

Skills

We assume that you are familiar with working on a bike and that you have the basic DIY skills and that you have only one left hand. Read a good book on bicycle maintenance if you think that will help you.

Left and right

If we talk about left and right we assume to be looking from the rear to the front of the bike. With the velomobile standing on it's wheels.

Front and rear

Naming front and rear we observe the direction of travel.

Questions

Should you have any questions don't hesitate to ask. (Customer or no customer) We will try to answer your question and may use it to improve on this manual. But have a look at our KV4 FAQ page first please.

Sizes

All non-bicycle specific parts we supply are metric. A bolt of M6 x 70 means the thread is approximately 6 mm in diameter and the length below the head is 70 mm. For a countersunk bolt the head is included in the length.

What you will need:

Enough room

Choose a place to work where you have enough room to work on the velomobile. It will grow while are working on it. Also you will need a safe place for the parts you have not yet used. You don't want to find yourself standing on them from time to time! Make sure you have enough light to see what you are doing.

It is not a dirty job, it is nice clean work. (except for the polishing and mounting of the chains) so it could be done in the house.

Make sure you talk this through, it is a nice project but not worth a divorce or something..



General tools

Wrenches, use open end wrenches or better still, ring spanners. These won't damage the nuts and bolts. If you don't have a fitting wrench you might use a adjustable wrench (bahco). Never use water pump pliers, they will damage or destroy the nuts and bolts. It is not nice to work with and it ruins the looks of your bike.

Set of Allen keys

An electric hand drill/screwing machine (a cordless is easy to handle and works well)

A right angle head or Right angle drill (could be borrowed, you will not need it often) (Cheapest solution is a separate head, we bought this one in a DHY sales for 5 Euro)

Right angle grinder with 0,8 mm cutting disk

Heat gun of burner. (gas cooker will do too)

Ø 3.3 (supplied) Ø 6 and Ø 9 mm steel drills

Rubber hammer

Hammer

Safety goggles

Measuring tape

Optional: Cloth polishing wheel and polishing agent. A cloth and brass polish will do fine, it will just take longer. (The polishing is optional anyway)

Grease, Oil



trestle



Bicycle tools

Screw Type Chain Tool This is an inexpensive but very useful tool that lets you remove chain rivets. This is also needed when adjusting a bike to a much longer or shorter cyclist.

Crank arm puller for removing crank arm fixing bolts and nuts.

You need also

A workbench with a vice or a workmate You will begin working on this.

Two simple trestles. Very useful for supporting the Velomobile in all sorts of positions

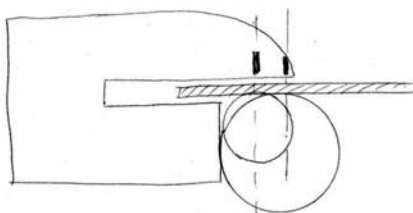


Special tools

A useful tool can be easily made of plywood. It will help you mark the centre of the tubes when drilling the holes through the sheet into the tube.

Naturally different markings are needed for different sizes of tube. Check this on the tube without the sheet.

With the use of a piece of tape and marker you can even find the distance between each rivet. Or from one hole to the next





General techniques

Using Tape.

We supply a roll of strong packaging tape with the kit. Tape is very useful to preposition things. Actually this is - literally- a very powerful tool. If you stretch the tape while applying it, the tape will exert a pulling force once it is applied. By applying a second tape in the same position you will double that force. This is very useful in bending the aluminium sheets in the proper position and getting them to fit nicely. You may regard it as a very flexible clamp. But be careful, you can actually overdo it and damage stuff! It **really** is a powerful tool.

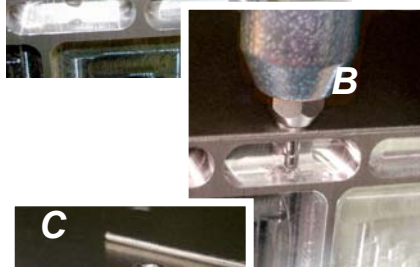


Pop riveting

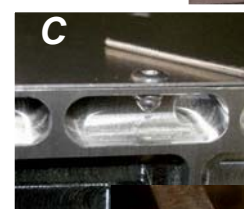
For most of the pop rivet connections one of the two parts is pre drilled. In those cases you can use these holes as a mould to drill the opposite hole. The kit is supplied with 2000 good quality pop rivets.



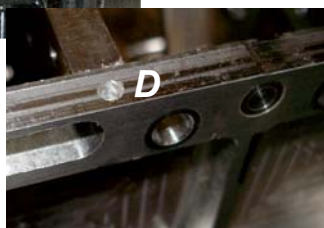
A) Position the two parts carefully, make sure the right sheet is on top. In general the higher sheet is over the lower sheet, to prevent the rain from dripping in. If in doubt, have a look at the large photographs on the KV4 manual page on our website.



B) Drill the hole using one of the supplied 3.3 mm drills, Remove any burr between the two parts



C) Fasten the (supplied) pop rivet.



D) You can not use pop rivets in solid sections

The wonderful thing about pop rivet is that it is a permanent connection and a not permanent connection at the same time. It can be removed. Simply drill through the head of the pop rivet and the complete rivet will be removed. The hole can be used again. This can be repeated several times.

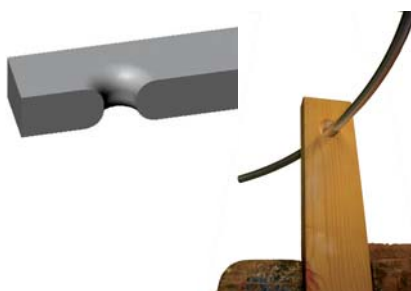
Make sure to drill in the right spot though, a hole can not be un-drilled.

Bending tubes

Some pre-bent tubes need to be corrected to match the exact form.

This is done easiest with the aid of a wooden plank with a gently rounded hole.

Do this carefully. Little by little at the time. Make a small change and check on the assembly. Be careful not to buckle the tube!



There is a small but helpful film on the site, showing the process.

Cutting sheets.



In some places you need to cut the sheet to size. All sheet is pre cut, and for a large part pre drilled. But in some places there is some extra material to remove the need to work very precisely .

A good way to cut it is using a right angel grinder using a thin (we use 0.8 mm) cut-off blades. This allows you to make a smooth cut.

An another way is to use a “Dremel”- type high speed unit with a flex-shaft attachment. This works well, but is slower and does not give such a smooth line. Make sure to use the real “Dremel” brand cut-off blades. One set will do.

(Be careful - in both cases - to take precautionary measures like safety goggles hearing protection and proper clothing)

Remove burrs with sandpaper. Do this carefully in spots where there is a risk that you might cut yourself, while using the velomobile. Be careful not the touch the surface of the sheet wit the sandpaper. This will leave ugly scratches.

