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Replacing the Mill DRO Slide Screw and Leadscrew Instructions

Replacing the Slide Screw on a DRO Mill

These instructions go over how to replace the slide screw on a DRO mill and reassemble the DRO handwheel housing.

1. Remove the DRO axis cover. All of the DRO information is in the Mill Digital Readout instructions (P/N 8100). Please refer to them (https://sherline.com/wp-content/uploads/2015/11/8100inst_2021.pdf), along with the instructions below.

   A. The DRO cover is a clam shell design. On the bottom side there are (4) self-threading 2-56 screws. Remove these with a small Phillips head screwdriver (see Figure 1).

FIGURE 1—This is the bottom view of the mill.

   B. Position the saddle so it is about 2" (50 mm) away from the end of the base. This will give you room to access all of the screws. Now rotate the handwheel until you see the 10-32 set screw. Loosen the set screw and remove the handwheel (see Figure 2).

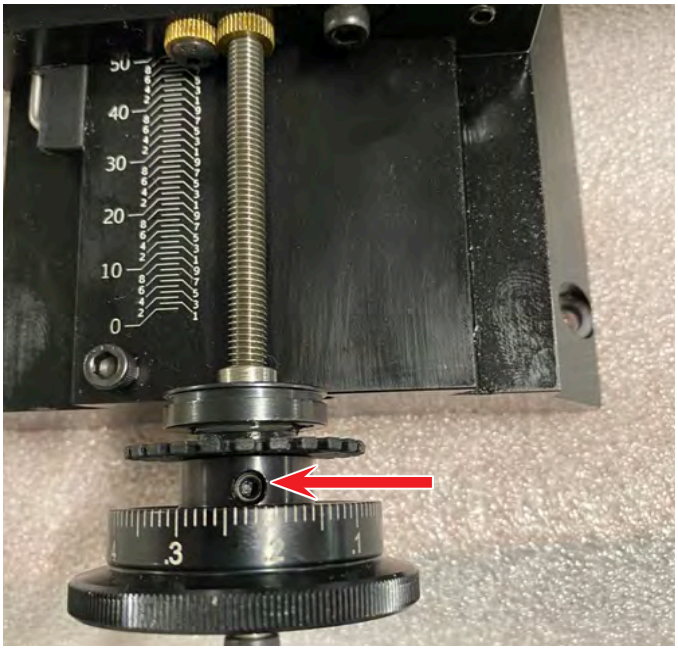

FIGURE 2—Handwheel set screw location.

   C. Once the handwheel is removed, there may be a shim washer (or two). Remove the shim washer (see Figure 3).

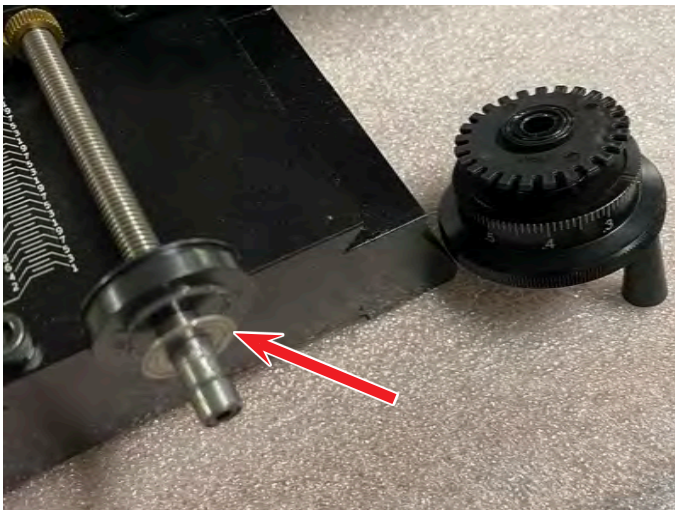

FIGURE 3—Keep the shim washer(s) hand for reassembly.

D. Remove the 8-32 locking screw and the anti-backlash lock (see Figure 4).

NOTE: The 8-32 screw may be tight and the hex in the screw may be shallow (that's how they are made). You want to use a good hex key that is not rounded off on the corners and make sure that it is seated to the full depth of the hex in the screw. You will need a 3/32" hex key.

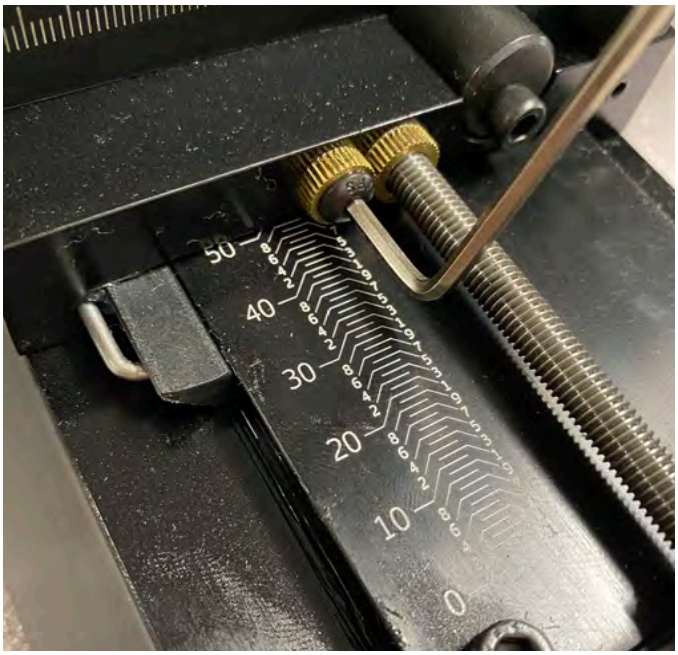

FIGURE 4—Shows the 3/32" hex key seated in the 8-32 locking screw that holds the backlash lock in place.

E. Now thread out the anti-backlash nut away from the saddle. If it is too tight to turn by hand, use a small straight blade screwdriver, insert the tip of the screwdriver into one of the knurl valleys, and lightly tap the end of the screwdriver until the anti-backlash nut turns (see Figure 5).

NOTE: The Y-axis slide screw is a left-hand thread, and the X-axis is a right-hand thread.

