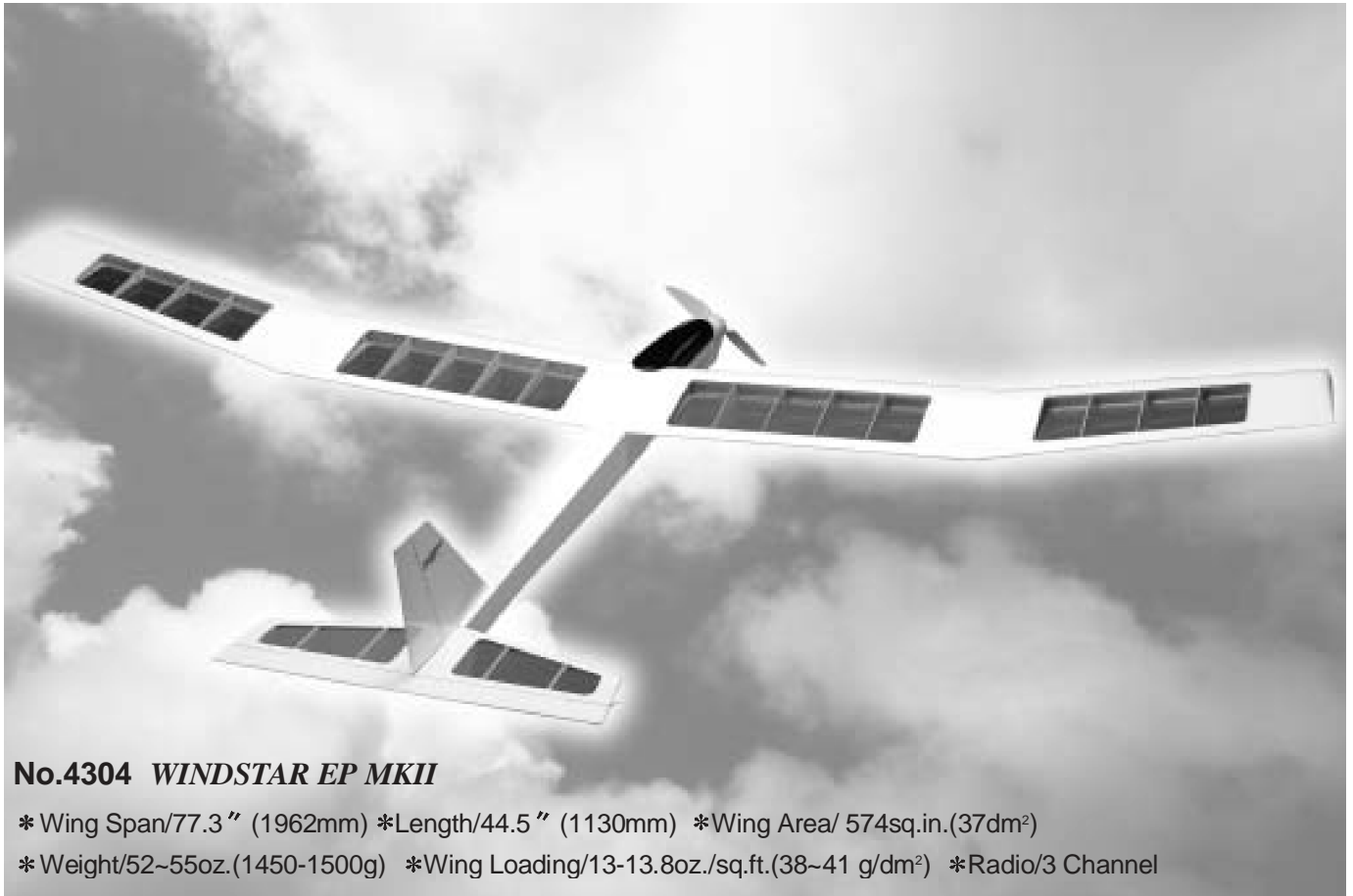


WINDSTAR EP MKII

Almost Ready To Fly

2M Electric Powered R/C Sailplane



No.4304 WINDSTAR EP MKII

* Wing Span/77.3" (1962mm) *Length/44.5" (1130mm) *Wing Area/ 574sq.in.(37dm²)
* Weight/52~55oz.(1450-1500g) *Wing Loading/13-13.8oz./sq.ft.(38~41 g/dm²) *Radio/3 Channel

Warranty: This kit is guaranteed to be free from defects in material and workmanship at the date of purchase. It does not cover any damage caused by use or modification. The warranty does not extend beyond the product itself and is limited only to the original cost of the kit. By the act of building this user-assembled kit, the user accepts all resulting liability for damage caused by the final product. If the buyer is not prepared to accept this liability, it can be returned new and unused to the place of purchase for a refund.

Notice: Adult Supervision Required: This is not a toy. Assembly and flying of this product requires adult supervision. Read through this book completely and become familiar with the assembly and flight of this airplane. Inspect all parts for completeness and damage. If you encounter any problems, call 660-584-6724 for help.

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INTRODUCTION

All of us at Thunder Tiger want to thank you for choosing the Windstar EP MKII. This Kit has been engineered to go together quickly and easily while still providing you with great looks and exceptional flying performance. The world of electric powered sailplanes can be an extremely challenging and rewarding experience. Your skill along with the design capabilities of your model will combine to defy the laws of gravity and produce flights of unbelievable distance or duration. Under proper conditions your Windstar EP MKII can stay aloft for hours from a single battery charge! As

Find the wind and lift conditions that affect it positively.

you to greatly extend your flight times.

The Windstar EP MKII is an electric powered 2-meter sailplane which is intended for use in light to medium wind and lift conditions. Its airfoil, motor package and design platform are intended to maximize performance under those flying conditions and will provide great results for pilots of all skill levels.

We suggest that before beginning to assemble this kit you thoroughly read this assembly instruction manual to familiarize yourself with the complete assembly procedure. This will insure that your assembly process will be as smooth and uneventful as possible.

We are confident that you will enjoy flying your Windstar EP MKII and that it will provide many hours of challenging and rewarding flight.

PRE-ASSEMBLY NOTES

1. If you are not an experienced R/C pilot plan to have a fully competent pilot help you to learn to fly your Windstar EP MKII. This will help you to be successful much faster and also avoid potential damage to your model.

2. Please assemble your model exactly according to these instructions. Do not attempt to modify or change the Windstar EP MKII in any way as doing so may adversely change its flying characteristics.

3. Before you begin please check the entire contents of this kit against the parts list and part drawings to be sure that no parts are missing or damaged. This will also help you to become familiar with each component of your Windstar EP MKII. If you find that any of the parts are either missing or damaged please contact your dealer immediately for replacement. Note: Your dealer cannot accept kits for return if construction has begun.

For customers in the US and Canada please call or write to ACE Hobby Distributors, Inc for replacement of missing or damaged parts.

ACE Hobby Distributors, Inc.

116W 19th St, Higginsville, MO 64037

Tel: 660-584-6704

Fax: 660-584-7766

E-Mail: service@acehobby.com

Remember. We have worked very hard to make this model as easy to assemble as possible while still maintaining our high standards of quality. Your assembly of this model is very important and will determine the final flight capabilities of your Windstar EP MKII, so use extra care and follow the assembly procedure exactly.