Finishing tube edges

Many edges of sheets are finished with tubes. These allow you to form the sheet around these edges.

To make this possible the sheet must be riveted properly to the tube.

A) Cut the sheet at the proper length. In most cases this is just over 90° around the tube counting from the rivets. In sharp corners 60° is better. The best position for the rivet is just where the sheet touches the tube or even better, slightly above that point. (A rivet below that point would deform the sheet in an ugly way)

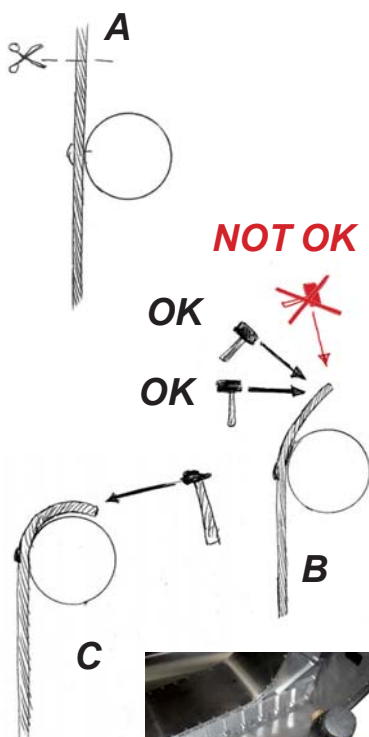
B) Use a rubber hammer to bend the sheet gently around the tube.

C) Use a small metal hammer to get the sheet more tightly around the tube.

Support the tube when hammering. If you cannot support it, then support it by holding a heavier hammer against the tube’s opposite side.

Use a piece of wood in difficult to reach spots. Avoid damage.

Do the rim tube edge (around the cockpit) at the end, this is the most visible edge. Do it when you have gained most experience.



Required parts



The Seat

Use the seat to practice your skills.

Any mistake can be corrected here. It will not show in the end result. The seat will be covered anyway.

Read general techniques first.

Some details of the seat have been improved. It does not effect the way of assembly .



Connect the two sheets with pop rivets

Use a table or a workmate



Drill a hole through the ribs at the location of the hole.

This is the low end of the seat

Put the first two rivets in.

Holding the rib you work on, in a workmate or similar, is a good idea.



Make sure the distance between the two ribs is at least 151 mm (inside) otherwise the seat will not fit over the main ribs of the frame.

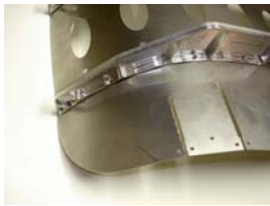
Make sure the ribs align with the holes in the sheet
fix the position at the top.

Use tape or a clamp to hold it there.



Drill a hole in the ribs using the sheet as a mould
Work your way up from the bottom. Drill and rivet, one at the time.

Do one rib first then the other.

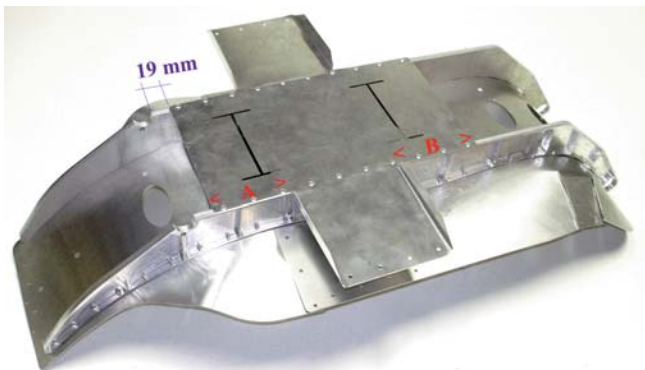


a



Bend the flaps inward to shape the seat.

Start at the long sides and work your way down. You will find the complex shape will form easy



The description below is a bit different form what is shown in the pictures, but is much easier.

Rivet one side of the cross to the edge of the seat and bend it over the ribs and rivet also on the opposite side. Then rivet the cross to the back of the ribs.

Careful, it is not as symmetric as you might expect. The larger end (B) goes at the bottom. Make sure the distance between the two ribs is at least 151 mm (inside) otherwise the seat will not fit over the main ribs of the frame.



Fasten the flaps with the separate pieces.



Fasten the top Tube and bend the remainder of the flap around it (about 1/4 around the tube)

Use a rubber hammer, support the tube, let it rest on the edge of a table.





Remove the first two rivets. (1 and 2) Insert the thick tube. Drill in the tube using the holes of the removed rivets as a mould. Rivet the tube with the two rivets.

Drill holes in the tube trough the front at 40 to 50 mm interval.

To get the proper drilling positions: see general techniques / finishing tube edges

Bend the remainder of the sheet around the tube
Use a rubber hammer, support the tube, let it rest on the edge of a table



Seat in this picture is an older version with one additional flap on the low end corners

***Congratulations, your first part is finished!
Store it in a safe place***



The Frame

The main frame is made out of CNC milled aluminium parts. They are bolted together. Because of this you will have the main structure of your KV4 ready in no time.

This is an important change compared to the old Alleweder



The basic frame structure

Important

Work on a table

Fasten all the bolts with Loctite 2701 or Freebond 1305 (not included)

Use washers

Be careful; the steel bolts are harder than the aluminium parts, make sure that the screw is in the proper position and angle before fastening. Aluminium is a softer material, so it is easy to damage the thread.

Fasten the front

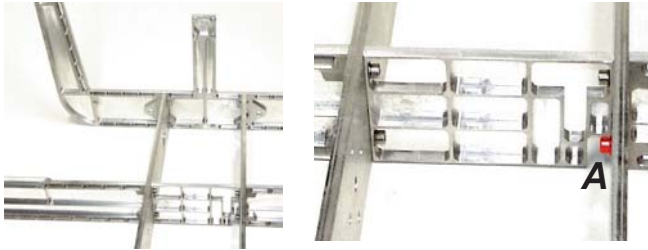
Keep the open side of frame to the back

You may need to take (file) some material form the notches to make them fit nicely

Fasten the back

*Keep the open side of frame to the back
 Use the M5 x 12 mm screws.*

Careful: holes with thread in the rib may not be 90° to the surface.

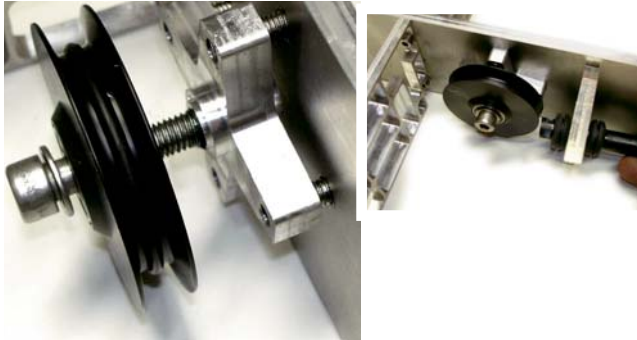


Mount the middle sections of the frame.

