3. Working from inside the fuselage, slide the threaded end of the pushrod until it reaches the exit slot. Carefully reach in with a small screw driver and guide the pushrod out of the exit slot.
4. Install the clevis on the elevator pushrod. Make sure 6mm of thread shows inside the clevis.
5. The control horn should be mounted on the bottom, left side and right side of the elevator at the leading edge, in line with the elevator pushrod.
6. Drill two holes through the elevator using the control horn as a guide and screw the control horn in place. (for both side)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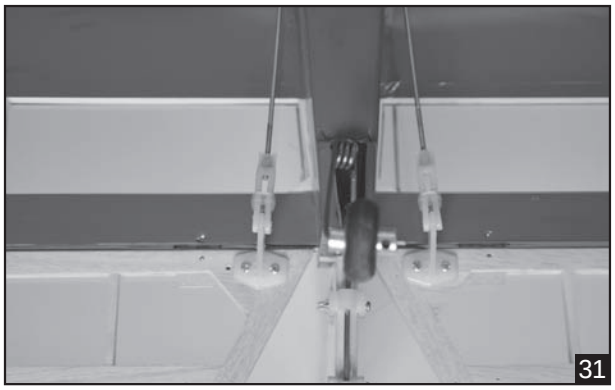

31

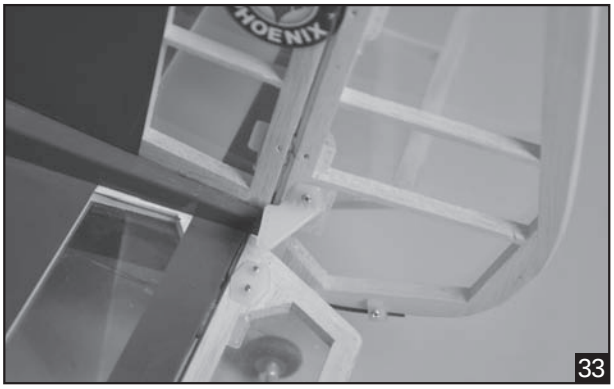
7. Attach clevis to the third hole in the control horn. Install a silicone tube on the clevis.
8. Locate one nylon servo arm, and using wire cutters, remove all but one of the arms. Using a 2mm drill bit, enlarge the third hole out from the center to accommodate the elevator pushrod wire.
9. Plug the elevator servo into the receiver and center the servo. Install the servo arm onto the servo. The servo arm should be perpendicular to the servo and point toward the middle of the fuselage.
10. Be sure both elevator halves are flat. Center both elevator halves and hold them in place using a couple of pieces of masking tape.
11. Connect two elevator purshord to the metal domino connector and secure it. Insert the wire pushrod into the metal domino connector and secure it.
12. With the elevator halves and elevator servo centered, carefully place a mark on the elevator pushrod wire where it crosses the hole in the servo arm.
13. Using pliers, carefully make a 90 degree bend up at the mark made. Cut off the excess wire, leaving about 8mm beyond the bend.
14. Insert the 90 degree bend up through the hole in the servo arm, install one nylon snap keeper over the wire to secure it to the arm. Install the servo arm retaining screw and remove the masking tape the elevator halves.
15. Using thick CA glue, secure the pushrod sleeves to the pushrod sleeve guide.

32

INSTALLING THE RUDDER PUSHROD

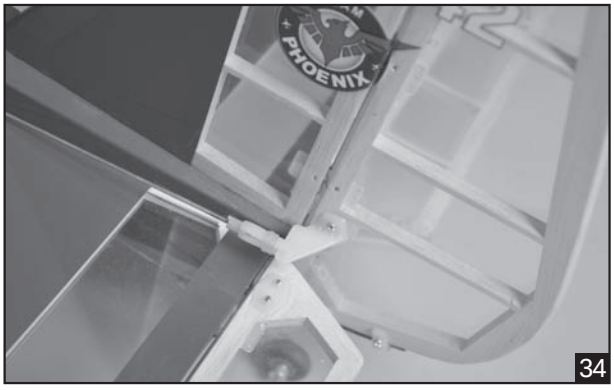
1. Locate the pushrod exit slot on the left of the fuselage.
2. Carefully cut away the covering material from the slot.
3. Working from inside the fuselage, slide the threaded end of the remaining pushrod down the inside of the fuselage until the pushrod reaches the exit slot. Carefully reach in with a small screw driver and guide the pushrod out of the exit slot.
4. Install the clevis on the rudder pushrod. Make sure 6mm of thread shows inside the clevis.
5. The control horn should be mounted on the left side of the rudder at the leading edge, in line with the rudder pushrod.

