



Construction Details Windrider Ele Bee

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Congratulations on receiving your new Ele Bee. The Ele Bee is a great all molded EPP electric flying wing that will provide hours of enjoyment. This manual is provided as a guide in the construction of your new wing. There are many different ways to build the Ele Bee, but if you have never built a flying wing before, this manual will provide you with the best methods. Feel free to email me at support@atlantahobby.com or call 678-513-4450 if you have any questions during construction.

It is a good idea to read all of the directions one time completely before starting! You will need a clean workspace or work bench approximately 5 feet long and at least 30 inches wide. It should be well lit.

1. Un-box your new plane and take note of all of the various parts. Take out the two wing cores and the fiber filament strapping tape.
The newest version of the Ele Bee has an internal Spar. Insert the spar into the most rear hole located on the wing root and slide the other wing half onto the spar. The two wing halves should be touching. See **photo #1, 2 and 3**
 - If you have 3 inch wide filament tape in your kit: cut three pieces about six inches long and tape the two wing halves together starting on the top of the wing (the top has the servo slot cut in it not the big holes just the slot for the servo arms).
 - If you have one inch wide filament tape in your kit: use three pieces to form three strips approximately 3 inches wide each, and tape as above.Try and keep the wing halves as tight together as possible during this step. While taping, fold over the #3 piece around the leading edge of the wing. If the tape gets a bubble in it just peel the tape off and cut a new piece. See **photo #1** for tape layout.
2. Flip the wing over and do the same thing on the bottom of the wing. Again try and keep the wing halves as tight as possible. Make the #3 piece of tape smaller on this side to avoid covering the front-most equipment bay. Just cut a smaller piece and fold over the #3 piece around the leading edge of the wing just like you did on the top side. This will make the nose area very strong. Tip: if you want, put a very thin and light amount of 30 minute epoxy on the root of the wings. This is not necessary but will make the wing a bit stronger.
3. Using a T-square, (top of wing w no cut outs) measure back 12 inches from the nose and make a mark. Then mark 3 inches to the left and to the right of the centerline of the two wing halves. Then cut out a section as shown in **photo #2**. This will allow the prop to spin freely and in clean air when you install it in a later step. Tip: use a new blade in your razor knife for a smooth cut. Draw a line first so you will have a guide to follow while cutting.
4. Step omitted for older model spar placement.
5. You will Install the servos so the longest arms are sticking up. Using your razor knife, slightly enlarge the middle hole on the servo arm and trial fit the pushrod for a smooth movement. Hook up your servos to the radio equipment at this time while it is just laying on the top of the wing. Make sure the trims are centered on the radio. Test the servos to

make sure the control movements are in the proper direction and that the arms are straight up when the stick is centered (see the details on radio equipment step 30 at the end of these directions). Then install the arms onto the servos. Trial fit your servos in the molded holes and trim the foam as necessary so the arms move freely. Remove the servo from the bay and cut a small slot with your knife from the servo bay to the front equipment bay. In a later step you'll run the servo wires in this slot into the front bay and then down the slot in the center of the wing halves to the receiver bay. See **photo #4**. The front bay will hold the excess servo wire.

