

Phencepost Instructions

Thank you for purchasing the Phencepost combat model. This plane is quickly built, is tough, durable, and will survive a lot of combat. It can be used for .15 size SSC combat or for .30 Open B combat. Both versions use the airfoil SD 6060 thick.

Manufacturer makes no warranty, implied or stated, as to the suitability of the model or materials for any purpose. The user accepts all responsibility for the safe use and operation of the model.

Items needed:

1. 2 inch wide Strapping tape. (unidirectional or bi-directional)
2. foam safe CA or epoxy glue.
3. Pro-Bond Polyurethane glue also sold as Gorilla glue
4. Radio, 3 servo's (any size) mini's preferred
5. 3 control horns
6. Pushrods, miscellaneous connectors
7. 4 to 6 ounce fuel tank
8. .15 - .30 motor
9. wood or sheet metal screws
10. steel or plastic washers (a small square of downspout material works great!)

Fuselage:

Attach the motor mount by sliding it into the post as far as it will go. The motor mount goes on the end farthest from the larger radio access hole. Attach with 8 small wood or sheet metal screws. The radio access hole is on the top. The motor mount should be in direct contact with the top of the post. The spacer block goes on the bottom. Drill the holes in the spacer block oversize so the screw threads do not engage the spacer block but do engage the motor mount. If you don't do this you will end up with a space between the motor mount and the spacer block which will allow flexing and a possible failure.

Some builders drill completely through the fuselage, mount and spacer. Three or four button head #4 screws are used with blind nuts on the bottom of the fuse. This secures the motor the motor mount and spacer securely to the fuselage.

In the SSC planes the battery needs to be right behind the motor mount. Slide some EPP foam or other padding up to the motor mount. Then slide in the battery. A 300-400 Nimh battery just fits inside the post. Use an extension wire to bring the end to the Receiver. Your RX should be at the access hole. Be sure the connection is solid by tying it with dental floss or tape it together. You don't want it to come apart accidentally! Use some scrap foam or EPP to keep the battery from sliding back. In the 30 size version the battery needs to be as far back in the fuselage as possible. The receiver goes in the receiver hole in the rear of the fuselage. A Hitech 555 receiver will fit but no padding is possible and vibration could damage it. You can use some padding and let the receiver stick up out of the hole. or you can use a Hitech HFS-05MS receiver which fits into the post with plenty of padding. They are very small and light and are inexpensive. Highly recommended! Berg also make a nice 72 mhz RX For the 30 size planes you will want to fix the battery in position so it won't slide forward and cause damage in a crash or midair. You can drill a hole through the fuselage and insert a dowel, screw or zip tie. You can also put a zip tie around the battery by inserting it from the rear of the fuselage.

Slide the two wing hold down plastic pieces onto the fuselage. First trim away any machining flashing with a sharp exacto knife. The one with the thicker plastic on top is the front one! Wait until you have mounted the wing and have the center of gravity checked before fixing these into place on the bottom of the fuselage with 2 small screws each. Place the screws right next to the outside of the fuselage so you don't damage or interfere with any wires etc inside. Then place the piece of G10 on top of the wing mount pieces and drill through the G10 and fix it in place with 2 small screws top and bottom on each end. The mounts should be about 1/2 way under the leading and trailing edges of the wing. You can use velcro on the wing and the G10 to help keep the wing from shifting if desired.

Tail assembly:

Find the rudder and elevator pieces. I like to make the elevator about 1/2 to 1/3 of the elevator. To make the elevator hinge remove one side of the box the other side serves as the hinge. Make the initial cut down the center of box; being careful to only cut through one side. You do not want to cut it off completely. After you have the initial cut down the center of box, fold box open. This will expose the areas that need to be trimmed. Carefully trim off the material that made up one side of box. Do not cut into boxes on either side! After you have it trimmed, flex the elevator up and down with maximum deflection. This will loosen up the hinge a bit.

Attach the rudder to the post with the part where it starts angling up at the end of the post. You can use screws with a plastic washer (don't hit your battery or receiver!) or you can use zip ties which go around the fuselage through a hole punched into the rudder. Insert a plastic piece under the zip tie to give a better grip. The rudder should be on the muffler side of the fuselage. Not on the side with the opening for the elevator servo!

