

# Bowers Fly Baby 1:2

## Instruction Manual



Big, wondering eyes we see when bystanders and fellow modelers look at the CARF-Models Fly Baby. They can't believe that what they see is a composite aircraft. It's almost like virtual reality. The staggering size of 4.2m wingspan is one thing, but how in the world have they put that fabric structure on that plane...? Questions over questions. Our Fly Baby is so unique, so special that people just don't want to believe what they are seeing.

**CARF-MODELS** 

# Liability Exclusions & Safety Responsibility

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 for loss, damage or costs 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 the 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 Ltd., is unable to monitor whether you follow the instructions contained in this instruction manual regarding the construction, operation 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 will function correctly and safely. You, as operator of the model, must rely upon your own expertise and judgement in acquiring and operating this model.

### **Personal safety**

There are a couple of things that are good to keep in mind when you are assembling your CARF-Models Bowers Fly Baby 1:2. Some of them are common sense, but it doesn't hurt to be reminded. While you are working with tools and sharp implements, be aware of others around you and the environment you are working in. When cutting or sanding materials, always wear a face mask to avoid inhaling particles. Keep your work environment clean and tidy at all times. A clean workshop will enhance the experience. Protect all parts from scratches and dents. Use rubber matting on your bench, and be careful of components like screws getting between the part you are working on and the bench. BE CAREFUL with the two combined ultra torque servos, open pushrods, and bell cranks - there is imminent danger to break your fingers when you switch on the RC system.

### **Assembly process**

This manual is set to provide detailed pictures of the building steps. You may wish to change and do some things in a different order, which is fine provided you keep in mind that some things need to be done before some others. When planning out the installation of your components, always keep the centre of gravity location in mind. If you plan ahead you can avoid having to add weight to your model. It is far easier to remedy a nose heavy model than a tail heavy model. A few grams of lead at the rear is preferable to hundreds of grams in the nose! You will find that it is easiest to fit items that cannot be relocated, like aileron, elevator, rudder and throttle servos, before you do a preliminary C of G check. Receivers, ignition and batteries etc. can generally be relocated to suit your requirements.

**Most of all, enjoy the process of creating your new CARF Fly Baby,  
a job well done is always satisfying!**



# Bowers Fly Baby 1:2

Category – Scale Prop Planes



## About

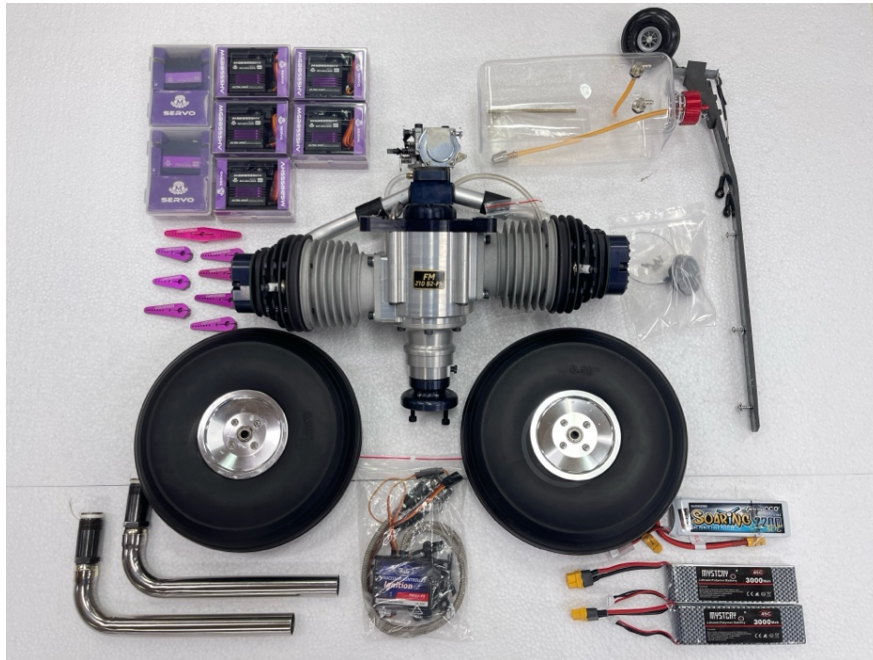
The Bowers FlyBaby is a Homebuilt Sport Plane from the '60s. It has been built after a set of plans in many different variants by aviators around the world. One of the latest builders of a FlyBaby is Jim Katz from the USA, who has created one of the nicest ones ever built. This has triggered the idea to build a FlyBaby as a large scale model. Most of such wooden airplanes are built up and covered with iron-on film. Either they are made in questionable quality in ARF factories or individually built from plans. However, not many models are actually 'building' anymore today. So the ARF factories are the only options. Wrinkles, bad glue joints, oil soaked wood frames and iron-on covering coming off over time - who doesn't know these problems.

CARF-Models set out to change this completely. Would it be possible to build an all composite 'wooden airframe' in the molds? Imitated wings made from ribs and spars, covered with fabric, stitched on the ribs? Painted in the molds, with a hard, sturdy and clean surface, easy to maintain as new?

**Well, it is. Here is the proof. The half scale CARF-Models Fly Baby!**

## What do you need???

An example of the basic and main accessories required...(picture is not including all components)