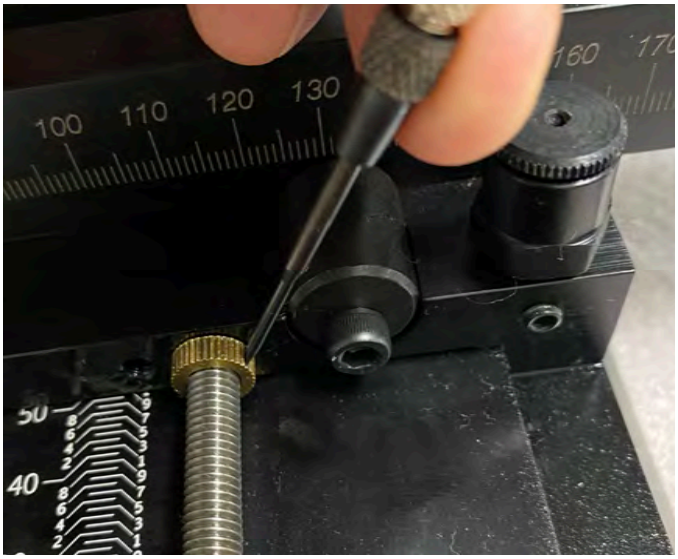

FIGURE 5

F. Using a 3/32" hex key, remove the thrust collar (see Figure 6).

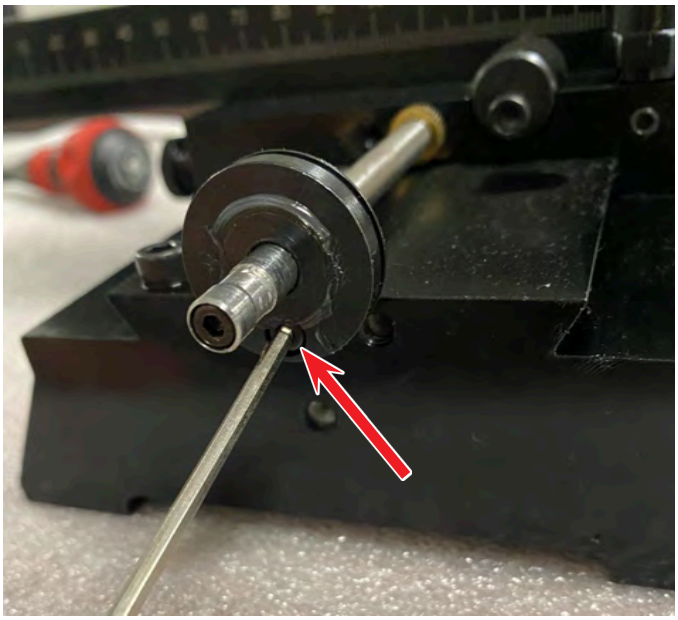

FIGURE 6

G. Unthread the slide screw from the saddle (see Figure 7).

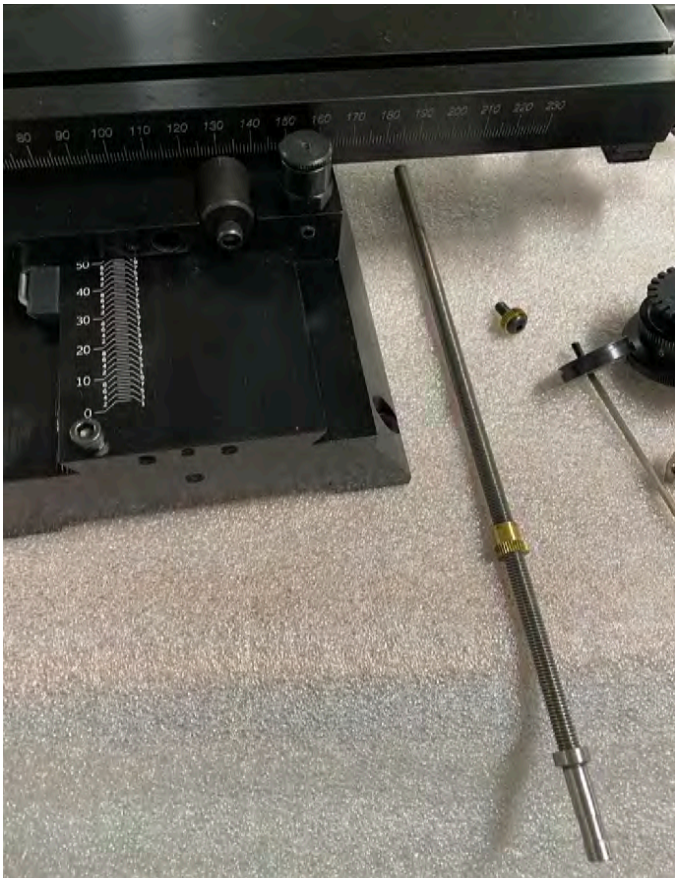

FIGURE 7

H. Remove the anti-backlash nut from the old screw and thread it onto the new screw.

I. Apply some light oil such as "3-in-1 oil," or sewing machine oil, onto the threads of the slide screw.

Then thread the new screw assembly into the saddle. You will also thread the anti-backlash nut into the saddle until the shoulder of the nut is either against the saddle or very close to the saddle (see Figure 8).

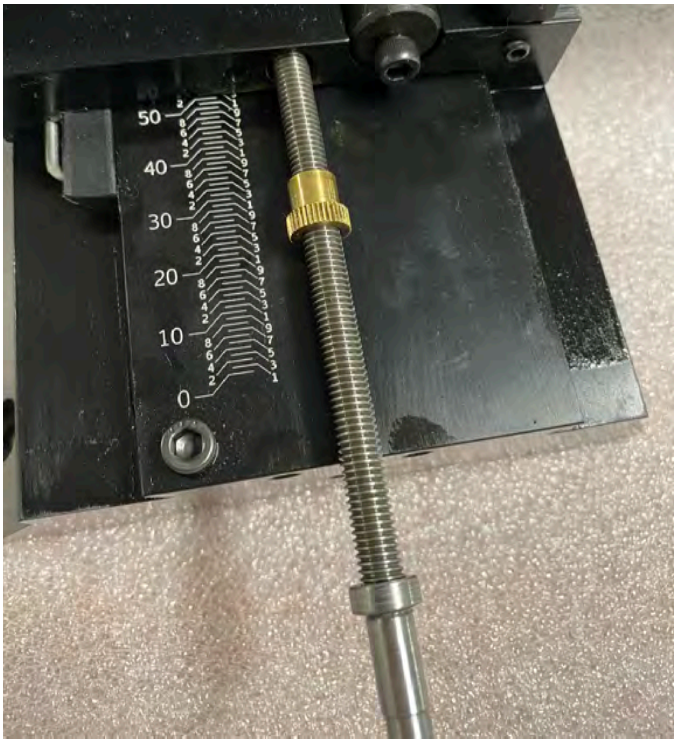

FIGURE 8

J. Now pull the saddle up close to the end of the base (see Figure 9).

NOTE: This is where the saddle needs to be in order to get the proper alignment of the thrust collar.

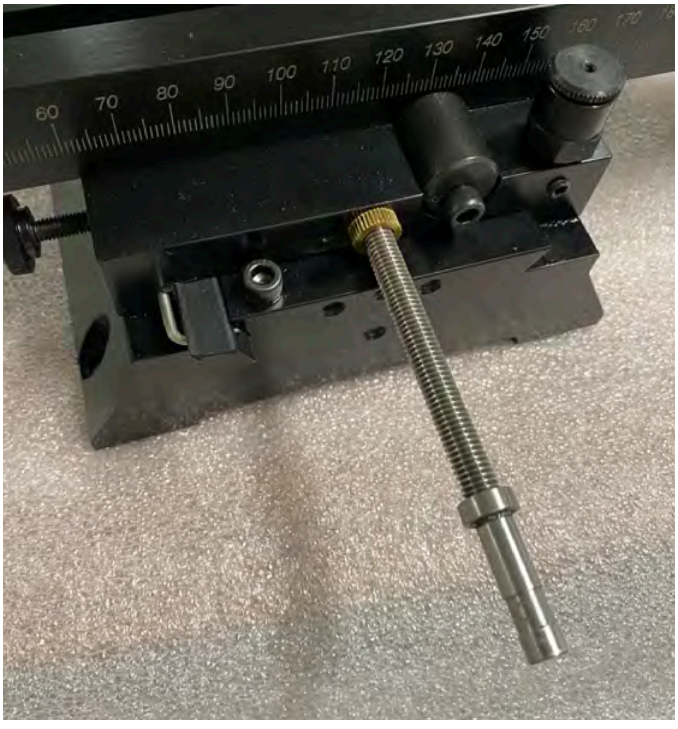

FIGURE 9

K. Place the anti-backlash locking collar next to the anti-backlash lock so the knurls align with each other. Then roll the locking collar down so the center hole aligns with the 8-32 tapped hole in the saddle (see Figure 10).

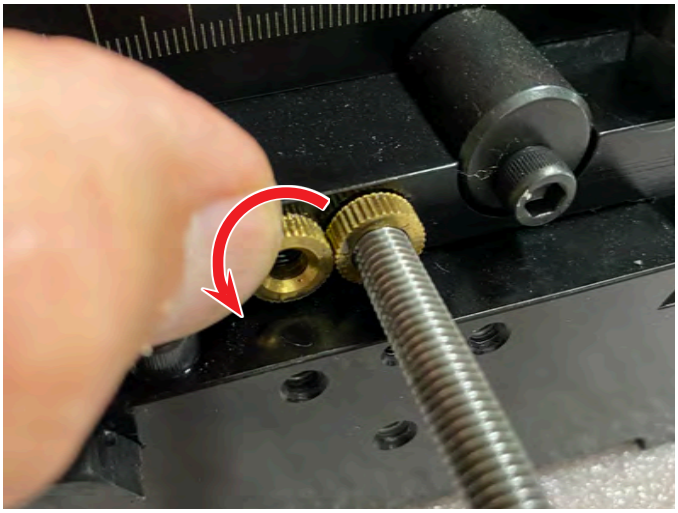

FIGURE 10—After you have aligned the knurls, roll the locking collar down until it aligns with the screw hole.

L. With the locking collar and the nut knurls aligned, insert the 8-32 screw into the locking collar (see Figure 11).

NOTE: The distance between the slide screw hole in the saddle and the 8-32 hole are very close to an "interference fit". This means that when you insert the 8-32 screw into the center hole of the locking collar, the 8-32 screw will rub against the side of the collar hole on the side of the anti-backlash nut. Because of this, the 8-32 screw will have a tendency to go in at a slight angle. Make sure that the 8-32 screw is perpendicular to the saddle when you start threading it in, or you will cross-thread the hole. If the screw starts to bind, don't force it in. Back it out and realign it. Then push the screw slightly toward the slide screw and thread it into the saddle.

