Diamond burnishing tools

For producing low microinch finishes on shafts or faces of any diameter, or on large bores.

- *Four designs allow use on most turning machines, manual or CNC*
- *Replaceable, polished diamond insert*
- *Adjustable for optimum burnishing pressure*

Cogsdill Diamond Burnishing Tools are simple, efficient tools designed to produce mirror-like finishes on a wide range of ferrous and non-ferrous part surfaces on most turning machines.

Set up and cycle times are short, even for unskilled operators. In all cases, the replaceable diamond insert can be changed quickly; on some models without removing the tool holder from the machine.

Four tool designs to suit your application requirements:

- **DB-1** For general purpose machining
- **DB-2** For use where work length is restricted
- **DB-3** and **DB-4** For use on CNC machining centers – the tool holders are offset so that the diamond insert is on center

The Cogsdill Diamond Burnishing Tool is designed to produce high quality, low microinch burnished finishes on shafts, large bores, and faces. With most metals, a turned or ground part with a properly prepared 80 to 100 microinch finish can be burnished to a 4 to 8 microinch finish in seconds. Cast iron can usually be burnished to an 8 to 15 microinch finish.

Cogsdill Diamond Burnishing Tools can burnish virtually any size stock; from carbon steels to tool steels, cast iron to alloys, and most ferrous and non-ferrous metals. The premium quality diamond burnishing insert is polished and contoured to provide superior finishes and excellent tool life.

Since set up and operation is relatively simple, no special operator skills are required. Diamond Burnishing Tools are versatile . . . various models are designed for use in the tool post of a manual lathe, automatic, or in CNC equipment. The tools can be used on both large and small diameters, and are ideal for short production runs. The Diamond Burnishing Tool can produce quality finishes on interrupted surfaces, such as a shaft with a keyway or the face of a flange having a series of bolt holes.

While the tool must be used with coolant, no special coolant is required. Straight oils, soluble oils, and synthetic coolants can be used to provide the necessary lubrication.

Replaceable diamond insert is polished and contoured for superior finishes and long tool life.

diamond burnishing tools

How it works

The Cogsdill Diamond Burnishing Tool is mounted in the tool post of the desired machine. The diamond burnishing point is brought into contact with the workpiece at the centerline of the part and perpendicular to the surface being finished. The tool is then fed into the workpiece an additional .002 or .003 inch (.05 or .08mm) to allow the diamond insert to become disengaged from the stop in the holder. The spring, with its preload, forces the diamond against the workpiece. The tool is then fed along the surface of the rotating workpiece to produce a mirrorlike finish.

As a recommended starting point the adjusting screw should be tightened (turn clockwise) until all clearance between the push rod and the spring is removed. Then tighten the screw another 1 to 2 turns which will compress the spring to provide the necessary preload to the diamond insert. This is the recommended starting point for mild steel. Slight adjustments in the burnishing pressure can be made, if necessary, to achieve the optimum finish. To adjust the burnishing pressure, tighten the adjustment screw to increase pressure or loosen the screw (turn counterclockwise) to reduce the pressure.

The prefinish on most metals should be approximately 80 to 100 R.M.S. for best results. A feed rate of .003 to .004 inches (.076 to .102mm) per revolution at speeds up to 750 surface feet per minute (229 surface meters per minute) is generally recommended when using the Cogsdill Diamond Burnishing Tool.

Normally, after the tool has been set to provide the .002 to .003 inch (.05 to .08mm) "interference", it can be fed onto the rotating work-piece and allowed to feed off. The slight radius of the diamond tip is sufficient to cause the tool to "climb over" the edge of the part and begin its burnishing action. Likewise, if an interrupted surface is burnished, such as a shaft with a keyway or a flange with bolt holes, the tip of the tool will drop into the interruption but "climb up" the other edge due to the radius on the diamond.

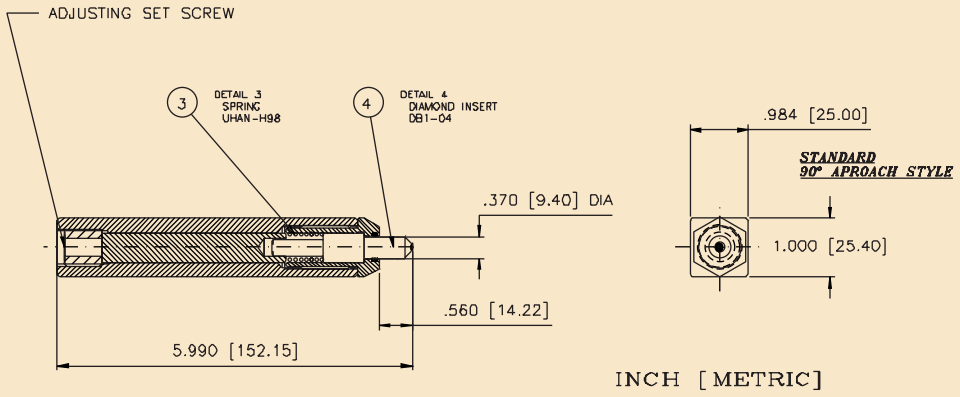
CAUTION: It is important NOT to exceed the recommended amount of interference. An excessive projection of the diamond insert into any surface interruption could cause tool breakage, as the diamond insert could not perform its "climbing" action. (Note: Adjustment of the burnishing force does not affect the amount of interference.)

Note: Diamond burnishing tools do not have the advantage of an overlapping effect as with multi-roll tools, and for this reason slower feed rates and/or multiple passes over the part may be required in order to produce the desired finish.