OTHER ITEMS REQUIRED

Radio: You will need at least a 3 channel radio control system with 2 servos on an aircraft frequency for use in your Windstar EP MKII. A standard size system will work fine and fit easily into your model. However, if you are really looking for every bit of extra performance then you should consider using one of the miniature radio systems available which would lower the weight and increase the performance of your Windstar EP MKII.

Electronic motor controller: We recommend the ACE #8007 AUTO CUT-OFF DEVICE with BEC for controlling the power of your Windstar EP MKII as well as eliminating the need for a separate radio battery. The BEC (Battery Eliminator Circuitry) in this controller will automatically turn off the power to the motor when the battery reaches a

factory present discharge level leaving about 20-25 minutes of flight time for the radio system. Note: Some radio manufacturers offer a lightweight radio system with a built-in motor controller with BEC especially for this type of model.

Flight Battery: We recommend the use of a 7 cell 8.4V 1000 mAh SCR battery pack for maximum performance. A 6 cell 7.2V or 7 cell 8.4V 1200 to 1700 mAh SCR battery will also work well but will not provide the climb performance of the 7 Cell 1000mAh SCR pack.

Charger: You will need a quick charger to charge your power battery. We recommend our #2685 DC Quick Charger for 6 cell battery or our #2686 DC Quick Charger for 7 cell battery packs. Note: When charging your flight battery be sure to very carefully follow the instructions provided with the charger.

Lead for Balancing: You may need some lead for balancing your Windstar EP MKII after you have completed the installation of your radio and battery. We recommend using the stick-on type of weights for ease of installation.

#64 Rubber Bands: You will need a minimum of 8 #64 rubber bands for holding the wing firmly on your model.

Foam Rubber Padding: We recommend 1/4 inch thick foam rubber for use around the receiver to give protection from vibration and hard landings.

TOOLS AND SUPPLIES NEEDED

1. 5 Minute Epoxy
2. Thin CA Glue
3. Medium CA Glue
4. 1/2 Masking Tape
5. Mixing Stick for Epoxy
6. Medium Grit Sandpaper
7. Rubbing Alcohol
8. Paper Towels
9. Hobby Knife
10. 1/16 Drill
11. 1/8 "Drill
12. Light Viscosity Oil
13. Small 90-Degree Triangle
14. Waxed Paper
15. Ruler
16. Z Bend Pliers
17. Pen or Pencil
18. Small Screw Drivers
19. Curved scissors

AS6078 Fuselage Set Bag

Fuselage (1)
Skid (1)
Front Former (1)
Wing Dowel (2)
Plywood (2)
Brass Hook (1)

AS6076 Wing Bag

Tape (6)
ABS Plastic Plate (1)
Outer Wing Joiner (6)
Inner Wing Joiner (2)
Inner Wing Joiner (1) (Aluminum)
Inner Wing Panel (Left/1)
Inner Wing Panel (Right/1)
Outer Wing Panel (Left/1)
Outer Wing Panel (Right/1)

AS6077 Tail Set Bag

Vertical Tail (1) Fin/Rudder
Horizontal Tail (1) Stabilizer/Elevator

PE0012 Canopy Set Bag

Canopy (1)
Balsa Wood (1)
Canopy Frame (1)

PE0013 Cowl Bag

Cowling (1)
M2.6x4mm Self-Tapping Screw (4)

PE0011 Hardware Set Bag

Horn Back Plate (2)
Control Horn Screw (4)
Control Horn (2)
Locked Hinges (7)
Rubber Band (1)

PE0565 Propeller Set Bag

Propeller Fin (1)
Spinner Cap (1)
Spinner Backplate (1)
HMF2-8N Screw (1)
Washer (1)
Drive Nut (1)
HMF2-8N Screw (1)
HMF2-12 Screw (2)

AS0252 Motor Set Bag

Motor

PE0566 Motor Mount Set Bag

Motor Mount (Left/1)
Motor Mount (Right/1)
M3x8mm Screw (2)
M3x8mm Self-Tapping Screw (4)

AS1084 Push Rod Set Bag

Push Rods (2)
Clevis (2)

ASSEMBLY

wing



1. Open the small wood parts bag and remove the wing panel joiner sets. You will find two sets (3 plywood pieces each) of outer wing joiners and one set (2 plywood pieces and 1 aluminum piece) of wing center section joiners. Note: The outer joiner pieces have a greater dihedral angle cut into them than the inner joiner pieces.
2. Sand the edges of each plywood joiner piece to remove any high spots or rough edges.

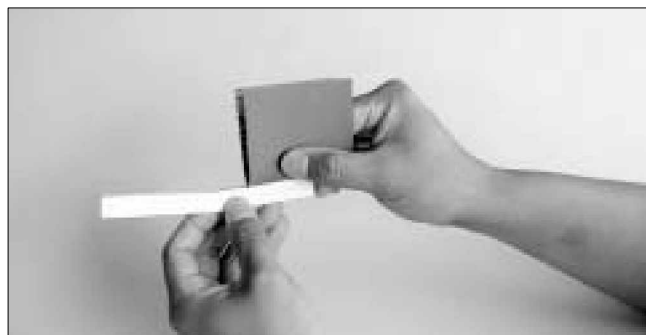


3. Using 5-minute epoxy assemble the two outer wing joiners. Apply a thin coat of epoxy to each side of one of the plywood pieces for each joiner and sandwich that piece between the other two plywood pieces. Press this assembly firmly together using care to keep the pieces aligned end wrap tightly with 1/2" masking tape to hold until dry.

"

4. Assemble the wing center section joiner using 5-minute epoxy. Sand both sides of the aluminum joiner piece to insure a good glue bond. Apply a thin coat of epoxy to both sides of the aluminum joiner and sandwich it between the two plywood pieces. Press this assembly firmly together using care to keep the pieces aligned and wrap tightly with 1/2" masking tape to hold until dry.

"



5. After the epoxy has dried remove the tape from all three joiner assemblies and sand the edges of each to remove any excess epoxy.
6. Select the left inner wing panel and the left outer wing panel and place on your work table. Trial fit one of the outer wing joiners into the joiner box. The joiner assembly should fit easily into the joiner box on both sides. If the joiner is too snug sand adequately to provide a good fit. Note: It is necessary for the joiner to bend slightly as the two panels come together to allow the end ribs to meet flush. Now repeat this fitting process on the right inner and outer wing panels.



7. Now trial fit two inner wing panels together using the center wing joiner with the aluminum center. Be sure that the two panels line up at center joint. Note: "L" means left inner wing panel, "R" means right inner wing panel.



8. Join the inner wing panels at the center. Mix up an ample amount of 5-minute epoxy (use 15 minute epoxy if you do not work fast) to install the center joiner in both panels and to coat the center wing rib face. Coat one end (halfway) of the center wing joiner with a thick coat of epoxy, spread epoxy

inside the joiner box on one wing panel and insert the coated end of the joiner into the joiner box. Now coat the entire exposed area of the center joiner, spread epoxy into the joiner box on the other wing panel, coat the center rib face of one panel and push the entire assembly together inserting the joiner into the joiner box. Push the panels together tightly and be sure they line up properly at the center. Wipe off excess epoxy that has oozed out of the joint with rubbing alcohol. Hold the assembly tightly together while the glue dries with 1/2" masking tape across the joint in 4 places (2 top and 2 bottom) "



9. After the wing center has dried remove the masking tape and iron the white trim tape (supplied) to the center joint on both side.

