Short construction manual for 28 Ohm and 50 Ohm design 28 MHz (10m) and 27 MHz (CB) yagis

Source: http://www.nuxcom.de/pdf/nuxcom-construction-manual-10-11.pdf

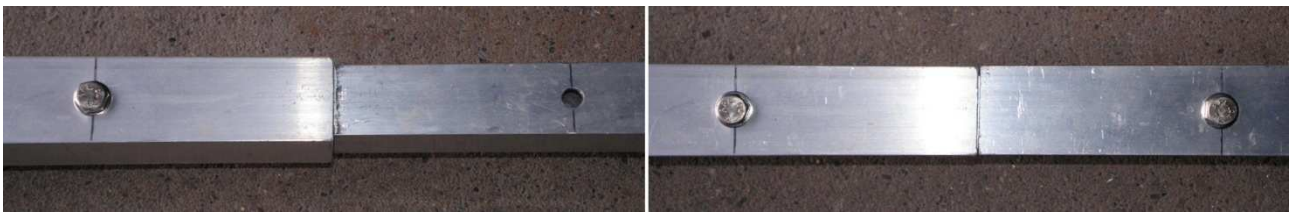
You receive all parts you need for assembling the antenna. The material is not handled in any way and it will be all your work and is on your own risk.

This manual is only a recommendation on how you can build up a working antenna with the delivered parts. Individual adjustments are possible. In all cases the customer is responsible for the proper function of the antenna.

All lengths and measurements of these antennas have to be followed exactly, or you will not have the predicted results.

Handling of the boom rod:

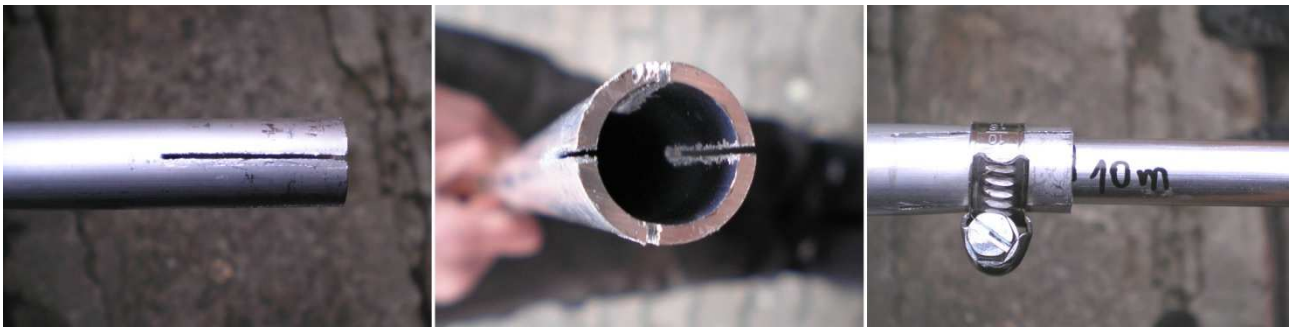
If the boom is split, make the boom connection first. The connection part is a 40cm long 25x25mm square rod, which will be pushed each half into the 30x30x2mm boom rods. For fixing use two hexagonal head screws M6x35 (with nut and two flat washers).



Now mark continuously the points for all elements. Don't measure from element to element, use a folding rule to mark all points continuously related to the starting point. When you have marked all points, you can disassemble the boom for further work.