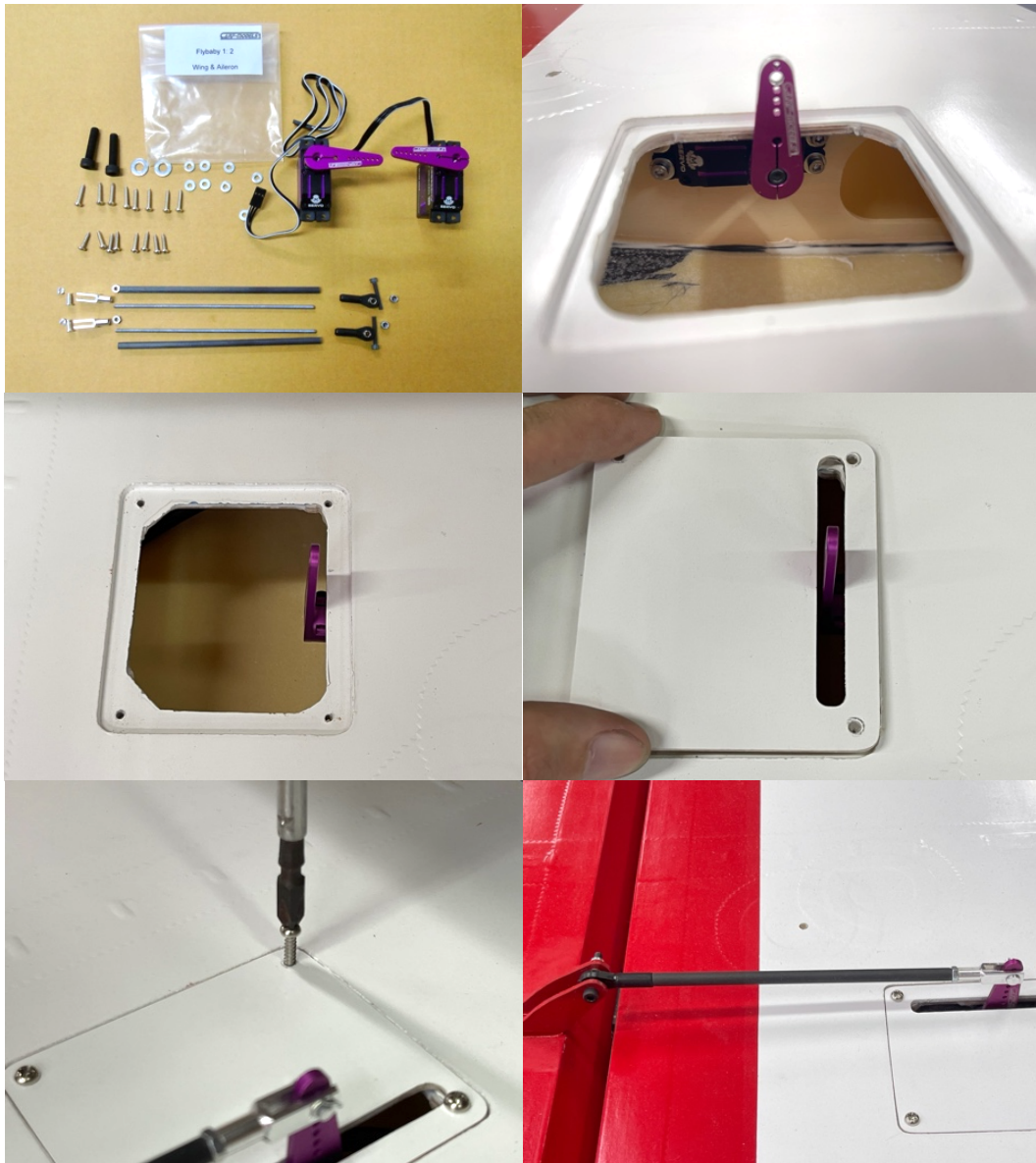
This is list of required or maybe required products to complete your Fly Baby KIT. This list only is a recommendation of how to equip your airplane. There is no reason similar products from other brands cannot be used in this plane. There are many ways and products on the market you can use with the Fly Baby.

Amount	Required	Possible Accessories
1x	Engine	Fiala FM-210 (2cyl) / Kolm 240 (4cyl)
1x	4cyl Engine Dome	Fly Baby 4cyl Engine Dome
1x /4x	Engine Standoffs	4x Aluminium Standoffs
1x	Propeller / Spinner	Fiala 36x14 / CARF Fly Baby Spinner
1x	Exhausts	Zimmermann Exhaust SET (Fiala FM-210)
1x	Kill Switch	Powerbox Spark Switch RS
2x	Throttle / Choke Servo	Mac Gregor MG8346HV
5x	High Torque Servos	Mac Gregor MGB8555HV
2x	Servo Arms short	CARF Servo Arms 25T
2x	Servo Arms long	CARF Servo Arms 25T
1x	Double Servo Arm	CARF Double Servos Arms 25T
1x	1L Tank	Aerobatic Fuel Tank 1000cc
2x	Wheels	Foam wheels 210mm / Ballon wheels 197mm; 262mm
1x	Tail Gear	Fly Baby Tail Gear
1x	Power Supplie	Jeti Central Box CB210,220 / Powerbox Competition SR2
2x	RX Batteries	Lipo 2s 3000 - 4000mAh
1x	Ignition Battery	Lipo 2s 3000 - 4000mAh
-	Servo Wire	Powerbox Servo Wire
-	Connectors	JR Connectors
1x	Pilot	Static Pilot 1:2 (Full body)
1x	Pilot Seat	Fly Baby Seat, Headrest & Control Stick

# Build Description

## Wings

- Prepare your aileron servo with your matching servo arm
- At approx. 35mm of the servo arm you drill a 3mm hole for the aluminium clevis
- Crimp a wire extension and connect in to the servo wire
- Place the aileron servo in the servo mount and screw it with 4x 3x12 allen metal screws and M3 washers
- Adjust the servo hatch and make sure your servo arm is centered in the servo arm slot (that position can vary with some servo brands with different servo case dimensions. Adjust the slot or use spacers under the servo)
- Assemble the aileron linkages with the M3 threads, 3mm carbon tubes, M3 nuts, M3 ball links and M3 aluminium clevis
- Check both linkages have the same length from the ball link hole to the aluminium clevis hole
- Install the aileron linkage with the included M3 bolts, washers, stop nuts and M3 aluminium clevis
- You may have to extend the linkage slot a bit in the length for more aileron deflection