6. Drill two holes through the rudder using the control horn as a guide and screw the control horn in place.



33

7. Attach clevis to the third hole in the control horn. Install a silicone tube on the clevis.



34

8. Locate one nylon servo arm, and using wire cutters, remove all but one of the arms using a 2mm drill bit, enlarge the third hole out from the center to accommodate the rudder pushrod wire.

9. Plug the rudder servo into the receiver and center the servo. Install the servo arm onto the servo.

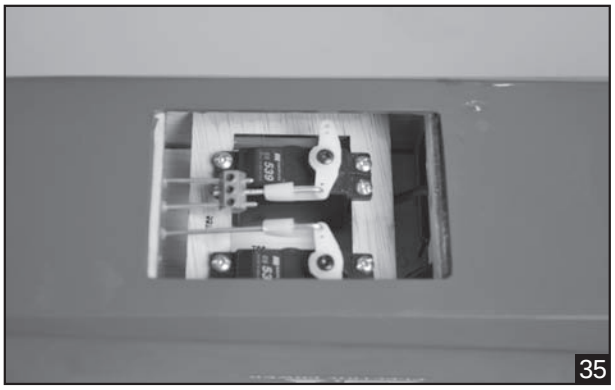
10. Center the rudder and hold it in place using a piece of masking tape.

11. With the rudder and rudder servo centered, carefully place a mark on the rudder pushrod wire where it crosses the hole in the servo arm.

12. Using a pliers, carefully make a 90 degree bend up at the mark made. Cut off excess wire, leaving about 8mm beyond the bend.

13. Insert the 90 degree bend up through the hole in the servo arm. Install one nylon snap keeper over the wire to secure it to the arm. Install the servo arm retaining screw and remove the masking tape from the rudder.

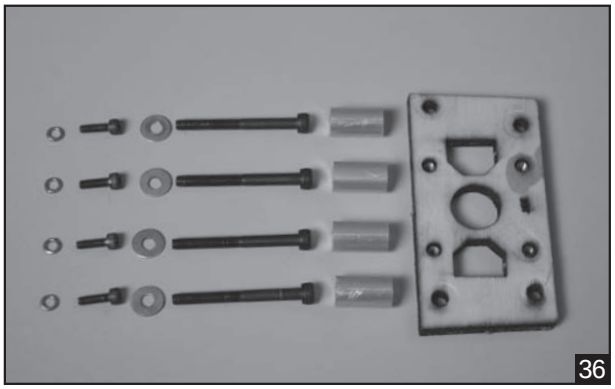
14. Using thick CA glue, secure the pushrod sleeves to the pushrod sleeve guide.


35

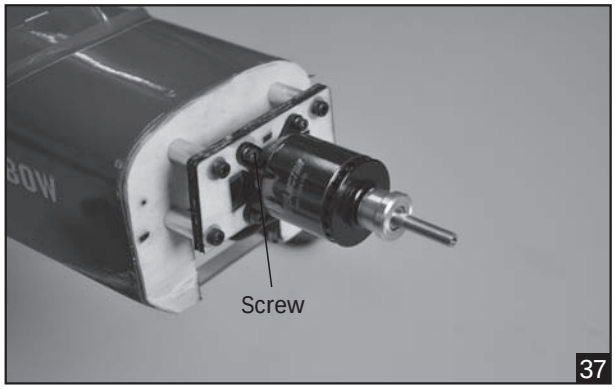
INSTALLING THE MOTOR AND BATTERY

This model fly with electric, here is our recommended for set up the system.

- Motor: OS motor OMA-3825-750 (not included)
- Lipo cell: 4 cells / 4000 – 5000mAh (not included)
- Esc: 50-60A (not included).

