Eurosport Ultimate

Instruction Manual

V 1.1

CARF-MODELS

Thank you very much...

...for purchasing our Eurosport Ultimate built with pride in our Total Area Vacuum Sandwich technology (TAVS).

Before you get started building and setting up your aircraft, please make sure you have read this manual and understood it.

If you have any question, please don't hesitate to contact us directly under info@carf-models.com or your dealer or rep.

Telephone: Call us at +49 6151 9179 156 or contact you CARF Sales Rep - he will be there for you! A full list of dealers and reps can be found on the CARF website: http://www.carf-models.com

Liability Exclusion and Damages

You have acquired a kit, which can be assembled into a fully working R/C model when fitted out with suitable accessories, as described in the instruction manual with the kit.
However, as manufacturers, we at CARF-Models are not in a position to influence the way you build and operate your model, an we have no control over the methods you use to install, operate and maintain the radio control system components. For this reason we are obliged to deny all liability's for loss, damage or cost which are incurred due to the incompetent or incorrect application and operation of our products, or which are connected with such operation in any way.

Unless otherwise prescribed by binding law, the obligation of CARF Models company to pay compensation is excluded, regardless of the legal argument employed. This applies to personal injury, death, damage to buildings, loss of turnover and business, interruption of business or other direct and indirect consequent damages. In all circumstances our total liability is limited to the amount which you actually paid for this model.

BY OPERATING THIS MODEL YOU ASSUME FULL RESPONSIBILITY FOR YOUR ACTIONS!

It is important to understand that CARF Models is unable to monitor whether you follow the instructions contained in this instruction manual regarding the construction, operating and maintenance of the aircraft, nor whether you install and use the radio control system correctly. For this reason we at CARF Models are unable to guarantee, or provide, a contractual agreement with any individual or company that the model you have made, functions correctly and safely. You, as operator of the model, must rely upon your own expertise and judgement in acquiring and operating this model.

Attention!

This jet aircraft is a high end product and can create an enormous risk for both pilot and spectators. If not handled with care and use according to the instructions. Make sure that you operate your Eurosport Ultimate according to the laws and regulations governing model flying in the country of use.

The engines, landing gear, servos, linkages and control surfaces have to be attached properly. Please use only the recommended servos and accessories. Make sure that the Centre of Gravity (CG) is located in the recommended place. Use the nose heavy end of the CG range for your first flights. A tail heavy plane can be an enormous danger for you and all spectators.

Fix any weights and heavy items like batteries, very securely into the plane. Make sure that the plane is secured properly when you start the engines. Have a helper hold your plane from the nose before you start the engines. Make sure all spectators are far behind, or far in front of the aircraft when running up the engines. Make sure that you range check your R/C system thoroughly before the 1st flight. It is absolutely necessary to range check your complete R/C installation first WITHOUT the engines running. Leave the transmitter antenna retracted or incase of 2.4GHz depress the range check button and check the distance you can walk before FAILSAVE occurs. Then start the engines, run at about half a throttle and repeat the range check. Make sure that there is no range reduction before FAILSAVE occurs. If the range with engine running is less then with the engine off, please don't fly at that time. Check that the wing and stab retaining bolts are tight and that all linkages are secured.

Please don't ignore our warnings, or those provided by other manufactures. They refer to things and processes which, if ignored could result in permanent damage or fatal injury.

Important/General Notes

Servo Choice

We strongly advise that you use the recommended servos and equipment listed in the manual.

Servo Screws

Fix the all the servos into the milled plywood servo mounts using the 2.9x13mm or 16mm sheet metal screws provided in the Kit, not the standard screws normally supplied with the servos by the servo manufacturer. This because all the holes in our milled servo mounts are 2mm diameter, due to our CNC manufacturing process and this is too big for the normal screws.

Building Sequence

The actual building sequence is your choice but it is usually most efficient to start as suggested in this manual, which has been created by building several airplanes by several experienced modellers.

Adhesives and Solvents

Not all types of glue are suited to working with composite parts. Please do not use inferior quality glue you will end up with a inferior quality plane. That is not strong and save. Jet Models require good gluing techniques, due to the higher flying speeds, and hence higher loads on many of the joints. We highly recommend that you use a slow curing epoxy such a 24hr resin and fill it with cotton flocks or thixo for gluing highly stressed joints.

