

# F3A CONTRAST LT

## INSTRUCTION MANUAL



Wing Span - 1870 mm

Length - 1980 mm

Wing area - 60 dm

Fly weight - 4850-4950 g

Thank you very much for purchasing our **CONTRAST LT** all-composite professional F3A aircraft completely made using Total Area Vacuum Sandwich technology.

The new **CONTRAST LT** was designed by Great Russian aerobatic pilot, Sergey Danilov (Master of Sports, F3A Champion of Russia, since 1996 participated in the European and the World Championships) and produced in Lithuania using top quality German made epoxy resin and glass/carbon fiber. This professional **CONTRAST LT** kit is the result of Sergey's 25 years experience in F3A world and his research in best F3A performances. This innovative design combined with the extremely lightweight structure, the full composite fuselage, wings and stabs, give the **CONTRAST LT** an impressive precision and smoothness at any airspeed and flight condition. Before you get started building and setting-up your aircraft, please make sure you have read this instruction manual several times, and understood it. If you have any questions, please don't hesitate to contact us.

**The contact details:**

**Email:** [algisu555@yahoo.com](mailto:algisu555@yahoo.com)

**Website:** <http://www.rc-composit.com>

**! Good flying to you !**

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## **5. Model Assembly Process! Warning !**

An RC aircraft is not a toy! If misused, it can cause serious bodily harm and damage to property. Fly only in open areas and AMA (Academy of Model Aeronautics) approved flying sites, following all instructions included with your plane, radio and engine, avoid flying near full-scale aircraft and avoid flying near or over groups of people.

The fuselage, wings, stabs, rudder, landing gears and other parts included in this kit are made of fiberglass and carbon fiber, the fibers of whose may cause eye, skin and respiratory tract irritation. Never blow into a part to remove fiberglass and carbon fiber dust, as the dust will blow back into your eyes. Always wear safety goggles, a particle mask and rubber gloves when grinding, drilling and sanding this parts. Vacuum the parts and the work area thoroughly after working with fiberglass and carbon fiber parts. It is important to understand that RC Compositus Company is unable to monitor whether you follow the instructions contained in this instruction manual regarding the construction, operation and maintenance of the aircraft, or whether you install and use the radio control system correctly. For this reason we at RC Compositus 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 judgment in acquiring and operating this model.

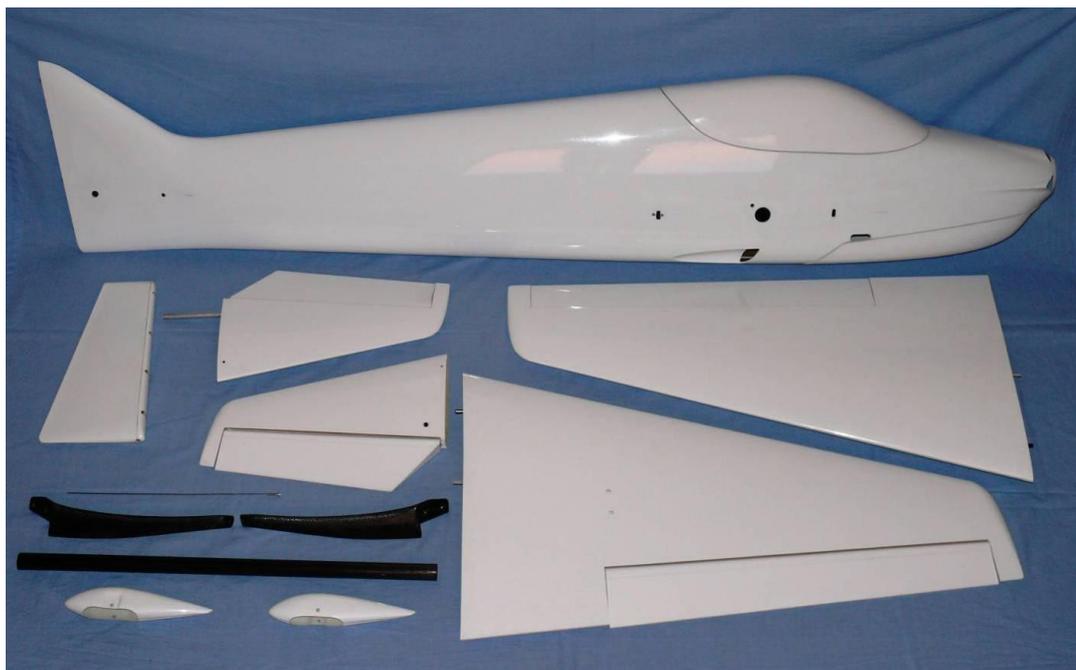
**By operating this model RC plane you, as operator, assume full responsibility for your actions.**

## 1. Available options

### 1.1. White Series

If you would like to develop your own painting scheme on your CONTRAST LT also to use own selected hardware, the basic white scheme is the way to go. It can be painted with any acrylic or polyurethane based paint. It is a good base for vinyl graphics as well.

The all white CONTRAST LT is the most economical version of this high performance F3A plane.



The all white CONTRAST LT is the most economical version of this high performance F3A plane.

#### **Kit includes:**

- Fuselage;
- Chin Cowl;
- Canopy;
- Preinstalled Removable Rudder with installed Rudder gap Cover;
- Preinstalled wings with cut Ailerons and installed Aileron gap Covers;
- Preinstalled Stabilizers with hinged Elevators and installed Elevator gap Covers
- Preinstalled Composite Landing gears;
- Preinstalled composit canalizer
- Wheel pants;
- Carbon fiber Wing tube, 25 mm Ø x 600 mm;

**Hardware's are not included in this series.**

## 1.2. Painted in Molds Series

The standard scheme with its elegant lines is just perfect for F3A, as it looks great in the air. We kept the style similar to other, typical F3A planes paint schemes, but we paid attention really well not to overload it with too much colors and shapes.

Painted in Molds Series is highly prefabricated for you. Only few hours of work will be needed to get Contrast LT ready to fly.





Painted in Molds Series is highly prefabricated for you. Only few hours of work will be needed to get Contrast LT ready to fly.

**Kit includes:**

- Fuselage;
- Preinstalled Chin Cowl;
- Preinstalled Canopy;
- Preinstalled Removable Rudder;
- Preinstalled wings with hinged Ailerons and installed Aileron gap Covers;
- Preinstalled Stabilizers with hinged Elevators and installed Elevator gap Covers;
- Preinstalled Composite Landing gears;
- Preinstalled compost canalizer
- Wheel pants;
- Carbon fiber Wing tube, 25 mm Ø x 600 mm;
- Hardware bag;
- CNC milled carbon fiber parts bag;
- Instruction manual (English);
- Decal set.

### 1.3. Custom Series

Custom Series is highly prefabricated for you. Only few hours of work will be needed to get Contrast LT ready to fly. All Custom Series planes will be airbrushed according to your wishes.

The cowl, canopy, landing gear, wheel pants and tail wheel assembly are already installed. On fuselage, seams on top and bottom are filled and repainted.

Every Custom Series design is airbrushed on white base airplane in very thin layer, after it is clear coated, sanded and polished. On average there is about 1 – 1,5 % (20-30 grams) weight increase in comparison to mold painted airplane. Bottom of the wings and stabs will be also airbrushed according to your design.



**Kit includes:**

- Airbrushed and preinstalled Fuselage;
- Airbrushed and preinstalled Chin Cowl;
- Airbrushed and preinstalled Canopy;
- Airbrushed and preinstalled Removable Rudder;
- Airbrushed and preinstalled wings with hinged Ailerons and installed Aileron gap Covers;

- Airbrushed and preinstalled Stabilizers with hinged Elevators and installed Elevator gap Covers;
- Preinstalled Composite Landing gears;
- Airbrushed Wheel pants;
- Carbon fiber Wing tube, 25 mm Ø x 600 mm;
- Hardware bag;
- Custom made protection bag set (fuselage, wings, stabs);
- CNC milled carbon fiber parts bag;
- Instruction manual (English);
- Custom Decal set.

## 1.4. RTF Series

RTF Series is fully assembled, trimmed and ready to flight planes. Only plug the batteries and your Contrast LT are ready to fly.

Your Contrast LT, can and, will be provided with anything according to your own preferences:

**Only write to us what equipment you want and we will install it.**

Composite sandwich parts are extremely strong, but fragile at the same time. Always keep in mind that Contrast LT designed for minimum weight and maximum strength in flight. Please take care of it, especially during transport, to make sure that none of the critical parts and linkages are damaged. Always handle your airplane with great care, especially on the ground and during transport, so we offer to you custom made full protection bag set (fuselage, wings, stabs) which are also part of this package or you can order them separately!

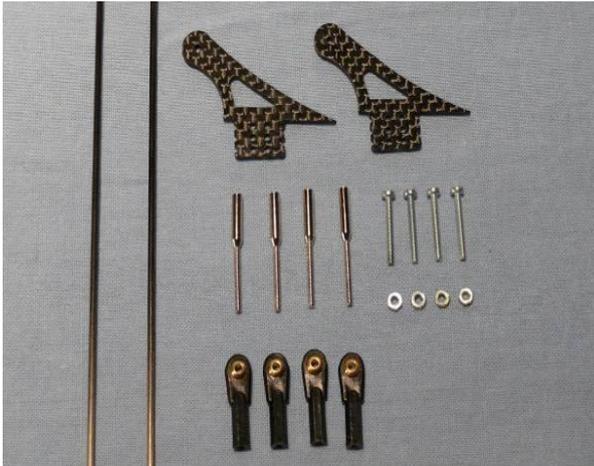


## 2. Kit Contents

### Quantity Description

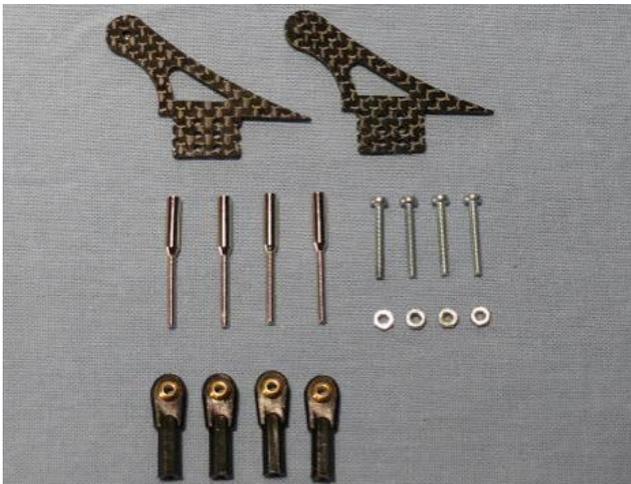
|   |  |
|---|--|
| 1 | Fuselage with hinged Removable Rudder;         |
| 1 | Preinstalled Chin Cowl;                        |
| 1 | Preinstalled Canopy;                           |
| 1 | Preinstalled Wing with hinged Aileron, right;  |
| 1 | Preinstalled Wing with hinged Aileron, left;   |
| 1 | Preinstalled Stab with hinged Elevator, right; |
| 1 | Preinstalled Stab with hinged Elevator, left;  |
| 1 | Preinstalled Composite Landing gear, right;    |
| 1 | Preinstalled Composite Landing gear, left;     |
| 1 | Preinstalled composit canalizer                |
| 1 | Wheel pant, right;                             |
| 1 | Wheel pant, left;                              |
| 1 | Carbon fiber Wing tube, 25 mm Ø x 600 mm;      |
| 1 | Aluminum Stab tube, 10 mm Ø x 200 mm;          |
| 1 | Custom made protection bag set;                |
| 1 | CNC milled carbon fiber (parts bag;            |
| 1 | Instruction manual (English);                  |
| 1 | Decal set.                                     |

## Hardware List



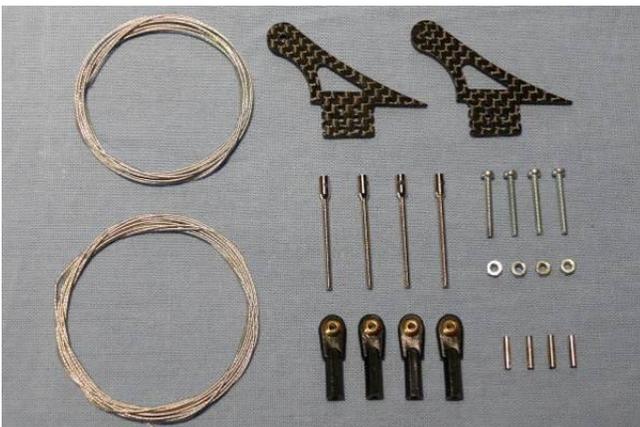
### Wing Pack (2 sets )

| Pcs., | Description  |
|-------|--|
| 2     | CNC milled carbon fiber or composite fiber aileron control horn; |
| 4     | Ball Link M2;  |
| 2     | Carbon fiber Pushrod ( Steel) M2 x 150 mm;                       |
| 4     | Bolts M2x15  |
| 4     | Nuts M2;   |
| 4     | Threaded coupler M2;   |



### Stab Pack (2 sets)

| Pcs., | Description   |
|-------|---|
| 2     | CNC milled Carbon fiber or composite fiber elevator control horn; |
| 4     | Ball Link M2;   |
| 4     | Bolts M2x15   |
| 4     | Nuts M2;  |
| 4     | Threaded coupler M2;  |

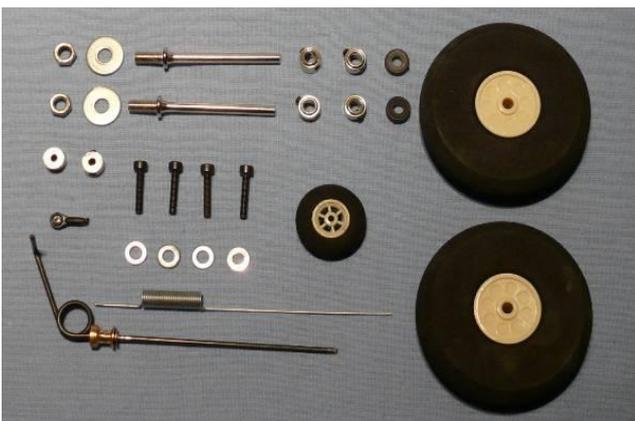


### Rudder Pack

| Pcs., | Description   |
|-------|---|
| 2     | CNC milled carbon fiber or composite fiber rudder control horn; |
| 2     | Pull-Pull Cables 0,6 mm Ø, 2 metres each;                       |
| 4     | Brass swag tube 2 mm Ø;   |
| 4     | Ball Link M2;   |
| 4     | Bolts M2x15   |
| 4     | Nuts M2;  |

### Landing gear Pack

| Pcs., | Description                           |
|-------|---------------------------------------|
| 2     | Main wheels 65 mm Ø;                  |
| 1     | Tail wheel 28 mm Ø assembly;          |
| 2     | Axle assemblies 4 mm Ø;               |
| 4     | Landing gear mounting bolts and nuts; |



### 3. Items Needed To Complete

#### 3.1. Required Tools and Adhesives

##### Personal protective equipment

The fuselage, dings, stabs, rudder, landing gears and other parts included in this kit are made of fiberglass and carbon fiber, the fibers of Chose may cause eye, skin and respiratory tract irritation. Never blow into a part to remove fiberglass and carbon fiber dust, as the dust will blow back into your eyes. Always wear safety goggles or safety shield, a particle mask and rubber gloves when grinding, drilling and sanding this parts.



Wear safety goggles or safety shield



Wear particle mask



Wear rubber gloves

Vacuum the parts and the work area thoroughly after working with fiberglass and carbon fiber parts.



##### Tools

Felt-tip Marker or Pencil  
 Sander  
 Ruler Metric and Standard  
 Course and Fine Sandpaper  
 Phillips Screwdriver (small)  
 Pliers  
 Dremel Power Tool  
 Rat tail file  
 Cut-off wheel  
 Hobby knife  
 Paper Towels  
 Synthetic oil  
 Soapy water solution  
 Plastic card



## Adhesives

15 and 30 Minute Epoxy  
 Thick CA (cyanoacrylate) glue  
 Masking Tape  
 Double-Sided Tape  
 Epoxy filler  
 Thread Locker  
 Acetone/Alcohol swabs or  
 Rubbing alcohol;  
 Paper or plastic caps  
 Wooden coffee spoons  
 Cotton buds



## Required Hardwares

Main LiPo pack;  
 Receiver LiPo pack;  
 Receiver;  
 Speed controller;  
 Brushless motor;  
 Carbon Propeller;  
 Receiver voltage regulator;  
 Servo arms;  
 Servo Extension leads;  
 Servos;

## 3.2. Power System Selection

### Performance Setup

Best efficiency and highest performance reached with (RTF weight 4900 grams):

- **AXI model** motors 5330/F3A GOLD LINE brushless motor;
- **Jeti** Advance 90 Pro Opto speed controller (or Castle Creations 110);
- **PT model** 20 x 13 E" Carbon Propeller;
- One (1) 10 S 40C 4500 mAh **H-Energy** LiPo pack or two (2) 5 S 40C 4500 mAh H-Energy LiPos;

### Optimal Setup

Optimal efficiency, performance and price balance is reached with (RTF weight 4700 - 4800 grams):

- **AXI model** motors AXI 5325/24 GOLD LINE brushless motor;
- **Jeti** Spin 99 Opto speed controller (or Castle Creations 110);
- **PT model** 20 x 12 WE" Carbon Propeller;
- One (1) 10 S 40C 4000 mAh **H-Energy** LiPo pack or two (2) 5 S 40C 4000 mAh H-Energy LiPos;

### Lightweight Setup

Lightweight Setup allows reach total weight of RTF plane in range below 4600 – 4700 grams:

- **AXI model** motors AXI 5325/18 GOLD LINE brushless motor;
- **Jeti** Spin 99 Opto speed controller (or Castle Creations 110);
- **PT model** 20 x 12 WE" Carbon Propeller;
- One (1) 8 S 40C 5000 mAh **H-Energy** pack or two (2) 4 S 40C 5000 mAh H-Energy LiPos;

### Receiver Power Setup

For confident power and constant voltage to receiver we highly recommend use one of this setups:

Hi power setup:

- **Power Box System** Sensor (up to 12 A);
- Two (2) 2 S, 25C, **H-Energy** LiPos with capacity from 400 mAh to 500 mAh each;

Lightweight setup:

- **Power Box** System Digi-Switch (up to 12 A);
- One (1) 2 S, 25C, **H-Energy** LiPo with capacity from 450 mAh to 600 mAh

### 3.3. Servos Selection

For the control surfaces of Contrast LT we recommend use follows **Hitec** servos:

Ailerons – two (2) Digital Servos 5-6 kg/cm;

Elevator – two Digital Servos 5-6 kg/cm or one (1) Digital High Speed Metal Gear Servo 8-9,5 kg/cm;

Rudder – one (1) Digital High Torque Servo 18-24 kg/cm;

Make sure you use same or equivalent torque servos that are digital.

Please do not risk your plane by using low torque or analog servos. Using of weak servos will increase chance of flutter and will reduce the accuracy of the airplane flight.

### 3.4. Radio Selection

For Contrast LT we recommend use minimum 6-channel 2,4 GHz computer radio system

#### 4. Warranty Information

Before starting to build, inspect the parts to make sure they are of acceptable quality. If any parts are missing or are not of acceptable quality, or if you need assistance with assembly, please contact RC Composit.

It is important to notify RC Composit of any damage or problems with the model within **30 days** of receiving your airplane to be covered under warranty. If you wish to return this aircraft for any reason a 20 % restock fee will be charged to the customer. In addition the customer is responsible for all return shipping cost and all prior shipping cost will not be refunded.

Parts will be exchanged or replaced once the original item is returned at the owner's expense. If you have any problems or questions, please contact [www.rc-composit.com](http://www.rc-composit.com), or email [algisu555@yahoo.com](mailto:algisu555@yahoo.com)

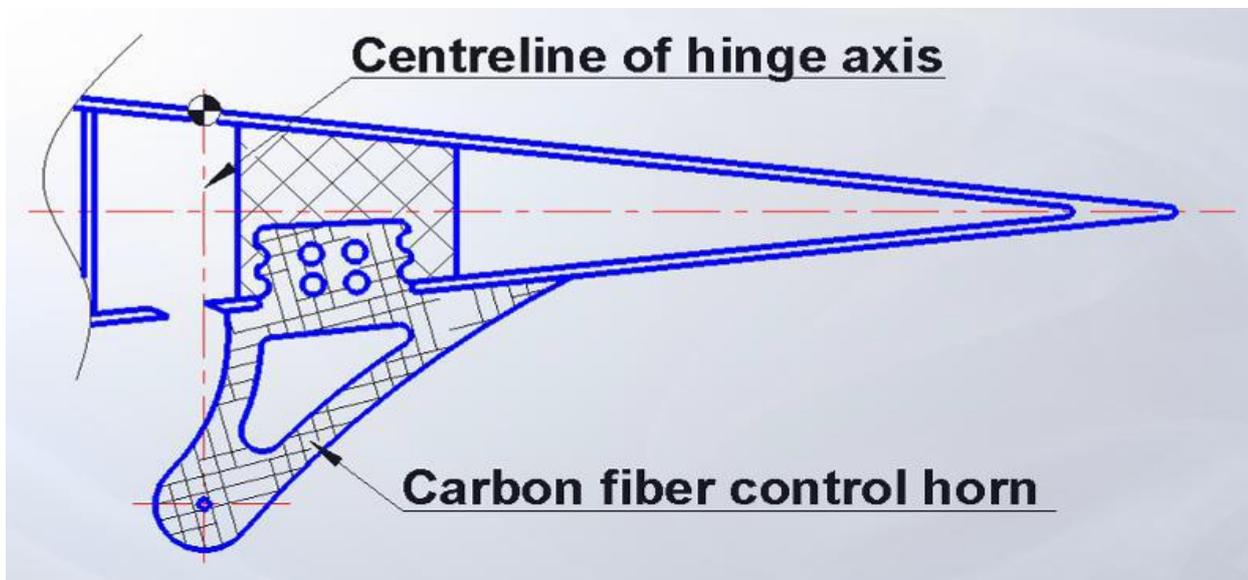
## 5. Model Assembly Process

### 5.1. Wings

Both wings are made in negative moulds, and fully vacuum bagged, using 2 layers of super light fiberglass in combination with a 2 mm Airex foam sandwich form a hard and durable outer skin. Each wing panel weighs between 310 and 325 grams, depending on the color scheme.

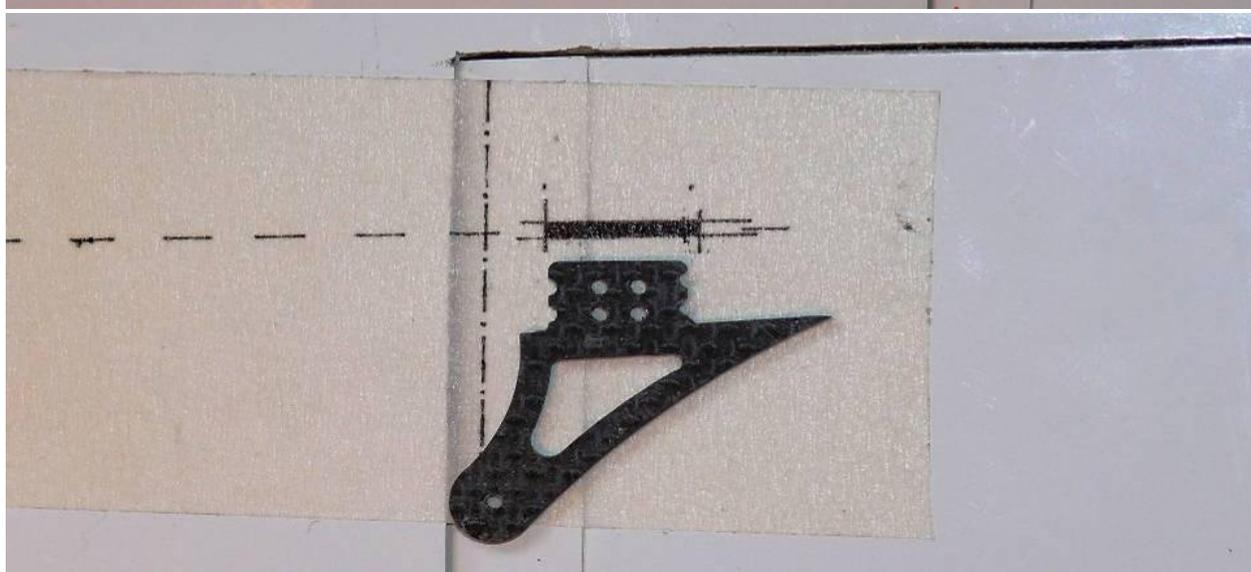
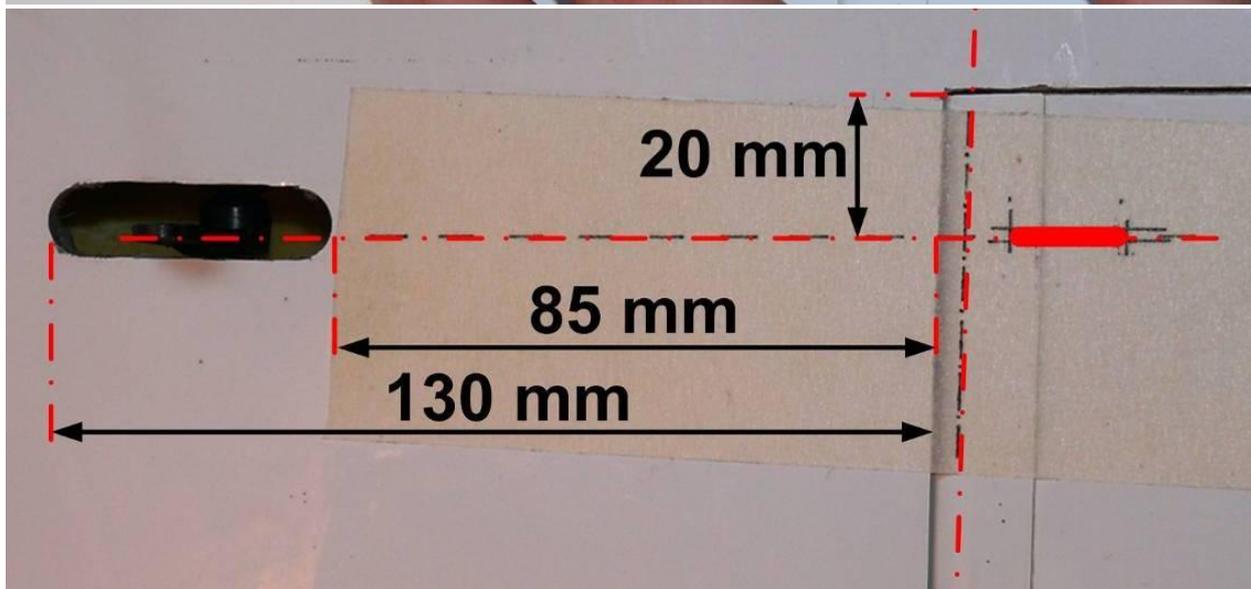
The ailerons are hinged already for you - laminated in the mould and attached to the wing with a special nylon hinge cloth, sandwiched between the outer skin and the foam. This nylon hinge is 100% safe and durable. You will never have to worry about breaking it, or wearing it out. There is no gap at all on the top wing surface.