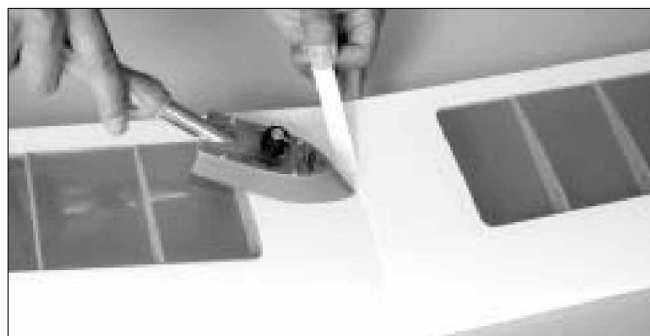


10. Next join the left outboard wing panel to the wing center section assembly. Mix enough epoxy to cover the entire wing joiner and the face of the joining rib. Spread epoxy inside the appropriate wing joiner boxes in the outer wing panel and the center section assembly, coat the entire wing joiner and the face of one rib at the joint. Insert the joiner into the outer wing panel joiner box and slide this assembly into the center wing panel assembly. Push the panels tightly together and be sure that they line up properly at the joint. Wipe off the excess epoxy that has oozed out of the joint with rubbing alcohol. Hold the assembly together while the glue dries with 1/2" masking tape across the joint in four places as was done with the center section.

"



11. Join the right outboard wing panel to the wing assembly. Repeat the step 10 process for the right wing panel.



12. After the epoxy has fully hardened remove the masking tape you used to hold the panels together while drying and iron the trim tape to the joints.



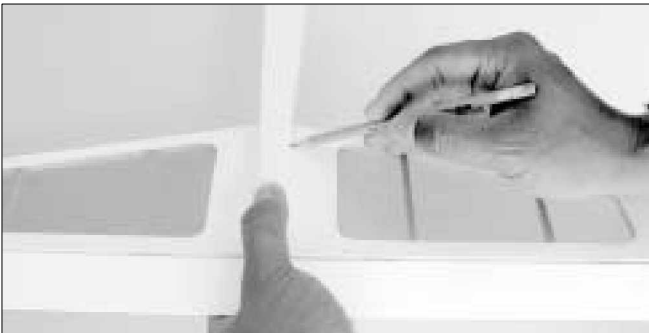
13. Locate the 5/16" x 3-3/4" plastic wing protector from the small parts bag and mark the center with a light pencil line. Now lightly sand the back side of this protector to allow glue to stick well. Trail fit this protector to the top of the wing, flush with the trailing edge, with the center mark you made aligned over the center section wing joint. If all looks well, glue in place with thin CA glue.

it into the stab saddle. You will be able to see the pre-cut notch in the stabilizer center section through the covering. Carefully cut the covering film from

the stabilizer to expose the fin slot. Follow the edge of the slot with a hobby knife being careful not to cut into the balsa structure. Remove this film on the both the top and bottom of the stabilizer. Repeat the same process on the fuselage fin slot.



2. Using a 90 degree triangle align one edge of the triangle with the trailing edge of the stabilizer in such a position that the other edge of the 90 degree angle extends through the exact center of the slot in the stabilizer. Now mark the trailing edge of stabilizer at the center line you have just established. Note: This is very important step in the alignment of your Windstar EP MKII.

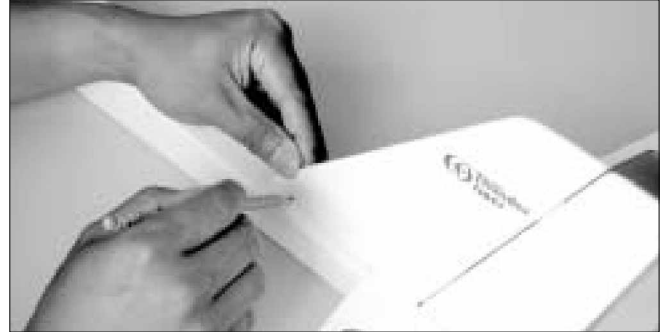


3. Lay the stabilizer in place on the fuselage stab saddle and align the leading edge slot with the fin slot in the fuselage and align the center line mark you made on the trailing edge with the center of the rear of the fuselage. Now draw a line along the edge of the fuselage onto the bottom of the stabilizer as shown.

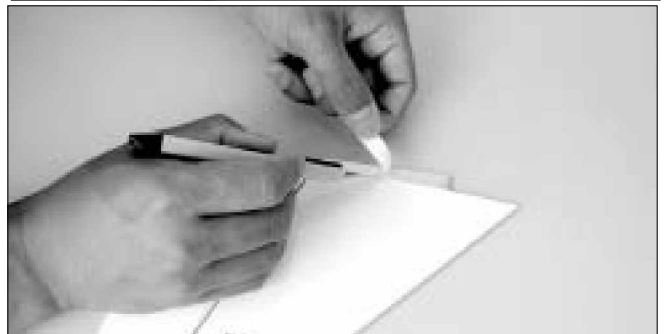
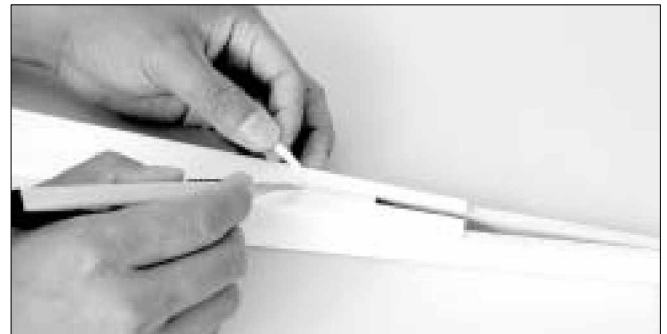


4. Using a very sharp hobby knife carefully cut the stabilizer covering along the lines you just make and

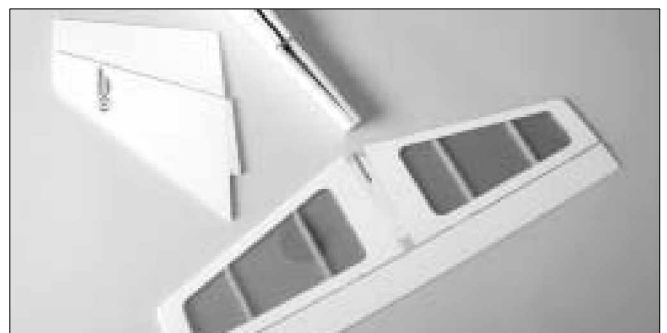
remove the covering film to expose the balsa wood surface. Note: Be extremely careful to cut only through the covering and not into the balsa wood as doing so will greatly reduce the strength of the stabilizer and may cause it to fail in flight.



5. Put the stabilizer on the fuselage stab saddle and insert the fin into the fin slot, be sure to push the fin all the way down into the slot. Now mark the edges of the fin on the fuselage and along the edge of the fuselage and stabilizer onto the fin as shown.



