Assembly guide for the Mini-Trainer (1.5 m = 59 inches)

Assembling of the Mini-Trainer is extremely simple. We suggest that you strictly follow the steps as they are described in this assembly guide because otherwise it would be impossible to mount correctly some of the parts. Before you start the assembling process, we suggest that you have a first glance at this guide in order to get a better idea of the construction method.

All laser-cut parts are individually marked, thus excluding any possible mix-up. In some cases, you must however be careful to not mount them the wrong way round.

The marking of the laser-cut parts obeys to a rather simple logic since we normally use an abbreviation of their technical terms in German (sorry, not in English). For instance, RS stands for “Rumpfspant” = fuselage frame. The parts are precisely cut and should normally fit perfectly. However, it can happen that you have to finish-grind a part to make it fit.

Simplicity was one major objective in designing the Mini-Trainer, docile flight qualities another. Its construction is very similar to that of the Star Trainer with a wingspan of 2 m (6.56 feet). By reducing the size of the Mini-Trainer, it can be transported easily and is suited to daily use.

The model aircraft can be equipped with a small combustion engine but was basically designed for an electric engine. The motor frame designed for mounting an electric engine is included in the kit.
Some personal comments of the model aircraft designer

First of all, I want to thank you in the name of aerobel for having chosen one of our model aircraft kits.

It is not easy to design a flying model aircraft consisting of a large number of wooden components which are supposed to fit together in the end. It is therefore inevitable that you may have to rectify a part a little bit to make it fit perfectly.

It can also happen that a part was modified subsequently but that we forgot to also update this assembly guide. This should not be a problem since the major assembly steps are always the same.

All model makers have their own idea as to the way and the order to build/assemble a model. The kit therefore consists of a number of modules which are assembled separately and put together at a subsequent stage only. This allows you to work on different modules at the same time, without having to wait until the glue has hardened completely.

Personally, I prefer classical casein glue for assembling wooden parts because this glue does not harden too quickly and is easy to use. Superglue may have its advantages but the risk is that you may have it where you do not want it to be. I do use it sometimes for fixing parts quickly or temporarily.

This assembly guide limits itself mainly to the basic structure of the plane. The subsequent covering with heat shrink film is not explained in detail as every model maker has his own method of doing this. If any problem should arise when doing the covering, you can always get in touch with me for help.

The model is basically designed for an electric motor but with some skill you may also adapt it to a combustion engine. The motor carrier supplied with the kit is designed for mounting a specific electric motor. This carrier plate may have to be modified slightly if you want to use a combustion engine.

Get into the assembling process now. Fun starts really once it is airborne. I wish you good luck. Who knows, one day I may have the opportunity of admiring your Mini Trainer in the air.

Rudolf Suter
Wings
1. Glue together spars VH / HH
2. Glue wing frames FR2-13 into the spars
   Note: Slide the frames in completely
3. Glue the reinforcement FR 1A onto FR1
4. Glue FR1 vertically onto plate MP
5. Glue the servo plate below into the slots of FR9 and FR10
6. Glue 3 reinforcements onto each other
7. Glue onto each other 2 parts VP1
8. Glue double part VP1 onto spar as shown on photo
9. Glue the wings onto centre section as shown on photo
10. Pass the aluminium tube through the holes
11. Glue VP 2-9 flush fitting top and bottom with the aluminium tube (refer to drawing and photo)
12. Glue into place the support QR1 for the aileron
13. Glue into place the nose-edge and the trailing edge
14. Glue into place the pine spars
15. Glue the reinforcements onto plate BP
16. Glue into place the plug (6 mm) on the left wing, protruding approx. 10 mm

Ailerons
15. Glue fin QR into QR2
16. Glue into place the trailing edge
17. Glue into place the support for the rudder horn (photo)
18. Glue into place balsa bits for fixing the hinges (photo)
Elevator unit (horizontal tail)

1. Glue HL2 and HL3 into HL9
2. Glue HL11 onto HL9
3. Glue into place HL4-7
4. Glue into place HL10
5. Glue into place HL8
6. Glue into place HL1
7. Glue balsa strip 2x15 mm onto one side
8. Glue into place balsa 6x6 mm
9. Glue into place the remaining covering strip 2x15 mm
10. Glue into place balsa rod 10x10 mm
11. Make slots in the trailing edge (rudder) 50x50 mm for the hinges
Fin (vertical tail)