Element rods

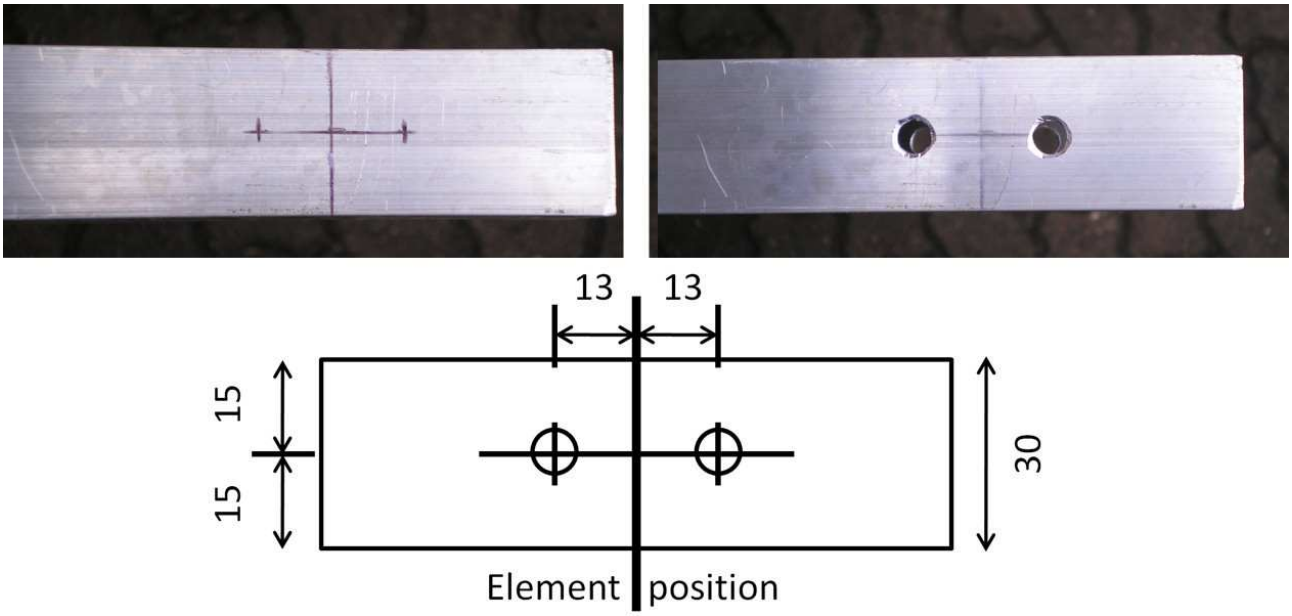
The elements consists of a 2m long 16x1,5 mm round rod with 12x1mm rods pushed into the ends to bring them to full size. You don't have to cut the outer 12mm tubes because they are pushed into the 16mm rods as long you get the desired length according to the dimensions table. Cut four slots into the ends of the 16mm rod (length about 3cm), so you can use the hose clamps to fix the tubes together.



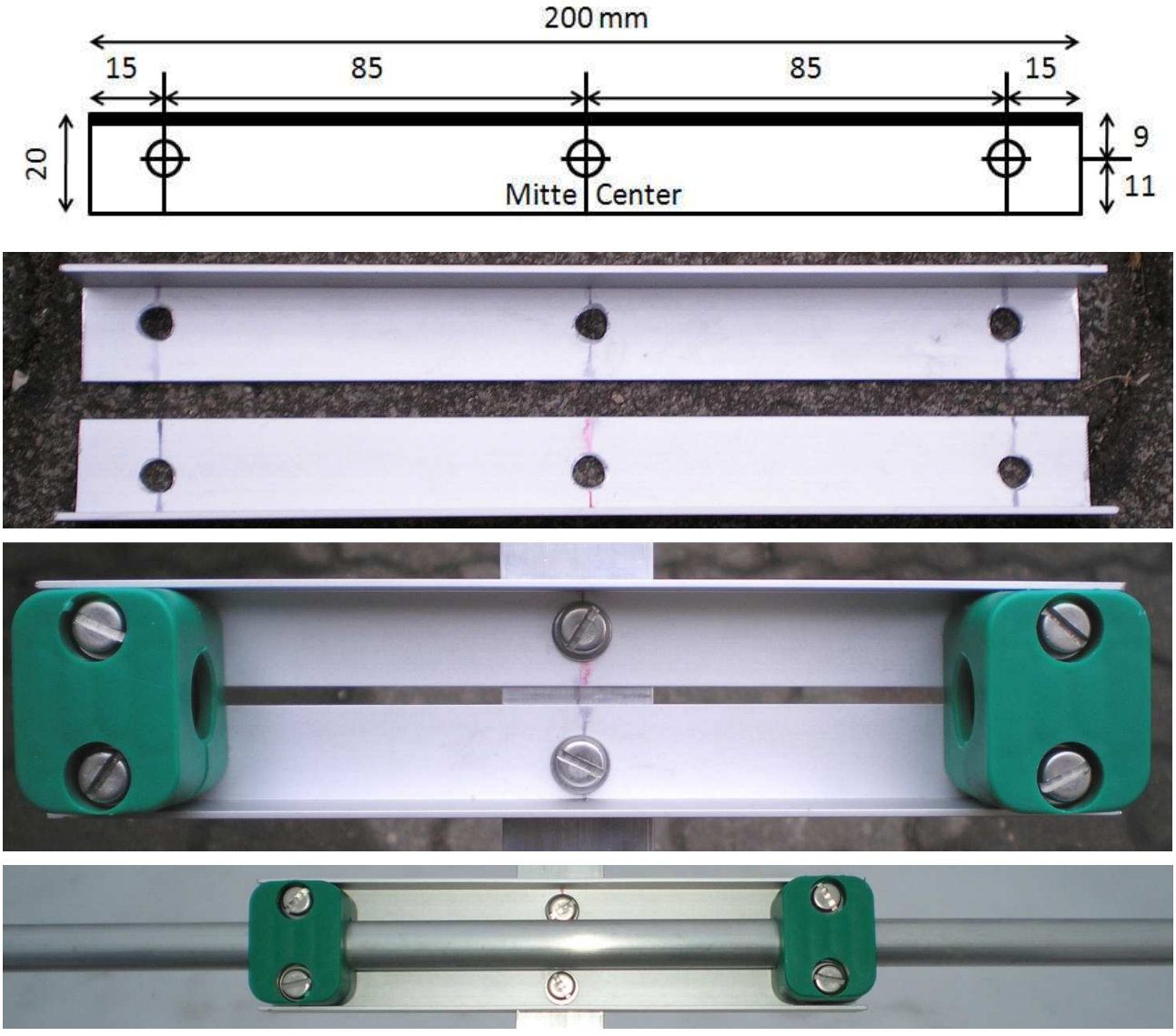
Mounting reflector and directors:

