Instruction Manual

PHOENIX MODEL®

SBACH 342 .120

SCALE 1:4 ½ ARF

SPECIFICATION

- **Wingspan:** 1663mm (65.5 in)
- **Length:** 1638mm (64.5 in)
- **Flying weight:** 4700-5200 gr
- **Wing area:** 56 dm2
- **Wing loading:** 85g/dm2
- **Wing type:** Naca airfoils
- **Covering type:** Genuine ORACOVER®
- **Gear type:** Aluminum Hi-grade for main gear and spring wire for tail gear (included)
- **Spinner size:** Plastic 70mm (included)
- **Radio:** 4 channel minimum (not included)
- **Servo:** 6 standard hitorque servo: 2 aileron; 2 elevator; 1 rudder; 1 throttle (not included)
- **Recommended receiver battery:** 4.8-6V / 1200-2000mAh NiMH (not included)
- **Servo mount:** 21mm x 42 mm
- **Propeller:** suit with your engine
- **Engine:** .120 / 2-stroke or .120/4-stroke glow engine (not included)
- **Motor:** brushless outrunner 2000-2400 W, 450 KV (not included)
- **Gravity CG:** 115 mm (4.5in) Back from the leading edge of the wing, at the fuselage
- **Control throw Ailerons:** Low: 12mm up/down, 10% expo; High: 15mm up/down, 10% expo
- **Control throw Elevators:** Low: 12mm up/down, 12% expo; High: 15mm up/down, 12% expo
- **Control throw Rudder:** Low: 30mm right/left, 15% expo; High: 45mm right/left, 15% expo
- **Experience level:** Intermediate
- **Plane type:** Scale Aerobatic

RECOMMENDED MOTOR AND BATTERY SET UP

- **Motor:** RIMFIRE .120 (not included)
- **Lipo cell:** 6-12 cells / 4000 – 5500mAh (not included)
- **Esc:** 80-100A (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:

1. 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 SBACH 342 .120 SCALE 1:4 ½ 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.
2. 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.
3. **The SBACH 342 .120 SCALE 1:4 ½ ARF will perform 3-D aerobatics easily if you use the largest engines recommended within the engine range. If you setup your airplane to do 3D maneuvers, you will need to be throttle conscious; that is, never apply full throttle on straight and level flying or in dives to prevent flutter.**

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.

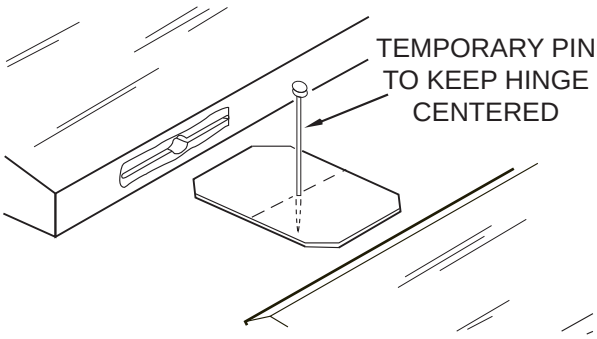
PREPARATIONS

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.

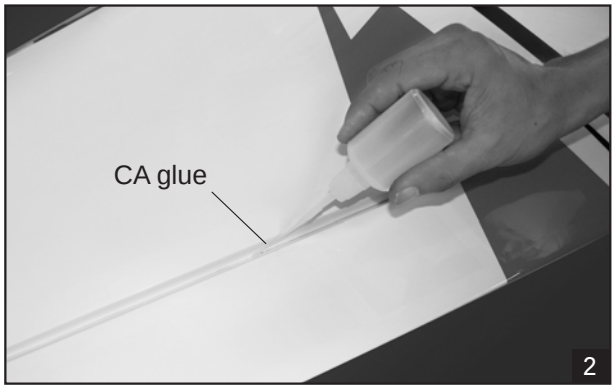

1

INSTALLING THE AILERONS

1. Test fit the ailerons to the wing with the hinges. If the hinges don't remain centered, stick a pin through the middle of the hinge to hold it in position.



2. Apply six drops of thin CA to the top and bottom of each hinge. Do not use CA accelerator. After the CA has fully hardened, test the hinges by pulling on the aileron.



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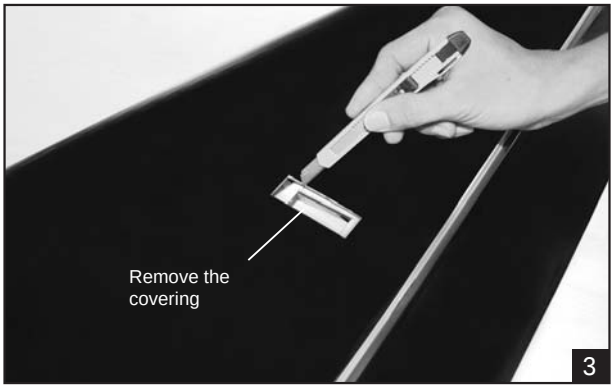
INSTALL THE AILERONS SERVOS & PUSHRODS

1. Install the servo in the wing require the use of one 305mm servo extension for each aileron servo. One Y-harness connector is required and is used to allow the aileron servo to plug into one slot in your receiver. You may have a computer radio that allows you to plug the servos into separate slots and then mix them together through the radio transmitter. If you choose to mix them with the radio rather than the Y-harness, refer to the instructions with your particular brand of radio.

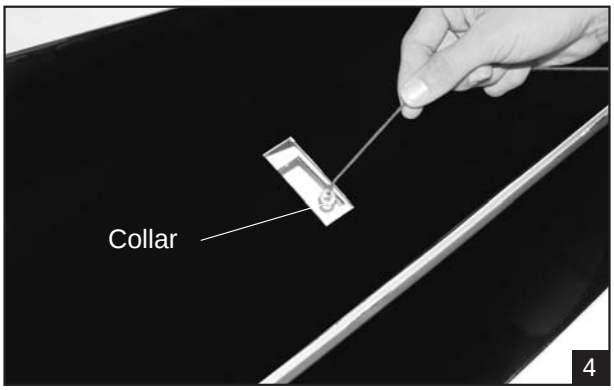
2. Attach the servo extension to the aileron servo. Secure the connectors together using a large piece of heat shrink tubing, tape or other method for securing the connectors together.

3. Turn the wing panel right side up. Using a modeling knife, remove the covering from over the precut servo box.

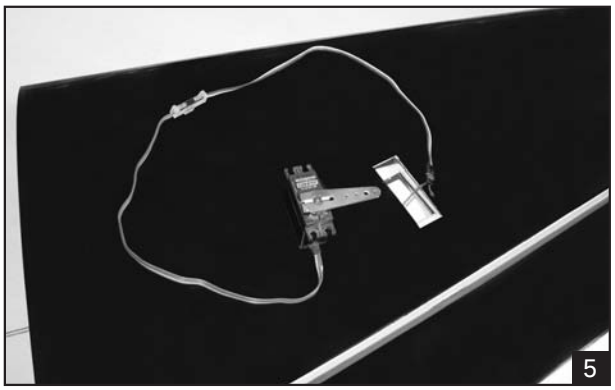


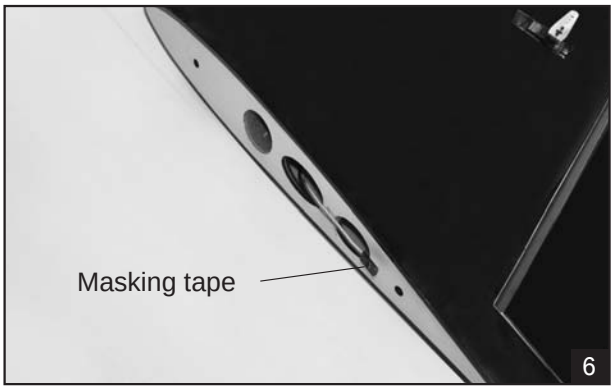
4. Using the string as a guide and pass the string from the servo opening to the hole in the root of the wing.

