Chengdu J – 10
3D Jet

Instruction Manual (english)

Thank you very much for purchasing our J-10 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 your dealer, your Rep or CARF-Models directly.

Email: feedback@carf-models.com

Telephone: Call 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, and 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 RESPONISBILITY FOR YOU 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 judgment 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 spectator. If not handled with care & used according to the instructions. Make sure that you operate your L 39 according to the laws and regulations governing model flying in the country of use.

The engine, landing gear, servo, linkages and control surfaces have to be attached properly. Please use only the recommended servos and accessories. Make sure that the Centre of Gravity 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 engine. Have a helper hold your plane from the nose before you start the engine. Make sure all spectators are far behind, or far in front of the aircraft when running up the engine. 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 engine 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 engine, 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 modelers.

Adhesives and Solvents

Not all types of glue are suited to working with composite parts . Please don't use inferior quality glue you will end up with a inferior quality plane .that is not strong or 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 flock 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 trough 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 joints. Don't use ACETON 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.

Tip:
Use only high quality 5 or 30 min 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 change their color and get more and more soft until the bond eventually fails.

At CARF Models we try our best to 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. 7 pcs standard size digital servos with at least 20 kg (JR 8711, Futaba 452MG, or similar)
2. 1 x Pneumatik Set J10
3. 1 x Smoke Tank Set
4. 1 x standard retract set or
5. 1 x retract set with light weight carbon struts
6. 1 x Powerbox Sensor, Evolution, Baselog
7. 1 x Powerbox Smoke Pump
8. 1 x Receiver Batteries
9. 1 x Powerbox I Gyro oder Gyro S3e
10. 1 x Turbine Jetcat P180 RXI oder similar
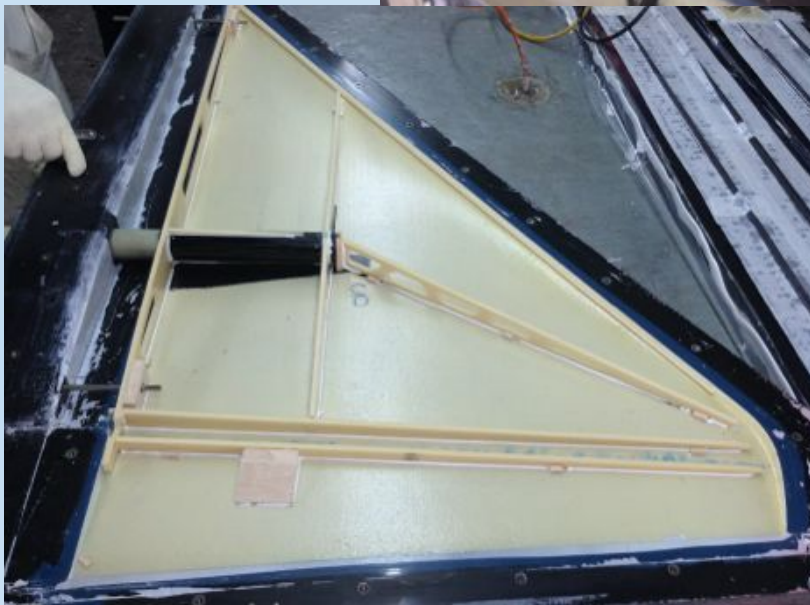
The fuselage is made in total area sandwich technology (TAVS) and reinforced with carbon in the highly stressed areas. Carbon reinforced gear formers are installed and alligned.

The wing is made in TAVS technology as well. Minimized internal structure makes it incredibly light but strong enough for any possible high speed or 3D maneouvers

List of the included hardware

Material Name	Piece	For What
ALL THREAD M3 x 200 mm	1	Ruder
Plastic ball link M3	2	Ruder
Button head screw M3 x 15mm	2	Ruder
SHEET METAL SCREW 2.9*13	4	Ruder
WASHER M3	4	Ruder
Stop nut M 3	2	Ruder
Rubber Grommet 10mm	1	Ruder
Allen Screw M4 x25mm	1	Ruder
ALL THREAD M3 x 50 mm	4	Vektor
Clevis M 3	2	Vektor
Stop Nut M 3	4	Vektor
WASHER M3	10	Vektor
Plastic ball link M3	2	Vektor
ALLEN SCREW M 3 x 16	2	Vektor
SHEET METAL SCREW 2.9*13	8	Vektor
Rubber Grommet 10mm	4	Vektor
Stainless Tube 50 mm	2	Vektor
Nut M 3	2	Vektor
Carbon Tube 1000mm	2	Vektor
Carbon Tube 500mm	2	Vektor
ALLEN SCREW M 4 x 25mm	4	Turbine Mount
Swasher M 4	4	Turbine Mount
T Nut M 4	4	Turbine Mount
ALLEN SCREW M 4 x 25mm	12	Landinggear mount
Swasher M 4	12	Landinggear mount
Plastic ball link M3	2	Nose wheel stering
Allen Screw M3 x 16 mm	2	Nose wheel stering
ALL THREAD M3 x 40 mm	2	Nose wheel stering
Stop nut M 3	2	Nose wheel stering
Allen Screw M3 x 16	1	Batterie Support
Swasher M 3	1	Batterie Support
T nut M 3	1	Batterie Support
Allen Screw M 4 x 12 mm	1	Canopy