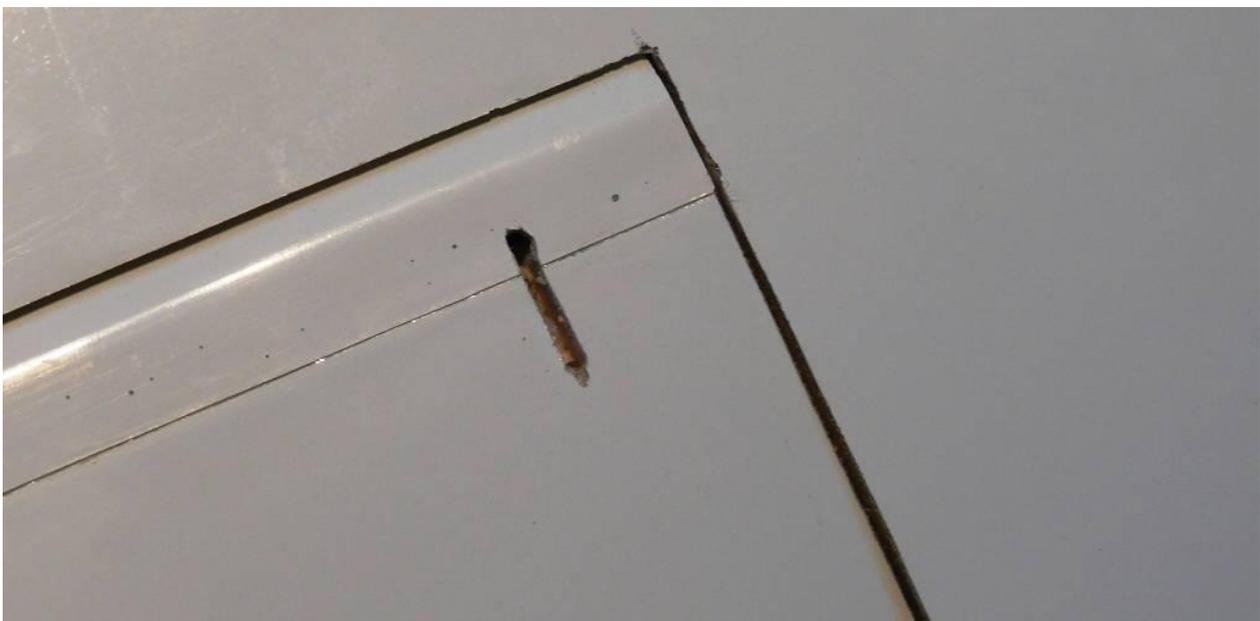
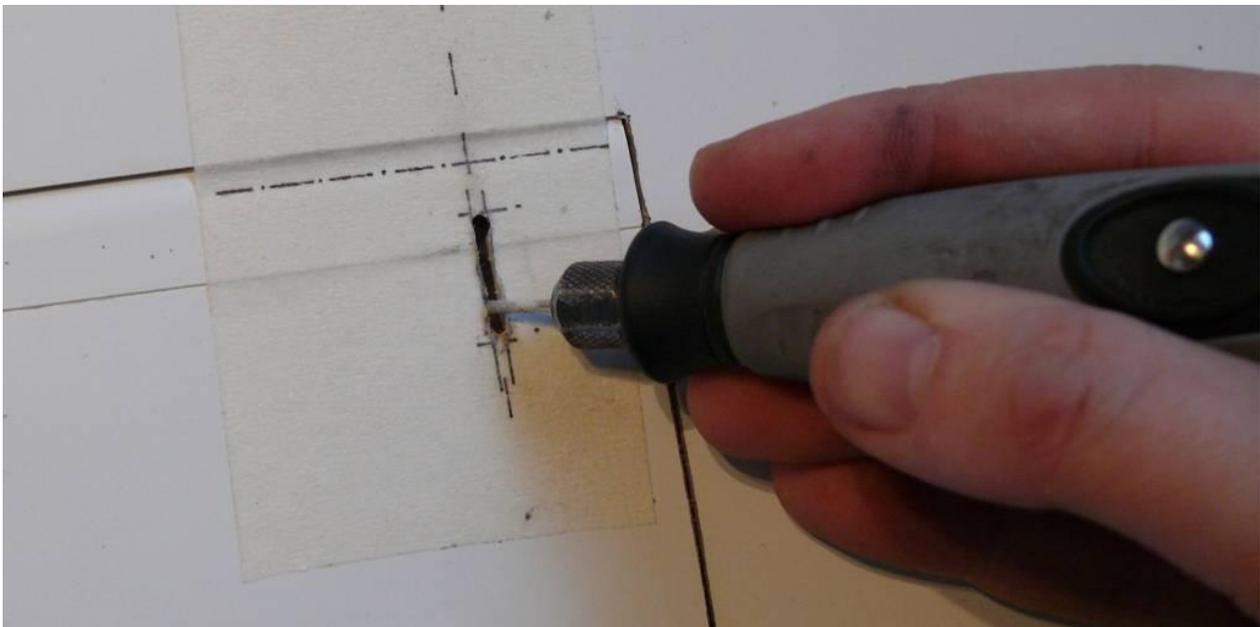
From the bottom of the aileron, aileron gap are covered with glass fiber seal. Because the axis of the hinge is not at the centerline of the aileron, so it moves slightly in and out when operated, and the aileron gets a little "bigger" in surface area when moving up, and "smaller" when moving down. This means that you need program in up to 10 % negative aileron differential in your transmitter more than the positive.

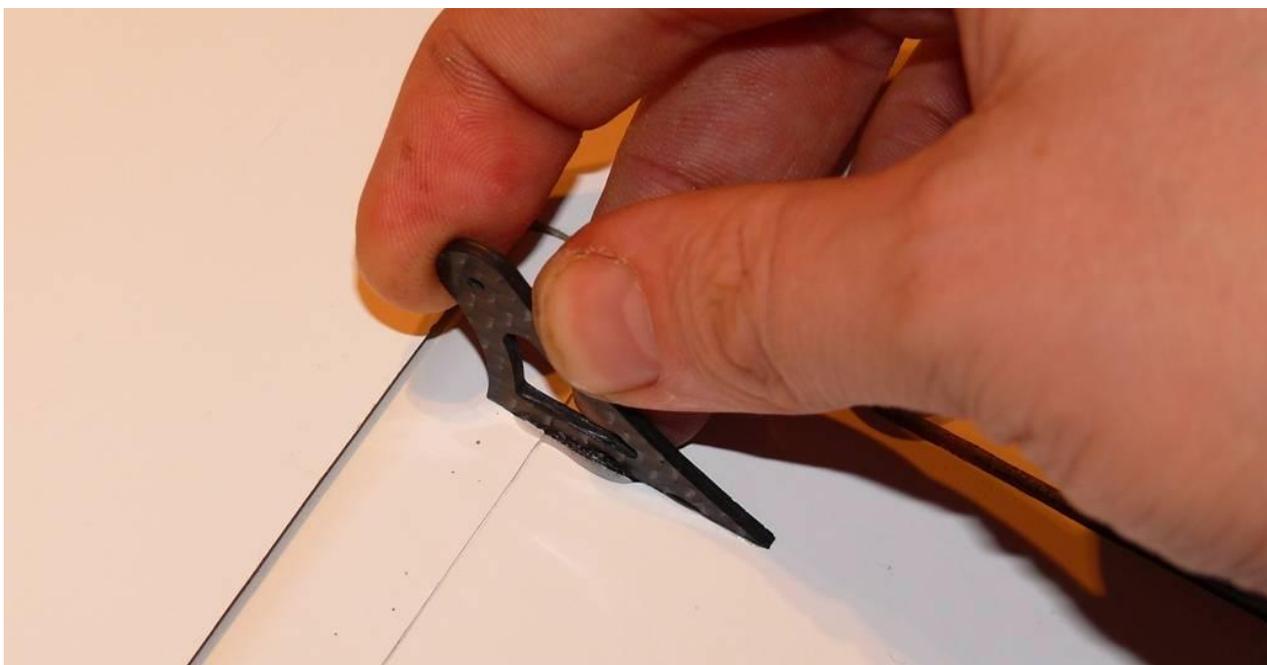
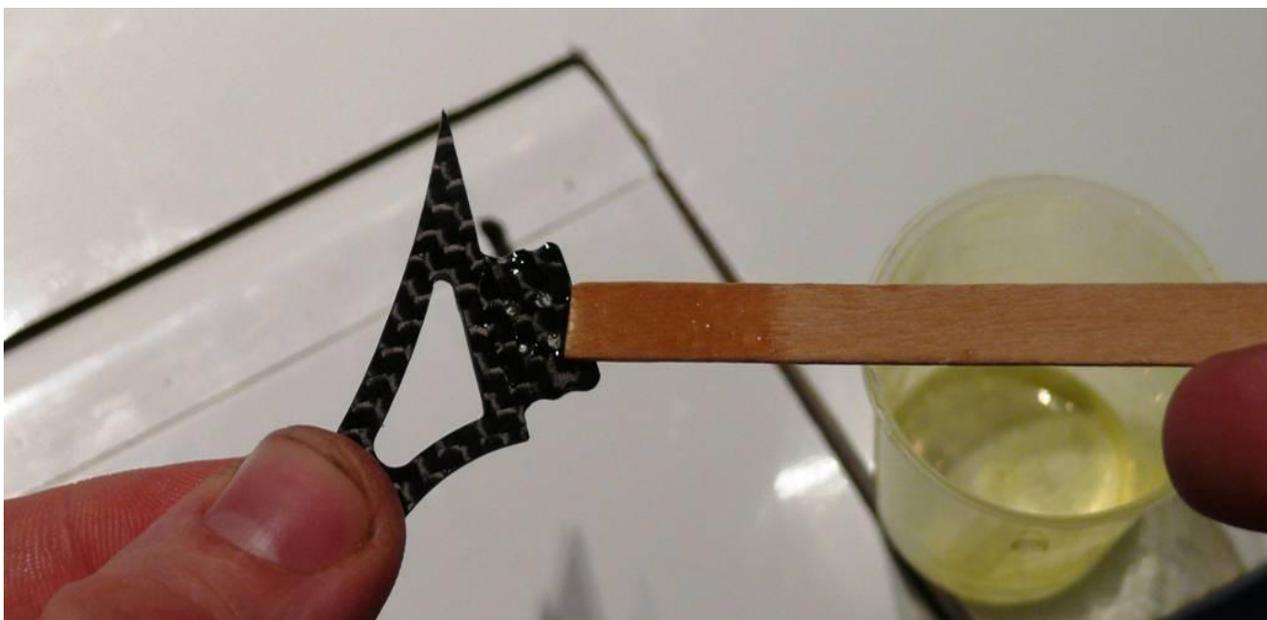


### 5.1.1. Aileron control Horn Installation

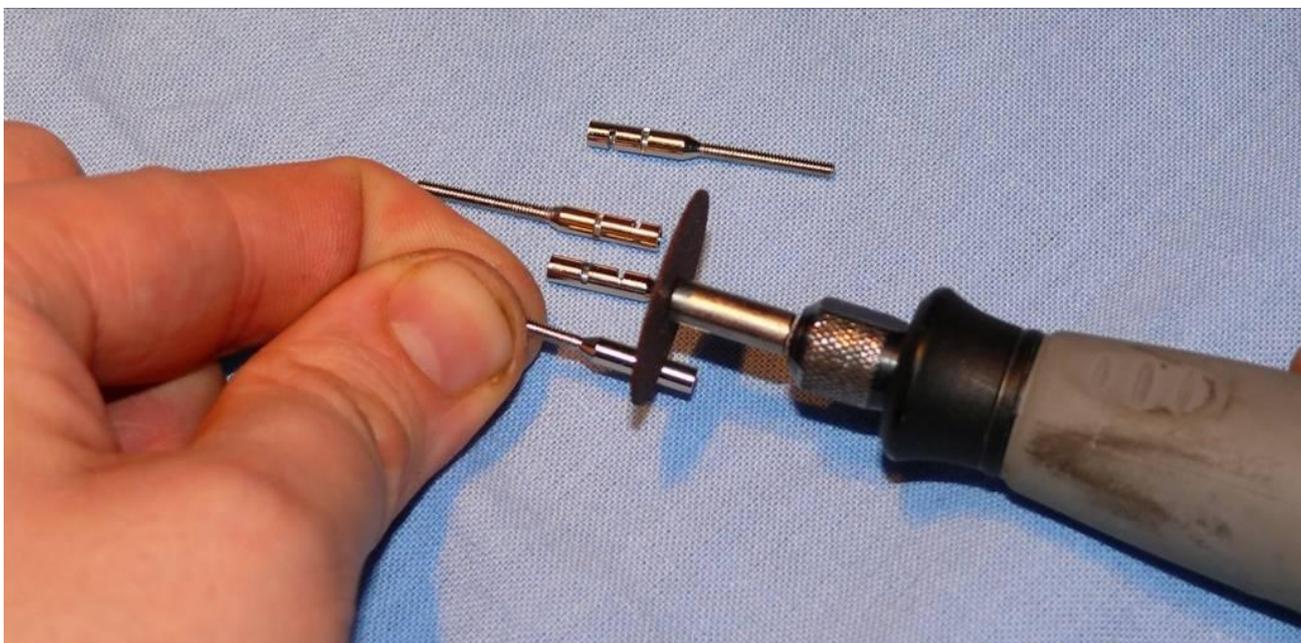
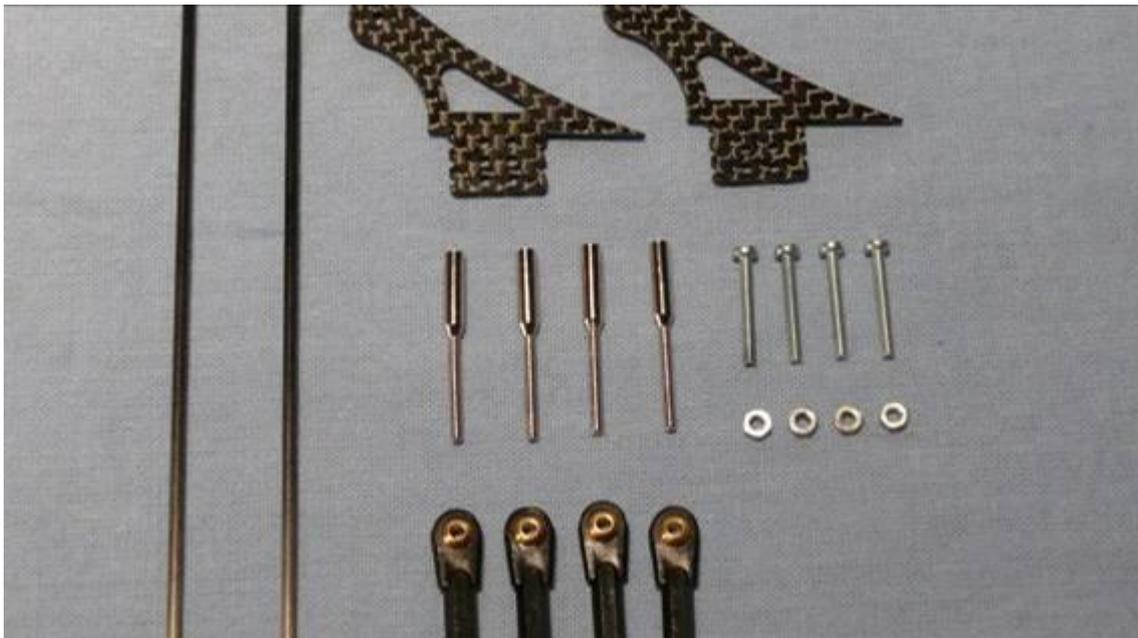
Use 15-30 minute epoxy to ensure adequate working and cleanup time

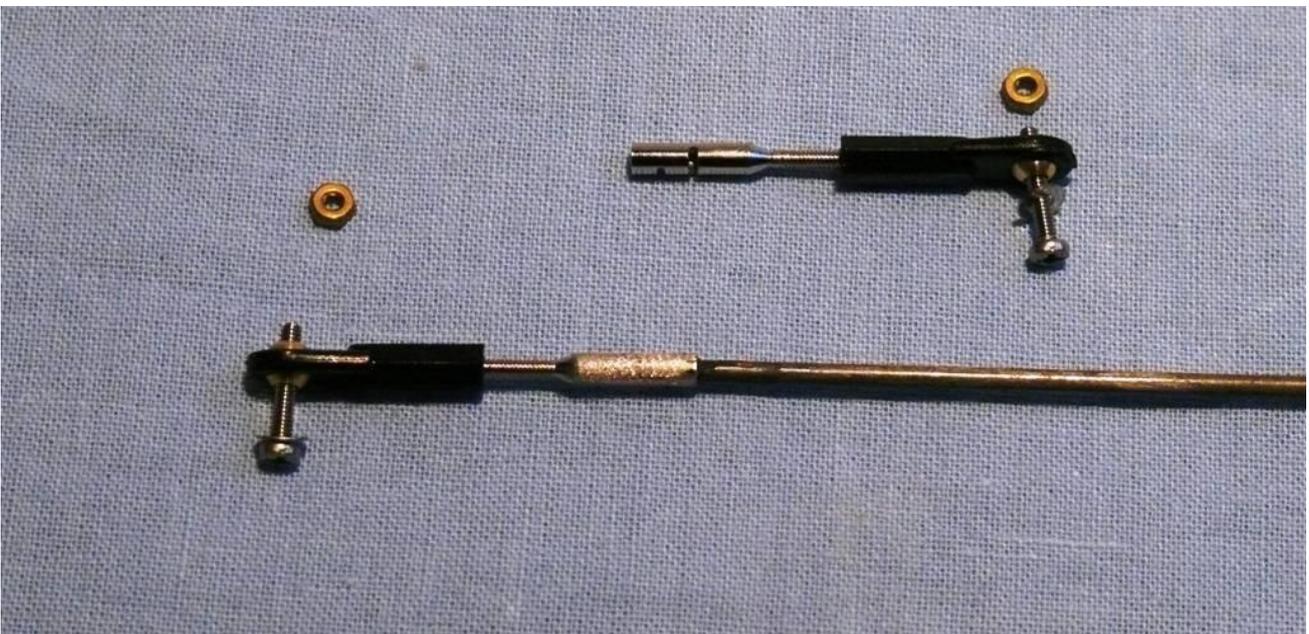


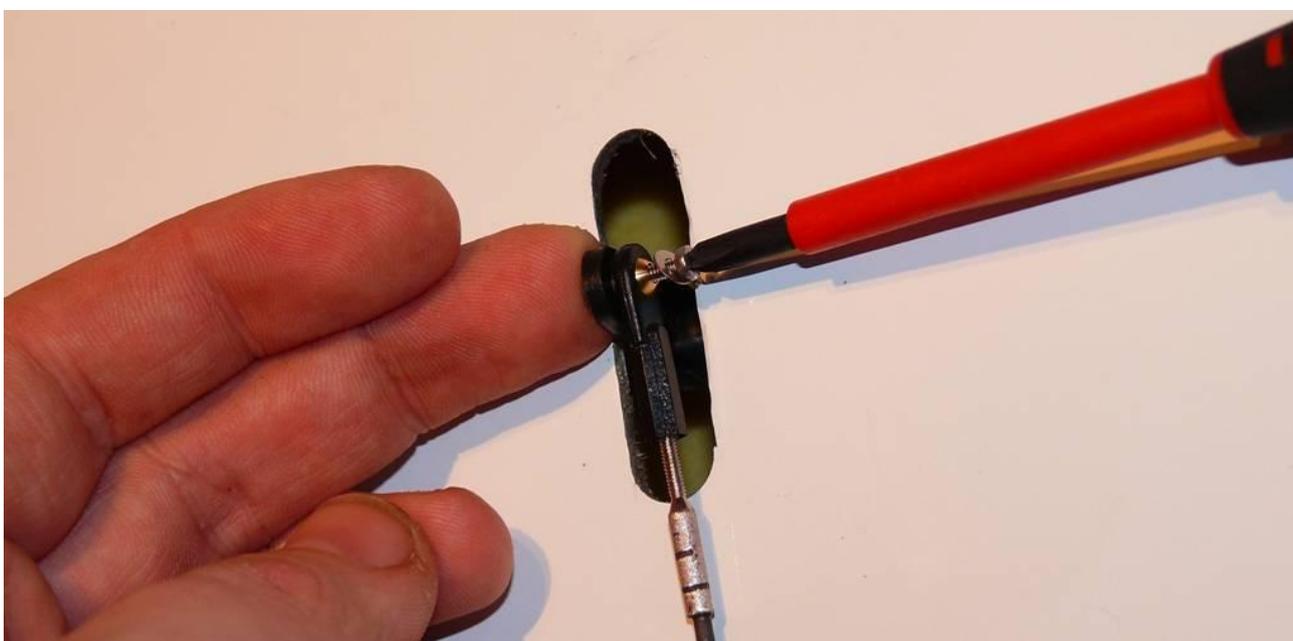
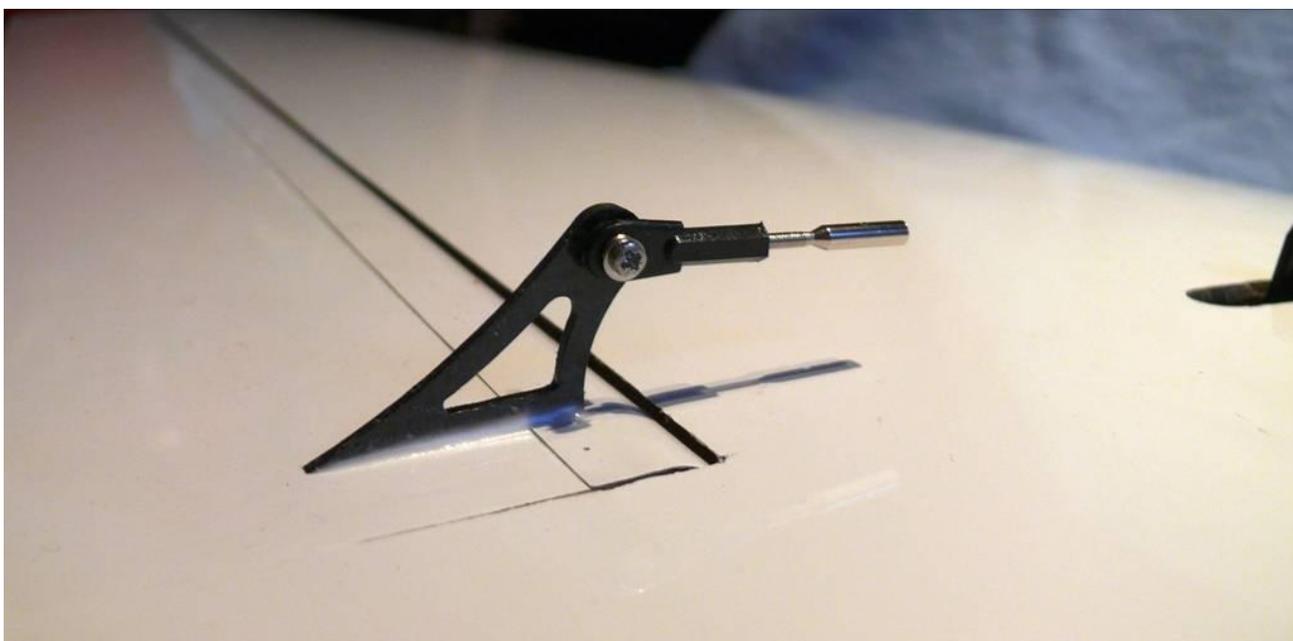
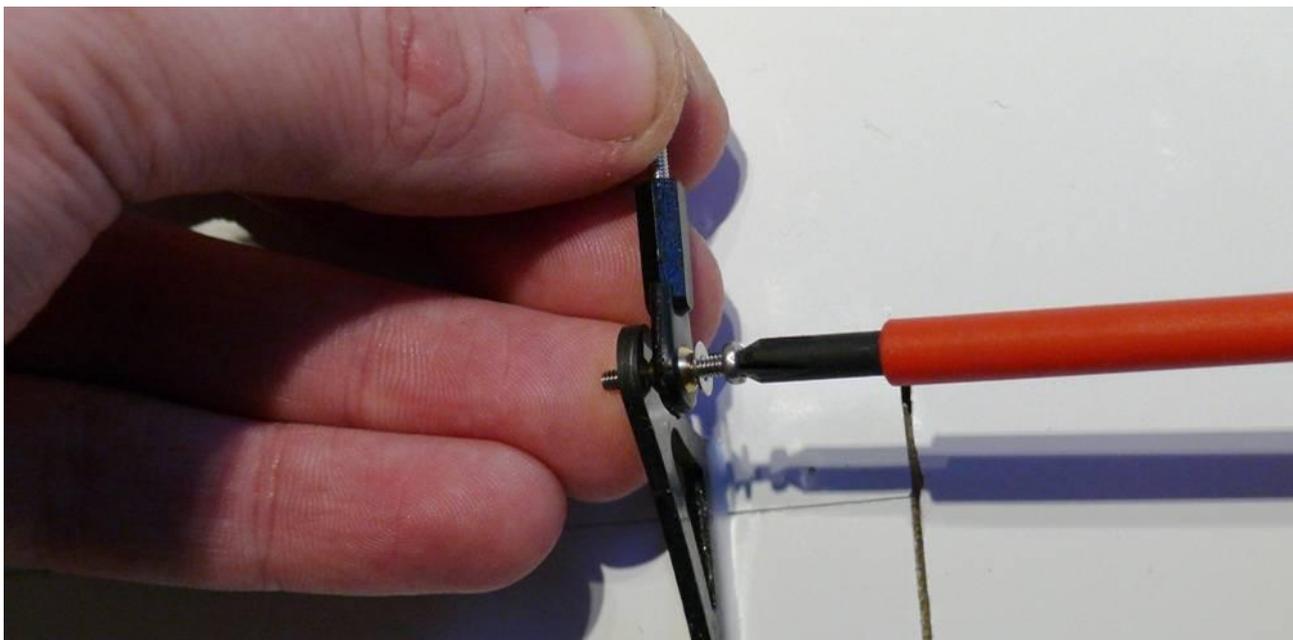