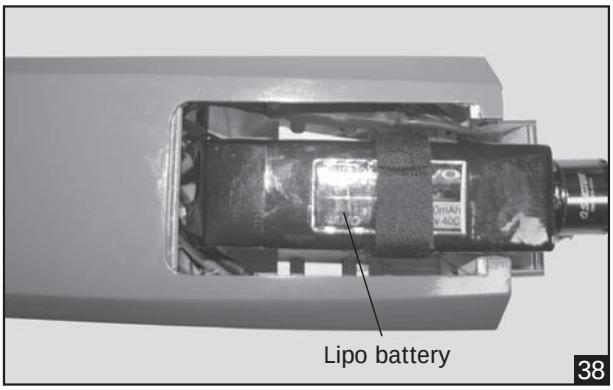

36

1. Install the motor.

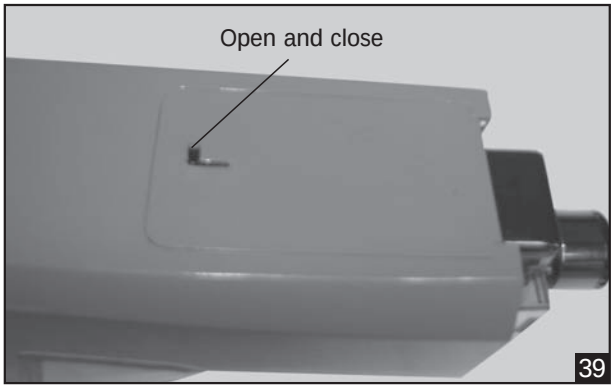


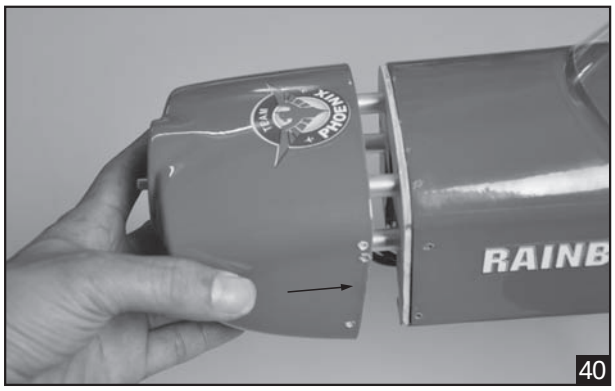
37

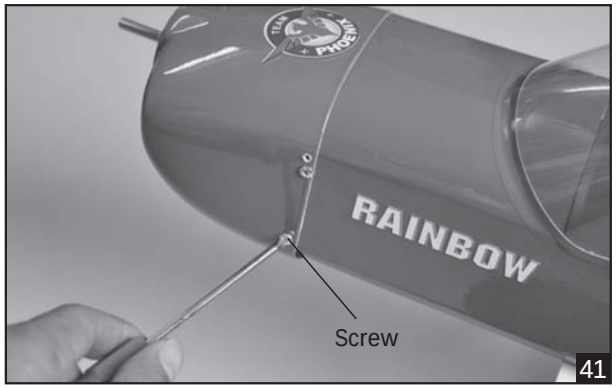
2. Install the Lipo battery.

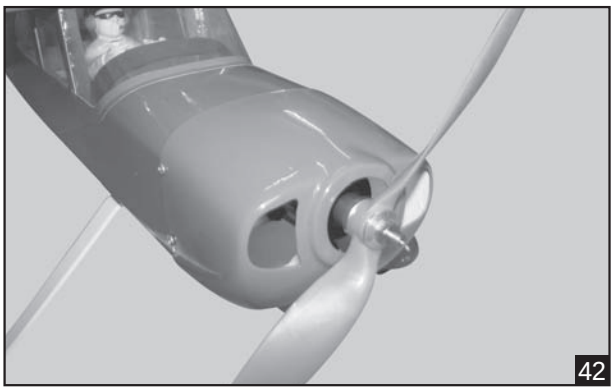


3. Open and close.

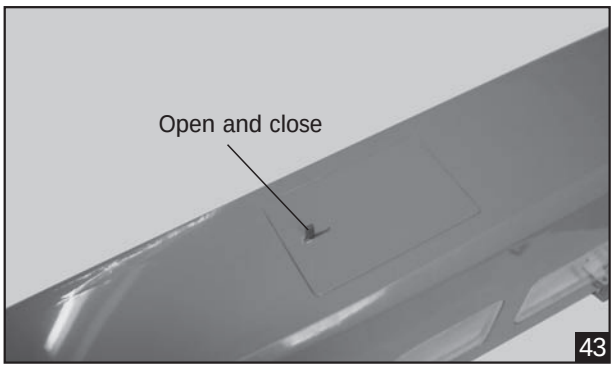








OPEN AND CLOSE THE PLATE



BALANCING

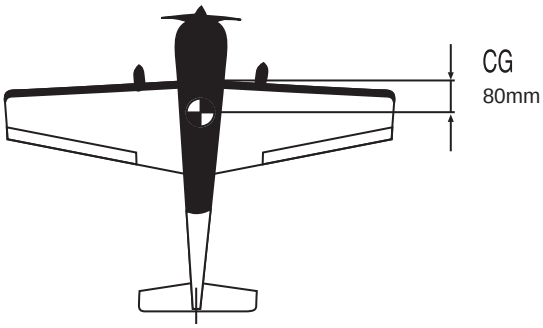
1. It is critical that your airplane be balanced correctly. Improper balance will cause your plane to lose control and crash.