List of included hardware

SHEET METAL SCREW 2.9 x 9 mm	6	Bottom Hatch
ALLEN SCREW M 4 x 30mm	12	Fuselage and Nosel Joining
Servo mount plywood	1	Canard
T Nut M 4	2	Canard
WASHER M 4	6	Canard
ALLEN SCREW M 4 x 15 mm	6	Canard
SHEET METAL SCREW 2.9 x 13mm	4	Canard
WASHER M3	4	Canard
Allen Screw M 3 x 12mm	4	Canard
Clevise Alu M 3	1	Canard
Nut M 3	1	Canard
ALL THREAD M3 x 30 mm	1	Canard
Servo mount plywood	2	Wing
SHEET METAL SCREW 2.9 x 13 mm	8	Wing
SHEET METAL SCREW 2.9 x 9 mm	8	Wing
WASHER M3	8	Wing
Plastic ball link M3	2	Wing
Allen Screw M 3 x 16mm	2	Wing
Stop nut M 3	2	Wing
Clevise Alu M 3	2	Wing
Nut M 3	2	Wing
Carbon Tube 3/5mm 230mm long	2	Wing
Rubber Grommet 10mm	2	Wing
ALL THREAD M3 x 230 mm	2	Wing
Batterie Support set	1	3 mm Plywood
Rear bottom Fin set	1	Composite sandwich
Elektronic support	1	3 mm Plywood with carbon
Support Vektorlinkage	4	Plywood
Airvalve Support	1	Plywood
Hoppertank support	1	Plywood
Kerosin pump holder	1	Plywood
Turbine distance wood	2	Plywood 3mm 16 x 300 mm
Kero and Smoketank support	1	Plywood
Fuel Tank	1	Composite
Fuel Tank Fitting	1	

Included Hardware

Fuel tank

Vector tube

Smoke tank mount

Battery support

Pump holder

Hopper support

Vektor linkage support
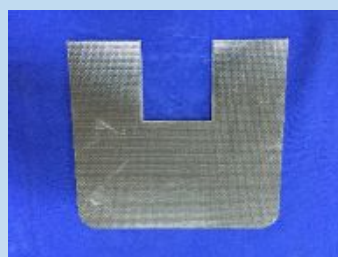
Electronic tray

Air valve support

Ventral fin set

Turbine mount spacers
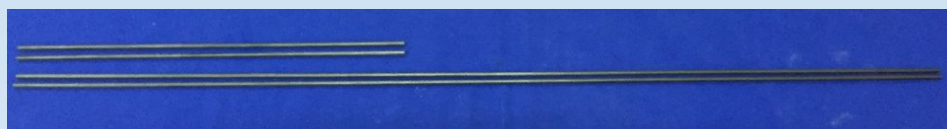
Vektor linkage

Hardware bags

Canard

Rudder

Gear

Wing

Turbine mount

Bottom hatch screws

Nose gear hardware

Fuselage joining bolts

Thrust Vector mount

Canopy and battery
support mount

Rudder and Fin Installation

The rudder linkage consists of an M3 all thread and two ball links. Install one ball link to the servo horn in 10 mm distance from the center. Then install the servo inverted into the rib's cut out. Use the 2.9x13 mm screws only!

Then insert the all thread through the slot and screw it at least 10 turns into the ball link.

Finally install the ball from the bottom side to the double thickness rudder horn and turn the plastic ball link on the all tread rod. Adjust length if necessary.

Canardservo Montage

Attention: The arm length should not be more than 10-12 mm, as the canard is only needed for precise gyro corrections in fast flight.

The canard axle with torsion linkage is factory built and ready for installation.

First assemble the plywood servo mount. Use CA to tack glue and then fill the nounts with thickened resin and reinforce with small patches of fiberglass. Mount the servo with the 2.9 x 13 screws, then bolt the servo mount on to the canard mount.

Drill your servo horn with 3mm dia to bolt on the ball link. Then install and adjust the linkage as shown on the photo above.

Wing servo mount
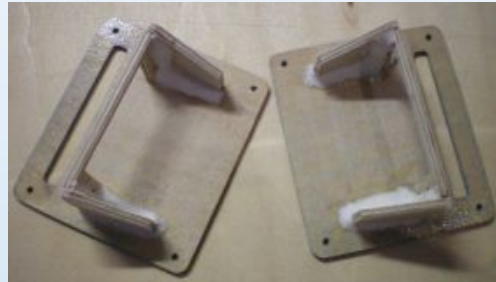
First sand the inner surface of the servo hatches with coarse sand paper. Then assemble the plywood servo mounts just like you did with the canard mount, and glue them on to the servo hatch. Test fit the servo (with installed servo arm) to make sure you glue the mount to the right spot in relation to the slot. To glue and reinforce everything remove the servo again.

Once the glue has set, install the servo permanently with the 2.9 x 13 mm sheet metal screws and washers. Extend the servo wires as fit and screw the hatches on with the 2.9 x 9 mm sheet metal screws.

Wing servo linkage
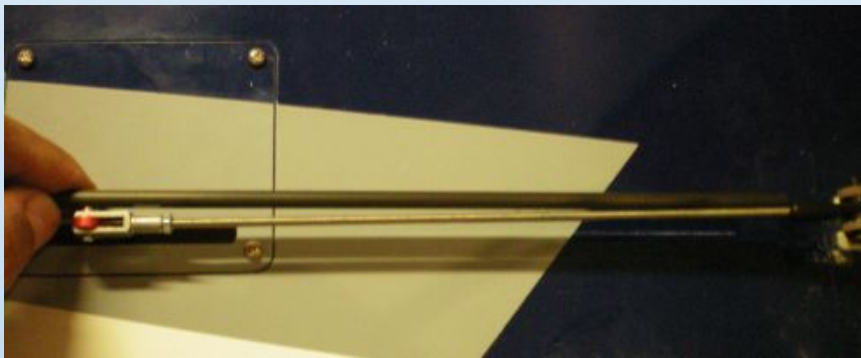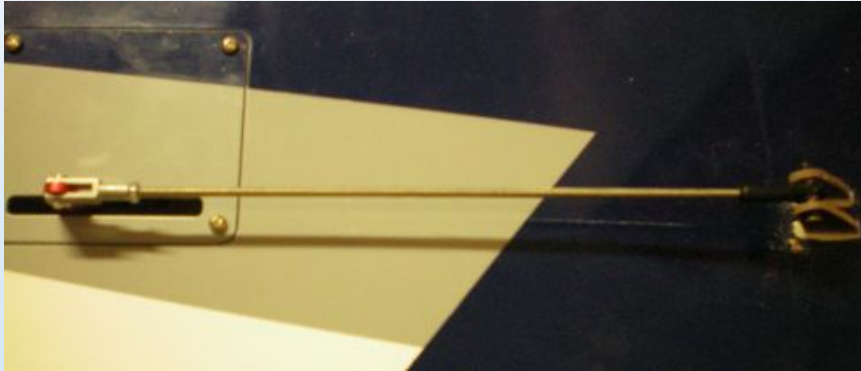
Servo horn length should be 25 mm (1"). This is important to copy for the gyro setup later.