Keep all the open side to the rear

Careful: the centre middle section can be mounted in many ways. Only one is OK

The one screw marked in red (A) should go in first



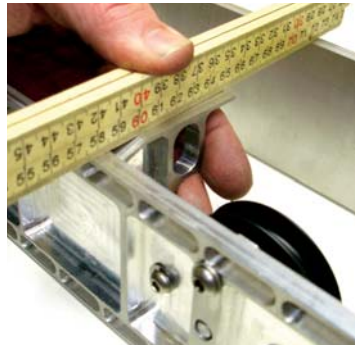
Mount the main chain roll.

Use a washer .

Do not use Loctite or Freebond here.



Chain tube with pre mounted strut

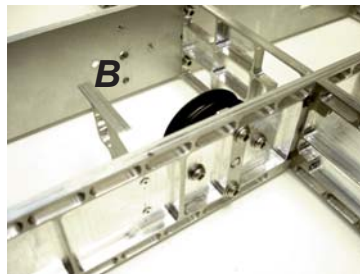


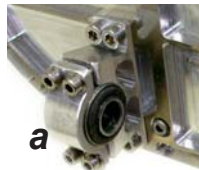
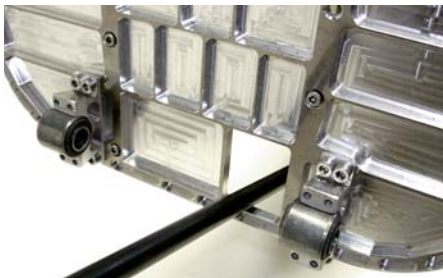
Mount the chain tube.

You need to drill two holes in the frame.

Make sure the end of the tube is close to the chain roll, but can never touch it. Make sure to align the strut with the top of the frame. Use a ruler to check this.

Mount the chain tube strut using two pop rivets
Attention: Don't forget to put in a pop rivet at the and (B) later when the sheet is in place





The rear fork mounting struts (pivot points)

Mount the struts to the rear of the frame.
 Put the rubber pivot units (a) in place.

Check the distance between them use the rear fork to see if it fits in between. (leave as little play as possible)

Mount the saddles over the pivot points.

Tighten the four screw equally. So that the base of the saddle is more or less parallel to the strut.

Add the sheets to the top.

The long sheet is made red in this picture for clarity.

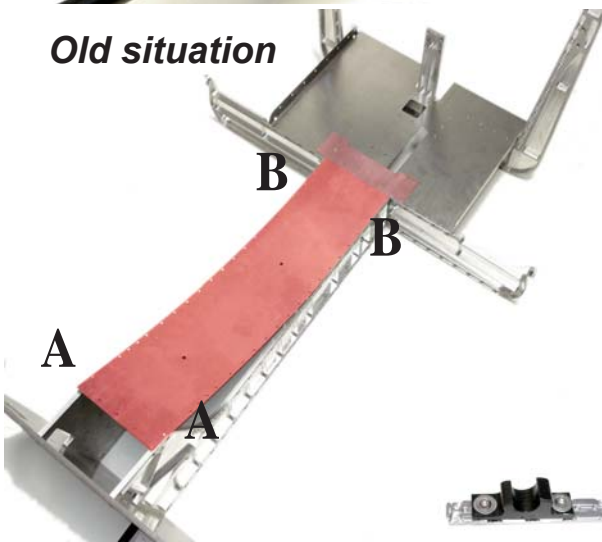
Careful! *The long piece goes underneath. (contrary to what is shown in picture)*

Do not yet put in rivets at the end in area A.

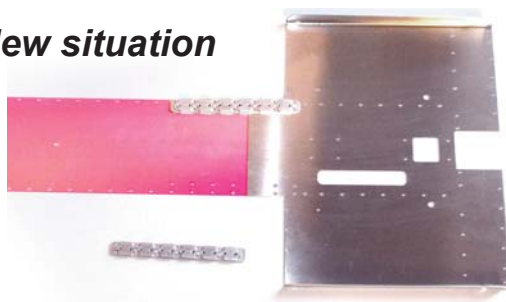
Leave the last four rows open. Another part will go here as well later

There has been a change in the way these sheets fit together. The picture below shows the new situation

Old situation



New situation



Do not yet put in rivets in area B

The mounting rails for the seat come here later.

Careful! *Make sure the frame is on a flat table. If the frame is warped while you attach the sheets the frame will remain warped. In other words: the frame will not be straight afterwards.*

The crankshaft beam

Mount the crankshaft beam, screw the two triangular struts to the (40mm) crankshaft beam.

The black plastic guide for the handlebar goes in between the two triangular struts.

The frame (red in this picture for clarity) is in between. The boom is mounted to the main frame by four small screws at the end of the boom. Make sure the serial number is at the top side.

Put in two rivets at the end (C)



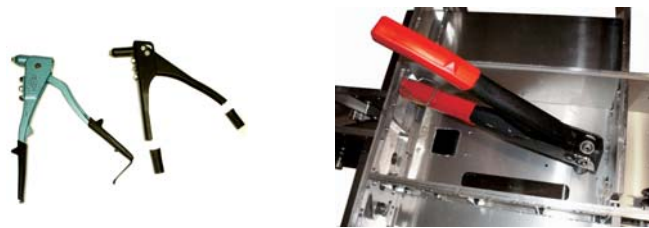


Polishing

If you like: It is worthwhile to polish the edges of the triangular struts and the beam side panels. These will be very visible to the driver.

Rivet the triangles from the bottom side.

You need a short rivet gun to do this (max 240 mm long) Otherwise it will not fit in the section. If necessary, cut down an old or cheap rivet gun to size. You will need it only here.



Mount the two side panels to the boom.

Holes need to be drilled and the boom to allow for the M6 screws.



The black plastic clip for the handlebar goes in between the two side panels.

The chain protection part, coloured green in this picture is no longer used in newer versions of the KV4. A better and lighter construction using a chain tube replaces it.

Please note the U shaped tube that forms the edge of the feet hole (as shown in some photographs) is replaced by two straight tubes that fit into the front rib.



The bottom sheeting

Rivet the bottom sheeting

The side panels also contain holes for the thin tubes that form in the front edges of the sheeting.

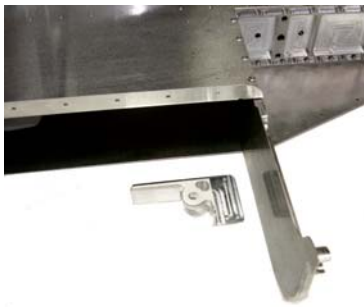
Mount these two tubes.

