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## **NOONER** (Speed 400 Class pylon racer)

Dear customer,

We are pleased that you purchased one of **ICARE** electric kit. You now have one of the finest, one design racer on the market. This beautiful racer is designed for the beginner and intermediate pilot, but expert will also find it a lot of fun to fly. It will only require a few hours to finish it. Being designated for experienced builder, we supply only basic instructions.

Important notice: **ICARE** shall not be responsible for bodily or property damage incurred by proper or improper use of this product. Any damages or liability are the sole civil and/or criminal responsibility of the end user.

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## **Wing Hold-Down Method**

### *General Construction Notes*

There are a number of ways the wing LE can be secured to the fuselage. For the prototype an 8-32 nylon bolt was used. An 1/8" light ply "tab" would also work well and may be slightly easier to fit to the bottom of the wing. In the photos I have shown the nylon bolt method. The thing to remember is that you want the fit to be nice and tight with no play. It must be strong enough for flight loads, and ideally allow the wing to separate from the fuselage with a minimum of damage in the event of a hard landing. The front hold down is done first, so that the wing can be fitted and aligned before drilling the hole for the rear hold down bolt. Also note that the fuselage seam may not be exactly on center, measure from the fuselage sides to locate your center line. I also added a layer of 3 oz glass cloth with 5 min epoxy across the face (see photos).

## **Wing**

The wings halves come presheeted and sanded ready to be glued together. To join the halves together lay the wings up side down, so the upper surface will be flat and the bottom will have a sort of dihedral made up from the airfoil thickness. Once glued together with epoxy, hog out an area to accept a vertical grained block of balsa in the area of the wing bolt and glue it in. Wrap the wing joint with some 1.5 oz glass cloth and (foam friendly) CA or epoxy. Add a bit more in the area of the wing bolt. Stick a little piece of 1/64" ply on top to distribute the forces of the wing bolt.

The ailerons can be actuated by two sub-micro servos (preferred method) or by installing torque tubes etc. If you choose later solution, use a standard micro servo mounted upright with screws



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in ply strips glued to the wing upper surface. There is just enough clearance between the pushrods for a tube that carries the wing bold up through a hole in the canopy. To use a standard mini servo you need to recess the servo into the wing 1/8" to 1/4" depending on your linkage height to clear the canopy. Note that some of the new smaller high torque servos would probably fit on top of the wing mounted on their side and allow larger battery packs to be used for sport flying as the bottom of the servo case would not protrude into the fuselage cavity. Mylar tape can be used for the hinges or you can just hinge with iron on covering, both methods work fine.

## Fuselage Preparation

Wash the entire fuselage with soap to remove any trace of wax or PVA.. Under the nose there is a small airscoop that should be opened up. Try to keep the lip a little bit rounded. There is a fair amount of filler there so it might take some effort. Again, I use the trusty Dremel for this. You will also see that the hole in the front of the fuselage is not round due to the fact that the cloth that comes out of the scoop area doesn't like to make that sharp corner. Some filling and fiddling might be required here. That is one touch-up I left for you guys. It is recommended that a cooling air exit be opened on the bottom of the fuse aft of the wing. The exit area should be a bit bigger than the scoop area.

## Wing Mounting Plate

The wing hold down is already glued in place. If you want to go with two bolts, do the front hold down first and fit the wing in the saddle with the front nylon dowel or tab located correctly. Measure from the same point at the trailing edge of each wing tip to the center line of the fuselage at the tail. When you are happy that the distances are equal and the wing is straight tape the wing to hold it in place. Then you can drill the pilot hole through the wing and mounting plate for the rear hold down bolt. Then remove the wing and install a 856 blind nut in the mounting plate or just tap the ply.

## Motor Mount

The motor mount is already glued in place. I did not use side or down thrust and that has worked out fine. Holes may beveled from the outside for flat head screws.

## Tail Feathers

Next, cut the slots in the aft fuse for the tail feathers. I use a dremel cutting wheel. If you don't have one a hacksaw blade works just fine. Open up the slots slowly and carefully with a coarse disposable nail file. These work really well and are stiff and fairly straight.