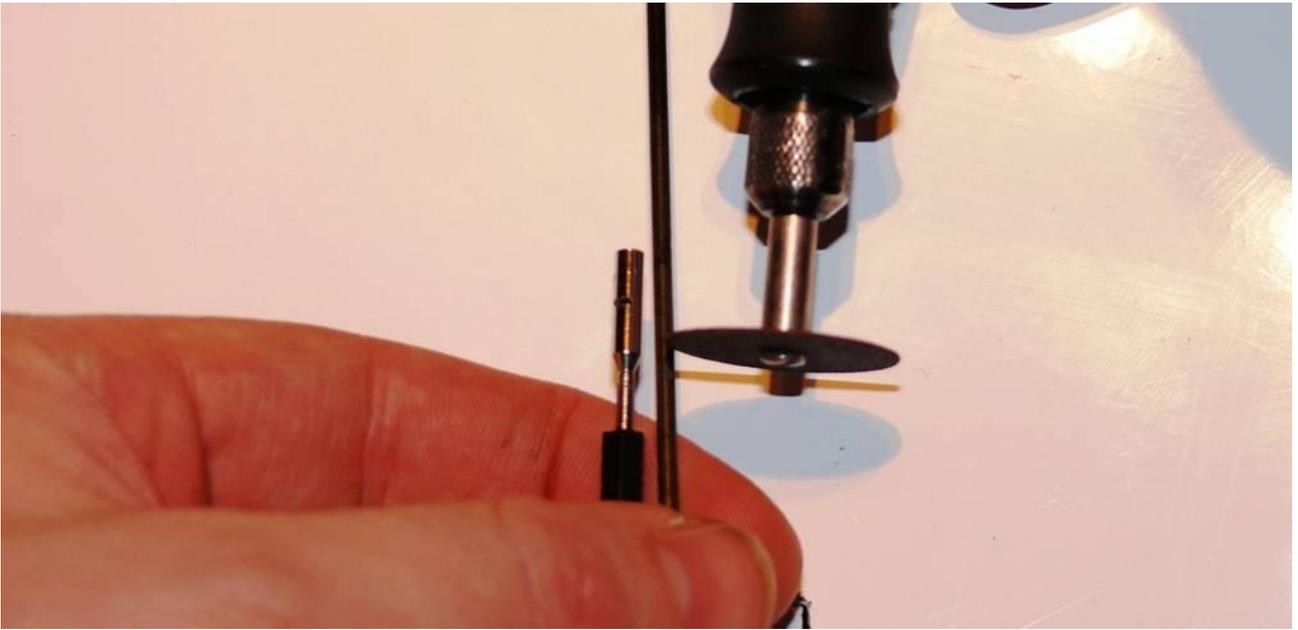










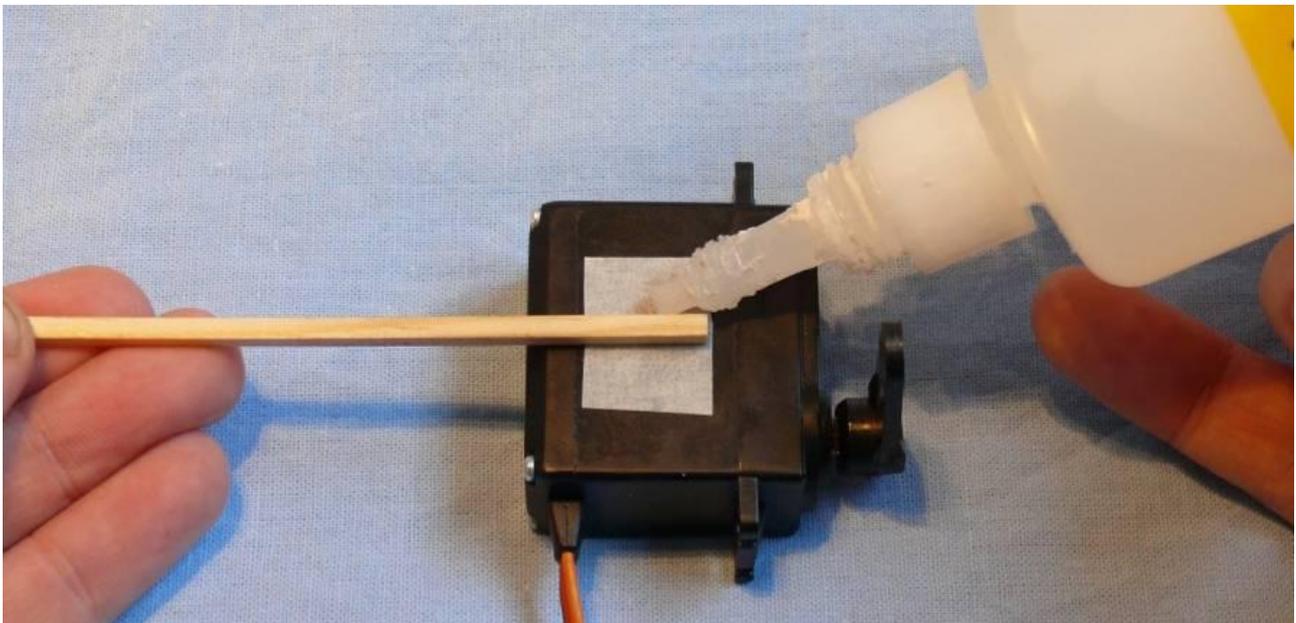
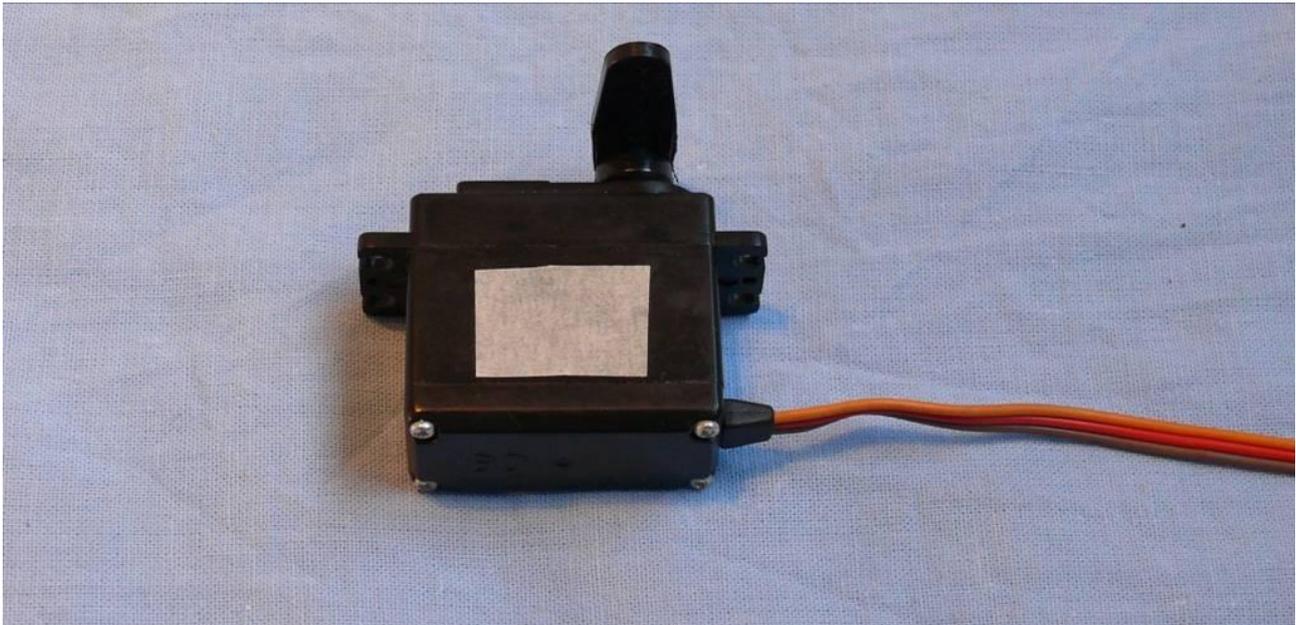


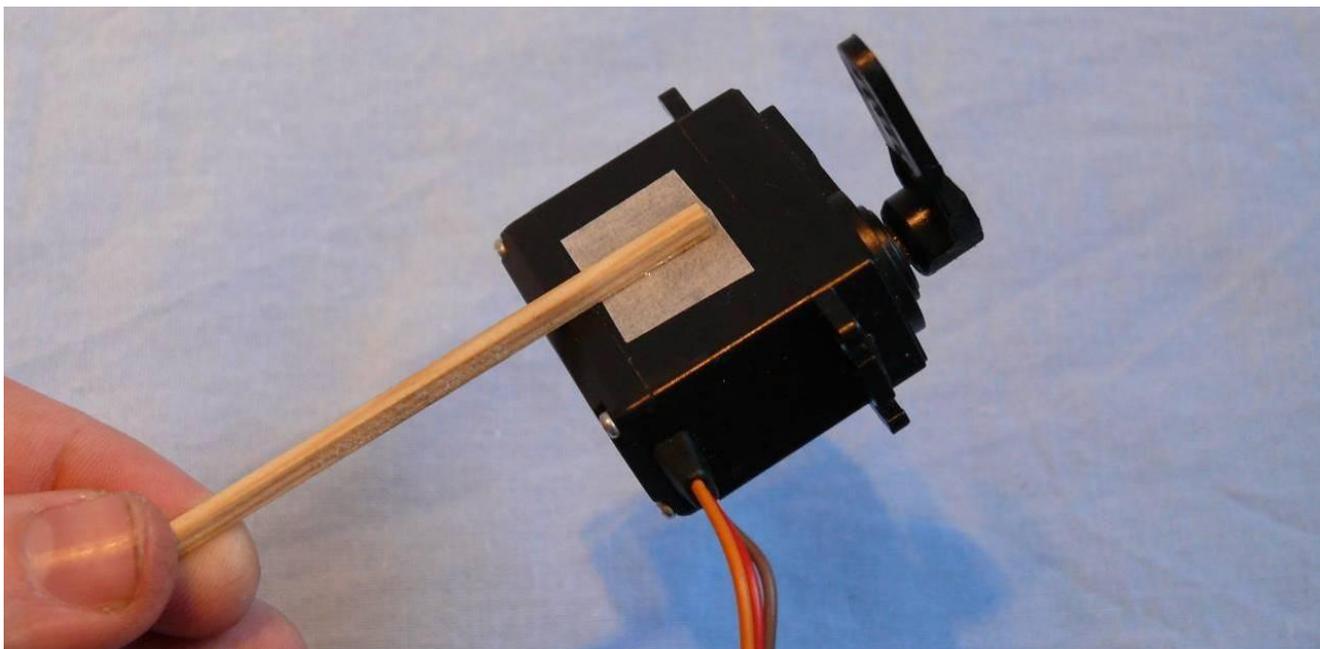
### 5.1.2. Wing Servo Installation

There are two options for mounting the servos:

- inside the wing;
- outside the wing;

To achieve better aerodynamic quality and model look we recommend that you use the first option.





## 5.2. Elevator

The stabilizer parts are also vacuum bagged sandwich molded using lightweight fiberglass cloth and 1,5 mm Airex foam construction. The elevator control surfaces are elastic-hinged. Each elevator panel weighs between 90 and 100 grams, depending on the color scheme.

From the bottom of the stabilizer, elevator gap are covered with glass fiber seal.

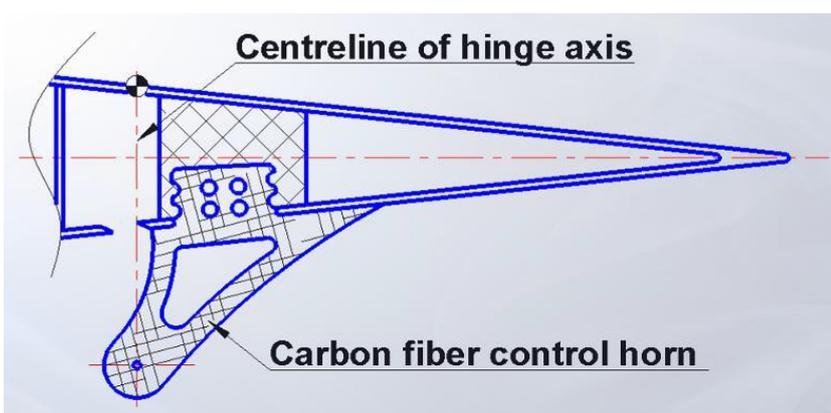
The horizontal stabs are mounted on a 10 mm aluminum tube (must be glued during the elevator assembly process), with a 3 mm carbon or aluminum anti-rotation axis at the front.

In order to increase the stability of inverted flight, also to offer more finite control in rolling maneuvers the model can be equipped with downward dihedral (with any angle from -1 to -5 degree) or straight stabilizer.

### **Negative angle dihedral stabilizer (- 5 degree)**

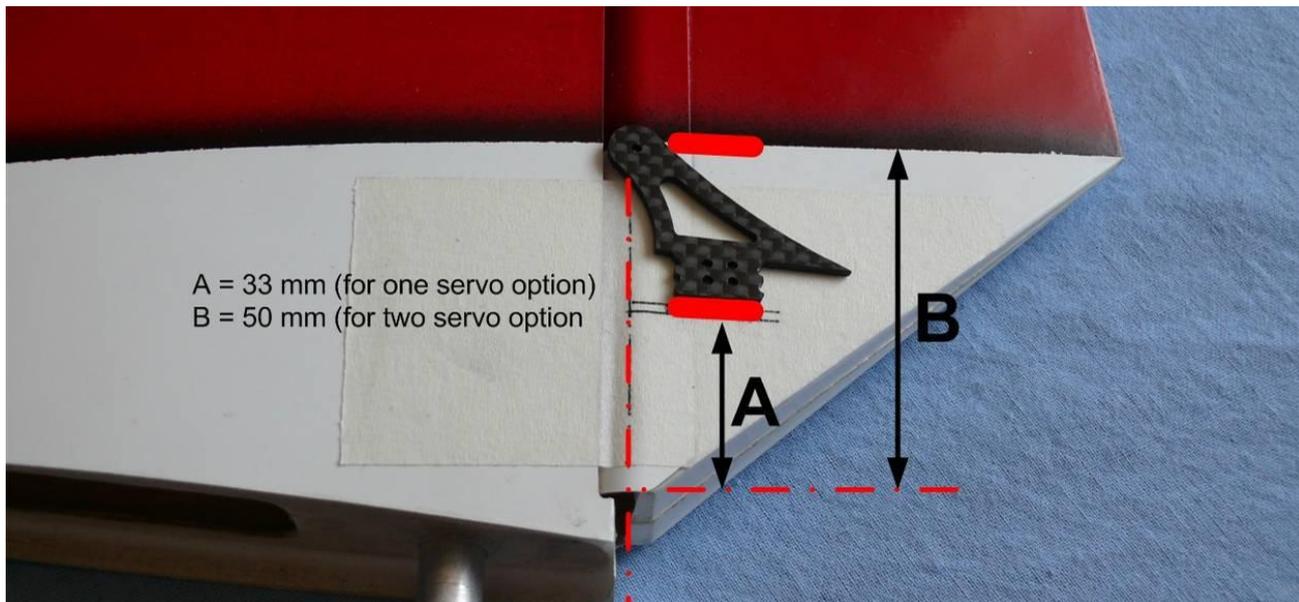


Because the axis of the hinge is not at the centerline of the elevator, so it moves slightly in and out when operated, and the elevator gets a little "bigger" in surface area when moving up, and "smaller" when moving down. This means that you need program in up to 10 % negative elevator differential in your transmitter more than the positive.

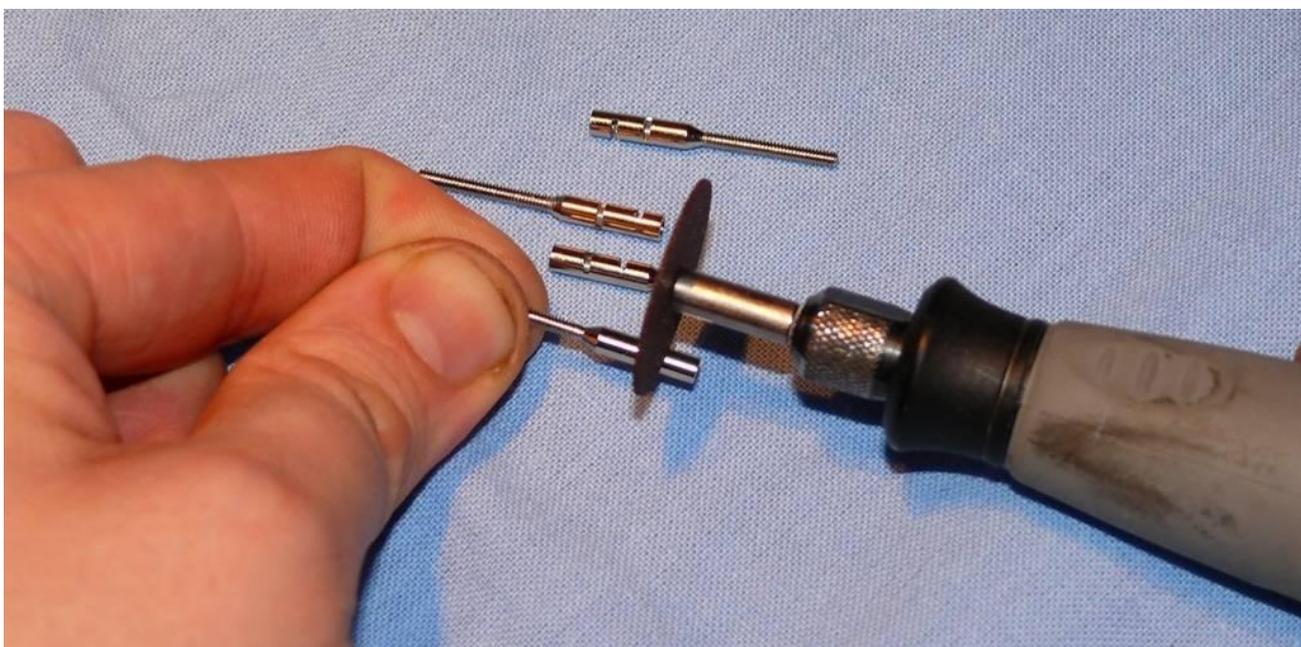


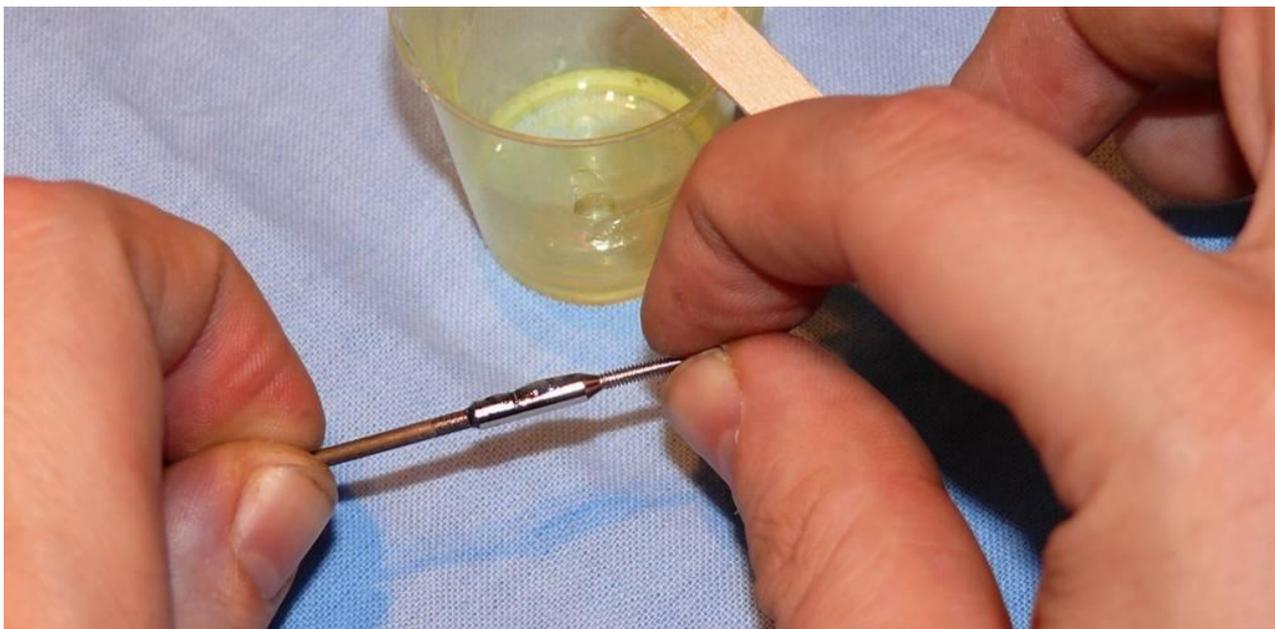
### 5.2.1. Elevator control Horn Installation

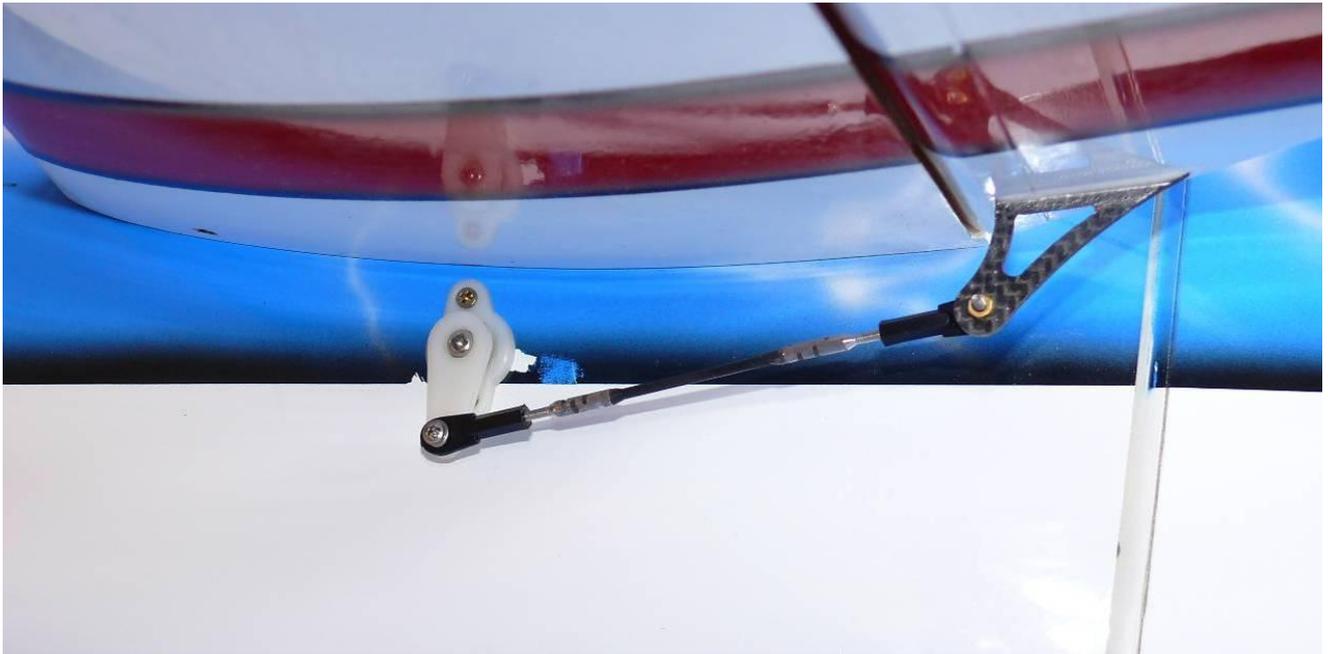
Use 15-30 minute epoxy to ensure adequate working and cleanup time.