Note: *A weigh tied to a string can be used first, then tied to the servo lead to pull it through.*

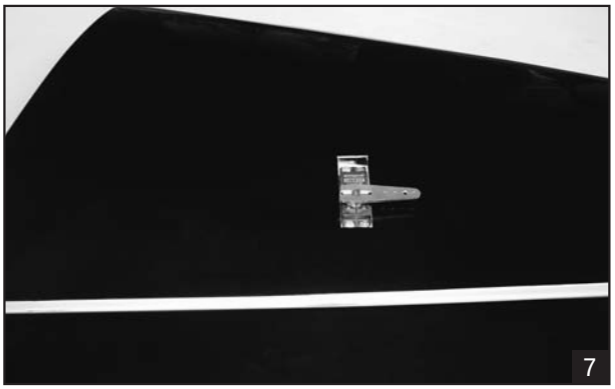


5. Tie the string from inside the wing to the end of the servo wire. Pull the servo wire through the wing with the string. Tape the servo wire to the wing to prevent it from falling back into the wing.





6. Temporarily position the aileron servo into the servo bay. Drill a 1.6mm hole through the four mounting holes of the servo, drilling through the plywood mounting plate in the wing. Install and remove a servo mounting screw into each of the four holes. Insert a drop of thin CA into the holes to harden the wood. After the glue has cured, install the servo into the servo bay using the hardware that came with your servo. Center the servo and install a servo arm as shown.

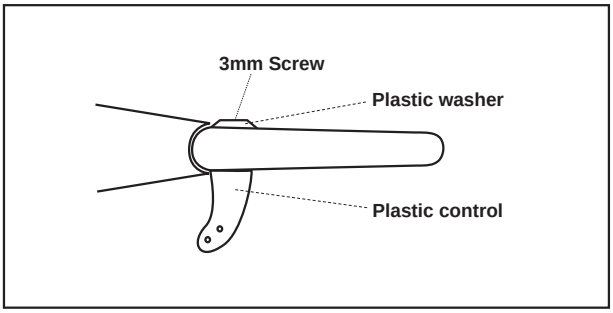


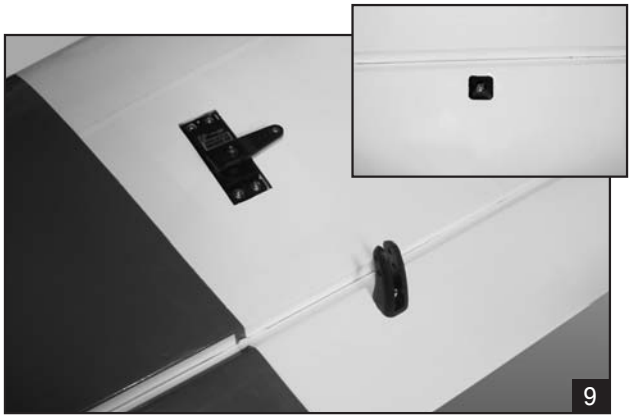
7. Repeat step # 1 - # 6 to install the second aileron servo in the opposite wing half.

INSTALLING THE CONTROL HORNS

1. The aileron has a block wood plate for mounting the control horn. One aileron control horn in positioned on each aileron.

2. Secure the control horn into the aileron.

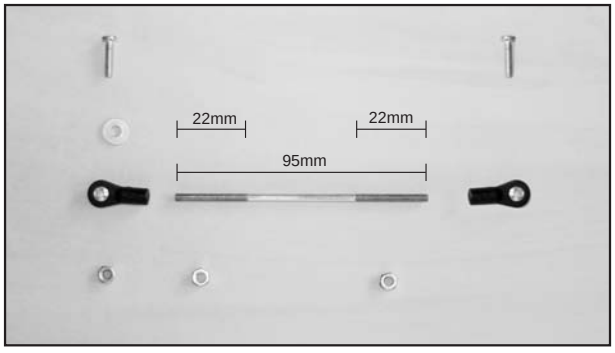




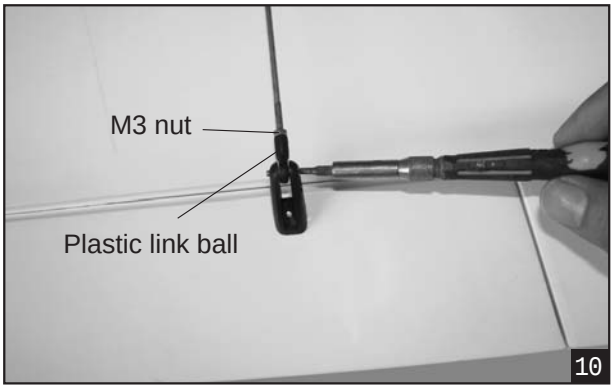
3. Repeat step # 1 - # 2 to install the control horn on the second aileron.

INSTALLING THE AILERON LINKAGES

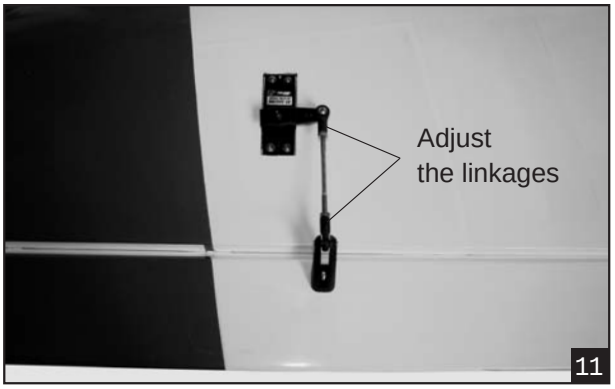
The aileron linkages are assembled as shown below.



1. Locate the pushrod wire. Screw the link ball onto the threaded end of the wire. Tighten the nut against and then install the link ball on the aileron control horn.

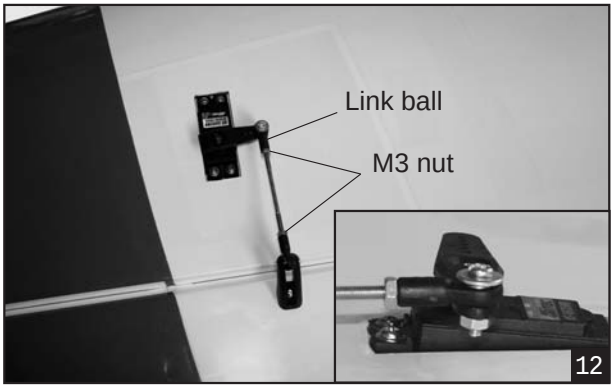


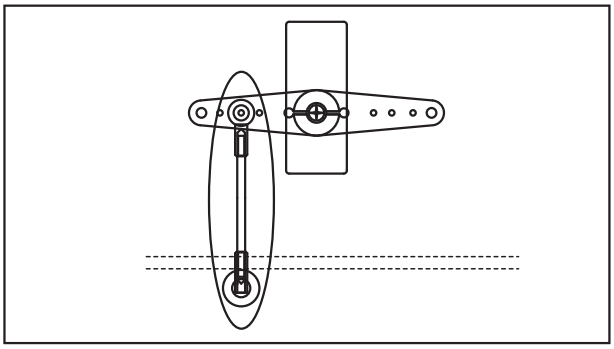
2. Make the same way for the plastic linkball to the other side of the pushrod wire.

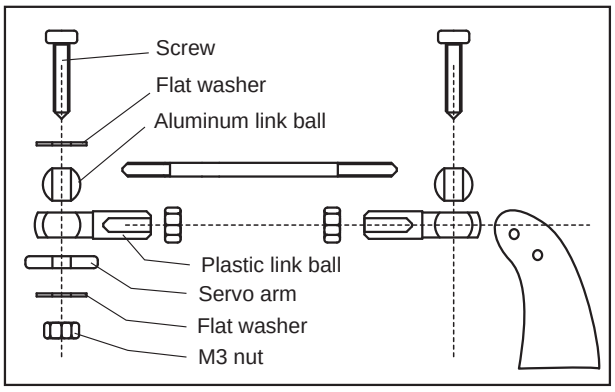


3. Plug the aileron servo into the receiver and center the servo. Install the servo arm onto the servo. The servo arm should be perpendicular to the servo and point toward the middle of the wing.

4. Center the aileron and hold it in place using a couple of pieces of masking tape. Adjust the linkage until the aileron and the servo arm are both centered and then tighten the nut against. Install the plastic linkball to the servo arm. Remember use thread locking compound to secure.