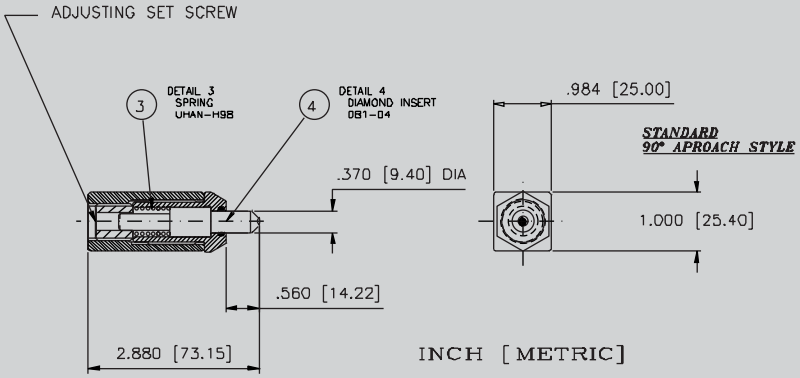
Diamond Burnishing Tools are adjustable for optimum burnishing pressure. For the DB-1 and DB-2 models, the adjustment screw is located in the end of the tool. For models DB-3 and DB-4, the adjustment screw is located on the side of the tool.

Standard tool specifications

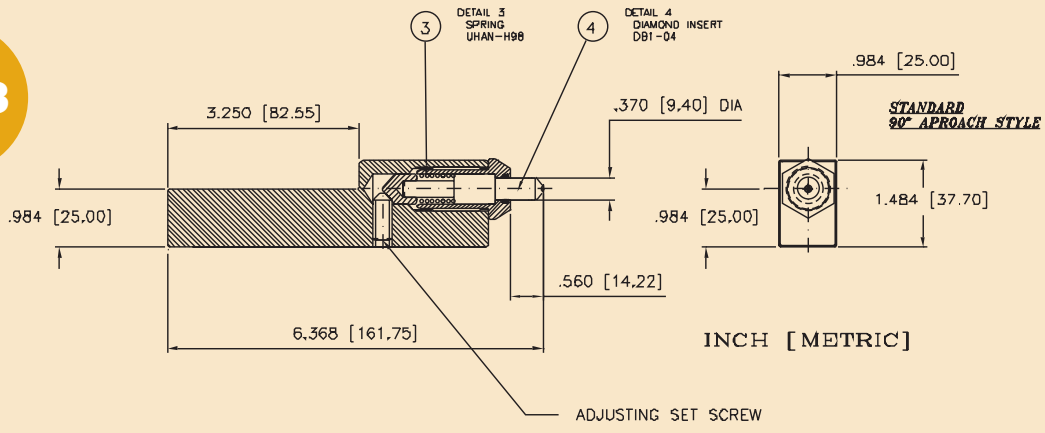
DB-1



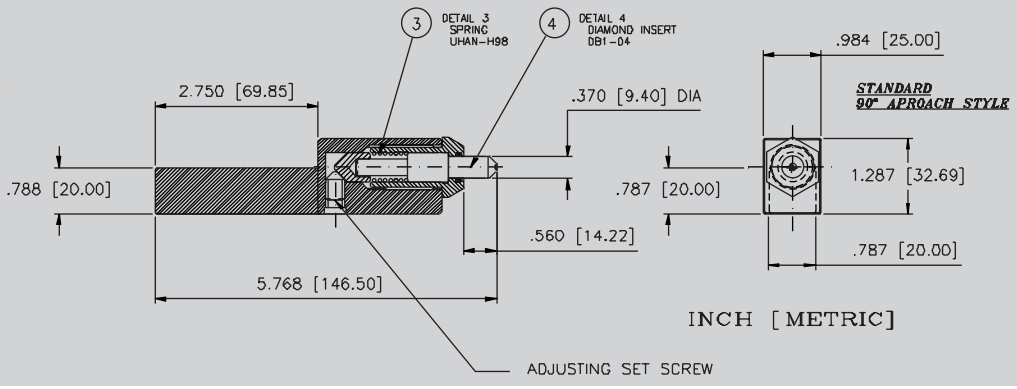
DB-2



DB-3



DB-4



Universal™ burnishing tools

For burnishing shafts, faces, tapers, contours, and relatively large IDs (greater than 2.750 inches/69.85mm)

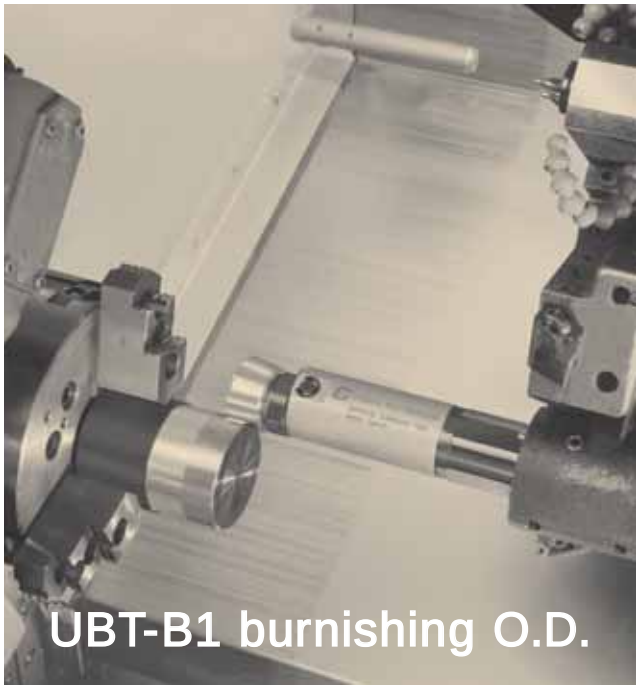
- *Boring-bar style and Indexable turning-holder style designs*
- *Tool designs to suit any part size or configuration, or any turning machine*
- *Low surface finishes*
- *Standard, available off-the-shelf*
- *Adjustable for optimum burnishing pressure*
- *Hardened steel or carbide rollers*

UBT-T1 indexable turning-holder style burnishing tool

(Left-hand tool shown)

UBT-B1 boring-bar style burnishing tool

Versatility


UBT-B1 burnishing O.D.