(Length 410 and 370 mm) If the holes are too tight, make them larger using a file. Do not use excessive force. The longer one goes in the lower position.



Turn the frame upside down, on two trestles.

Put the other two thin tubes, that form the edge of the feet hole in position.



Make sure to position and rivet the fixation points for the wheel suspension correctly first.



Hammer the front edges of into shape.

Do this gently

Make sure the tube is riveted firmly to the sheet before you start hammering.



Try the bracket holder

This is a good time to try the bracket holder on, as the boom can now be easily reached. (This is still possible after completing the fairing.)

Attention: make sure the side marked with K is on the chain side.

Position the clamps so that the bolts can be reached from the other side (where the chain is not).

Remove the bracket holder again.

Assemble the two inside plates of the wheel housings

Assemble the two thin tubes (1000 mm x 10 mm) but first bend them in A.

(Older version shown in this picture)

B must be slightly curved. (The middle of the bend facing downwards) For bending see general techniques Check if they fit the nose rib.



Assemble the two mounts for the upper end of the suspension.

Use the M6 x 20 bolts to fasten it to the main rib and the M6 x 12 bolts to fasten it to the inner sheet of the wheel housing.



Older version shown in these pictures.

In the present version the struts are positioned lower than in the picture.



The inside plates off the wheel housings need to be drilled from the inside. You need a Right Angle Drill to do this.

Modification : The rivet holes at the bottom can now be drilled from the outside. You still need the right angle drill for the rivets that go into the strut



The pre-bent tubes need to be corrected to match the exact form.

Is done easiest with the aid of a wooden plank with a gently rounded hole.

Do this carefully. Little by little at the time. Make small change and checked on the assembly. Be careful not to buckle the tube! For bending see general techniques.



The wheel housings

Assemble the top plates of the wheel housings



Older version shown in these pictures.

In the present version the top plate is just one piece.





Make sure the bottom edge is parallel to the rib.



Contrary to what is shown in some pictures, this is the right moment to fasten the outer edge tubes of the wheel housing.

Here also the pre-bent tubes need to be corrected to match the exact form. (see above)



Drill a 9 mm hole through the mount for the upper end of the front suspension

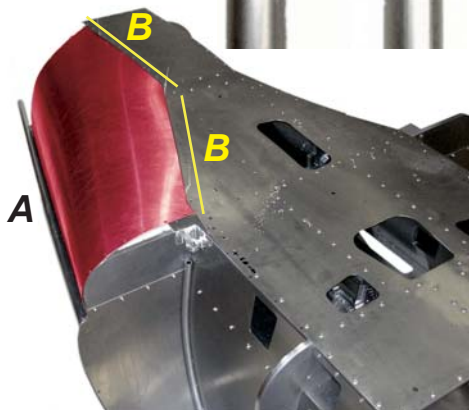
The bottom side sheets

Mount the two (about 131 cm long) tail floor tubes (A) in the ribs.

For ease of transportation these tubes consist of two parts (95 cm and 36 cm) that must be put together. Attention: The 36cm parts go at the rear. Do not put these in before you start working on the tail.

Cut the end going into the rib by the wheel housing at an angle to match the rib. Fasten the tube with a rivet in each rib.

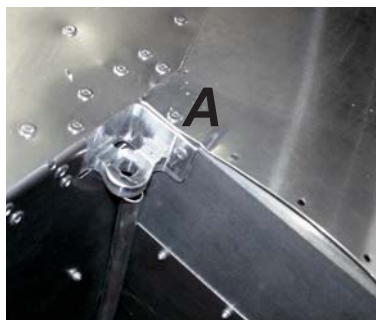
The fit is not so exact, but that is not a problem. Small deformations are allowed.



Put the bottom side plate in position and fasten it. Rivet the bottom edges (B) (that connect to the bottom sheet) first, then bend the sheets and fasten further.

Please note: the bottom side plate goes underneath the bottom sheet. See enlarged picture. If it is difficult to see on you print have, a look at the large pictures on the KV4 manual page on our website





Hammer gently in A, right next to the fixation point for the suspension so that the plate can close the edge properly.

Then rivet the rest of the sheet.



This is what you have so far

Hammer the edge gently around the tube.

This edge will be visible from the inside.

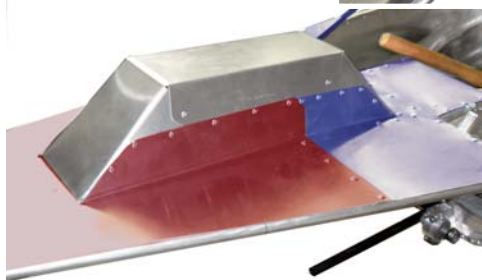
The tail floor

Now put the bottom of the tail section together.

Careful: Before you rivet the sides to the tubes make sure the ends of the tubes are at the proper distance. Check using the tail rib

You may want to use some silicon kit to make the mudguard watertight.

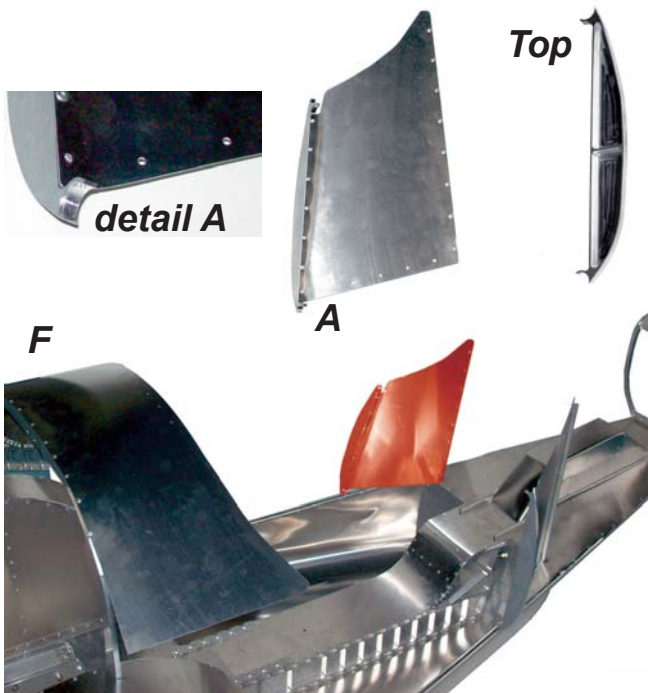
If you want to apply paint, then wait until after painting.