6. Using your razor knife, cut a small slot in the foam from the receiver bay (the center bay) out toward the tip on the bottom of the wing. When it is time to install the equipment (in a later step) you will gently push the receiver antenna in the slot using your fingertip, leaving about 1 to 2 inches loose in the receiver bay. Tip: if you think you might need to remove your receiver later, you can bury a small plastic pushrod tube (a small straw also works) in the foam and route the antenna through that tube for easy removal. See **photo #5** for the antenna in the foam and **photo #6** for the antenna in the tube methods. You will need to cut a bigger slot for the pushrod method or you can use a soldering iron to melt a slot, but do not breathe the fumes of melting foam, as they are dangerous! **Note. Do not install the equipment yet!**
7. Next we will apply the fiber tape to the trailing edge of the wing.
 - If you have 3 inch wide tape: cut a strip 24 inches long, then cut it in half lengthwise. This makes 2 pieces 1.5 inches wide by 24 inches long. Place one of the strips along the trailing edge of the left wing, wrapping the tape around the trailing edge, so approximately 3/4 of an inch is on the top of the trailing edge and 3/4 is on the bottom of the trailing edge. See **photo #7**. Repeat this for the right wing.
 - If you have 1 inch wide tape: just cut two pieces 24 inches long and wrap as in the above step and as per the photo.
8. Step omitted due to new internal Spar.
9. Apply the fiber tape to the leading edge of the wing.
 - If you have 3 inch wide tape: cut a strip 27 inches long, then cut it in half lengthwise. This makes 2 pieces 1.5 inches wide by 27 inches long. Place one of the strips along the leading edge of the left wing wrapping the tape around the leading edge, placing approximately 3/4 of an inch on the top of the leading edge and 3/4 on the bottom of the leading edge. See **photo #9**. Repeat this for the right wing.
 - If you have 1 inch wide tape: just cut two pieces 27 long and wrap as in the above step and as per the photo.
10. Apply the fiber tape on the bottom of the wing from the wing tip to a point 9 inches down the leading edge from the nose of the opposite wing.
 - If you have 3 inch wide tape: cut a strip 34 inches long and then cut it in half lengthwise. This makes 2 pieces 1.5 inches wide by 34 inches long. Place one of

the strips from the rearmost corner of the trailing edge to the point measured on the leading edge. See **photo 10**. Repeat this for the other side of the wing.

- If you have 1 inch wide tape: just cut two pieces 34 long and do as in the above step and as per the photo.
11. Trial fit the canopy bottom/motor tray on to the top of the wing. Fold over the rear flap on the canopy so it forms a 90 degree angle that slips over the trailing edge of the wing cutout area. Trim plastic flush with bottom of the wing. See **photo #11**.
 12. Cut a strip of fiber tape one inch wide and place on the bottom of the battery compartment of the motor tray. Take another piece and wrap the battery compartment of the motor tray to reinforce it in case of a crash. See **photo #12**. If you are a first-time radio control pilot, put another piece on the inside of the battery compartment. This will add strength in case of a crash.
 13. Cut a small slot in the bottom middle of the battery tray just large enough to route the speed controller receiver wire through to the receiver compartment. Remove the canopy and cut a small slot in the foam so the wire can reach into the receiver bay. Set the canopy aside till later. See **photo #13**.
 14. Start the color taping process on the top surface, at the trailing edge. Wrap the first piece of tape around the trailing edge. As you move forward with the rows of tape only overlap the tape about 1/16 to 1/8 of an inch to keep the weight down. Depending on your design, the tape does not have to wrap the leading edge, as you can add a trim stripe along the leading edge later to clean up any taping errors. Tip: place a heavy book or weight on the opposite wing to keep it flat during the taping process to prevent warping. If the tape gets a wrinkle in it just pull it up and lay it back down flat. See **photos #14 and #15**.
 15. Install the servos and receiver in their respective holes. Route the servo wires in the small slot you cut earlier, from the servo bay to the front bay and then into the receiver bay via the slot where the two wing halves join. Leave the excess servo wire in the front bay. See **photo #16**. Tip: you do not have to plug the servos into the receiver at this time, but mark which wire goes to which servo to make it easier later. Note that we will install the speed controller to channel #3 during a later step.
 16. Cover the equipment holes with the supplied coroplast covers and hold in place with fiber tape. Make sure the coroplast is flush with the bottom of the wing for best airflow. Tip: trim the foam or coroplast for the best flush fit. See **photo #17**.
 17. Follow the same procedure to tape the bottom surface as the top. Start at the trailing edge. Only overlap the tape about 1/16 to 1/8 of an inch to keep the weight down. Trim the tape as needed. Tip: overlap the tape over the wing tip for a tight hold.
 18. Note that the elevons are pre-shaped at our factory. We recommend you spray paint them, but you can also cover them in colored tape. Start by trimming the elevons to the proper length and to conform with the shape of the wing cutouts. See **photo # 18**. Install the

elevons flush with the top of the wing using the fiber tape as a hinge. Make sure that the beveled edge of the elevon is on the bottom and toward the trailing edge to allow the elevon to bend down. Cut 3 small pieces of fiber tape approximately 3 inches long and 1 inch wide. Place 3 hinges per elevon with the tape on the top only! Place one piece in the middle of the elevon and one on each end. See **photo #19**. Do both elevons this way, making sure that the tape is tight and flat. Check to be sure the elevons move freely 1/2 inch up and down. Tip: many hinge other methods are available but this one is simple and strong.