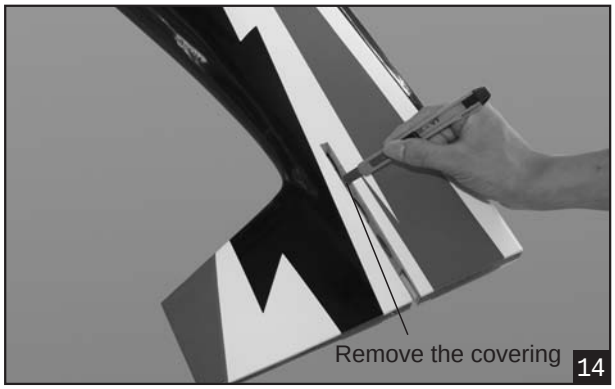




5. Repeat step 1 - step 4 for the second aileron linkage.

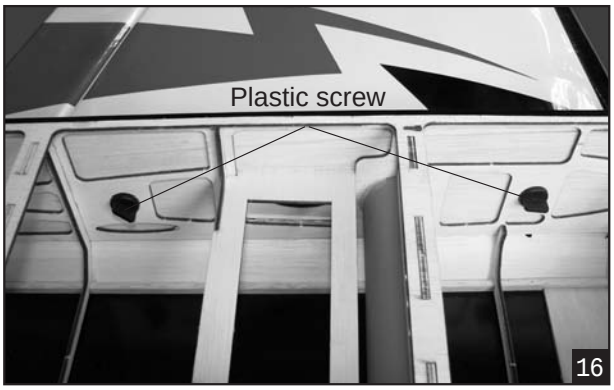
INSTALLING THE HORIZONTAL STABILIZER

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



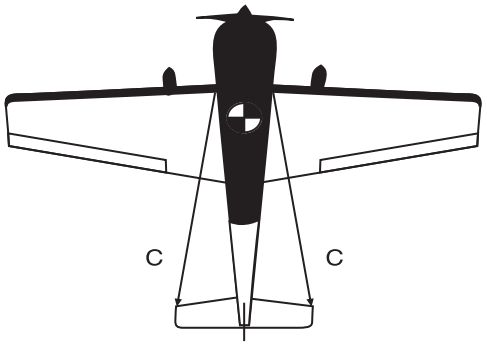
2. Remove the covering from the stabilizer.

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.

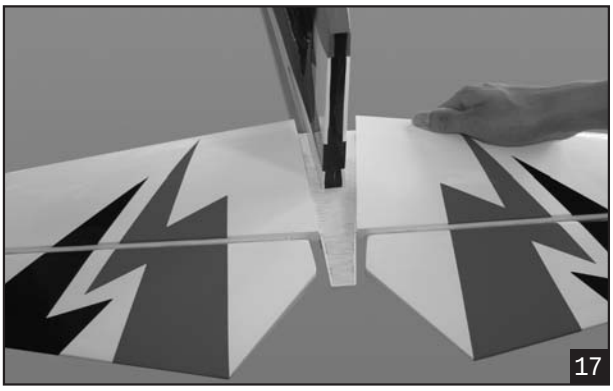


3. Attach the wing to the fuselage as picture.

4. Test the position of the elevator and adjust it as shown.



5. When you are sure that everything is aligned correctly, mix up a generous amount of 30 minute epoxy. Apply a thin layer to the bottom and to the top of the stabilizer mounting area and to the stabilizer mounting platform sides in the fuselage. Insert 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.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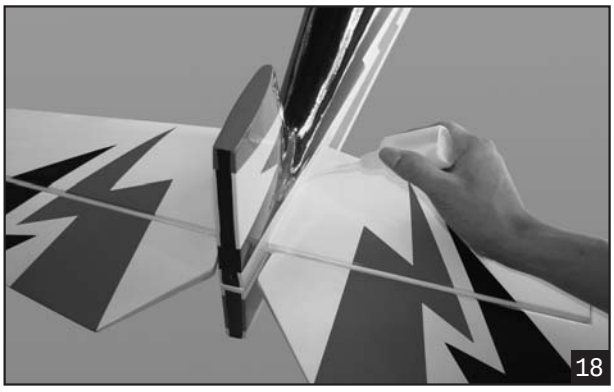
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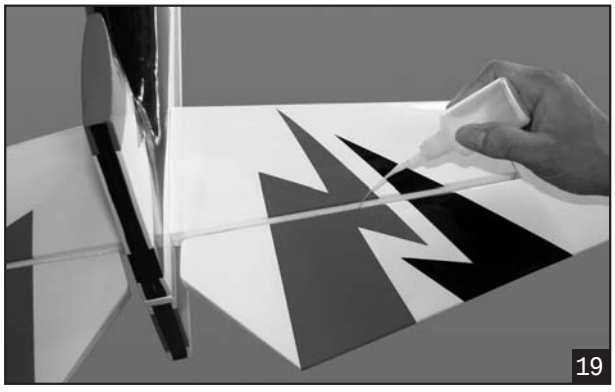
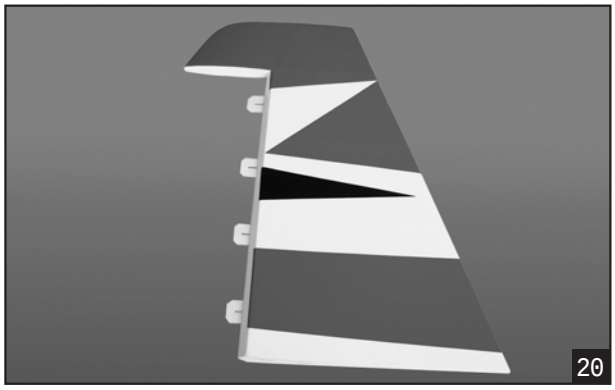
6. After the epoxy has fully cured, remove the masking tape or T-pins used to hold the stabilizer in place and carefully inspect the glue joints. Use more epoxy to fill in any gaps that were not filled previously and clean up the excess using a paper towel and rubbing alcohol.

7. Repeat step 1 - step 2 from the installing aileron for the installing elevator.


19

INSTALLING THE RUDDER

Repeat step 1 - step 2 from the installing aileron for the installing rudder.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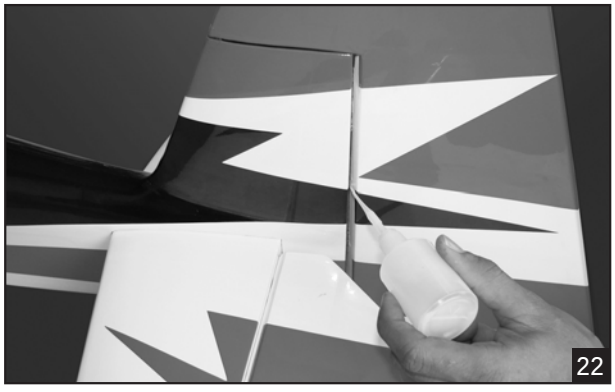
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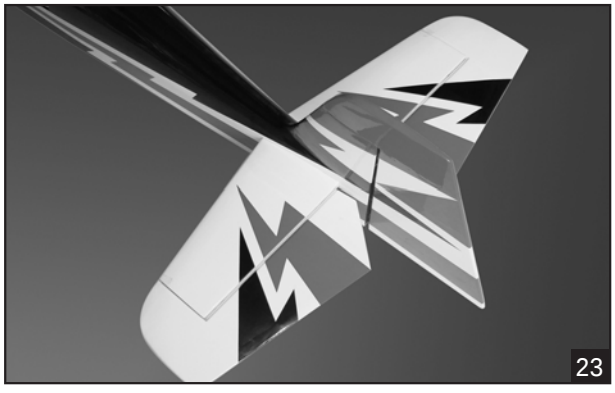
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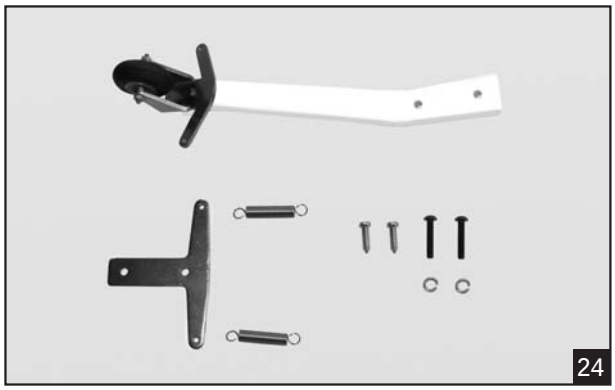
INSTALLING THE TAIL WHEEL

1. The tail wheel set.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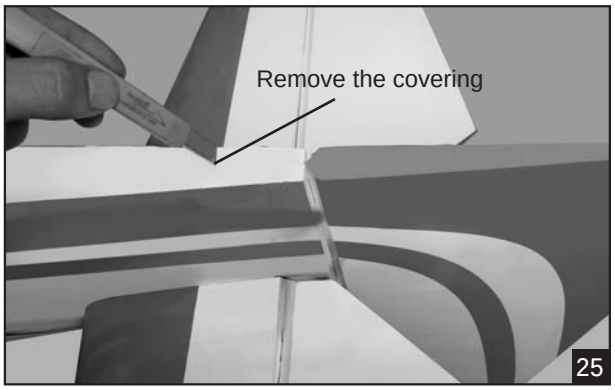
2. Remove the covering.