The element rods are mounted insulated from the boom with plastic pipe clamps, lying on two L-profile (20x20x2mm) aluminium bars. The aluminium bars are fixed each with a slotted screw M6x40mm (plus nut and two flat washers) to the boom. The plastic pipe clamps are fixed also with two slotted screws M6x40mm (plus nut and two flat washers) to the aluminium bars.

Mounting of the bars on the boom:

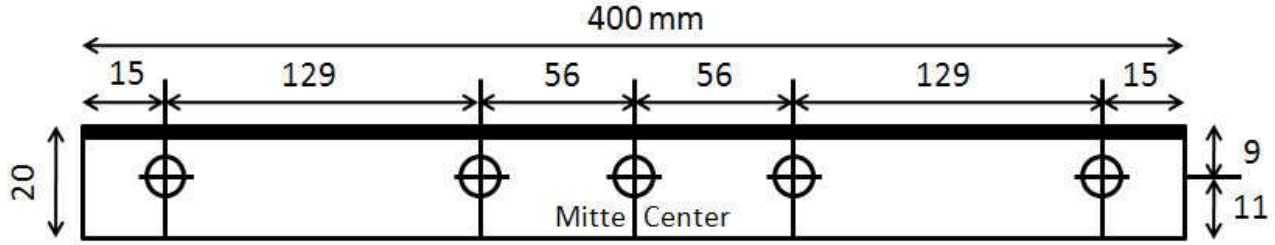


Template for the drills on the aluminium bar:



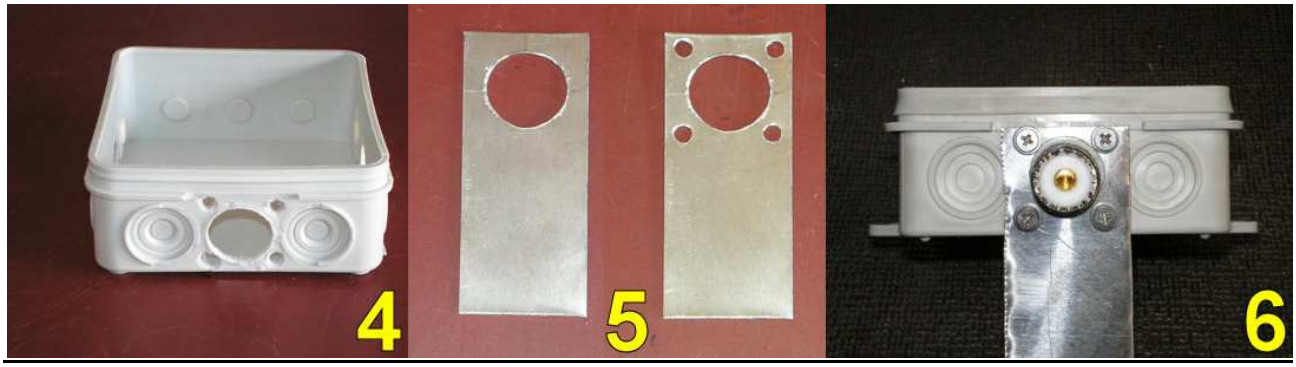
Mounting the dipole:

First we build up the radiator. It will be mounted similar to the parasitic elements, but with two plastic pipe clamps on each side, because the middle rod of the radiator will be split into two parts (2x 1m). Also the aluminium bars are each 40cm long, not 20cm.