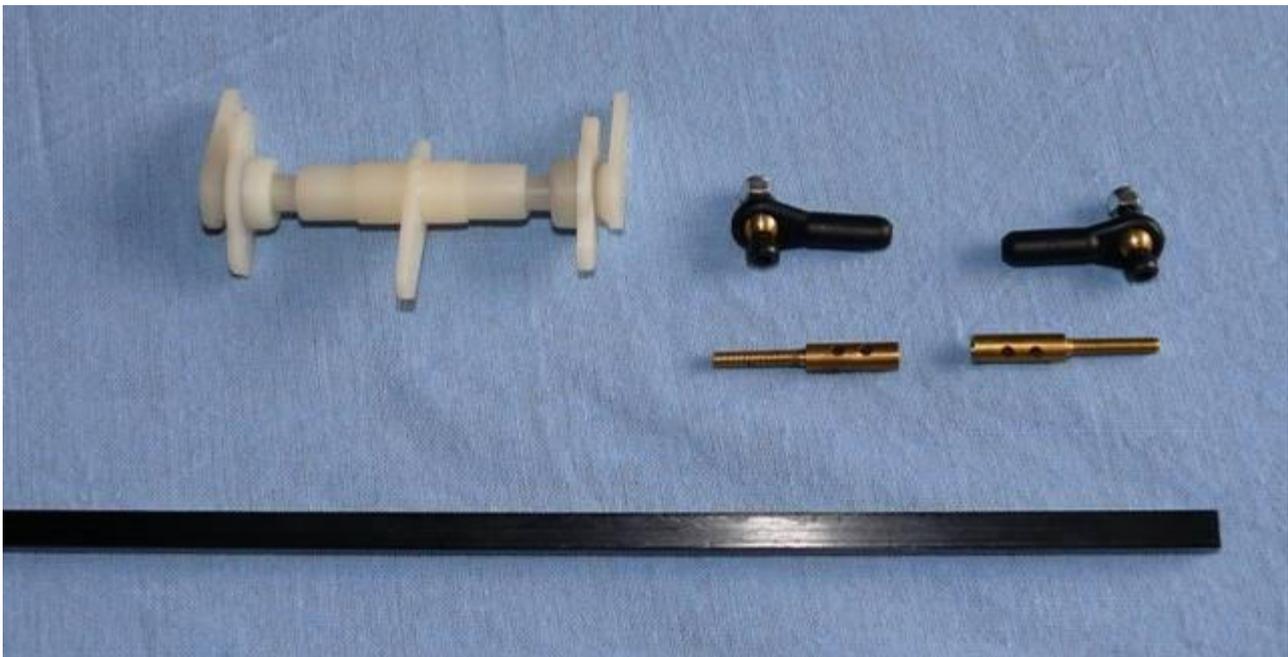


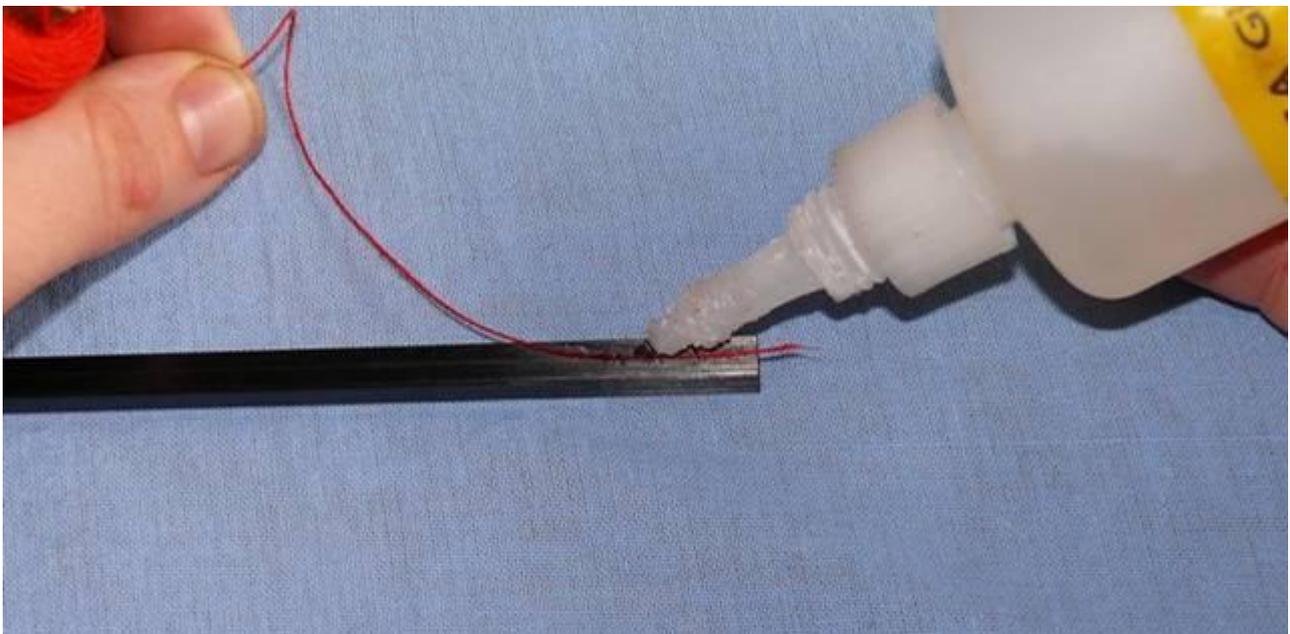
### 5.2.2. Elevator Servo Installation

There are three options for mounting the elevator servos:

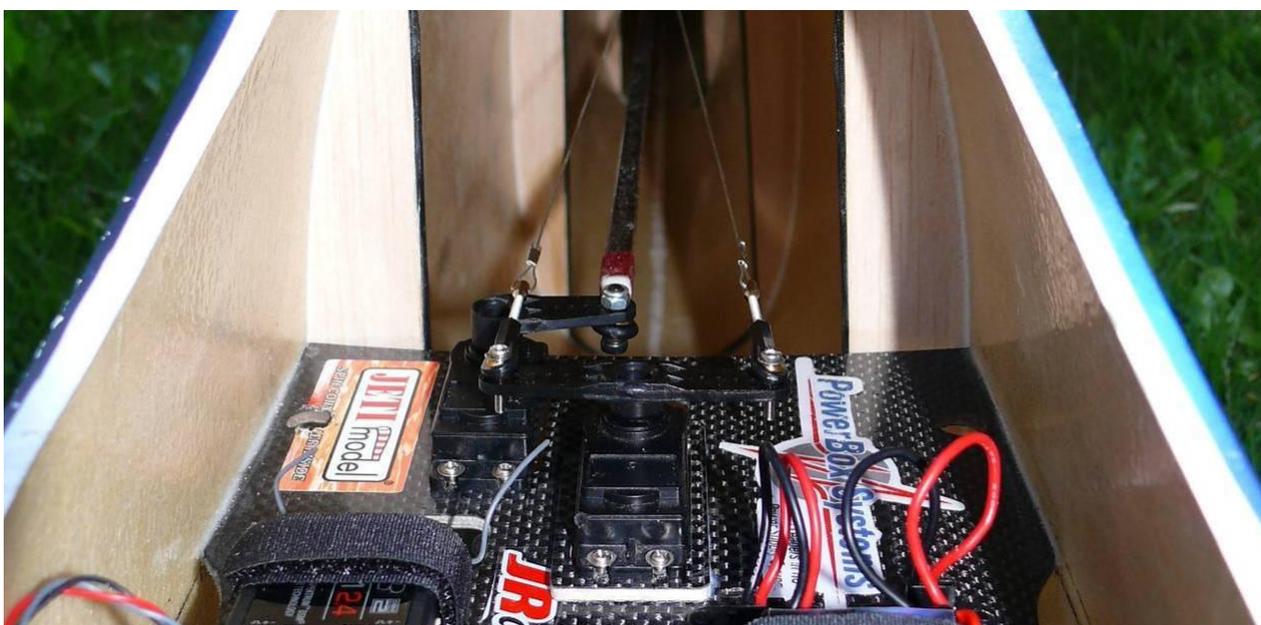
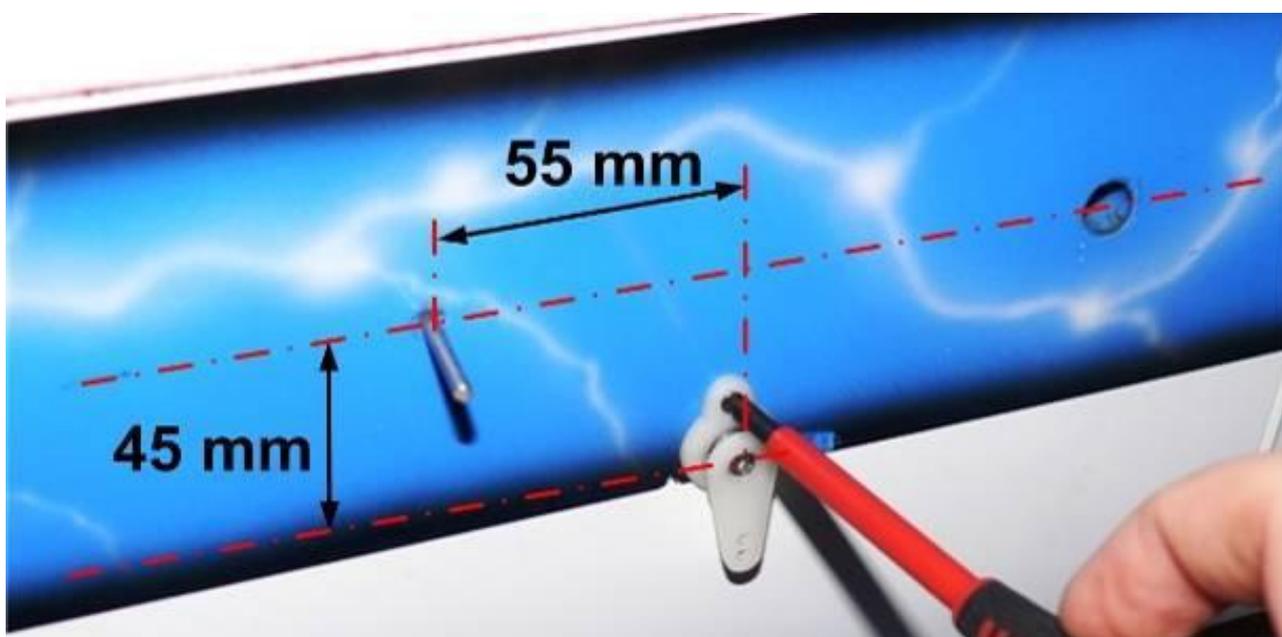
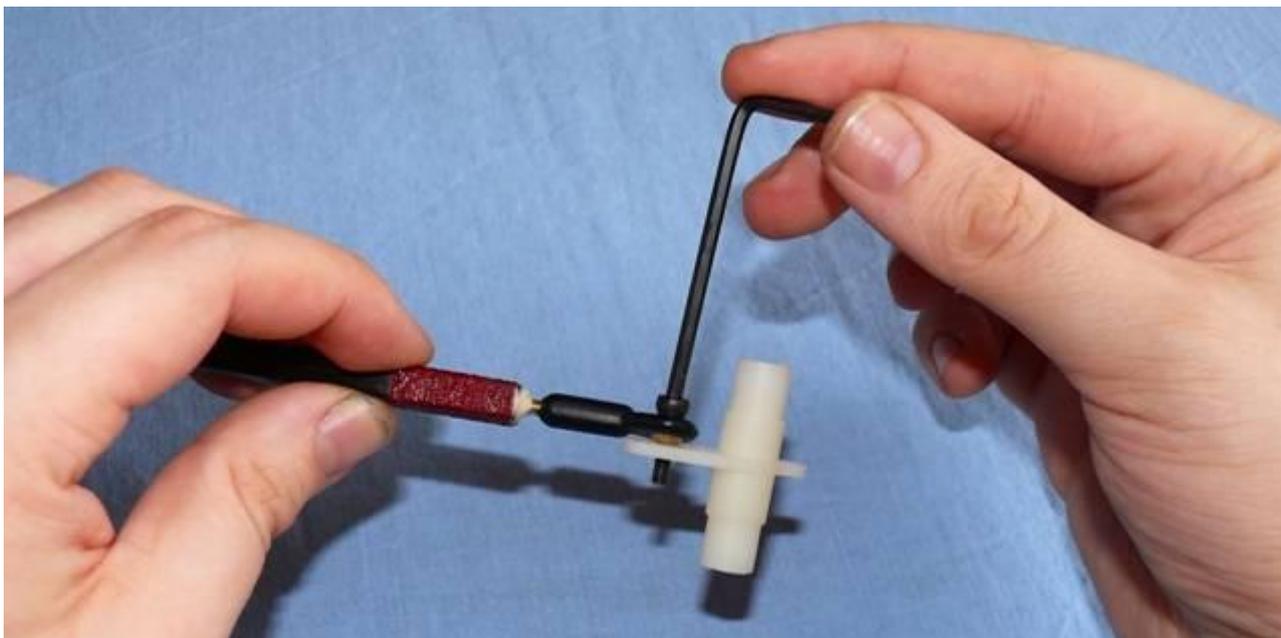
- inside the elevator halves ( 2 servos)
- on fuselage sides ( 1 servo)
- Inside the fuselage with common elevator shaft and one servo.

In order to reduce the weight of the model also to reduce the inertia of the tail and achieve best model flight characteristics we recommend that you use the last option.







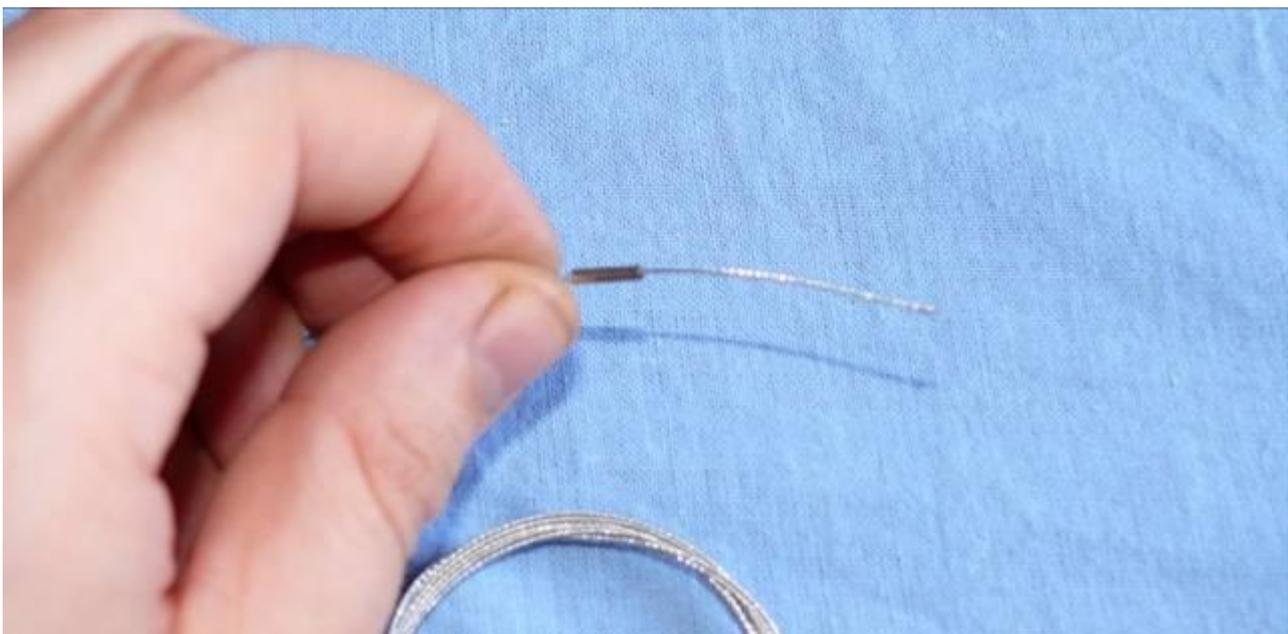
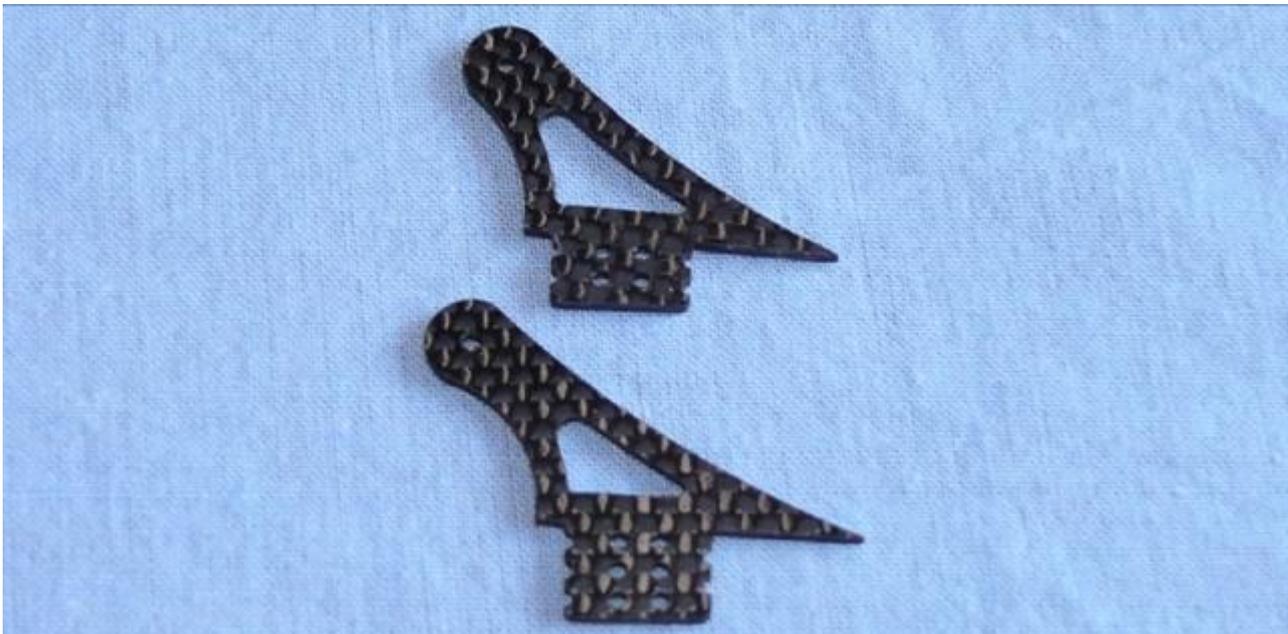


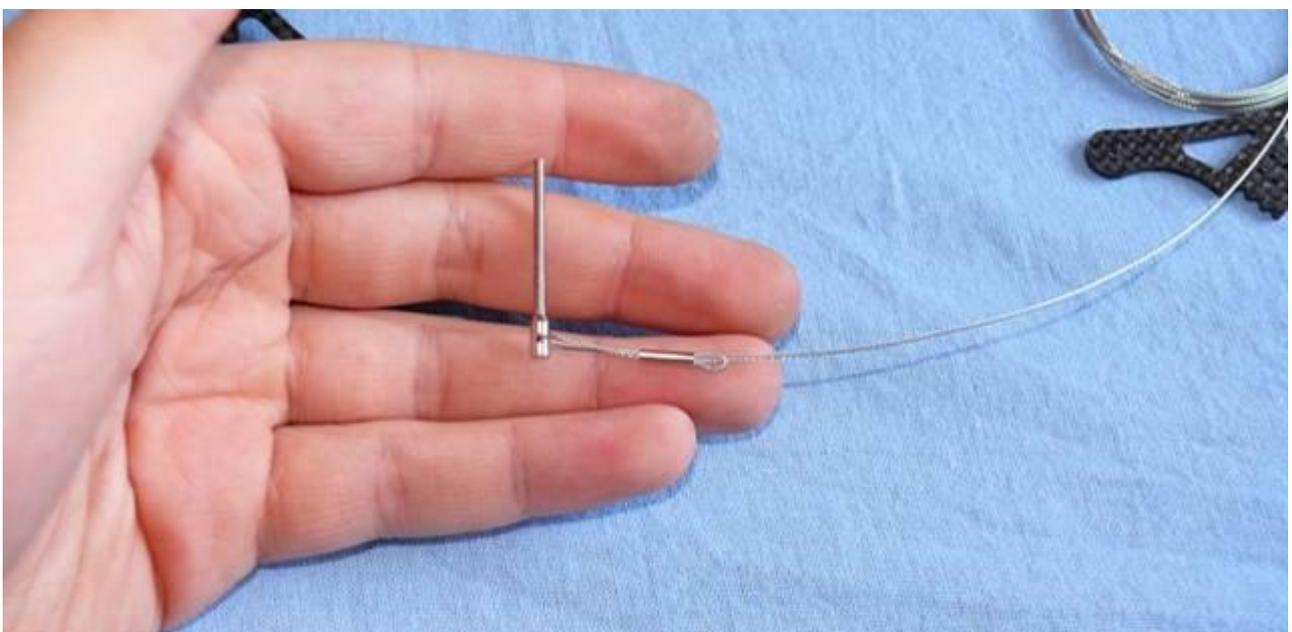
### 5.3. Fuselage

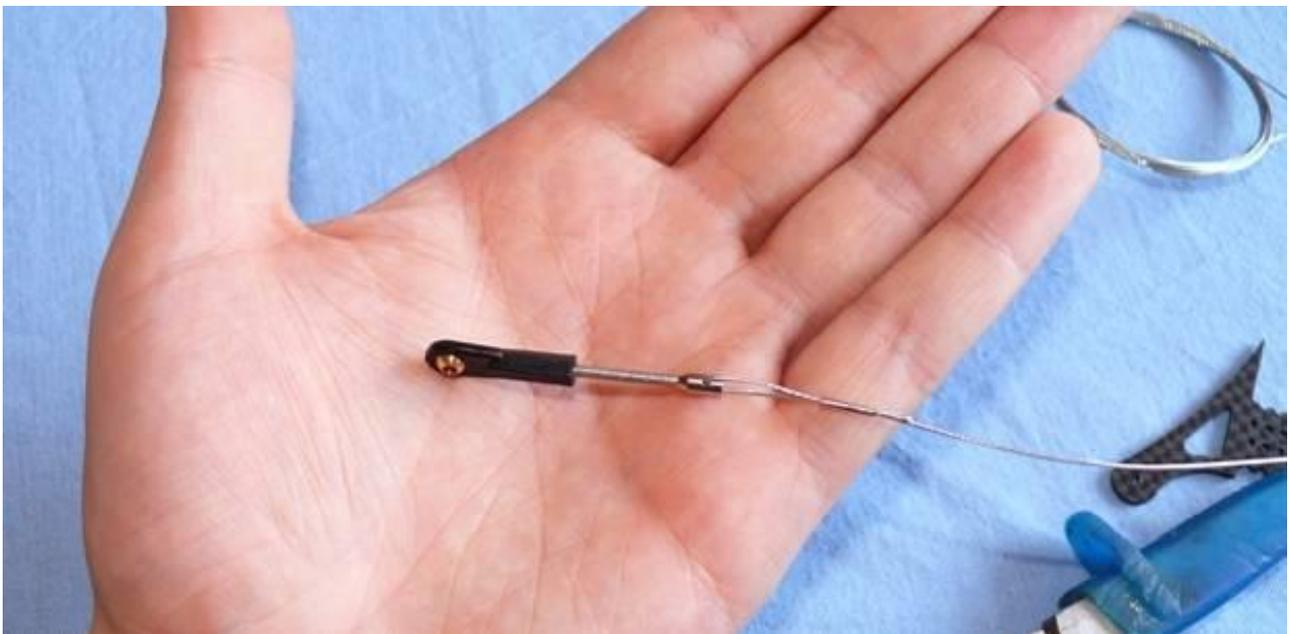
Fuselage are made in negative moulds, and fully vacuum bagged, using 2 layers of super light fiberglass in combination with a hard 2 mm Airex foam sandwich form a hard and durable outer skin. The complete front of the fuselage is reinforced with an additional layer of carbon cloth, from the LG supports forward to the nose-ring.

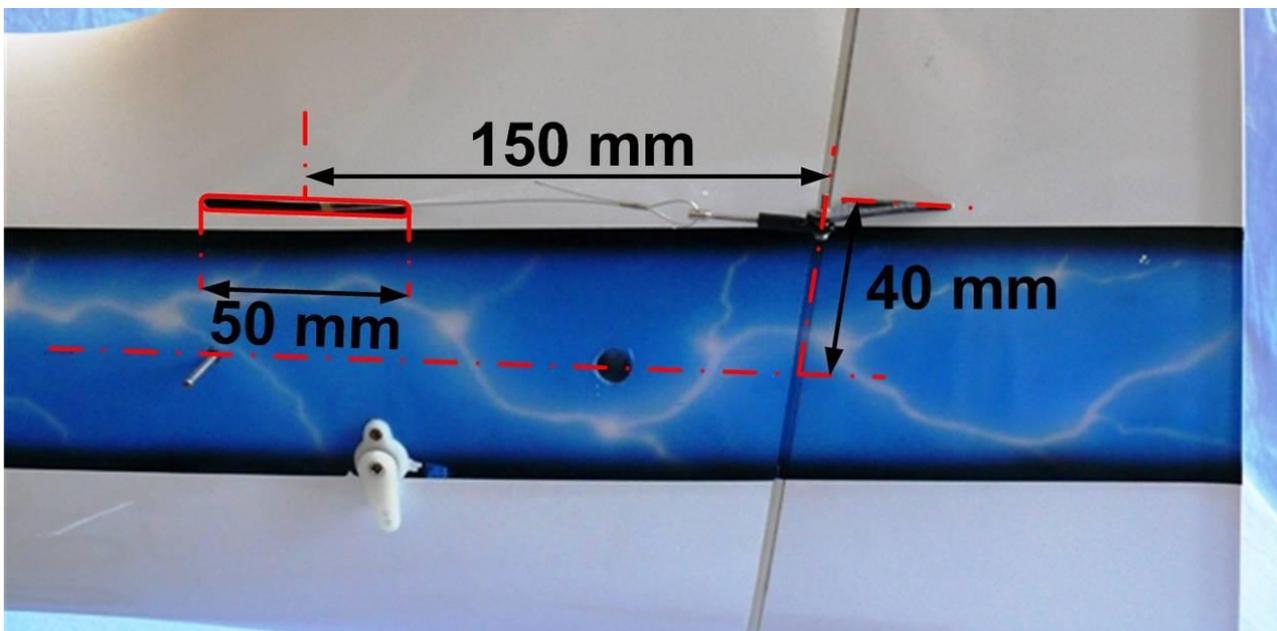
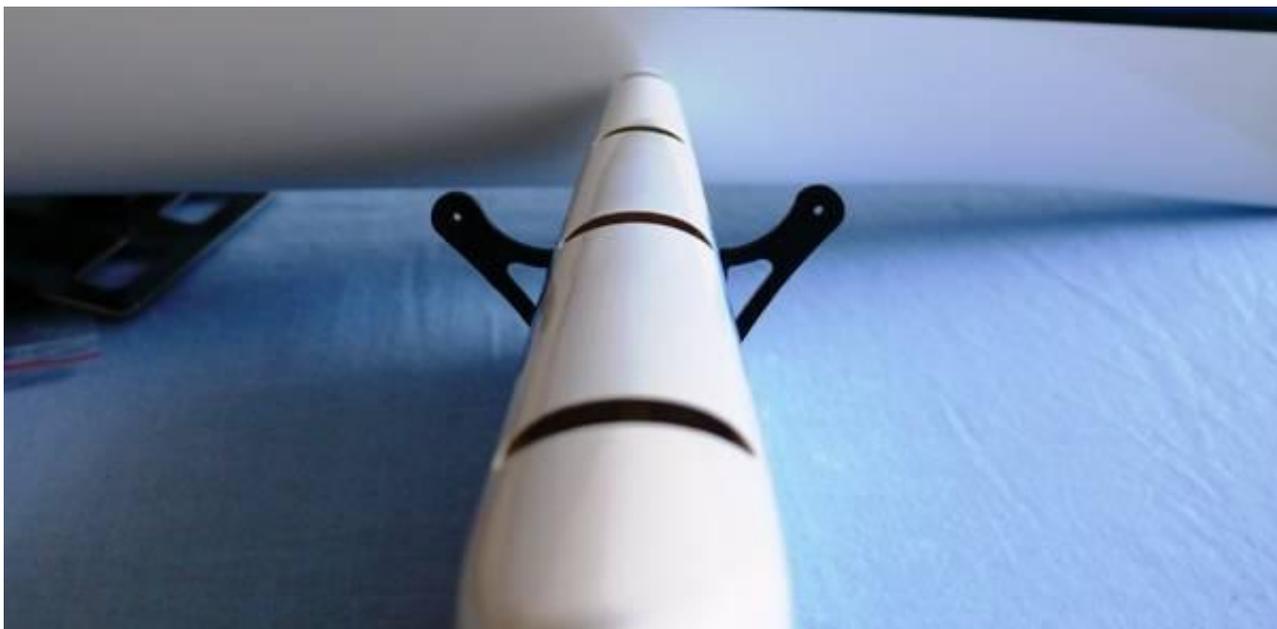
#### 5.3.1. Rudder and Rudder control Horn Installation

The rudder is hinged with a 2 mm steel wire, fitted through factory-installed bearing plates, for perfect alignment.