Drill the servo horn 3mm, use a drop of grease and mount the aluminum clevis. Mount the M3 all thread, install the ball link temporarily and fit to the dual control horn. Then cut the carbon reinforcement tube to the precise length, take the ball link off again and slide the tube over the all thread.

Finally install the ball link and turn it tightly against the carbon tube.

Battery tray

Assemble the battery tray from the 3 wood parts and glue and reinforce well. Install the T-Nut and the mounting bolt and trial fit it in the nose of the fuselage.

Sand the inner surface with coarse sand paper and glue the two formers in with 30 min expoxy. You can fill the glue mix with some glass fiber or cotton flock.
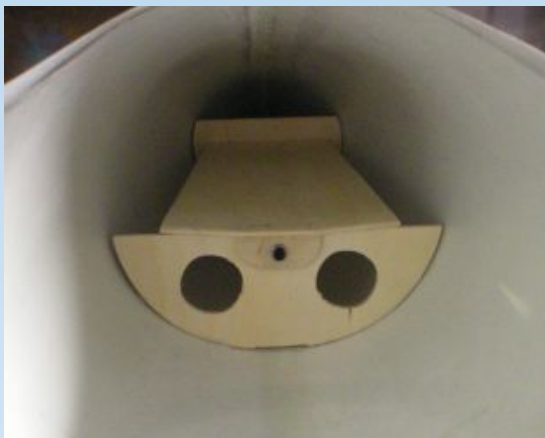
Finally check that the horizontal board can be removed and reinstalled without problems.

Canopy and cockpit

Canopy and cockpit

Roughly cut the canopy with short scissors, put it over the canopy cutout and mark the final cut lines with a permanent marker, approx. 2 mm outside of the frame edge. Then cut front and rear part carefully with short scissors. Warm up the plastic if you are working in a rather cold workshop!

Since the canopy is quite small, gluing is not difficult. Just insert from inside and fix from outside with some tape, use a few dots of CA glue and complete it with a bead of 30 min epoxy from inside.

Important is that you do this while the canopy frame is installed on the fuselage. Glue the rear part first. There is easy access from front and rear.

Canopy and cockpit
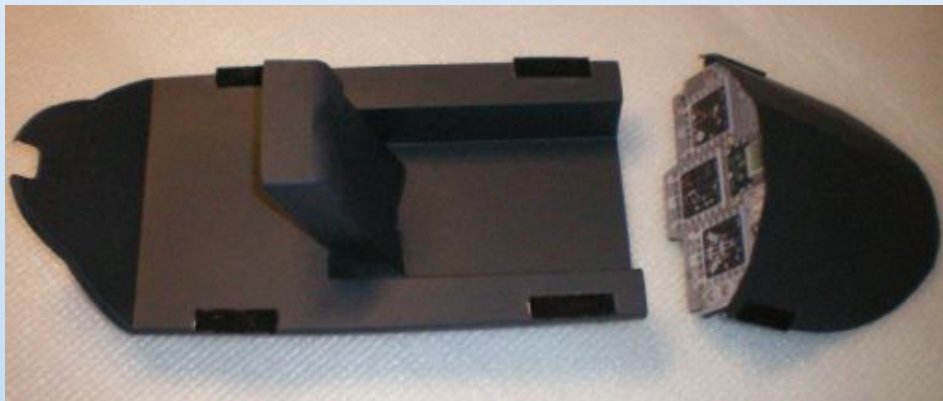
Cut the cockpit parts, assemble and reinforce the tub with the included plywood strips. Sand the surface well before you paint grey. Last but not least glue the printed instrument panel to the dash board.

A few strips of self adhesive Velcro will hold it in place, from below against the flat edges of fuselage's cut out.

Main and hopper tank

Follow the pictures to assemble the main tank. Solder the short bass tubes to the 4mm fuel tubes to act like a barb. This is VERY IMORTANT if you don't want you engine quit in a hover down on the deck… They prevent the fuel line from slipping of and make sure it seals perfecty, even after attaching small cable ties.

Install the brass tube in the center of the Tygon clunk line so that the baffle will not rub the fuel line.

Insert the brass tubes through the brown rubber plug and bend them as needed. Heating the tubes for an instance to a red glow temperature (propane torch) softens them for smooth bending over your finger.

Main and hopper tank

Use a very short 6mm festo tube for the clunk line. The clunk is placed in the cubic center of the hopper, it is not designed to move at all.

For the breather tube (connection to the main fuel tank) use a piece of tygon and cut a "V" shape to the end, that makes sure you get as much as possible air out during refill .

The wood parts of the hopper tank mount are self explaining. Glue them together with thick CA glue and mount the hopper with a strip of Velcro.

Smoke tank assembly (optional)

The optionally available smoke tank is assembled following the same process as the main fuel tank.

Then glue the smoke tank mounts (two plywood pieces with two half round cutouts) against the smoke tank.

The smoke tank gets tied against the main tank with two long strips of double sided velcro. Two long cable ties if attached carefully, can do the job, too.