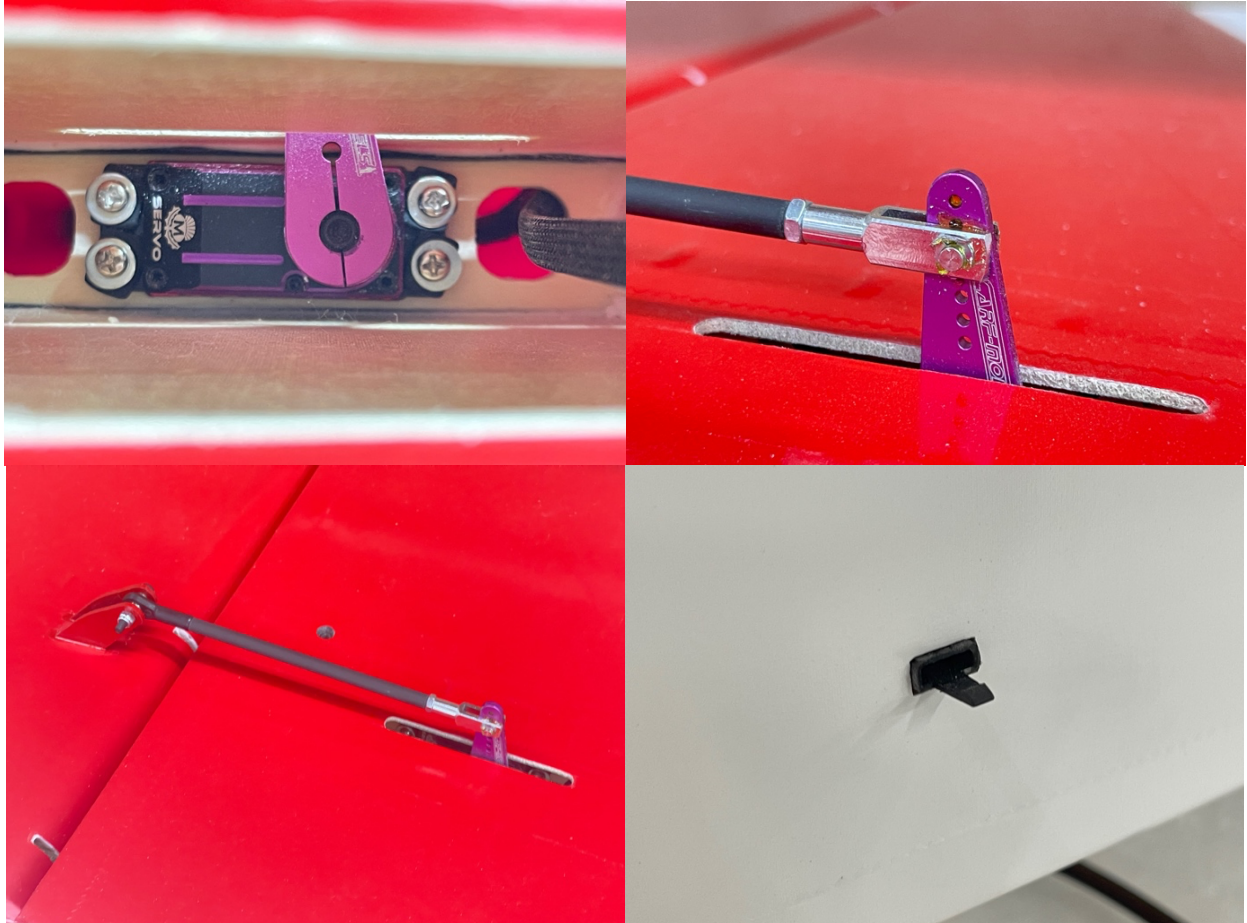


- As shown in the picture below it's the easiest solution to use a standard JR Connector for the fuselage – wing connection
- other types of connectors work as well (MR30, Mutliplex or AMP connectors for example)



### Stab

- Prepare your elevator servo with your matching servo arm
- At approx. 32mm of the servo arm you drill a 3mm hole for the aluminium clevis
- Now fit your servo wire through the servo mount and lead it back out of the elevator on the left or right cable slot
- Install your elevator servo with 4x 3x12 allen metal screws and M3 washers



## Rudder

### Fin installation

- Before you start installing any rudder equipment you should place the fin onto the fuselage
- Prepare the fin by mounting the fin tube with a M3 bolt
- Now put some glue into the hole of the fuselage and some glue on the carbon fin tube
- While the glue starts drying you should already remove the fin so it cannot stick to the fuselage
- A different way is to mark the carbon tube while it's mounted to the fin and glue the carbon tube without using the fin
- In this case it's not easy to adjust the mounting point in the carbon tube in the correct angle to the fin

### Servo installation

- Prepare your rudder servo with your matching servo arm
- Place your assembled rudder servo in the rudder servo tray (head at the back) and screw it in place with 4x allen metal screws 3x12



### Rudder cable installation

The rudder is connected via a rather traditional pull/pull setup (no crossover of the cables).