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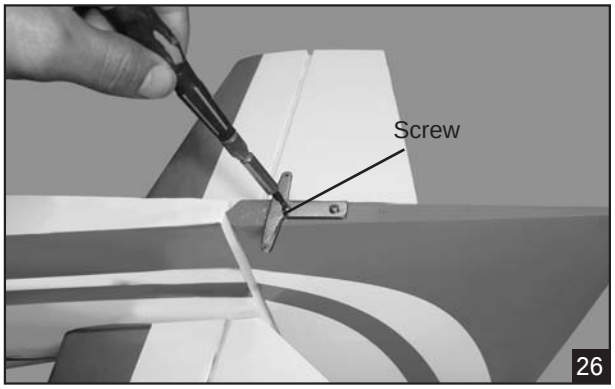
3. Secure the plate to the rudder.



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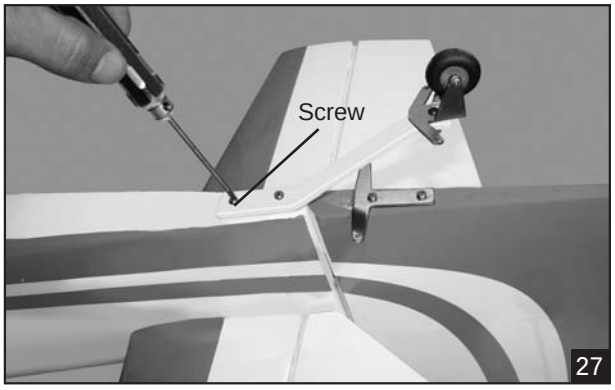
4. Secure the tail brace to the fuselage.



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5. Connect the spring.


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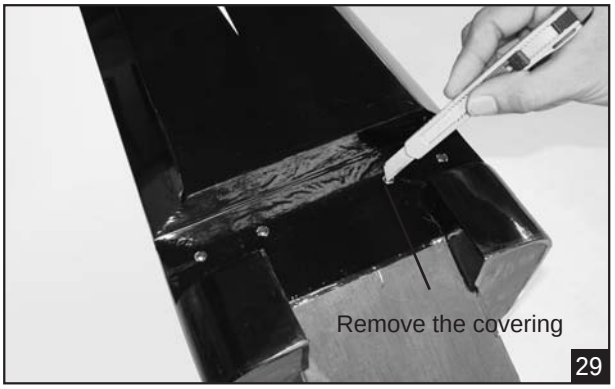
INSTALLING THE MAIN LANDING GEAR

1. Nuts have been installed at the factory.
2. Install main landing gear into the fuselage using (4) 4mm x 20mm socket head screws and flat washers provided in the kit.



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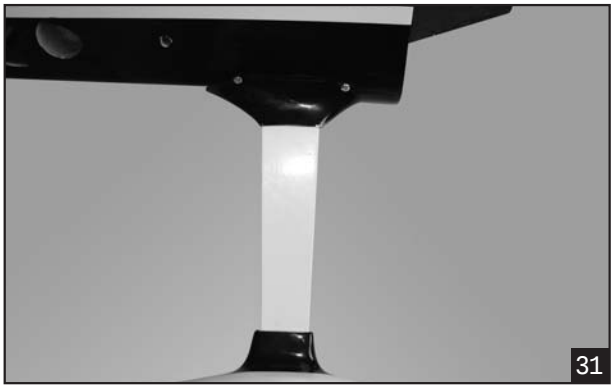
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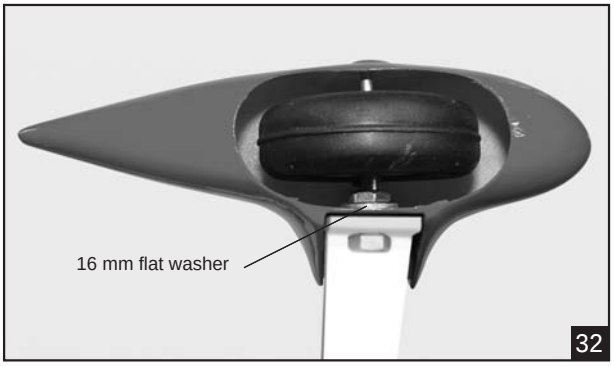
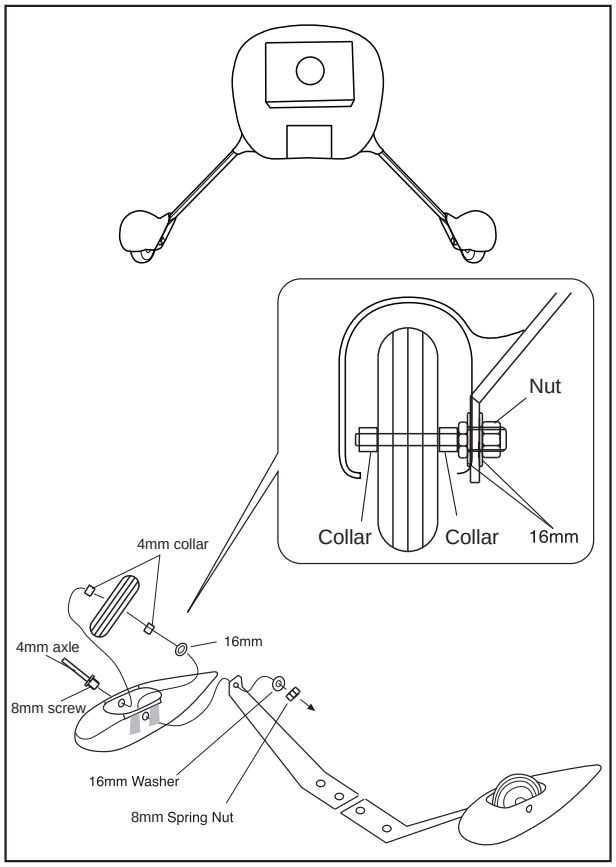
INSTALLING THE WHEEL PANTS



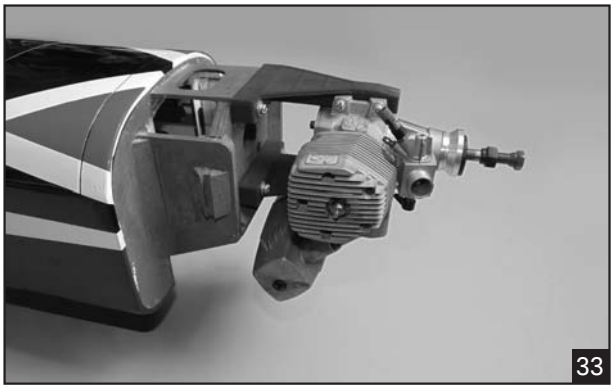


After installing the wheel pant, apply a small drop of thin C/A to the bottom nut.

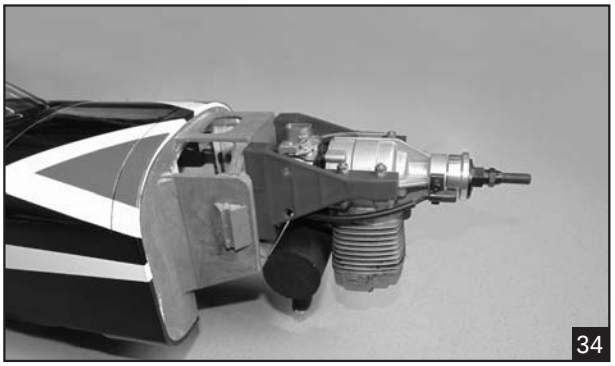
INSTALLING THE ENGINE

Locate the long piece of wire used for the throttle pushrod. One end of the wire has been pre-bend in to a "Z" bend at the factory. This "Z" bend should be inserted into the throttle arm of the engine when the engine is fitted onto the engine mount. Fit the engine to the engine mount using the screws provided.