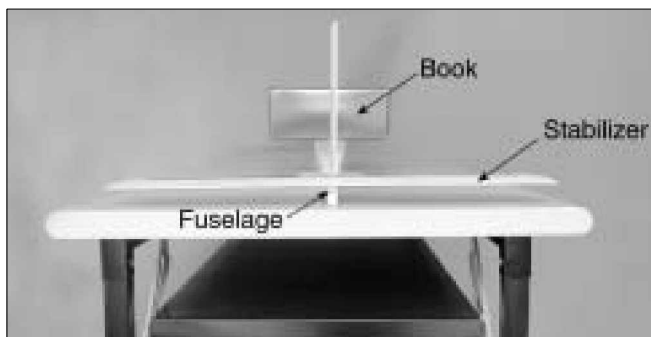
6. Carefully cut out the covering film in the area you just marked being careful not to cut into the balsa wood.



7. Your fuselage and tail surfaces should now look like this, and are ready for assembly.



8. Place the fuselage on a flat surface and weight it down by using a book or some other heavy object placed across the wing saddle.



9. Put the stabilizer in the stab saddle and line up the leading edge slot and the trailing edge center line with the center of the rear of the fuselage. The stabilizer should sit flat in the stab saddle and the tips of the stabilizer should be the same distance off the work surface. Note: If one stabilizer tip is higher than the other lightly sand the corresponding side of the stab saddle to lower the stabilizer tip until both tips are the same height off the table.
10. Using five-minute epoxy (to give time to check alignment) glue the stabilizer in position on the stab saddle. Be sure to check center line alignment and the height of the stab tips off the table as the glue dries.



11. Now trial fit the vertical fin into the fin slot to check for proper fit and alignment. Using the 90-degree triangle align the fin at exactly 90 degrees to the stabilizer as shown.
12. While keeping the fin aligned at exactly 90 degrees to the stabilizer glue the fin in place by applying thin CA glue along the edge of the fin where it contacts the fuselage and the stabilizer.

13. Cut the covering from over the holes in the fuselage for the wing dowels and install the dowels into fuselage.



14. Center the dowels in the fuselage with the same amount of dowel length protruding from each side of the fuselage and glue in place using thin CA glue.



15. Locate the two pieces of square cut plywood and use CA glue to glue two pieces together face to face.
16. Using a ruler and pencil find the center of the two glued pieces by drawing diagonal line from corner to corner. Then drill a 1/16" hole in the center of the plywood piece you just marked where your lines cross.
17. Using the screw end of the brass hook (supplied) screw the brass hook into the hole in the center of the plywood piece until the point is just barely visible through the other side. Now using thin CA glue apply 2 drops where the brass threads screw into the plywood to secure the brass hook into the wood. Be sure the open hook is directly toward one of the edges of the plywood.



18. Use medium CA glue to glue the hook assembly you just prepared onto the fuselage floor just in front of the bulkhead with the open side of the brass hook facing forward.

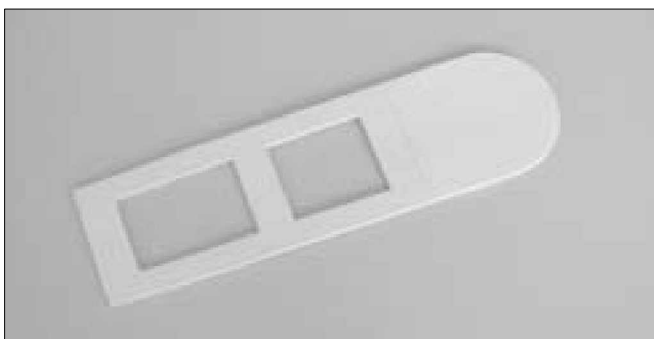


19. Locate the front canopy former. Trial fit the front canopy former into the slots in the fuselage which are just behind the firewall. Sand the former slightly if necessary to be sure that the tabs on the edges of the former sit down on top of the fuselage.
20. When satisfied, glue the former in place with thin



CA.

21. Locate the lower canopy frame with attached rear



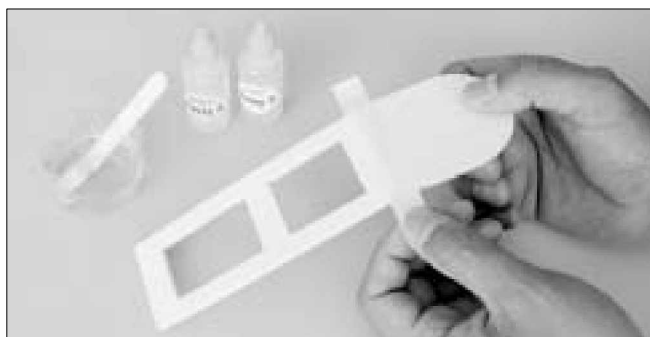
canopy frame.

22. Place the lower canopy frame and rear former in



place by bending the rear former up at the score lines. Be careful not to break the rear former loose from the main frame.

23. Now remove the frame and put a small amount of



5 minute epoxy in the gap you created in the bottom of the canopy frame at the rear bulkhead when you bent the frame to fit the fuselage. Now cover this area with a small piece of waxed paper and push the frame back into place on the fuselage.

24. Use masking tape to hold the canopy frame in



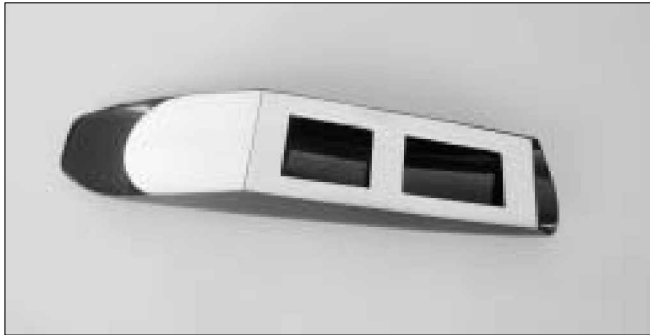
place till the glue dries. This should lock the rear canopy former at the correct angle.

25. Refer to the cut lines and place the dried canopy

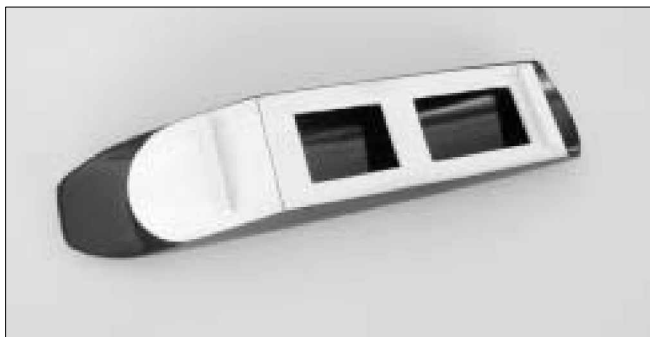


frame inside the canopy with the rear top edge of the rear canopy former located about 1 inch in from the end of canopy. Now using thin CA securely glue the canopy frame into the canopy.

