

**VIDEO INSTRUCTIONS AVAILABLE**  
For Squaring and Indicating a Mill  
video instructions, please visit our  
YouTube channel at <https://youtu.be/oKU7XJAY9e0>

**SHERLINE**  
**PRODUCTS**  
INCORPORATED 1974

## Squaring up and Indicating in a Mill

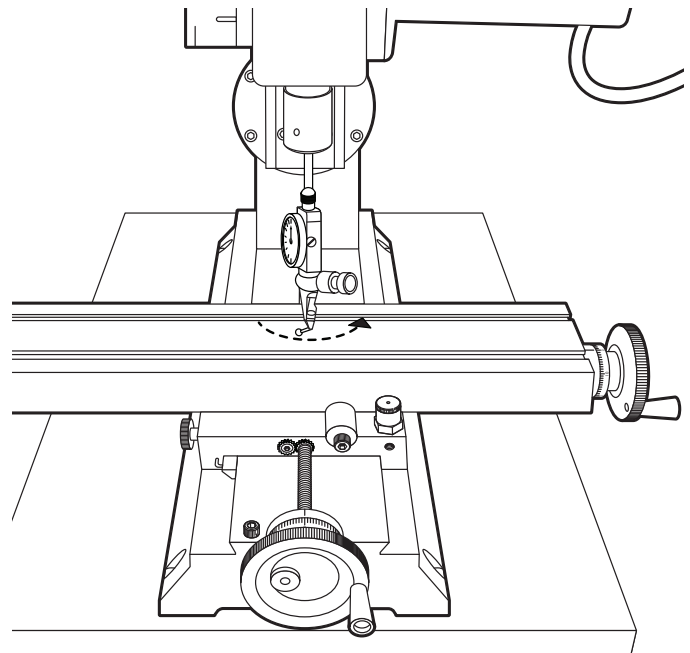
The instructions for squaring the headstock on the mill are in our 2000 mill instructions ([2000inst.pdf \(sherline.com\)](https://www.sherline.com/2000inst.pdf)) on pages 3, 4, and 5. Use the instructions beginning on page 4 for a machine with a rigid column base.

The difference between these instructions and the 2000 mill instructions is that the 2000 mill is able to rotate in the X-axis, whereas all our other mills can not.

With a dial test indicator, first check the X- and Y-axis for square before you make any adjustments. If you are within .001", you are fine.

### Squaring the Column with the X-axis

In order to square your headstock in the X-axis, you will need to loosen (3) of the (4) mounting screws (see #26 in Figure 1 below). Then loosen the fourth screw, and then tighten it so it is snug. Then indicate the top of the tooling plate from left to right in the X-axis until the indicator reading is the same on both sides by tapping the column bed in either direction (see Figure 2). Once it is square, tighten all four mounting screws. When adjusting this axis, the relationship from side to side is a 1:1 ratio because the pivot point is centered under the headstock.



*FIGURE 2—Squaring the left to right rotation of the column with the X-axis.*

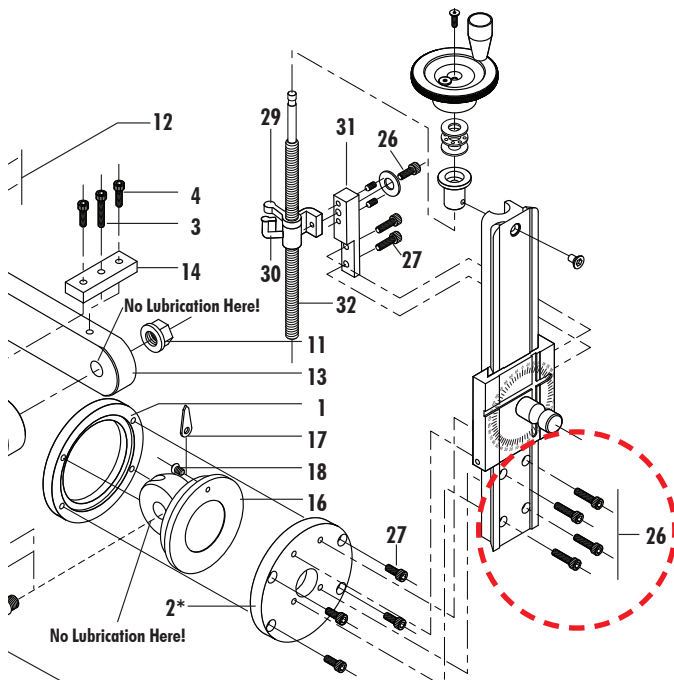
The indicating procedure that you just did will tell you how flat the tooling plate is in the X-axis. In the instructional video noted above, you are moving the table to the right with the indicator moving in the X-minus direction. This is the proper way to do this. With the surface moving away from the tip of the indicator, there is no surface force on the tip of the indicator. Moving the indicator in the X-plus direction, there can be a slight load on the tip of the indicator.

