

Adjustment of the Crosshair Lasers on the Powermatic 2820EVS Drill Press

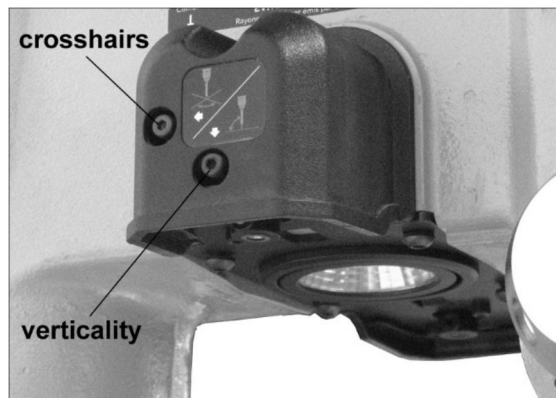
Caution: Do not look directly into the laser beam or view it directly with optical instruments.

Overview:

There are two lasers, one on each side; each has a pair of adjustment screws. They project light spread along two vertical planes, which will appear on a flat surface below them as two lines.

The front screw controls the verticality of the plane of the light. This can be tricky to adjust and will be covered over with a small square of black electrical tape to discourage casual users from using it.

The back screw controls the horizontal position of the beam, where the crosshairs meet. While it shouldn't be necessary, users can adjust this without causing serious difficulties.



*Figure 1: Left side laser adjustment screws
(Image from the equipment manual)*

Things you will need:

- A 3 mm hex wrench (The manual says 2.5 mm, but that is wrong.)
- A piece of scrap 2byN at least 7" long
- A short, rigid drill bit (such as a center or spotting drill bit)
- 1/4" of black electrical tape

The Process:

1) First, take the wood piece and use the jointer, planer, and saws to square the piece up completely. It should be sized about 7" long (perhaps a bit longer), a little under 1.5" thick, and 3+" wide. (The last dimension is not critical.)

2) Put a short, rigid drill bit in the chuck. Adjust the table so that the bit is just above the wood piece when it is oriented vertically. You should move the table aside slightly so the small face can rest firmly on a completely flat section of the table (away from the center area and the fence slots). Lock the table into place.

Then set the wood piece horizontally on a large face and verify that the bit can leave a mark on the top face; the quill should be near maximum extension then.

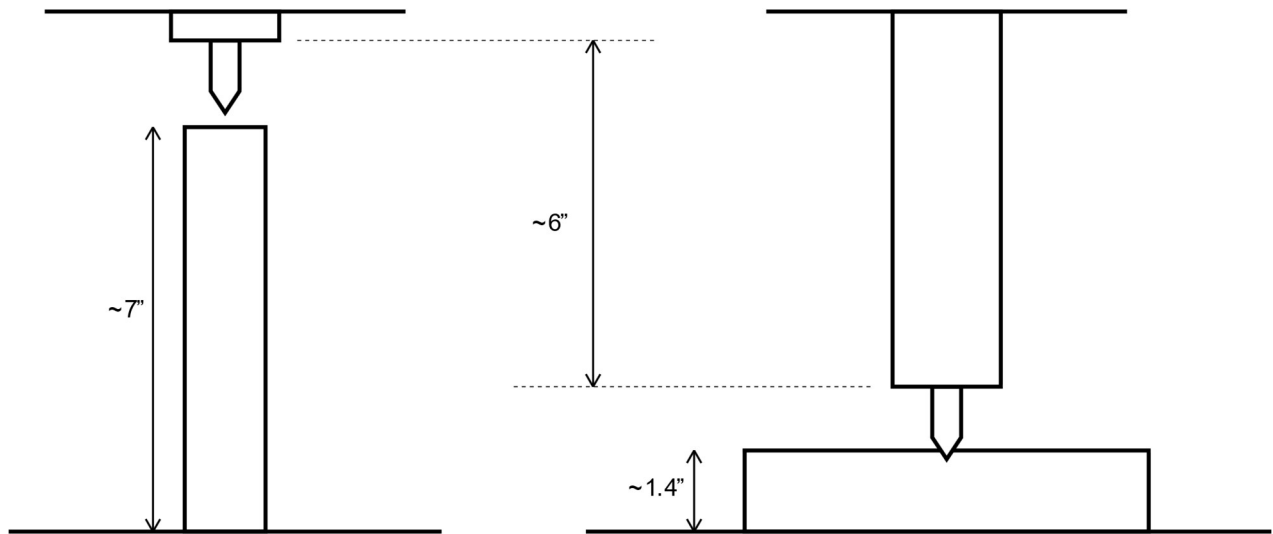


Figure 2: The board is sized and the table positioned so that, with the board oriented vertically, the bit is just clear of the board with no quill extension, but also so that, with the board oriented horizontally, the bit can just mark the board at the lower end of the quill range.