Cut out the tail feathers out of light 1/8" sheet and take the time to give them an airfoil shape. You will reduce drag and weight. Glue the fin to the stab using 2 squares to align it vertically and horizontally. No need for a fillet as they will both be supported by the fuselage. With the wing



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installed and blocked up equally on either side, slide the tail feather assembly into the slots in the fuselage and check the alignment laterally by measuring to each wing tip. Carefully open up the slots further where required and also ensure that the tail is in the same horizontal plane as the wing and CA it in place. Then run a small fillet of epoxy/micro balloons along the joint between each surface and the fuselage.

I have a separate rudder. I have taped it in place and it is not controlled by a servo but if I ever decide to do it I can. Some sport flyers have installed a rudder, 480 size or small brushless motor and are flying with 7 or 8 800AR's as a mini pattern ship. You have to add some 1/8 blocks to build up the rudder to match the thickness of the bottom of the fuselage. The fuse is thick at the rear to allow a brush to be inserted during layup. This is best done before painting the fuse.

Note: Many racers have decided to skip the rudder option and therefore do not require the "notched" elevator shown in the drawings. I have shown the "simple" elevator set up in the photos. The original looks a little nicer, but is more work to join the elevator halves. For an elevator joiner, I use aluminum tubing the same dia. as the thickness of the stab but wrapped with a bit of thin glass for strength and stiffness. It is the stiffest method I have come up with. Wire is either way to flimsy or too heavy. Then I run a 2-56 bolt through to act as a horn or use a 1/16 ply horn depending on the elevator option you go with. Use what ever you are comfortable with. I used a tape elevator hinge and it has held up well. For the "simple" elevator option a covering hinge provides a tight gapless solution.

## Paint

Now the fuselage is ready for final preping and painting. If you are not a big painter and you aren't sure of the best way to go, here is a fool proof route: Get some "Truck and Van Paint" from the automotive section of Canadian Tire. It has a funny blue nozzle exactly like Coverite 21st Century Paint and smells exactly the same (except that it is 1/2 the price!). It comes in a bunch of colors including metallics. If you want to match film covering you can go with genuine 21st century paint. This paint is really great because the nozzle allows a really thin coat, it dries really quickly so you get a minimum of dust on it and it rubs out nicely. Hang the fuselage from the fire wall and mist on a very thin coat that does not come close to covering. Let it sit for 2 min. and do it again. Repeat as many times as you need to build up a good finish. Don't try to do it in one coat or you will have a mess. Several thin, even coats will give you a nice result. After 24 hrs you can rub it out for a deep shine. You can paint the tail feathers at the same time or mask them off for another color or for iron-on film. Go easy on the paint if you plan on racing, it's easy to add 3/4 plus ounces if you aren't careful.

## R/C installation

When the tail feathers are all done it is time to put it all together and go fly. I glue my servos in place using two 1/8" square vertical balsa sticks. I CA them to the servo case and then to the fuselage after roughing it up with sandpaper. The logic here is that they are strong enough for all flight loads, don't require any structure for attachment and they can be easily split along the grain



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to remove the servo. Also, removing the servo lugs allows more room in the fuselage. Incidentally, I do this on all my smaller planes now. For the elevator, I made up the horns and pushrods, hooked up the servo and mounted the elevator. Once everything was in place and it was confirmed that all the lengths and adjustments were correct, I glued the servo in place. Easy!

I taped the canopy in place on mine with transparent tape. What ever you use, it would be advisable to make it not too hard to remove so that you can access your aileron servo and linkage. After you are happy with the trim set-up you can use a couple of dots of "goop" adhesive to attach the canopy – which will still allow you cut the canopy off with an exacto knife if the servo or linkage needs attention.

### **Setup and Flying** (*Original Scott Black Comments*)

Adjust the aileron for as much deflection as you can get without binding. This racer has a high aspect ratio and therefore lots of roll damping. I found I needed lots of aileron but perhaps that is because my linkage is a little softer than I would like. Make sure the cg is right and everything is nice and tight. Mine came out at 16 oz and flew pretty well on 7 cells. At 1 lb it is dead easy to give it a hard toss angled 20 deg above the horizon leaving you lots of time to get the right hand back to the Tx.