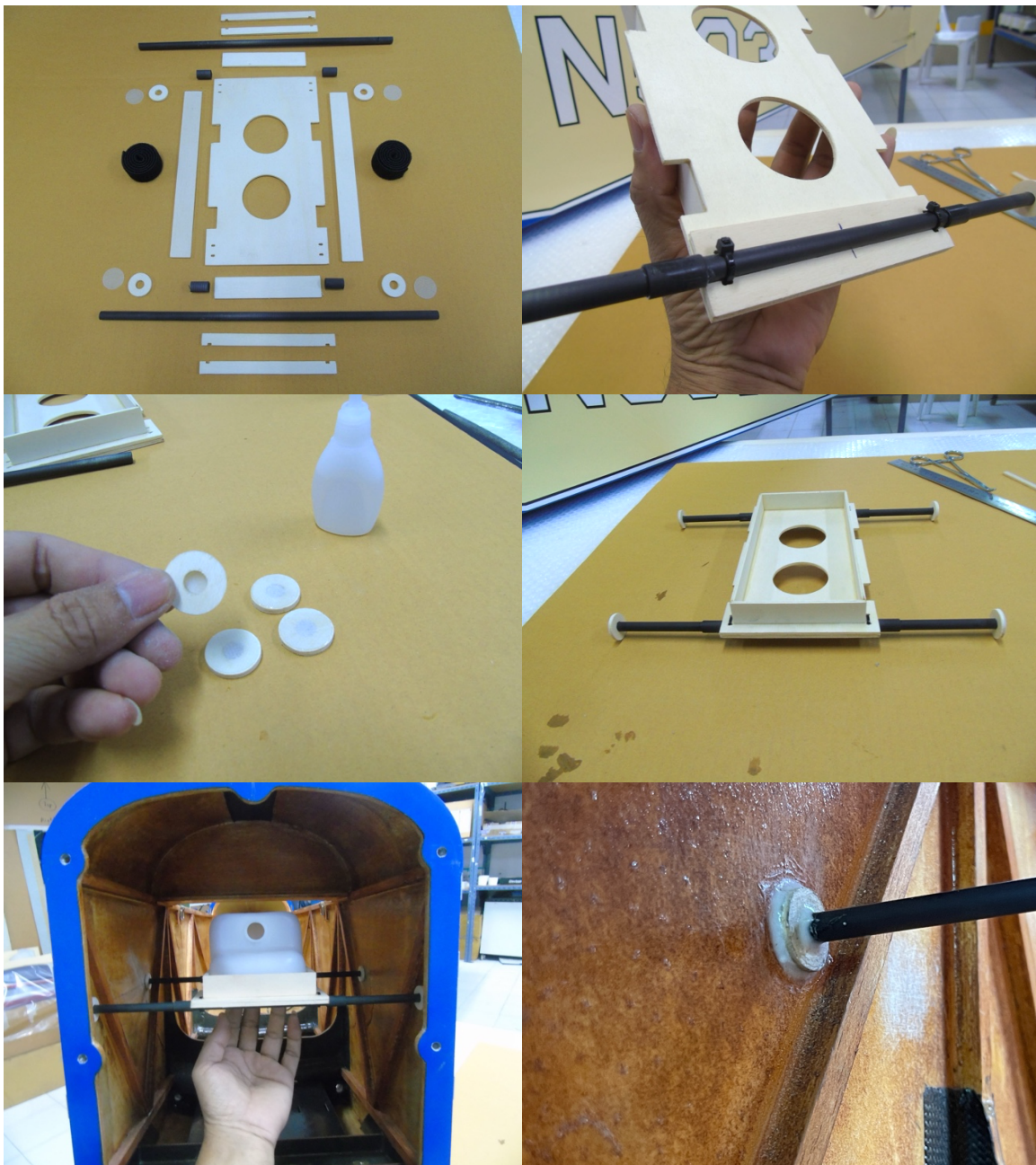
- Create the rudder cables with the two M3 ball links on rudder side first and fit them through the slot into the fuselage
- Then create the two M3 fork heads and crimp them the rudder cable on the servo side
- Double-loop the ends of the rudder cables in the back as well as in the front to make sure they won't slip out
- Crimp them to the correct length and allow a few mm of length adjustment with the threaded ends
- Then move the system from end to end to see that nothing is binding or rubbing





## Fuel Tank installation

- Before placing the fuel tank with the included welcro we recommend to put a 4mm brass tube in the fuel line to prevent the fuel line turning around (we recommend to put some anti slide material between the tank and the tray as well)
- We have created a set of milled parts and carbon tubes to mount the tray in the fuselage
- It's recommended not to install it too high in the fuselage to be able to see the fuel tank through the cockpit opening
- First you should assemble the fuel tank tray like shown in picture 1 to 4 (use CA to fix the the woodparts/carbon tubes and use resin with micro after everything is in position)
- Level your assembled tray in the fuselage and mark the four spots with a pen
- After sanding the premarked surfaces you put your fuel tank tray and hold it in place with a drop of CA on each spot
- At the end glue the fixed spots with resin and micro (after it dried your ready to install your fuel tank)



## Engine Dome installation

### Cowling preparation

- Before installing the engine you should make the cylinder cutouts in the cowling
- The crankshaft cutout as well as the three small cutout stripes below the crankshaft and a big air outlet on the bottom of the cowling come already preinstalled
- You only need to install the cylinder cutouts on the left and right side of the cowling
- We included adjustment stickers to stick onto your upper and lower cowling (made for the Fiala FM-210, if using other engines, please take the sticker idea as a start and adjust the cutouts to your engine)
- You should use the included stickers to cut your cylinder spots with less effort and quite comfortable
- After you have cut the cylinder spots take some sandpaper and sand the sharp edge to be a clean and good feeling cutout
- Additionally you should install some edge protection all around the cutouts and especially in the thin back of the cutouts to protect the spark plug wire in the thin back of the cutouts





## Engine installation

- The firewall is all set with the perfect offset to match the cowling
- 20mm standoffs are needed for the engine mount (Fiala FM-210)
- Before you start to work make sure you close all opening of your engine to prevent small pieces and dust coming into your engine
- At first, we recommend cutting out the carburetor slot below the firewall and mount the engine dome to the fuselage
- Then stand the plane up on its tail with the bottom half of the cowling bolted
- Use the engine with your standoffs and the upper cowling to perfectly line up your engine
- When your engine is lined up, take off the cowling and mark the holes at the firewall
- Use the marked spots to drill the holes into the firewall
- Before drilling bigger holes for the included M6 T-Nuts make sure your engine really is middled by assembling the whole cowling once again
- Now drill bigger holes to fit 4x T-Nuts from the back of the firewall and screw your engine with the 4x included M6 50mm bolts and M6 washers
- Don't forget to put a drop of Loctite on each of your engine bolts
- If you like you still can add 4x M6 washers with M6 stop nuts from the back (not included)



## Ignition installation

- The ignition should either be installed on top or from the inside to the top of the engine dome
- You can place the ignition by drilling four M3 hole into the engine dome's top side and mount it with 4x M3 screws, washers & stop nuts

