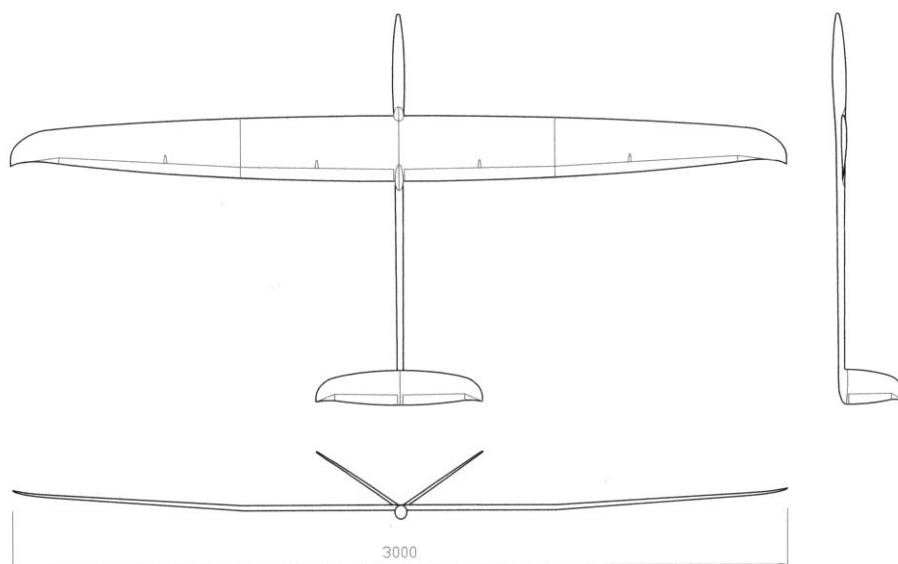


Wing span [mm]:	3000
Aspect ratio:	14,67
Wing area [dm <sup>2</sup> ]:	61,33
Wing loading:	from 19,6
Weight [g]:	from 1200
Airfoil:	VS1



## **BUILDING INSTRUCTION**

**ERWIN XL *ultralight***

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## DATA

### 1. Kit – Contents

Fuselage, in two parts, incl. canopy and cover for end of fuselage  
 Wing, in two parts  
 V-Tail

Carbon pipe, 1 piece  
 Carbon pipe with steel core, 1 piece  
 Steel bar, 1 piece

Covers for servos on wing, 4 pieces  
 Levers for rudders, 4 pieces

Servo board  
 Assembly board for hook for winch start  
 Ball connectors for the elevator, 2 pieces  
 Brass pipes for the elevator, 2 pieces  
 Pipes and push rod, 2 pieces each  
 Threaded coupler, 2 pieces  
 Plugs and frames for connection of wing and fuselage, 4 pieces each

Screws, 2 pieces, for fixing the V-tail

Building instruction (please download from our homepage)

### 2. What else do you need:

Controls of the wing:  
 Connectors for push rods, M2,5mm, 8 pieces  
 Welding rod, d=2mm  
 Steel wire 1,5mm, 0,8mm

Hook for winch start and nut

On-off switch / socket for loading  
 Cables (electricity)  
 Cable for antenna, possibly steel wire for extension of antenna  
 Plugs

Epoxy-glue (for example UHU 300 endfest or Stabilit, no fast hardening epoxy resin)  
 Cotton flocks to thicken glue



Hook for winch start



Connector for push rods, M2,5mm

### 3. Electronical equipment

Servos for the wing	Dymond D60 Hyperion Atlas HP DS09SCD
Servos for the V-tail	Graupner C261 (these servos will fit into the gap of the servo board) DES 281 C2081 Hitec HS65HB or MG Robbe S3107 (weak)
Receiver:	2,4GHz: all (lead antennas outside the fuselage) 35 MHz: Graupner DS19 Simprop Scan 7
Accumulator:	Eneloop 2000 mA/h

#### 4. Settings for the first flight

(measure from the leading edge of the wing to the back)

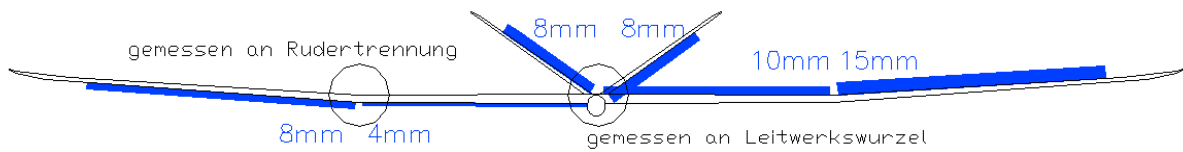
**Centre of gravity:** due to little weight 100mm is possible without

