Section 9: X Axis Install and Adjustment

The following is the installation instructions for the X axis assembly. The bill of materials for this assembly is:

<table>
<thead>
<tr>
<th>Description</th>
<th>Printed/Made/Purchased</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>ja_x_rod_clamp</td>
<td>Printed</td>
<td>4</td>
</tr>
<tr>
<td>Entire assembly from previous</td>
<td>Made</td>
<td>1</td>
</tr>
<tr>
<td>M3 X 12 SHCS</td>
<td>Purchased</td>
<td>8</td>
</tr>
<tr>
<td>M3 Nut</td>
<td>Purchased</td>
<td>8</td>
</tr>
<tr>
<td>M8 Smooth rod</td>
<td>Purchased</td>
<td>2, cut to 415mm long</td>
</tr>
</tbody>
</table>

The part “ja_x_rod_clamp” in the build orientation.

You will note this design puts the x axis rods on last. It is not like the Prusa, where the bars fit in holes in the right and left x axis assemblies. This decision was a fundamental part of the design. I simply could not print a hole that was straight enough, so that the much longer x axis rod would not tilt and bind. The length of the x axis rod magnifies any inaccuracy. Even if it would work in PLA, I was having even more trouble with ABS and tall thick parts. Putting the rods on after the right and left x axis sides are adjusted so the x axis bars are perfectly square with the y rods avoids all this difficulty. It insures a square Mendel, which you do not have to fight to level the bed.
Slightly sand the bottom to remove any bumps

Ream with a 4.5mm or #15 drill bit. This is oversize because we will move the part to adjust the x axis.
Now place one of the 415mm rods across the y carriage rods.

Turn the right hand side threaded rod by hand until the z bearing holder just touches the rod.
Do the same for the left side.

**NOW DO NOT MOVE EITHER SCREW AGAIN UNTIL WE PUT THE Z BELT ON!!**

Now prepare the x carriage as shown. Put the 8MM smooth rod through the 360 bearings and snap the carriage clamps on each end. Place as shown. Note the frame has been turned around; we are working from the back now.
Place the carriage assembly into place. On this side, the rod tucks under the notch in the bearing mount.

Place a screw and nut in place and engage, but do not tighten
Put the other side in place and put in a screw and nut in a similar manner.

It should look like this. Now add a second screw and nut in each clamp.
Turn around to work on the front.

Insert the 8MM smooth rod through the bearings and into place.
Put the clamps on each end and add screws and nuts. Leave loose, as before.

Next we will adjust the orthogonality of the axes.
Sight along a square and inspect the perpendicularity of the x axis smooth rod that rides in the 3 bearings to the y carriage bar (white paper underneath may help).

Adjust as necessary by moving one end of the y bar support.
Now adjust the other y carriage rod to be parallel to the one just adjusted, and at a distance of 165mm center to center (157 edge to edge).

I used a caliper, but this is not too critical, and a ruler would suffice.

Now we get the x axis very parallel to the y axis. This may be a bit overkill, since the print bed is adjustable, but it makes things easier at the end.
Now, all the x rod clamps are loose. Measure between the y rod and the x rod with the x rod pushed to the bottom of its adjustment range (that 4.5 mm hole for an M3 screw in the rod clamp). Repeat at each of the 4 points where the x and y rods “cross”. Now push the x rod to the top of its travel (about 1.5mm higher) and measure again. Average all these measurements, and set your caliper to this value, AND LOCK IT.
Place the calipers between the rods as a gage, raising the x rod to a uniform height with respect to the y rod. Tighten the x rod clamp screws at the nearest clamp. Repeat at all 4 points. Then re-check and tweak as necessary.

Done…