Install with OS 120 two stroke



Install with OS 22cc Engine

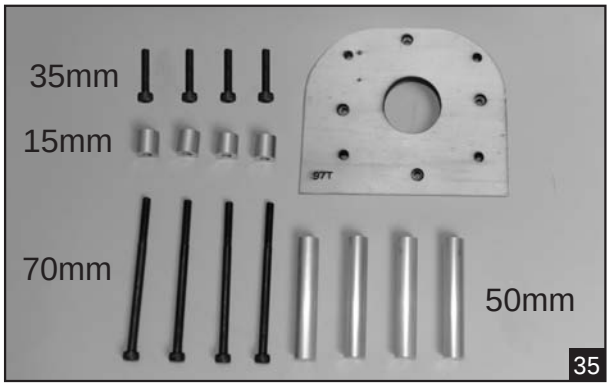


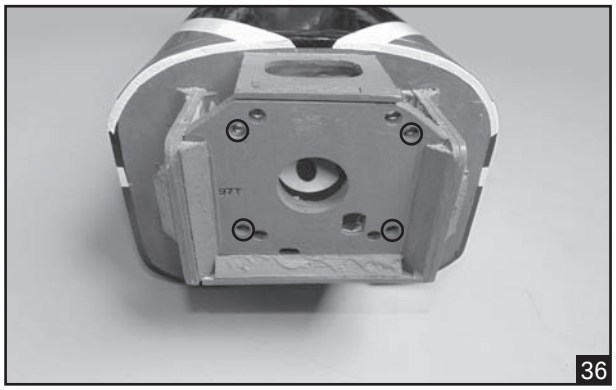
INSTALLING THE MOTOR AND BATTERY

Installing the electric motor

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

- Motor: RIMFIRE .120 (not included)
- Lipo cell: 6-12 cells / 4000 – 5500mAh (not included)
- Esc: 80-100A (not included)

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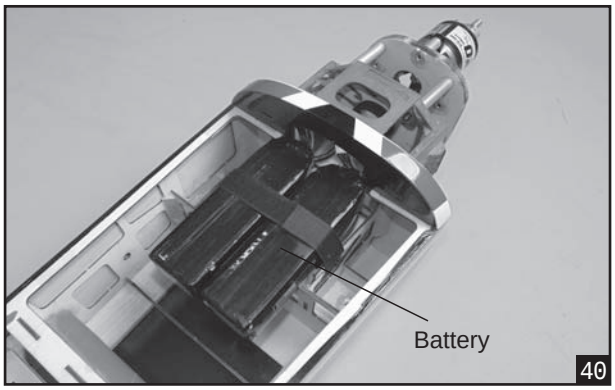

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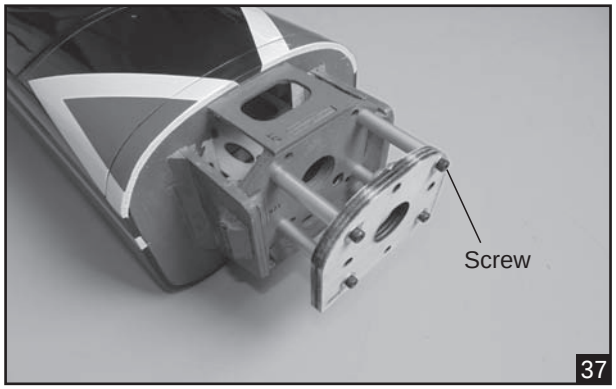

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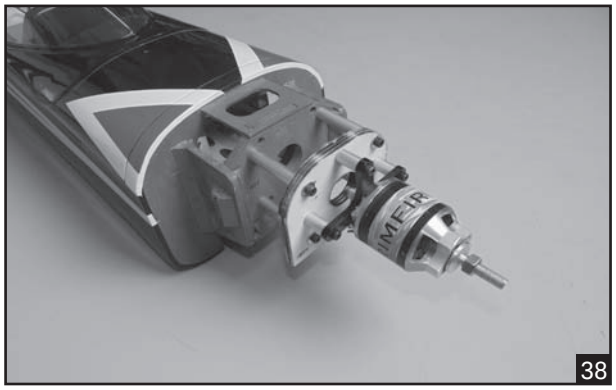
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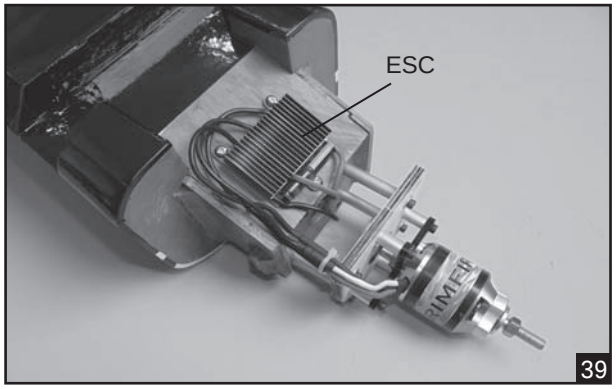

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INSTALLING THE THROTTLE PUSHROD HOUSING

1. Place the engine into the engine mount and align it properly with the front of the cowling. The distance from the firewall to the front of the engine thrust washer should 145mm.

If your engine is equipped with a remote needle valve, we suggest installing it into the engine at this time.

2. When satisfied with the alignment of the engine, use a pencil and mark the mounting hole location onto the firewall, where the throttle pushrod will exit.

3. Now, remove the engine. Using a 5mm drill bit, drill holes through the firewall and the forward bulkhead at the marks made.

4. Slide the pushrod housing through the hole in the firewall, through the hole in the forward bulkhead, and into the servo compartment.

5. Apply a couple of drops of thin C/A to the pushrod housing where it exits the firewall and where it passes through the forward bulkhead. This will secure the housing in place.

6. Using a modeling knife, cut off the nylon pushrod housing in front of the servo tray.

INSTALLING THE STOPPER ASSEMBLY

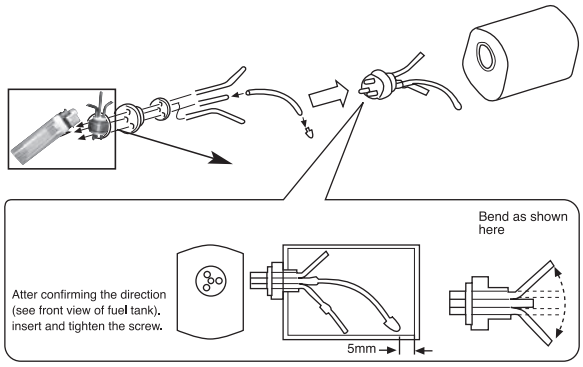
1. The stopper has been pre-assembled at the factory.

2. Using a modeling knife, cut one length of silicon fuel line (the length of silicon fuel line is calculated by how the weighted clunk should rest about 8mm away from the rear of the tank and move freely inside the tank). Connect one end of the line to the weighted clunk and the other end to the nylon pick up tube in the stopper.

3. Carefully bend the second nylon tube up at a 45 degree angle (using a cigarette lighter). This tube will be the vent tube to the muffler.

4. Carefully bend the third nylon tube down at a 45 degree angle (using a cigarette lighter). This tube will be vent tube to the fueling valve.

! *When the stopper assembly is installed in the tank, the top of the vent tube should rest just below the top surface of the tank. It should not touch the top of the tank.*



5. Test fit the stopper assembly into the tank. It may be necessary to remove some of the flashing around the tank opening using a modeling knife. If flashing is present, make sure none of it falls into the tank.

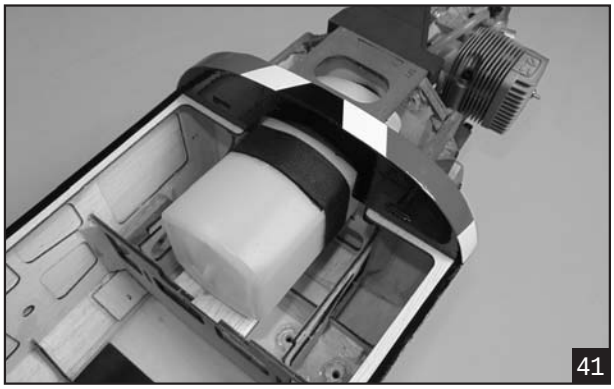
6. When satisfied with the alignment of the stopper assembly tighten the 3mm x 20mm machine screw until the rubber stopper expands and seals the tank opening. Do not over tighten the assembly as this could cause the tank to split.

