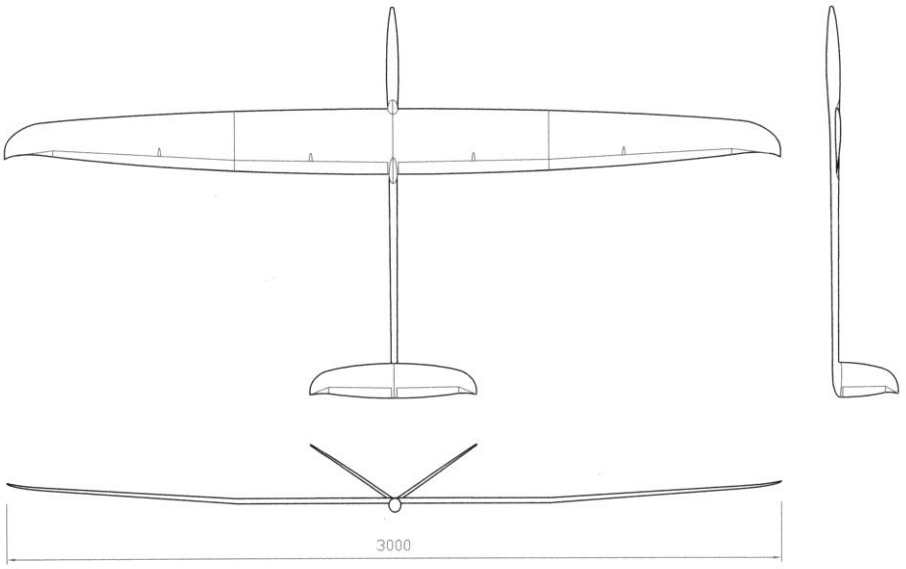
Wing span [mm]:	3000
Aspect ratio:	14,67
Wing area [dm2]:	61,33
Wing loading:	49-70
Weight [g]:	3000-4500
Airfoil:	VS1



BUILDING INSTRUCTION

ERWIN XL *slope*

CONTENTS

DATA

ASSEMBLING THE MODEL

BEFORE THE FIRST FLIGHT

DATA

1. Kit – Contents

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

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

Connectros / ballast (more ballast available on demand):

	Segler / Glider	**Elektro**
Normal (Slope)	2x Kohlestab / *carbon rod* 2x Stahl kurz / *steel short* 1x Stahl lang / *steel long* (auf Anfrage / on demand)	2x Kohlestab / *carbon rod*
Medium	1x Kohlestab / *carbon rod* 2x Stahl kurz / *steel short*	1x Kohlestab / *carbon rod* 1x Stahl kurz / *steel short*
Ultralight	1x Kohlerohr / *carbon pipe* ~~1x Kohlerohr + Stahl innen /*carbon pipe + steel core*~~ 1x Stahl kurz / *steel short*	1x Kohlerohr / *carbon pipe*

Building instruction (please download from our homepage)

2. What else do you need:

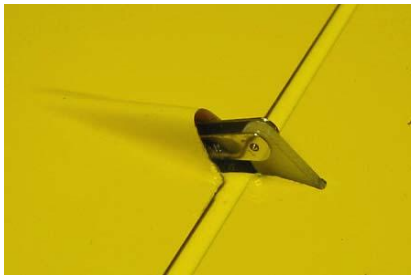
Controls of the wing:
Connectors for push rods, M2,5mm, 8 pieces
Welding rod, d=2mm
Steel wire 1,5mm, 0,8mm

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	Futaba S3150 Graupner DES 448
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

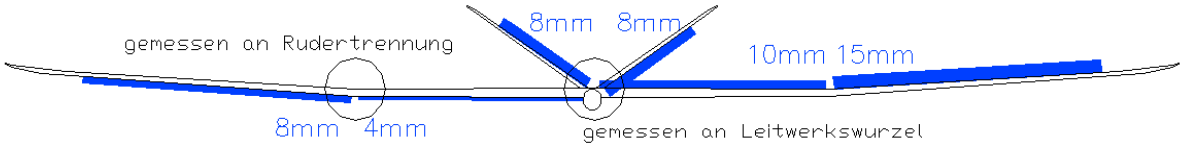
4. Settings for the first flight

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

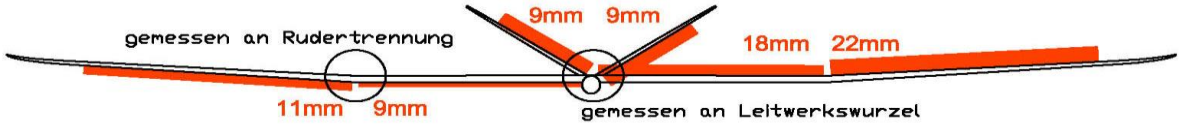
Centre of gravity: weak conditions: 88-94mm (f.e. plain, soft wind on slope)
strong wind on slope: up to 110mm possible
Hook for winch start: 10-20mm before centre of gravity (start with 20mm)