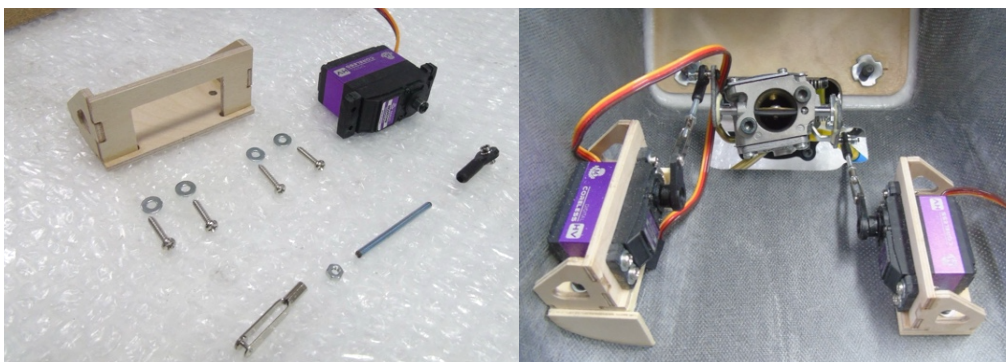


## Throttle & Choke Servo & Ignition Switch installation

- Before you start installing your throttle and choke servo you need to install the two carbon plates on the carburators throttle and choke linkage (Valach 210)

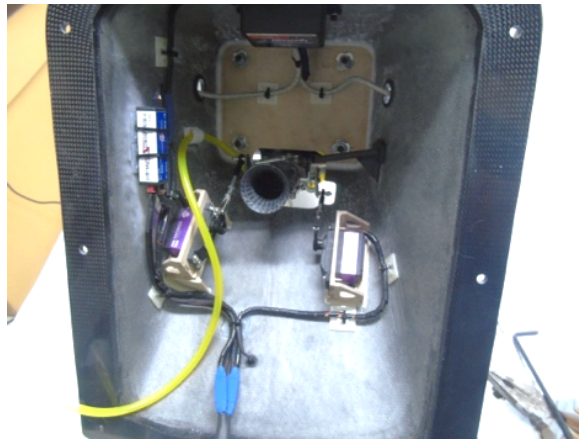


- Now you can assemble the two different servo mounts (fix them with CA first), install the servos and linkages
- Next up you place the whole combination connected to the carburator's linkages plates and mark the spot where the servo mount is supposed to be with a pen
- If you have passed this step you now should glue the two servo mounts at the marked positions in the engine's dome with resin and mirco

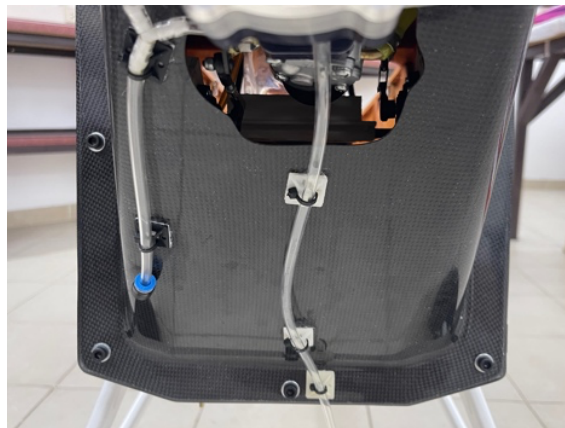




- Because you're already working on the engine dome you can install the ignition switch as well as the fuselage connector and the fuel line which connects the carburetor and the fuel tank
- The intake funnel is not standard, the Fiala FM210 work flawless without it as well



- Here we recommend to use a shorter piece fuel tube with a festo connector on the fuselage's side and fuel tube on the engine dome's side to make the connection as easy as the wire connection
- Especially for the valach 210 there is an oil collector next the usual fuel overflow line (you can install both on the outside of the engine dome)



### Engine adjustment needles

- To set up your engine without taking off the cowling we recommend to install two carbon tubes like shown in the pictures



Now your engine dome should be all set and you can move on to the next step...



## Propeller installation

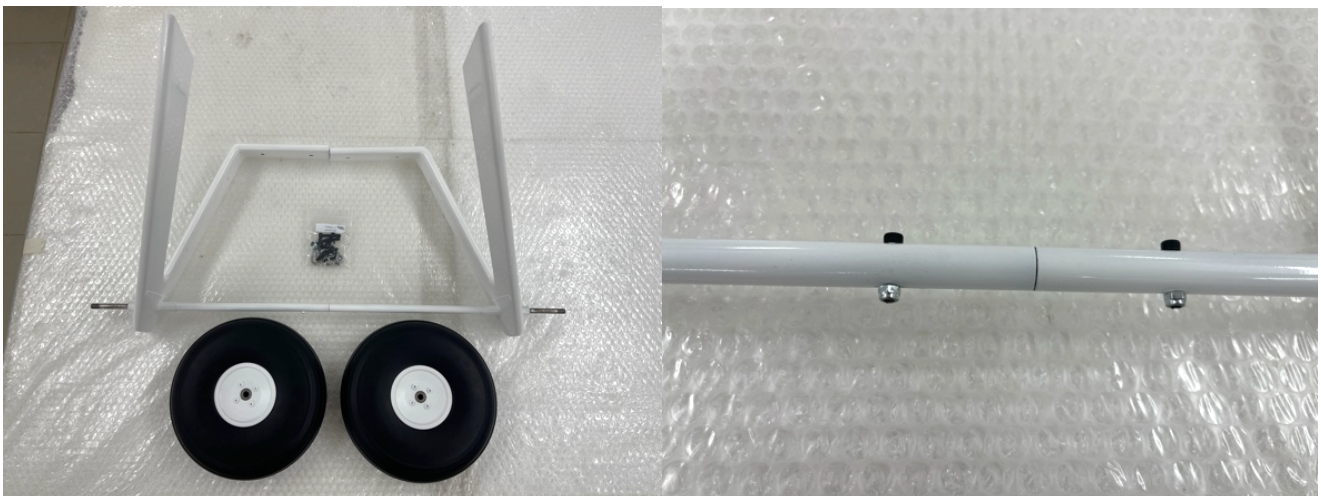
- After you have drilled the propeller you place it on the crankshaft pin
- You should be able to screw every single screw by hand until they are all in (if that's not possible you need to sand or extend the hole until it is)
- Tighten the propeller screws in a crossover and then tighten them clockwise