**Hook for winch start:** 5-10mm before centre of gravity (start with 10mm)

**Difference in angle of attack:** +1°

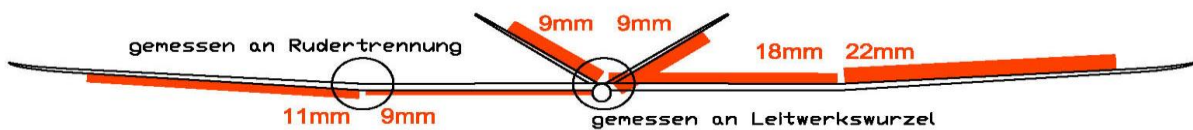
##### Ailerons und flaps (soft)

(measure between aileron and flap and on deepest point of the elevator)



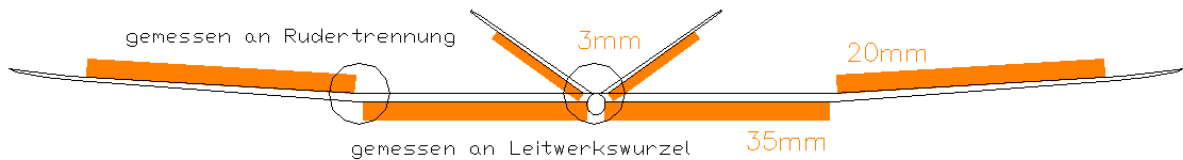
##### Ailerons und flaps (strong / dual rate)

(measure between aileron and flap and on deepest point of the elevator)



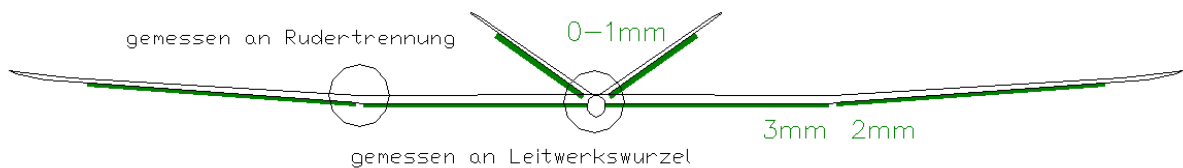
##### Butterfly (landing position)

(measure between aileron and flap and on deepest point of the elevator)



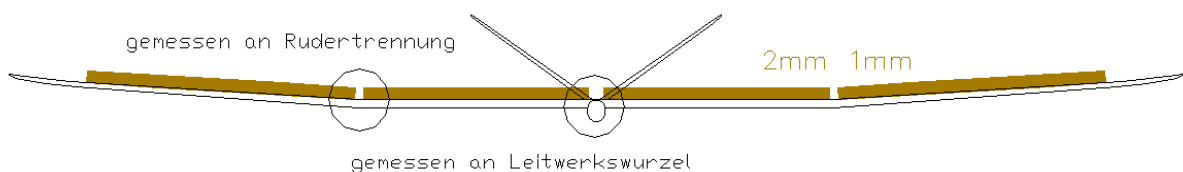
##### Flaps positive

(measure between aileron and flap and on deepest point of the elevator)



##### Flaps negative

(measure between aileron and flap and on deepest point of the elevator)



## ASSEMBLING THE MODEL

### 5. V-tail

The v-tail is ready prepared with holes for screws to be fixed on the fuselage.

Controlling of the elevator:

Bend two **brass levers** as shown below and glue the **ball connectors** to one end each. Then **glue the levers to the control surfaces** of the elevator.



The gluing spot should be as **near** as possible to the **turning axis** of the controls (silicone hinge).

Ready mounted levers with ball connectors.



We use a very simple solution to mount the canopy.  
Just glue the carbon stick into the canopy.



## 6. Gluing the fuselage

Check the alignment of the **V-tail** regarding the axis of the fuselage, so that it is fixed **symmetrically**.

To do this, mount v-tail and wing on the fuselage. Look at Erwin XL from the front and slowly lower the tail, until the ends of the elevator disappear behind the wing.

If **both ends** of the elevator **disappear at the same time**, the v-tail is aligned correctly.

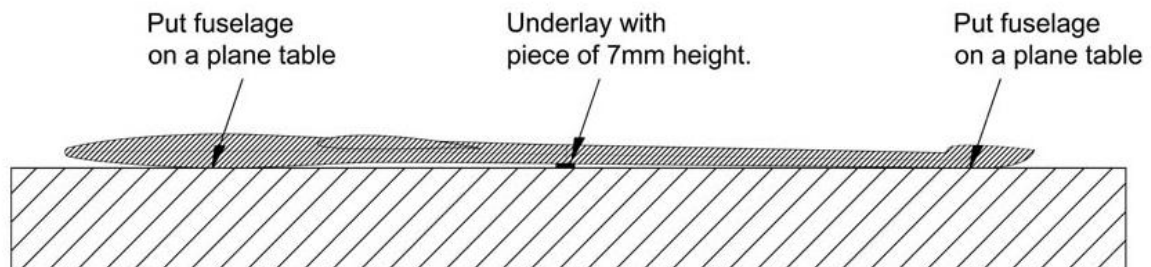


If the v-tail isn't aligned correctly, **chamfer the edges** of the fitting. Put the two parts of the fuselage together again and turn one part until the v-tail is mounted symmetrically.