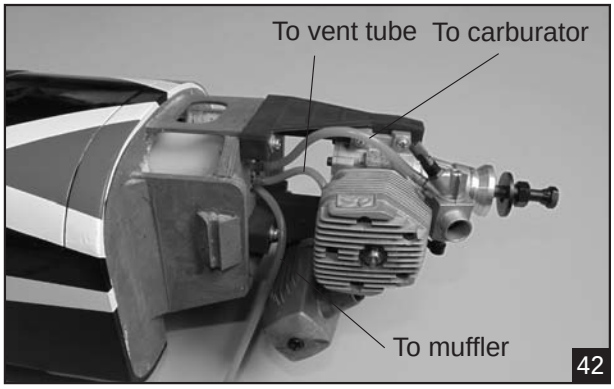
7. Using a modeling knife, cut 3 lengths of fuel line 150mm long. Connect 2 lines to the 2 vent tubes and 1 line to the fuel pickup tube in the stopper.

8. Feed three lines through the fuel tank compartment and through the pre-drilled hole in the firewall. Pull the lines out from behind the engine, while guiding the fuel tank into place. Push the fuel tank as far forward as possible, the front of the tank should just about touch the back of the firewall. Blow through one of the lines to ensure the fuel lines have not become kinked inside the fuel tank compartment. Air should flow through easily.

! *Do not secure the tank into place permanently until after balancing the airplane. You may need to remove the tank to mount the battery in the fuel tank compartment.*

9. To secure the fuel tank in place, apply a bead of silicon sealer to the forward area of the tank, where it exits the fuselage behind the engine mounting box and to the rear of the tank at the forward bulkhead.


41



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INSTALLING THE THROTTLE SERVO

1. Install the rubber grommets and brass collets into the elevator, rudder and throttle servos. 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.

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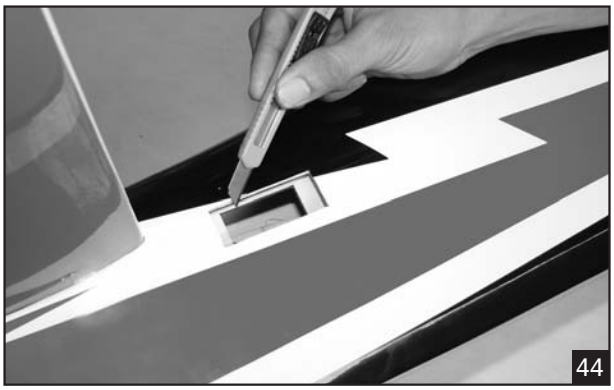
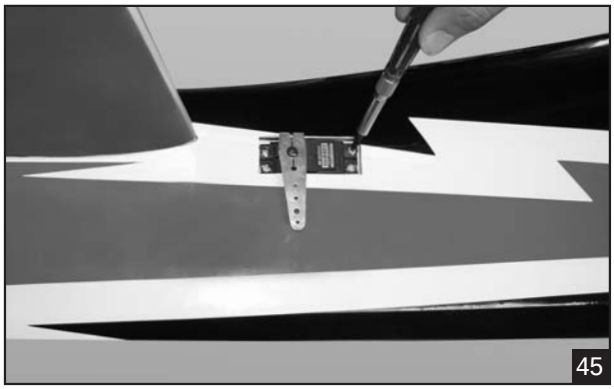
INSTALLING THE ELEVATOR SERVO

1. Remove the covering from both size of the fuselage.

2. Install two servo to the fuselage as shown.

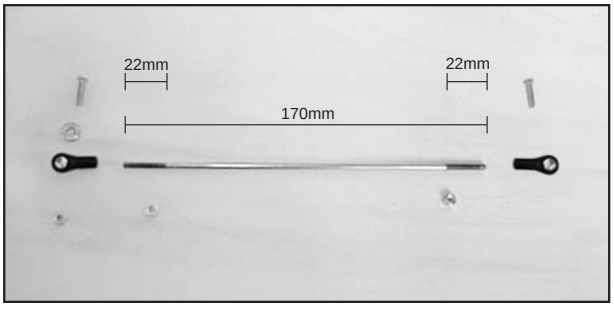




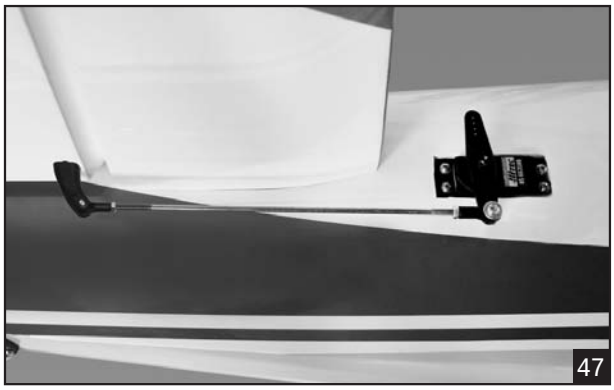
3. The elevator has a block wood plate for mounting the control horn. One elevator control horn in positioned on each elevator.

INSTALLING THE ELEVATOR LINKAGES

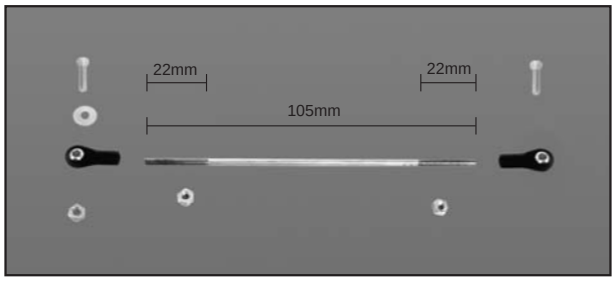
The elevator linkages are assembled as shown below



. Repeat these step as installing the aileron linkages (Page 4 and page 5).



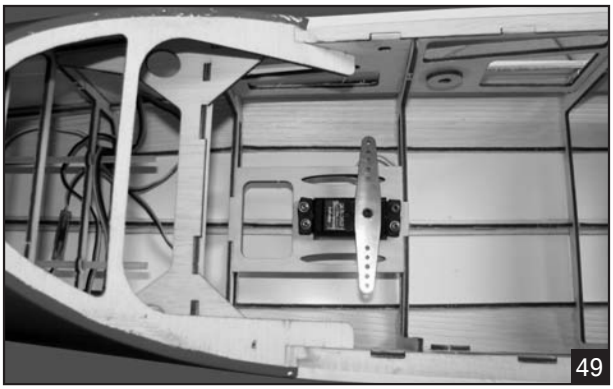
The elevator linkages are assembled as shown below



. Repeat these step for the second servo elevator.

INSTALLING THE RUDDER SERVO

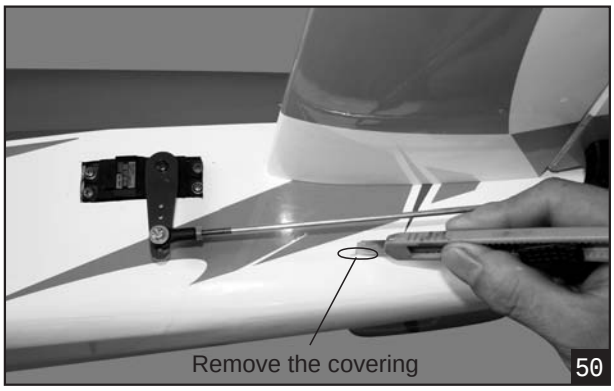
Install the rudder servo to the fuselage as shown.



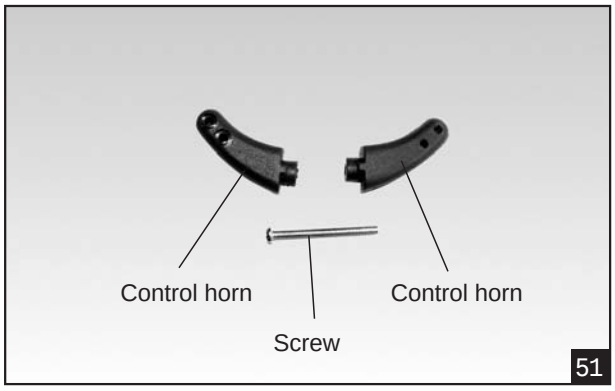
INSTALLING THE RUDDER LINKAGES

The rudder is controlled by two metal cables. Install the rudder linkages and cables as below.