Now what you want to do is locate the indicator as you have it in the middle of the tooling plate. Then you will zero the indicator with it pointing to the right. Then (by hand) turn the spindle 180° so the indicator is now pointing all the way to the left side. If the column is square to the table in the X-axis, the indicator will read zero on both sides. This is how you (sweep in/square) the column in the X-axis.

**NOTE:** The wider radius that you can swing with your indicator, the more accurate you will be able to “sweep in”/square the head.

### Squaring the Column with the Y-axis

To square in the headstock in the Y-axis, you will need to loosen the hex nut (#11 in Figure 3 on the following page).



*FIGURE 1—The dashed-line circle shows the column mounting screws that need loosening.*

Then use the adjustment screw (#3) to make the column tilt forward or backwards. Because the pivot point of the arm mount (#16) is behind the column and the headstock, this adjustment is not a 1:1 ratio. You will need to make minor adjustments to the indicator reading with the indicator at the front of the tooling plate. Then see how much that incremental move has affected the reading when the indicator is at the back of the tooling plate.

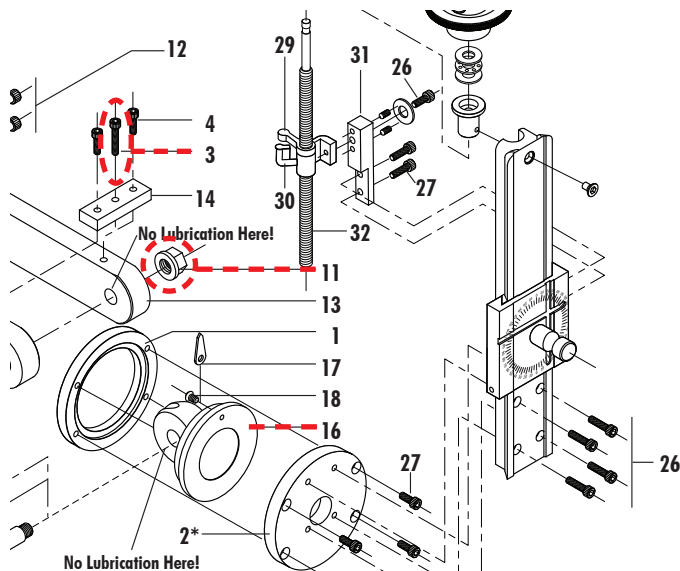


FIGURE 3— The dashed-line circle shows the nut (#11) and screw (#3) that need loosening. #16 is the arm mount.

To square the column in the Y-axis, you do the same procedure as you did in the X-axis but instead of zeroing the indicator at left and right, you zero the indicator with it pointing straight out to the front of the machine (see Figure 4). Then you turn the spindle 180° so the indicator is pointing to the back of the machine. This will tell you if the column is square in the Y-axis.

Adjust as needed in both axes until the indicator reads zero from side to side and front to back.

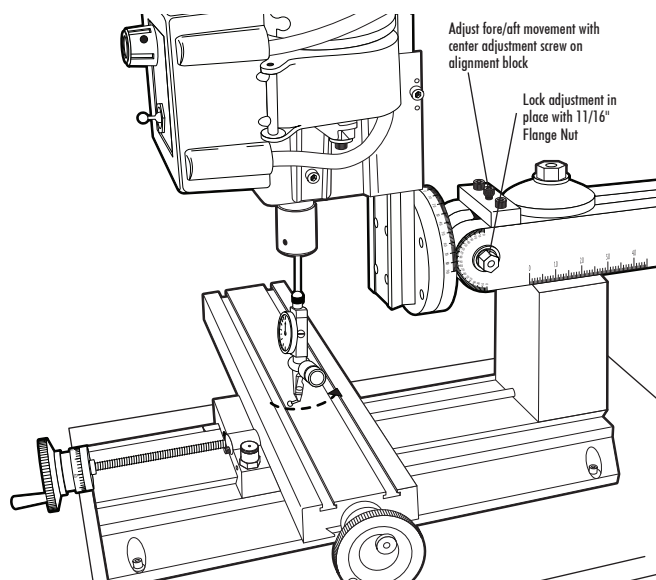


FIGURE 4— Squaring the fore and aft pivot movement of the column with the Y-axis.