Furthermore, check, if the **difference in angle of attack of +1°** can be set without problems.

For this, put the 2 parts together and place the fuselage on a flat surface. The distance between fuselage and surface should be **7mm at the joining spot**. You can f.e. check this with a small piece of wood, which you place under the fuselage.



If you can't assemble the 2 parts of the fuselage in this position, **grind at the fitting**.

Then glue the parts together. Use **epoxy-glu**e and some **cotton flocks** to thicken the glue.



## 7. Electronic components inside the fuselage

First of all, thread a steel **wire of 1,5 mm** into the **outer tubes** of the push rods. By this, they get a lot **stiffer** and you can thread them into the fuselage easily. Once the tubes are inside the fuselage, you can bring them to the right position from outside by using **magnets**. (On photo white outer tubes were used.)

You can fix the tubes easiest by applying **runny super glue** (with very thin viscosity) on both ends of the tubes and letting it run along the tubes.

If you prefer to glue the tubes with 5 minute epoxy (mixed with cotton flocks), you must apply the glue before you thread the tubes into the fuselage. Put glue app. every 25cm.

In both cases, the **ends should not be glued** to keep them still mobile. Therefore, place the final sticking point about 10 to 12 cm from the ends of the tubes.

**Glue the servo board** into the fuselage as shown on the photo. Grind the gluing areas thoroughly and glue with "UHU endfest 300" (epoxy 2 component glue) thickened with cotton flocks.

Then, thread the **thin pipes into the tubes**, which act as pushrods for controlling the elevator.

To **stiffen the push rods**, thread a **0,8mm steel wire** inside. We recommend this especially at the ends, where the push rods are not led inside the outer tubes anymore.

Glue the **threaded couplers** to the ends of the pushrods. These couplers are turned into the plastic part of the **ball connector**.

Here, you can adjust the length of the pushrods later.

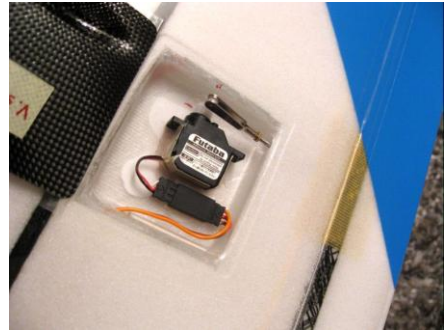
The **servos for the elevator** are mounted **on the servo board**. The wholes are prepared for Graupner servos C261.



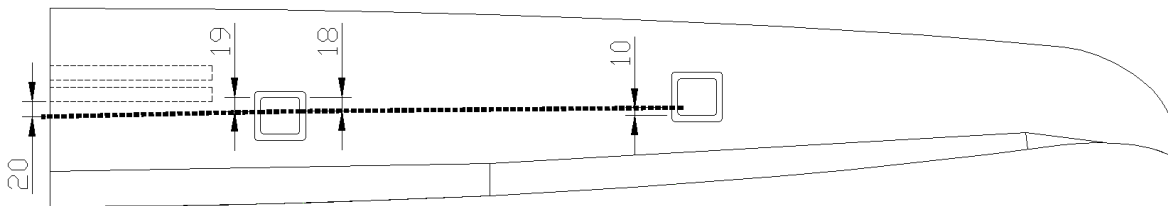
## 8. Wing

The openings for the servos are big enough for all appropriate standard servos including mounting frame, such as Futaba S3150.

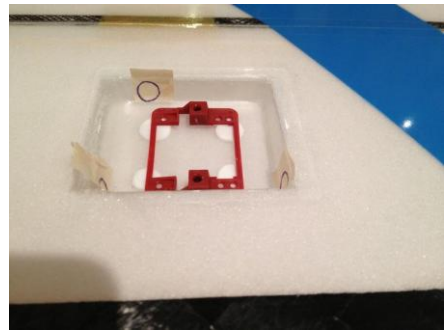
The connection to the levers on the rudder goes **crosswise through the wing**.



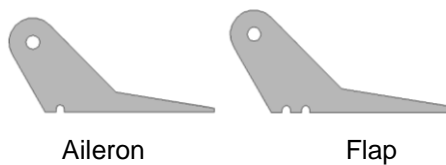
**Lead the cable** through the wing as shown below.