We take great care during production at the factory to ensure that all joints are properly glued but of course it is wise to check these yourself and regular any might just have been missed. When sanding areas on the inside of the composite sandwich parts to prepare the surface for gluing something onto it, do not sand through the layer of lightweight glass cloth on the inside foam sandwich. It is only necessary to rough up the surface with 120grit and wipe of any dust with Acetone or de-natured alcohol before gluing to make a perfect joint. Of course you should always prepare both parts to be joined before gluing for the highest quality points.

Do not use Acetone for for cleaning external painted surfaces as you will damage the paint.

TIP:
- for cleaning small spots or marks off the painted surface you can use liquid cigarette-lighter fuel.
- use only high quality 5 or 30min. epoxy, since the cheap brands of this kind of glue are not moisture resistant like a proper resin. You will notice this as older bondings changes their colour and get more and more soft until the bond eventually fails.

At CARF Mdels we try our best o offer you a high quality kit, with outstanding value-for-money and as complete as possible. However, if you think that some additional or different hardware should be included, please feel free to let us know.

Email us: feedback@carf.models.com

We know that even good things can be made better!

Accessories

This is a list of suggested accessories which will help you to complete your project:

1 5x Standard size digital servos with at least 25 kg for none 3D use (JR 8911 or similar*) or 7x Standard size digital servos with at least 25 kg for 3D use (JR 8911 or similar*) or in addition to both options another 2 servos if you will split the Elevons
2 1x Eurosport Ultimate fuel tank set enlarged (210108) or 1 x Eurosport Ultimate light weight fuel tanks set regular (210109) or 1 x Eurosport Ultimate kevlar fuel cells (340108)
3 1x Eurosport Ultimate extra light landing gear set (210500) or Eurosport Ultimate electric retract set from Electron (210501)
4 1x Eurosport Ultimate pneumatic pack (280600) in addition with (210500)
5 1x Eurosport Ultimate thrust tube non-vector (340506)or 1 x Eurosport Ultimate vector thrust tube (210506)
6 2 x Receiver Batteries
7 1-2 receivers and a power management system
8 1x 3-axis Gyro (CORTEX Pro recommended)
9 1x Turbine Jetcat P180 Rxi, KingTech 180 or similar

* Important: use Aluminium servo horns only!!!

Additional suggestions:

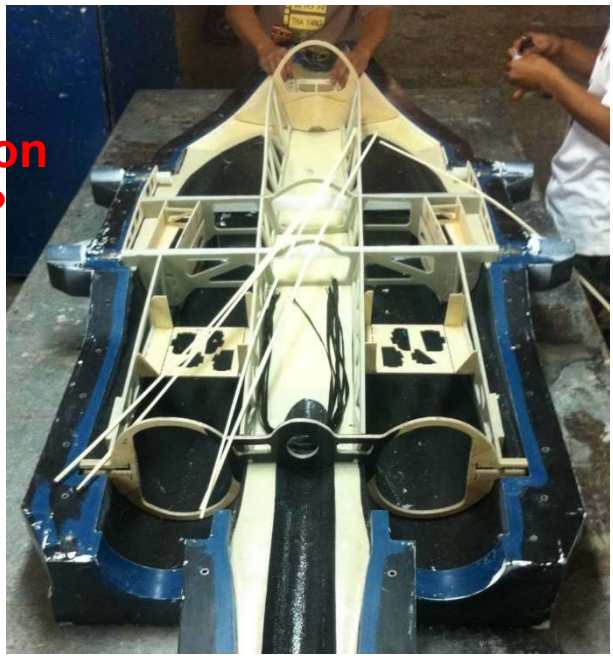
1) Please do not use any engines above 180N thrust range. Larger engines will be heavier, have higher idle thrust levels and are responding slower to throttle changes as they operate in their lower power range. Furthermore the thrust tube (#210506) is not suited for engines above 180N thrust range. We do not warrant use of any engines larger than 180N.

2) A full intake duct (#340104) is available from earlier versions of our Eurosport. However, it will not fit with the enlarged fuel tanks and might create problems when fitting with the new Electron landing gear. It also makes the plane heavier which will not be beneficial for the 3D capabilities.

3) The gear door and speed brake door package (#760700) is also available from older versions of the Eurosport, but here again it will make the plane heavier and more complex, not improving the flight performance, so it is not recommended to use.

General information

Fotos von innen??



Fotos von innen??