Now you need to loosen all four of the mounting screws that hold the column bed to the arm mount (see #26 in Figure 5 below). Then tighten one of the top screws just snug. Then tap the top of the column bed where the stepper motor is mounted to one side or the other. Recheck the indicator reading on both sides. Continue to move the bed towards the side that is reading higher until both sides have the same reading within .001". Then tighten all four screw and recheck.

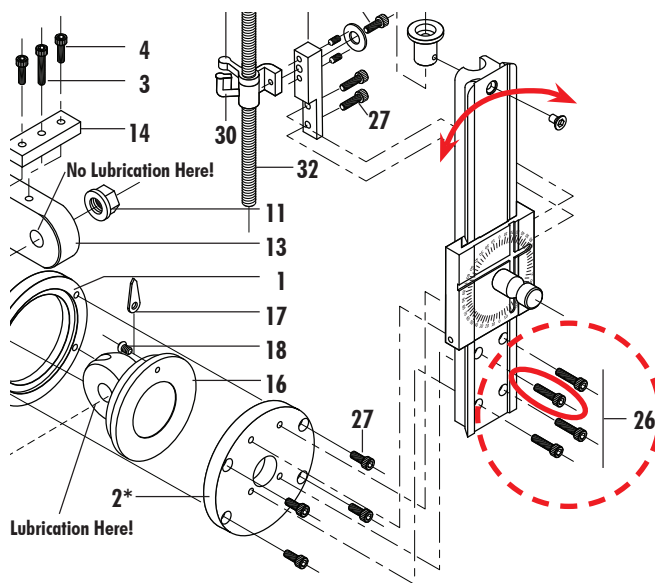


FIGURE 5

#### Using a Sweeping Motion to Check the Column for Square to the Table

You want the surface that you are indicating to be either parallel to the tip and the indicator body, or you want the tip to be close to 90° to the indicator (see Figures 6 and 7). The surface contact is to the side of the indicator tip, not at an angle. The indicator reading when mounted this way is 1:1. If your indicator and tip are making contact with the surface at a 45°, you will not get an accurate reading on the indicator.

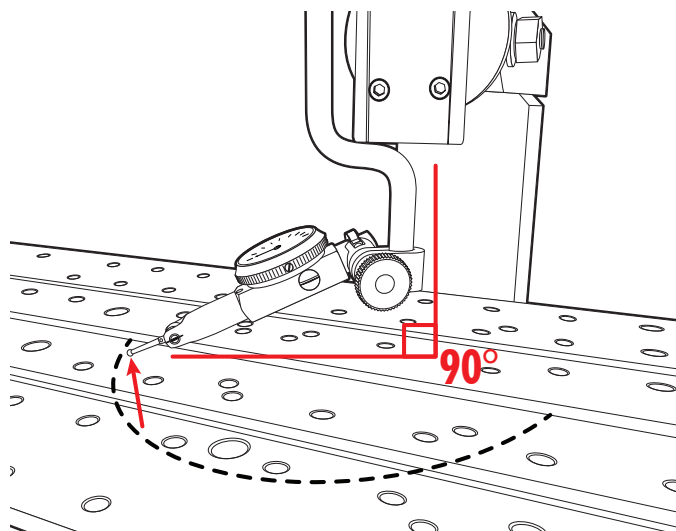
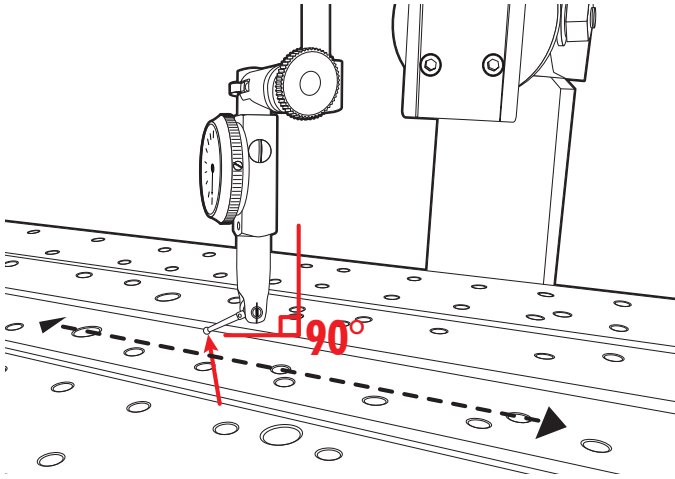


FIGURE 6—The indicator body and tip are almost parallel to the surface. The indicator should be positioned as shown above for sweeping in both the X and Y axis.



*FIGURE 7—The indicator body is perpendicular to the surface and the tip is almost 90° to the body. The only time the indicator will be like this is when you are indicating a surface to see if it is flat or square.*

Thank you,  
Sherline Products Inc.