## Landing Gear, Wheels & Tail Gear installation

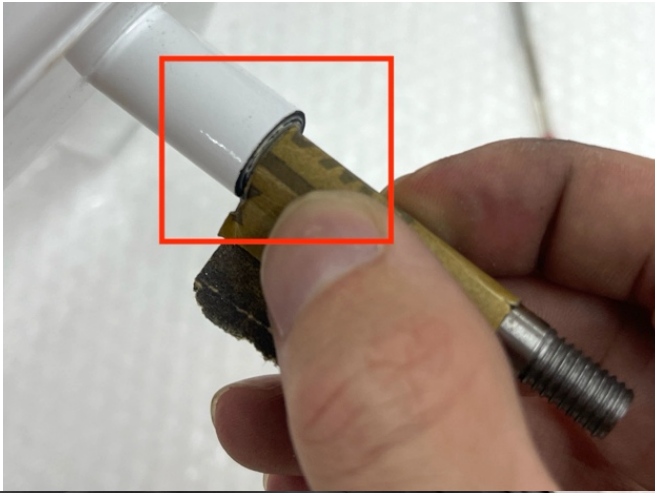
### Landing Gear

- Slide in the left landing gear from the left into the fuselage and the right landing gear from the right (make sure the lower tubes fit into each other perfectly!)
- Screw the main landing gear with 4x M6 bolts from the outside and 2x M4 bolts from inside of the fuselage (a drop of loctide recommended)
- You need to screw the lower tubes as well with 2x M3 bolts, 2x M3 stop nuts (no washers needed)



## Wheels

- Before you put on your wheel you may have to sand the inner part of the axle (there may can be a bit of color on the axle which would not give you a smooth run of the wheels)
- Install your wheels and secure it with a M6 nut (a drop of loctide recommended but not nesessary)





## Tail Gear

- Fix the tail wheel in position using tape and mark the spots where you need to drill the three holes in your tail wheel and fuselage
- The front and back holes of the tail gear need to be drilled 25mm from each edge of the tail gear surface
- The middle hole needs to be drilled at 125mm from the back hole
- After you drilled the three holes into the tail gear mount you need to tighten it with 3x allen metal screws 4x16mm and 3x M4 washers
- To finish up your tail gear installation you need to connect the tail gear wires from the lower rudder arm to the tail wheel arm with the included wiring hardware (4x crimp sleeves, 2x M3 ball links, wire, 2x M3x20mm bolts, 2x M3 washers)



## Flying wires

- First of all... no, the flying wires don't have any structural use for the strength of the airplane (do not replace them with steel wires, they would destroy your airplane)
- For this working step you need a lot of space in your workshop. You can work on each wing independently if you wish
- First install the wings to the fuselage with the carbon tubes and the two M6 bolts. Make sure they are tight on the fuselage. Sometimes the left wing needs a little more push to sit flush, we noticed this, too. But it will sit tight once the bolt is tightened
- Then familiarize yourself with the 5 different 3D printed mounting tabs. Install the top one at the fuselage frame (see photo for location) and use the long M4 bolts and stop nuts to install the other ones to the wing. It's pretty self-explaining which one belongs where. Straight ones in front, angled ones in rear. Sand the wires where they are to be inserted into the clevises.

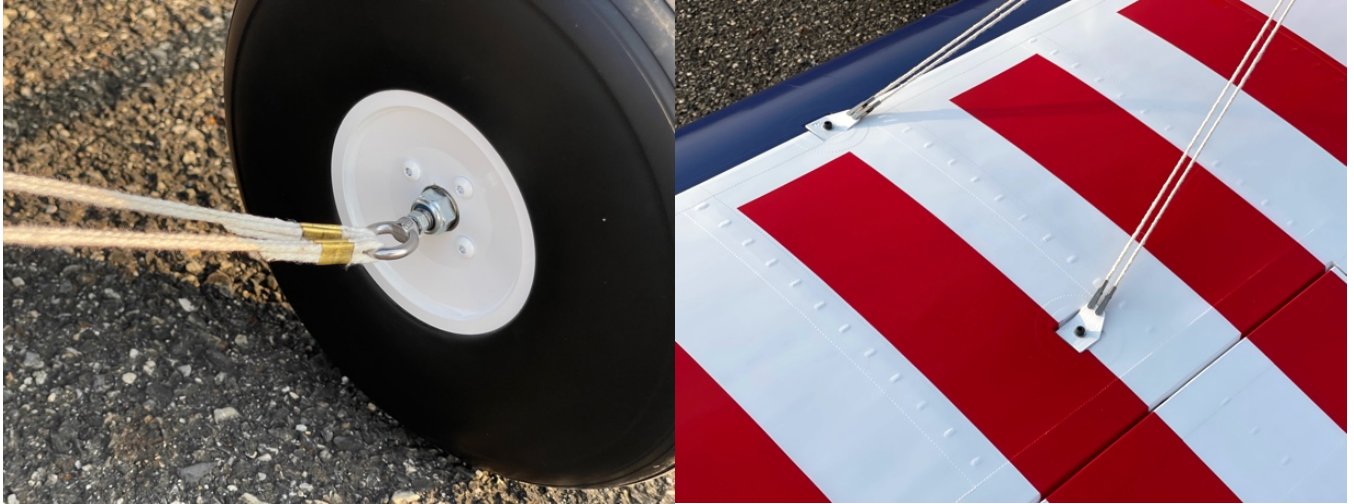
### Start with the upper wires

- Pull each upper wire through the inner clevis (fuselage side) and glue with CA glue
- Clip the clevis into the upper mounting tab
- Pull the outer end of each wire loosely through the lower end clevis and clip the clevis into its mounting tab
- Pull the wire tight and mark the wire with a felt pen where the clevis should be permanently placed
- Un-clip the outer clevis from its mounting tab, push it 8-10mm further up the wire (to create a little tension on the wire when finally assembled) and glue it also with CA glue into the clevis as possible





- Then cut the excess wire as close to the clevis as possible. Test install the upper. Pull each wire (4 on each side) through the eyelet bolt and use the brass tube pieces as shown on the photo (use CA glue to secure the wires once more).
- Then follow the same procedure for the other end of the wires like you did with the upper flying wires.
- Pull the other end of each wire loosely through the lower outer end clevis and then follow step 4, 5 and 6 of the upper flying wires accordingly.