The fuselage and the wings are made of total area sandwich technology (TAVS) and are reinforced with carbon in the highly stressed areas. Carbon reinforced gear formers are installed and alligned.

Included hardware

XXX Pack

XXX Pack

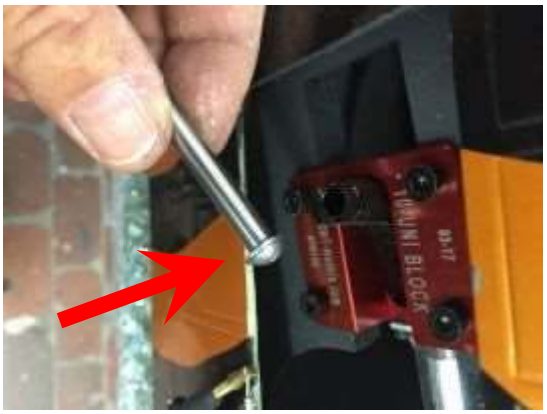
XXX Pack

XXX Pack

XXX Pack

Landing Gear Installation

There are two options to istall a good landing gear into the Eurosport Ultimate. Either the eletrict gear from ELECTRON or our CARF-Models pneumatic gear.

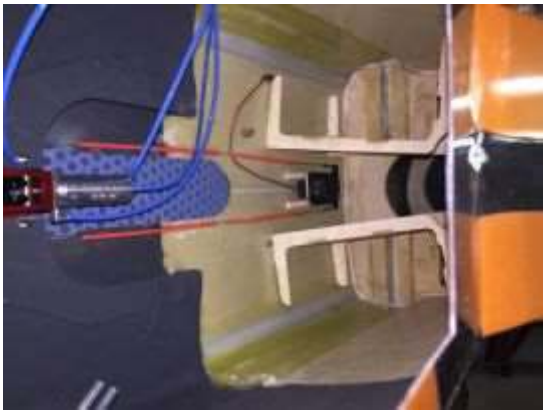


Important: First step is to check if all screws are secured with Loctite or similar. Especially the screw from the nose gear.

Mount the nose gear into the plywood frame. Use the included T-Nuts, which you can glue REVERSED against the wood if driving them in is too hard.

If necessary, grind a little recess to give room for the dual pull-pull linkage.

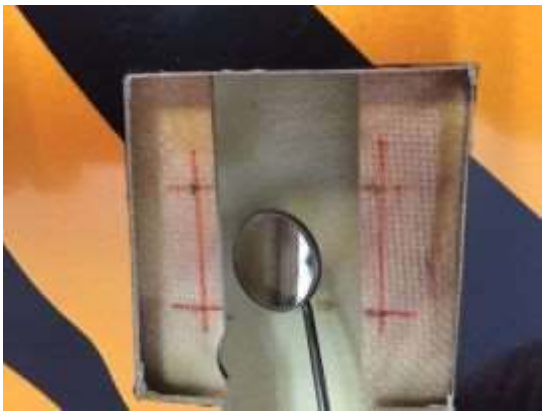
There are many options for nose gear steering, different gear types require different methods. Here it is show an individual servo mount. A regular side mount is included in the kit, which can be used for the eletron version.



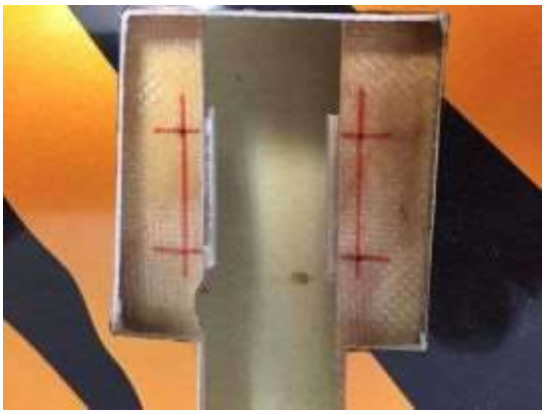
Position the main gear incl. strut and wheel like this to mark the holes to be drilled.

Due to the ongoing changes and improvements to the landing gear by the manufacturer, it might be necessary to work on the gear mounts and the wheel cut out slightly.

Landing Gear Installation



Some earlier kits are still made for the wider bolt hole distance. Therefore it is necessary to fill the little recess below the main gear plate with some scrap



Drill holes and place the drive-in nut, if necessary, cut off one side of the T-Nut to give enough clearance to the gear frame.