Installation of smoke injector tubes (optional)
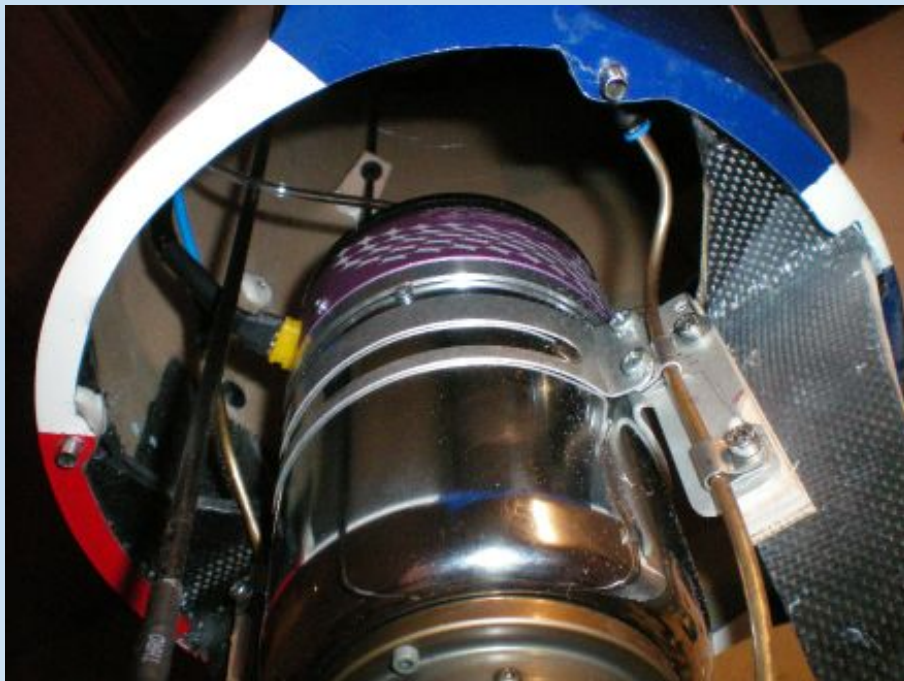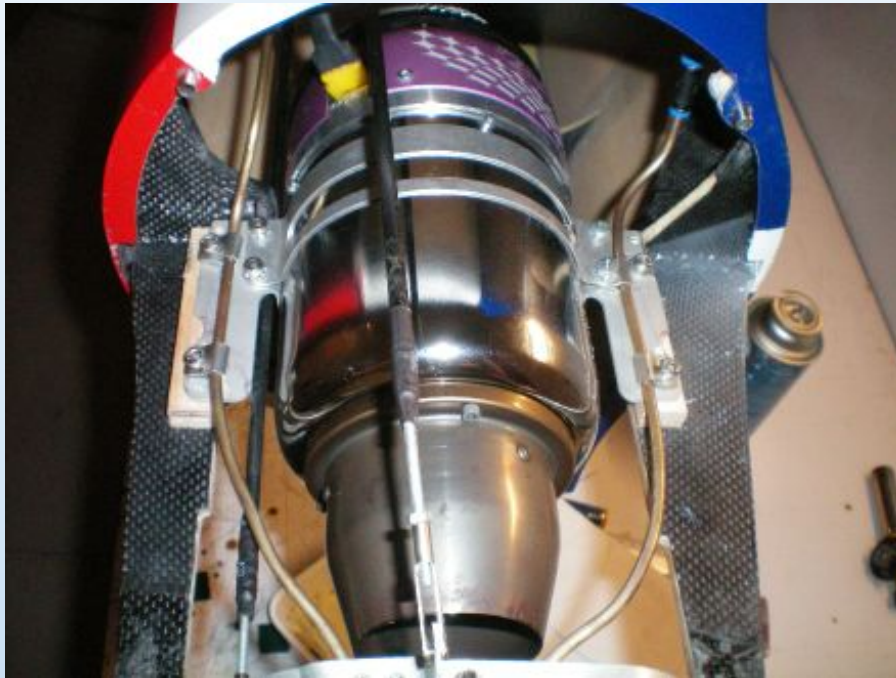
Use 4 mm brass tubes and attach as suggested on the photos above.
Soften them if necessary by glowing with a torch. Make sure they to not
restrict the movement of the vector tube in any way.

Engine and vector installation

Die The vector linkage is made from 4 long but light weight carbon tubes, threaded end pieces and stainless steel connector. Sand all carbon tube surfaces outside (coarse sand paper) and inside (3mm drill bit) before gluing anything. Glue with good epoxy or Hysol.

Connect a long and short carbon tube with the stainless connector tube. For the looks you can attach a black shrink tube when done.

Vector tube linkages

Roughen the inner ends of the carbon tubes with a drill bit .

Wrap some yarn around the all thread stud and apply Hysol. Then slide the stud into the tube.

After that wrap some yarn around the outer diameter of the carbon tube and harden this with CA glue.

Once hardened, sand the surface a little and attach a black shrink tube for the looks.

Vector tube and servo installation
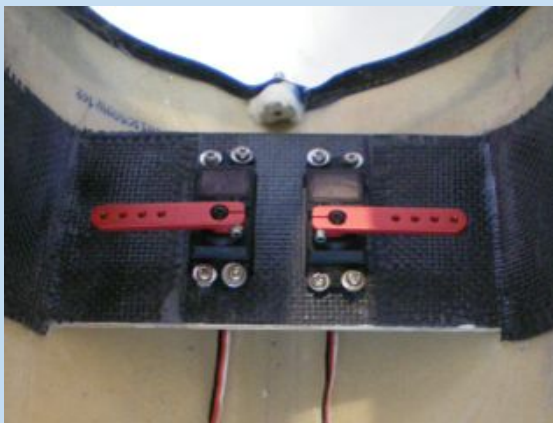
Install the vector tube now into the mounts. Use the phenolic spacers, M3 bolts, washers and lock nuts.

Make sure that the vector tube can move freely to all directions.