UBT-B1 burnishing face


UBT-T1 burnishing taper

(Left-hand tool shown)

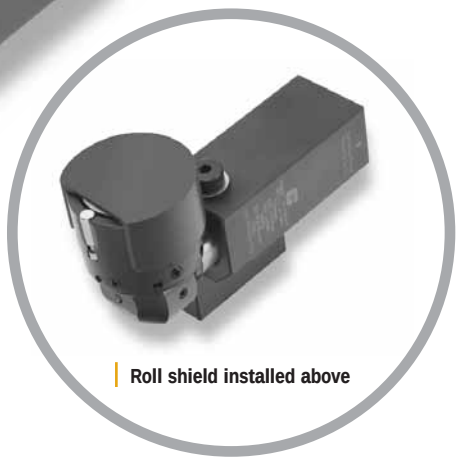
Burnish
any size, any configuration, on any turning machine.

Turning-holder style

UBT-T1

UBT-T2

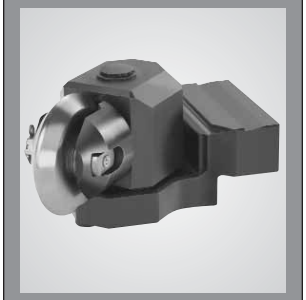
UBT-T3



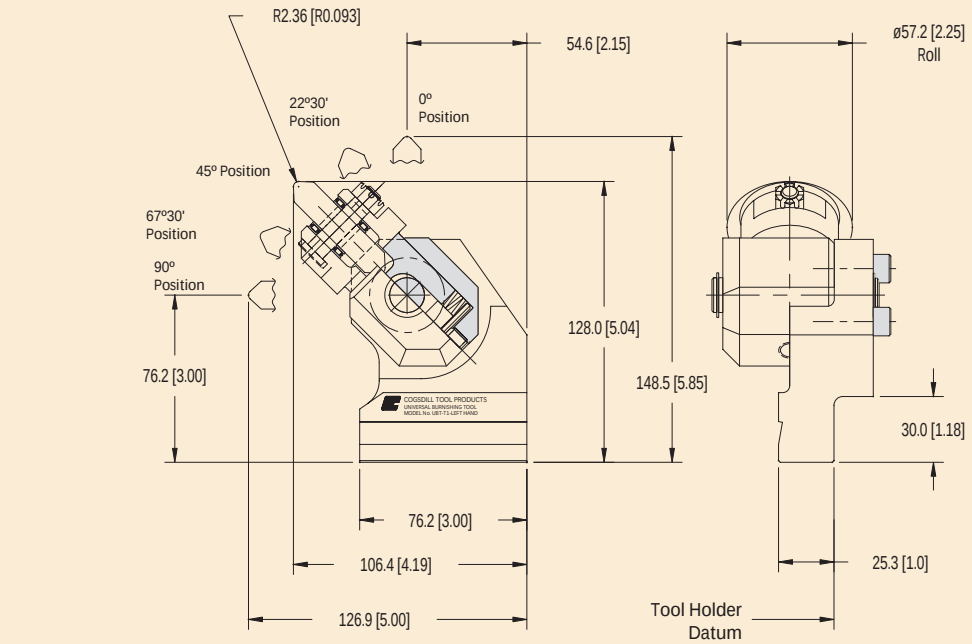
Roll shield installed above

Turning-holder style

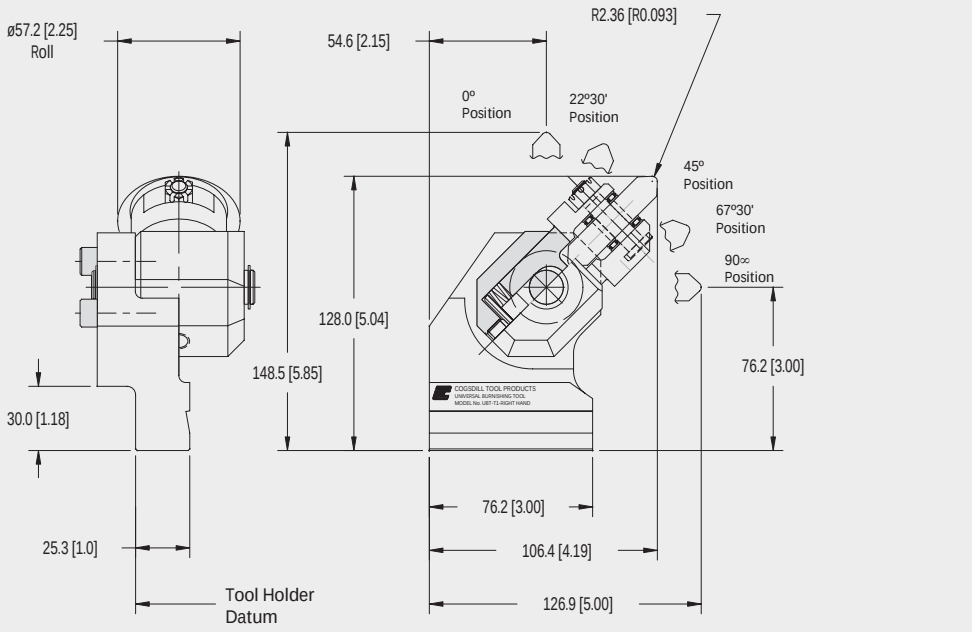
UBT-T1



FOR BURNISHING OUTSIDE DIAMETERS, FACES, TAPERS, AND CONTOURS

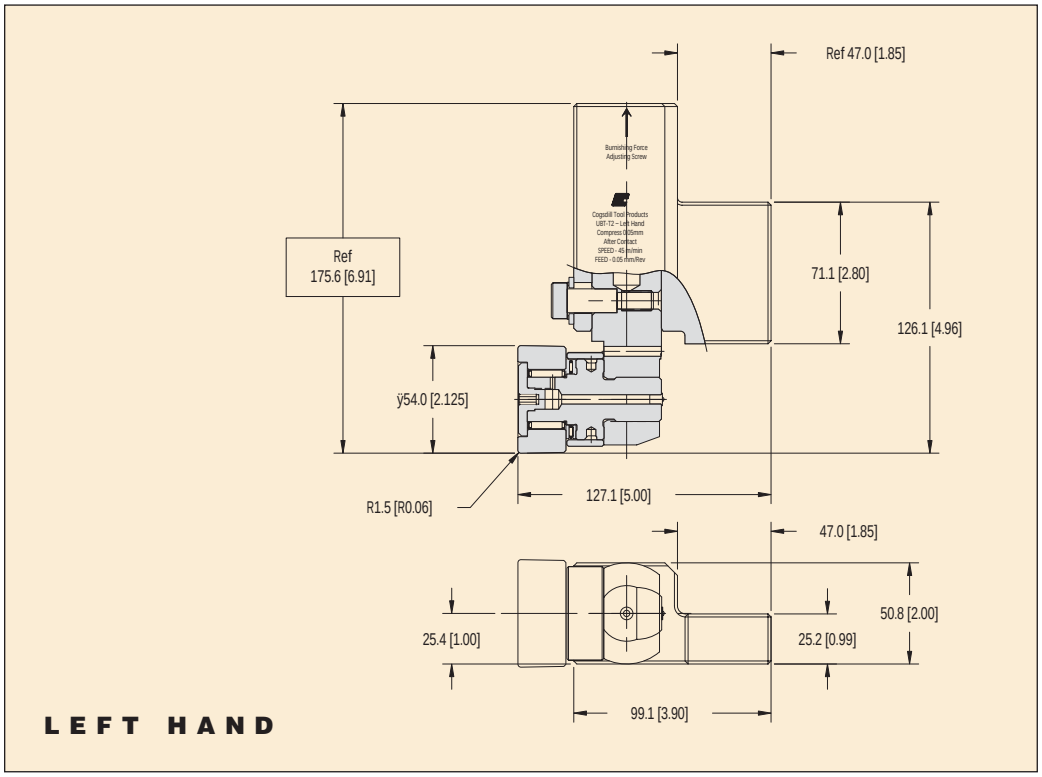


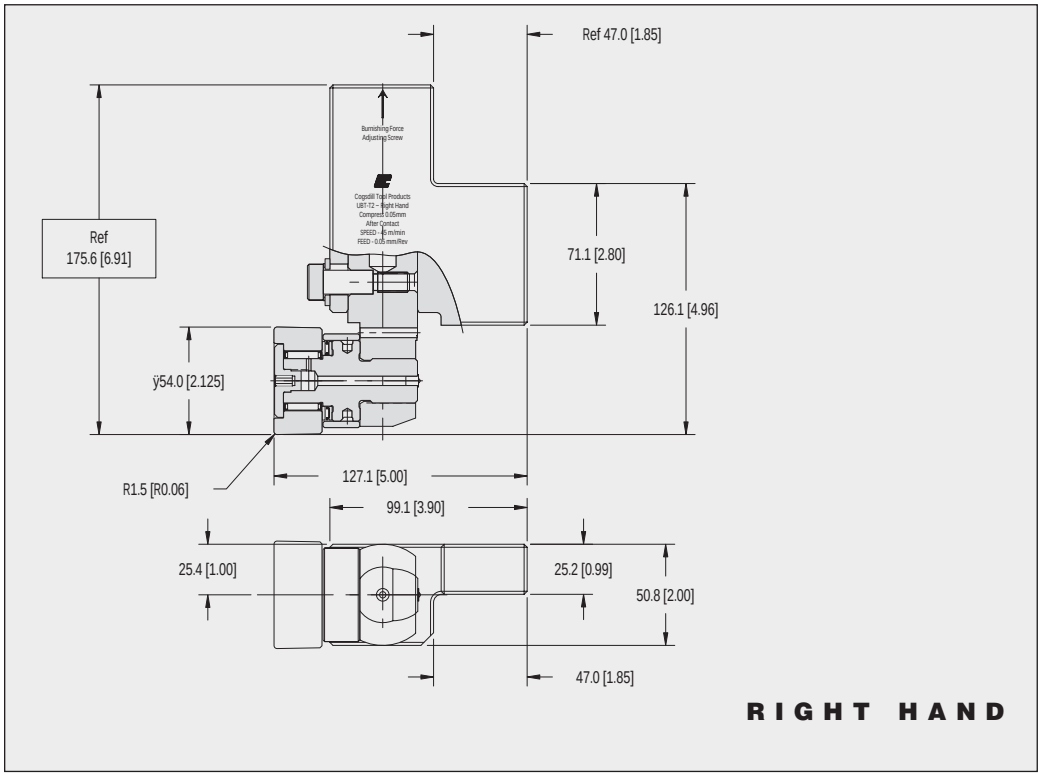
