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SHERLINE PRODUCTS
INCORPORATED 1974

Z-axis Backlash Lock

P/N 4017Z/4117Z

The Purpose of the Z-axis Backlash Lock

CNC machining operations require precise Z-axis movement to producing a good part. The normal backlash of .003" to .005" can be unacceptable in these situations and a way was needed to reduce backlash to the .001" to .002" range. The problem would arise when the Z-axis gibs were set so tight to eliminate vibration that the headstock had to be physically pushed down. This would leave backlash between the cutter and the part. With the normal vibration of making a cut and the tendency of an end mill to pull itself down into the part, the headstock would slowly lower the amount of this backlash. Sherline owners found ways to work around this problem when working with manual machines, but it soon became apparent that this was a problem that was unacceptable for CNC machining. This problem has been solved without adding excessive cost to Sherline mills. We designed this lever to lock the leadscrew a couple of years ago, but we never thought of it as an option that could be used to control backlash. Once we realized this lock could be used in this way, we had a prototype working the next day and were into production within a week. We are also pleased to report that the anti-backlash system can be added to every Sherline mill or vertical milling column ever built!

By locking this lever against the Z-axis saddle nut, it keeps the leadscrew from turning once the headstock is positioned at the proper height for the operation. This new lever positioning system will allow you to position the locking lever in a partially locked position, removing as much backlash as you desire, and then it can be locked in that position. As wear occurs, the position of the locking lever can be adjusted.

NOTE: If you are retrofitting this system to an older mill, you will find more complete installation instructions on the other side of this sheet.

Installing and Using the Z-axis Lock on a CNC Mill

The locking arm is clamped in the lock plate for shipping. Loosen the knurled thumbscrew and remove the plastic arm. Insert the pin in the end of the plastic lever into the hole in the end of the brass Z-axis locking lever from the bottom side. Align the locking arm with the slot in the lock plate and slip it in. Move the brass locking lever to provide the desired amount of backlash. Tighten the thumbscrew to hold the plastic arm in position. Do not overtighten the thumbscrew. There is not a lot of force trying to move the arm. The arm serves only to hold the locking lever in position once you have adjusted it.

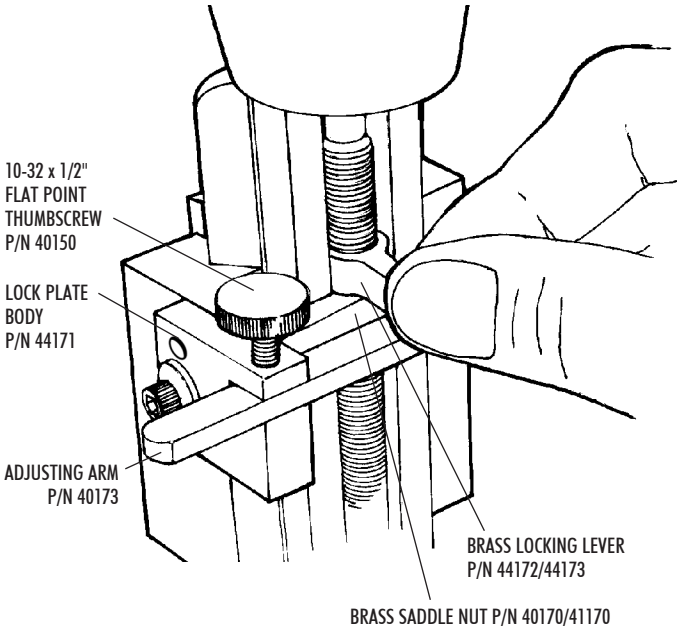

FIGURE 1—Components of the lever locking system as they are now installed on new Sherline CNC mills.

The brass locking lever is adjusted by hand as shown in Figure 1, and then the positioning arm is locked in place. Don't adjust the locking lever by moving the plastic arm directly. You will have much better feel for the amount of pressure needed by adjusting the locking lever itself.

Installing on Older Mills that Have a Locking Lever

Manual mills made before 1/04 and equipped with a locking lever on the leadscrew do not have a center hole in the end of the locking lever for insertion of the pin on the end of the adjusting arm. It will be necessary to drill a 3/32" hole in the center of the enlarged portion of the arm before the pin can be installed.

Installing a New Saddle Nut and Locking Lever on a CNC Mill Not Currently Fitted with a Locking Lever

Prior to January 2004, newer Sherline manual mills came with a locking lever but CNC mills were shipped without one to prevent accidental locking that might ruin a part. The new retrofit installation kit includes a new locking lever and a new saddle nut without the spring loaded ball to hold it in the unlocked position. The positive locking arm allows partial locking of the lever to reduce backlash to a minimum. The small detent in the locking lever that was formerly used to engage a spring-loaded ball has been