

VIDEO INSTRUCTIONS AVAILABLE

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SHERLINE PRODUCTS

INCORPORATED 1974

End Mill Holder Run Out

How to Check and Fix End Mill Holder Run Out

Our end mill holder uses the $\frac{3}{4}$ -16 thread and the shoulder of the spindle to locate against in order to run true. The pitch diameter of our spindle thread is held at the top end of tolerance on the spindle and the bottom end of tolerance on the end mill holder in order to achieve the least amount of run out on the thread-to-thread connection. The shoulder surface contact then act as the last part of the truing and aligning process of the assembly.

The most common cause of run out on the end mill holders is a chip or a slight dent on either of the mating surfaces where the end mill holder contacts the shoulder of the spindle (See pictures). Check both of these surfaces for chips or dents. If you see any dings on the end mill holder, you can sand it lightly with some 360 grit wet or dry silicon carbide sand paper with the sand paper on a flat surface to remove any high spots. Use a figure-8 motion when sanding to keep the holder as square as possible to the sanding surface. A back and forth sanding motion will cause the end mill holder to rock slightly to each side and your surface will not sand flat.

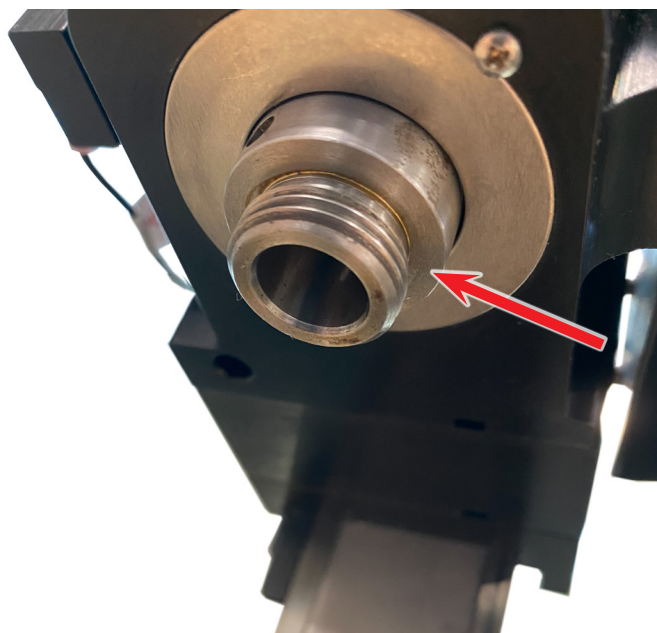


FIGURE 2—The red arrow is pointing to the shoulder of the spindle surface.



FIGURE 1—End mill surface.

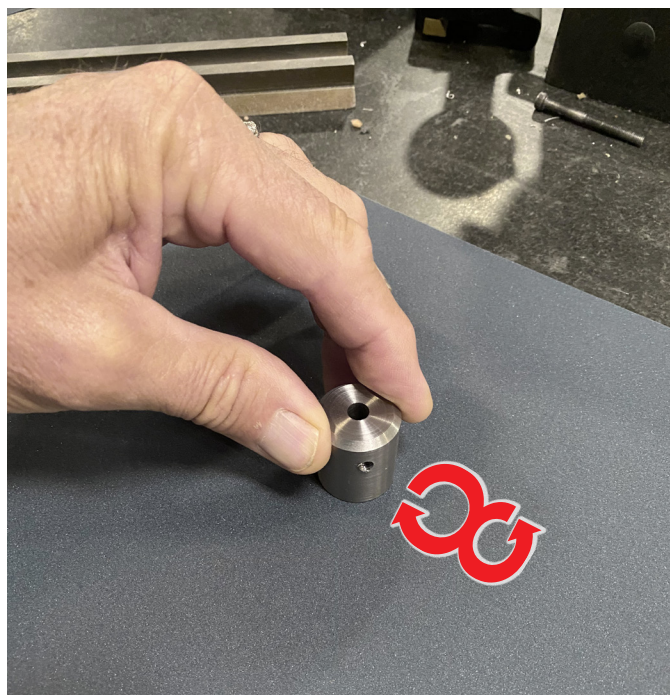


FIGURE 3—Light sanding in a figure-8 motion holding the end mill holder flat and square to the paper.

If the mating surfaces are good and free of dents and dings, then check the run out of the shoulder of the spindle first. Make sure that the point of the indicator is at a 90-degree angle to the indicator body. This will give you the most accurate reading. Turn the spindle by hand. The shoulder surface should have a run out of .001" (.0254mm) or less.

INDICATOR NOTE: The indicator in these pictures is a .0001" (.0025mm) indicator. A .001" (.0254mm) indicator will work. The indicator point must be as close as possible to being parallel to the surface for which you are indicating to get an accurate reading.