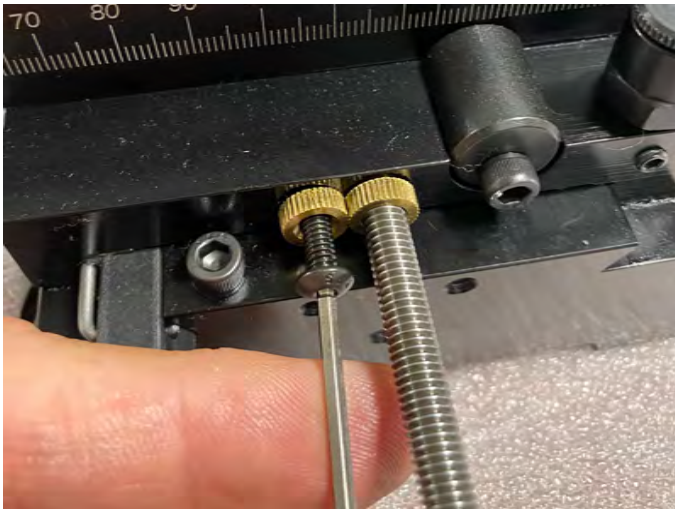

FIGURE 11—Thread the 8-32 screw into the locking collar.

M. Leave a slight gap between the head of the 8-32 locking screw so you can adjust it. Then using a small flat end screw driver tighten the anti-backlash nut (see picture). Once the nut is tight, tighten the 8-32 locking collar screw. This will lock the anti-backlash nut in place so it cannot turn (see Figure 12).

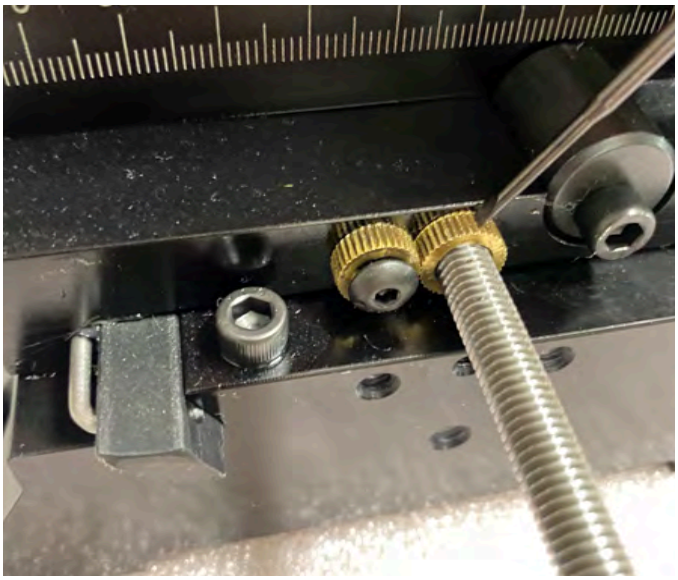

FIGURE 12

N. Use a 3/32" hex key in the end of the slide screw and turn the slide screw in toward the saddle (see Figure 13). The slide screw should turn with a bit of resistance. If it turns easily, tighten the anti-backlash nut a bit more. If it feels a bit too tight, leave the nut set where it is, and the slide screw will wear it in during use.

FIGURE 13

O. Thread the slide screw in until the adapter collar is almost to the end of the base (see Figure 14).

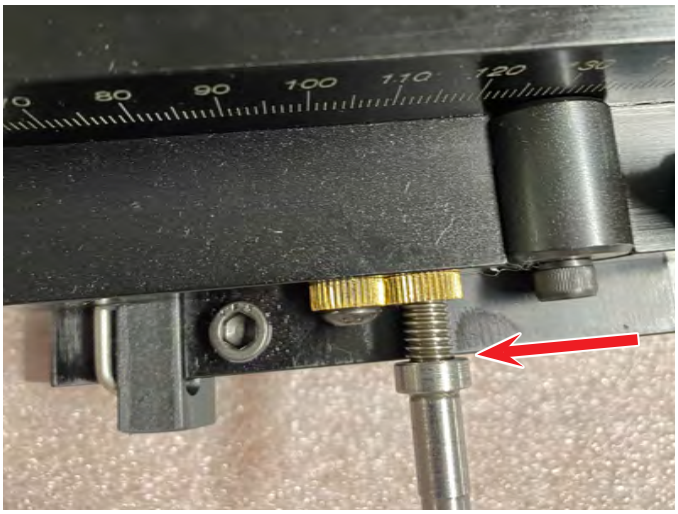

FIGURE 14—The red arrow shows the adapter close to the base.

P. Then push the saddle back a bit until three-quarters of the adapter is extended out past the end of the base (see Figure 15).

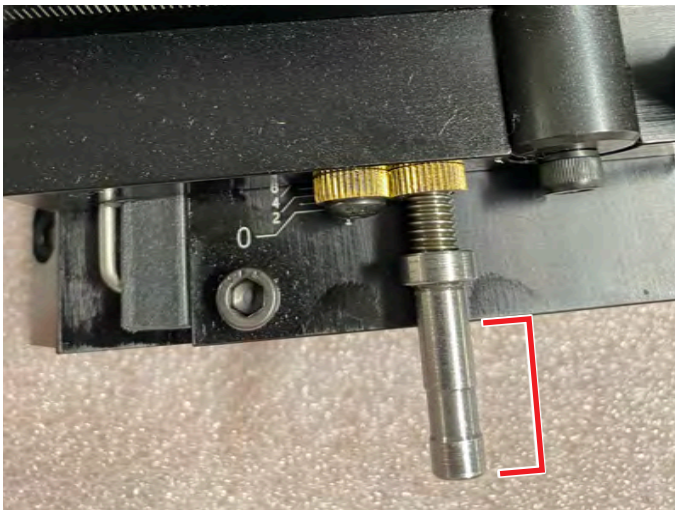

FIGURE 15

Q. Locate the thrust washer on the slide screw adapter with the groove toward the base (see Figure 16).

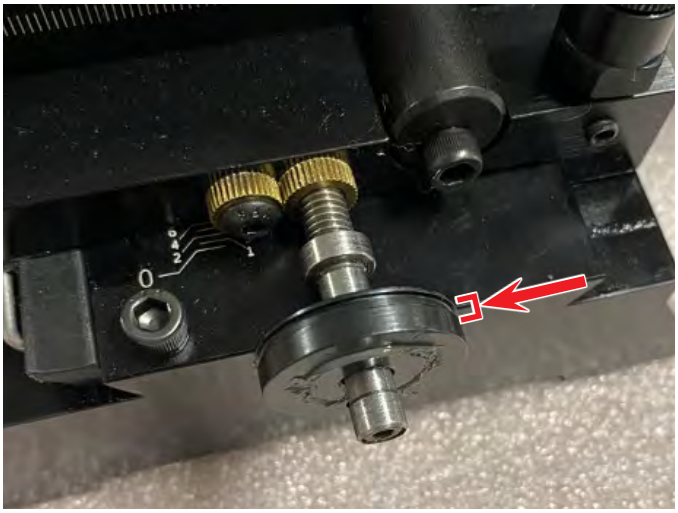

FIGURE 16—The small bracket shows the groove on the thrust collar installed nearest the base.

R. Insert the thrust collar mounting screw and leave it loose. Grab the thrust collar by the sides. You will notice that there is some play. The thrust collar will move from side to side a slight amount. Move the collar so it is in the middle of the play area (see Figure 17).

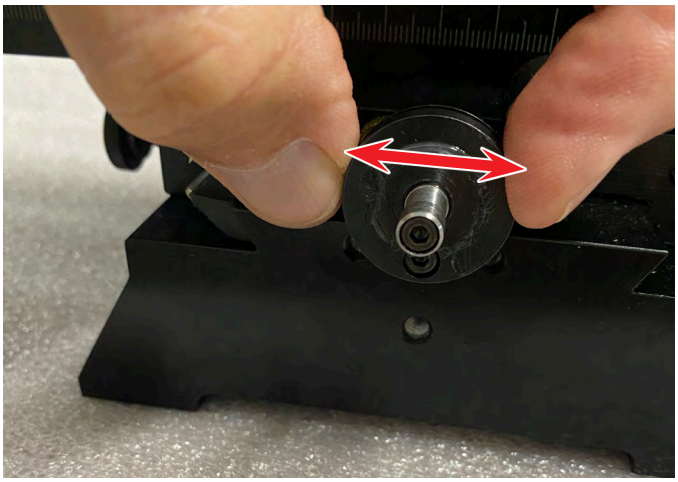

FIGURE 17

S. Once the collar is located in the middle of the play area, hold it in place, and then tighten the mounting screw (see Figure 18).