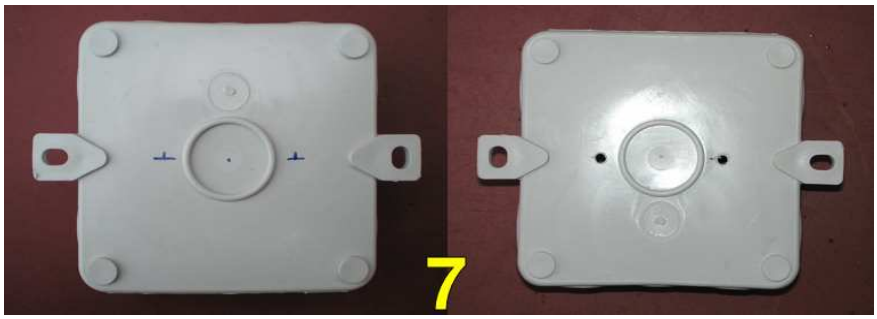


The break of the radiator rod in the middle has to be 10-15 millimetres. This distance has to be cut from the length of the middle 16mm rod, because the middle rod has to be exactly 2,00m from tip to tip, including the spacing in the middle. Drill 3,5mm holes into the inner ends of the rod, you need them for the contact screws. Remember the distance between the two holes, you will need them for the connection box.

Handling of the connection box

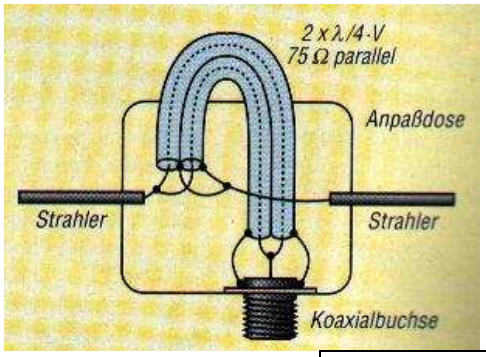


Picture 4: Cut a hole on one side of the box without a lug. Apply the coax socket in the hole, mark the mounting holes and drill them with 3.5mm carefully. **Picture 5:** Drill a 16mm hole in the grounding plate and apply the coax socket - mark and drill (3.5mm) the mounting holes like before. Cut all overlaying edges at the box. **Picture 6:** Attach the coax socket and the grounding plate with the provided M3x12mm screws (including one flat washer) to the box. After that fold the plate in about 27mm distance from the box in a 90 degrees angle away from the box. You can cut the plate about 10mm after the bend and drill a hole in the end what will be a fixation of the box to the boom (no picture).



Picture 7: Mark and drill two holes on the bottom of the box for the contact screws (3mm holes). The distance between the two holes depends o the distance of the holes in the radiator rods (you should have remembered this). These holes are used for the 3,9 x 16 mm contact screws from the connection box to the radiator tubes. If you are building up a 28 Ohm Yagi, you can make the holes in the middle of the box. If you are building a 50 Ohm type yagi, you need more space for the choke, so make these holes at the end of the box near the wall opposite to the coax socket (see also picture 12).