1. Glue parts SL2 and SL3 into the parts SL6-8
2. Glue into place SL5
3. Glue into place SL4
4. Glue into place SL9
5. Put on the balsa covering 2x15 mm on both sides
6. Glue balsa rod 6x6 mm onto front side
7. Glue into place the remaining covering 2x15 mm
8. Glue balsa rod 10x10 mm on top side
9. Make slots in the trailing edge (rudder) 50x10 mm for the hinges
Center section of the fuselage

1. Place on the table the side panel SW4
2. Glue into place the frame RS6
3. Glue into place the servo plate
4. Glue into place the frame RS8
5. Glue into place the mounting parts FB2 for the wings
6. Glue into place part RS6A
7. Glue into place the plate CP1 for the cockpit
8. Glue into place the side panel SW4
9. Glue into place the base plate BP
10. Glue into place the top mounting part FB2 for the wings
Front section of the fuselage

1. Glue together the motor frame with RS2 (marking directed in the flight direction)
2. Glue into place the reinforcement MTV (marking directed in the flight direction)
3. Glue the frame RS4 into the side panel SW2
4. Glue into place the carrier plate TP3
5. Glue into place the side panel
6. Glue into place the frame RS5
7. Glue into place the bottom plate BP2
8. Glue into place the motor frame
9. Glue together the housing for the battery pack (place the cover inside the fuselage for drying so that it fits perfectly to the covering later on)
10. Cut out the X section of the motor frame

Engine cover

1. Glue plate MA onto side panel SW1
2. Glue into place frame RS2
3. Glue into place the second side panel SW1
4. Glue into place frame RS1
5. Cut out the X section
Rear section of the fuselage

1. Glue together the different parts of the fuselage
2. Glue into place rear fuselage frame RS9
3. Glue into place rear fuselage frame RS11
4. Glue into place rear fuselage frame RS13
5. Glue into place bottom section of the fuselage
6. Glue into place the lateral sections of the fuselage
7. Glue into place the top sections of the fuselage
Tools

For assembling the structure (hull) of the Mini-Trainer you only need few tools:

1. Glue (casein glue)
2. Adhesive tape (yellow crepe tape)
3. Weights to weigh down
4. a smooth wood saw
5. a keen edge knife
6. a small file (rasp)
7. a grinding plate (grain sizes 180 and 240)
8. Power drill (pistol grip drill or box column drill)
9. various screwdrivers
10. Rubber rings of different sizes

Preparation

As we can only laser-cut parts up to a certain size, some parts come along in two sections and must be glued together butt-joined.

The joining sections of such parts are often jagged for easier positioning and better sturdiness.

Glue the parts together perfectly levelled, put weights on to weigh down and let harden thoroughly.

Rear section of the fuselage

The photo shows the frames of the rear section of the fuselage after they have been glued together.

The fuselage has to be assembled according to the 3-dimensional drawings and by following the different steps as described there.
Glue into place a triangular rod of 10x10 mm, approx. 100 mm (3.94") long, as shown on either side of the rear section of the fuselage.

These triangular rods will be used for fixing the elevator unit (horizontal stabilizer).

Front section of the fuselage

Cover of the battery pack

The photo shows the cover upside down.

Glue a small strip of wood on both sides of the cover as shown. These reinforcements will be used to drive in the fixing screws.
Engine casing

Photo shows the basic construction of the engine casing. Reinforcement of the upper part by using 2 mm = 0.079” thick balsa strips.

The lower centre part has to be cut out in order to leave sufficient space for the heads of the screws for fixing the nose landing gear (see photo below)

Glue in on both sides small bits of balsa as reinforcements for the screws.

In the same way, glue a strip of balsa onto the motor frame.

Centre sections of the wings

Glue together the two centre sections of the wings.

Make sure to glue the parts into place at a perfect right angle.
Wings

Assembly of wings and middle section.

Saw the aluminium tube (supplied with the kit) into two identical sections. You then insert one of them through the holes of the wing frames.