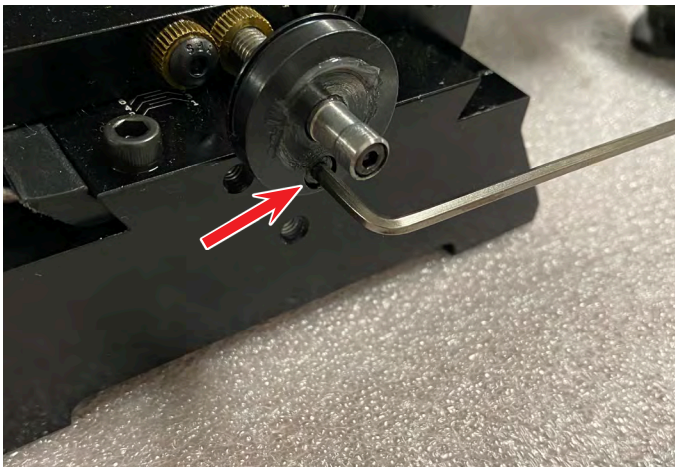

FIGURE 18

T. Place the shim washer back on (see Figure 19).

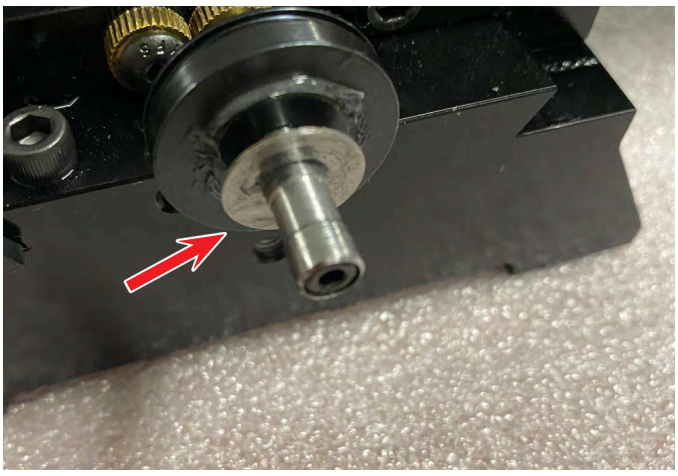

FIGURE 19

U. You will see a slight indent on the screw adapter where the set screw from the handwheel was originally set. Turn the screw so a virgin area of the collar is facing up (see Figure 20).

FIGURE 20—The red circle shows the indent.

V. Now place the handwheel on the adapter with the set screw facing up (see Figure 21).

IMPORTANT NOTE: The thrust collar is sandwiched between the collar of the adapter and the handwheel. In order to get the least amount of backlash in this assembly, you must squeeze the handwheel and the collar against the thrust collar while you are tightening the set screw in the handwheel. To do this, place your thumb on the end of the handwheel and pull the mill table toward the handwheel (like a "C" clamp) and squeeze tight. While you are forcing these parts toward each other, tighten the set screw in the handwheel.

FIGURE 21

W. Now use the handwheel to move the saddle in and out. Check the amount of free play in the handwheel before there is a change of direction in the saddle. You should be able to get the free play (backlash) to .002" (.051 mm) or less.

If you have more than .002" (.051 mm), Tighten the anti-backlash nut a bit more or readjust the handwheel/thrust collar assembly as shown previously (see Figure 22).

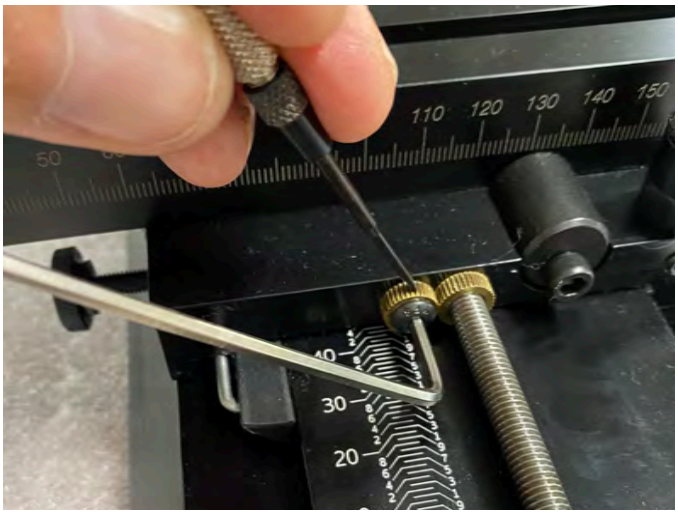

FIGURE 22

2. Assembling the DRO

A. Both the bottom and top half of the DRO housing have a ridge on one side. This ridge goes into the groove on the DRO thrust collar (see Figures 23 and 24).

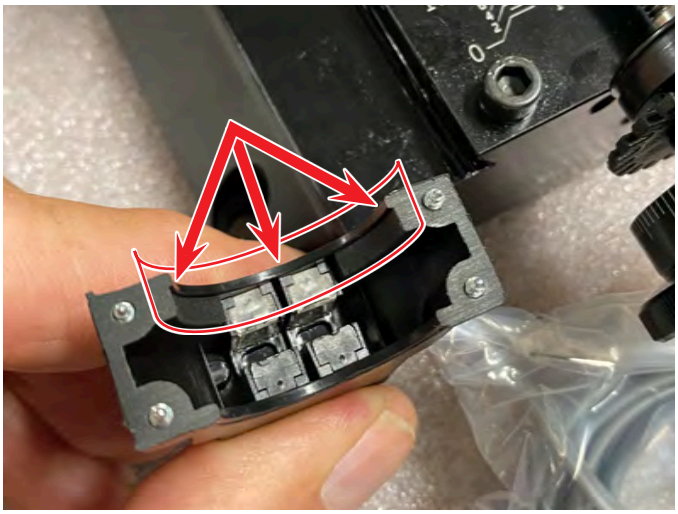

FIGURE 23—Bottom half of the DRO housing.

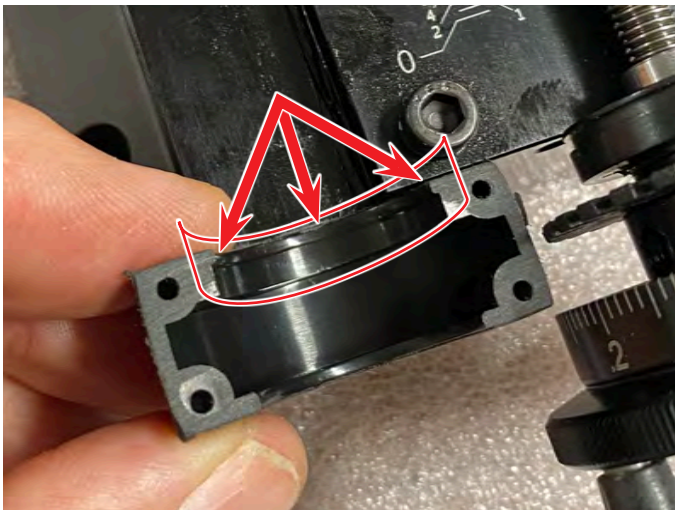

FIGURE 24—Top half of the DRO housing.

B. Take the bottom half and assemble it onto the bottom of the thrust collar with the step in the thrust collar groove. Make sure that the mounting screws are in the bottom half (see Figure 25).

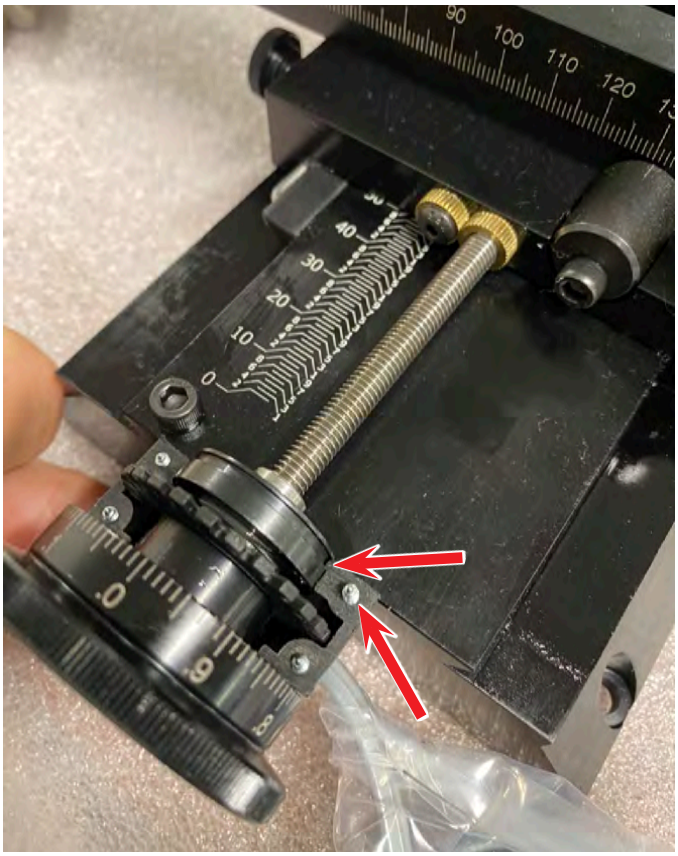

FIGURE 25

C. Place the top half onto the thrust collar with the step in the groove and press both top and bottom halves together (see Figure 26).