Install the vector servos with 38 mm (1 ½") servo arms. Drill with 3 mm and bolt the ball links

38 mm
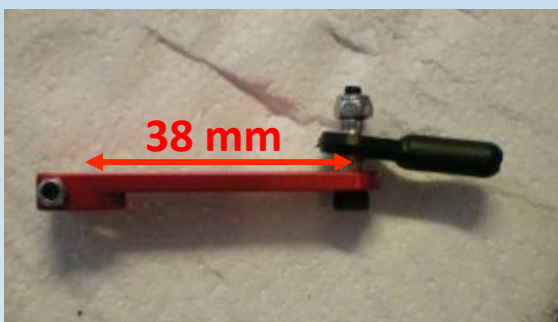
Vector final installation
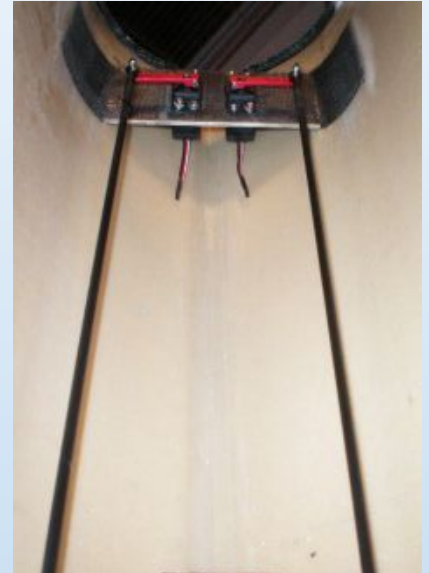
Now turn the previously finished linkages into the plastic ball links on the servo.

Adjust the length of the linkages so that the vector is pointing as straight as possible.

If necessary, you will have to bend the yaw linkage slightly to allow full deflection when the engine is installed. Final setting, however, has to be done when the engine is permanently installed.

Remember to secure the clevises with loctite, but only after everything is installed and tested.

Vector final installation

Now remove the linkages from the plastic ball links once more and slide the wooden supports (with attached rubber grommet) over them. Locate the best position and glue them to the fuselage. You can use a small patch of glass cloth to reinforce the joint.

It is important that the linkage is routed as straight as possible, so that the movement of the vector tube is with the least amount of friction.
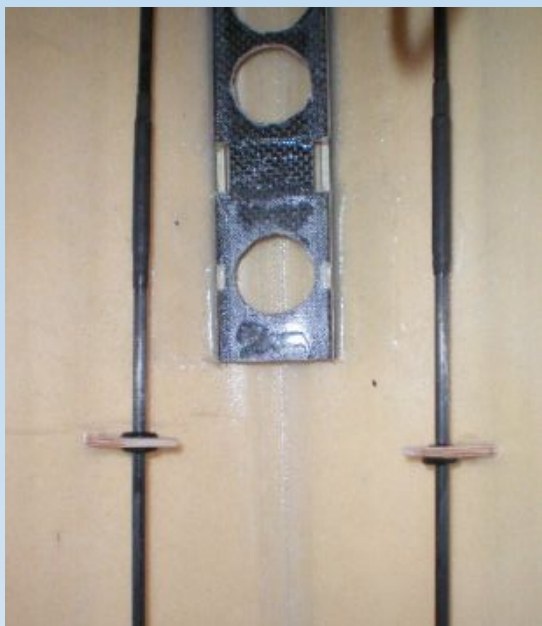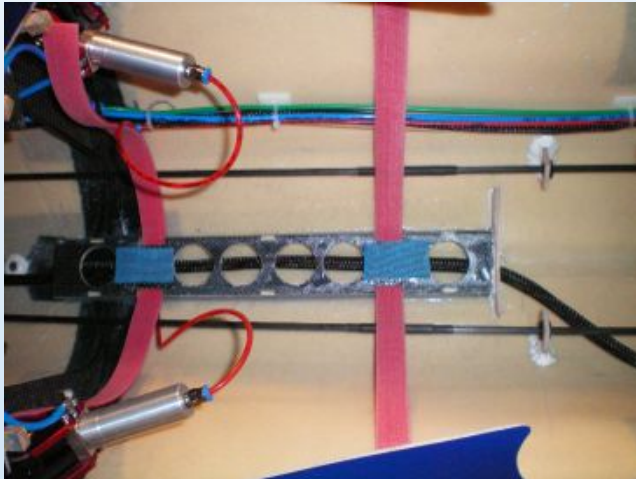
Vector final installation
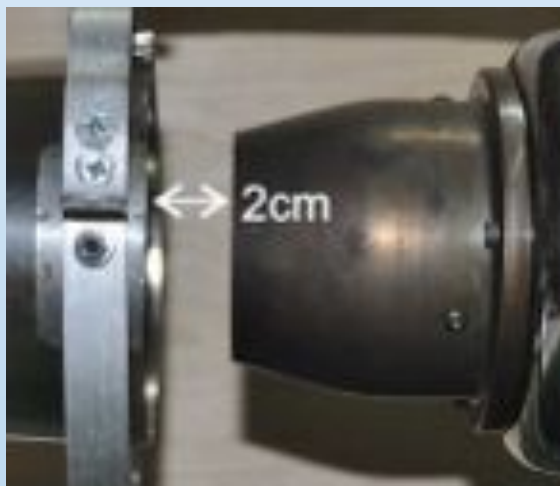
Trial mount the engine and use the wood strips as spacers until the engine nozzle is well centered in the vector tube. You also need to take care that the distance from the rear edge of the engine nozzle to the intake of the vector tube measures approx. 20 mm.
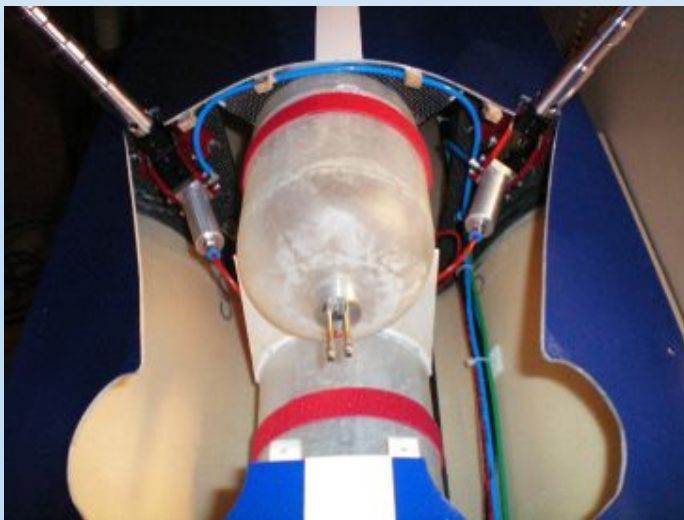
Main and smoke tank installation

