

CW TIP 5 — Sherline Equipment for Horological Repair/Jerry Kieffer

Using Sherline Equipment for Horological Repair

Jarex Johnson is a craftsman who makes jewelry but is now studying watchmaking. He asked renowned watchmaker, Jerry Kieffer, about the tolerances required for horological work using Sherline machines. Here, first, is Jarex's question, and then Jerry's response.

Jarex Johnson's Question

What I wanted to speak with you about was how far I can push my Sherline Mill and Lathe when it comes to precision. I am aware all machines have a little "play" and it comes down to the operator when we are trying to achieve the high demand of perfection. My goal is to make a watch from scratch one part at a time. I will start by replacing parts in an existing movement to check the accuracy of my work with its timekeeping.

My equipment is still pretty new and it sounds like Karl (Rohlin, Sherline Products V.P. of Manufacturing) was saying that new equipment needed to get "broken in" before the adjustments would work with tighter tolerances. I am at about .004" on my most extreme backlash on the lathe and maybe .003" on the mill because I have adjusted things to be a little more rigid.

It seems to me so far the trade off with backlash is with rigidity, where milling something hard and heavy would demand a tighter adjustment (more backlash) vs. milling something delicate and small with the rotary table with looser adjustments (less backlash).

Thank you kindly for corresponding with me.
Jarex

Check out Jarex's website, *Custom Jewelry & Stonecutting* at jxandco.com.

Jerry Kieffer's Response

Unfortunately, horological repair information, for the most part, was published before affordable small machine tools were available. Thus there will be little, if any, info on their use for horological repairs.

Instead, the Watchmaker's Lathe will be highlighted. The watchmaker's lathe was designed to be used with a graver and is limited to one's ability to control the graver for OD turnings.

The Sherline Lathe and Mill are machine tools designed to be utilized by controlling the cutting tool with

lead screws in the same manner horological parts are manufactured.

With that out of the way, Karl is correct in that you need to make chips to know what to ask. I will make a few general comments.

1. For micro-machining, backlash is of no issue if it is .005" or under. Without backlash, the slides would not operate free enough to provide accurate handwheel scale readings.
2. Slides should operate free enough for micro-tooling feedback but JUST tight enough to prevent any bed side play.
3. 90% of my lathe tool use is with factory stock AR-4, and E-4 or D-4 brazed carbide tools Made in the USA only. They are held in double-sided standard tool posts until they are replaced. They are shimmed so that the cutting tip is dead center to the center of spindle rotation per attached photo (see Figure 1). I first file a piece of rotating stock with a file to a sharp pencil point. The cutting tip of the tool is then set/shimmed with optics viewing from the rear of the lathe. This setting is absolutely critical for anything good to happen.

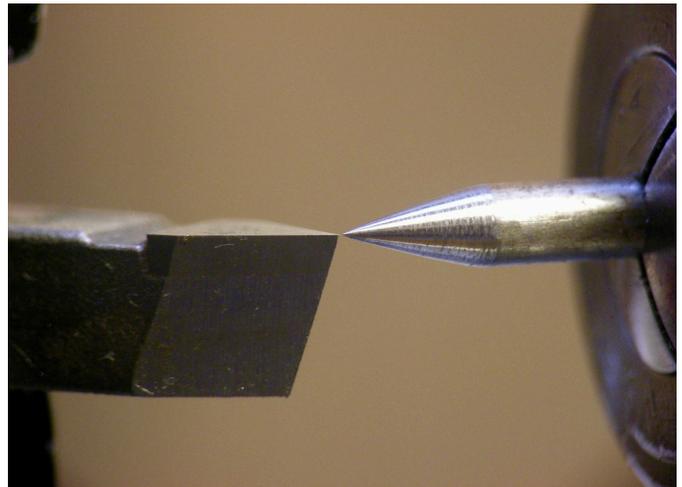


FIGURE 1

4. Mills are held in the milling machine using MT collets with some micro mills and drills held with WW collets.
5. Micro-drilling will require Sherline's adjustable drill chuck alignment accessory for either a chuck

or WW collet adapter. If you choose a Chuck, I would suggest an Albrecht 1/16" chuck.

From this point, I would suggest reading Sherline's instruction guide and become familiar with common setups. I would then suggest machining 12L14 steel as practice until you are comfortable machining and then attempt to make something. 12L14 steel is a free-machining steel and will not present machining obstacles allowing you to become proficient faster. Once basic machining has been mastered, you will most likely have questions on accessories and procedures.

Jerry Kieffer