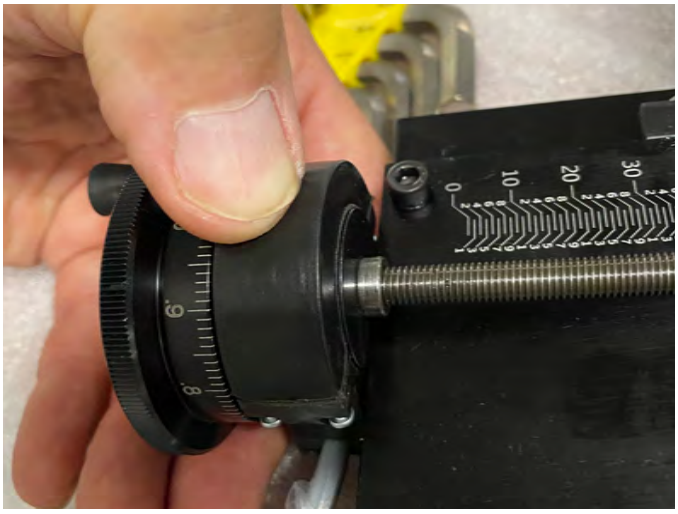

FIGURE 26

D. The (4) mounting screws are self-tapping screws and the DRO housing is plastic. There are already threads in the housing from the initial assembly. Turn the screws CCW until you feel the thread of the screw click into the existing threads in the DRO housing. Then tighten the screws. If you don't align the screw threads with the threads in the housing, you will cross thread the threaded holes in the housing.

NOTE: The housing is plastic. Do not overtighten the screws or you will strip the threads out of the housing. Just tighten them until they are snug.

FIGURE 27—Note the numbers and the rotational arrows:
1: Rotate the screws CCW until the screw threads align with the existing housing threads.
2: Then tighten the screws CW until snug. DO NOT overtighten.

Replacing the Leadscrew on a DRO Mill

These instructions are for replacing the leadscrew on the mill. All of the DRO information is in the DRO instructions. Please refer to these instructions along with the instructions below (https://sherline.com/wp-content/uploads/2015/11/8100inst_2021.pdf).

Removing the Old DRO Leadscrew

1. First move the column saddle down about 2" (50 mm). Remove the DRO axis cover. The DRO cover is a clam shell design. On the bottom side there are (4) self-threading 2-56 screws. Remove these with a small, Phillips head screwdriver (see Figure 28).

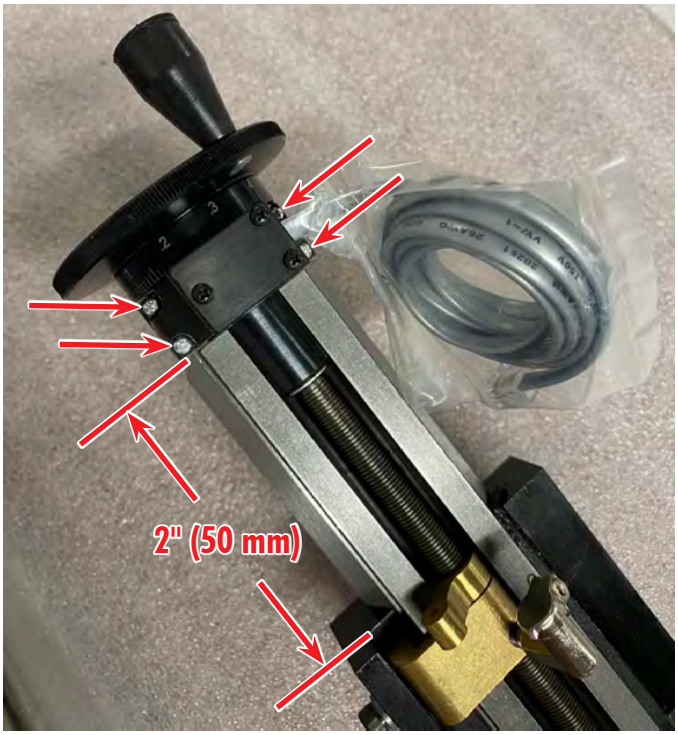

FIGURE 28

2. Remove the 82° screw from the center of the handwheel (see Figure 29).

FIGURE 29

3. Rotate the handwheel to gain access to the 10-32 set screw. Loosen the set screw and remove the handwheel (see Figure 30).

FIGURE 30

4. There may be shim washers on top of the thrust bearing in the leadscrew support. See how many shim washers there are. Remove them and set them aside (see Figure 31).

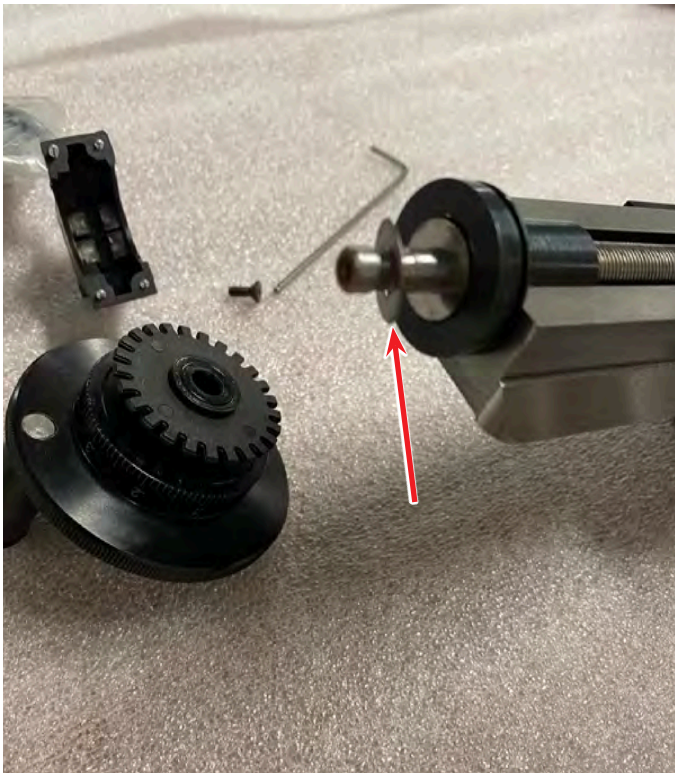

FIGURE 31

5. Remove the 10-32 82° screw from the column bed that holds the column thrust in place. Then remove the column thrust along with all of the shim washers, thrust bearing, and 1/4" washer that is on the bottom of the leadscrew support (see Figure 32).

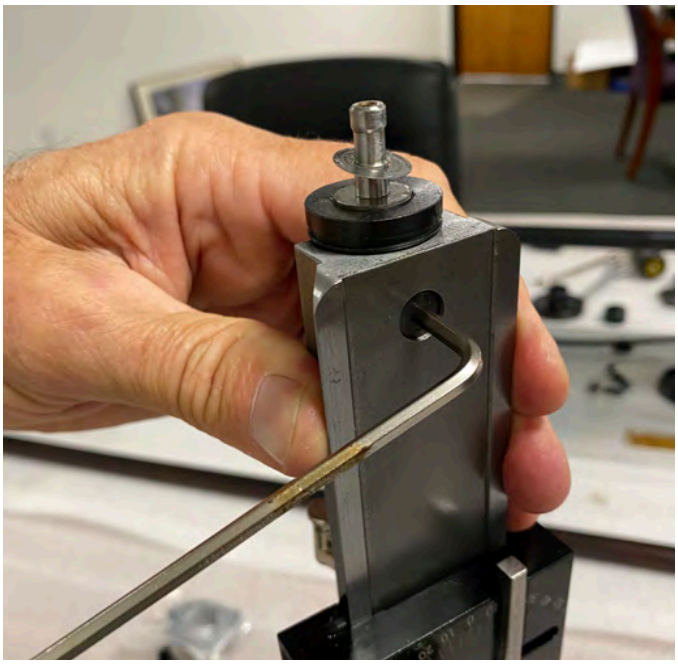

FIGURE 32

6. Column thrust assembly parts: Shim washers, top thrust bearing washer, thrust bearing, bottom thrust bearing washer, column thrust, and 1/4" washer.