Attach the elevator to the post with 4 screws with washers or small plastic pieces with a hole in the center. Make sure the holes are in the same flute of the coroplast. The elevator hinge line should be just beyond the back end of the post. After making the holes and loosely installing the screws Slide the short piece of fiberglass rod into the flute right next to the screws. Use a small rod to push it into place so equal amounts are sticking out beyond the post. If you hold the tail up to the light you can see its position. **One can also use bamboo skewers in a similar manner. By placing a skewer on either side of a flute one can use a large fender washer on a screw between the skewers, the washer will span the gap between the skewers.** Now tighten down the screws. Be careful not to over tighten the screws or you will strip them out of the post and will need to make new holes or use larger screws! I find it best to place the screws right next to the outside. Be careful not to put holes in your receiver or battery! The rods keep the elevator from bowing up when you tighten down the screws.

Mount the elevator servo and throttle servo in the holes in the fuselage. Enlarge the holes if you want to use full size servo's. Attach them with screws or electrical tape. Use extensions as needed. I recommend a cable for the throttle linkage rather than a pushrod as you will have a lot less stripped throttle servo's this way! Attach the elevator control horn and a short pushrod. EZ type connectors make adjustments easy.

Wing assembly:

Lightly sand the wings smooth. Sand down the trailing edge if needed to fit the wing halves together. Glue the 2 wing halves together using foam safe CA, Probond or epoxy. Make sure they are straight and you have the amount of dihedral you want! Put a little probond into the spar groove and spread it out into the entire slot. Work the glue down into the entire slot. Push the rod into the slot with a flat head screwdriver all the way down into the spar slot. Do not use carpenters glue for this as it will not stick to the fiberglass rods very well. You can push a small screwdriver through the wing in front of and behind the glass rod and cinch them together with a zip tie or pin the rods

into place with T-pins. Cut off the excess zip tie and push the connection down into the foam. You can apply a strip of bi-directional strapping tape over the spar slots to keep the glue from foaming up too much. It is a good idea to monitor the drying process though so you can squish down any bulges that might appear. Or you can leave the tape off and let the glue foam up and cut or sand off the excess that foams out. Make sure the wing is straight before you set it aside to dry! I like to cut off any big globs with a knife and then use a small hand plane to remove most of it followed by a little sanding with a block.

Attach the trailing edge plastic strip. You can apply probond to the foam. Note that I don't advise putting the glue on the plastic strip as it is very tough to handle when covered with glue! If the plastic strip is too wide for the TE it can be stripped down to the proper width easily. Just make a small cut at one end and you can just pull off the excess for the remaining length. You can also use a small plane to remove the excess plastic strip after it has been glued on. The trailing edge plastic strip is very important to prevent the wing from splitting from the back in a hard crash. Use rubber bands to hold it in place, then do the other side of the wing. Let it dry overnight. You can also spray everything with 3M-77 and stick into place. Much easier in my opinion! 5 minute epoxy also works well. Apply a second layer of the plastic strip over the center 18 inches or so of the wing. One layer will stretch enough in a hard impact to split the wing at the center.

Attach the leading edge plastic strip and EPP leading edge with Pro-bond, 5 minute epoxy or 3M-77. To use probond apply a thin layer of pro-bond to the leading edge foam and to the EPP. Put the LE plastic strip and EPP in place on one side of the wing and use rubber bands to hold it in place while it dries. Then do the other side. Let dry overnight. It is a bit messy and someone to help hold everything in position while rubber bands are applied helps a lot! Or spray with 3M-77 and assemble. Again a lot easier in my opinion!

Cut the plastic trailing and leading edge protection pieces to fit by notching a part out over the aileron. Use a heat gun to warm the center of the trailing edge piece until it is soft. Hold it in place on the wing with gloves until it is stiff again. Glue the trailing edge pieces on with 3m-77 or probond. Be sure the ailerons can move freely. The leading edge piece can have part or all of the area that is full of holes trimmed off. I like to leave about 1/4 inch of the area with holes. Remember that you want the vertical hold down rod to go into the front reinforcement plastic. Heat the leading edge piece with a heat gun until it is soft and then form it to the leading edge. Use gloves and be careful not to burn yourself! If you're not happy with your first attempt warm up the bad parts and try again! Glue the leading edge piece on with pro-bond or 3M-77.

Attach the ailerons with strapping tape. To do this cut 2 x 2 inch pieces of strapping tape from the roll. Stick the 2 pieces together (sticky side to sticky side) with about 1/4 inch or less of overlap. The overlap should be about the thickness of the aileron wood. You will need at least 6 -9 of these pieces for each aileron. Spray the aileron wood with 3M-77 where you will attach the tape (both ends and the middle) on the top and the bottom. Place the pieces on the aileron first with the 1 piece going top to bottom and the other piece going bottom to top at each attachment point (both ends and middle). Now spray the wing with 3M-77 where the tape will attach to the foam. Carefully put the aileron into position and get the tape pieces into place onto the wing. I usually do the top pieces first and then the bottom pieces. If you do this before the 3M-77 fully dries it is a lot easier to reposition the tape as needed to get a very tight hinge line. Don't worry if the aileron wants to stick up or down a bunch. As long as the hinge line is reasonably free it will function fine. The vertical wing attachment fiberglass rods will run at an angle through the wing just behind the leading edge and just in front of the trailing edge. Use the leftover pieces from the wing spar rods. To help keep these fiberglass rods in place glue the small circular pieces of plywood on the bottom and top of the wing where the holes enter and exit the wing. Glue them on with foam safe CA or Pro-bond. For the front bottom reinforcement you can drill through the plastic reinforcement and not use the plywood disc. The rod will be at a way back from vertical but that is actually better.