The **openings** in the servo box for cables a.s.o. must still be thrilled.

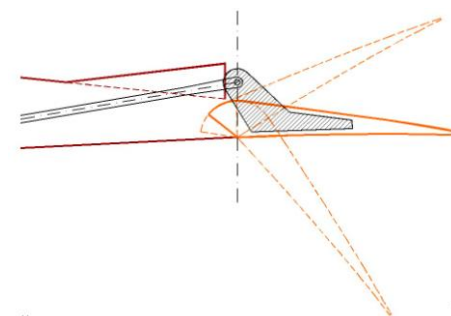


Before you glue the levers into flaps and ailerons, **grind the gluing spots** on the control surfaces and on the levers.



For gluing the lever use **epoxy-glue with cotton flocks**.

When fitting the lever in the correct position, notice that the hole in the lever should be situated **vertically above the hinge line**.



To connect the servos to the levers use two **connectors M2,5mm**. In between, use a **welding rod** (diameter 2mm), which you solder inside the both connectors.

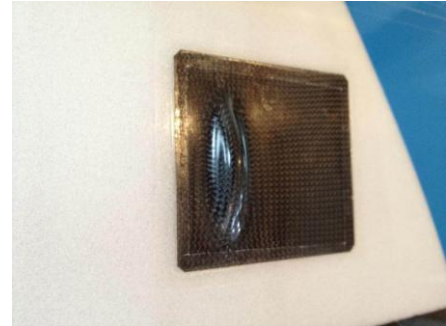
To find the right length of the welding rod put all servos in **0-position**. If the length isn't exact after soldering, you can **heat the soldered point** with the soldering iron until the wire can be moved to the correct position.



The root ribs have **recesses for the plugs** between fuselage and wings for easy electrical connection.



Fix the covers of the servos with a double-sided adhesive.

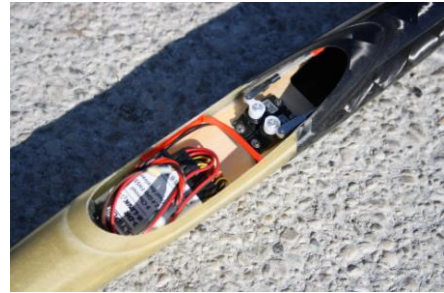


In order to **move the triangular ends** of the ailerons, connect the two control surfaces with an adhesive tape.



## 9. Installation of antenna

Erwin XL **ultralight** has a fuselage cone made of aramid or glass. So you can place the receiver in this area.

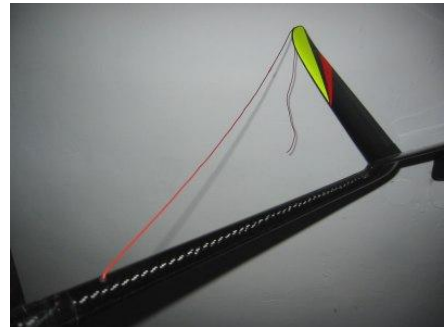


### 35 / 40 MHz:

To ensure a good receipt, a **part of the antenna** must be situated **outside the model**.

One possibility is to „**extend**“ the **fuselage** at the rear end with a steel wire of about 450mm. Fix the end of the antenna to this steel wire.

Another solution is to fix the **antenna to the end of the elevator**. Lead the antenna inside the fuse behind the wing and then leave the fuselage. You should add the length between receiver and the breakthrough of the fuselage to the end of the antenna, so that the original length of the antenna is completely outside the fuselage.



Always **test the reception** on ground before you fly!



## BEFORE THE FIRST FLIGHT

### 10. Ballast system

You can easily change the **weight** by **varying** between the **different connectors**.

1x Carbon pipe, **20g**

1x Carbon pipe with steel core, **220g**

1x Steel bar, **460g**

**Erwin XL ultralight** has just **one connector**.



### 11. Fixing of the wing

When attaching the wings, make sure that the connector will not be postponed again.

First, push the **connector into the first wing half as far as possible**. Note, that the **shorter part** of the connector should disappear **inside the wing**. Then, push the **fuselage onto the connector** and finally the **2nd wing half**.

Close the gap between wings and fuselage with **adhesive tape**. By this way, the wing halves are fixed to the fuselage.



## 12. Check list before starting:

1. Check **centre of gravity** (the angle of attack is pre-set)
2. Check **rudders**:
  - Do rudders move in the correct direction?
  - Check the greatest swings of the rudders
  - All control surfaces are continuously connected to the wing along the hinge line.
3. Check **reception**:
  - Leave the antenna inside the radio control and go away from the glider up to a distance of about 60m. The rudders should not tremble.
  - 2,4 Ghz: depending on radio controller (f.e. reduce transmission power)