Slide the long vecro pieces through the slots in the tank mount and attach the main fuel tank as shown on the photos.
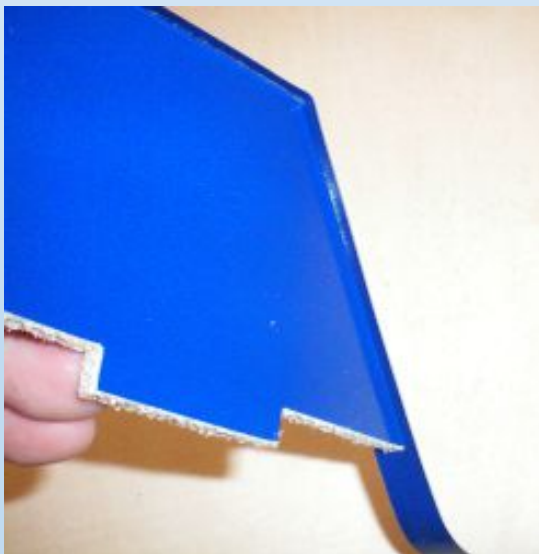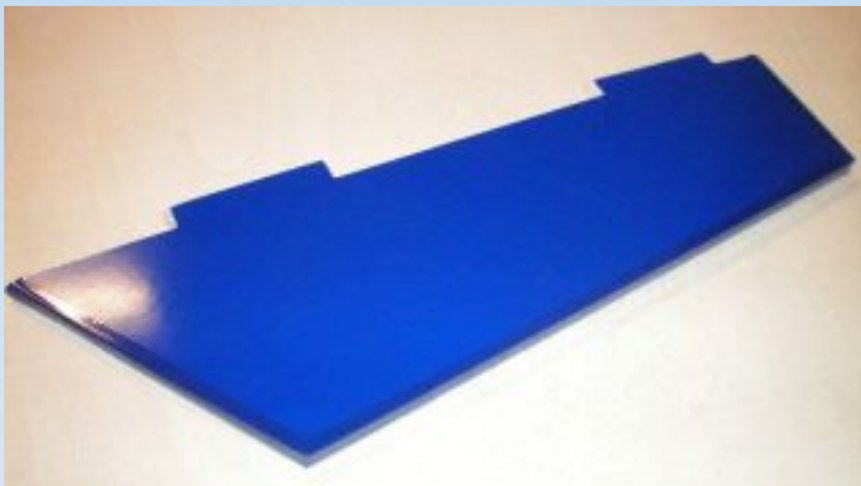
Main and smoke tank installation

The installation of the smoke tank has been described in an earlier section, here are the photos to illustrate how it's done.

Ventral fins

Use some vinyl to cover the Open foam edges of the ventral Fins.

Ventral fins

Sand the contact surfaces and then glue the two fuselage extensions to the fuselage. Use 30 min epoxy.

Then measure 25 mm (1") from the rear edge and trial fit the ventral fins to their final position. Mark the positions of the tabs, drill/grind slots in the fuselage and glue the ventral fins to the fuselage, interlocking the tabs in the slots. Use 30 min epoxy for this work.
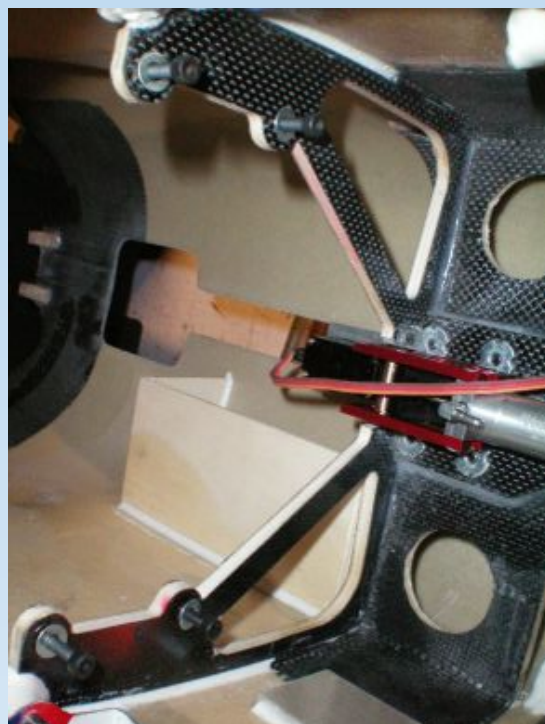
Retract installation