LEFT HAND



RIGHT HAND

Turning-holder style





UBT-T2

FOR BURNISHING OUTSIDE DIAMETERS

Turning-holder style

UBT-T3

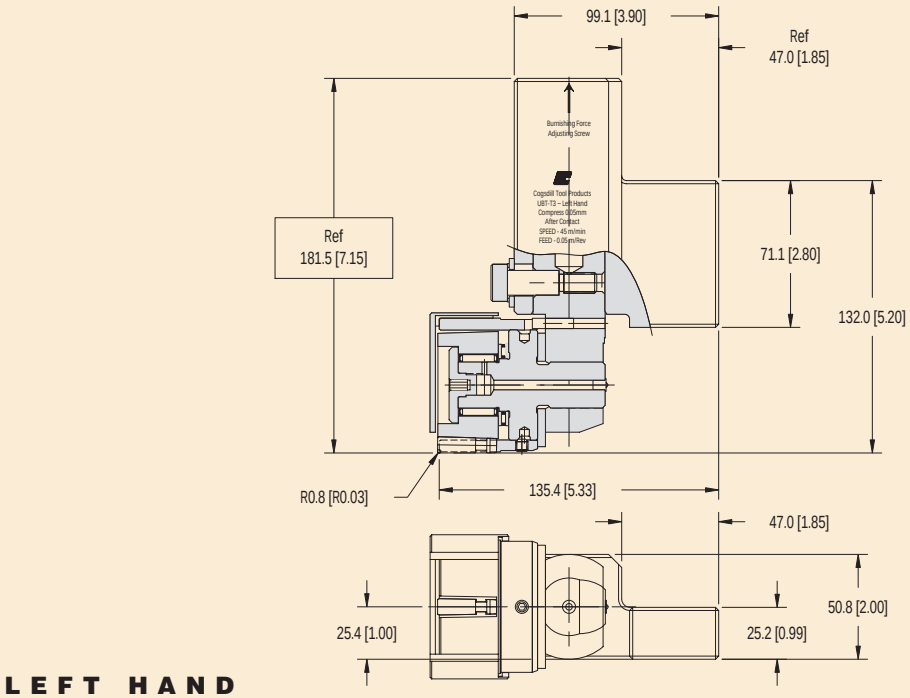
FOR

BURNISHING LARGE

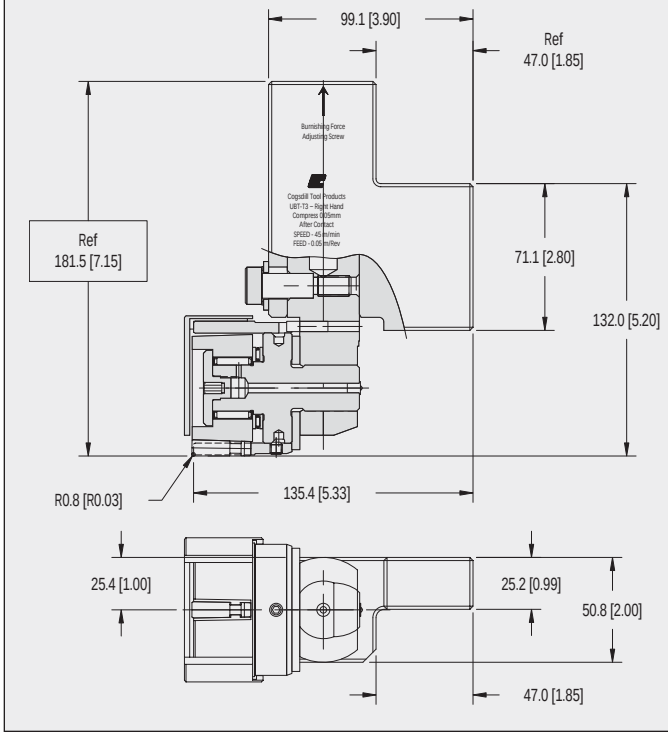
OUTSIDE DIAMETERS,

(GREATER THAN

100mm/4.00 in.)



