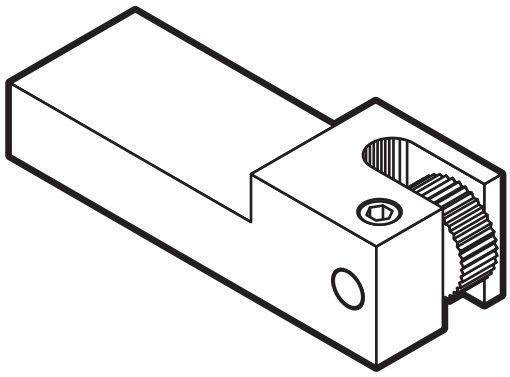


VIDEO INSTRUCTIONS AVAILABLE
For Bump Knurl Tool Holder setup and demonstration, please visit our YouTube channel at https://youtu.be/KFQS9A50CgU

SHERLINE PRODUCTS
INCORPORATED 1974

Bump Knurl Tool Holder

P/N 2275

About the Bump Knurl Tool Holder

Our bump knurl holder was designed primarily so customers who have CNC machines could add a knurling operation to their program. This style of holder is the same style that is used on full-sized CNC machines. It is held in position using the 3/8" Insert Holder Tool Post (P/N 7600, not included).

The knurling process exerts a lot of force on the part and also on the machine (or holding device).

Because our machine is a scaled down version of a full-size machine, our machine and holding accessories are not capable of withstanding the same forces that a full-size machine is capable of. Because of this, there are limitations to the knurl size and method of holding your part.

Knurl size: Knurls from 40 TPI (threads per inch) and higher will work well on our machine. Courser knurls from 32 TPI and lower will not work well.

Knurl types: Straight knurls will work the best; however angled knurls will also work. In order to get a diamond pattern you will need to use a "Male" diamond knurl. The "Female" diamond knurl will not work, due to the force needed to push the material outward into the cavities of the female knurl.

Part holding methods: For best results when holding your stock in a collet or a chuck, use a collet that will allow you to feed the stock through the center of the collet, or hold the stock in a chuck using the full face of the chuck jaws with the stock going past the jaws and into the chuck body and/or spindle (see Figure 1). In general, this means that your stock diameter will not exceed 3/8" on our standard headstock spindle and 1/2" on our 3C headstock spindle.

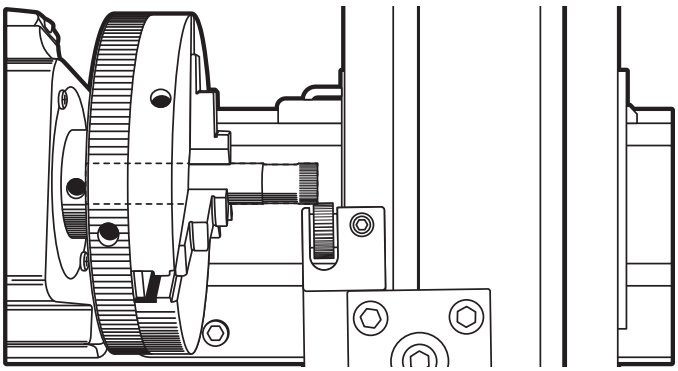


FIGURE 1—The dashed line indicates the stock passing into the chuck body.

On long parts where the knurl is in the middle of the part, the part should be supported on the end with a live center. The same rules that apply to turning long stock apply to knurling long stock.

Spindle RPM: All knurling operations are done at slow spindle speeds of 500 RPM or less, while applying cutting fluid liberally. On a manual machine, or when setting up a knurling operation on a CNC machine, the first engagement of the knurl with the part is done by turning the spindle by hand (not with the motor on).

Correct Stock Diameter prior to knurling: When cutting a knurl, you need to have the correct diameter on your part. This will ensure a good clean knurl that does not "double track." If the diameter is not correct, then the circumference of the surface to be knurled will be too long or too short. A 40 TPI knurl would leave 40 indentations on a line that was 1" long. If you are using a knurl, and your diameter is correct when the knurl makes the last indentation on the part and it is going to cut into the first indentation, the spacing between the last indentation and the first will be such that the next peak on the knurl will line up with the first indentation. If the diameter is too big, or too small, then the next peak on the knurl will not align with the first indentation. It will either make a new indentation before, or after the first indentation. This will cause a double knurl; therefore, a 40 TPI knurl will become an 80 TPI knurl. There isn't an exact formula to calculate the correct part diameter for a specific knurl because you would be calculating a diameter for the final depth of the peaks of the knurl. This would assume that you were creating a 100% knurl form where the material has been forced out and up onto the valley of the knurl to fill it 100%. It is virtually impossible to get 100% knurl form. Additionally, a 100% knurl form may not be desired depending on the purpose of the knurl. Therefore, to solve this problem, you either increase or decrease the part diameter slightly until the knurl stops double tracking. This is also another reason that you want to turn the spindle by hand when you first engage the knurl with the part. When the knurl depth is just deep enough to indent the part, you can turn the spindle by hand until it gets back to the first indentation. Then you can see if the knurl is lining up with the first indentations when it begins the second revolution of the part.