26. Trim the canopy flush with the bottom of the canopy frame base along the cut lines.

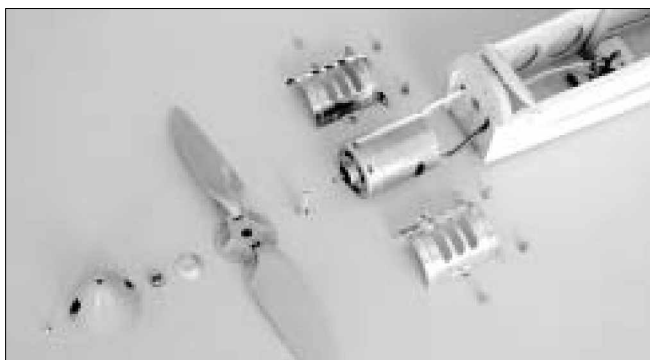


27. Cut 2 pieces of 1/4" square balsa to fit across inside the fuselage under the canopy frame for



alignment. One piece should fit approximately 1/3 of the way up the rear former and one just in front of the front canopy opening of the canopy frame. Cut these pieces to fit exactly between the fuselage sides at these locations. Center these pieces on the canopy frame at the locations described and glue them in place.

28. Locate the motor pack and propeller set as shown.



29. Assemble the motor holder around the motor



using two 3x8 mm screws provided. Line up the cooling slots in the motor with the center slots on each side of the motor holder and tighten the screws to lock the motor in place.

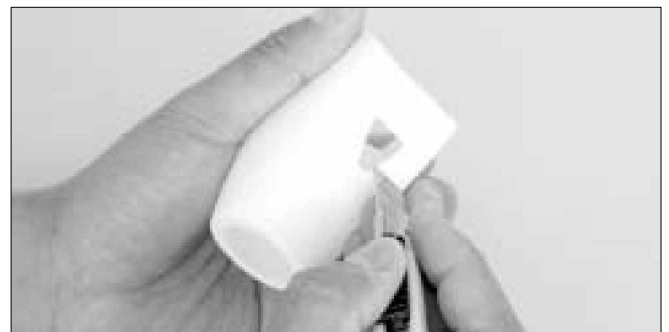


30. Insert the motor wires through the holes in each side of the firewall and hold the motor assembly in place against the firewall. Adjust the position of the assembly on the firewall so that the distance from the mounting tabs to both the top and bottom of the firewall is approximately equal and mark the mounting hole locations.

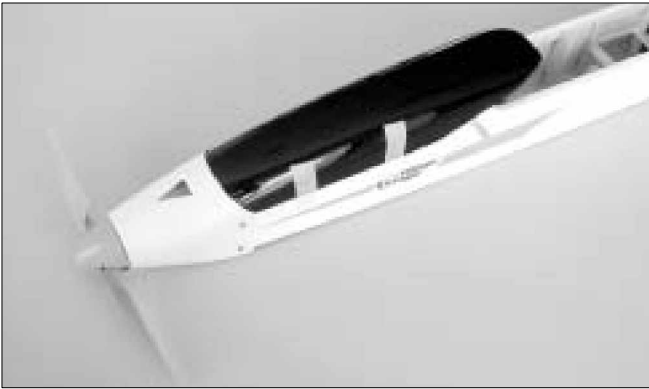
31. Remove the motor assembly and drill 1/16" pilot holes (or use an awl) for mounting screws at the locations you just marked. Now reinstall the motor assembly and screw firmly in place using the four mounting screws provided.



32. Cut the cowl mounting flange away from the cowl along the cut lines by using curved scissors.



33. Cut the front opening in the cowl for the motor shaft. Leave a 1/4" lip around the front opening. Now carefully cut out the air inlet opening on the top of the cowl using the molded cut lines to allow cooling air to enter the cowl.



34. Put the canopy in place on the fuselage and temporarily tape in place using 4 pieces of tape. Now slide the cowl in place over the motor and temporarily install the motor shaft spindle, propeller backplate, washer, nut and spinner. Center the nose of the cowl approximately 1/16" behind the spinner backplate and use 4 pieces of tape from the cowl onto the spinner to hold this alignment.



35. Put slight downward pressure on the back of the cowl to fit it snugly down onto the front of the canopy. This will create a slight opening between the bottom of the cowl and the fuselage which will allow cooling air to escape. Now drill 1/16" pilot holes for the 4 mounting screws through the cowl and into the fuselage. These holes should be positioned 1/4" from the top and bottom of the fuselage side and 1/4" from the back of the cowl. We recommend that you drill the two holes on one side of the fuselage and insert the cowl mounting screws before moving to the second side, this will help maintain proper cowl alignment.

36. With the cowl and screws installed remove the tape from the canopy and the spinner and check the final alignment of the cowl and spinner.

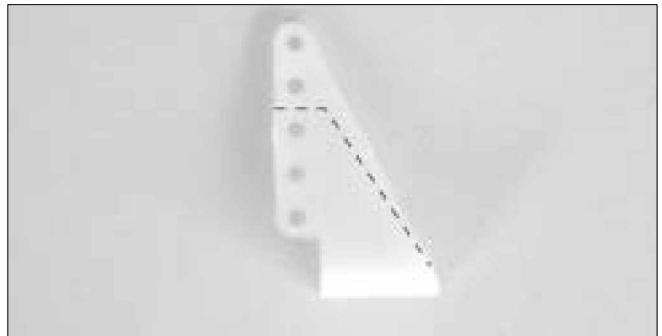
37. Install the prop blades onto the backplate hub with the screws provided. Install the motor shaft spindle and mount the prop and spinner.



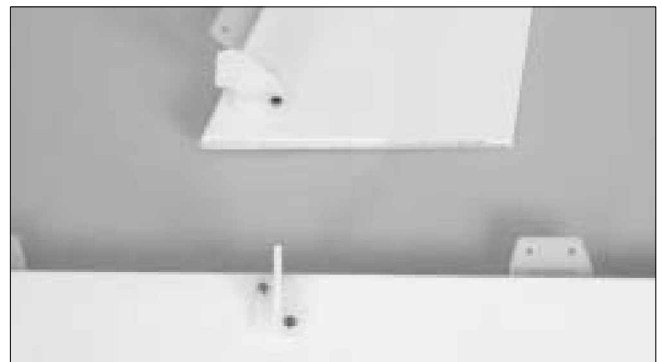
38. If necessary trim the mounting flange on the plastic landing gear skid down to 1/8" all the way around. With the deepest section of the skid forward position it on the bottom of the fuselage 1/4" behind the back edge of the cowl and centered on the fuselage. Glue in place with thin CA by running a small bead of glue around the edge of the joint and allowing it to

wick underneath.

Install control surfaces



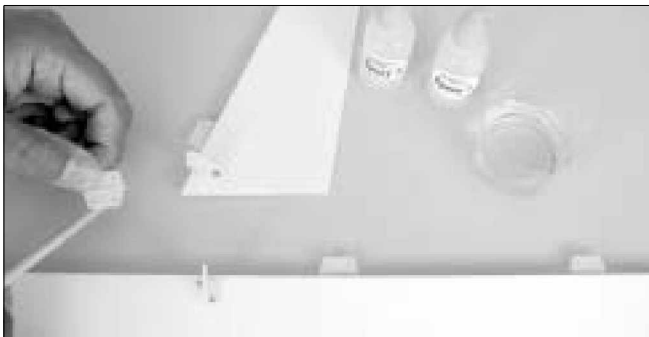
1. Find the two nylon control horns and cut them down as shown using a hobby knife.