19. Temporarily, mount the motor tray on top of the wing using colored tape along the flange. Make sure it is straight front to back and side to side, or the motor thrust will be off center. Tip: electrical tape works great here and comes in colors to provide an accent stripe. See **photo #20**.
20. You may break in the motor for best performance, or you can choose to not break it in. Some people report seeing vast improvement while others do not (I have never broken one in). Some just replace the motor if it goes bad (stock speed 400 motors are about \$8.00). There are two methods used to break in motors. It's your choice, but I prefer the dry method as it is simple and works well but I have never taken the time to break in a motor.
 - Dry Method: take two C or D sized cells and hook them in series (positive to negative) to generate 3 volts and connect this to your motor. Make sure that the negative wire goes to the red dot on the motor (remember the motor runs backwards on a pusher plane). Let it run for 10-15 min.
 - Wet Method: same as above, but drop the motor it in a glass of (preferably distilled) water for five to ten minutes while running. You may be surprised at the color of the water from wearing the brushes down.

While the wet method will provide a quicker burn-in time, it can have its own set of problems. Make sure that you dry the motor completely with a hair dryer, then lubricate the bushings (where the shaft exits the motor) lightly with 3-in-1 light oil or some other fine machine oil..

21. Solder the speed control wires to the motor. Note that since the motor is mounted on the rear of the plane, the red wire goes to the red terminal as the Ele bee motor is already reversed at the factory. The positive terminal has a red dot next to it. See **photo #21**. If the motor spins backwards (in a later step) you can always reverse the two wires.
22. Temporarily tape the motor into the motor slot in the tray using some two sided tape and route the speed control receiver wire through the small hole into the receiver bay. Temporarily tape the speed controller into the tray. See **photo #22**. This is a good time to mount the motor tray to the wing. Do this with several small squares of two-sided tape on the bottom of the battery compartment making sure to align the motor tray in the center of the wing. You will tape it down for good later.
23. Flip the wing over and use your knife to cut a small slot in the tape on three sides of the receiver bay coroplast to make a small door. *Be careful not to cut your antenna wire or any of the servo wires!* Open the coroplast door, take the speed control wire, and plug it

into channel #3 in the receiver. Plug your servos into channels 1 and 2 and close up the receiver bay door. Leave a little flap of tape so you can get back in to make adjustments. See **photo #23**. Generally the pilots right servo goes into #1.

24. Make 4 small holes in the side of the canopy flange next to the motor all the way through the wing and attach the motor using the supplied ties and coroplast. Note that only one tie is really necessary but it won't hurt to use two. See **photo #24**.
25. Look on the top of the canopy for the thin lines that indicate the air vents. Cut out the air vent on the top front of the canopy peak, and also at the rear of the canopy where the motor shaft exits. This allows cooling of the motor, battery and speed controller. Cut the lines along the side of the canopy top to fit. Remember to cut a little bit first and trial fit your battery. You can always cut more later but it is hard to add it back. See **photo #25**.
26. Use four small hook and loop dots (Velcro) to hold the canopy top to the motor tray. Put two near the rear and two near the front of the canopy.
27. Attach the push rods to the servo arms and the control horns to the pushrod clevis. Check the angle to the elevons to avoid binding the servo. Attach the control horns to the elevons using the supplied wood screws. Adjust the length using the threaded clevis as necessary. Tip: if you are a beginner pilot the linkage should be on the top hole at the elevon and the middle hole at the servo. This reduces the throw of the elevons and makes the control of the aircraft slower. Once you improve your flying you can lower the clevis on the elevon giving you more throw and more aerobatic abilities! See **photos #26 and #27**.
28. The orientation of your propeller needs to be correct with respect to the forward motion of the plane. Since the motor is on the back of the plane instead of on the front, you need to flip the propeller around so the shape is the same as if it was on the front of the airplane. If your kit has the standard white props, remove the rubber spinner in the middle, flip the propeller over 180 degrees and firmly press the spinner back on. It is sometimes hard to remove the spinner the first time but keep at it. The writing on the standard white prop should face away from the motor and away from the wing. The plain unwritten side should face the motor and the wing. See **photo #28**. Tip: a straight pin works nicely to make a small hole in the nose cone. This will allow air to escape when you push it on the motor shaft. If you have the high performance carbon props (optional upgrade) follow the directions on the prop bag. These carbon props will give you much better performance.
29. Install the battery in the motor tray holding it in place with Velcro. Tie a loop of string (dental floss or stronger) through the motor tie downs making a loop just shorter than the fully extended speed control wires. Place the loop between the two male terminals on the speed controller each time you plug in your battery. If/when you crash the battery will most likely eject and put a great deal of load on the speed controller wires. If the string is shorter than the speed controller wires the battery will simply load up the string and unplug the battery thus saving you a \$40 speed controller. Tip: as an added safety method loop the speed controller wires and tie with a spare wire tie. See **photo #29 and #30**.