Glue into place the reinforcements VP 1 to VP9 to flush with the aluminium tube.

Detail of the aileron. Make sure the slots for the rudder hinges are placed on the top side of the wing.

Between FR9 and FR10 you can see the servo plate which has to be glued into the respective spaces.

On one of the wings, you glue into place a 6 mm beech wood dowel pin for better torsion stiffness.
Wings

Emerise and glue into place as shown a pine strip 10x2 mm on the bottom side of the wing.

This pine wood strip will later on give a better hold to the foil covering.

Cover the top side of the wing between the first 2 frames by using 2 mm = 0.079" thick balsa.

As you can see, the pine wood spars go as far as the middle of the wings. The balsa covering is glued into the open spaces between these spars.

Ailerons

Glue into place at the top side of the ailerons, next to the slots for the hinges, small pieces of balsa.

These reinforcements will be used to fix the rudder hinges.

Also glue into place the same type of reinforcements where the hinges will be fixed to the wings.

Elevator unit (horizontal stabilizer)

Here you see the first step in assembling the elevator unit.

Let the assembled parts dry thoroughly before you continue.
The next steps in assembling the elevator unit.

Glue into place HL11
Glue into place the plate HL9
Glue into place parts HL4 to HL7

Glue into place the remaining HL parts.

Proceed as follows in assembling the aileron:

1. Glue into place on the top side the balsa covering (15x2 mm)
2. Glue into place the square rods (balsa 6x6 mm)
3. Put the balsa covering onto the bottom side of the aileron (15x2 mm)
4. After having smoothed off the outside edges, glue a strip of balsa (10x10 mm) onto HL8 for closing-off.

**Elevator**

The elevator consists of one single strip of balsa (50x10 mm)
Fin assembly (vertical tail)

Glue together at right angle parts SL2-3 and SL6-8.

Glue into place the remaining parts.

Proceed as follows for putting on the covering:

1. Glue into place on one side the balsa covering (15x2 mm)
2. Glue into place the square rod (balsa 6x6 mm)
3. Put the covering onto the other side of the fin
4. After having smoothed off, glue a piece of balsa (10x10 mm) onto SL9 on the top side for closing-off.

In order to enable you to glue into place the rudder hinges, the trailing edges (balsa, 10x10 mm), the latter ones must have slots in the middle.

A simple way to make these slots, is to use a thin circular saw (approx. 1 mm thick) mounted onto a Dremel or Proxxon machine.

You can now smooth off the assembled model aircraft and then put on the foil covering of your choice.

A laser-cut gauge is supplied with the kit enabling you to check the radius of the tail unit and the shape of the wing tip.
Steering of the aileron

Take the plastic protection off the luster terminals which are supplied with the kit.

Screw the steel wires, which are already cranked up, to the luster terminals.

Insert the landing gear into the slots provided for and fix it to the structure by screwing a plywood plate placed on top of the linkage assembly.

The wheels are not supplied with the kit as every model maker has his own preferences as to the way they should look like.

Normal wheel sizes: nose wheel 55 mm = 2.16", front wheels 70 mm = 2.75"

If you use uneven grass airstrips, we suggest you go for somewhat bigger wheels (nose wheel 60-65 mm = 2.36" - 2.56", front wheels 75-80 mm = 2.95" - 3.15").

Screw the nose wheel into place and connect the cranked up steel wire to the servo jack for the rudder.

Note: Make sure the rudder and the nose wheel are not activated the wrong way round.

Positioning of the servo jacks in the fuselage

One servo activates the elevator unit (horizontal stabilizer), the other one the rudder and at the same time the nose wheel.

The servo carrier plate has 2 cut-outs for an electric motor. If you want to install a combustion engine, you will need a third carrier plate for throttling (not included).

You can however make such a carrier plate yourself using some of the remaining plywood.
Fix the electric motor by using M3 screws.
Adjust side pull and camber angle by using washers.
The washers are not supplied with the kit.

Fixing of the hinges
It is not absolutely necessary to use all the 8 screws. 4 screws are normally sufficient.
A drop of superglue can do miracles.

Steering of the rudder

Steering of the elevator
Gauge for the cockpit window

Side window

Front window