The rear rod should be at a similar angle. Drill through the plywood discs and glue the fiberglass rod into place. It should stick up about .5 to .75 inch. Cut off any excess. Cover the wings with colored packing tape. Be sure to wipe off all the spider webs and sand lightly. Apply a light spray of 3M-77 to help the tape stick better. For increased strength you can first apply a layer of bi-directional or unidirectional strapping tape. These tapes are heavy and will add up fast! To be close to or under minimum weight in SSC, I use only one strip of tape on the top and bottom of the wing over the spars and one strip over the EPP foam on the leading edge. To get up to the minimum in Limited B you can cover nearly the entire wing with strapping tape.

You can install a single aileron servo in the middle of the wing on top or use two servo's mounted in the outboard section of the wing with a Y harness. Press the servo into the foam firmly to leave an impression and then cut out the hole with a sharp exacto knife. Make the hole smaller than you think you need as you want a snug fit. Glue in with hot melt glue or install wood rails if you prefer.

Run rubber bands from dowel to dowel crossing them under the fuselage. And from wing hold down to wing hold down crossing on top of the wing. The rubber bands will be very tight. Use plenty of rubber bands. To aid in wing attachment you can use some velcro with a sticky back (available at fabric stores) to aid in keeping the wing in position while attaching the rubber bands. It also helps keep the wing from shifting in midairs and dirt naps! You want rubber bands going over the top of the wing from the plastic wing hold downs and rubber bands going under the fuselage from the vertical fiberglass rod wing hold downs. This gives pull in both directions and keeps the fuselage from bowing under the pressure of the rubber bands. If the fuselage does get bowed a little you can usually just put it over your knee and bend it back! Don't kink it though!

Tape the fuel tank onto the post just behind the engine. Place the included foam between the tank and the post to prevent fuel foaming. Use a 3 or 4 oz tank on for a .15. Use a 4 or 6 oz tank for a .25. 4 oz is just barely enough fuel for a .25 and if your .25 is thirsty it may not be enough for a complete round of combat! There is less room for the tank on the .25 and you want a tank that is short. You may need to bend the brass fittings at a close to a 90 degree angle to clear the cylinder head. These lines are prone to getting holes in midairs or ground impacts. Check them before each flight! Use electrical tape or packing tape. You don't want it so tight the foam gets crushed and you have fuel foaming!

Balance point is 2.75 inches from the leading edge about 6 inches out from the center of the wing. Move the wing forward or back to get the proper balance. If the model seems to drop the nose on landing despite using a lot of elevator make it a bit more tail heavy. A slightly tail heavy plane is more responsive and maneuverable. You may need to reduce your throws. An overly tail heavy plane is uncontrollable! Experiment with CG! If needed trim away a bit of the rudder to allow the wing to move back farther on the 15 size plane.

Aileron position is very important. They should be neutral or very slightly reflexed (up) a very small amount. Aileron position will affect the amount of elevator trim required. Set the ailerons neutral or just slightly reflexed (up) If the plane requires a lot of up or down trim to fly level you can adjust the aileron reflex to correct this a bit. If the plane requires a lot of up trim to fly level and - or is pitch sensitive especially to down maneuvers raise both aileron a few turns on the clevis and try it again. If a lot of down trim is required to fly level then lower the ailerons a bit and try again. The elevator should be neutral when trimmed out for level hands off flight. This means the aileron reflex is correct. I believe the pitch sensitivity comes from the ailerons fighting the elevator to control pitch. The ailerons act as elevators on the short coupled planes. If the plane is overly sensitive to elevator inputs even with reduced throws then make the plane more nose heavy by sliding the wing back further. Another clue can be collected by flying inverted. It should take a little forward movement of the stick to fly level. If the plane dives severely when inverted you probably need to raise the ailerons a bit. It should go down somewhat but not radically.

Set the control throws at: ailerons .5 inch up and down and elevator at .5 inch up and down. Start here and adjust to your liking. The wing will take a lot of elevator throw without snapping. It just starts to slow down more.