2. Remove the rudder from the fin and lay it on the work surface with the left side facing up. Position one control horn on the rudder as shown with the edge of the base of the control horn parallel to and approximately 1/8" up from the bottom of the rudder. The upper front edge of the horn base should be approximately 1/8" back from the

rudder hinge line. Now using the horn as a template mark the location of the mounting screws holes.

3. With the elevator in position on the stabilizer place the other control horn on the bottom of the elevator with the front of the base 1/8" back from the leading edge of the elevator and the horn centered in front of the rear fuselage opening. Mark the location of the horn mounting holes.
4. Drill the mounting holes with a 1/6" bit and install the horn on both elevator and rudder by using the mounting screws and nylon nut plate.



5. Using 5-minute epoxy glue the hinges into the rudder. Use an old knife blade or similar item to put glue inside the slot cut for the hinges and apply a very small amount of glue on the contact. Area of the hinge being installed. Push the hinge into the slot and wipe any excess glue away from the hinge. Note: It is important not to get glue into the hinge pin area or it may glue the hinge solid. Hint : apply a very small amount of thin oil directly on the hinge pin area of each hinge before installation and do not move the hinge back and forth until after the glue has dried. This will keep any excess glue from getting inside the hinging area and allow you to pop any excess glue off the joint by working the hinge back and forth after glue has dried.
6. Install the rudder onto the fin by using the same process of gluing the hinges as in the same process of gluing the hinges as in the previous step. Note : It is important to keep the hinge gap (distance between the fin and rudder) as small as possible.

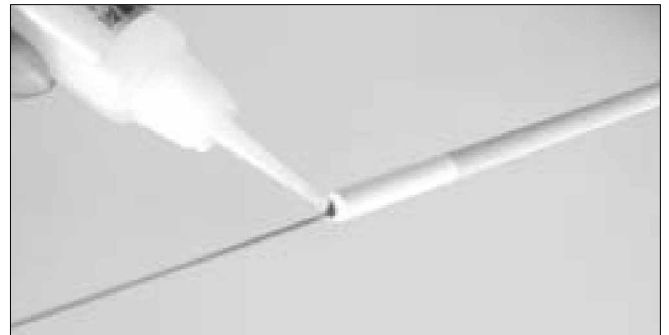


7. Install the hinges in the elevator using the process described in steps 5 above.
8. As soon as the epoxy has dried from step 7 work the hinges to be sure they move freely and then install the elevator to the stabilizer by again gluing hinges as describe above.

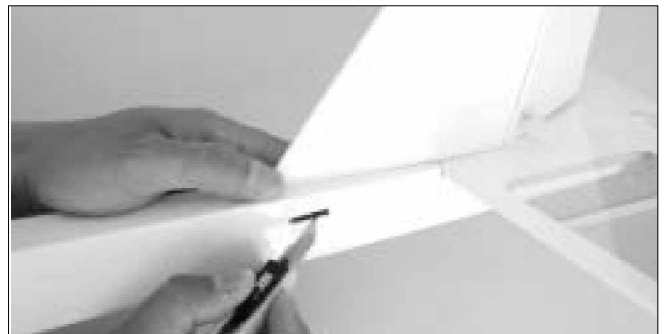


9. Using your hobby knife cut the covering away from the opening at the rear of the fuselage for the elevator pushrod exit.

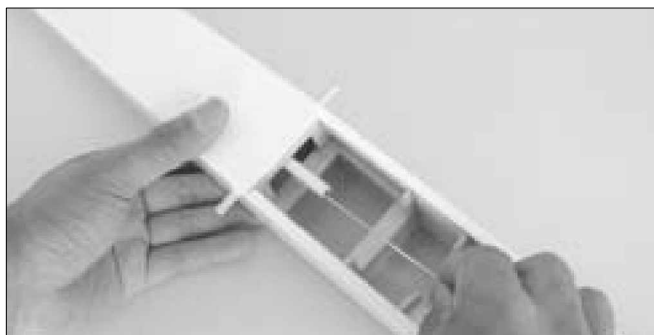
Install Pushrod



1. Locate the two pre-assembled pushrods and apply 4 to 5 drops of thin CA glue into each end of both push rods where the dowel, wire and shrink tubing meet. This will harden the assembly together and insure that no flexing will occur during use.



2. Using your hobby knife cut the covering away from the pushrod exit hole for the rubber pushrod in the left side of the fuselage.



3. Use the shorter of the two pushrods and insert the threaded end first down the inside of the fuselage, starting through the radio compartment, and out through the rudder pushrod exit hole.
4. Screw one of the clevis onto the threaded pushrod until approx. 1/4" of thread is visible inside the clevis.



5. Attach the clevis to the control horn in the center hole. Note: It may be necessary to bend the pushrod wire slightly where it exits the fuselage to allow free movement of the pushrod.

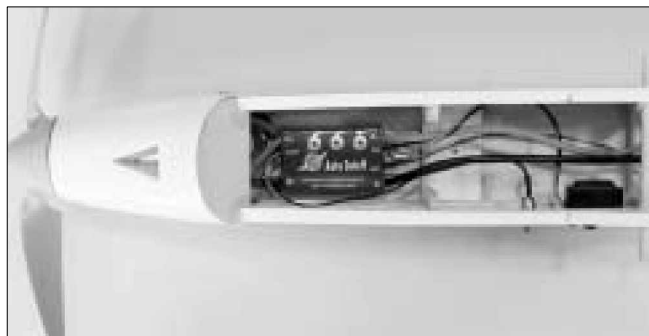


6. Install the elevator pushrod down the fuselage the same way and exit it out the slot in the tail of the fuselage.
7. Screw the other clevis onto the threaded portion of this pushrod until 1/4" of thread is visible inside the clevis.
8. Attach this clevis to the bottom hole (farthest from the elevator) of the elevator clevis.
9. Check the elevator pushrod assembly for freedom of movement. It may be necessary to remove a

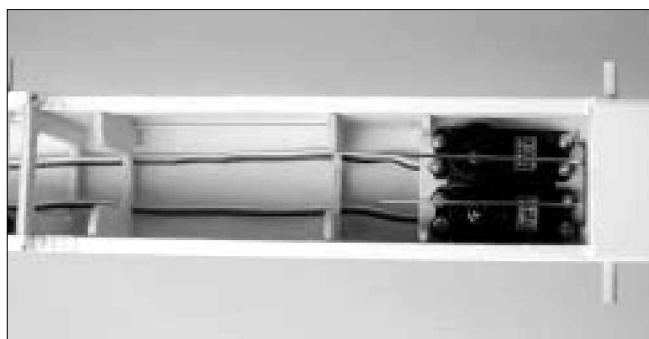
slight amount of balsa from inside the pushrod opening at the rear of the fuselage if the clevis is rubbing.

Install The Radio System

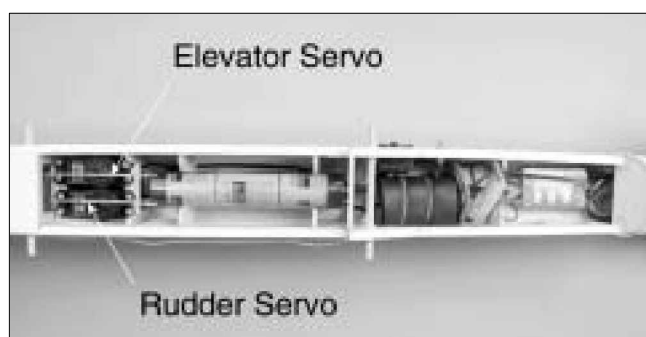
Note: Always follow the mounting suggestion supplied with your radio system.