   NOTE: This is the order of assembly for all of these parts when you reassemble the machine. This order is critical (see Figure 33).

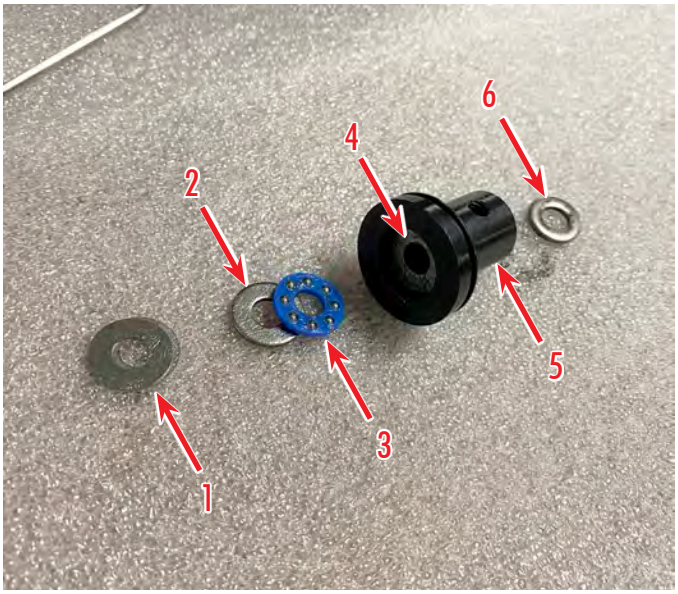

FIGURE 33—(1) Shim washers, (2) top thrust bearing washer, (3) thrust bearing, (4) bottom thrust bearing washer (still in the leadscrew support), (5) column thrust, and (6) 1/4" washer.

7. **VERY IMPORTANT NOTE:**

   DO NOT remove the saddle nut from the column saddle. The saddle nut has been aligned properly in the factory. Leave the saddle nut attached to the column saddle (see Figure 34)!

FIGURE 34—The red oval shows the location of the saddle nut.

8. Unthread the leadscrew all the way out of the saddle nut. This is easier to do with the handwheel on (see Figure 35). Put the handwheel back on the leadscrew and tighten the set screw until it is snug (no need to overtighten).

FIGURE 35

9. When the leadscrew is threaded all the way out of the saddle nut, the saddle nut "lock" will still be attached. Remove the leadscrew and saddle nut lock from the machine (see Figure 36).

FIGURE 36

10. Thread the saddle nut lock off of the leadscrew.

Installing the New Leadscrew

1. Now thread the saddle nut lock onto the new leadscrew. Be sure to have the plain side of the saddle nut lock facing towards the handwheel end of the leadscrew (as shown above. The other side of the lock has the indent hole. This side should be facing away from the handwheel (see Figure 37).

FIGURE 37

2. This part of the assembly is tricky and it needs to be done correctly. The threads in both the saddle nut and

the lock are machined so they align with each other when the saddle nut lock is in the unlocked position.

A. Thread the leadscrew through the lock so there are two or three complete threads showing below the lock (see Figure 38).

FIGURE 38

B. Insert the leadscrew/lock assembly into the cavity in the column bed. With the lock in the unlock position, push the leadscrew down into the top of the saddle nut (see Figure 39).

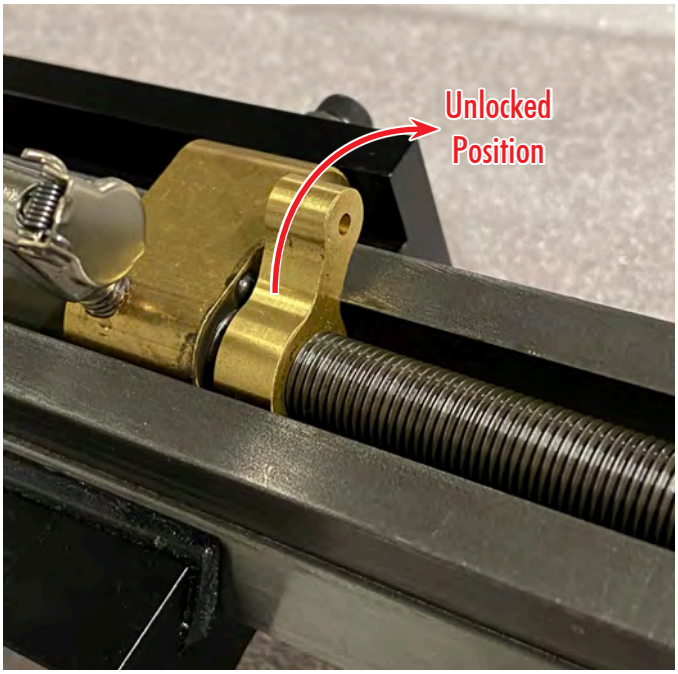

FIGURE 39

C. The leadscrew has a left-hand thread. While holding the leadscrew, so it is perpendicular to the saddle nut (very important), slowly turn the leadscrew CW while holding the saddle lock in place forcing the leadscrew into the saddle nut (see Figure 40).

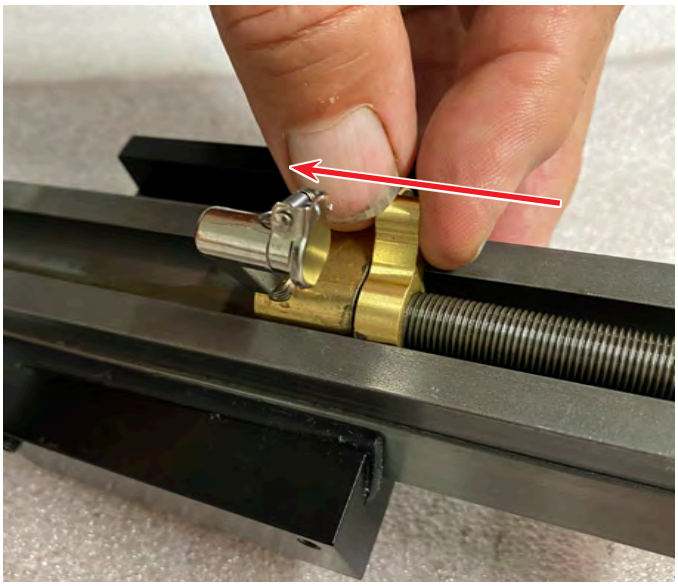

FIGURE 40

D. As you turn the leadscrew clockwise, you will feel the "lead thread" of the leadscrew "click" when it aligns with the "lead thread" of the saddle nut. Continue to turn the lead until the space between the lock and the leadscrew almost disappears. When the space is almost gone, you will feel the lead thread engage with the lead thread of the saddle nut (see Figure 41).

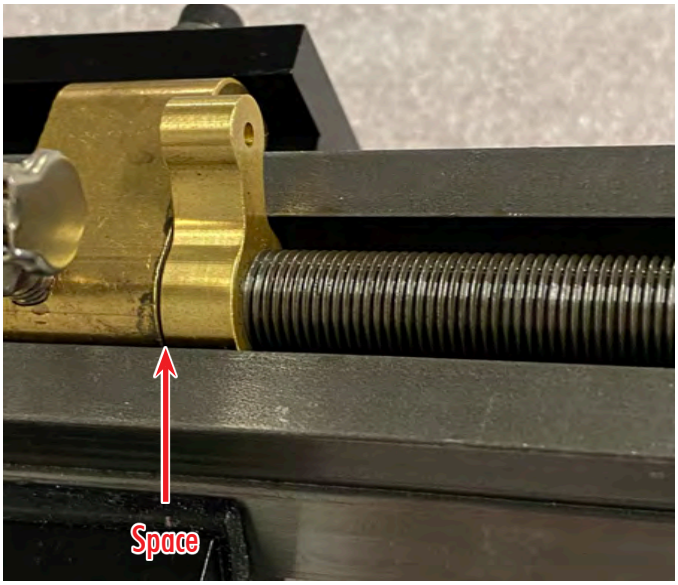

FIGURE 41

E. At this point, begin to turn the leadscrew Counter Clockwise. The leadscrew should begin to thread into the saddle nut. Again, the leadscrew must be perpendicular to the face of the saddle nut, or the leadscrew will try to cross thread the saddle nut. If you feel any resistance repeat this procedure until you feel the lead thread engage with the lead thread of the saddle nut.

3. Once the leadscrew is threaded into the saddle nut, thread the leadscrew in until it protrudes past the bottom end of the saddle nut.