A



Mount the two short tubes

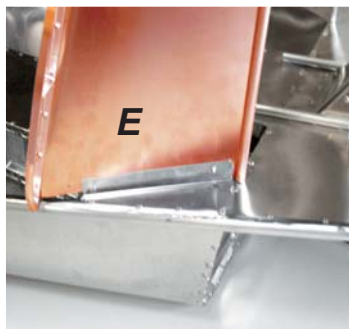


The “shoulder struts”

Attach the struts that will hold the rim tube (next to where your shoulders will be) of the cockpit opening first to the small sheets Rivet the thin tube on the opposite side of the sheet.

The good position: At the end of the flap of the sheet (A)

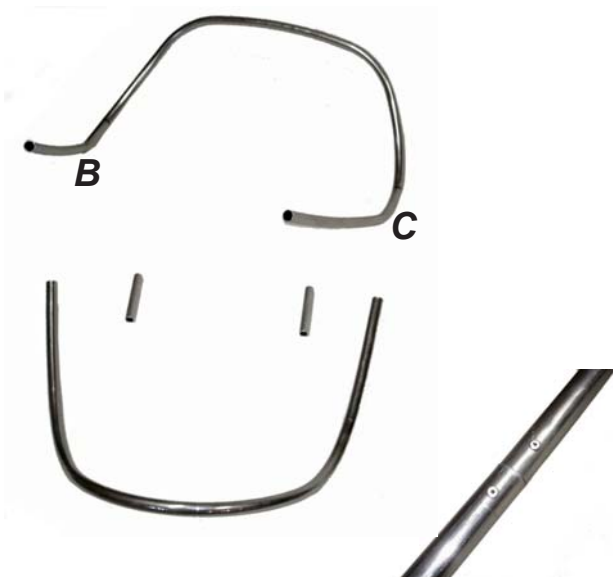
Attach this sub assembly to the flap on the tail plate (E)



The top rear nose sheet

Rivet the top rear nose sheet (F) to the main rib
Start with the middle rivet. Then bend the sheet in shape using tape.

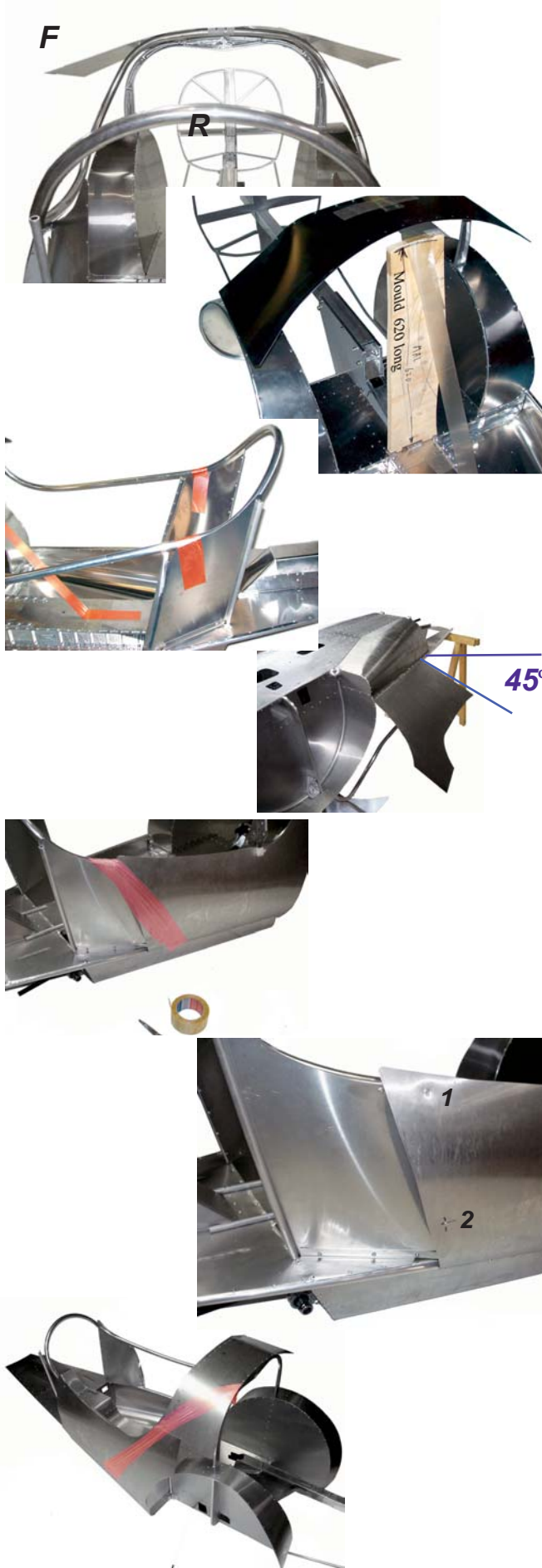
Now only rivet about 200mm on each side. The rest comes later.



The rim tube

Join the two parts of the tube that will form the rim of the cockpit together. Drill a hole dim 6 mm at the bottom side in B and C .

This is only to let out any “mistake rivets” (rivets that have to be drilled out) The exact location is not important. It has to be more or less at the lowest point.



Drill two rivet holes in the rim tube, both exactly in the middle.

One in the front middle (F) at the top and one in the back middle at the top (R).

Position the rim tube with tape.

Important: *At the front (F), the top of the tube must be 610 to 620 mm above the floor sheet (middle section) at the rear (R), the top of the tube must be 455 to 465 mm above the tail floor sheet. If you do not get these dimensions right, you may find that some of the sheets will not fit!*

It is a good idea to use a piece of wood, cut at the proper length, as a temporary mould that the rim tube can rest on.

Make sure the centre holes in the front and rear are in the middle.

Check by looking carefully and by measuring a distance left and right if it is symmetrical.

Adjust by repositioning or by gently applying force until it is.

Fasten the side sheet to the outside of the tube at an about 45° angle.

Important: *Make sure you have about 15 mm overlap in the wheel housings. You will need this later to fasten the edge of the sheet to the tube in the wheel housing.*

Then tape the sheet in position.

Use enough layers of tape to get it really nice in position.

Rivet it to the rim tube.

Use the self made tool to find the centre of the tube.

Attention: Do not yet rivet the side sheets to the top rear nose sheet or to the wheel housing.

Use just two rivets at the rear to fasten it to the ribs.

If you look carefully you will find that the outside shape of the rib is not a smooth curve, but that it consists of several straight lines. Find two spots in the middle of these straight lines so that the head of the pop rivet does not interfere with the curved shape of the sheeting. Use a file to take away some material of the head if necessary.



Drill a rivet hole in the top of the tail rib.
Make sure it is exactly in the centre.

Mount the tail rib.