   THE CENTER OF GRAVITY IS LOCATED 80mm BACK FROM THE LEADING EDGE OF THE WING, AT THE FUSELAGE. This location is recommended for initial test flying and trimming. BALANCE A PLANE UPSIDE DOWN WITH THE FUEL TANK EMPTY.

2. Mount the wing to the fuselage. Using a couple of pieces of masking tape, place them on the top side of the wing 80mm back from the leading edge, at the fuselage sides.

3. Turn the airplane upside down. Place your fingers on the masking tape and carefully lift the plane.

4. If the nose of the plane falls, the plane is nose heavy. To correct this first move the battery pack further back in the fuselage. If this is not possible or does not correct it, stick small amounts of lead weight on the fuselage under the horizontal stabilizer. If the tail of the plane falls, the plane is tail heavy. To correct this, move the battery and receiver forward or if this is not possible, stick weight into the firewall. When balanced correctly, the airplane should sit level or slightly nose down when you lift it up with your fingers.



LATERAL BALANCE

After you have balanced a plane on the C.G. You should laterally balance it. Doing this will help the airplane track straighter.

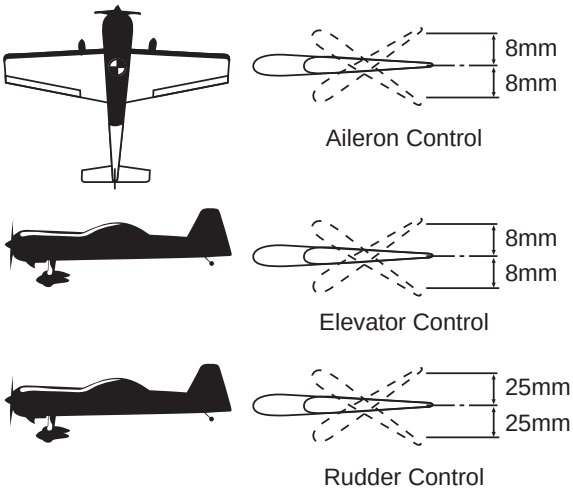
5. Turn the airplane upside down. Attach one loop of heavy string to the engine crankshaft and one to the tail wheel wire. With the wings level, carefully lift the airplane by the string. This may require two people to make it easier.

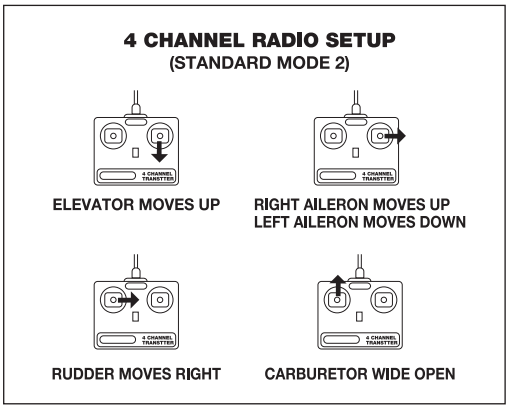
6. If one side of the wing fall, that side is heavier than the opposite. Add small amounts of lead weight to the bottom side of the lighter wing half's wing tip. Follow this procedure until the wing stays level when you lift the airplane.

CONTROL THROWS

1. We highly recommend setting up a plane using the control throws listed.
2. The control throws should be measured at the widest point of each control surface.
3. Check to be sure the control surfaces move in the correct directions.

Ailerons : 8mm up 8mm down
Elevator : 8mm up 8mm down
Rudder : 25mm right 25mm left





FLIGHT PREPARATION

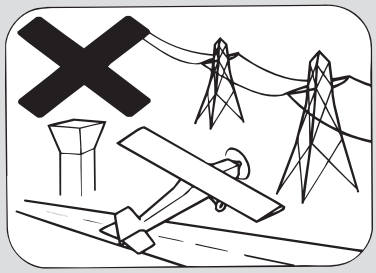
PRE FLIGHT CHECK

1. Completely charge your transmitter and receiver batteries before your first day of flying.
2. Check every bolt and every glue joint in your plane to ensure that everything is tight and well bonded.
3. Double check the balance of the airplane
4. Check the control surface
5. Check the receiver antenna . It should be fully extended and not coiled up inside the fuselage.
6. Properly balance the propeller.