Use the following photos as guideline to install the main and nose landing gear. Both Behotec and Airtech Germany systems will fit the pre-drilled mounting formers.
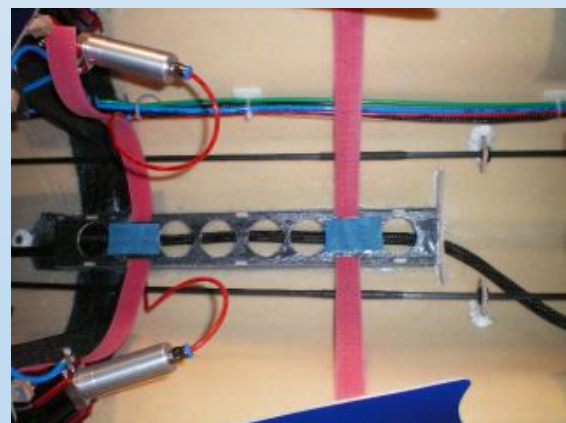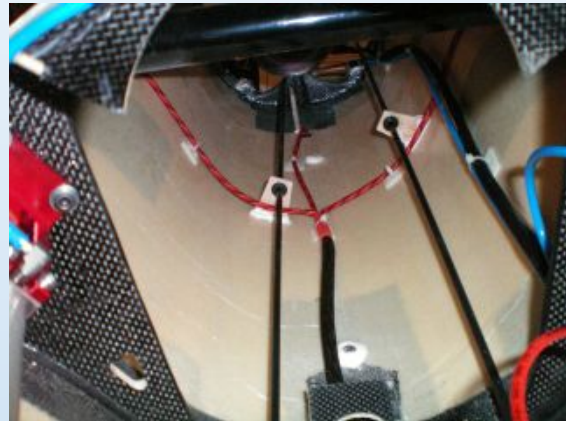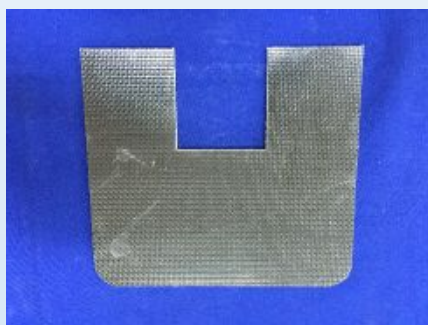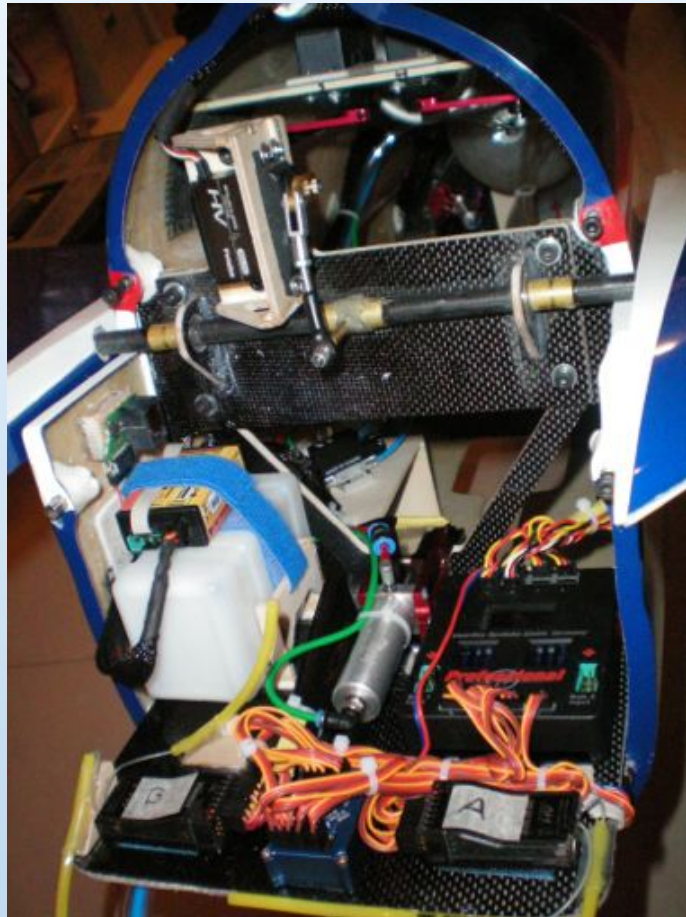
Retract installation

Wiring and plumbing
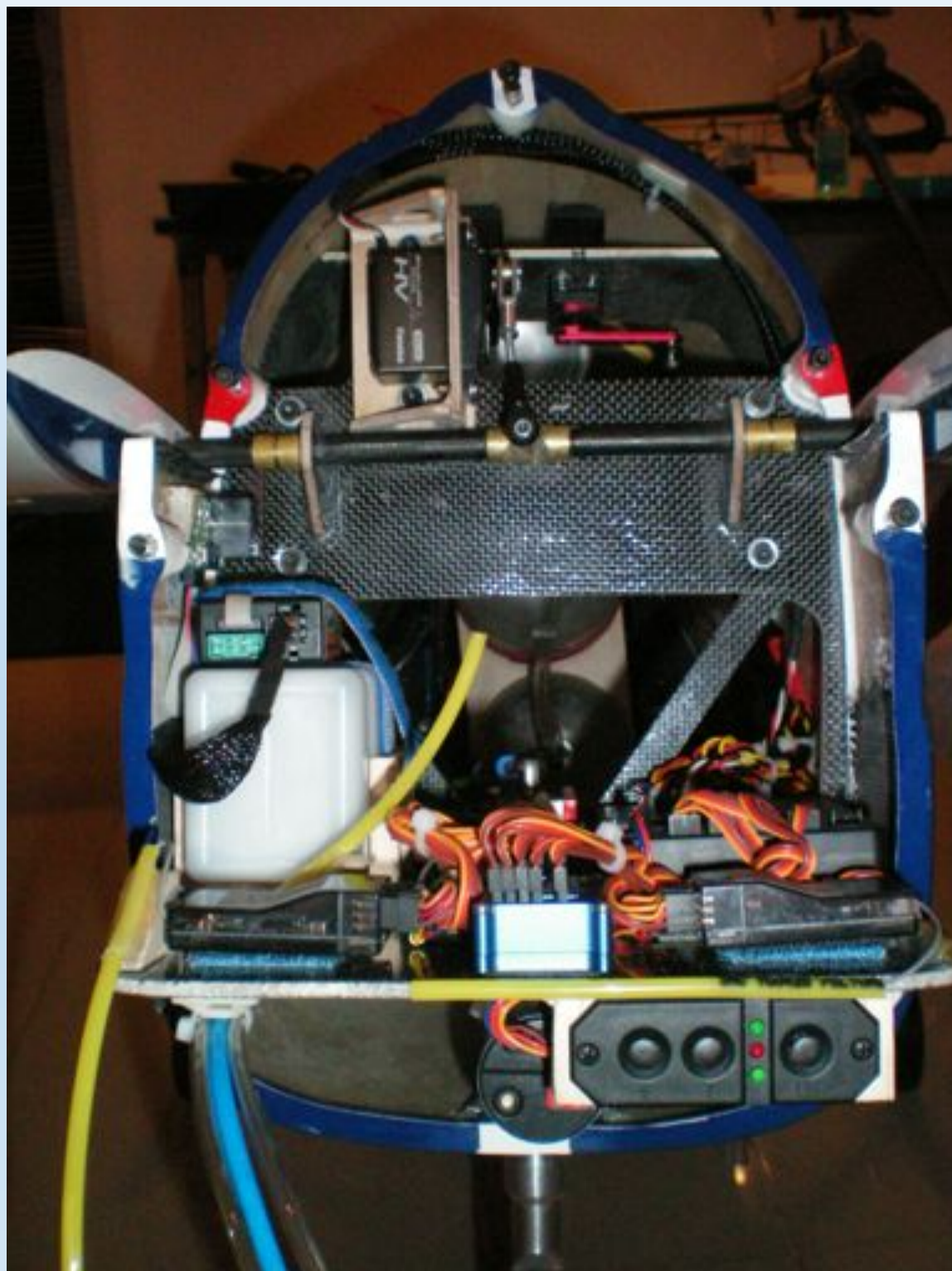
![CARF-MODELS logo]