As for elevator throw, please pay careful attention to the following: I don't want somebody saying that the airplane snaps and is dangerous. All my models will snap or drop a wing during a stall and to me it is an absolute **NON ISSUE**. I just avoid stalling unless I choose to. This is basic airmanship. For a pylon racer, where you are turning as hard as you can, you simply have to limit elevator throw so that you do not have sufficient control power to snap but you have enough to fly and turn. The taper of the wing and high aspect ratio is there to make the model aerodynamically efficient and to allow it to bank quickly and crisply. If you set it up and fly it properly there is absolutely no reason why you should snap out and crash.

My Nooner, like the Tracker Pattern Ship, my Cub (!), certainly my Sabre and possibly even the Pond Racer will snap in a tight turn with full throws. Since I increased the taper slightly this trait might be a bit more pronounced however I have added a bit of washout. If you reduce the throws by perhaps 20% it won't snap. Reduce the throws!

For the first flight, do not apply full elevator at first - you won't need to. Simply feel the plane out and try a few tight racing turns up nice and high. At **high altitude**, do a full speed full elevator pylon turn. If it snaps, reduce the throw. If not, make sure you are still able to do a nice tight turn. If it does snap out, don't panic - just let go and it will sort it self out instantly. It will only snap if you pull. I can turn on a dime with no tendency to snap now that the elevator throw is properly adjusted. BTW, it would only snap-out on FULL elevator which you should never be using for sport flying so don't be scared of this. This is no evil airplane. It is a pussy cat and is very maneuverable. **ALL THIS ASSUMES PROPER CG LOCATION**. Remember: CG and elevator power are closely related.



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My model is set up with the cg 2" aft of the LE at the wing root. That is about 33%. That is a fairly aft cg. If you are nervous start at 30%. I use +/- 12 deg. of elevator throw which is not a lot but is plenty for a 33% cg. If you use a more forward cg then have a bit more throw available for the first few flights until you get it sorted out. My method is to use the dive test to set the cg, then use a tight turn to determine the max elevator throw you can have without snapping. This is obviously applicable to any airplane. I was easily able to achieve the desired cg by moving the battery pack along a strip of velcro on the floor of the plane. There is plenty of room for adjustment.

Well, that's all there is to it. Obviously I will be happy to hear of your progress and answer any questions. I hope you all have a lot of fun with these and have many lunch time flying sessions. That's what I built it for. I also hope that most of you will enter into a sport pylon race. Racing this plane is dead easy and it is a helluva lot of fun!



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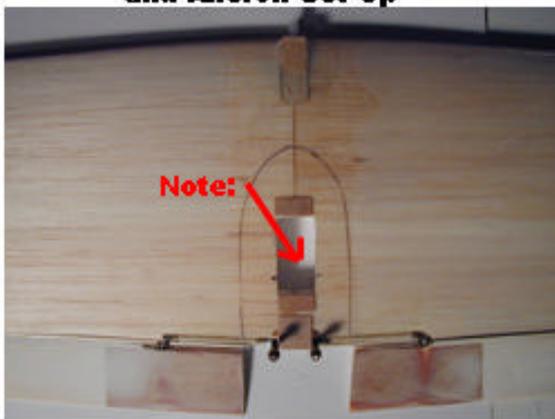
**Wing Front Hold Down Detail**



**Front Hold Down With Fairing**



**Wing Showing Torque Rod and Aileron Set-Up**



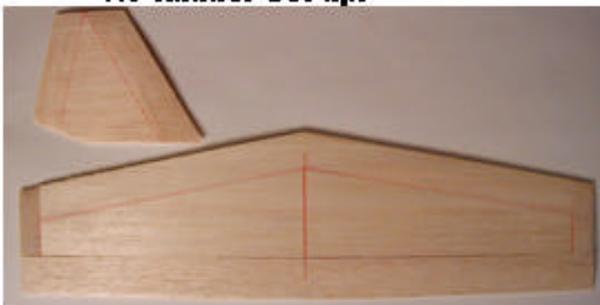
**Note:** Aileron servo must be recessed into wing 1/4 in. for arms to clear canopy.  
*(this has not been done yet in photo)*

**Front Fuse Wing Hold Down Detail**



**Note:** Add 1 layer of 3 oz. glass in this area.

**Simple Tail Option for No Rudder Set-up.**



**Rear Hold Down Mount**