4. Now pull the lock lever towards the center of the leadscrew. If the space between the lock and the saddle nut were correct when the leadscrew began threading into the saddle nut, the lock should bottom out on the top of the saddle nut and lock the leadscrew so it can't turn (see Figure 42).

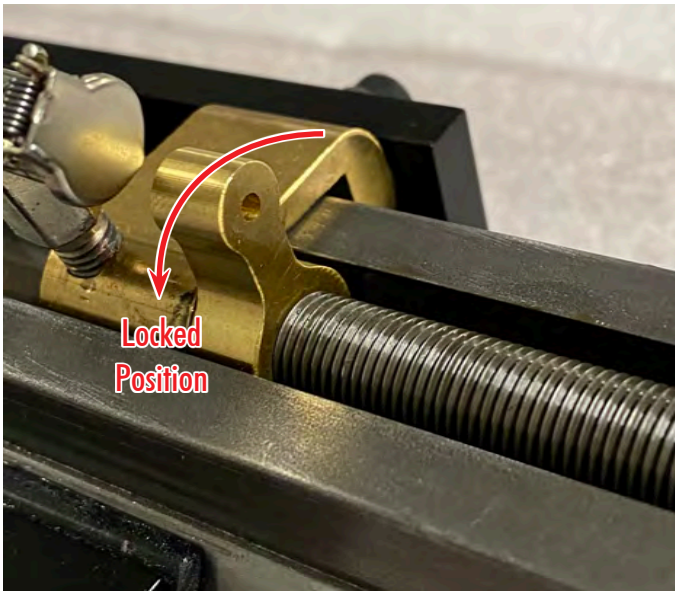

FIGURE 42

5. Move the lock lever to the unlock position. Add some 3-In-One oil (or light sewing machine oil) to the leadscrew and continue to thread the leadscrew into the saddle nut (see Figure 43).

FIGURE 43

Reinstalling the DRO Handwheel

1. Thread the leadscrew down until the threaded area at the shaft is about 1" (25 mm) below the end of the column bed. Place the 1/4" washer on the leadscrew shaft (see Figure 44).

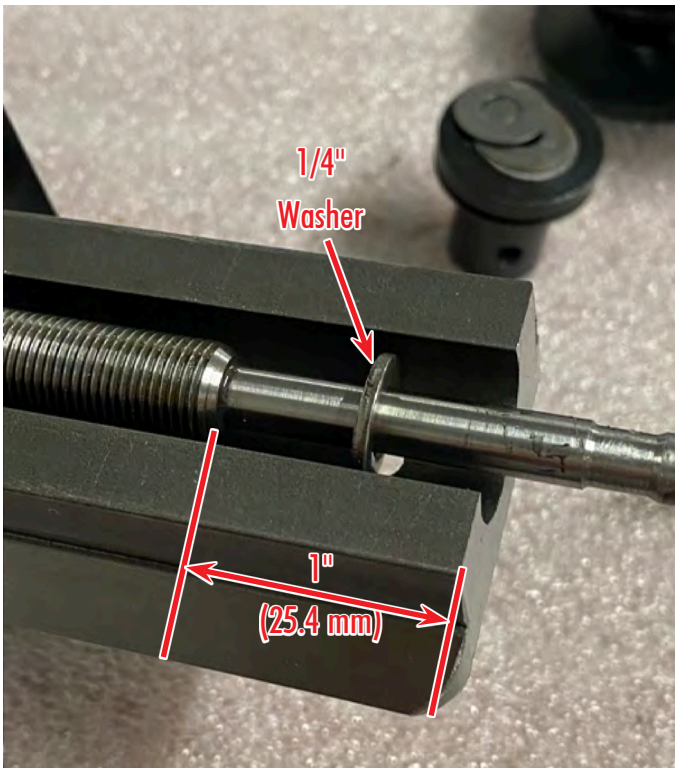

FIGURE 44

2. Now insert the rest of the column thrust assembly onto the leadscrew shaft and into the column bed (see Figure 45).

FIGURE 45

3. Turn the column thrust body until the 10-32 hole aligns with the 82° hole in the column bed (see Figure 46).

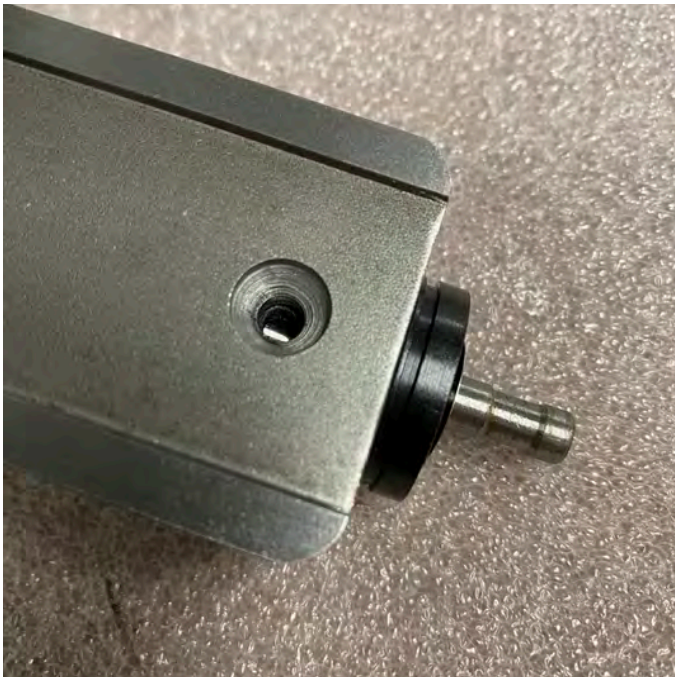

FIGURE 46

4. Thread in the 10-32 82° screw to lock the column thrust in place (see Figure 47).

FIGURE 47—The 10-32 82° screw is now in place.

5. The handwheel, column thrust, and leadscrew assembly works the same way as the slide screw assembly. All of these parts are sandwiched between the leadscrew thread shoulder and the handwheel. Pull the column saddle towards the column thrust so the 1/4" washer is pressed hard against the column thrust. Now place the handwheel onto the leadscrew shaft with the set screw facing up. Pull the handwheel and the column saddle towards each other (see Figure 48).

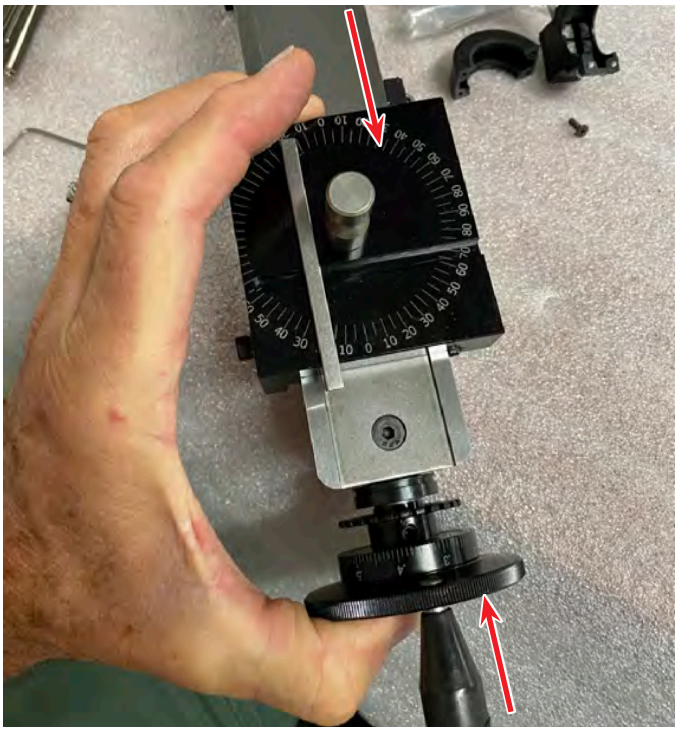

FIGURE 48

6. Now tighten the set screw in the handwheel (see Figure 49).

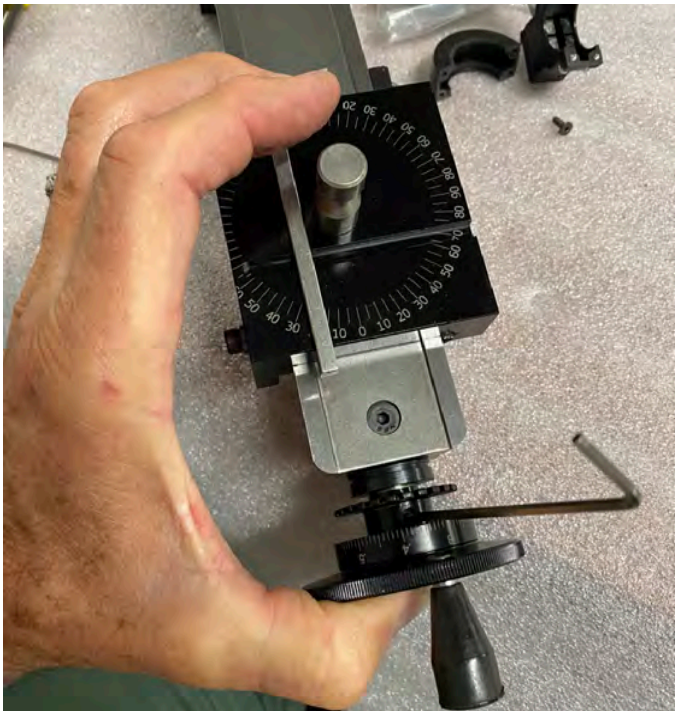

FIGURE 49

7. With the set screw tightened, turn the handwheel CW and CCW to see how much backlash there is before the column saddle changes direction. You should have .002" (.051 mm) or less if the assembly is correct.