### 5.3.2.1 Canalizer installation

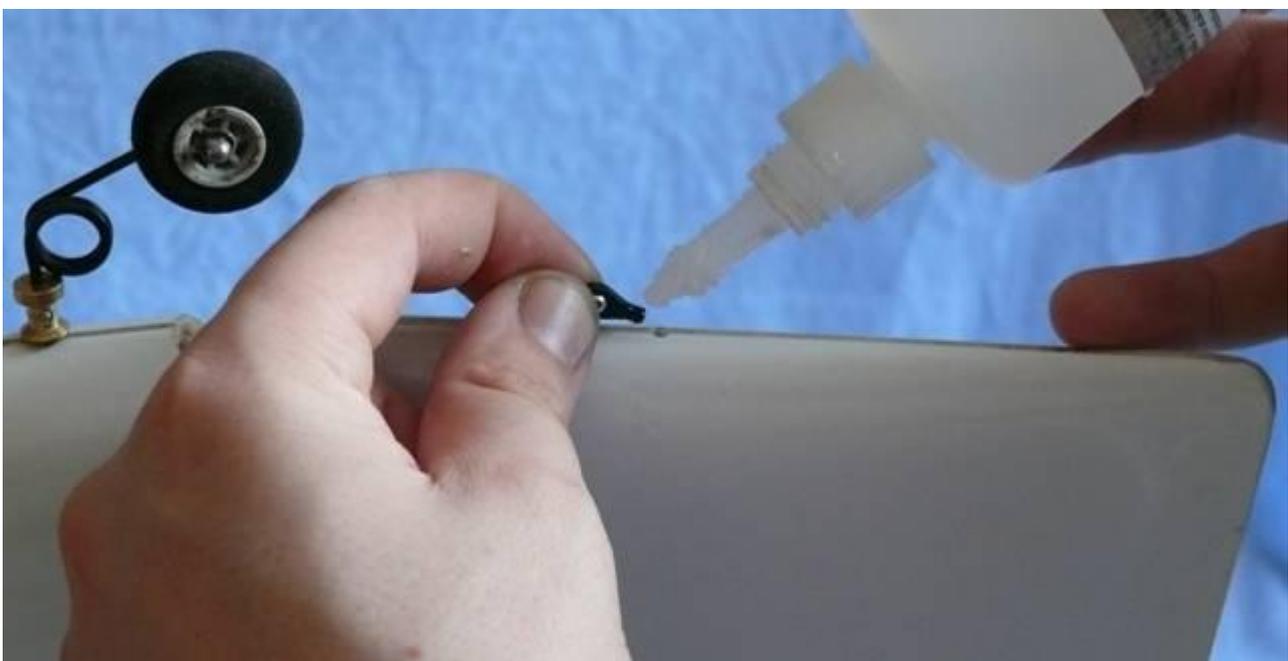
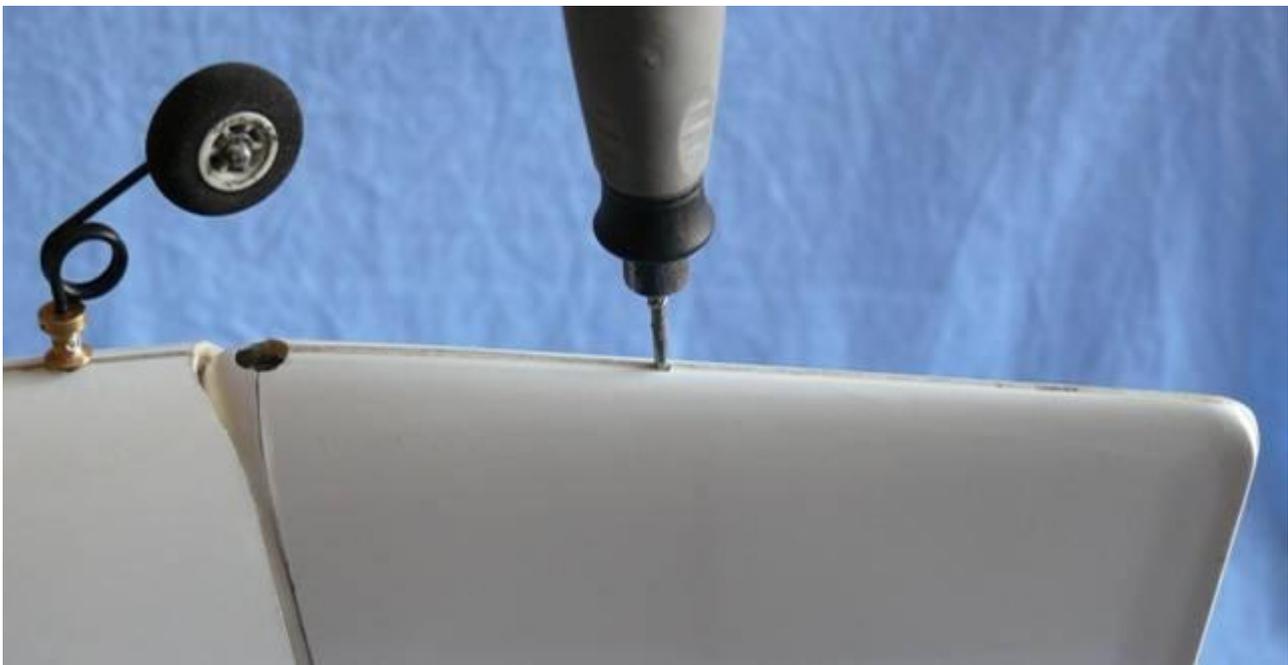
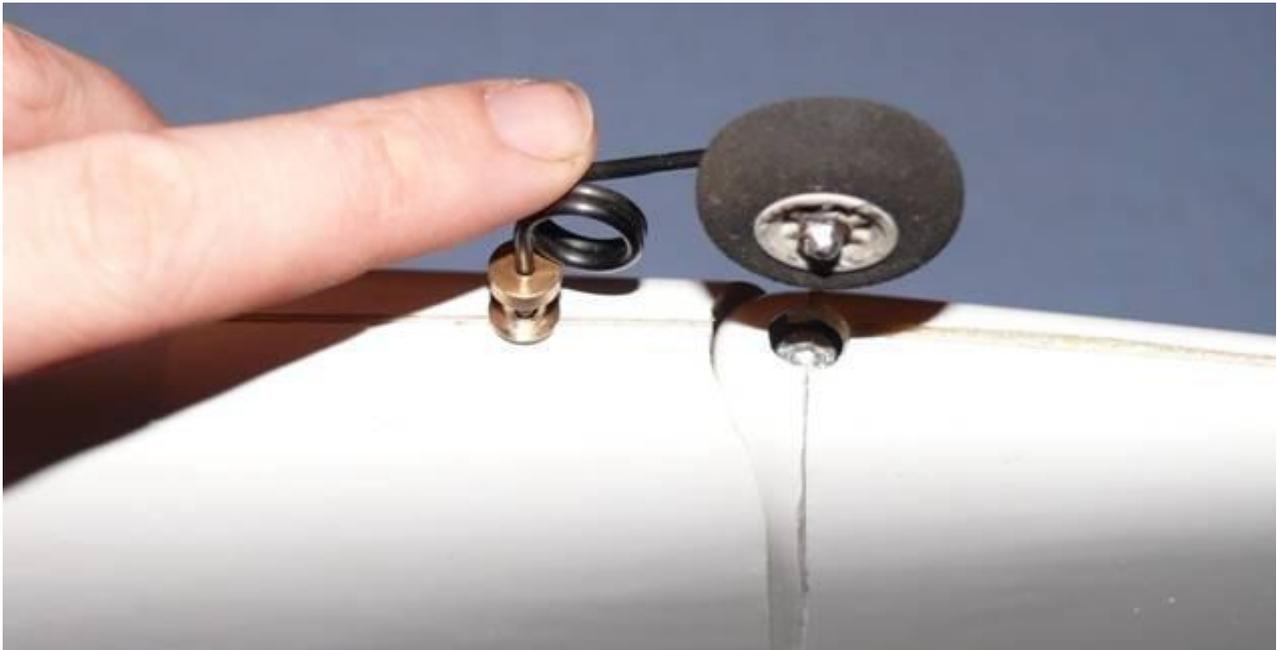


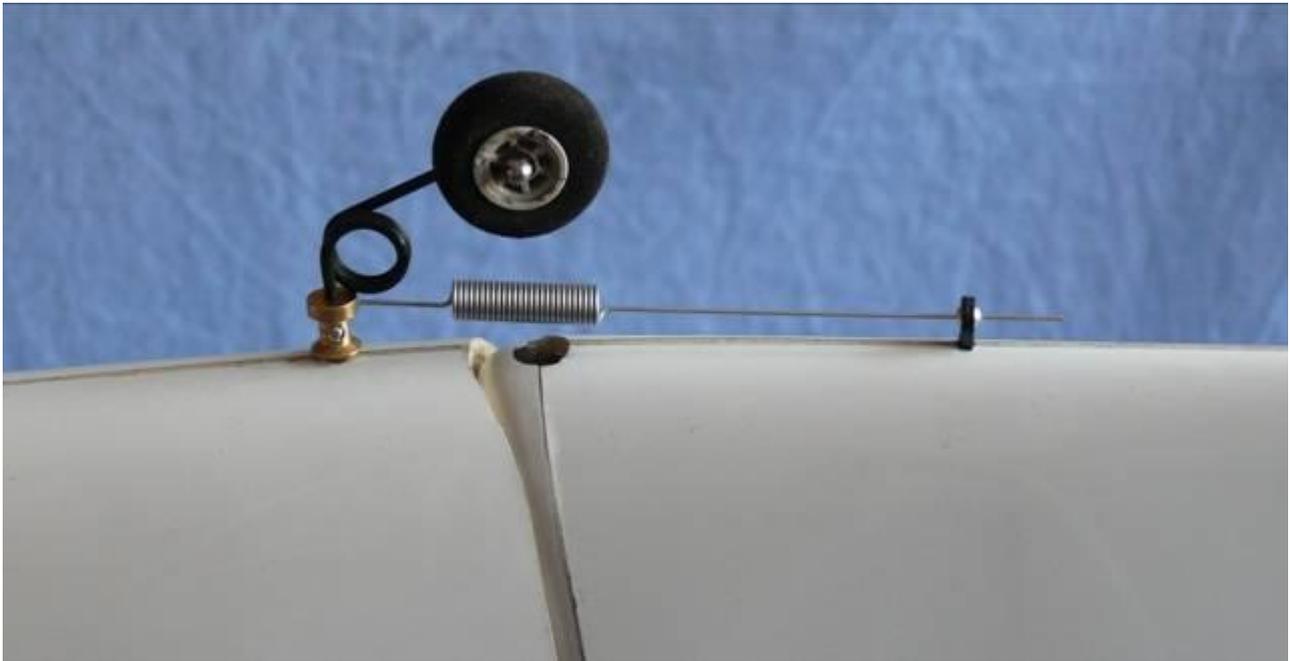
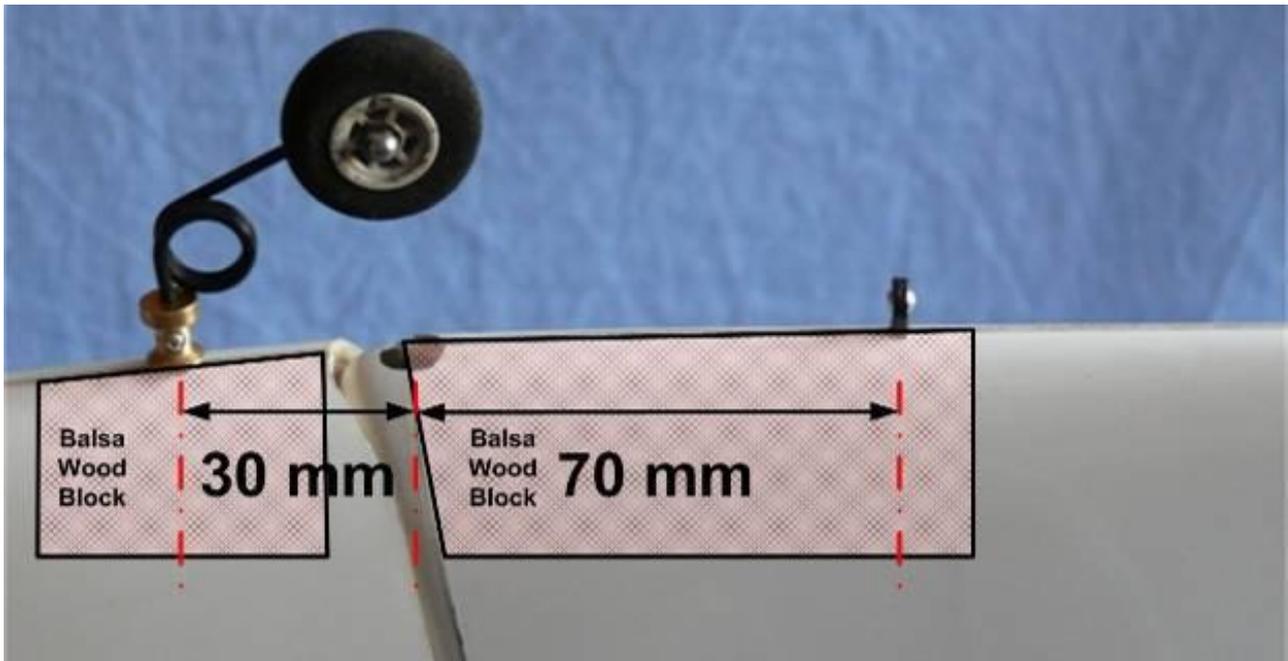


### 5.3.2 Tail Wheel Installation

There is a balsa plate already glued into the fuselage floor.







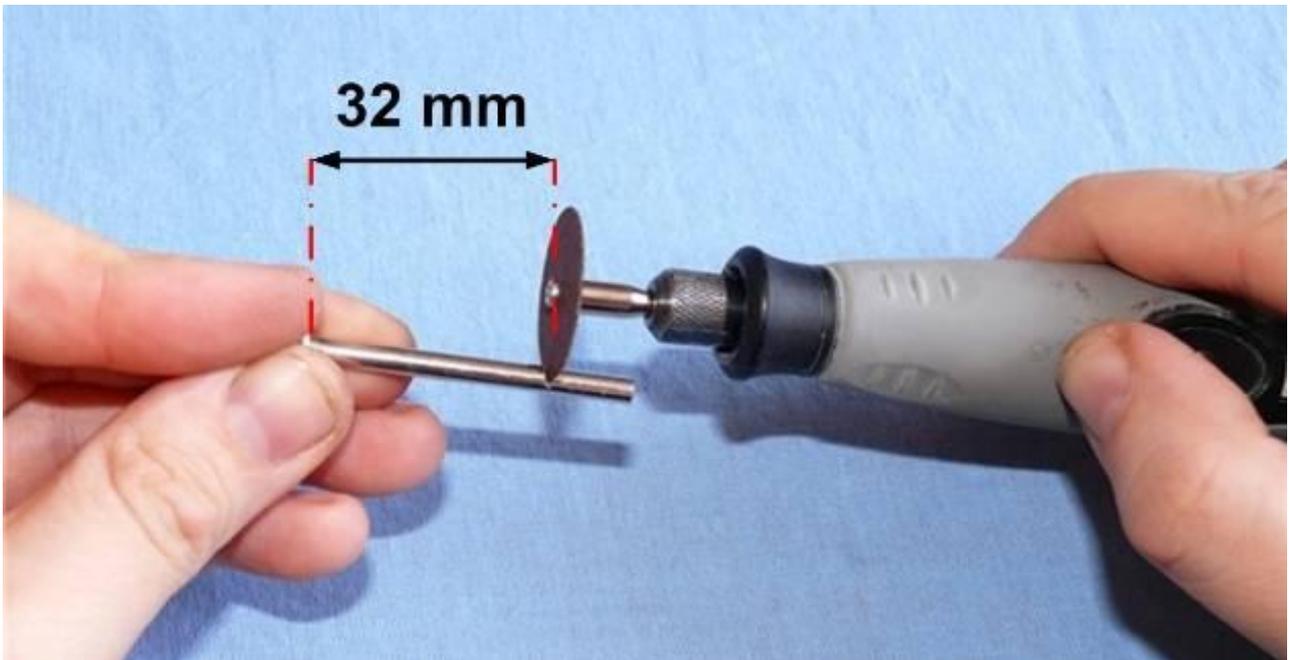
### 5.3.3. Landing Gear Installation

The main landing gear legs are laminated from a number of carbon and glass rovings and cloth, in negative molds, and heat cured. This produces a strong, but still flexible and lightweight, structure. Each leg is secured through the underside of the fuselage, at the back of the chin cowl position, into the factory-installed carbon reinforced plywood mount.

Landing gear comes drilled and ready to install but you still need to drill the holes for the axles and wheel pants. If you have any problems inserting the bolts through the landing gear to the mount, please re-drill through the existing holes to make sure that there is no debris in the holes.

Assemble the gear using provided axles, or equivalent, to keep the weight down. Make sure you use thread lock on the axle screws to prevent the threads from backing off and losing the wheel or pant in flight.