30. With your transmitter off, plug in the battery to the speed controller. Make sure your throttle is all the way off, then turn on the transmitter, then the switch on the speed controller (if it has one). Test as follows:
- Stick back: both elevons should move up.
 - Stick forward: both elevons should move down.
 - Stick to the right: the pilot's right elevon should move up and the left one down.
 - Stick to the left: the pilot's left elevon should move up and the right one down.
- If this is not correct consult your transmitter instructions. Do not run the motor yet. Turn off the speed controller, then the transmitter and unplug the battery.
31. Install the airfoil Velcro to the tips of the wing and then peel the covering and place the coroplast tips on with the front of the tip flush with the front of the leading edge. Tip: you may hang the tip about 1/3 below the wing if you want a little more stable flight. You can also upgrade to our Combat tips and coroplast elevons. See **photo #31**.
32. For normal flight the elevons will be slightly up. Take a ruler and place it on the bottom of the wing. Rest the elevon on the ruler, that is where neutral should be. You may need to do some trim work with the clevis to get the proper setting. You will have to fine tune this during the first few flights but this will at least get you up in the air. See **photo #27**.
33. The plane should balance between 7.5 to 8 inches back from the nose. Further forward is better for beginners and farther back is better for more acrobatics and seasoned pilots. Make a mark on the bottom of the wing 7 3/4 inches back from the nose and tape a big round pencil (like in kindergarten) at this point on the bottom of the wing (see **photo #32**). If it balances then your center of gravity is correct. You will know it's balanced if you tip it on its nose and it stays there, then tip it on its tail and it stays there. Move the battery back and forth to adjust the balance and mark the battery tray with a marker once you find the right spot.

I have weighed several of the planes I have built for customers and they weighed in with no battery at 1 lb. 0.5 oz or 16.5 oz. Here are the weights for various batteries:

- 8 cell 1700 Nicad w/ deans plug: 9.8 oz.
- 8 cell 1400 Nicad w/ deans plug: 9.6 oz.

So a stock Ele Bee with the stock Speed 400 motor is 16.5 oz. + 9.8 oz. for a 1700Mah Nicad battery, for a total of 26.3 oz. Remember, lighter is always better.

Congratulations - it's built!

The most common question is, "Okay, it's built, how do I get this thing into the air?" Before launching your plane for the first time (if you are a first time pilot), please be aware that an excellent RC flight simulator exists called FMS (Flight Model Simulator). If you become discouraged during your initial attempts at flight, the worst thing that you can do is to give up for good. The plane is strong – and yes, you will crash it (we crash ours all of the time) and it can take it. If you are getting discouraged, take a break, download FMS from <http://fms.pathbot.com/> and have some fun playing with different RC models on your

computer. You can even download and try out a flying wing model like the Ele Bee. After you regain your confidence a bit, tackle your real wing again.

The plane can be intimidating at first because there is no obvious way to launch it. Visit www.atlantahobby.com and look at my movies to see how to throw it. See **photo # 33** for the recommended methods. If you have never flown RC I would suggest getting some help from an experienced pilot. At least you should join <http://modelaircraft.org/> so you are covered under their insurance. If you just can't find anyone or are just too stubborn to ask for help, take it out to a field the size of a football field or larger with no people around. These things can be dangerous so you must be cautious at all times.

Before you run out to the field to throw your new plane into the air, there are a few things that should be checked first. This is your preflight checklist and NEVER skip it before each flight.