### Manifold installation

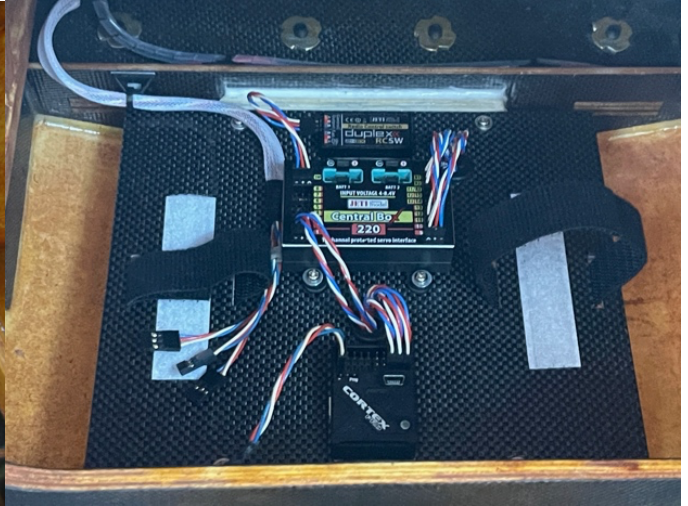
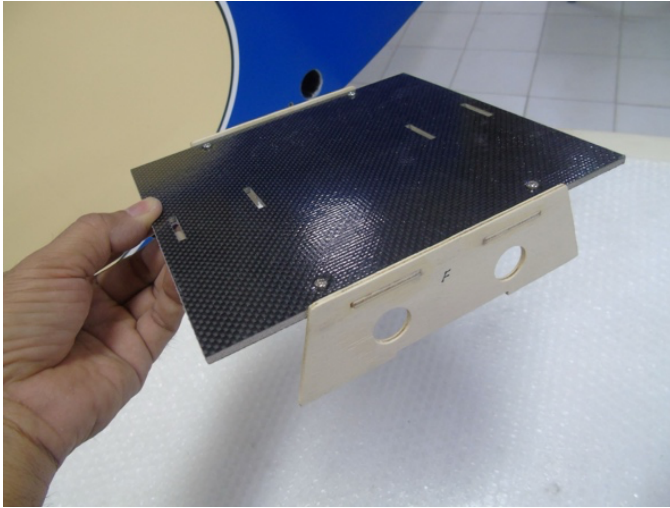
- We recommended using the Zimmermann stainless steel "L" manifolds.
- The installation to the cylinders should be quite easy.
- The most important point is to tighten them during your assembly in your workshop for the first time and retighten them right after the first engine run while the cylinders are hot.
- This is very important! Otherwise the manifolds could fall off during the first couple of flights.





## RC Board installation

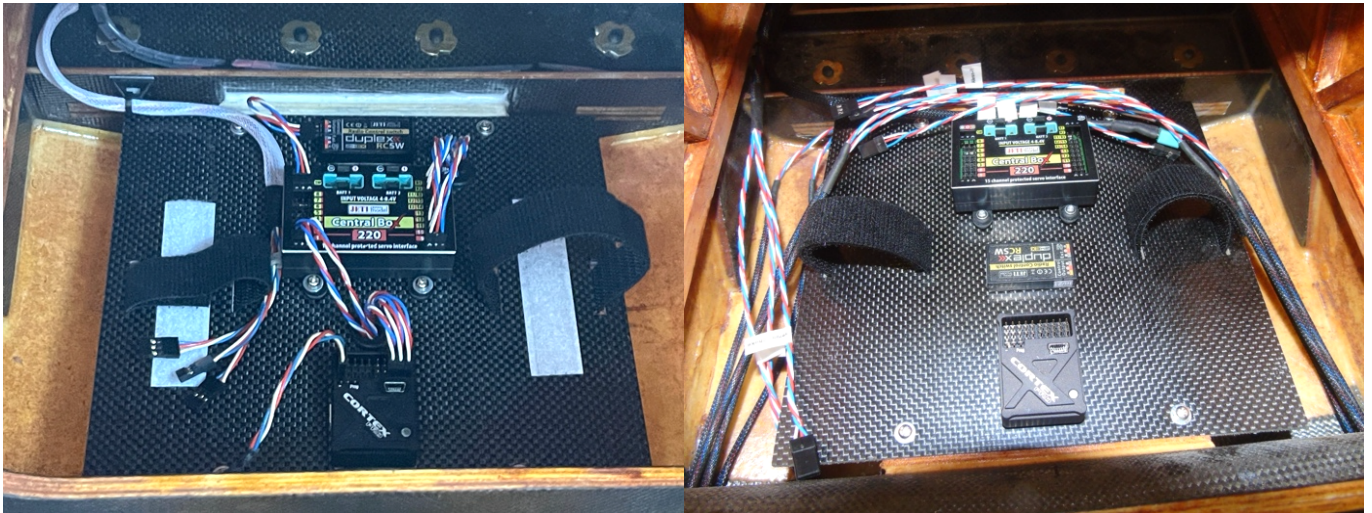
- Preassemble your rc board, fit it into the fuselage between the landing gear mount and the wing tube
- Sand the surfaces before fix the rc board with CA to hold it in position
- If everything fits good you now can glue the two mounts with resin and micro
- You now can install as well as uninstall the rc board with 4x allen metal screws 3x12mm