The choke (DK7ZB match) for the 28 Ohm antenna types

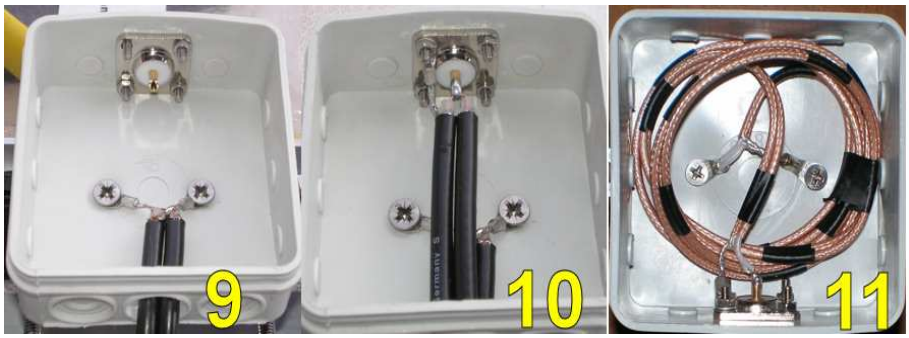


The choke needs a length of lambda/4 multiplied with the shortening factor "V" of the cable. Only the fully shielded length of the cable counts to the total length, soldering lugs do not count to the length and should be as short as possible. It could make problems if the solder lugs on the radiator side are too long, because they would "stretch" the dipole some millimetres and you could get mismatching in the system.

28 Ohm antennas have two parallel 75 Ohm cables.

	Lambda/4	**V = 0,66** PE –cable - RG59 PWR = 1000 Watts	**V = 0,70** PTFE – cable RG179 PWR = 2000 Watts
27,000 MHz (CB)	2,78m	1,83m	1,94m
28,400 MHz (10m)	2,64m	1,74m	1,85m

Assembly

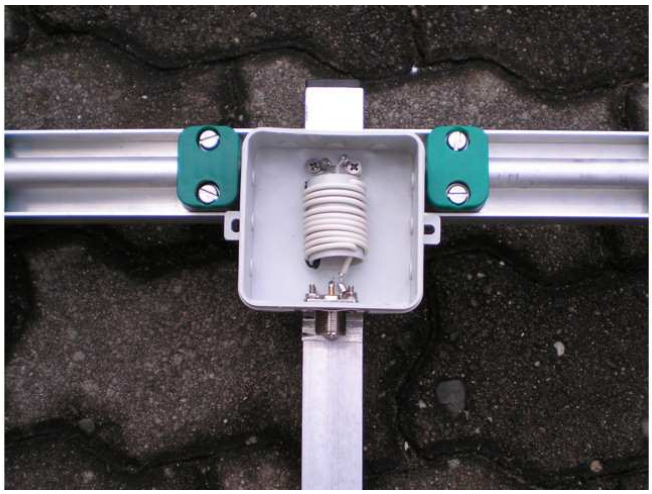


Picture 9: On the one end solder the 4mm cable shoes to the ends and connect the choke with the 3.9 x 16 mm screws to the radiator tubes. If you are using RG59 you have to carry the choke outside of the box, make a coil outside the box and lead it back into the box. **Picture 10:** In the inner it will be soldered to the coax socket. The inner conductors to the inner contact and the outer conductors to a 3mm cable shoe, which will be connected to one M3x12 screw at the coax socket. **Picture 11:** If you are using RG179 PTFE cable, you may wind it to a coil and leave it completely in the box as shown in the picture.

Choke for antennas in 50 Ohm design

Picture 12: In fact this isn't really a choke, it's only a coil for suppression of the sheath current. 50 Ohm systems do not need a transformation. The choke has about 10 windings of thin coax cable on a 25 mm diameter PVC tube. The number of windings is uncritical, but it should have at last 7 windings for good suppression. Solder one end to the coax socket - connect the outer conductor with a 3mm cable shoe to the M3x12 screw. Solder the other end to the two 4mm cable shoes and fix them with the 3.9 x 16 mm contact screws to the radiator tubes. Now your antenna should be ready.

For end mounting just put the box onto the radiator and screw the two self tapping screws into the radiator rods. Do not screw too hard! Mark the point on the boom, where you can fix the grounding plate and drill a 4.5mm hole into the boom rod and fix it with an M4x40mm (plus nut and two flat washers) screw to the boom. You have finished now the radiator