Difference in angle of attack: +1°

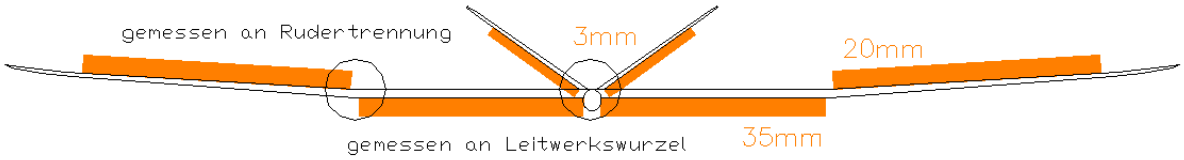
Ailerons und flaps (soft)
(measure between aileron and flap and on deepest point of the elevator)



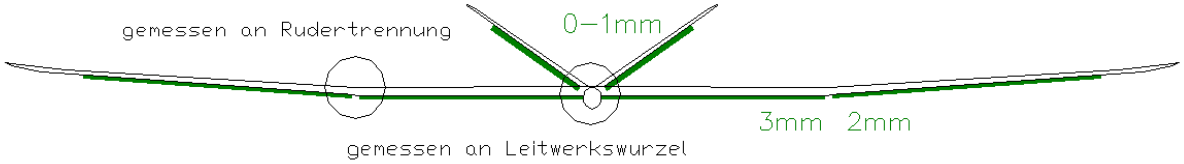
Ailerons und flaps (strong / dual rate)
(measure between aileron and flap and on deepest point of the elevator)



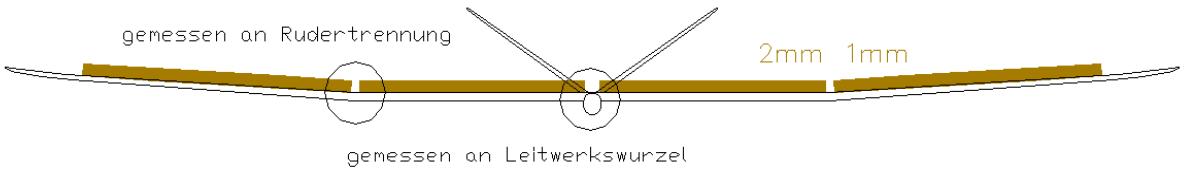
Butterfly (landing position)
(measure between aileron and flap and on deepest point of the elevator)



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.
(Here to be seen on Erwin XL ultralight)

6. Gluing the fuselage

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

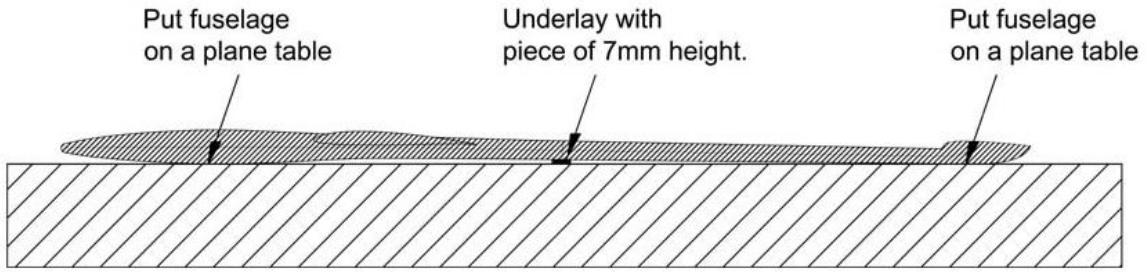
To do this, mount v-tail and wing on the fuselage. Look at Erwin XL from the front and slowly lower the tail, until the ends of the elevator disappear behind the wing.

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-glue** 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.

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

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.

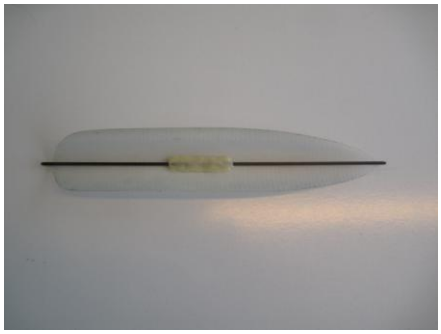
Then, thread the **thin pipes into the tubes**, which act as pushrods for controlling the elevator.