3) Using a good square, scribe a line along one of the large faces, perpendicular to the small faces. Use a wood scribe, exacto/precision knife, or a sharp utility knife to cut this line clearly, straight, and as deep as possible in one pass. This will work far better than marking a line with a pencil or pen – the mark will be narrower, and the depth will scatter the laser light in a way that will make it much easier to see.

4) Turn on the drill press and the lasers. Remove the squares of tape covering the front adjustment screws. (If you are careful, you may be able to re-use them; otherwise, you will need to cut new tape squares later.)

5) Orient the wood vertically, with the scribed line toward the back, and place it near one of the laser beams. Then adjust the forward screw for that laser until the laser can overlay the scribed line exactly (moving the piece as necessary). You want the laser line and the vertical scribed line to be exactly parallel.

Repeat this process with the other laser. You now have preliminarily adjusted the verticality of the lasers.

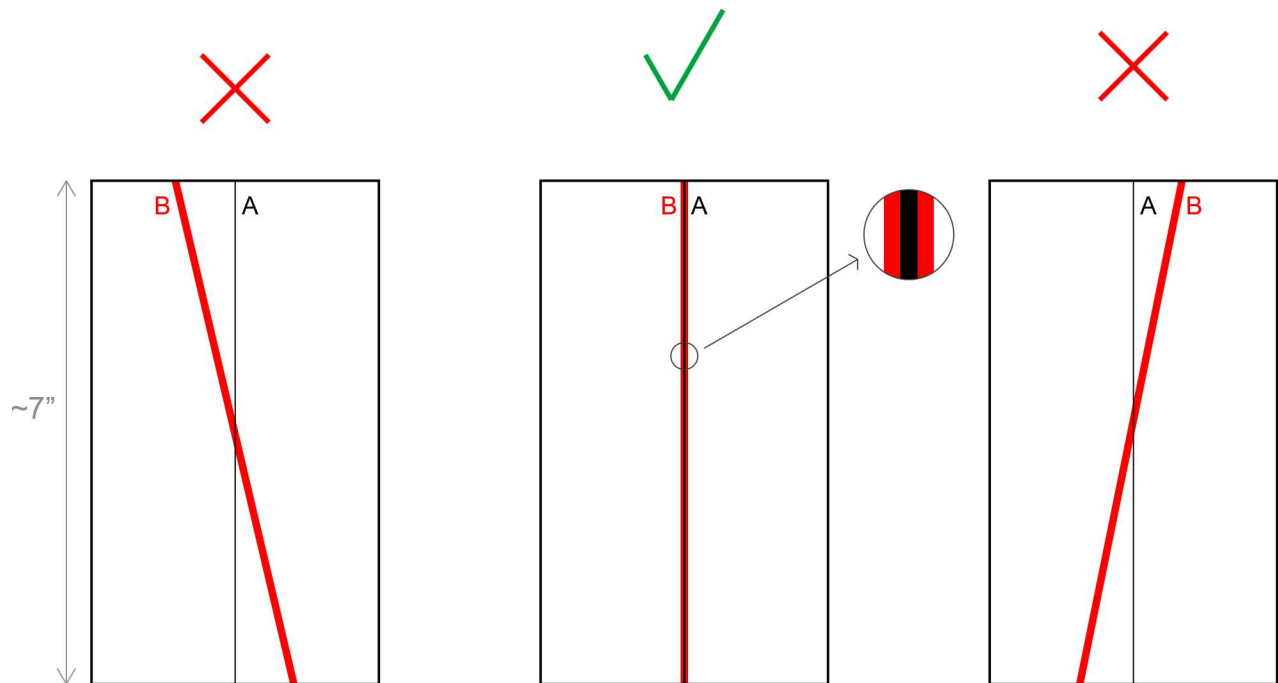


Figure 3: It is essential that the scribed line A is perpendicular to the table. Adjust the front screw until laser line B overlays the scribed line A. (You'll have to move the board as well.)

6) Now position the piece vertically under the bit and lower the bit enough to leave a small mark. Turn the two **rear** adjustment screws to position the laser lines so that they cross precisely over the mark. Be certain the wood piece does not move during this process! (Unfortunately, this piece shape, while better for the rest of the process, does not lend itself well to being clamped.)

7) Now lay the piece flat on a large face and lower the bit to leave a small mark. Again, be certain the piece does not move! (Clamping is more feasible in this orientation.) If the lasers still cross over the mark, you are done and should proceed to step 9. If they do not, then use the **front** adjustment screws to position the laser lines to cross over the mark.

8) Return to step 6 and iterate through steps 6 and 7 (making new marks each time). The lasers should require less and less adjustment at each iteration, until the lasers cross over *both* the mark made when the piece is vertical and the mark made when the piece is horizontal.