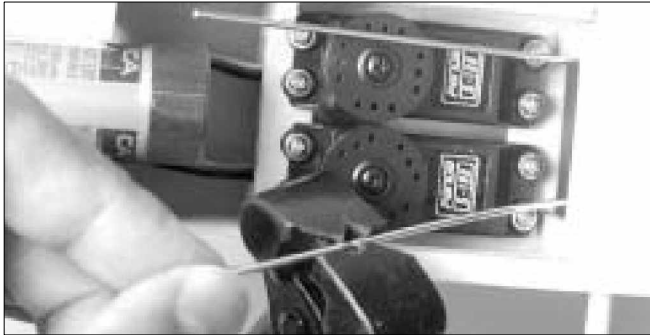
1. Use 1/16" double sided mounting tape to mount the Auto Cut-off Device to the bottom of the fuselage in the front compartment of the nose. Plug the motor leads of the Auto Cut-off Device into the leads from the motor, observing the proper polarity.
2. Mount the on/off switch from the Auto Cut-off Device just behind the nose section center bulkhead approximately 1/2" of the way up the fuselage side. Use the switch plate from the switch as a guide to accurately mark and cut the hole and screw locations. Also install the push button of the Auto Cut-off Device 1/2" before the switch.



3. Position your servos in place in the servo tray with the output shafts toward the front of the fuselage. Use the mounting screws provided with your radio to mount the servos to the servo tray.

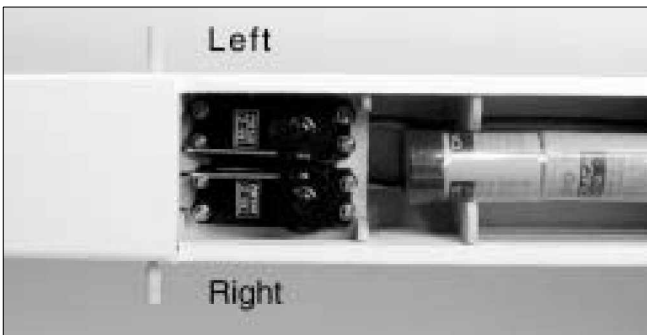


4. Install the receiver in the aft nose compartment as far forward as possible. Be sure to cushion the bottom and sides of the receiver with thin foam to protect it.
5. Plug in the components of your radio system according to the radio and Auto Cut-off Device instructions. Plug in the servos so the servo on the left side is the elevator and the servo on the right is rudder.



6. Place servo arms on your servos. Trim the length of the arms to be sure that they do not hit the other servo or the fuse side. Line up the appropriate pushrod wire to the center of each servo arm in its neutral position. Mark the wire at the exact hole location in the servo arm where it will attach. Now make a Z bend in the wire at this location and cut off any excess wire which extends more than 1/4" past the Z bend.

"



7. Thread the Z bends into the servo arms and attach the servo arms to the servo output shafts.
8. Now turn on the radio and check to see that the control surfaces are in their neutral position when the servos are centered. If not adjust the clevis in or out to center the surface. Also check to be sure the controls move smoothly and do not bind



9. Drill a small hole in the side of the fuselage near the receiver for the receiver antenna to exit the fuselage. Thread the antenna through this hole, Under the rear

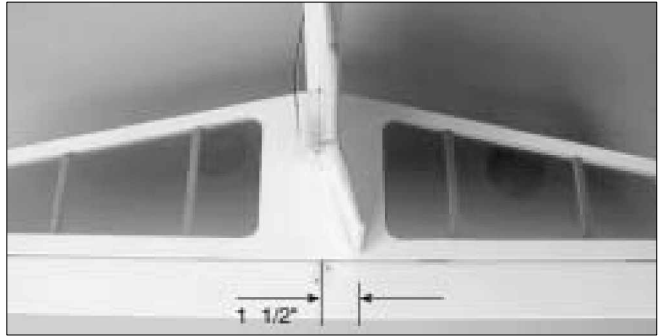
wing dowel and up to the top of the fin. Attach the antenna using the antenna keeper supplied with your radio.

FINAL ASSEMBLY

Control Surface Throws

For first flights on your Windstar EP MKII we recommend the following control surface movement.

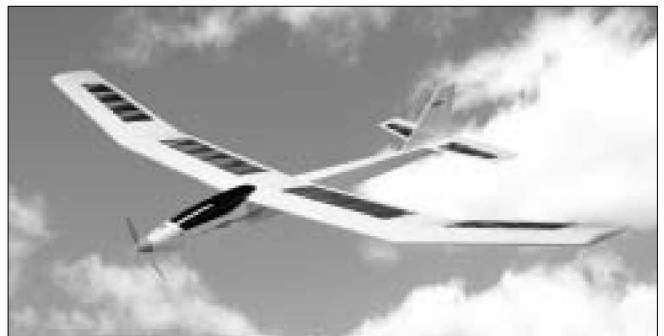
Rudder 1-1/2" right and 1-1/2" left
Elevator 1/2" up and 1/2" down



Note: The control throw is measured at the point of the control surface farthest from the hinge line. You can move the pushrod attach points in or out on the control horns and servo arms to change the amount of throw on each surface.

These are the suggested starting throws for your *Windstar EP MKII* and later you may wish to change them to fine tune the handling to your own personal preference.

Mount The wing



We recommend that you always use eight #64 rubber bands to hold the wing of your *Windstar EP MKII* onto the fuselage. During flight the stresses on the wing are sometimes very great and tend to try to lift the wing off of the fuselage if it is not adequately attached.

Balancing Your WINDSTAR EP MKII

Balancing your model is very important and must not be overlooked. The center of gravity (CG) of your Windstar EP MKII should be 2-1/2 " behind the leading edge of the wing. Add lead weight to the nose compartment of your model just behind the firewall until the correct balance point is reached. To check the balance the model must be fully assembled with flight battery installed and ready to fly. Make a mark on the bottom of the wing 2-1/2 back from the leading edge on both sides of the fuselage. Pick up the plane from a level position using on finger under the wing on each mark. Add lead until the plane remains level when you pick it up. After you have become familiar with your model's performance you may wish to change the CG slightly to change how responsive your model feels to the controls. Caution: Do not move the CG more than 1/2 in either direction.

FIRST FLIGHTS

Before you attempt to fly your model you should perform some final



manufacturers instructions.

2. Check the direction of travel of your control surfaces and the operation of the motor controller per the manufacturers instructions.
3. Range check your radio system per the manufacturers instructions.
4. Double check that you have installed the screws in the servo control arms and that the clevis are snapped tightly on the control horns.

We strongly recommend that you get help from an experienced R/C pilot to learn to fly if you are just beginning. You should be able to find help at your local dealer or club field.

First of all, if you are flying with other flyers, check to make sure



do not turn on your radio until they have safely landed and have turned their radios off.

Secondly, even though the Windstar EP MKII is very easy to fly, if you are a novice modeler/pilot, we highly recommend that you seek

the help of an experienced modeler for your first few flights. He can save you a lot time and possible disappointment by helping you get your model in the air safely and getting it trimmed out for you.