8. Move the saddle lock lever back to the unlocked position. Now insert and tighten the center screw in the top of the handwheel. This screw should just be snug (see Figure 50).

NOTE: If you over tighten this screw, it will compress the column thrust assembly parts even more and may result in too much compression of these parts. After you have tightened the center screw, turn the handwheel CW and CCW and feel for increased resistance. If this screw is too tight, the handwheel will be hard to turn. If so, back out the center screw a bit. If it doesn't loosen up, you will need to remove the center screw and do the previous steps, 5 and 6 again (Figures 48 and 49 repsectively).

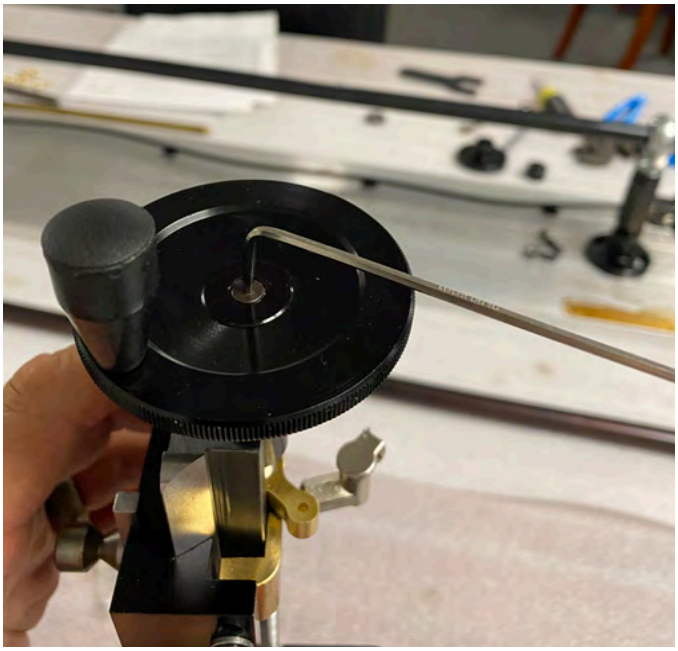

FIGURE 50

9. Insert the top half of the DRO housing on the front side of the column bed making sure that the lip side of the housing is inserted into the groove on the column thrust (see Figures 51 and 52).

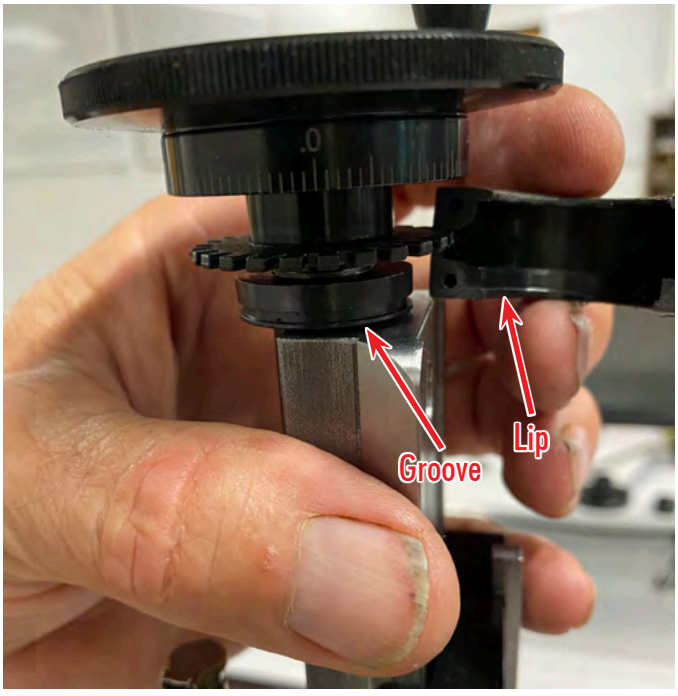

FIGURE 51

FIGURE 52

10. Insert the bottom half of the DRO housing on the backside of the column bed, again, with the lip in the column thrust groove (see Figures 53 and 54).

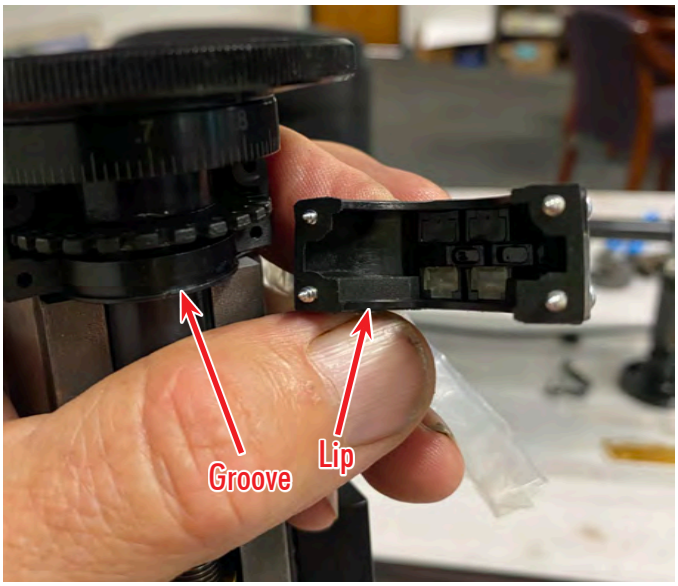

FIGURE 53

FIGURE 54

11. The (4) mounting screws are self-tapping screws and the DRO housing is plastic. There are already threads in the housing from the initial assembly. Turn the screws CCW until you feel the thread of the screw click into the existing threads in the DRO housing. Then tighten the screws. If you don't align the screw threads with the threads in the housing, you will cross thread the threaded holes in the housing. Before you tighten the screw, rotate the housing so the bottom of the housing is facing straight back from the backside of the bed (see Figure 55).

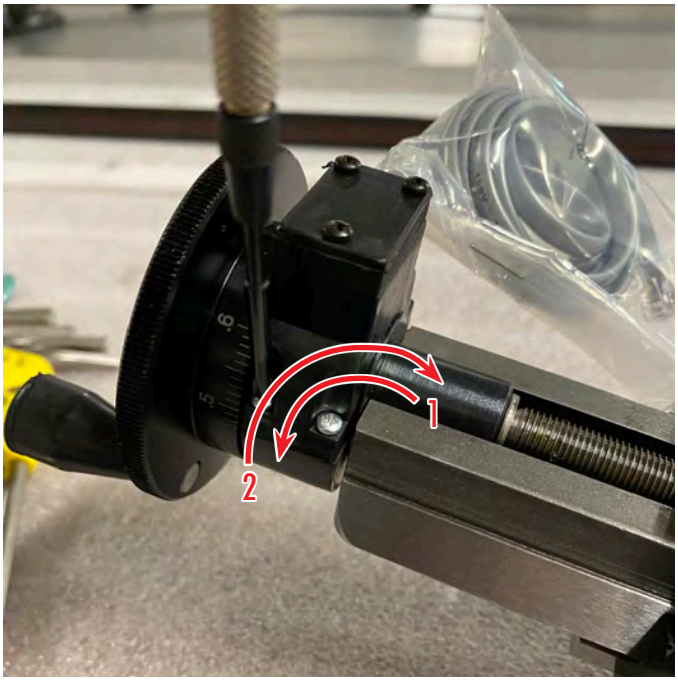

*FIGURE 55—**NOTE:** The housing is plastic. Do not overtighten the screws or you will strip the threads out of the housing. Just tighten them until they are snug.*

Thank you,
Sherline Products Inc.