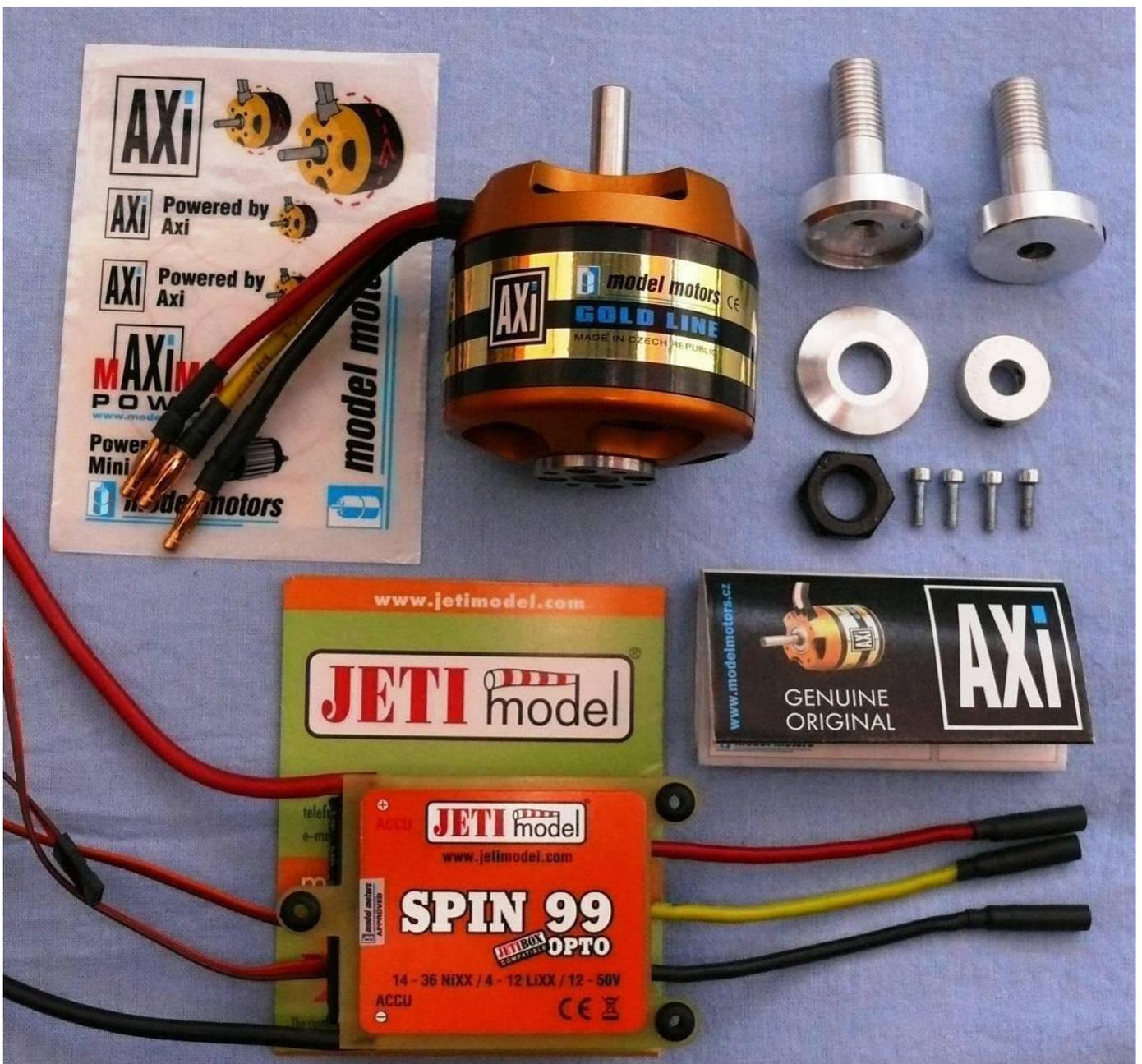


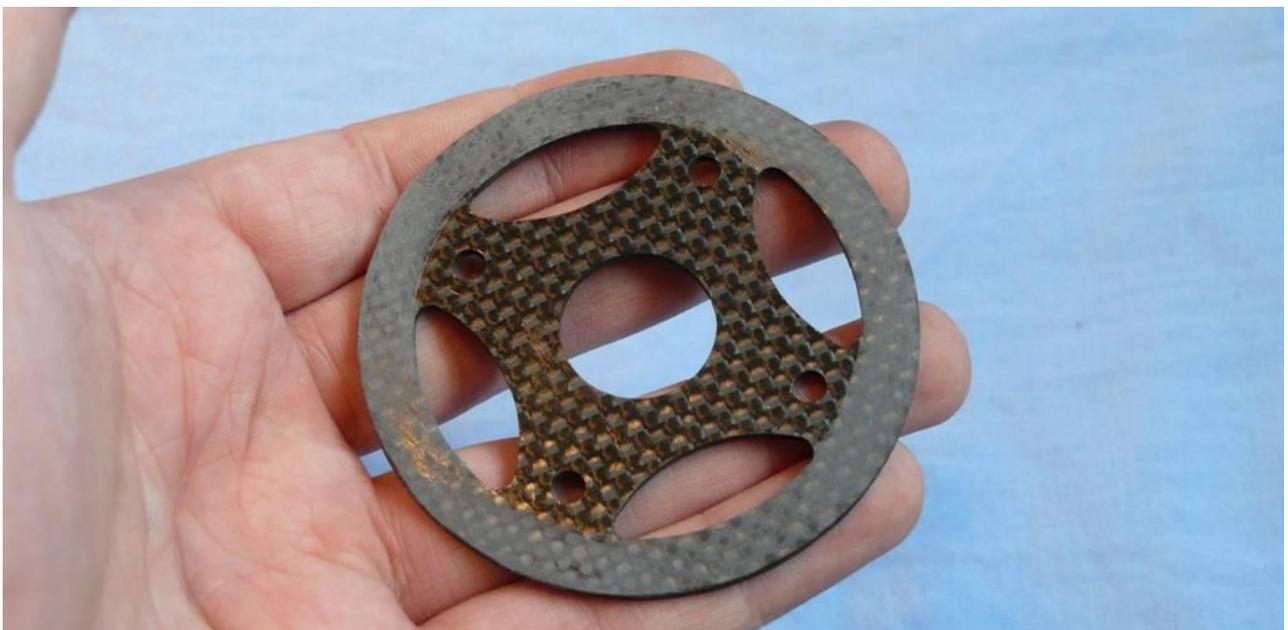
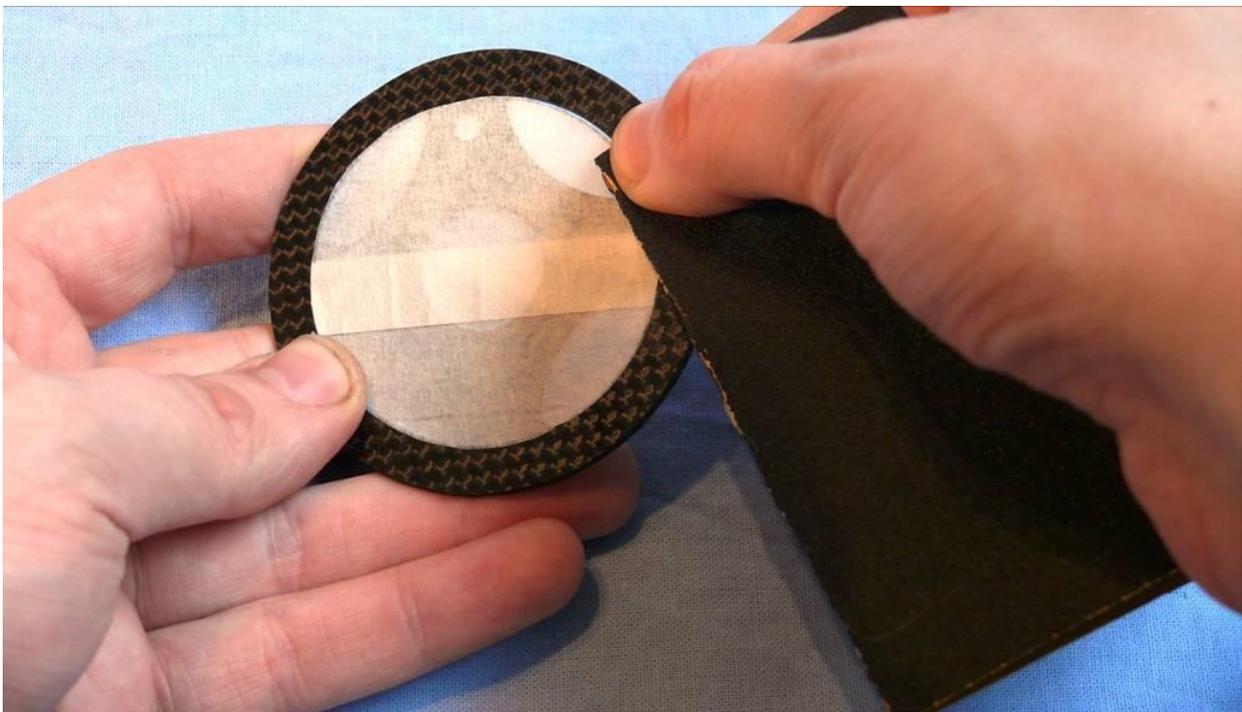
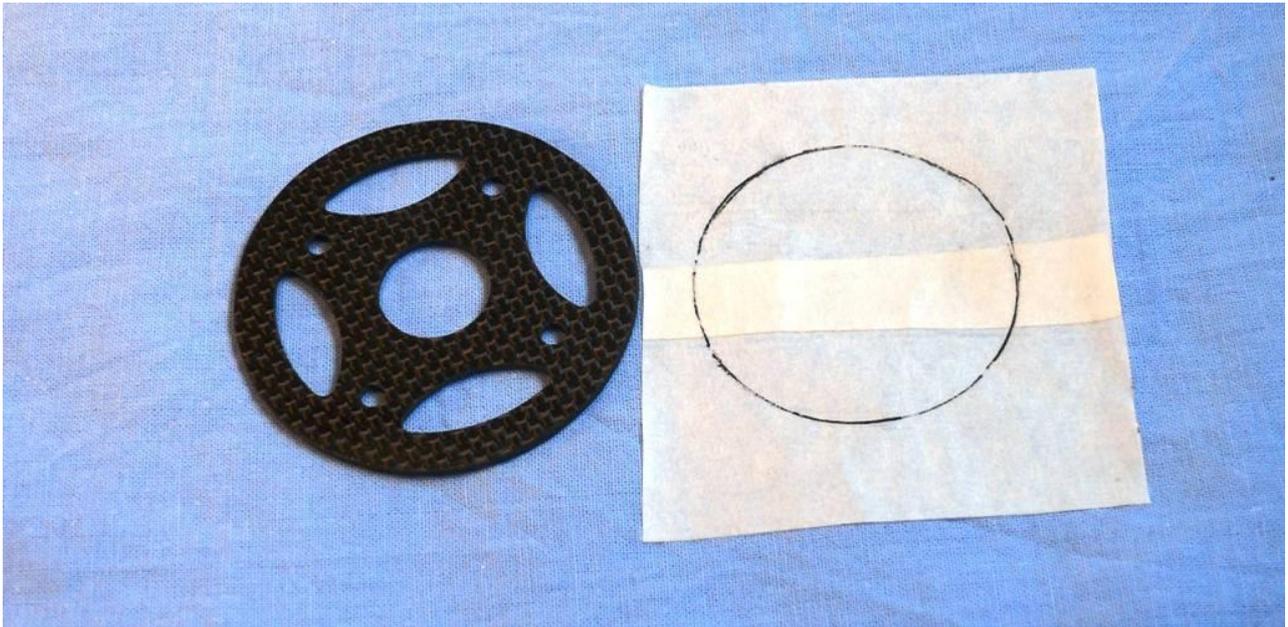
### 5.3.4. Engine mounting

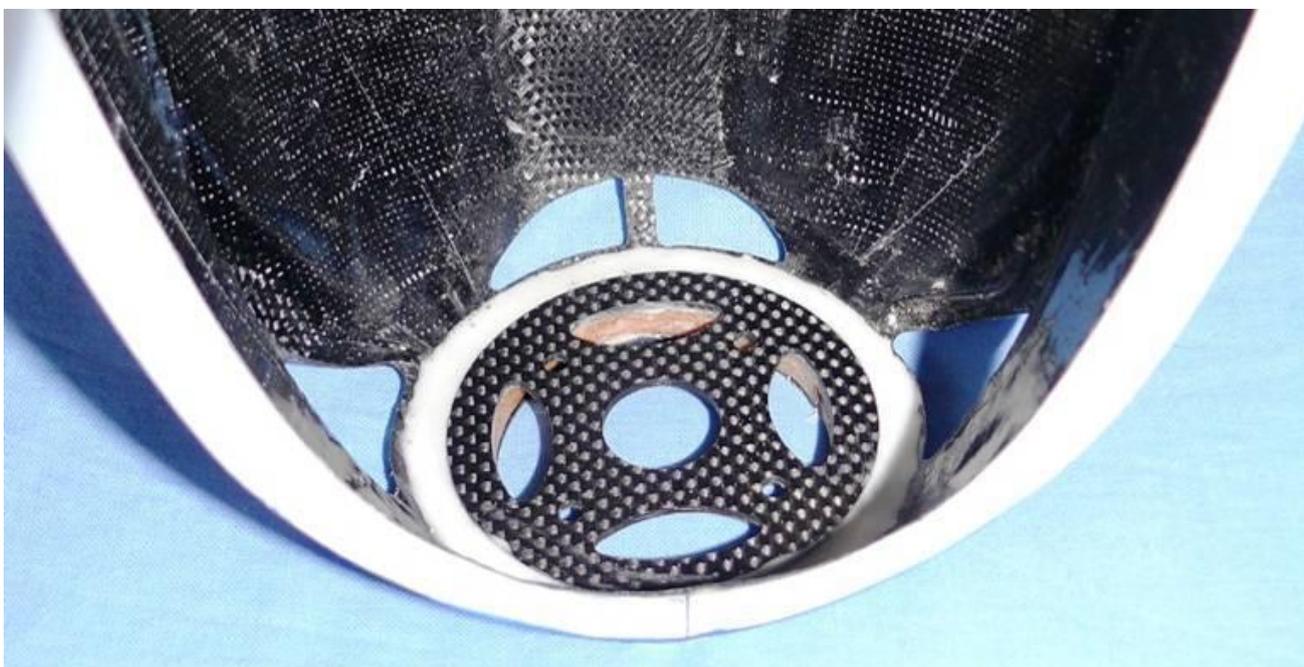
There are so many options and choices of motor that it not possible to show, them all here. We have shown typical electric version set-up here, including an installation of **AXI model** motors AXI 5325/24 GOLD LINE brushless motor.

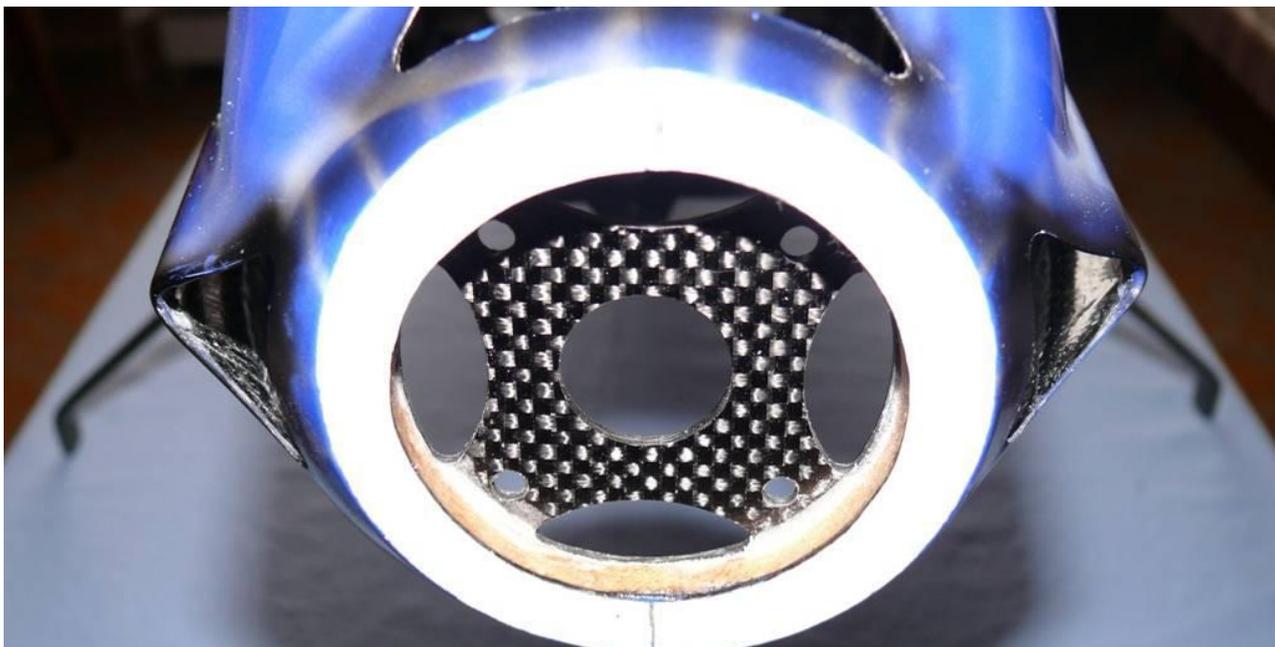
If fitting a gas or glow motor with a short header and muffler (without tuned pipe) it is most likely that the completed aircraft will be nose-heavy, so plan to mount all the other items (batteries, receiver, elevator servos etc) as far back as possible.

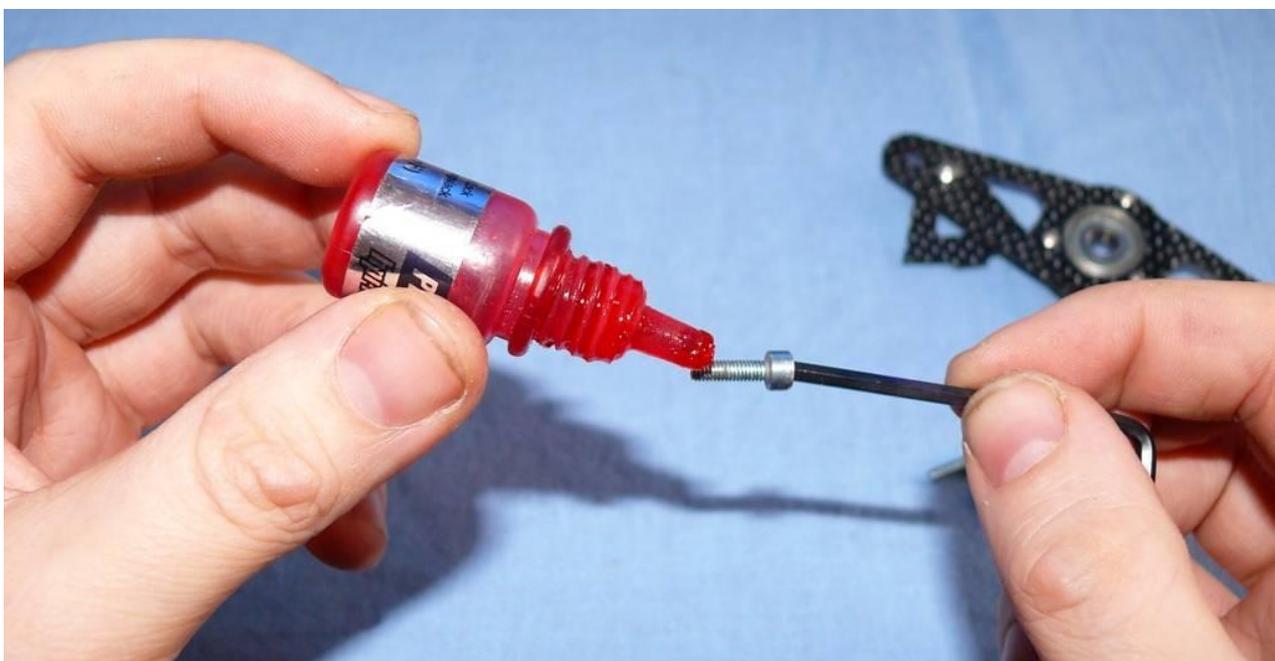
Included in the kit is a carbon firewall for **AXI model** motors 5330/F3A, AXI 5325/24 and AXI 5325/18GOLD LINE brushless motors.

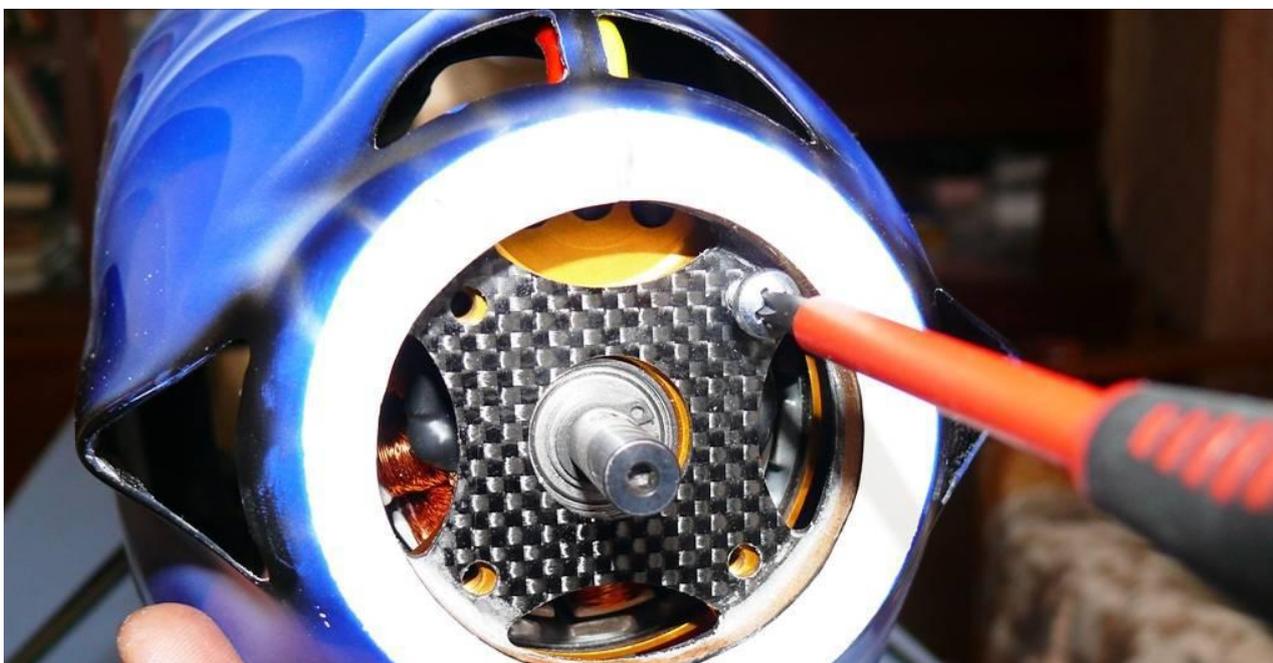


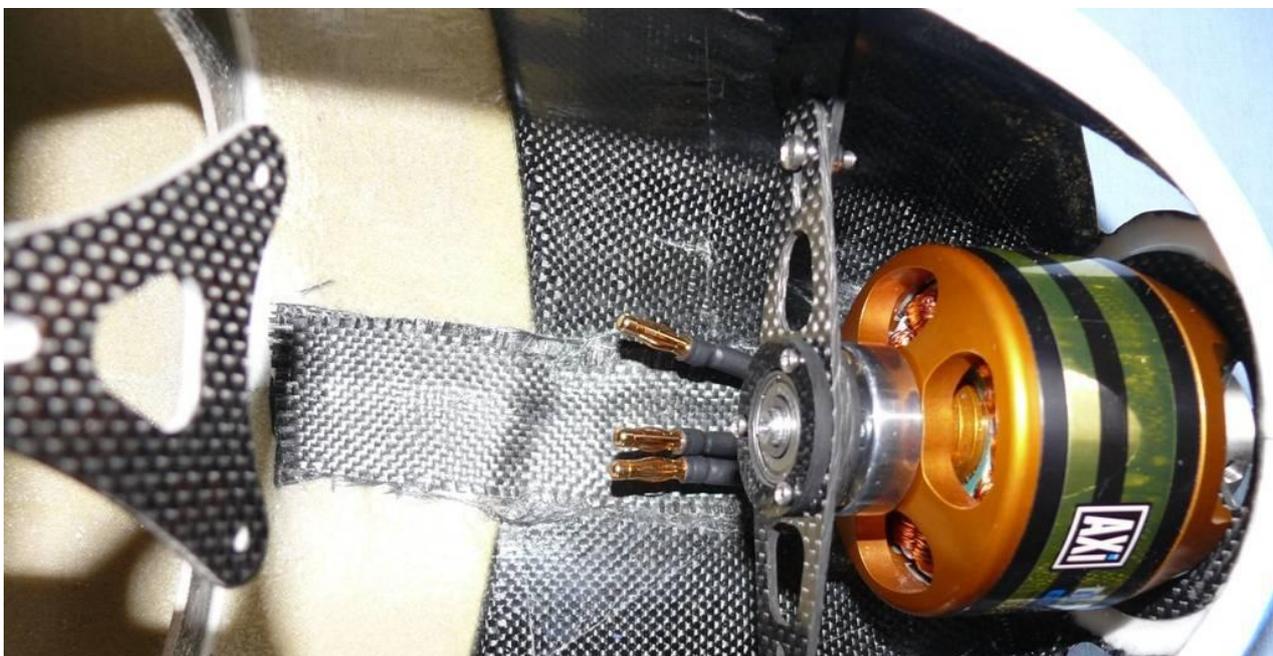


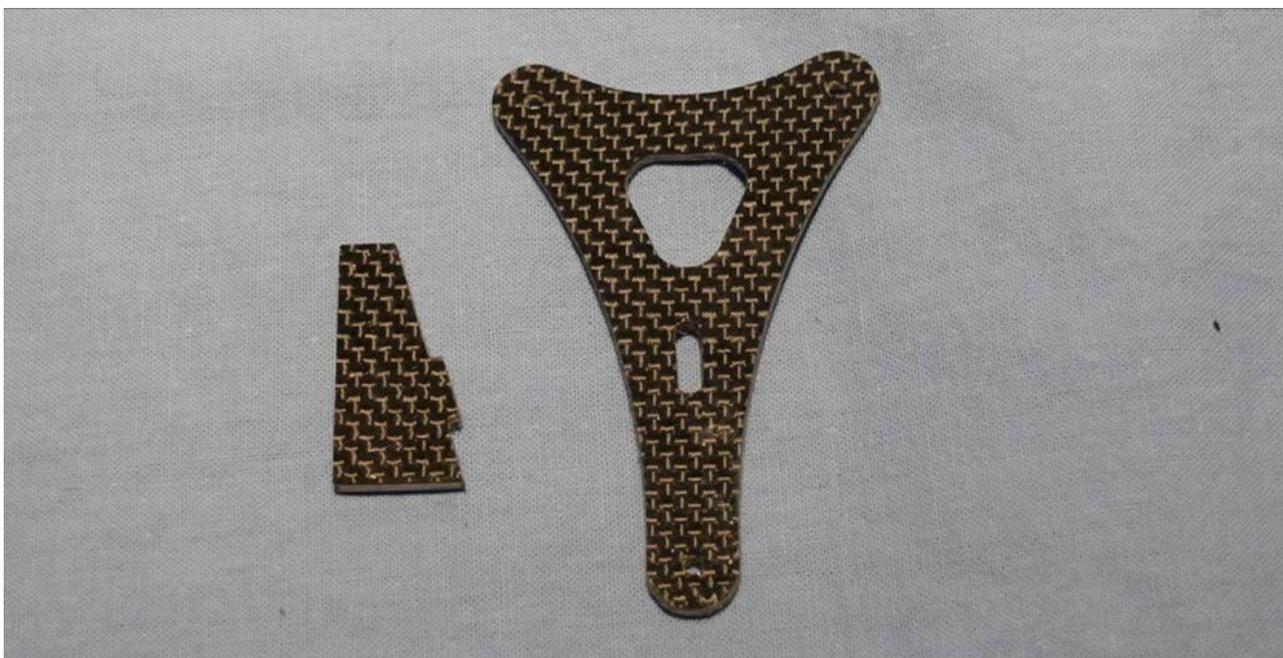


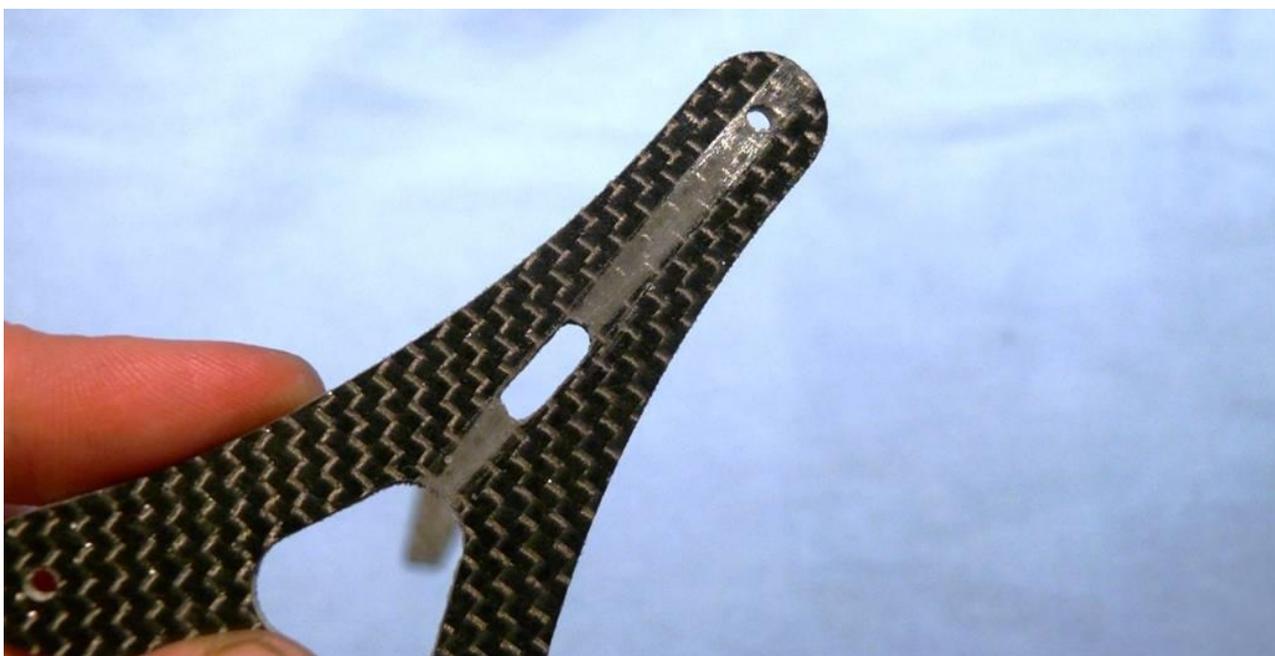
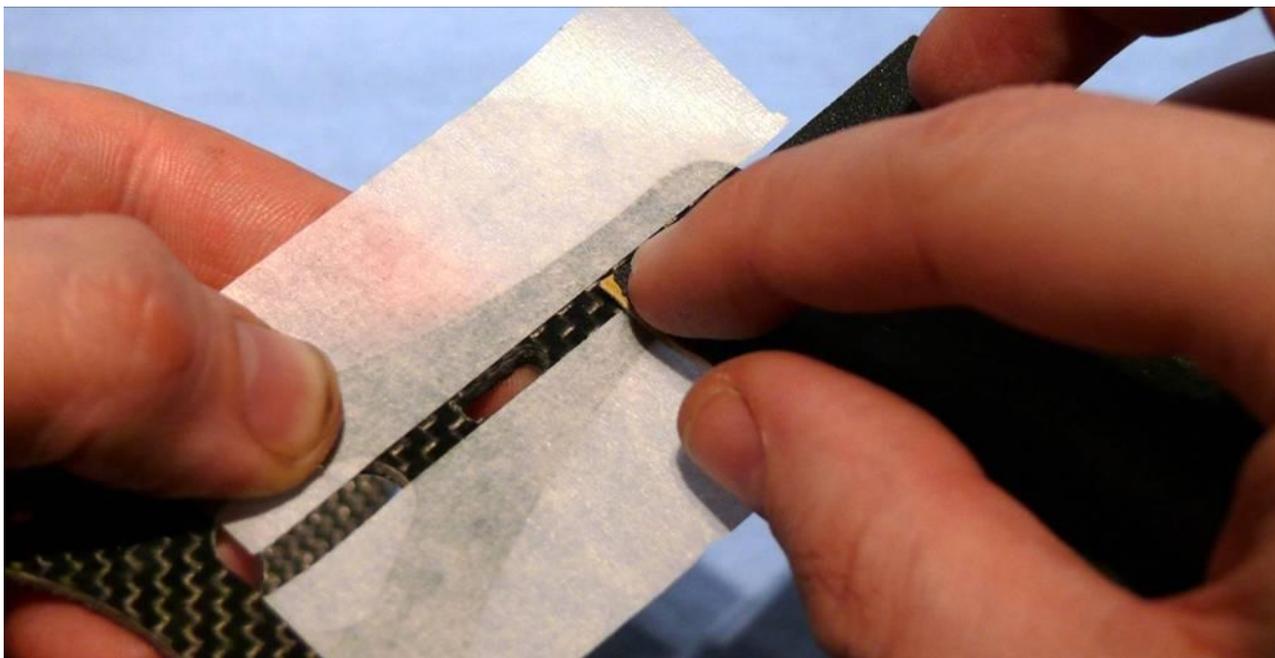