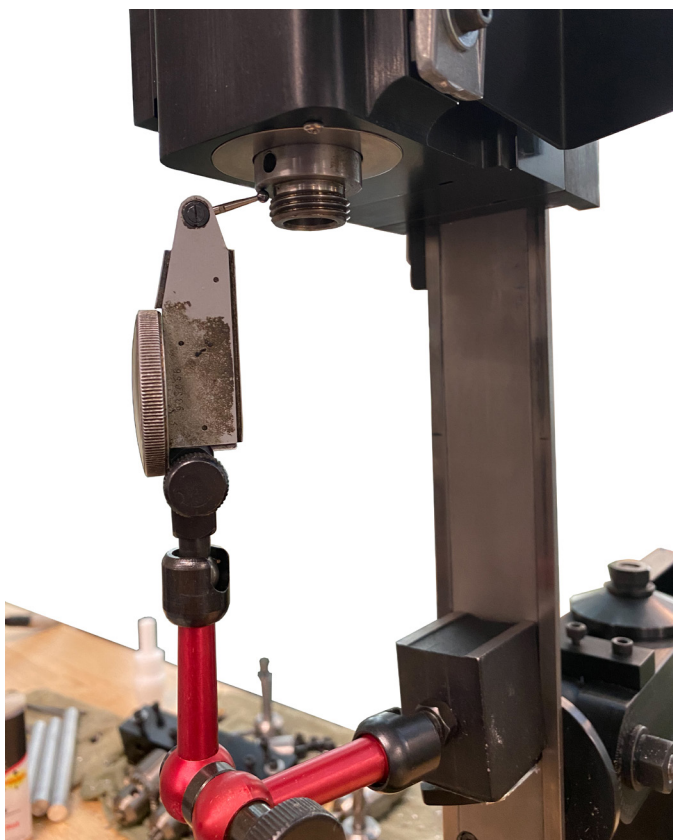


FIGURE 4—The indicator tip is on the spindle shoulder.

If the spindle shoulder run out is good, then mount the end mill holder on the spindle and check the run out of the 3/8" bore (not the outside of the body). The bore should have a run out of .001" (.0254mm) to a maximum of .002" (.0508mm). If the spindle is held within the .001" tolerance and the end mill is within the .001" tolerance, the overall "assembled run out" can be as much as .002" (.0508mm). We strive to hold both parts under .001" in order to keep the assembled run out as low as possible.



FIGURE 5—The indicator tip is located inside the 3/8" bore of the end mill holder.



FIGURE 6—The indicator tip located inside the end mill holder from another angle.

Next, mount your end mill in the holder. Be sure to use the flat on the end mill to secure it with the set screw.

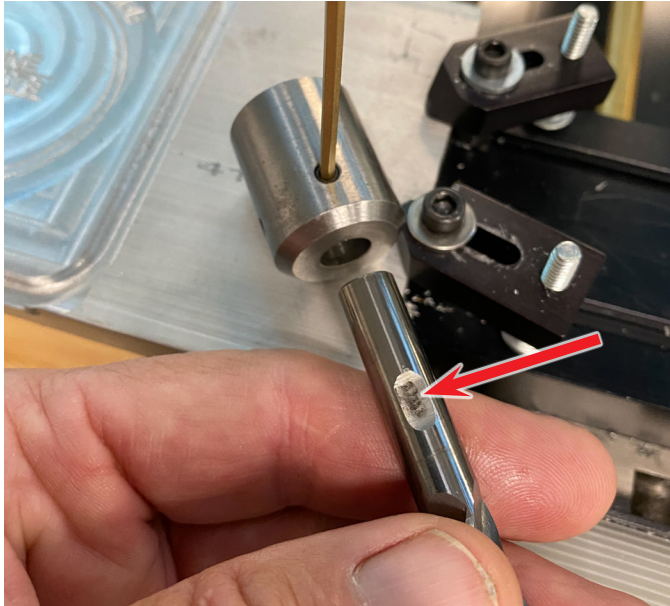


FIGURE 7—The red arrow is pointing to the ground flat on the end mill.

Now check the run out of the end mill in the holder. Be sure to place your indicator tip on the shank of the end mill, not the flutes. Turn the spindle by hand. The end mill should run out .001" (.0254mm) to a max of .002" (.0508mm).



FIGURE 8—The indicator tip is located on the end mill shank.

Using this method, you can pinpoint the source of the run out.

1. If it is the shoulder of the spindle, the spindle can be turned true and we have separate instructions for how to do this.
 - A. Written instructions: Truing the Spindle Shoulder Face (https://www.sherline.com/wp-content/uploads/2020/10/truing_spindle_face_inst.pdf)
 - B. Video Instructions: Truing the Spindle Shoulder Face (<https://youtu.be/wSh42JTTA5w>)
2. If it is the end mill holder, the holder can be replaced (as long as it was not damaged by poor use or wear).
3. If it is your end mill, the end mill can be replaced.

Thank you,
Sherline Products Inc.