It is a recommended option to glue the T-Nuts REVERSED against the wood from the bottom side, as the used plywood is a very hard, 7-layer finnish birch.

Enlarge the hole for the wheel a little bit (ca. 5mm to 8mm). This is due to the fact that the new style wheels are a little larger and better suited for grass runway operation.

Landing Gear Installation

Grind a flat spot to the pin for the grab screws and fix the strut, secure the grab screws all with Loctite.

After the gear itself is installed, take care o the valve and air tank installation. This can/should take place at a later stage, but it is described here in this chapter.

See the photo for suggested position of the air tanks.

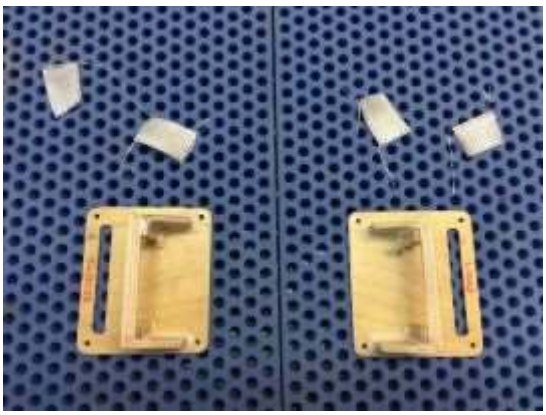
And this is a suggested position for the electronic valves.

Wings

Build the servo mounts with the milled wood included in the kit. Mark the correct position of the servo by using a servo horn to center.

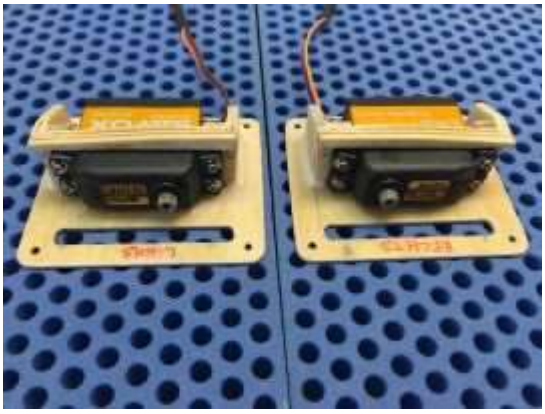
Sand the back surface of the servo hatch well and use epoxy to glue the wood together.

Once the plywood is glued together it is very important to reinforce the joints with small pieces of fiberglass and 30 min epoxy.



Be careful and do not use too much resin so that the servo will still fit in.

Use only the included 2.9 mm sheet metal scews to mount the servos, as our production process drills dia. 2mm holes, which are too big for the screws included with most servos.



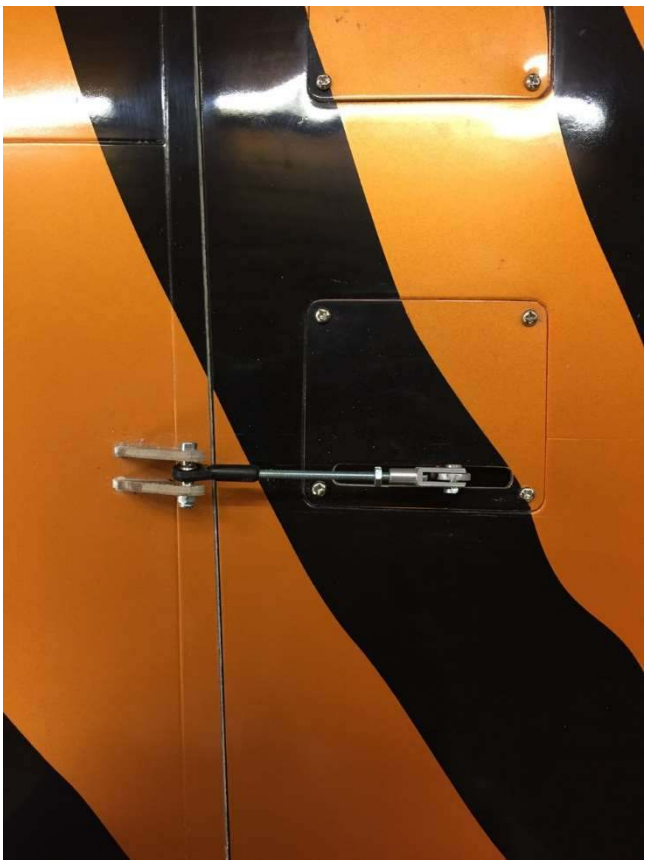
Glue an additional piece of wood onto the frame.