LEFT HAND



RIGHT HAND

Boring-bar style

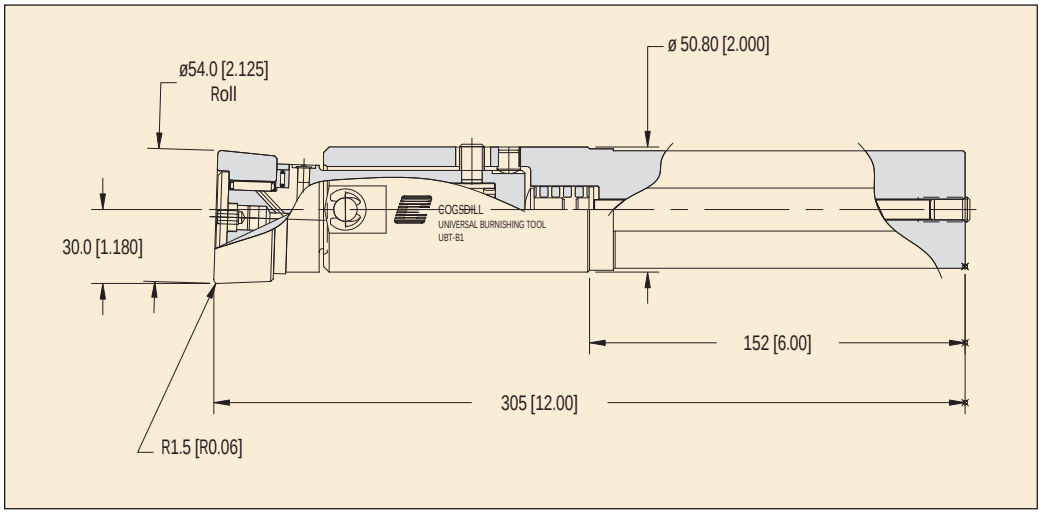
UBT-B1

UBT-B2

UBT-B3

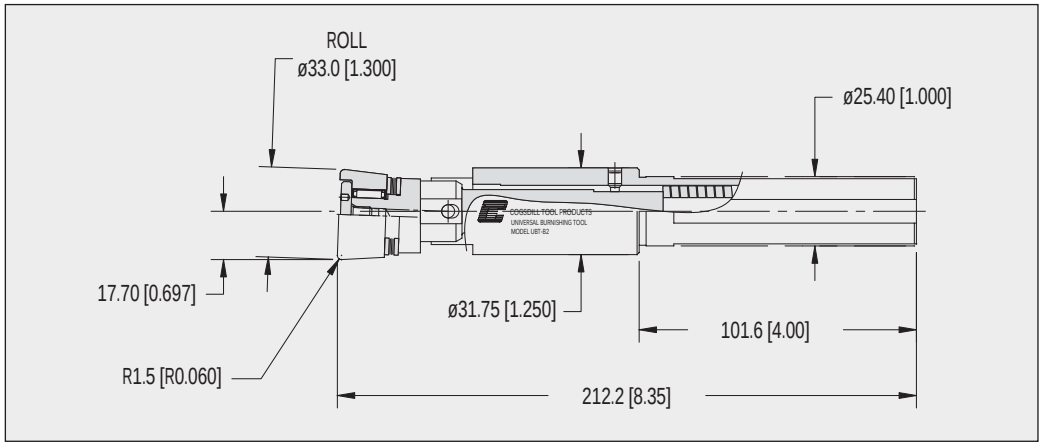
Roll shield installed above

Boring-bar style



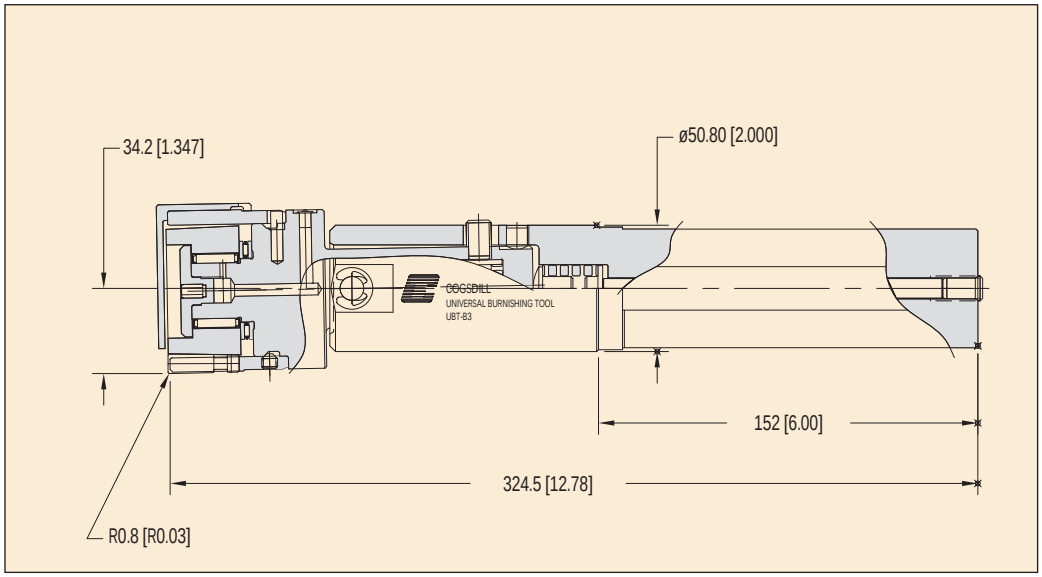
UBT-B1

FOR BURNISHING OUTSIDE DIAMETERS, FACES, AND LARGE INSIDE DIAMETERS (IDS GREATER THAN 70mm/2.75 in.)



UBT-B2

A SMALLER VERSION OF THE UBT-B1



UBT-B3

FOR USE IN SMALLER INSIDE DIAMETERS (IDS GREATER THAN 70MM/2.75 IN.) OR ON LARGE OUTSIDE DIAMETERS (GREATER THAN 100mm/4.00in.)

Set-up and operating instructions for UBT-T Tools

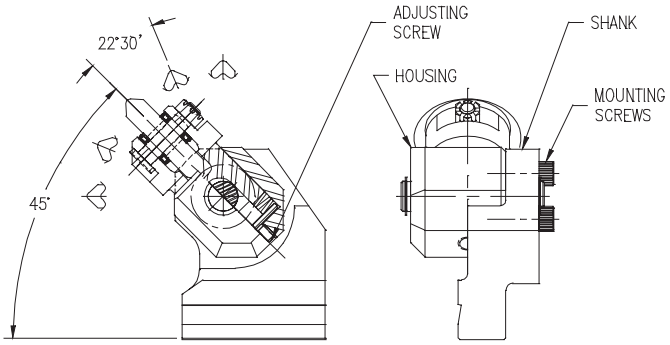
Note: UBT™ single-roll burnishing tools do not have the advantage of an overlapping effect as with multi-roll tools, and for this reason slower feed rates and/or multiple passes over the part may be required in order to produce the desired finish.