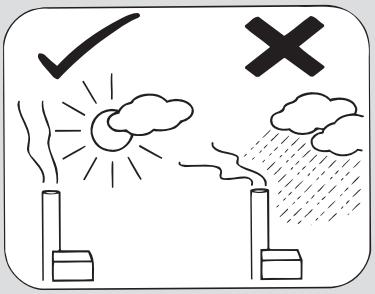
We wish you many enjoyable flights with your plane and once again thank you for your choosing a Phoenix Model's product.

I/C FLIGHT WARNINGS

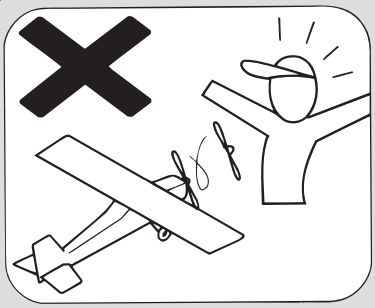
Always operate in open areas, away from factories, hospitals, schools, buildings and houses etc. **NEVER** fly your aircraft close to people or built up areas.



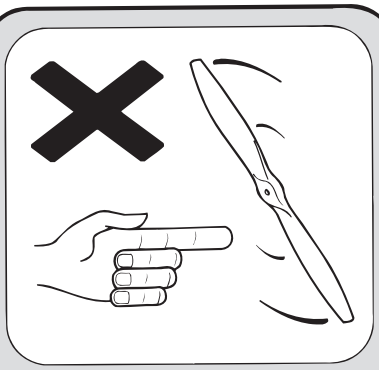
NEVER fly near power lines, aerials or other dangerous areas including airports, motorways etc.



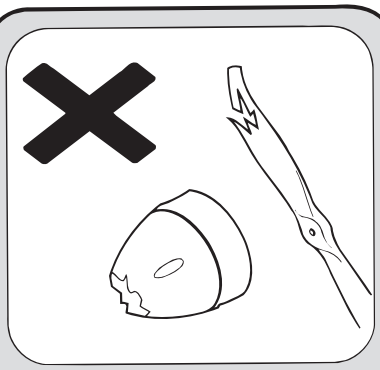
NEVER fly in wet conditions or on windy or stormy days.



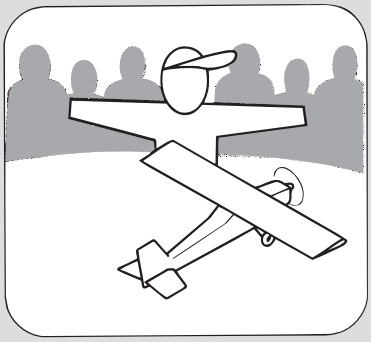
ALWAYS adjust the engine from behind the propeller, and do not allow any part of your body to be in line with the propeller.



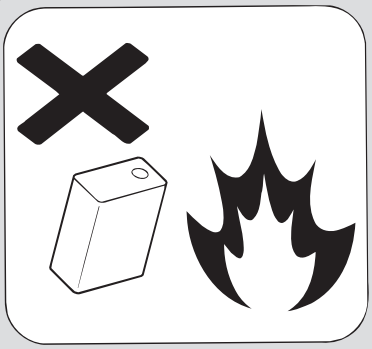
THE PROPELLER IS DANGEROUS
Keep fingers, clothing (ties, shirt sleeves, scarves) or any other loose objects that could be caught or drawn in, away from the propeller. Take care at **ALL** times.



NEVER use damaged or deformed propellers or spinners.

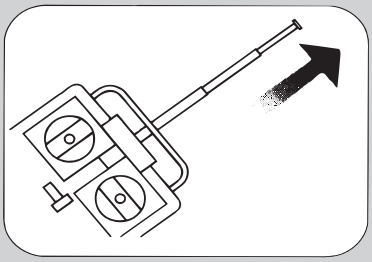


Keep all onlookers (especially small children and animals) well back from the area of operation. This is a flying aircraft, which will cause serious injury in case of impact with a person or animal.

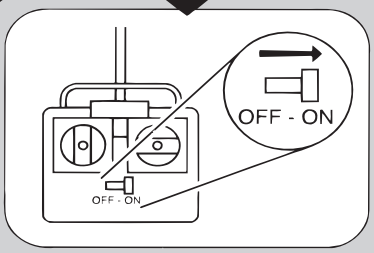


DO NOT dispose of empty fuel containers on a fire, this can lead to an explosion.