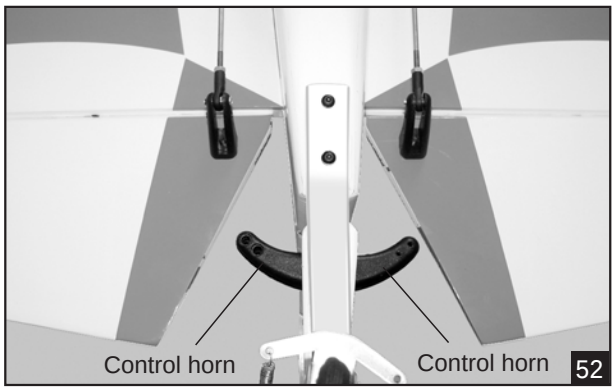
1. Use a hobby knife to remove the covering from the openings for the rudder control cables.



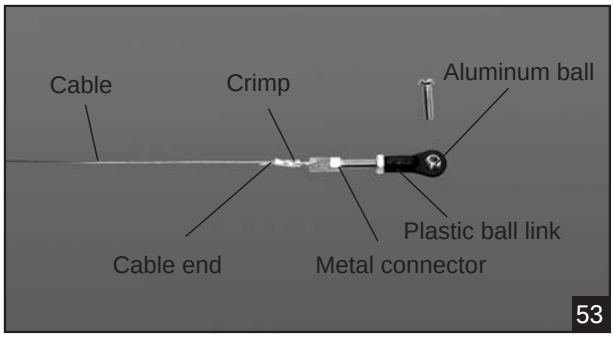
2. The rudder has a block wood plate for mounting the control horn. Two control horn in positioned on both side rudder (left and right).



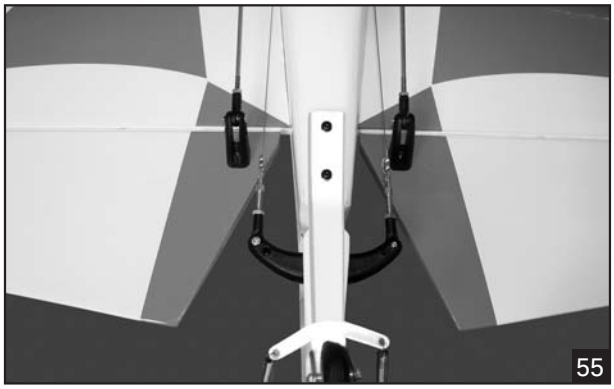
3. Install the control horn to the rudder.



4. Slide a crimp onto the cable, then pass the cable through the threaded cable end. Pass the cable back into the crimp and use crimping pliers to secure the crimp to the cable. Guide the cable into the fuselage to the position for the rudder servo.

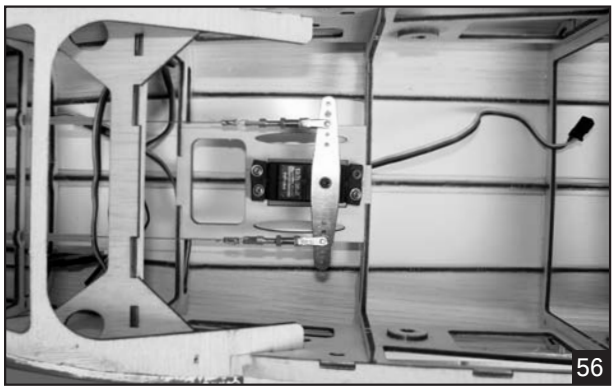


5. Thread the metal connector to the link ball.



6. Center the rudder servo using the radio and install the servo arm. Attach the metal clevis to the rudder servo arm.
7. Slide a crimp onto the cable, then pass the cable through the threaded cable end. Pass the cable back into the crimp and use crimping pliers to secure the crimp to the cable.
8. Thread the metal connector to the metal clevis.
9. Attach the clevis to the rudder servo. There should be light tension on each of the wires when installed properly.

Note: *Remember use thread locking compound to secure.*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INSTALLING THE THROTTLE

1. Install one adjustable metal connector through the third hole out from the center of one servo arm, enlarge the hole in the servo arm using a 2mm drill bit to accommodate the servo connector. Remove the excess material from the arm.

! *After installing the adjustable metal connector apply a small drop of thin C/A to the bottom nut. This will prevent the connector from loosening during flight.*

2. Plug the throttle servo into the receiver and turn on the radio system. Check to ensure that the throttle servo output shaft is moving in the correct direction. When the throttle stick is moved forward from idle to full throttle, the throttle barrel should also open and close using this motion. If not, reverse the direction of the servo, using the transmitter.

3. Slide the adjustable metal connector/ servo arm assembly over the plain end of the pushrod wire. Position the throttle stick and the throttle trim at their lowest positions.

4. Manually push the carburator barrel fully closed. Angle the arm back about 45 degree from center and attach the servo arm onto the servo. With the carburator barrel fully closed, tighten the set screw in the adjustable metal connector.

5. Remove the excess throttle pushrod wire using wire cutters and install the servo arm retaining screw.


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MOUNTING THE COWL

1. Remove the muffler and needle valve assembly from the engine. Slide the fiberglass cowl over the engine.

2. Measure and mark the locations to be cut out for engine head clearance, needle valve, muffler. Remove the cowl and make these cut outs using a rotary tool with a cutting disc and a rotary sanding drum attachment.

3. Slide the cowl back into place. Align the front of the cowl with the crankshaft of the engine. The front of the cowl should be positioned so the crankshaft is in the middle of the precut opening. Hold the cowl firmly in place using several pieces of masking tape.

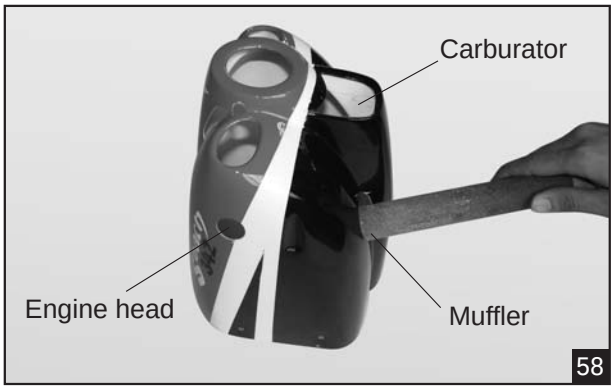
4. While holding the cowl firmly in position, drill four 1,6mm pilot holes through both the cowl and the side edges of the firewall.

5. Using a 3mm drill bit, enlarge the four holes in the cowling.

! *Enlarging the holes through the cowl will prevent the fiberglass from splitting when the mounting screws are installed.*

6. Slide the cowl back over the engine and secure it in place using four 3mm x 12mm wood screws.

7. Install the muffler. Connect the fuel and pressure lines to the carburator, muffler and fuel filler valve. Tighten the screws completely.



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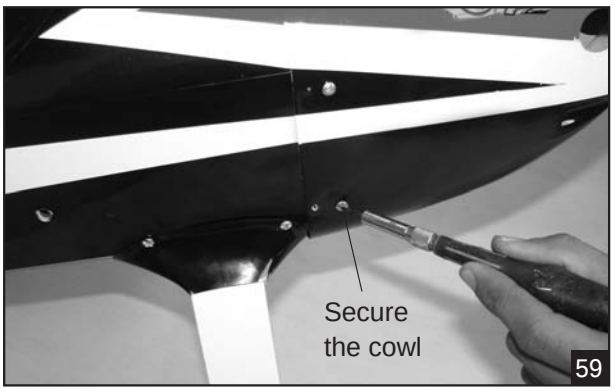

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FINAL ASSEMBLY

INSTALLING THE SPINNER

. Install the spinner back-plate, propeller and spinner cone. The spinner cone is held in place using two 3mm x 20mm wood screws.

. *The propeller should not touch any part of the spinner cone. If it dose, use a sharp modeling knife and carefully trim away the spinner cone where the propeller comes in contact with it.*

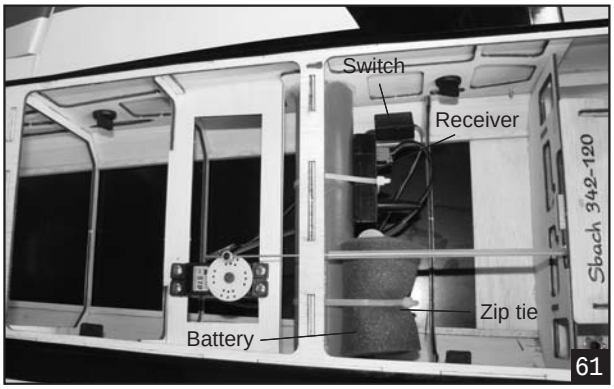
INSTALLING THE SWITCH

1. The switch should be mounted on the fuselage side, opposite the muffler, close enough to the receiver so the lead will reach. Use the face plate of the switch cut out and locate the mounting holes.
2. Cut out the switch hole using a modeling knife. Use a 2mm drill bit and drill out the two mounting holes through the fuselage side.
3. Secure the switch in place using the two machine screws provided with the radio system.