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 later the length of the pushrods.

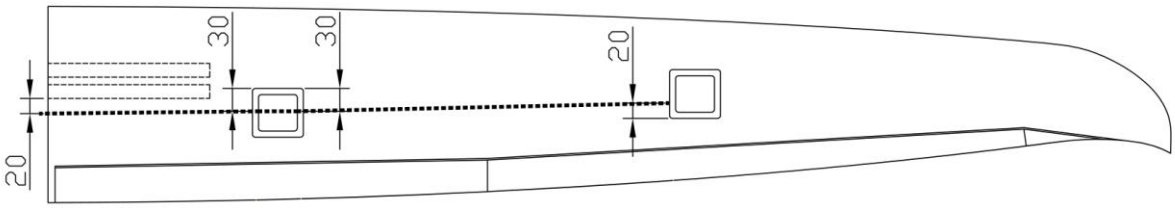
We use a very simple solution to mount the canopy.
Just glue the carbon stick into the canopy.



8. Wing

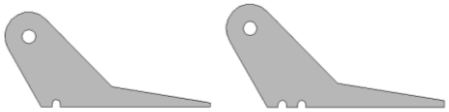
The openings for the servos are big enough for all appropriate standard servos including mounting frame, such as Futaba S3150.

Lead the cable through the wing as shown below.



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

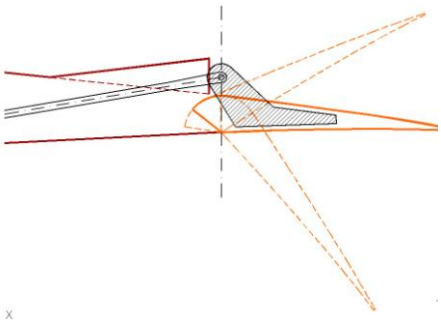
Before you glue the levers into flaps and ailerons, **grind the gluing spots** on the control surfaces and on the levers.



Aileron Flap

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**.

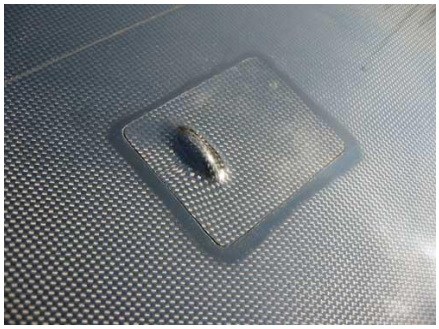


To connect the servos to the levers use two **connectors M2,5mm**. In between, use a **welding rod** (diameter 2mm), which you solder inside the both connectors.

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 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.

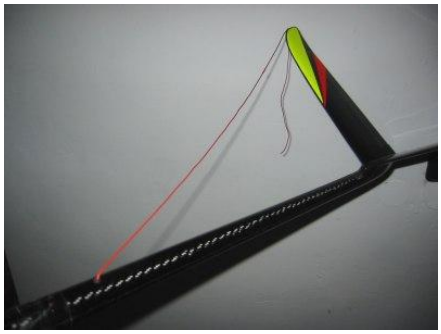


In order to **move the triangular ends** of the ailerons, connect the two control surfaces with an adhesive tape.

9. Installation of antenna

If you want to install **2,4 Ghz**, let the **antennas stand out of the carbon fuselage** as shown on the photo of Elvira. The angle between the antennas should be **90°**.

35 / 40 MHz:



As **Erwin XL slope** is completely made of carbon, a **part of the antenna** must be situated **outside the model**.

One possiblity 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**.

You should always use **two connectors** when flying **Erwin XL slope**.

If the glider accelerates too slowly, don't hesitate to add further weight. Erwin XL slope can do well with more weight, in the air as well as when landing.

(Photos made from an older version of the root rib.)

2x carbon short, 150g

1x carbon short, 1x steel short, 450g

1x steel short, 1x steel long, 1125g

2x steel long, 1500g
(Order an additional steel bar if you need it)

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)

13. Attention, Erwin XL is sensitive to heat!

Pay attention, that **Erwin XL does not heat up**! That means,
- don't let the model lie in the car, when the sun is heating up the car.
- don't let the model lie in the sun too long. Protect wing and elevator with bags, if you don't fly.
- Avoid all other possibilities to heat up Erwin XL.

The model is heated up to 50° during production, but in the sun the model can easily reach higher temperatures. During flight the model is sufficiently cooled by the airstream.
This sensitiveness is high shortly after production / purchase and will get less gradually.