

## **Introduction**

The work surface in the plasma cutter consists of a grate made from a set of steel fins spaced about 3” apart. AS the machine gets used the torch gouges out these fins bit by bit. Also there is corrosion and abrasion that tends to wear away the work surface. Over months or years the surface can get several millimeters out of true.

The strategy for planing the surface is to attach an angle grinder to the machine gantry so that the edges of all of the fins can be ground down at the high points to give a flat, horizontal plane where the sheets rest.

PLEASE NOTE: If the tank is completely full, you should probably drain out at least half the water. The vibration from the grinding action can cause water to splash upwards, and you don’t want the grinder to get soaked. Don’t electrocute yourself.

## **What You Will Need**

You will need one of the two or three METABO angle grinders and the fixture custom-built to clamp it to the gantry. These components are illustrated below.



The fixture has 3 major parts, a base and two cleats. Also included are 2 M8-1.5 x 30 mm bolts, 2 M8-1.5 x 12 mm bolts, 2 M8-1.5 nuts, washers, lockwashers, and one 3/8-16 wing nut.

The base consists of a base plate with a 3/8-16 x 6” bolt welded to it. The cleats have form-fitting epoxy pads molded over a METABO grinder to grip it where there is some relief on its sides. The cleats have sleeves that fit onto the 3/8-16 bolt and the wing nut clamps the cleats down tightly over the grinder.

Remove the side-handle from the grinder. Also remove the blade guard. With the METABOs it's pretty easy. There is a handle adjacent to the guard, shown in the figure below



### **Assembling the grinder to the fixture**

Using the two M8-1.5 x 12 mm bolts, attach the cleats to the sides of the angle grinder using the two threaded holes reserved for the side handles. The epoxy pads should locate themselves on the topography of the sides of the grinder.



Clamping force is provided by the wingnut holding the cleat sleeves to the 3/8-16 x 6" bolt on the base, when the grinder is mounted to the gantry.

### **Shift the Torch**

The torch interferes with where the grinder needs to go. To shift the torch you will need to remove the tether on top of the quill. This is shown below. A convenient place to put the torch is to rotate it 120 degrees in the magnetic mount on the quill stage. These are shown below.



### Attach the Grinder to the Gantry

Insert the M8-1.5 x 30 mm bolts with flat washers through the two 8-mm holes at the bottom edge of the mounting plate that carries the CNC Z-axis quill. Note the lowered water level.



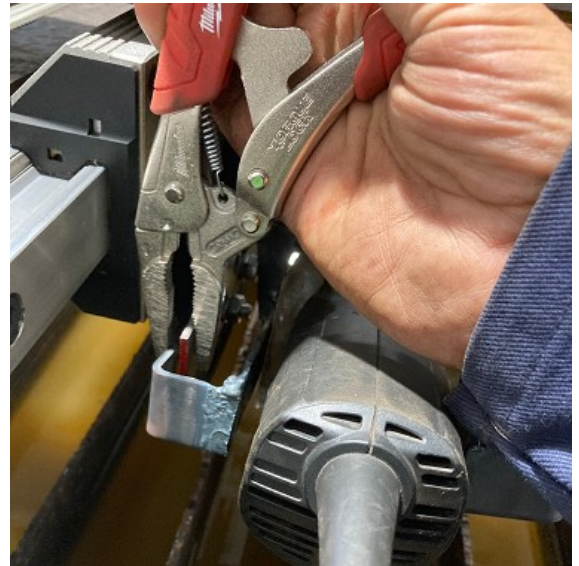
Use the middle set of holes in the base plate as shown. Two sets were drilled wrong. Tighten the nuts with lock washers to hold the base tightly to the gantry.

Slide the assembled grinder with cleats onto the 3/8-16 x 6" bolt. Notice that the grinder can fit pointing to either the left or the right. Shown below is the orientation with the grinder pointing to the left side of the machine. Tighten the wing nut.



### Set the Grinder Pitch

Tilt the grinder down so it touches the upper edge at a height where you want to plane. Don't force it down too hard. It should just drag on the edge when you wheel the gantry sideways.



Holding the grinder firmly at the proper pitch, find the point where the cleat overlaps the base. Clamp it firmly with a pair of vise grips.

### That's It! You're ready to go!

Now you can move the grinder around by pushing the gantry in two directions. I found that manually holding the grinder power switch while wheeling the gantry parallel to the vanes gives you

enough feel to know how hard to push the grinder. Wear eye protection, hearing protection, and eye protection. Don't dip the extension cord into the water bath.

You will be able to grind the vanes all of the way up to one end with the grinder in one orientation. To grind up to the other edge, you will need to reverse the grinder in the mount and reset the pitch angle.

I found the grinding to be somewhat slow but not too terrible. It takes about 3 hours to plane the whole surface.

Since the grinding wheel wears down during the process, you should check the pitch angle a few times during the operation. If you move the grinder over a previously ground portion you should see just a little bit of sparking where the wheel drags on the fin edge. If the grinder doesn't make contact at all, you need to reset it with the vise grips.