Wings

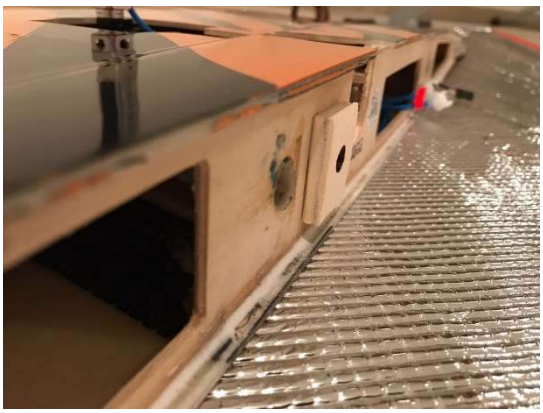
Grind the frame like this to clear the upper skin.

Insert and tighten the servo screws as mentioned before, then install the servo arm and install and adjust the linkage.

Clevis on servo side, ball link on control surface side!



A practical note: Add a piece of soft plywood to the wing root, so that the gap between fuselage and wing is filled. That way screwing the wing to the fuselage will not put too much stress on the glue joints of the root rib in the wing!



Vertical Fin and Rudder

In this manual you'll see various linkages for the rudder, included in the kit is a 2mm push-pull system with spring steel clevises on servo side and M2 plastic ball links on the rudder side.

Insert all screws (use only the 2.9mm sheet metal screws included in the kit) and secure them properly.

Then adjust the length of the threaded rods, solder the threaded ends on and install the linkages to the servo.

Finally mount the M2 ball links to the rudder and make the final length adjustment.

Canards

If necessary clean at first the holes in the servo mount. Test with an M4 bolt. We already installed drive-in nuts (4mm) for you in the factory for easy assembly.

Use the 6mm collar as a spacer on each canards.

Build the servo mount like the ones for the aileron.

Mount the servo and the push rods as shown on the photo on the right. Attach the ball links to the aluminum control horn and clamp the control horn on the carbon axle.

Use the panel line on the fuselage to adjust the neutral position of the canard.

Fuel system

Use the wood frame to position the fuel tanks. Please also note the slight simple wood mount modifications for a 1l coke bottle smoke tank.

There are 3 different tanks available, here we show the extended size, light weight tanks.

If you connect the fuel tanks parallel it is very important to use for both tanks the exact same tube length!

This picture shows the smoke tank. A 1 liter Coca Cola bottle fits perfectly into the fuselage-back.

The hopper tank is positioned in the front of the airplane, at least it should be visible through the canopy opening to detect any collecting air.

Vector Thrust tube

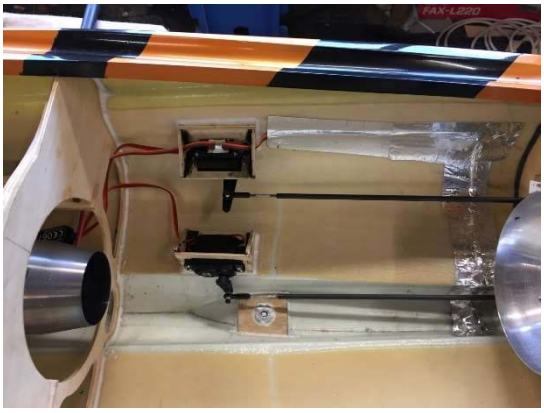
If necessary clean at first the holes in the servo mount. We already installed drive-in nuts (4mm) for you in the factory for easy assembly.

Assemble the servo mounts as described earlier. Make sure they are glued properly with the little pieces of fiberglass in the edges.

Attention! Check the length of the screws twice! Do not screw them through the servo mount into the fuselage. If necessary, please add 4mm washers on the inside, so that the bolts do not show marks on the outside of the fuselage!

Secure all screws with Loctite.

Test mount the servos as shown in the photo.



You will have to drill a hole in the spar to support the vector rod as shown on the photo.

Vector Thrust tube

From some scrap balsa created a support for the vector push rods. It is enough if they are supported one at about half the length.

See the final layout here.

For creating the pushrod it is important to drill a few 1.5 mm holes across the carbon tube where the all thread stud is glued in.