INSTALLING THE RECEIVER AND BATTERY

1. Plug the servo leads and the switch lead into the receiver. You may want to plug an aileron extension into the receiver to make plugging in the aileron servo lead easier when you are installing the wing. Plug the battery pack lead into the switch.

2. Wrap the receiver and battery pack in the protective foam to protect them from vibration. Use a rubber band or masking tape to hold the foam in place.
3. Position the battery pack and receiver in place and using the two zip ties for mounting them as the picture below.
4. Using a 2mm drill bit, drill a hole through the side of the fuselage, near the receiver, for the antenna to exit.

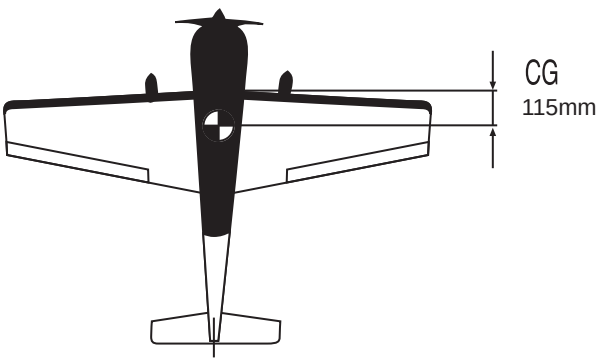


BALANCING

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 115mm BACK FROM THE LEADING EDGE OF THE WING, AT THE FUSELAGE. 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 115mm 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

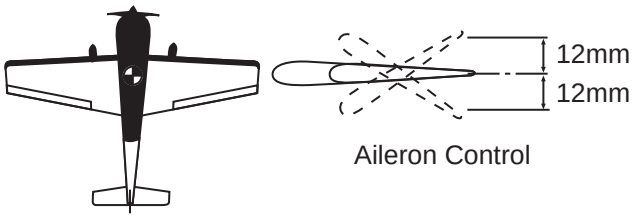
1. We highly recommend setting up a plane using the control throws listed.

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.

- **LOW RATE**

Ailerons :	12mm up	12mm down
Elevator :	12mm up	12mm down
Rudder :	30mm right	30mm left



Aileron Control

Elevator Control

Rudder Control

3-D PERFORMANCE SETTINGS

The SBACH size 120 will perform 3-D aerobatics easily if you use the largest engines recommended within the engine range. If you setup your airplane to do 3D maneuvers, you will need to be throttle conscious; that is, never apply full throttle on straight and level flying or in dives to prevent flutter.

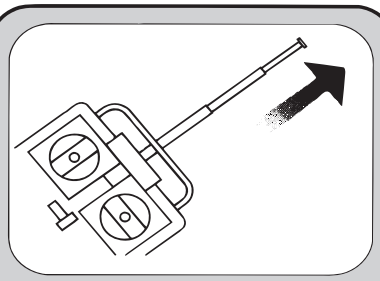
- **HIGH RATE (FOR 3D)**

Ailerons :	45mm up	45mm down
Elevator :	40mm up	40mm down
Rudder :	45mm right	45mm left

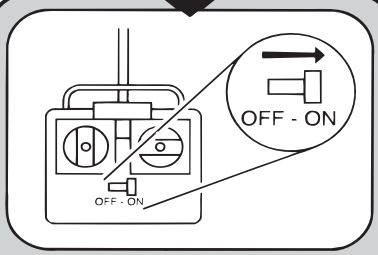
3D SERVOS

The large control throws require servos with great centering. The digital servos are second to none in this department. Digital servos such as the Futaba BLS 351 should be used on all control surfaces of this airplane for optimum performance.

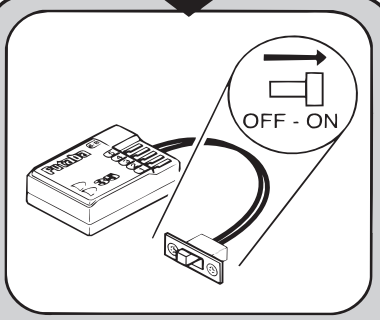
I/C FLIGHT GUIDELINES



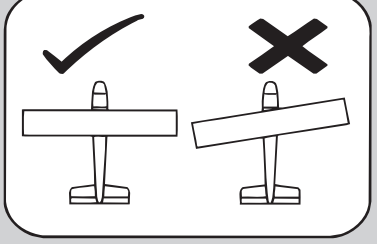
When ready to fly, first extend the transmitter aerial.



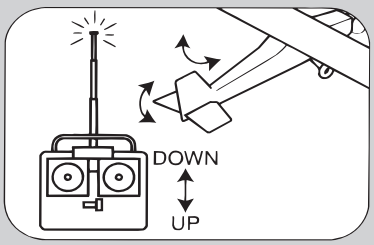
Switch on the transmitter.



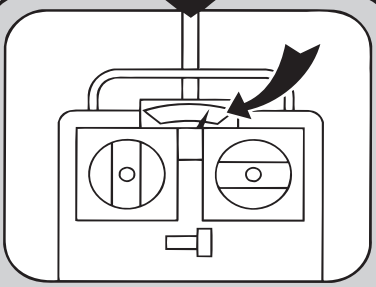
Switch on the receiver.



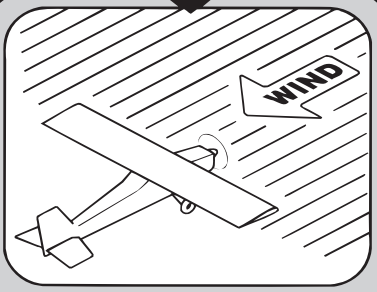
Check that the wings are correctly fitted to the fuselage.



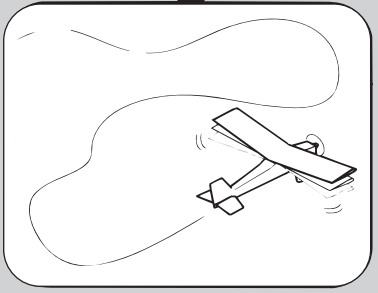
Operate the control sticks on the transmitter and check that the control surfaces move freely and in the CORRECT directions.



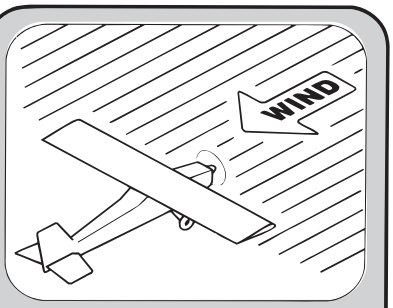
Check that the transmitter batteries have adequate power.



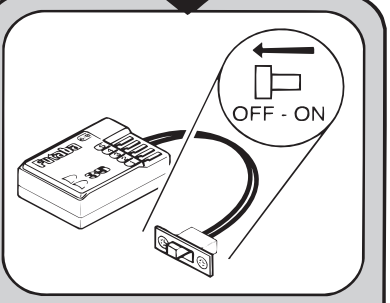
ALWAYS take off into the wind.



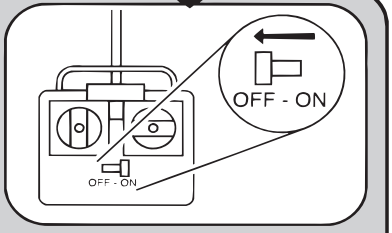
If the model does not respond correctly to the controls, land it as soon as possible and correct the fault.



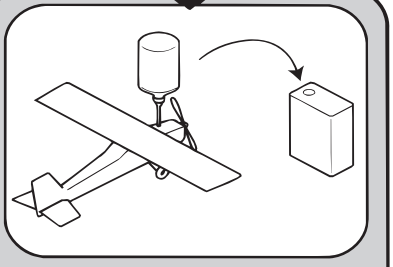
ALWAYS land the model INTO the wind, this ensures that the model lands at the slowest possible speed.



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.

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