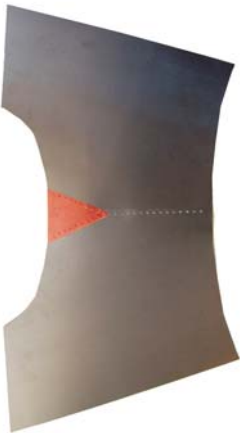
The tail rib is changed slightly to include a grip.

On the left the original that is used in the KV4 that was built for the manual. On the right the new one.



Cut away the surplus of the small side sheets at the top.

*Do the same with the small tubes.
So that they will not interfere with the tail sheeting.*



The tail sheet

Rivet the two halves of the tail sheet and the little triangle at the front together.

Position the tail sheet over the tail rib and the rim tube.

Put the 2 centre rivets in, to keep in position.

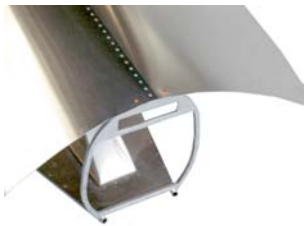


Tape the sheet in shape.

Attention: *If you do not handle the sheet carefully you may create a buckle in one of the two “front flaps” This will not harm the performance but it will damage the looks a bit. Make sure the tail is symmetrical. In this stage it is very easy to deform the tail floor so that the tail rib tilts to left or right. Make sure you correct this befog you start drilling and riveting. Use several layers of tape to get the sheet nice and tight in position.*



Attention: *Check symmetry again.*



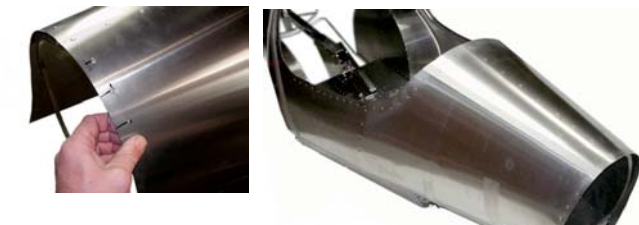
Start riveting from the top of the tail rib.

Then work your way down from the top of the rim tube.

Use intervals of 40 mm. Use the self made tool to find the middle of the 8 mm thick rib



Now check if the front edge of the sheet is still nice and tight against the side plates. If necessary remove tape and apply new tape or add tape. Make sure the tail sheet is also tight against the tail floor tube.



Rivet the front edges working your way down from the top.

A special technique is needed to get the sheet as straight as possible. Drill at an angle, holding the drill slightly downwards. Insert the rivet at the same angle. Before fastening the rivet pull the rivet gun downwards, forcing the rivet at a straight angle again. In this way the outer sheet is pulled down a bit. Now fasten the rivet, while holding the gun in this position.



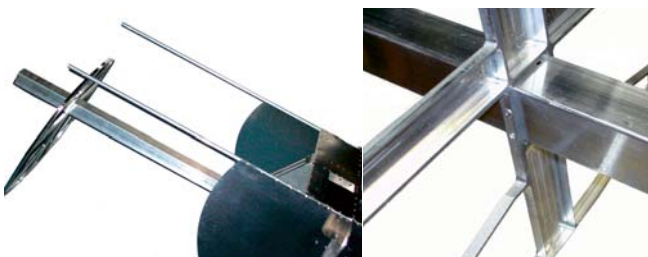
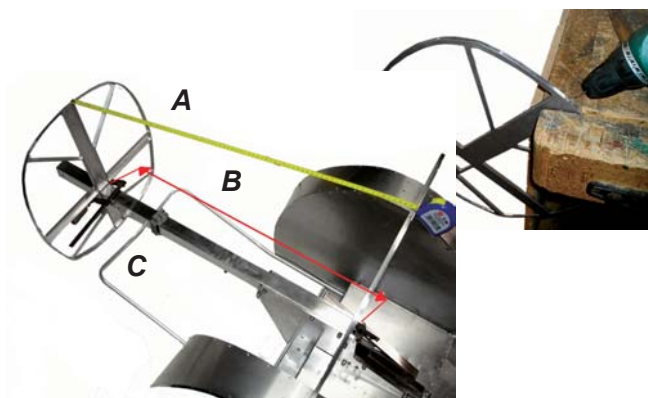
Rivet along the tail floor tubes

The nose

Drill a hole in the top centre of the nose rib.
 Mount the nose rib to the boom.

Distance between the main rib at the top (A) should be 850 mm. Distance over the boom from the inside of the nose rib to the end of the boom (B) should be 784 mm.

Please note that the tubes running to the nose rib are different than shown in the photograph with the A, B and C marks



Fasten the nose rib with just 2 rivets.

You will need the right angle drill to do this. More rivets will follow later.

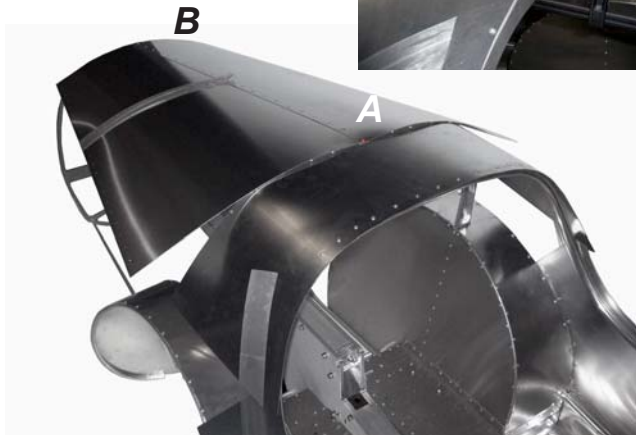




Remove the rivets that connect the 'top rear nose sheet' to the main rib.

This will create a gap between the 'top rear nose sheet' and the main rib.

Use tape or a clamp to pull into position so that the gap is closed.



Drill holes, with 50 mm interval, along the long sides of the main nose sheet.

*Attention: Make sure to remove the burrs properly
About 15 mm from the edge*



Rivet the sheet to the middle of the main rib (A) and to the middle of the nose rib (B)

Make sure that the rivets end up more or less in the middle of the 8 mm thick main rib

Attention: Do not yet rivet along the nose rib



Rivet the first few rivets in H as shown in the picture

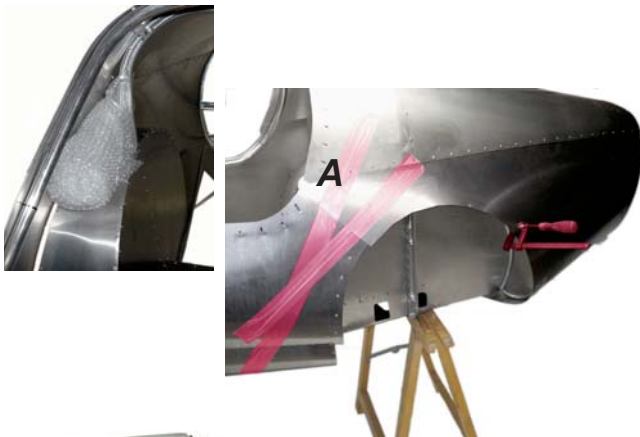
(rivets marked red)

Put the nose side sheet in position with tape.