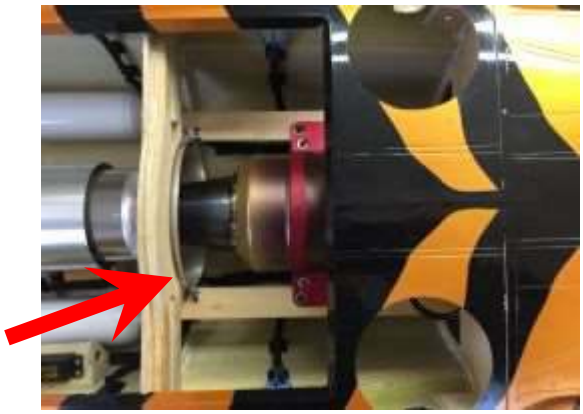
Then apply 30 min epoxy inside the tube and on to the all thread and turn the threaded rod anti clock wise while slowly pushing it in, until glue exits every hole. Then you know you have a perfect bond!

Thrust tube mounting: Install the carbon entry cone to the front edge of the tumble tube. If you have to overcome diameter tolerances, you can grind the carbon slightly, and if not enough, cut 6 10 mm cuts around the circumfence of the stainless tube and then push it over the carbon entry cone. Drill the mounting holes through the carbon and use M3 bolts, sheet metal screws or 3mm rivets to join them permanently.

Mount the carbon entry cone with 2 aluminum brackets as shown in the photo. Please note: This is an important joint, use appropriate screws, make sure that nothing can come lose. If the tumble tube moves in the fuselage, the result can becatastrophic beause there is a connection between the servos and the vector.

Vector Thrust tube

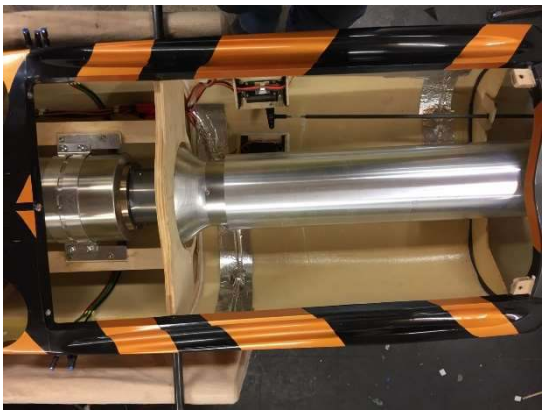
You may have to grind the hole in the rear balsa former to allow the thrust tube to fit through. This hole might be slightly smaller because it would fall apart in the production process before it is glued into the fuselage.



Position of the thrust tube The cone should stick 10-15 mm out of the rear engine former. The engine's nozzle should be inside the carbon entry cone so that the distance of the rear edge of the nozzle and the front edge of the stainless thrust tube are 20-25 mm apart.

Depending on the engine type you might need 6mm spacers to center the engine in the thrust tube (JetCat's engine clamp is 6mm asymmetric, others are symmetrical.

Additionally some scrap wood is needed to fill the gap in the connetion brtween engine rails and rear former. The gap is so that the engine could be slid in from the rear during the assembly process. Once everything is installed, this slot must be filled.!!!



Mark the nozzle where it needs to be cut..

Vector Thrust tube

Cut out the nozzle. Glue (with high quality silicone) or screw them to the fuselage.

Cut out this part from the fuselage for 3D thrust tube support.

Cut 2 circular openings in the rear former to help to get thecooling air out of the fuselage.

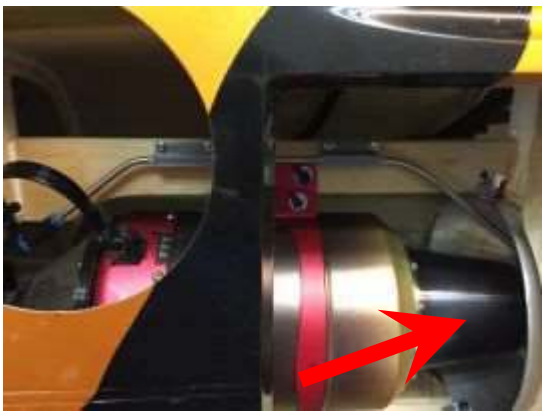
The bigger the holes, the better for pressure compensation during flight.

You will have to clear the fin fillet at the rear with a Dremel in order to create room for the up/down vector pushrod.