1. Where is your CG (center of gravity)? With the battery in but unplugged and the canopy on, balance the plane on your fingertips. If you haven't marked on the bottom of the wing then you need to do that now. It will save you many headaches in the future by providing a quick reference point before the launch. The CG is critical for it to fly right!
2. Look to be sure no one is on your transmitter channel or you will cause them to crash and ruin both of your days!
3. Set your throttle to off and turn the transmitter on. Keeping your hands away from the prop, plug the battery in. Be careful, as of this moment your motor is quite capable of cutting your fingers to the bone (don't ask). If your receiver or transmitter is not working properly or if someone else is on your frequency, your motor could start full throttle without any warning.
4. Looking from the back to the front of your plane, when you move the stick to the right, does the right elevon go up and the left elevon go down? Left movement of the stick should be the opposite. Pull back on the stick and both elevons should go up, push forward on the stick and both elevons should go down.

For your first flight, pick a day with no wind! Find a park or hill where you can throw the plane with everything turned on except for the motor. Center the trim adjustments on the transmitter and give your plane a good throw straight ahead. **Throw it hard!** Make small corrections but watch where it goes. If it turns right, then either add left trim or adjust your right elevon clevis. This assumes you are throwing it straight and level in the first place. If the plane abruptly hits the dirt, try to throw it again as hard as you can, or try a different throwing style. If it still hits the dirt, then there are several things which need to be checked. Is your CG correct? Measure and balance it again and this time mark the spot with a pen. Look at your elevons from the side as best as you can. They should look like they are raised just a bit, maybe 1/8-1/4 inch.

On a good toss most people can get their plane to glide well over 20 yards. If you have never flown RC you should practice throwing it till your arm hurts. Throw it, fly it straight, land it. Do this again and again till your arm hurts and you are flying it well with no power. If you cannot throw it hard enough, get someone to help you. Once you can fly it straight with no power practice a gentle turn and do this again and again till you can do it each time without crashing. The plane needs to fly fast so don't keep pulling back on the stick, let it fly and just make small corrections just like you drive your car.

An excellent way to practice is to throw the plane, hit the throttle full for one or 2 seconds and turn it off again. Land it and do it again. This is the painful part of learning but it will pay off in the long run. Next see if you can turn it without hitting the ground or stalling out. To make a turn with the plane you need to know the proper sequence of control inputs. From level flight bank the plane by pushing the stick right or left just a little (1/4 of the stick throw at the most). The plane will start to roll in that direction. If you hold the stick over it will roll upside down and that poses challenges, so just roll a little then center the stick. The plane will start to descend so you will need to pull back on the stick just a little to keep it in the air. This will also cause the plane to continue the turn. To stop the turn you have to push the stick in the opposite direction back to level flight.

Now that you can fly away from you (into the wind) it is time to make the first turn around and fly it back to you. Remember, after you turn back toward yourself the control direction is backwards with the nose of the plane facing you. Up and down are still correct, it is just turning that can give you trouble. Throw your plane, turn the motor on and climb about 25' straight ahead. Turn the motor off and make the first 180-degree turn back toward yourself. Let the plane glide and see what happens next. Remember to turn the motor off before turning so you don't pile drive it into the ground. Practice this until you understand the turn and control toward yourself. Some pilots find it easy to turn around and look over their shoulder, this way left is left and right is right. Others try to imagine sitting in the plane at the controls, whatever works for you is fine. Keep doing this until your battery is exhausted. This will get you familiar with how it behaves with both with the motor on and off. It also gets you into the practice of always landing with the motor off.

Making short flights will build confidence in your ability. Do the short hops for one or two battery charges or until you feel you can go a little longer. (Remember, walk before you run). Do not fly at full throttle except while taking off till you are comfortable with the plane as it will go very fast and get away from you! If it's heading for the ground turn off the throttle!

If a part gets broken remember that it was built with tape so it can be repaired easily. Some parts are better replaced so check with me for all replacement parts. Don't make modifications to the planes wing or airfoil. It works great just like it is.

Now that you know a little about what it takes to fly the plane, only practice will get you flying like a pro. You will crash it – we all do – but the Ele Bee it can take it. Have fun, be safe and call or email me if you need any help