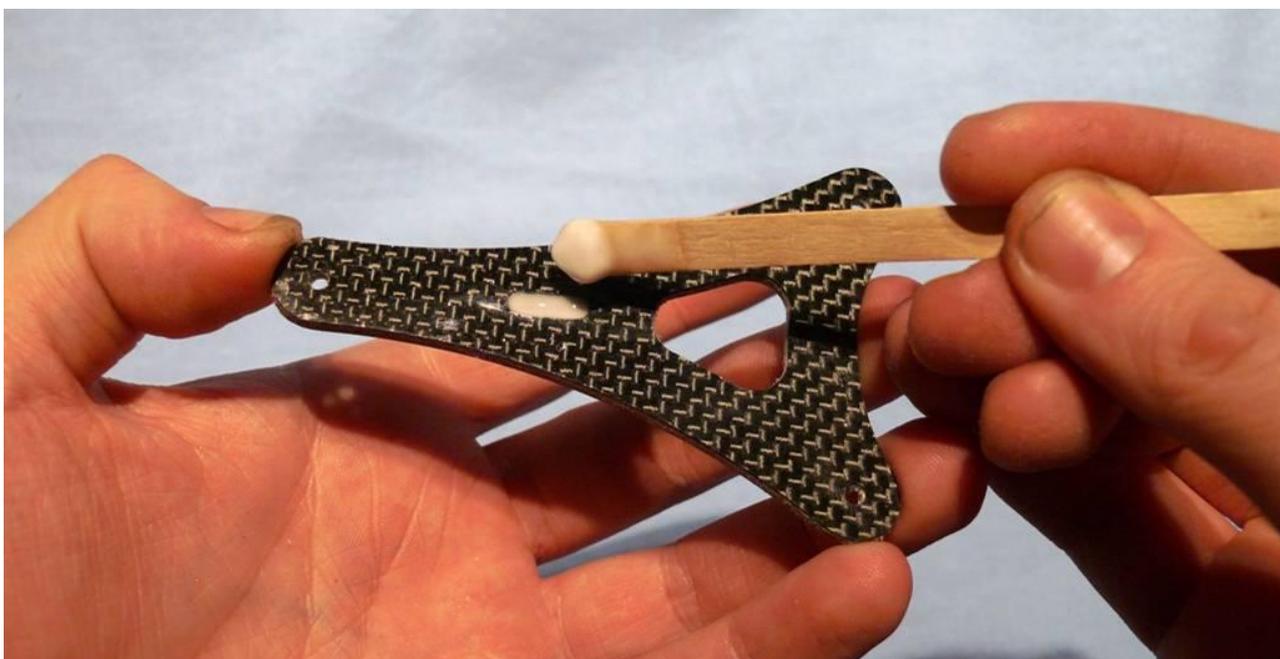


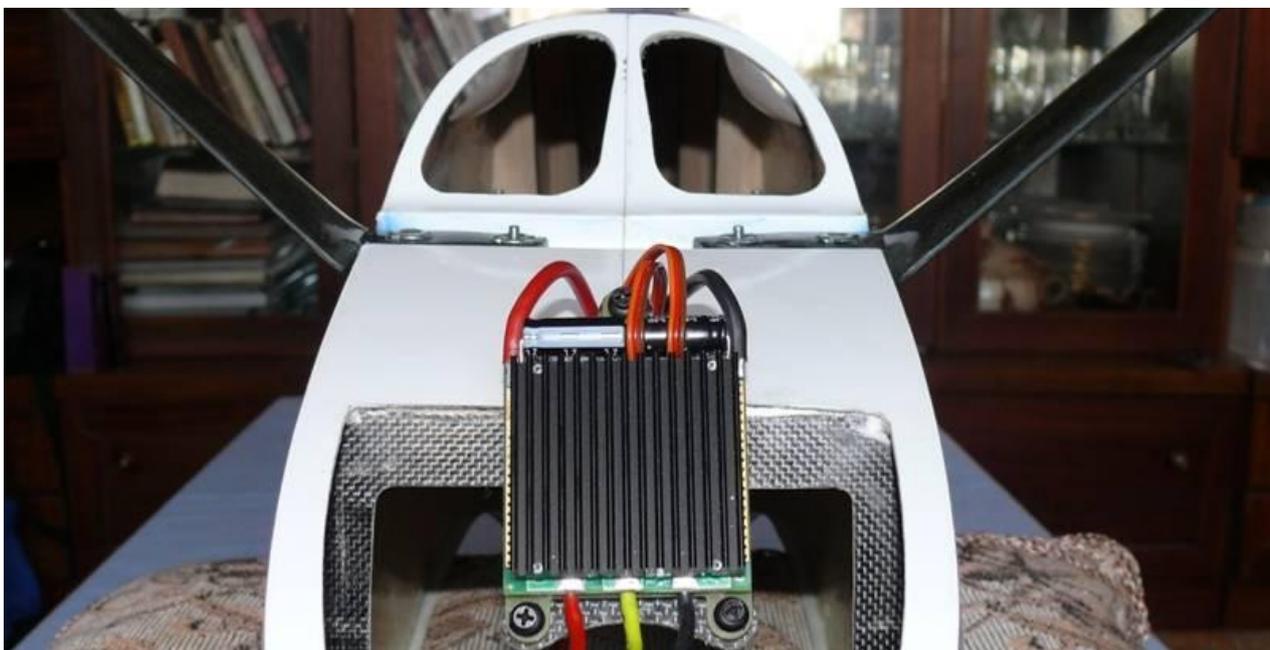
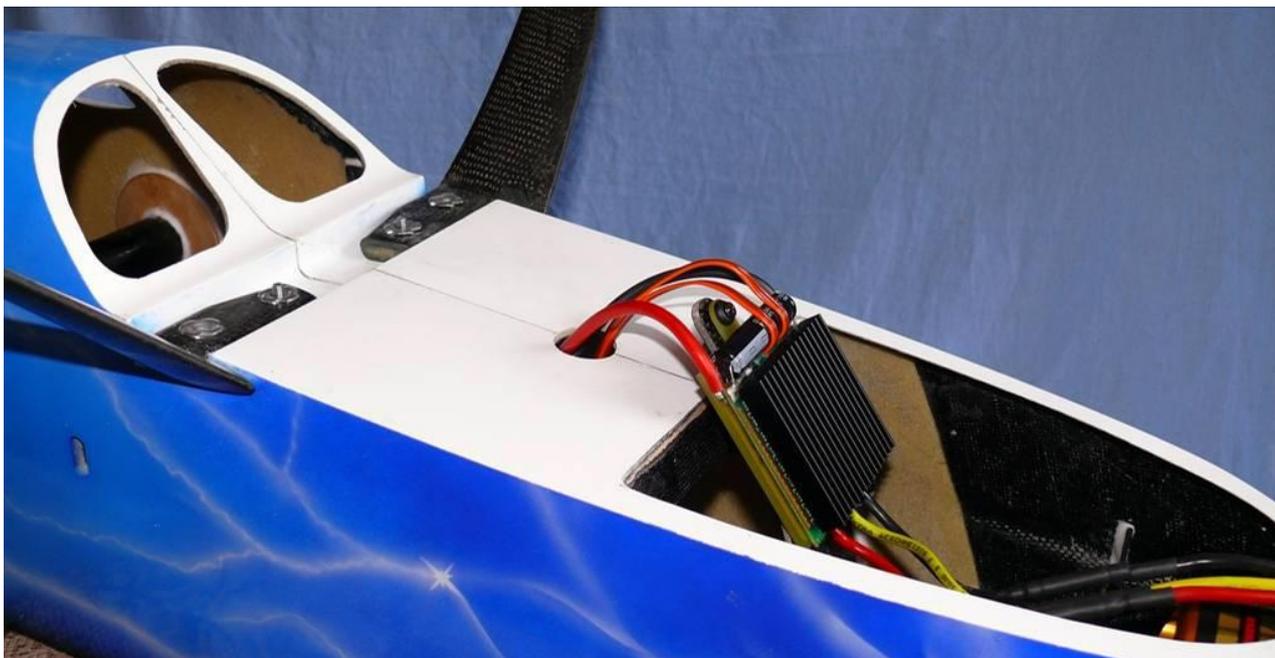




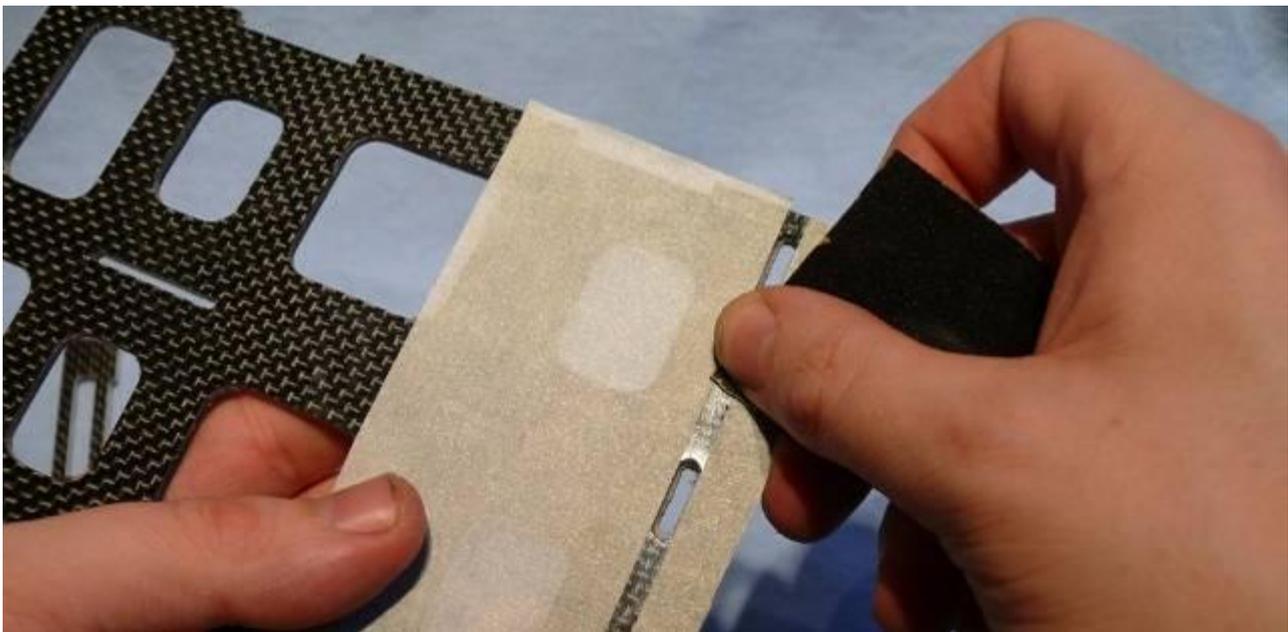
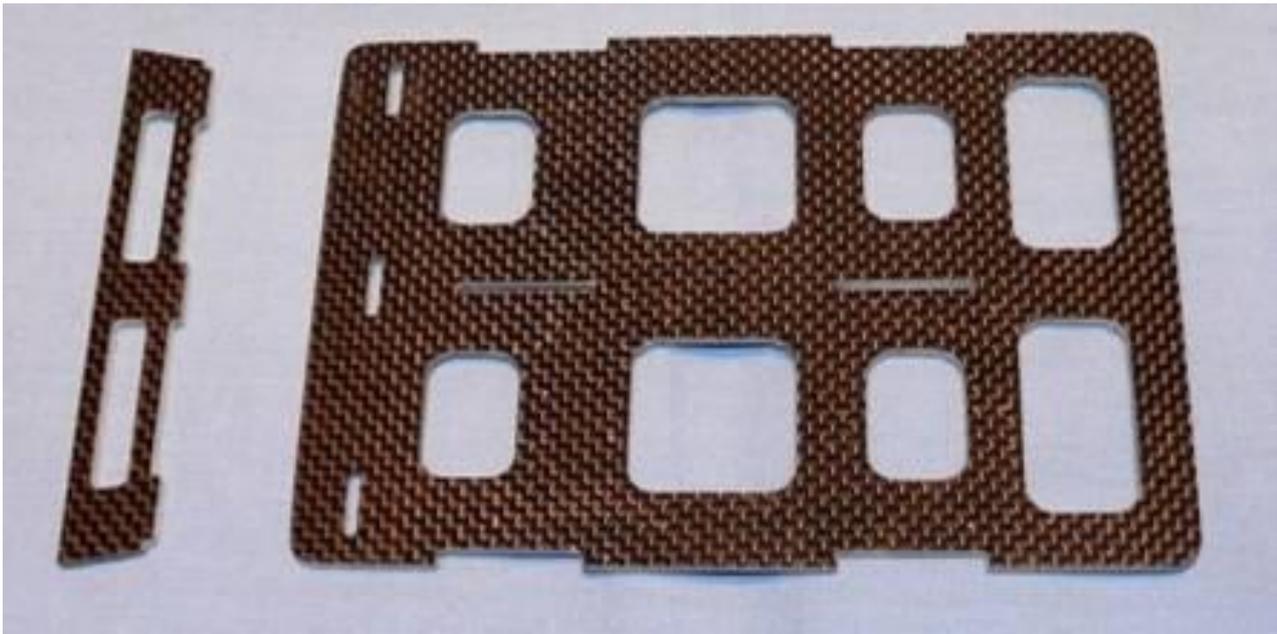


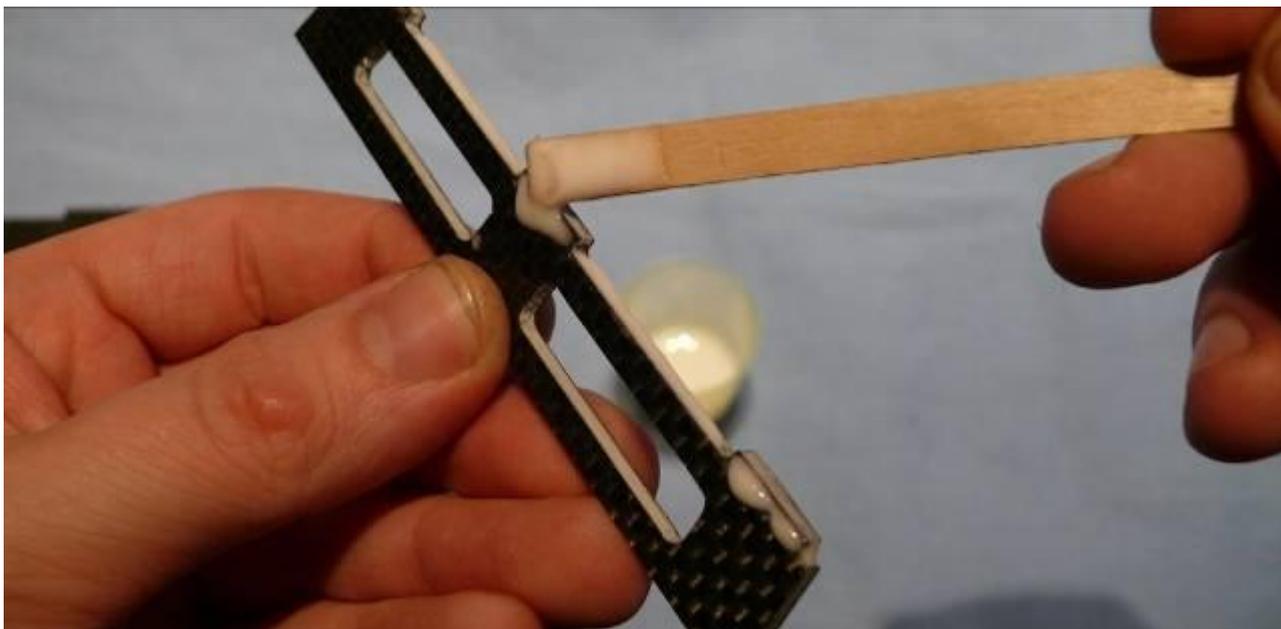


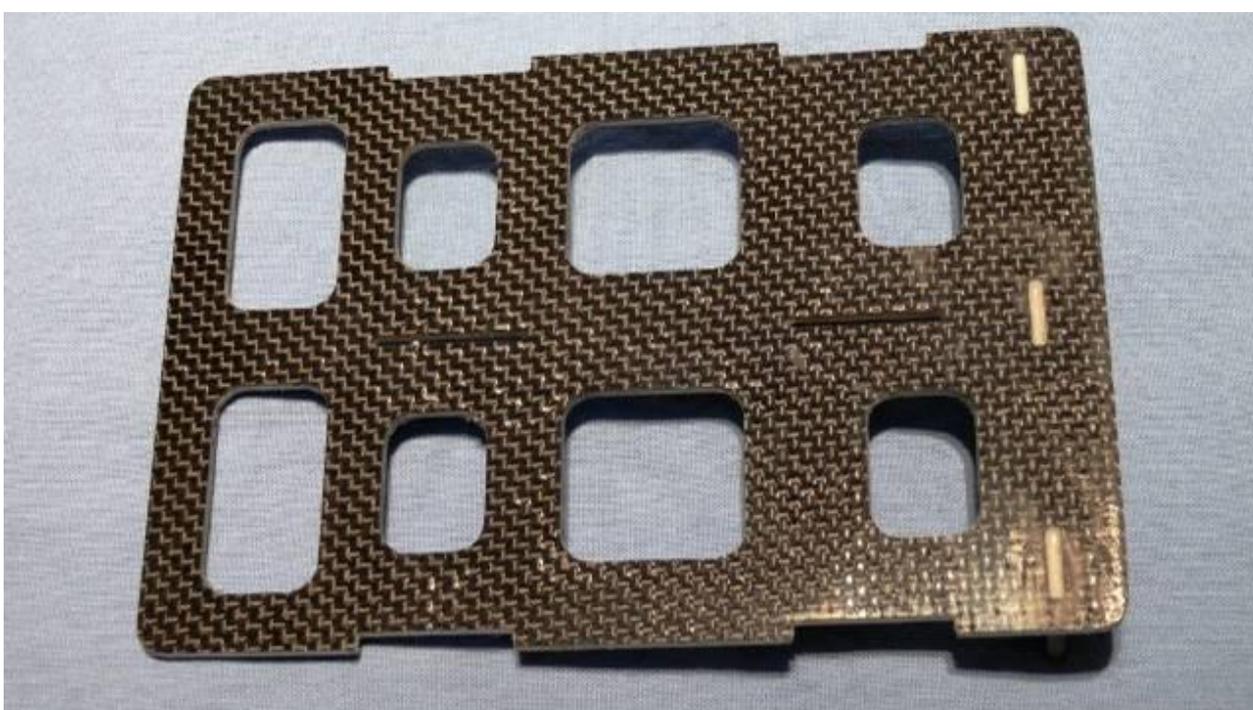
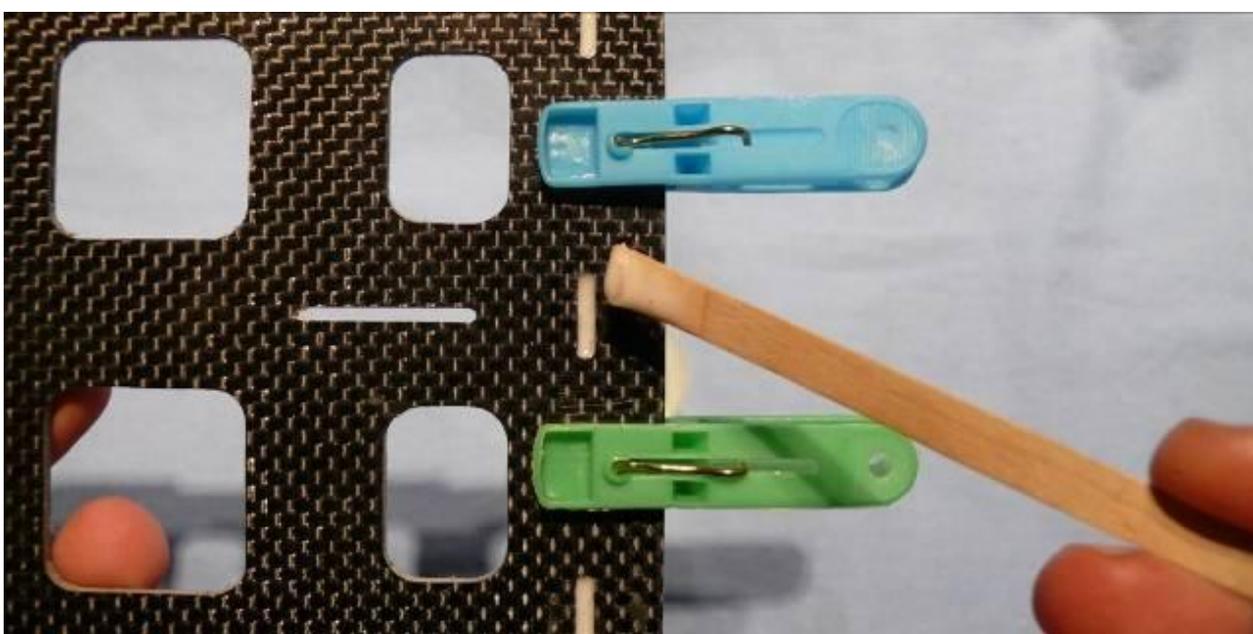
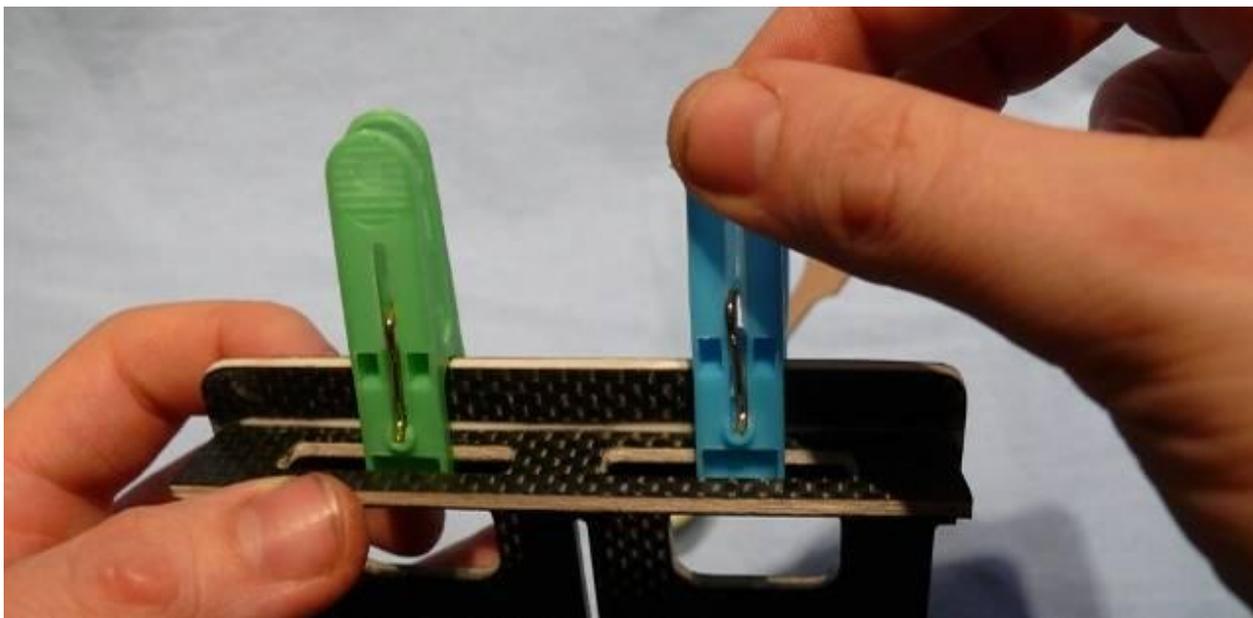


