



Aligning the Lathe Headstock and Tailstock

The following instructions are extracted from the [Sherline Assembly and Instruction Guide](#).

The versatile feature of Sherline machines that allows the headstock to be removed or rotated for taper turning and angle milling keeps us from being able to lock the headstock in perfect alignment. Precision ground alignment keys and accurate adjustment at the factory, however, make the machines highly accurate. In standard form, alignment should be within .003" (.08 mm). This should be more than acceptable for most jobs you will attempt.

Only someone new to machining would talk about “perfect” alignment. Machinists speak instead in terms of “tolerances,” because no method of measurement is totally without error. We believe the tolerances of your machine are close enough for the work for which it was intended; however, for those searching for maximum accuracy, here are some tips for maximizing the accuracy of your machine.

Loosen the headstock, push it back evenly against the alignment key and retighten. This will maximize the accuracy of the factory setting. To achieve greater accuracy, you will have to be willing to sacrifice one of the better features of your lathe or mill; that is, its ability to turn tapers and mill angles in such a simple manner.

HEADSTOCK—If you choose total accuracy over versatility or need it for a particular job, proceed as follows. Remove the headstock and clean any oil from the alignment key and slot and from the area of contact between bed and headstock. Replace the headstock, pushing squarely against the key and retighten. Take a light test cut on a piece of 1/2" to 3/4" diameter by 3" long aluminum stock held in a 3-jaw chuck. Use a sharp-pointed tool to keep cutting loads low so as not to cause any deflection of the part. Measure the diameter of both machined ends. If there is a difference, the headstock is not perfectly square. Now, without removing the key, tap the headstock on the left front side (pulley end) if the part is larger at the outer end. Tap on the right front side (chuck end) if the part is larger at the inner end.) You are trying to rotate the headstock ever so

slightly when viewed from the top until the machine cuts as straight as you can measure. There should be enough movement available without removing the key, as its factory placement is quite accurate.

Take another test cut and re-measure. Repeat this procedure until you have achieved the level of perfection you seek. Then stand the lathe on end with the alignment key pointing upward and put a few drops of Loctite® on the joint between key and headstock. Capillary action will draw the sealant in, and when it hardens, the key will be locked in place. We prefer this method to “pinning” the head with 1/8" dowel pins, because it offers you the option to change your mind. The headstock can be removed by prying with a screwdriver blade in the slot between the bottom of the headstock and the lathe bed to break the Loctite® loose should you wish to be able to rotate the headstock again.

TAILSTOCK—To maximize the machine’s tailstock alignment, first make sure that there are no chips caught in the dovetail of the bed and no chips or dents in the taper of your tailstock center. Now put a 6" long piece between centers and take a long, light test cut. Measurements at either end will tell you if you need to use an adjustable tailstock tool holder in the tailstock to achieve better tailstock alignment. We manufacture adjustable tailstock tool holders (P/N 1202, -03, -04, -06) and an adjustable live center (P/N 1201) that can help you attain near perfect alignment at the tailstock should your job require it. Instructions for their use are included with each item.

Remember that unless you drill very small holes (less than 1/64") or turn a lot of long shafts, by using a machine with a fixed headstock you are giving up a very useful feature to solve a problem which can usually be handled with a few passes of a good mill file. The inaccuracy inherent in any drill chuck is such that perfect machine alignment is meaningless unless you use adjustable tailstock tool holders.

—Joe Martin, President and Owner
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