UBT-T1 tool set-up

Loosen the load *adjusting screw*. Retighten the *adjusting screw* until it comes into contact with the spring. Continue to tighten screw 1/2 turn past snug. This is a recommended starting point for mild steel.

Adjustments can be made to the burnishing force to achieve optimum finish. Tighten the *adjusting screw* clockwise one turn to increase the burnishing force, or counterclockwise to reduce the force.

Roll orientation is adjustable in 22°-30' increments. Loosen *mounting screws* two turns. Lift *housing* from *shank*. Rotate to desired position, making sure castellations are engaged. Tighten *mounting screws*.

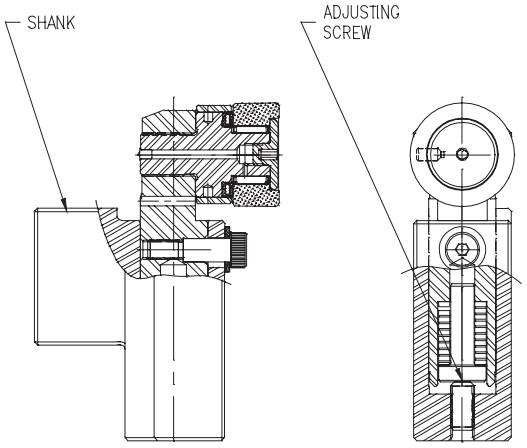


Left hand style shown

UBT-T2 tool set-up

Loosen the load *adjusting screw*. Retighten the *adjusting screw* until it comes into contact with the spring. Continue to tighten screw four turns past snug. This is a recommended starting point for mild steel.

Adjustments can be made to the burnishing force to achieve optimum finish. Tighten the *adjusting screw* clockwise to increase the burnishing force, six turns total, or counterclockwise to reduce the force.



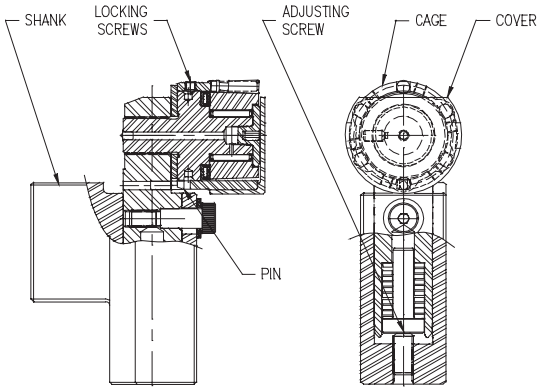
Left hand style shown

UBT-T3 tool set-up

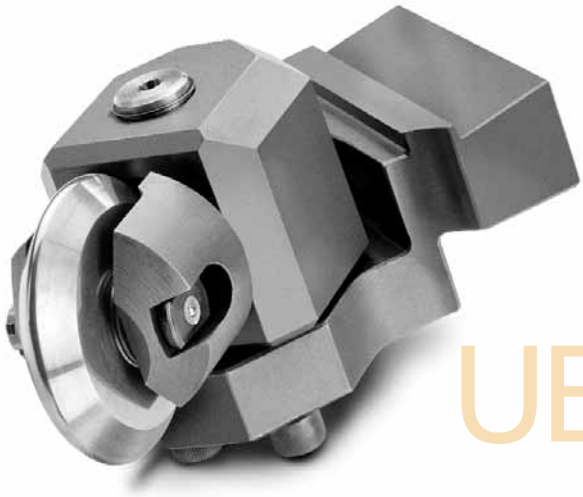
Loosen the load *adjusting screw*. Retighten the *adjusting screw* until it comes into contact with the spring. Continue to tighten screw two turns past snug. This is a recommended starting point for mild steel.

Adjustments can be made to the burnishing force to achieve optimum finish. Tighten the load *adjusting screw* clockwise to increase the burnishing force, six turns total, or counterclockwise to reduce the force.

To index to a new roll station, pull off *cover*. Loosen *locking screws* and slide *cage* forward approximately 0.157 (4.0mm) until it disengages from *pin*. Rotate *cage* approximately 60°, until *pin* aligns with slot in *cage*, and push back. Tighten locking screws and replace *cover* in position shown.



Left hand style shown



UBT-T TOOLS

Set-up and operating instructions for UBT-T tools

UBT-T tool operation

Mount any UBT-T tool in the desired turning station. Use a UBT-T tool that corresponds with the respective turning tool. Bring the tool into contact with the part to be burnished; contact has occurred when you see the mandrel rotating.

Feed the tool another 0.003-0.005 inch (0.08-0.13mm) into the part to provide interference between the roll and part so that the roll will float in its spring travel. Interference should not be used to increase burnishing force; burnishing force should only be adjusted with the load adjusting screws. This ensures the tool can be fed on/off the part and across interruptions without damage to the tool or workpiece.

For optimum results and long tool life, coolant is required. Any soluble, synthetic, or straight oil can be used. Whenever possible, and for best results, the tool should be fed towards the spindle when burnishing diameters and towards the centerline when burnishing faces. (Note: UBT-T2 and UBT-T3 tools cannot be used to burnish faces.)