Wiring and plumbing

Equipment installation

Equipment installation

Equipment installation

Balancing

The Center Of Gravity is 32-33 cm behind the leading edge of the wing root.

You can drill a small hole into the area of the fuselage which is covered by the wing root, right and left side. After drilling the holes, glue small plywood reinforcements from the inside over these holes (CA glue) and then re-drill the holes through the wood. A string or wire hook will help you to measure the CG precisely.

Control set up

Basic Information

Best is to use two flight modes with your J-10. One for the normal flight and one for 3D. The main difference between the two is the Vector throws, which are much less in the normal flight than in the 3D flight.

The canard is simply tied to the elevator and is constantly active. Deflection is very small as it is only used for the gyro to stabilize in fast flight mode.

Neutral Positions for the control surfaces

Flaperons (Aileron/Elevator) measure 6mm from the edge of the fuselage fairing.

The canard should be parallel to the wing, the rudder centered and the vector tube should also be aligned with the turbine nozzle, by eye.

Control set up

Control throws

Measure at the root and trailing edge of the respective control surface.

Elevator: 35mm up/down (1 ½")

Aileron: 30 mm right/left (1 ¼")

Rudder: 30 mm right/left (1 ¼")

Canard: 25 mm up/down (1")

Pitch vector: maximum
Mix to elevator but only active in 3D mode
Make sure that the vector tube does not bind anywhere and the engine thrust will never pass outside of the vector tube.

Yaw vector: maximum
Mix to rudder but only full deflection in 3D mode. For normal flight the deflection should be reduced to 30%.

Control set up

Der Höhen-Vektor:
Der Höhen-Vektor wird proportional auf das Höhenruder gemischt, ist jedoch nur im 3D Flugmodus
aktiv. Im Normalflug hat dieser keinen Ausschlag.
Im 3D Flugmodus soll der Ausschlag so groß wie möglich sein. Es ist wichtig, dass bei voll gezogenen
bzw. gedrückten Vektor und vollem Seitenvektor der Vektor sich frei bewegen kann nicht irgendwie
hängen bleibt. Auch muss der Vektor komplett außerhalb der Turbinennossel bleiben, der
Abgasstrahl muss jederzeit durch den Vektor gehen.

Der Seiten-Vektor:
Der Seiten-Vektor wird proportional auf das Seitenruder gemischt und ist jedoch auch nur im 3D Flugmodus aktiv. Der Ausschlag
im 3D Flugmodus soll so groß wie möglich sein. Es ist wichtig, dass bei voll gezogenen bzw.
gedrückten Vektor und vollem Seitenvektor der Vektor sich frei bewegen kann nicht irgendwie
hängen bleibt. Auch muss der Vektor komplett außerhalb der Turbinennossel bleiben, der
Abgasstrahl muss jederzeit durch den Vektor gehen.

I Gyro 3e setting

(Temporary)

1. First of all, install the PowerBox Terminal software to your computer. Then connect the USB interface to the iGyro3e and start the Terminal program

2. Select iGyro3e and you will come to the Expert settings of the gyro.

3. 2. Change the sliders and checkboxes as shown here:

I Gyro 3e setting

(Temporary)

3. Connect the delta servos to Aileron-A and Elevator-A. The deltamixing is done in the iGyro now. No mixing in the transmitter.
4. Connect the Vector Servos to Elevator-B and Rudder (a rudder control with the iGyro is not provided in this setup, if needed, an addition iGyro 1e can be used)
5. Use an additional channel for the Gain. Set it to -100% to get all surface working and check the gyro direction. Change it if necessary with the button
6. The iGyro is now ready setup. You have two ranges:

- Range A: normal flying. Aileron and Elevator with Heading (if you don´t want it, remove the checkbox), Vector gyro off (0%)
- Range B: 3D flying. Aileron, Elevator,Vector on, without heading
7. Fly and adjust Range A in flight with a gain slider. When you are done, land and use the percentage value to put it on a switch, for **example** your tested value is +48%. The switch also activates and deactivates the vector control in the transmitter:

Switch Position 1: 0% - Gyro off, Vector control in the TX off
Switch Position 1: + 48% - Gyro on, normal flying, Vector control in the TX off
Switch Position 1: - 100% - Gyro on, 3D Flying, Vector on, Vector control in the TX on

For more details for your Gyro setup you can contact

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The designers of the airplane will be happy to assist!