Flex in the part: Depending on how far your knurled surface is from the front of the chuck or collet, you are going to get

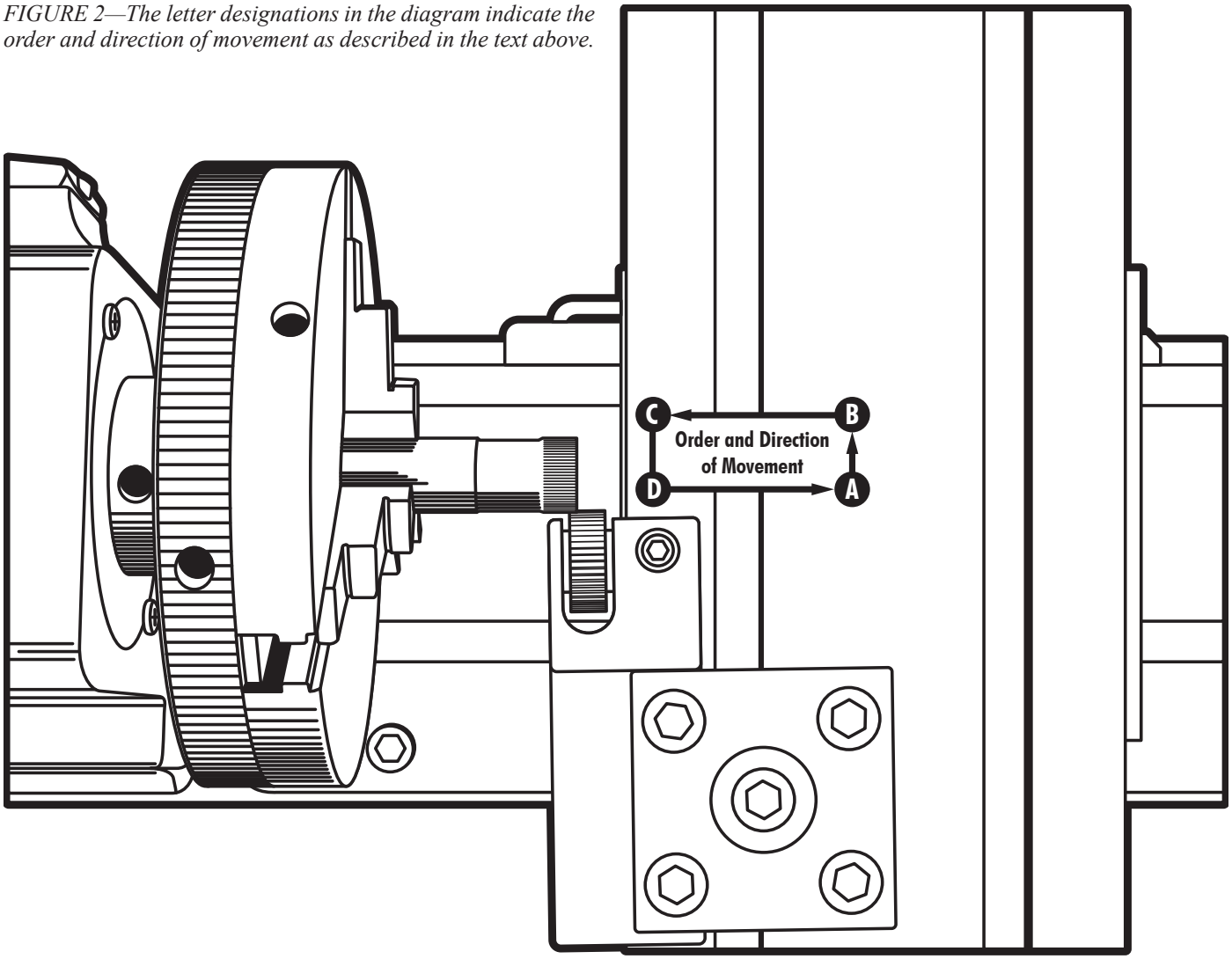
more or less part flex from the knurling operation. If you want a consistent knurl depth on your part, you may need to cock the knurl holder off at an angle to compensate for the flexing of the part.

NOTES:

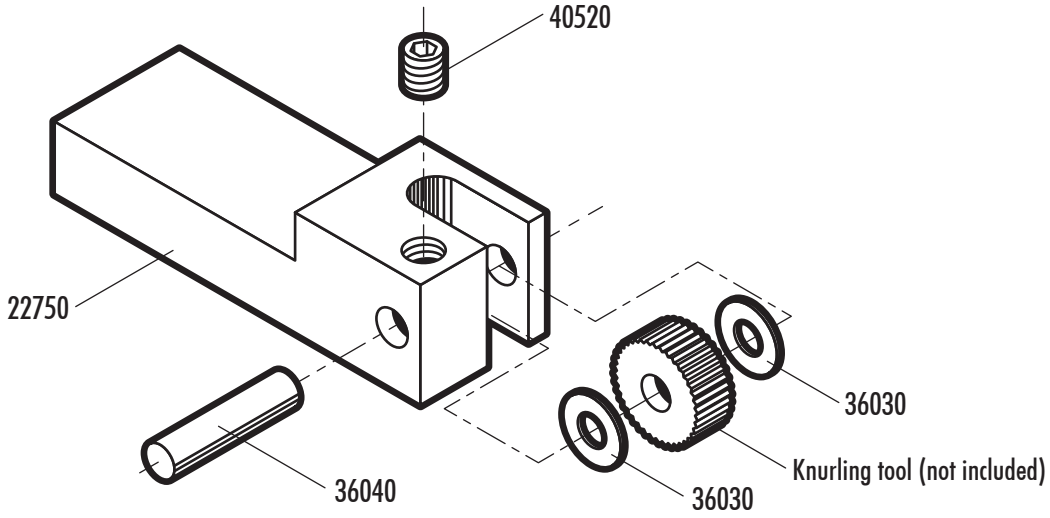
1. Larger stock can be held and knurled. However, larger diameter parts that are held with the chuck jaws reversed, using the steps on the chuck jaws will likely "walk their way out of the chuck" when the side force of the knurling operation is exerted on the part. The same holds true for collet work where the stock is only held by 1/4" or less. The stock needs to be held firmly in order to not move when the knurling force is exerted.
2. When attempting to knurl larger diameters using a method of "small in feeds," followed by "side feeds" tends to work best (see Figure 2).
   A. Position your knurl so the lead edge is past the front of the surface to be knurled by about .020".
   B. Now feed the knurl into the side of the part until the knurl makes contact with the outside of the part. Now move the knurl in .002 - .003". At this point, the knurl will begin to make indentations on the surface to be knurled and the knurl tool will begin to turn and track in these indentations.
   C. Now you can feed the knurl sideways in the Z-axis until you reach the desired length of the entire knurled surface.
   D. Then feed the knurl back out in the Z-axis until you reach the original .020" overlap where you started. Continue this cycle of feeding into the side of the part by .002 -.003", then feeding to the final length sideways, and then backing out until you reach your final depth for your knurled surface. Feeding the knurl sideways on successive passes exerts less force on the part than direct in-feed from the side. The shallow depth of cut will keep the lead edge of the knurl from digging into the material. As long as you do not move the knurl away from the lead edge of the knurl between passes, the knurl will remain engaged with the indentations and you will not get a "cross knurl" or "double knurl" where the knurling tool begins a new knurl pattern in between the original pattern.

Thank you,
Sherline Products Inc.

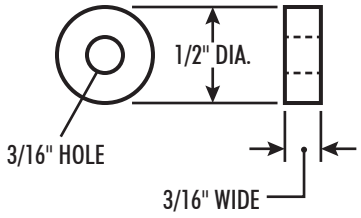
FIGURE 2—The letter designations in the diagram indicate the order and direction of movement as described in the text above.



Exploded View



Knurl Specifications



Parts List

NO. REQ.	PART NO.	DESCRIPTION
1	22750	Bump Knurl Holder Body
2	36030	.030" Washer
1	36040	3/16" x 3/4" Steel Dowel Pin
1	40520	10-32 x 3/16" Cup Point Set Screw
1		Knurling Tool (not included)

Optional Circular Pitch Knurls

TPI = Threads per inch, T = Teeth on the knurl

Straight Tooth Knurls			
Part Number	Tooth Angle	TPI/T	Qty.
3618A	90°	40 TPI/63T	1
3619A	90°	41 TPI/65T	1
3620A	90°	47 TPI/73T	1
3622A	70°	50 TPI/70T	1
3623A	70°	53 TPI/83T	1
3624A	70°	60 TPI/94T	1
3625A	70°	60 TPI/109T	1
3626A	70°	80 TPI/125T	1

Spiral Tooth Knurls			
Part Number	Tooth Angle	TPI/T	Qty.
3609L	90°	40 TPI/55T	1
3609R	90°	40 TPI/55T	1
3610L	70°	50 TPI/68T	1
3610R	70°	50 TPI/68T	1
3611L	70°	80 TPI/107T	1
3611R	70°	80 TPI/107T	1

Male Diamond Tooth Knurl			
Part Number	Tooth Angle	TPI	Qty.
3627	90°	25 TPI/30° Helix	1

Approximate Increase in Knurled Diameters			
TPI	Tooth Angle	Straight	Diagonal
40	90°	.009	.009
40	70°	.012	.010
50	70°	.009	.009
60	70°	.007	.007
70	70°	.006	.006
80	70°	.005	.005