Start riveting nose side sheet from point H.

This is not as easy as it seems. The shape gets a bit 3D, so the 2D sheet needs to be forced a bit. This does not mean apply great forces, Just rivet the first 20 cm and then apply the tape again to get the best shape, Do another 10 cm and reposition the tape again if necessary.





Where the side sheet, the nose side sheet and the top rear nose sheet meet (A) the shape gets more 3D.

Stuff some material inside between the main rib and the sheeting to get the shape just right. (A)

(Old newspapers will do). This way you can force the sheet into its proper form and shape. You can drill and river right trough this newspaper.

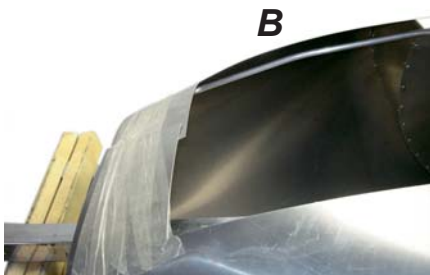
This picture shows the older version with one less seam



Turn the velomobile upside down.

Put a trestle under the front end of the boom and one under the rim tube

This is an alternative way. Tape some Styrofoam blocks to the top (But it is not as stable)



To get a nice shaped nose, bend the tubes in B.

Make a gentle curve to follow the natural shape of the sheet. You will find the sheet want to be curved here, rather than forcing is straight bend the tube gently.

The nose area looks a bit different due to a change in the feet hole construction. Method remains more or less the same



Make sure (C) the nose rib is at 90° with the boom.

Fasten it with two rivets on each side

(two in addition to the two you have already put in)





Hammer the edges of the tail sheet around the tubes

See “general techniques” in the first chapter.



Hammer the front edge gently onto the rib.

Rivet the outer sheets to the little tube that is on the outside of the wheel housing.

Use the self made tool to find the proper location.
Use 40 mm interval between the rivets



Before you do this; It is not a bad idea to temporarily mount the front wheels. (Not shown in the pictures) This will give you an idea of the shape of the wheel housing with respect to the wheel.

The sides of the wheel housing are very flexible until they are fastened to the outer sheets. The shape can be a bit different than intended. (just a matter of taste by the way.)
See (several pages) below for instructions on how to mount the wheels



Attention: The wheel can be adjusted forwards and backwards. It is a good idea to mount it as forward as possible. See the section on mounting the front suspension. The wheels can be easily removed to allow better handling of the body.



Cut away the surplus sheet along the wheel housing and bend it around the tubes.



This is most easily done using a right angle grinder with a thin (0,8 mm) cut-off blade. Leave about 15 mm (a) of material. Make sure you have the velomobile in a position that allows you to work comfortably.



Rivet the sheet to the feet hole tubes

Use 40 mm interval

Cut the sheet around the feet hole into shape and bend it around the tubes.

Attention: The construction (in the front) differs slightly for what is shown in the pictures





Trim the edge of the sheeting along the rim tube.
 Leave about 30 mm above the rivets to wrap around the tube.

Hammer gently in shape. See "general techniques" in the first chapter.

The front wheel suspension

General lay out of the front suspension.

It is a light weight version of a MacPherson strut suspension. The strut contains a spring and a friction shock absorber. The suspension design with its rods, may look very simple but is quite sophisticated. It's virtual axis aligns with the where the wheels rest on the ground. It makes a very good suspension at a very low weight.



Mount the arms(A) to the struts (S)

Use the M8 x 20 bolts Use washers, use locktite.

Mount the struts.

The large rubber washer (R) goes on the outside (wheel housing side of the support) under this rubber ring a large steel washer. If you use "fat" tires you should add extra washers to create enough clearance. It also lets you compensate for weight (distribution).

The small rubber ring goes on the inside, with a washer and the nut on top.

Grease the excenters and rotating points (G)

Use very little. Be very careful not put any grease on the brake pads of drum.

Maintenance The small opening in the fixation point is for lubrication. It needs a few drops of thin oil every few months.

Fasten the threaded bars to the frame.

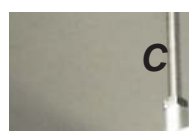
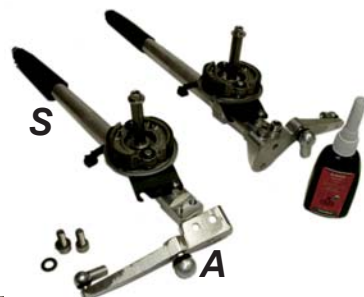
The rear one (coloured blue in the picture) is the longer one of the two. The thinner one (coloured red in the picture) is for steering,

To fasten the ball joints you need a thin 11 fork spanner. (shown green in the pictures)

Wind down (red) an old spanner for this purpose.

Do not use a washer in the rear connection point (N)

Attention: Your safety may depend on these parts. Make sure you always leave at least three full turns of thread in any threaded bar connection. Secure each connection by tightening the additional nut (C). Do not use locktite here.





The fixation point of the front threaded bar. (Looking from the front, velomobile in upside down position)

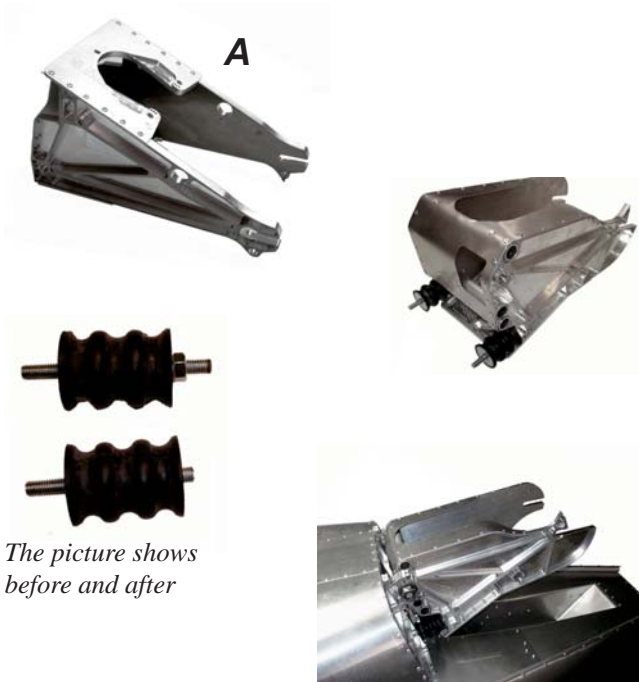
Put the handle bars in it's position

The brake handle goes to the front



Assemble the steering rods.