Important: The radio control system is set up to operate the control surfaces just like a real airplanes as if the pilot (you) are sitting in cockpit controlling the airplane. When you want the plane to dive, you push the elevator stick forward (up), to climb you pull the stick back (down), to turn right, you move the rudder stick to right and visa versa. When you want to turn the motor on you push the throttle stick forward and when you want to turn the motor off you pull the stick back. It is the turning that causes the most problems with novice pilots because when the plane is flying towards you a right turn command on the transmitter cause the plane to turn to your left (which is the planes right). Get the picture? Fortunately the up and down commands do not change. The easiest way to conquer this problem is to try and always face your body near the direction the planes is flying. This means that you will have to look over your shoulder at times, but many modelers find this an easy way to learn.

THE FIRST FLIGHTS

You should always use the first few flights to get accustomed to your new airplane and its flying characteristics. Keep the model upwind and climb to a good comfortable altitude to cut off the motor and trim your Windstar EP MKII for a glide. At altitude cut the motor and start your glide. Have an experienced modeler adjust the trims of the transmitter for you until the plane will glide straight and level without any other control input. Once the trims are set practice making smooth turns in both directions while losing as little altitude as possible. When the Windstar EP MKII starts to get too low for comfort turn the motor back on and climb back up to altitude. Practice this climbing and gliding until you are comfortable with the airplane.

Depending on the battery you use the Windstar EP MKII will make 2 to 3 good climbs up to a nice thermal searching altitude from single battery charge. Once the Auto Cut-off Device shuts off the power to the motor you will need to set up for your landing. Continue to make smooth gently turns while lining up the Windstar EP MKII with your landing strip. Once you are set up to land keep the wings level and let the model settle in for a nice gentle landing while adding up elevator to keep the nose up slightly as the plane slows down. Make several flights like this to really familiarize yourself with the characteristics of your model and to learn the glide and distance covering abilities of the Windstar EP MKII. Once you have mastered a good comfort level you are ready to start searching for thermals which will really increase your flight times.

THERMALS

Thermal soaring is one of the most interesting and challenging types of flying there is. Believe it or not, your Windstar EP MKII is capable of flights thousands of feet high, lasting for several hours, and covering dozens of miles. The following paragraphs will help explain how to take advantage of natures energy sources called thermals.

Thermal is the term applied to columns of rising air. This air is rising because it is warmer than the surrounding air. A dust devil is simply a thermal which has picked up some dust. Even a tornado is very similar to a thermal, but of course much stronger.

Thermals occur when the sun, or other heat source, heat the air in one location faster and/or warmer than the surrounding air. Darker surfaces (plowed fields, asphalt parking lots, etc.) absorb the sun

s energy faster than lighter colored and are generally good thermal generators. This warmer air is lighter (less dense) than the cooler air and thus rises. The rising air naturally starts to rotate, much like water going down a drain, and forms an inverted funnel shaped column that usually gets larger with altitude. This warmer air often contains water vapor which condenses as it reaches the cooler air high above the earth forming big puffy Cumulus clouds that experienced sailplane flyers will watch to determine where the thermals are forming. Thermals vary in strength, but often contain air that is rising at speeds over 1200 feet per minute. Some thermals are so strong they can even rip a sailplane apart, especially if the plane is flying fast when it passes through the thermal.

THERMAL SOARING

It takes lots of practice and concentration to thermal soar like the Hawks and Eagles. Since the pilot is not sitting inside an model sailplane, he cannot feel the thermal, he can only see his sailplanes reaction to the thermal. Therefore, the majority of the time, unless the pilot is paying careful attention to the plane, he may not even realize that plane is near a thermal. Since most thermals are relatively small, less than a hundred feet in diameter near the ground, the sailplane will rarely fly directly into the thermal and start rising. More likely, it will fly near a thermal and the wing closest to the thermal will rise turning the plane away from the thermal. So as you can see, an inexperienced pilot may bounce around between the thermals with ever knowing that he is encountering rising air.

In order to take advantage of thermals, you need to fly smoothly with as few control inputs as possible. Watch the sailplane carefully and it will tell you what the air around it is doing.

When a sailplane does fly directly into a thermal it will either start rising or stop sinking at its normal rate. Either case is reason enough to explore further. Continue flying straight ahead until you have obviously passed through the area of strongest lift. Now start circling in fairly tight, but smooth circles. Because of the thermals inverted funnel shape, the lower the planes altitude, the tighter the circles need to be. As the plane gains altitude, the diameter of the circles can be increased. If you see the plane falling off on one side of the turn, move the circle over into the stronger lift. Thermals are swept along by the wind so allow your circle to drift downwind with the thermal. Be careful when following a thermal downwind though as you still have to be able to make it back to the field!

If the sailplane is flying along and all of a sudden turns by itself, it has probably flown near a thermal. Keep in mind that thermal will have tendency to turn the plane away, so make a 180 degree turn and fly back towards the thermal. If you don't quickly encounter lift start searching around that area. If you find the thermal, follow the procedure outlined above to take advantage of it.

Thermals can be generated at any time of the day, but the strangest thermals are usually produced when the sun is directly overhead 10:00am to 2:00pm seems to be the best time to find the strongest thermals.

If you find yourself getting too high or you're having trouble getting out of a strong thermal. **DO NOT** dive the plane to lose altitude. This will very quickly over-stress the airframe and blow the wings off the plane. The easiest and safest way to quickly lose altitude is to apply full rudder (either right or left) and full up elevator. This will put the plane into a tight spin that will normally not over-stress the airframe. This is especially useful if the sailplane gets sucked into a cloud or gets too high to see. The spinning action will give the sun a better chance of reflecting off of the wing and catching your attention.

As you might expect, with all this rising air, there must also be some sinking air. This sinking air is the sailplane pilots enemy and one of the factors that really make soaring challenging. Sink as it is referred to, is usually not as strong as the nearby thermals, but is can quickly put a sailplane on the ground. Sink in one of the reasons, you have to be very careful when chasing a thermal downwind. If you encounter sink, immediately turn and fly 90 degrees to the direction of the wind. Apply a little down elevator to pick up some speed and get out of the bad air as quickly as possible.



your model at a model club field which is specially set up for model flying. But always be sure that you operate the model in a safe and careful manner and observe the

Following Suggestions:

1. Do not fly your model close to buildings, power lines, roads, or other obstacles.
2. Do not fly in congested areas such as parks or occupied playing fields. Select wide, flat and open area to fly with no obstructions and plenty of room for learning to fly.
3. Do not fly without help from an experienced model pilot until you have learned how to fly. Your local model club or hobby shop can recommend an instructor if you do not already know one.
4. Always check for other modelers in the area and be sure that your frequency is not in use by someone else which might cause you model to crash. Always observe frequency control systems at flying fields and wait your turn to fly.
5. Never fly your model directly toward spectators, autos, other modelers or their models.
6. Always abide by the rules for model flying provided by your club and the governing agency for model aircraft in your country.



Now that you have completed the assembly of your Windstar EP MKII model we feel that have a very capable and good looking 2-meter electric sailplane. We hope that you will enjoy this model and get many hours of flying pleasure from its use. Thank you for purchasing this Windstar EP MKII from Thunder Tiger and we look forward to providing you with other great R/C products in the future.