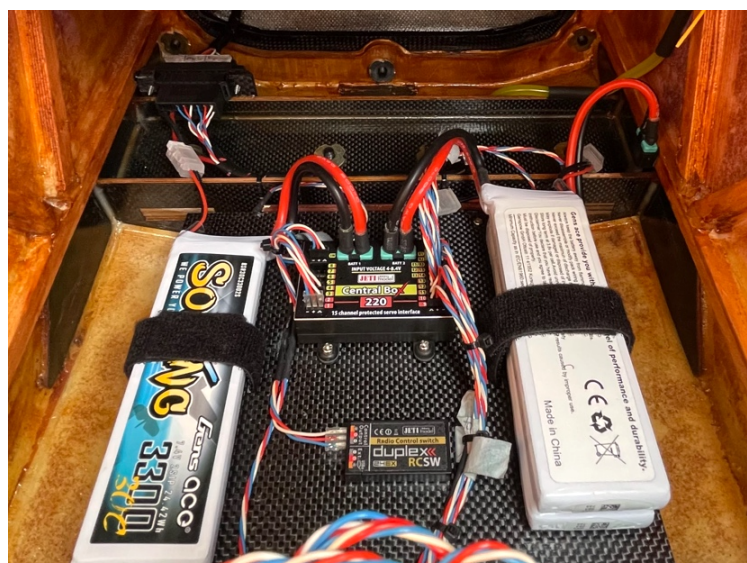
## RC Power System

- Mount your central box or similar power supplies on the included and already installed rc board (Please don't only use double sided tape to secure your power system, it's a prop plane with vibrations)
- It's the heart of the plane and shouldn't be able to move or fall off and cause an accident
- If your system doesn't have mounts use some welcro, cable ties or design your own mount to secure it
- Right next to the power supply you can mount your gyro and rc switch (Jeti)
- We recommend to drill some holes into the rc board where you can fit your wires through to the power supply, gyro and switch which only is necessary for a better look and wire management (you still can connect the wires from the left and right site of the rc board)



## CG & Batteries

- The center of gravity is 18 cm from the leading edge, or at 27% of the chord. If you're using a Gyro, that's a perfect setting. If you not plan on using a Gyro, we recommend to move the CG slightly further forward. The FlyBaby does not have very large tail surfaces, which makes it a little more sensitive to the proper CG position...
- The two rx-batteries should be placed on each site of the power system on the rc board
- The ignition battery can be placed below one of the rx batteries





**More Pictures...**

**Ignition cable:**



**Fuel Tank Overflow:**



**Useful pictures:**



## Final Setting

### Control Throws:

The throws all can be set up to maximum travel to run between 35-50% expo.

For low rates you can reduce the elevator and rudder control throws by 30% and the aileron throws by 15%, but that is very much up to your personal preference.

If your using a gyro in your Fly Baby you should set it between 20-40% gain. If you are not really sure or new to gyro you can use a rotation switch on your radio to adjust the gyro midflight (don't do that yourself, always ask your flying buddy for help in that case!)

Thank you for being a loyal customer, for choosing a fine and technologically very sophisticated aircraft over many other, maybe simpler built choices on the market. We are sure you will enjoy every minute of building and flying your Fly baby.

We hope you have enjoyed assembling your CARF-Models Fly Baby and you have many years of happy flying with it. If you have found yourself in difficulty and need some assistance, your sales rep is only an email away. Please contact your rep and they will endeavour to assist you, and get you back on track. Alternatively you can contact us via the emails below. We also welcome your feedback, please contact us if you would like to see something added or altered. We are always looking to improve our products and the information we supply.

[www.carf-models.com](http://www.carf-models.com)

Bowers Fly Baby Manual (Decemeber 2024)

## KIT Components

Product	Quantity
Fuselage	
Top Cowling	1
Bottom cowling	1
Fuselage top Hatch	1
Front canopy frame with window clear material	1
Engine dome (2 cyliner long - std.kit)	1
<b>Engine dome (4 cyliner short - option part)</b>	1
Right wing assembly with Aileron and colored servo hatch taped	1
Left wing assembly with Aileron and colored servo hatch taped	1
Right Stab - elevator with hinge, fiberglass rod Ø4mm x 580mm	1
Left Stab- elevator with hinge, fiberglass rod Ø4mm x 580mm	1
Fin - Rudder with hinge, fiberglass rod Ø4mm x 720mm	1
Right landing gear with carbon tube axles painted	1
Left landing gear with carbon tube axles painted	1
Hardware complete set with list	1
Main wing tube, Carbon Ø 40mm x 500 mm x 1.5mm	1
Rear wing tube, Carbon Ø 20mm x 500 mm x 1mm	2
Stab tube, Carbon Ø 20mm x 360 mm	2
Fin tube, Carbon Ø 20mm x230 mm x1mm	2
Set of Protection bags (wings, stabs and rudder)	1
Instruction manual	1



## Spare Parts

Whenever you have a bad landing, forget to fuel or just crack a part during transportation of your Fly Baby you possibly will need a spare part... In case please use this list to see what you need and let us or your Sales Rep know by email so we can arrange to producer your spare part even it is a custom Scheme.

Product	Art. Number	Item Type
Fly Baby Instrument Panel	170_1040-00	On request
Fly Baby Hardware Package	170_5030-00	On request
Fly Baby Fuselage	170_1000-99	On request
Fly Baby Front Canopy Frame	170_1010-99	On request
Fly Baby Top Cowling	170_1020-99	On request
Fly Baby Bottom Cowling	170_1030-99	On request
Fly Baby Fuselage Hatch	170_1040-99	On request
Fly Baby 2-Cylinder Engine Dome	170_1050-99	On request
Fly Baby Right Wing	170_2010-99	On request
Fly Baby Left Wing	170_2020-99	On request
Fly Baby Right Aileron	170_2030-99	On request
Fly Baby Left Aileron	170_2040-99	On request
Fly Baby Right Stab	170_3010-99	On request
Fly Baby Left Stab	170_3020-99	On request
Fly Baby Right Elevator	170_3030-99	On request
Fly Baby Left Elevator	170_3040-99	On request
Fly Baby Fin	170_3050-99	On request
Fly Baby Rudder	170_3060-99	On request
Fly Baby Right Landing Gear with Axle	170_4010-99	On request
Fly Baby Left Landing Gear With Axle	170_4020-99	On request