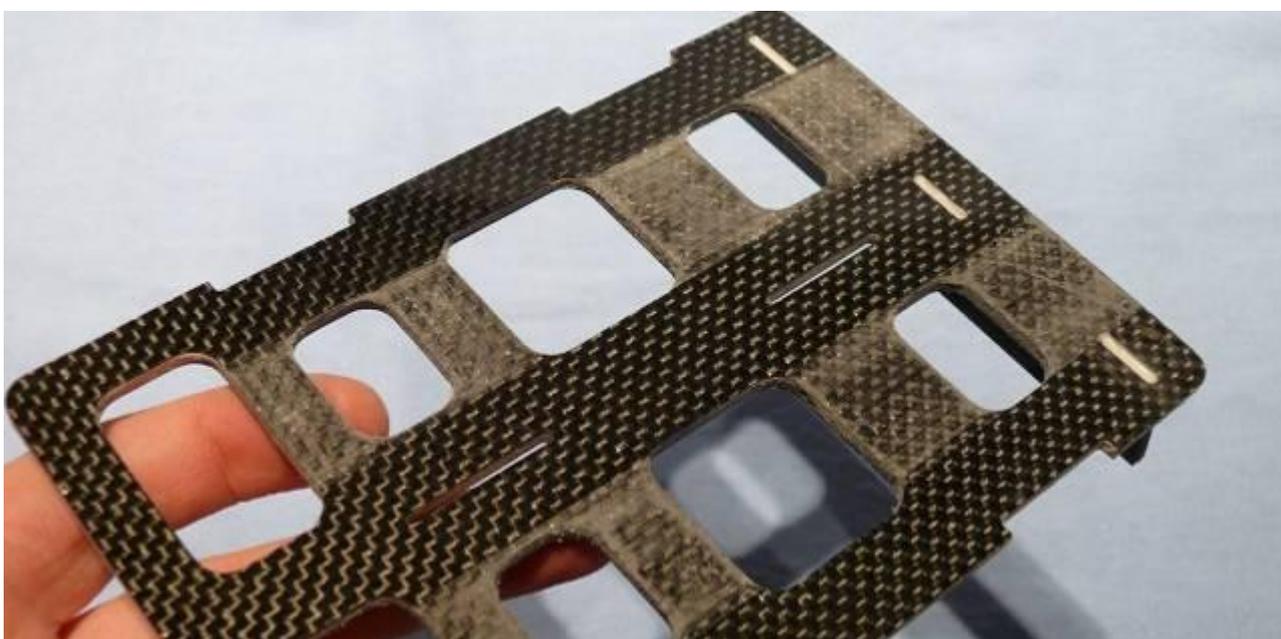
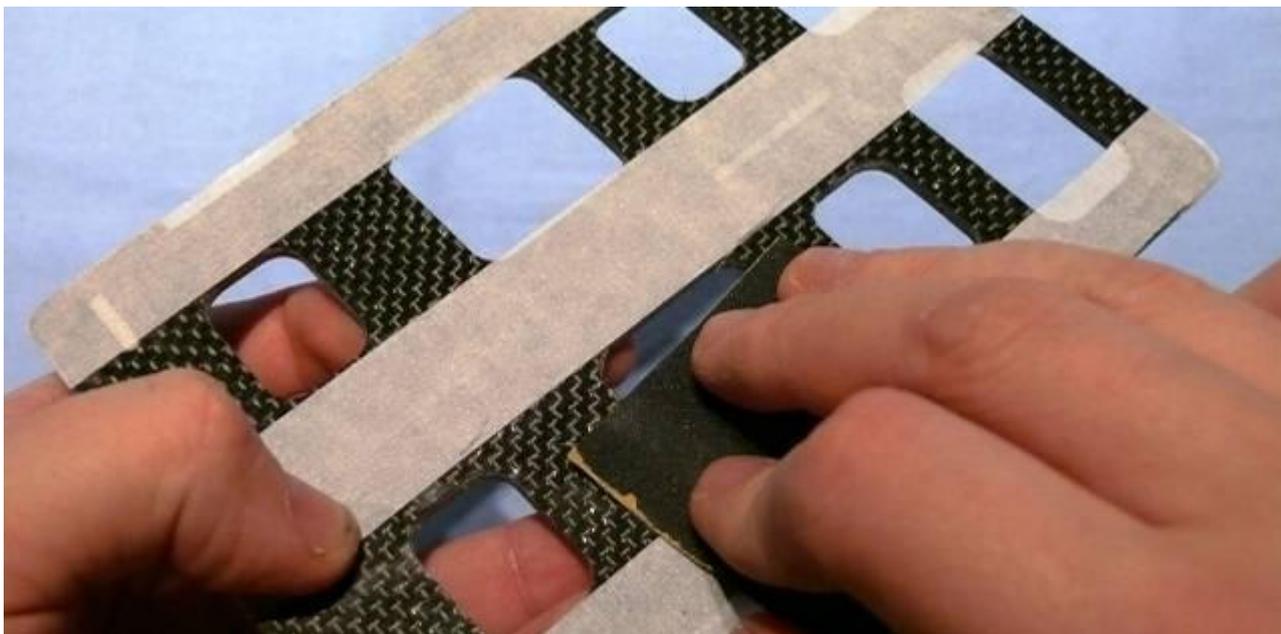


### 5.3.5. Battery Tray Installation



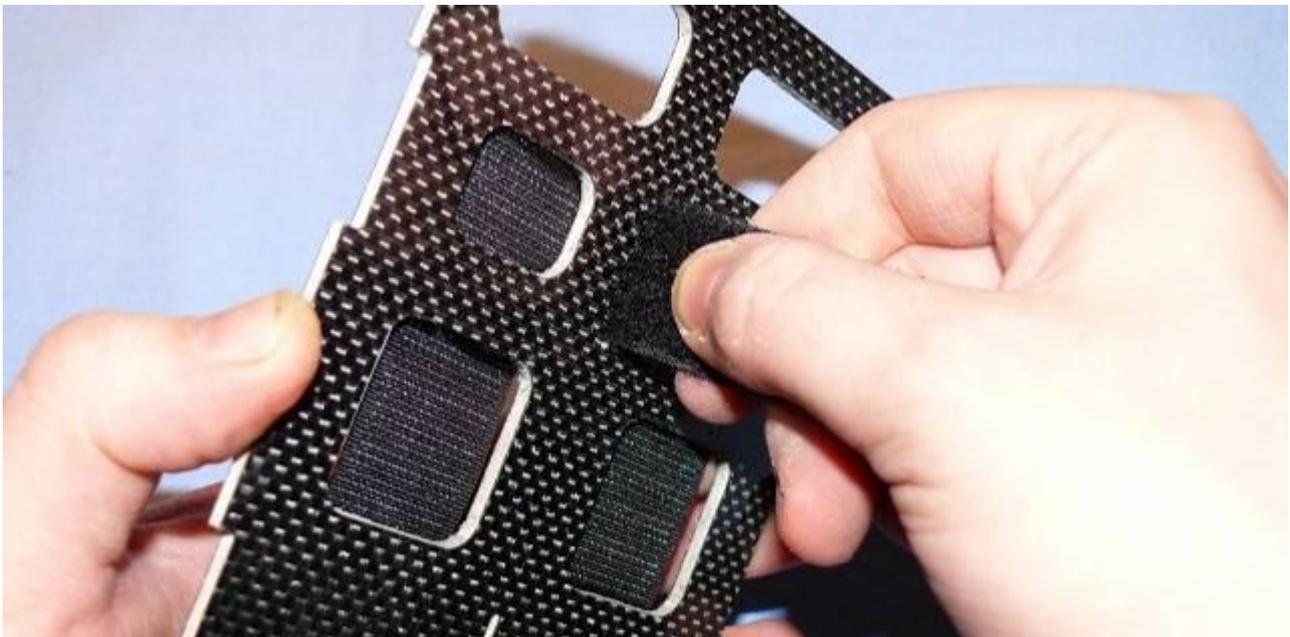


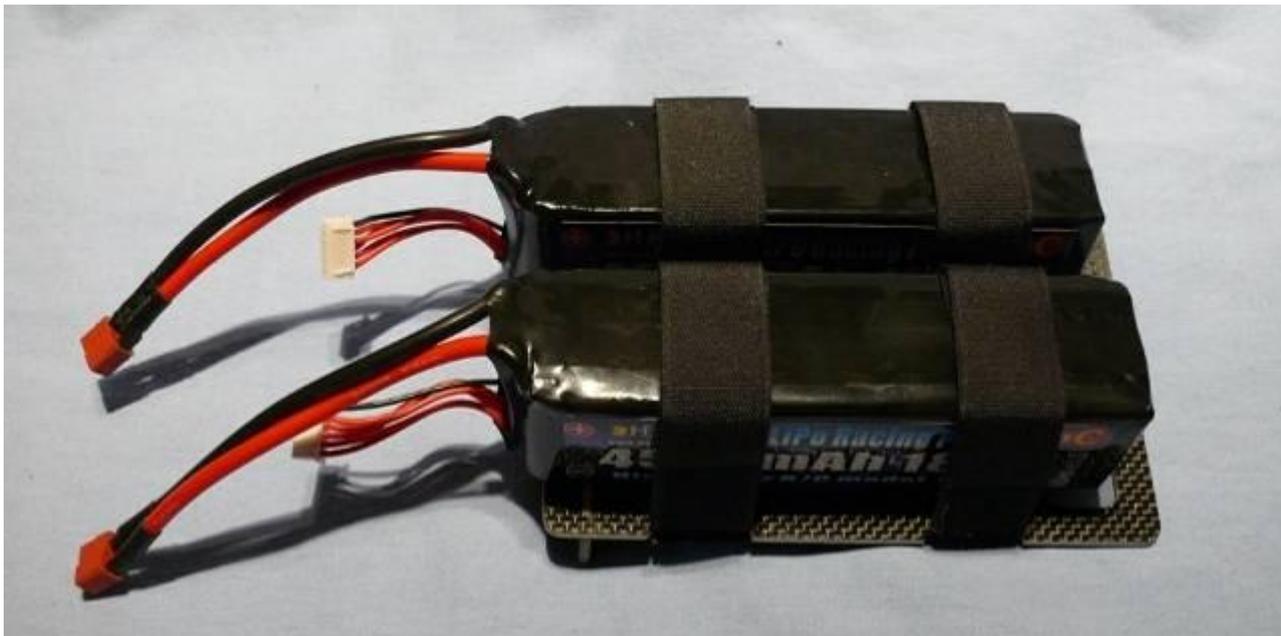








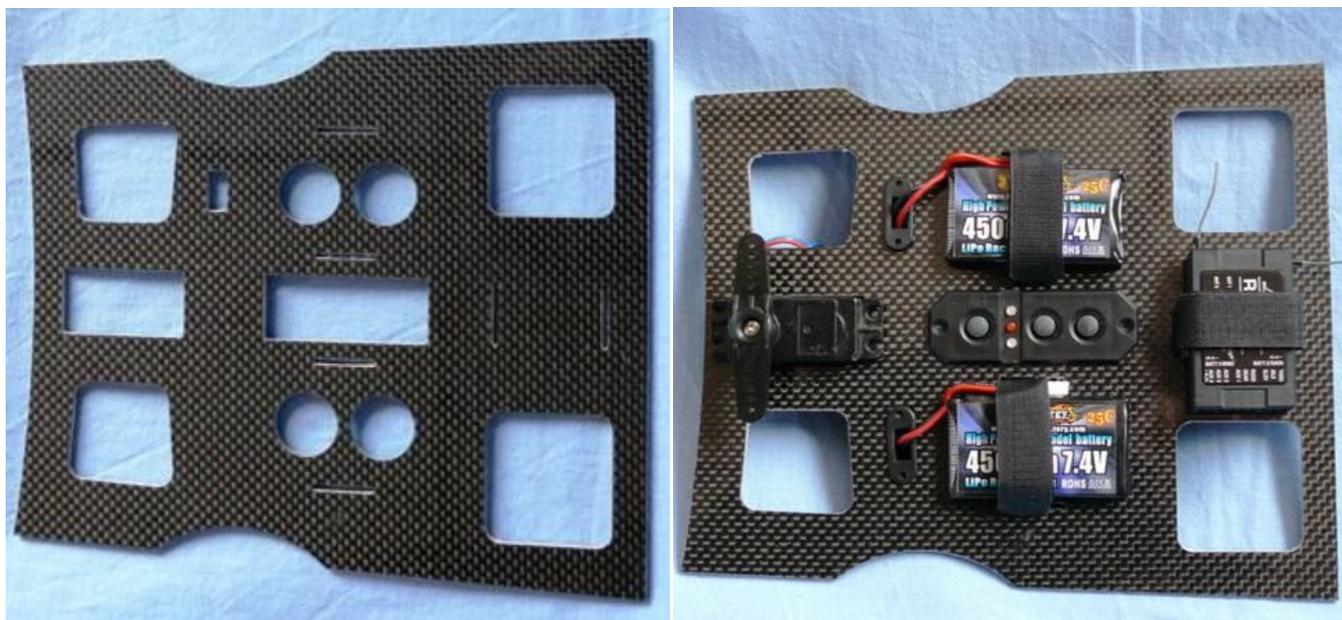
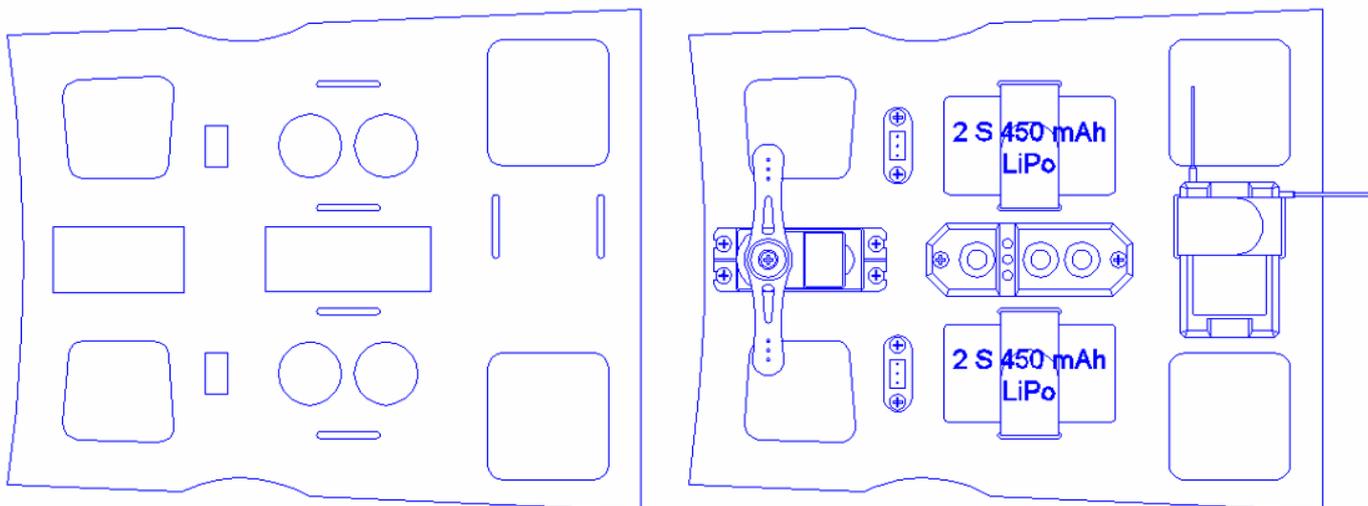




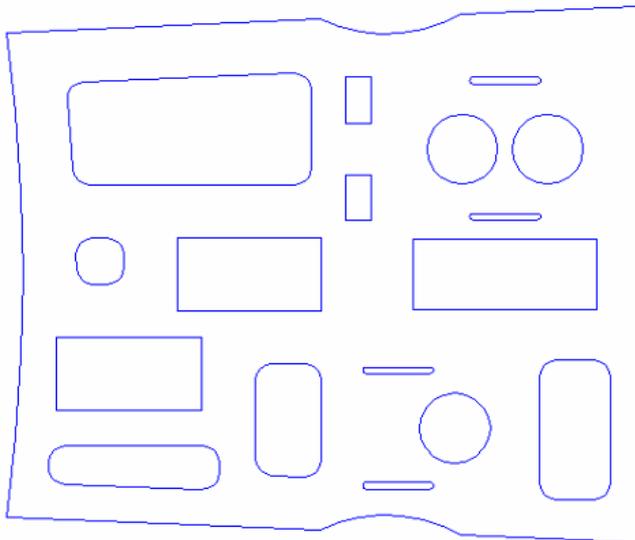
### 5.3.6. Radio Equipment Installation

The plane can be ordered with two types of servo trays:

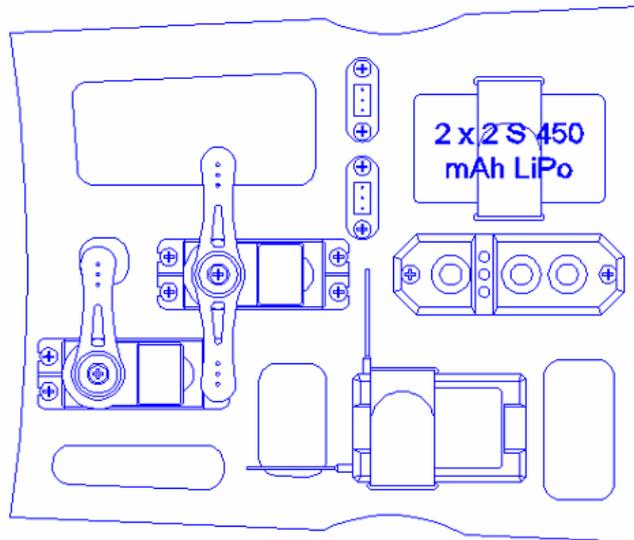
- One servo version:

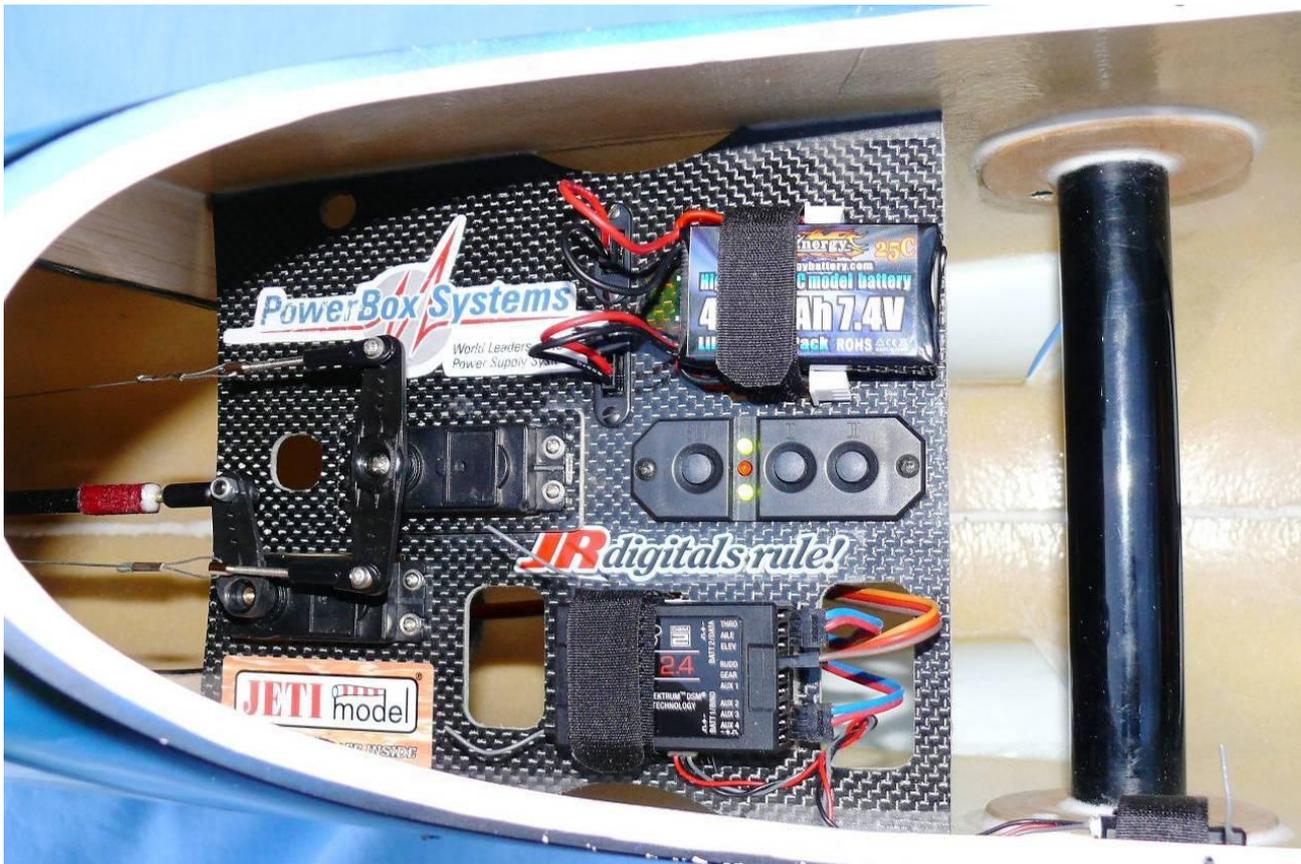


- Two servo version:



x





## 6. Balancing the Model/Control Throws

At this stage the model should be in ready-to-fly condition with all of the systems in place including the brushless motor, servos, landing gear, the radio system, and battery packs.

The recommended Center of Gravity location is 5-10 mm behind the wing tube

Please use the battery pack, moving it forward or backward, to achieve the perfect balance.

Balance the plane laterally also, holding the motor propeller shaft and a fingertip under the fin post, and if needed add a small weight to the light wing to make it track correctly.

## 7. Standard angle of attack:

- Left wing +0,0 degree. Rigts wing + 0,0 degrees
- Left stabilizer +0,0 degree. Rigts stabilizer + 0,0 degree

## Rekomend setup

Rudder High – 12.7 cm each direction, 48% expo. I use this for all flying.

Rudder Medium – 88% each direction, 36% expo. I use this for some snaps.

Rudder Low – 80% each direction, 33% expo. I rarely use this rate (mostly from friends that fly the plane and do not like sensitive rudder).

Aileron High – 24° up, 25° down, 75% expo. I use this for all snaps, and crossover of reverse spins.

Aileron Medium - 9° up, 10.1° down, 40% expo. I use this for all normal flying.

Aileron Low – 8.6° up, 9.6° down, 39% expo. I use this for all normal flying when it is very cold and airplane is very responsive.

Elevator High – 20.3° up, 21.4° down. 62% up and 52% down expo. I use this for spins only.

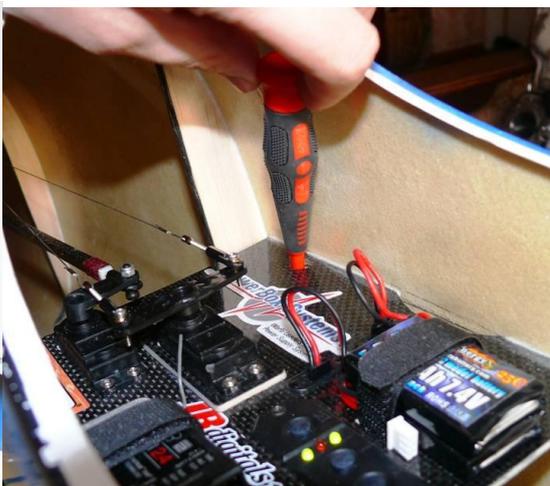
Elevator Medium – 12.1° up, 15.5° down. 36% up and 46% down expo. I use this for takeoff, landing, and some downline snaps (where it is harder to show good break on entry of snap).

Elevator Low – 10.4° up, 12.0° down. 23% up and 30% down expo. I use this for all normal flying, and most snaps.

### Stabilizer angle adjustment



### Wing angle adjustment



## 8. Mixing the Model

For best performance, we recommend to use a linear mixing. Aileron and elevator throws measured in degrees and mm at widest point of the aileron, rudder and elevator.

Mixing

Throttle to Elevator

Idle – 2% down elevator; approximately 0.7mm

10% - 0%

91% - 0%

Full – 1% down elevator; approximately 0.3mm

Rudder to Elevator

100% full left rudder – 9% down elevator

83% left rudder – 5% down elevator

60% left rudder – 4% down elevator

50% rudder (Center) – 0%

40% right rudder – 4% down elevator

17% right rudder – 5% down elevator

0% full right rudder – 9% down elevator

The mix uses expo curve, so it is smooth curve between mixing points. I use this mix all the time, except when throttle stick is at idle.

### Rudder to Aileron

100% full left rudder – 6% left aileron

65% left rudder – 1% left aileron

50% rudder (Center) – 0%

35% right rudder – 1% right aileron

0% full right rudder – 6% right aileron

## 9. Preflight

Pre-Flight checks are just as important for any RC airplanes as they are for full scale airplanes. There are very much things that could go wrong during a flight. It is critical that you check everything twice to minimize the risk of crashing your expensive and carefully constructed airplane.

**Step 1.** Check CG is set properly. It is always a good idea to check the CG each time before the first flight of each day.

**Step 2.** Make sure the voltage of the transmitter and receiver batteries are acceptable levels before flying. Follow the recommendations in the radio manual for minimum charge requirements. Charge all batteries before each flight.

**Step. 3** Check trims and sub trims are set to neutral and controls centered. Check rate and flight mode switches set properly.

If you are using MHz radio check the receiver antenna is fully extended and not reversed on it self. Always double check to make sure your transmitter antenna is fully extended.

**Step. 4** If you are using any MHz radio you need to make sure that your frequency is free before turning on your radio. Follow your club's pre-flight instructions for obtaining the frequency pin.

**Step 5.** With your radio system on, make sure the control surfaces are moving correctly with each stick movement of the transmitter. Ensure all flight controls are free from binding and are centered. Check that all hinges are tight and will not pull out. Control linkages must be rigid and tight and have no slop.

**Step 6.** The engine vibrations during flight sometimes cause bolts to vibrate loose. Make sure the bolts holding the wing to the fuselage are in place and are tight. Make sure all engine mounting bolts and servo screws are tight. Also make sure the propeller nut is tight. Check all control horn bolts, wheel collars are tight and secure. Use Thread Locker where necessary.

**Step 7.** A range check is a very important pre-flight check that should be done before the first flight of each day at the flying field. Do a range check in accordance with the radio manufacturer instructions. If there is insufficient range or interference do not fly until it is resolved.

**Step 8.** Hold onto the airplane and move the throttle stick forward. Verify that the motor turns the right direction and goes to full throttle. Move the throttle stick back to low, verify that the motor stops turning. Do not fly an unreliable engine.

**Step 9. Go fly and have some fun**