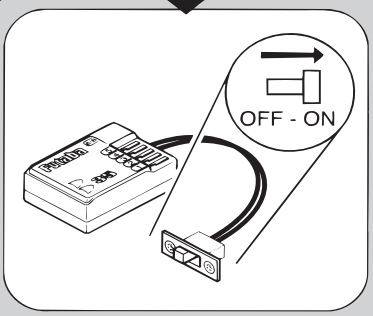
I/C FLIGHT GUIDELINES



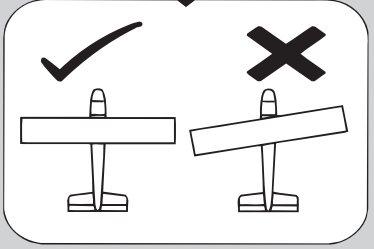
When ready to fly, first extend the transmitter aerial.



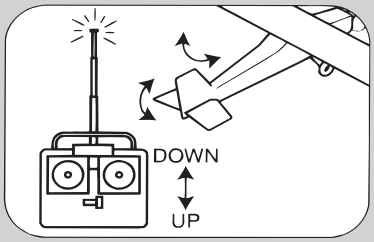
Switch on the transmitter.



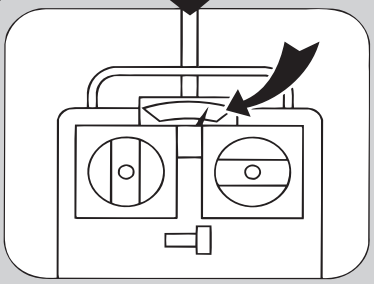
Switch on the receiver.



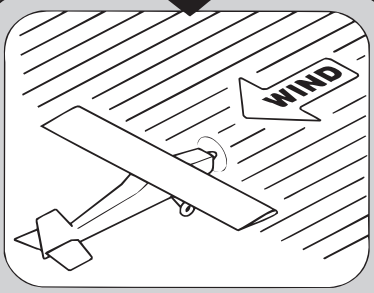
Check that the wings are correctly fitted to the fuselage.



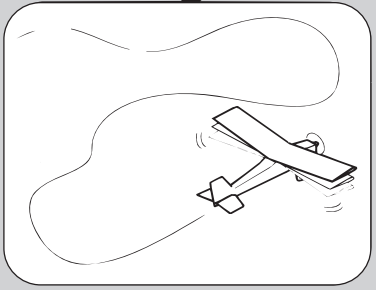
Operate the control sticks on the transmitter and check that the control surfaces move freely and in the CORRECT directions.



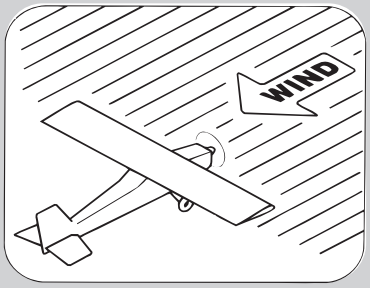
Check that the transmitter batteries have adequate power.



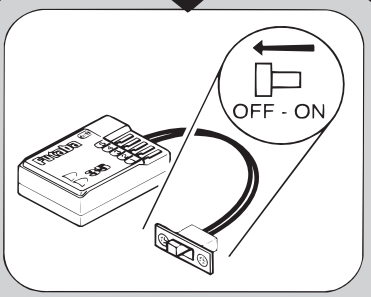
ALWAYS take off into the wind.



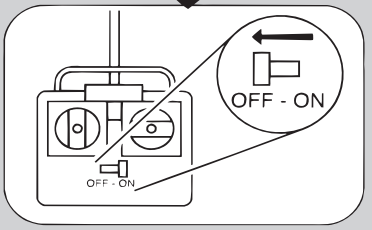
If the model does not respond correctly to the controls, land it as soon as possible and correct the fault.



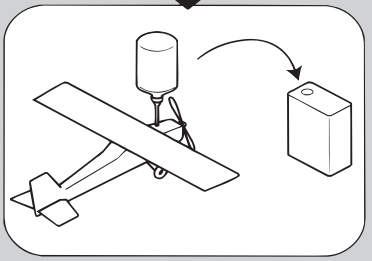
ALWAYS land the model INTO the wind, this ensures that the model lands at the slowest possible speed.



Switch off the receiver.



Switch off the transmitter.



Empty the fuel tank after flying, fuel left in the tank can cause corrosion and lead to engine problems.

Made in Vietnam