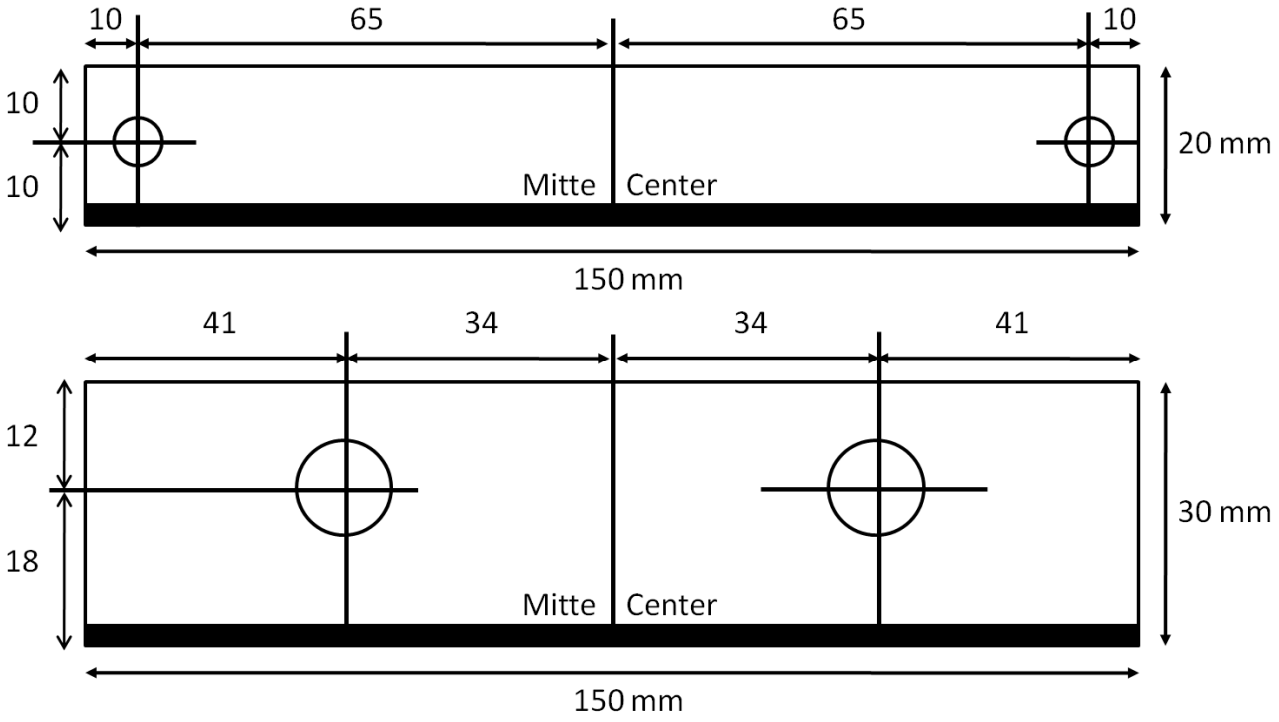


Making the mast connection:

Find the balance point of the antenna first and make a marker on or near this point. There should be the middle of the mast clamp brackets too.

You have received and 30cm long aluminium L-profile (30x20x3mm) which has to be cut into two 15cm long parts. Make 9mm holes on the wide side for the pipe clamps, and 6,5mm holes for the fixation to the boom on the small side. The two brackets will be fixed with two screws M6x45 (plus nut and two flat washers) over and below the boom, with the small side looking to the boom and the wide side looking to the mast. Connect the two pipe clamps to the brackets and your mast connection is ready.

The delivered pipe clamps are for maximum 60mm mast diameter. You can purchase bigger ones if you have a thicker mast rod. The following measures are for the 60mm clamps:



Last workings and fine tuning:

Now do some testing (the antenna height over ground should be at least 6 metres). If it works well, you can seal all vents in the box with silicone or hot glue. Some professionals fill the box with epoxy resin to protect it completely. If you don't fill it, leave a small hole in the box on the future bottom side of the box, so that condensed water can flow out. There are pipe caps for the boom and the 12mm rods included in the kit to close the boom and element ends.

There shouldn't be any need for fine tuning but you could optimize the SWR with the length of the dipole. If the best SWR is below your preferred frequency, your radiator is too long. Try to shorten it in small millimetre steps. If your best SWR is above the preferred frequency, then your radiator is too short. Please check first if you can live with this mismatching, because making the radiator longer is a problem. Check also if your element lengths and distances are ok. It is better to leave the dipole tubes some millimetres longer before cutting to length.

Please consider that on these high wavelengths the surrounding and the height over ground will impact the SWR. Different heights can cause different SWR minimums. So please check and adjust the antenna at the desired mounting place, where it will be in the future.

If you need more help, so please contact us or use our support forum at http://forum.nuxcom.de.

If you have critic or suggestions regarding this manual, please contact us:

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Disclaimer:

Drilling, cutting and other technical work have to be done carefully and can hurt you. We are not responsible for any accidents which result in following our instructions in the manual. Please be careful.

Room for notes: