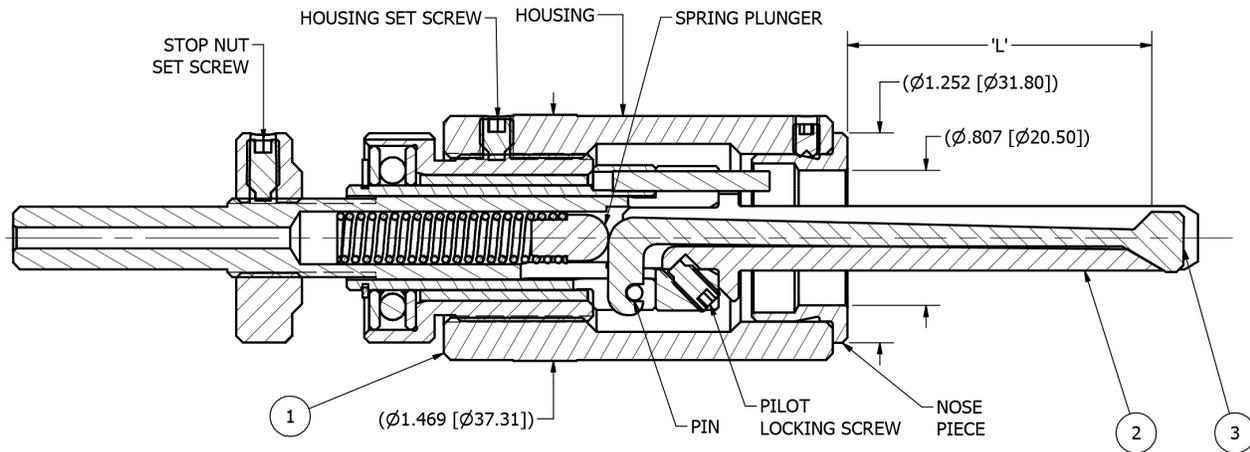


# ELLIOTT BACK CHAMFERING UNIT

## INSTALLATION AND OPERATING INSTRUCTIONS

PARTS LIST		
ITEM	QTY	DESCRIPTION
1	1	BCU OPERATING HEAD
2	1	BCU PILOT
3	1	BCU CUTTER



### To assemble (or remove) the cutters and pilots:

Loosen the housing set screw with a 2.5 mm hex key and unscrew the housing completely off the assembly.

Visually locate the pin that the cutter will hook into on the assembly. See link to video below for more help.

Use a 2 mm hex key and back out the pilot clamp screw so that it's just flush with the ID to give maximum space so the cutter can fit into bore.

Take the cutter and line up the hook to the pin and insert the cutter into the bore, compressing the spring plunger and swinging it in, in a circular motion, to hook it under the pin. You may need a thick pad or gloves with a leather palm to protect yourself from injury from the end of the cutter while inserting the cutter. Keep the bearing assembly from moving with a firm grip or tighten up the stop nut against the back of the bearing assembly.

Insert the pilot in the bore and tighten the set screw with a 2 mm hex key. Thread the housing back on and follow the procedures listed for each machine type to set the location and size of the chamfer.

Reverse the above procedure to replace the cutter or pilot.

Please see this link for video of assembly and removal: <http://monaghantooling.com/precision-metal-finishing/back-chamfering/>

### Operating Instructions:

Pilots are made to order (based on the bore's diameter), so the bore needs to be accurately machined for consistent chamfer sizes.

Too small, and the pilot may bind in the bore during operation causing catastrophic damage. Too large, and the pilot will deflect causing inconsistent chamfers and possible damage to the pilot from flexing too much. Please consult the factory for the proper bore size for your specific application.

### Use the chart below for cutting data:

Part Material	Cutting Speed	Cutting feed rate
Aluminum	100-150 SFM	0.006-0.012 Inch/rev
	30-45 M/min	0.15-0.30 mm/rev
Cast Iron	50-100 SFM	0.006-0.012 Inch/rev
	15-30 M/min	0.15-0.30 mm/rev
Soft & mild steels	30-80 SFM	0.006-0.012 Inch/rev
	10-25 M/min	0.15-0.30 mm/rev
Hardened steels, stainless & aerospace	10-30 SFM	0.006-0.012 Inch/rev
	3-10 M/min	0.15-0.30 mm/rev

### Setting Chamfer Position:

Take a fully assembled BCU and use a 2.5 mm hex key wrench loosen the housing set screw. Thread the housing in or out until the desired "L" length is achieved. Use a scale, caliper, or the actual part for reference and then tighten the set screw.

If using a stop on a fixture, then the distance would be from the stop and not the top of the part. This length may need to be adjusted after test cutting a part.

**Setting Chamfer Diameter:**

The size of the chamfer is a function of how far the BCU is fed forward. Setting the chamfer size is different depending on what type of machine you are using to chamfer the parts. See below for the different methods.

**CNC Machine** – The stop nut is not used for this type of operation and may be adjusted all the way back. Use a 2.5 mm hex key to loosen the locking set screw. Do not remove this nut, as it will make it more difficult to change the cutters. Confirm that the nut will not touch the housing during operation or the BCU may be damaged. The first 0.020”-0.030” (0.508-0.762 mm) amount of stroke will bring the cutter flush with the pilot diameter.

Use this formula to determine amount of stroke required to chamfer to a specific diameter. For every 0.001” (0.025 mm) of forward motion, the cutter will cut 0.0012” (0.030 mm) in diameter or 1.2x forward movement. Max chamfer diameter depends on the bore size and cutter/pilot used. Consult factory for more exact values if required.

Example: Nominal bore size 0.500” (12.7 mm) diameter.  
 Desired chamfer size 0.590” x 45 Deg (14.986 mm x 45 deg).  
 Lift required =  $\emptyset 0.590 - \emptyset 0.50 = .090$ ” (2.29 mm) x 1.20 = 0.108” (2.74 mm) + 0.030” (0.76 mm) = 0.138” (3.51 mm) required stroke.

If the chamfer is too small, the size can be changed in two different ways: one is to stroke out farther.

Or, if at max lift, adjust the “L” length to get the correct chamfer by decreasing the “L” length (moving the housing forward) relative to the cutter position. Use the graduated marks on the housing body to help dial in this position.

The “+” direction will increase the length and the “-” will decrease the length. One revolution is 1.25 mm (0.049”) depth. Each division is 0.063 mm (0.0025”) or each division marked in 10 increments equals 0.25 mm (0.010”).

**Manual machine (drill press, etc.)** – To set the chamfer size when using a non CNC machine, the stop nut should be used. The farther the nut is away from the housing, the larger the chamfer will be.

First, use a 2.5 mm hex key to loosen the set screw on the housing body. Using a scale, caliper, or part, adjust the housing so the depth of the cutter will be in the correct location.

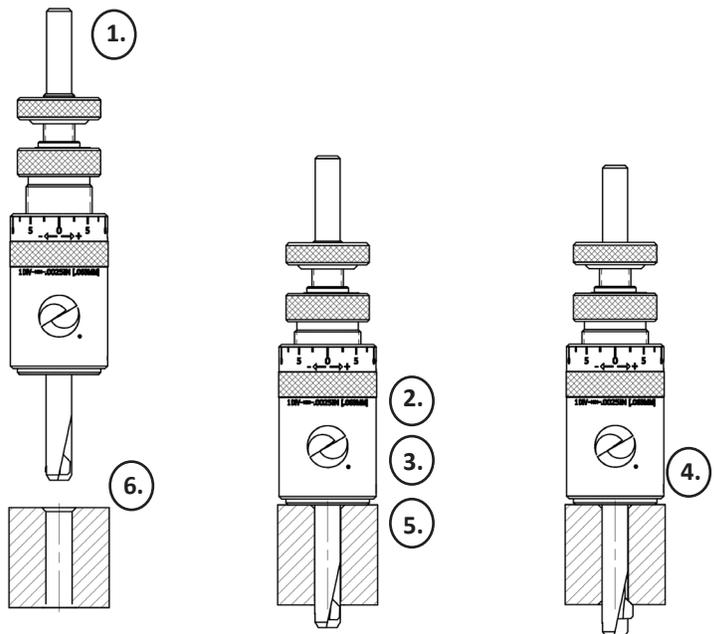
Using a 2.5 mm hex key, loosen the stop nut and thread towards the housing, stopping at a distance about equal to the size of the chamfer required.

Be sure to tighten all of the set screws and then cut a test part. Determine if the chamfer is the correct size. If too small, then adjust the stop nut back away from the housing. If the chamfer size will not get any bigger, then the housing was adjusted too far. See CNC instructions on how to adjust the “L” length position. Reset the stop nut location and re-cut a part.

Once the proper housing location and stop nut location have been determined, check the set screws on the housing and stop nut to prevent movement. DO NOT overtighten them!

**Operating Procedure**

1. With spindle turning clockwise at the recommended RPM from cutting data chart, rapid advance so tip of pilot is about 0.100” (3 mm) from top of actuation surface.
2. Turn on coolant and feed slowly into bore until nose piece is within 0.010”-0.030” (0.25-0.75 mm) of the actuation surface.
3. Feed at the recommended feedrate until nose piece just touches the actuation surface.
4. Continue to feed at recommended feed to the desired chamfer size depth or if using a manual machine until the stop nut bottoms out against the housing.
5. Dwell for 2-3 seconds and then retract at a feedrate 3 times the in-feed to the position in step 3 above.
6. Slowly back out tool until pilot tip is about 0.100” (3 mm) from actuation surface.
7. Move to next bore or make a tool change for machining next feature.



For additional technical support:

