

MILL TURN & TURNADO BALL SCREW SERVICE

The MILL TURN has 4 ball screws in total- X, Y and Z (2). For all practical purposes, they should last the lifetime of the machine unless they are not properly lubricated or suffer some damage from a machine incident. The Turnado has only 2 ball screws.

LUBRICATION

On generation 1 machines the X ,Y and Z ball screws required manual lubrication with light lithium grease either via a zerk fitting on the ball nut or manually along the surface of the screw. On generation 2 machines the X and Y ball screws were lubricated via the one shot oiler system and the Z axis ball screws were done via a zerk fitting. The Turnado machine has the one shot oiler and only has 2 ball screws.

REMOVAL

Z AXIS

The Z axis screws are easily accessible and visible. In order to remove one or both, follow these steps.

- 1. Lower the mill head to its lowest position so it is resting on the lathe column and the 2 clamp locks on the tailstock end.**
- 2. Remove the top sheet metal cover, loosen the drive belt adjuster and remove the belt.**
- 3. Loosen the set screws on the round nut holding the large pulley in place, remove the round nut and lift off the pulley. It may be a tight fit on the shaft and key, so gentle prying up equally from each side may be necessary. Remove the key from the shaft.**
- 4. Loosen the 4 bolts holding the round bearing plate and remove it- be careful not to lose the thrust bearing which consists of 3 parts.**
- 5. Loosen the 4 bolts holding the ball nut to the mill head casting and lift the ball screw assembly up and out. Be careful when handling the ball screw, as they**

are very low friction and the nut can simply thread itself down by gravity and fall off the screw with loss of all the balls.

Y AXIS (on the Turnado this is the X axis)

The Y axis screw powers your carriage across in front of the chuck.

1. At the back of the table, pull off the rubber dust cover, loosen the set screws holding the round nut and remove the round nut.

2. Remove the 4 allen bolts holding the bracket to the cross slide carriage and remove the bracket. It may require a gentle tap to come away from the carriage. Be careful not to lose the thrust bearing components.

3. Go back to the front of the machine and loosen the set screws holding the handle to the stepper motor and remove it as well as the 4 bolts holding the sheet metal shield in place.

4. Look up under the end of the table and find the 2 set screws securing the connection collar to the end of the ball screw. Loosen these 2 screws and then loosen the 2 allen bolts holding the stepper motor bracket to the end of the carriage. Remove the stepper motor and mount.

5. Now you can slide the carriage far enough forward to expose the end of the Y axis ball screw. On series 2 and later machines including the Turnado, you will also find the single shot lubrication manifold and pipes. This will also expose the 4 allen bolts holding the X axis bracket in place. This is a good time to check them for tightness.

6. Loosen the oiler fitting and remove the 6 allen bolts holding the Y axis ball nut to the bracket and pull the ball screw assembly out.

X AXIS (on the Turnado this is the Z axis)

The X axis ball screw is the long one which moves the carriage longitudinally along the main casting and runs down the center of the main bed.

1. Remove the 2 bellows way covers on generation 1 and 2 machines. On generation 3 machines and Turnados the bellows are round and attached to brackets bolted to the bed casting and the main carriage. Remove the mounting bolts holding the bellows on the tailstock end of the carriage. Run the main carriage as far as you can toward the headstock end. Disconnect the machine

from the power source and remove the end panel covering the electronic components.

2. Remove the CNC drive belt and then the pulley attached to the end of the ball screw. (There will be 2 set screws 180 degrees apart on generation 1 and 2 machines.) Remove the 4 bolts holding the bearing plate in place and remove the bearing plate.

3. Go to the tailstock end of the machine and remove the rubber dust cover from the end, and loosen the set screws holding the round nut in place. Remove the round nut.

4. Remove the 4 allen bolts holding the bearing plate in place and remove the bearing plate. (The plate may be a bit tight due to sticking to paint and the close fit- screwdrivers on each side with equal pressure will help to pull it out.) Be careful not to lose the thrust bearing parts. Manually screw the ball screw toward the headstock end until the end is near the ball nut. At this point on generation 3 machines with round bellows, you can remove the bellows assembly.

5. Looking down the channel of the main bed from the tailstock end you will see the ball nut is held into the bracket with 6 allen bolts. On series 2 and later machines and the Turnado you will also see the plastic feed pipe for the one shot oiling system. A 5MM allen type socket on an extension will make it easier to remove the 6 bolts. The oil fitting will use an 8mm open end wrench. Once the 6 bolts and the oil pipe are removed, pull the ball screw assembly out of the bracket, and it will lift up and out the tailstock end.