9) The laser crosshairs should now accurately predict the bit position over the entire range of quill motion. (Re-)place small squares of black electrical tape over the two forward screws to discourage casual modification. Turn off the drill press, put your tools back, and discard the marked scrap piece.

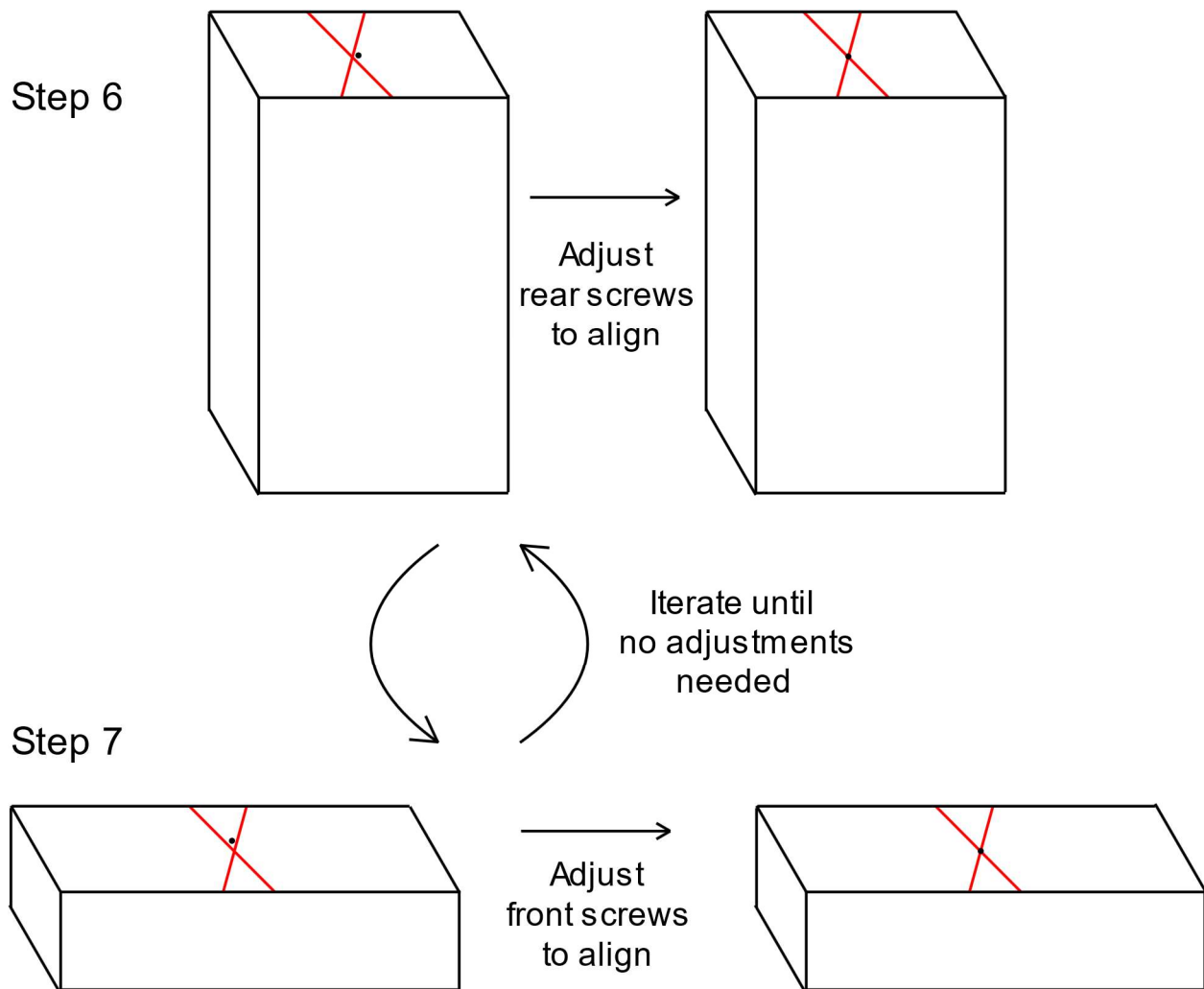


Figure 4: Turn the screws to align the beams with the mark made by the bit. Always adjust the rear screws for the tall orientation and the front screws for the short orientation. Iterate over these steps until no further adjustments are needed.

Other Notes:

The alignment of the laser beams seems stable over a period of more than a month. It should probably be checked every three months, assuming no misalignment has been observed sooner.

The manufacturer recommended procedure (simpler, but less accurate in my experience) can be found in the manual, https://wiki.asmbly.org/images/5/5d/PM2820EVS_manual.pdf, in section 8.6 on pages 15-16.

This process was created by Austin Asmbly Makerspace steward Ethan Moore (ethan.moore@asmbly.org); let him know if you have problems implementing it.