Turbine

This is the mounting of a KingTech 180, which has a fully symmetrical engine mount.

Always check the correct distance between nozzle of turbine and the beginning of thrust tube with your turbine manufacture.



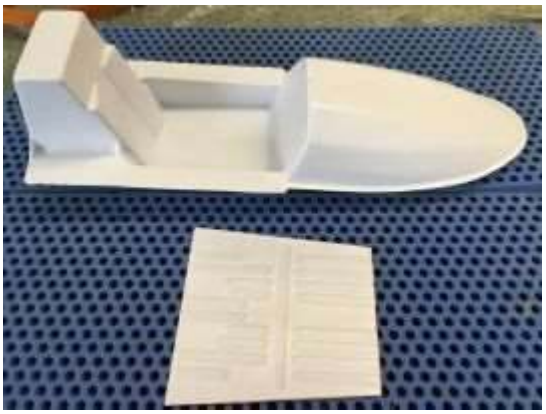
Cockpit

You can cut the canopy in 2 pieces for an easier installation.

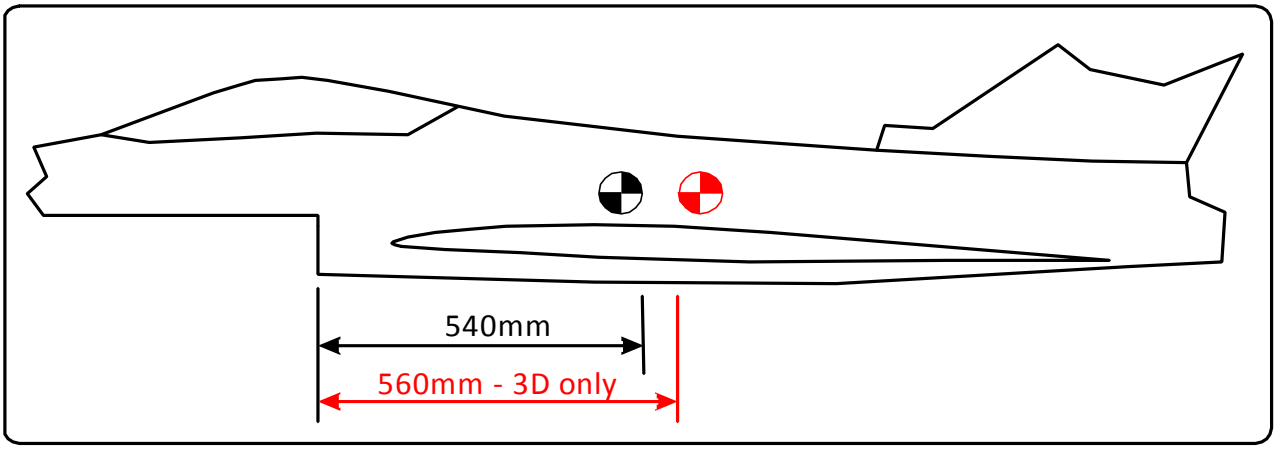
Glue the canopy into the frame (e.g. with silicone or 30 min epoxy) and position it with magnets.

Paint the cockpit parts of and install the part with the pilot seat first, than the part behind.

You can create a cockpit panel, fit a pilot bust, or leave it very simple. You could even tint the canopy from inside with canopy tinting paint available e.g. from Tamiya.



Center of Gravity (CG) and rudder deflections



Center of Gravity (CG):

Normal flight: 540mm measured from the leading edge of the air inlet

3D flight with Vector thrust tube: 560mm measured from the leading edge of the air inlet

Rudder deflections - normal flight:

Elevator: 30mm up / 30mm down

Aileron: 16mm up / 16mm down

Rudder: 35mm right / left

Canard: 25mm up = Canard goes down at the trailing edge / 15mm down = Canard goes up at the trailing edge

Vector: 10mm up / down and right / left

Expo over all: ~30%

Rudder deflections - 3D flight in torque position only:

Elevator: maximum

Aileron: maximum

Rudder: maximum

Canard: 25mm up = Canard goes down at the trailing edge / 15mm down = Canard goes up at the trailing edge

Vector: maximum

Expo over all: ~30%

Please note: The above values are suggestions based on the first flight tests. It is always possible to adjust these values to your personal likings but it is advisable to start with the moderate values given above!

Thank you!
Your CARF-Models Team