Screw them in as far as you can on the side of the wheel. This will allow you to screw the bar in without unscrewing it completely on the wheel side. Make sure it is always in at least three turns on each end. Adjustment must be done by repeating the assembly this time screwing the bar in less (or more) into the wheel side. (See the section on alignment below)



The rear fork

The rear fork has been fully redesigned. This (A) is what it looks like now. But it comes fully assembled and with mounting points for a v-brake. So in the assembly pictures it looks a bit different.

Mount the rubber suspension units to the rear fork

Optional: *If you like you can, on one side, (the side that will go onto the fork) cut away part of the tread of the rubber suspension units. Before you do put a nut on. Carefully finish the end. The rear fork is made of aluminium which is much softer than steel. So the tread can be easily damaged. Until you cut one end, the suspension units are symmetrical*
Attention: *If you don't trust yourself with this, leave the tread in its original length. It is not necessary.*

The picture shows before and after

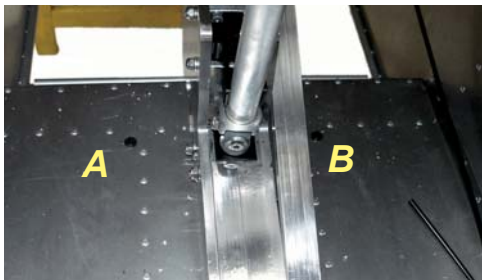
Mount the rubber suspension unit on the rear fork

Mount the rear fork on the pivot points.



Mount the suspension unit with nut from the inside. Use a washer.

Move the fork a bit down to create the space you need to fasten the nut



Drill a hole in the floor in A and B for the front brake cables.

Behind the second row of rivets.



Put the supplied rubber grommets (rings) in the holes to protect the cable.



There is a hole (C) in the wheel housing just behind the main rib.

Put the rubber grommet in to protect the cable.

Both front cables go to the special double brake handle on the handlebars.

The rear v-brake has a separate standard brake handle,

Fasten the cables with tie-wraps.

Make sure the steering is not hindered by the cable. This requires a second tie-wrap on the right hand side. You might want to look for this picture on our website to see it in full detail.



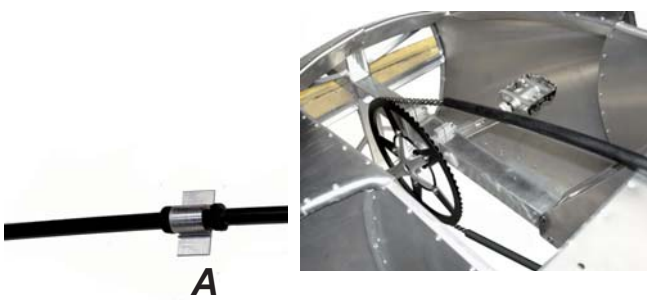
Link cables to the gears.

See enclosed Sachs instruction manual for details.

Mount the return chain tube. Rivet the bracket (A) close to the end of the bottom.

Make sure there is enough clearance for the derailleur. Please note that it moves forward when changing to a larger sprocket .

The front end of this return chain tube is used to tension the chain. In other words it acts as a spring. Please note: picture shows also the chain. Put the chain in after mounting the chain tubes.



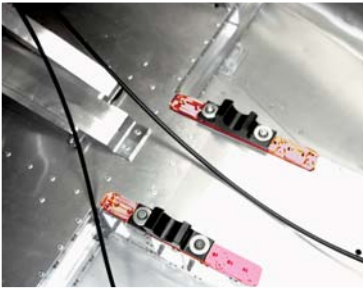
The pulling side of the chain is protected by a short chain tube. This is to keep your trousers clean.

Mount the bracket (B) to the side of the boom support.

Chain tubes add only very little friction and a lot of practicality.



Attention: *It is important that in the pulling side of the chain, the chain tube is in the proper position. So that it does not hinder the chain. So that the chain can find it's proper location without leaning heavily in to the chaintube.*



Mount the two rails for the chair.

Align the front with the edge of the floor, unless you are of unusual length.



The rear end of the seat rest on a support made of two small ribs and a centre piece. It attaches to the side of the main ribs

The nosecone

Put the nosecone in position.

Check visually, it is in a nice flowing line with the rest of the nose. Please note it can be upside down.

The tip (A) should be below the centre, not above.



Mark some points of the edge of the nosecone on the nose.

Remove the nosecone.

Put masking tape parallel to the edge of the nose just outside of the overlap of the unfinished nosecone.

Make a note of the distance to of the tape to the edge. (For this example let's assume it is 50 mm)

Now put the nose cone back in position.

Make sure it is properly aligned. Check side view as well as top view.

Tape the nosecone to the nose.

Make markings on the nosecone that allow a 20 mm overlap.

(in this example that would be 30 mm from the tape)

Use masking tape to connect the marks on the nosecone.

Make sure it is a nice flowing line.

Cut the nosecone along this line.

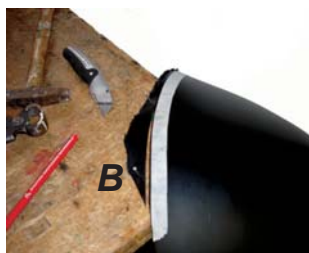
Use a sharp knife. You can nail (B) the cone to the edge of a table for easy handling. Only use nails in the edge you are going to cut off any way.

Put the nose cone in position again. Put a rivet in the centre at the top. Apply tape to stretch the nosecone along the nose.

Rivet the nosecone working down from the top.

Use few rivets, five will do. (indicated with yellow dots)

Leave the bottom section unattached





Use masking tape to mark the proper shape of the tail.

Cut away the surplus material

(using for instance a right angle grinder with 0,8 mm blade)

Use sand paper to make the resulting edge not sharp.

Tail light

Mount the supplied tail light

The rear view mirror

Mount the supplied rear view mirror.

Drill a hole in the sheet just outside the cockpit, about 200 mm from the centre of the vehicle. Put it at sufficient distance from the edge not to interfere with the optional canvas. Use a very large washer inside.

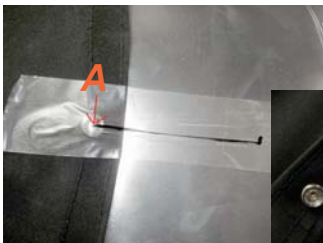


Optional stuff

The canvas

Tape the optional canvas to the body. Put the tape on where the fasteners will come.

This picture shows the older version of the canvas. It now has an extra seal. This does not change the method of mounting



Mark the position of the fastener on the tape (A).
Remove the canvas a bit and drill through the marked position on the tape (A).



Use the supplied spacer to give the rivet gun sufficient clearance