ROLLS FOR UBT-T TOOLS

ITEM NO.	TOOL TYPE	ROLL TYPE & RADIUS
UBT-006	UBT-T1	HARDENED STEEL, .093 IN. (2.36MM)
UBT-007	UBT-T1	HARDENED STEEL, .030 IN. (0.76MM)
UBT-010	UBT-T1	CARBIDE, .093 IN. (2.36MM)
UBT-015	UBT-T2	HARDENED STEEL, .060 IN. (1.52MM)
UBT-016	UBT-T2	CARBIDE, .060 IN. (1.52MM)
6100-708-00312	UBT-T3	HARDENED STEEL, .030 IN. (0.76MM)

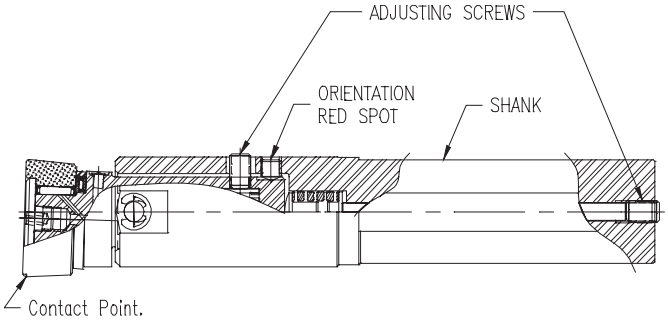
Set-up and operating instructions for UBT-B Tools

Note: UBT™ single-roll burnishing tools do not have the advantage of an overlapping effect as with multi-roll tools, and for this reason slower feed rates and/or multiple passes over the part may be required in order to produce the desired finish.

UBT-B1 tool set-up

Loosen the load *adjusting screws*. Retighten the *adjusting screws* until they come into contact with the spring. Continue to tighten both screws one turn past snug. This is a recommended starting point for mild steel.

Adjustments can be made to the burnishing force to achieve optimum finish. Tighten the *adjusting screws* clockwise to increase the burnishing force, three turns total, or counterclockwise to reduce the force.

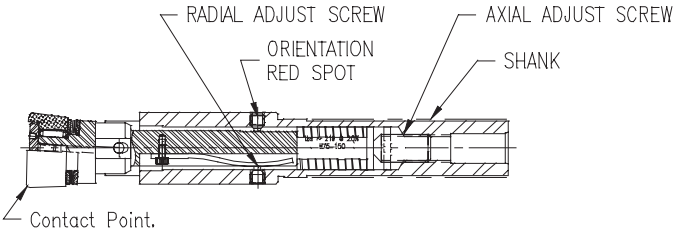


UBT-B2 tool set-up

Loosen the load *adjusting screws*. Retighten the *axial adjusting screw* until it comes into contact with the spring. Continue to tighten three turns past snug. This is a recommended starting point for mild steel.

Tighten the *radial adjusting screw* until it comes into contact with the spring. Continue to tighten 1-1/2 turns past snug. Do not tighten beyond this point; overloading this screw will not allow the tool to float on its spring travel and will impede tool function.

Adjustments can be made to the burnishing force to achieve optimum finish. Tighten the *axial adjusting screw* only. Turn clockwise to increase burnishing force, for a total of 6-1/2 turns, or counter-clockwise to reduce the force.

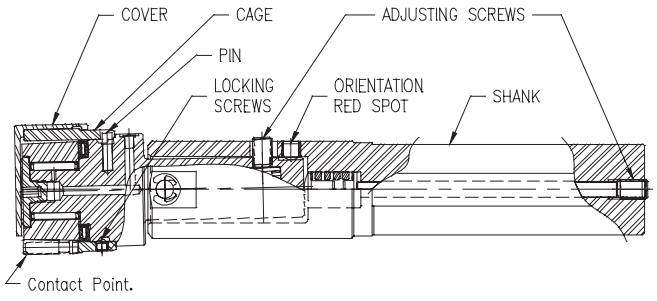


UBT-B3 tool set-up

Loosen the load *adjusting screws*. Retighten the *adjusting screws* until they come into contact with the spring. Continue to tighten both screws one turn past snug. This is a recommended starting point for mild steel.

Adjustments can be made to the burnishing force to achieve optimum finish. Tighten the *adjusting screws* clockwise to increase the burnishing force, for a total of three turns, or counterclockwise to reduce the force.

To index to a new roll station, pull off *cover*. Loosen *locking screws* and slide *cage* forward approximately 0.157 (4.0mm) until it disengages from *pin*. Rotate *cage* approximately 60°, until *pin* aligns with slot in *cage*, and push back. Tighten *locking screws* and replace *cover* in position, exposed *roll* opposite orientation red spot.



UBT-B TOOLS

Set-up and operating instructions for UBT-B tools

UBT-B tool operation

Mount any UBT-B tool in the desired boring bar station. (Note: The red orientation spot *must* be opposite the contact point.) Bring the tool into contact with the part to be burnished.

Feed the tool another 0.003-0.005 inch (0.08-0.13mm) into the part to provide interference between the roll and part so that the roll will float in its spring travel. Interference should not be used to increase burnishing force; burnishing force should only be adjusted with the load adjusting screws. This ensures the tool can be fed on/off the part and across interruptions without damage to the tool or workpiece.

For optimum results and long tool life, coolant is required. Any soluble, synthetic, or straight oil can be used. Whenever possible, and for best results, the tool should be fed towards the spindle when burnishing diameters and towards the centerline when burnishing faces. (Note: the UBT-B3 tool cannot be used to burnish faces.)

ROLLS FOR UBT-B TOOLS

ITEM NO.	TOOL TYPE	ROLL TYPE & RADIUS
UBT-001	UBT-B1	HARDENED STEEL, .060 IN. (1.52MM)
UBT-002	UBT-B1	CARBIDE, .060 IN. (1.52MM)
UBT-003	UBT-B1	HARDENED STEEL, .030 IN. (0.76MM)
UBT-018	UBT-B2	HARDENED STEEL, .060 IN. (1.52MM)
UBT-019	UBT-B2	CARBIDE, .060 IN. (1.52MM)
6100-708-00312	UBT-B3	HARDENED STEEL, .030 IN. (0.76MM)

Speed and feed recommendations for UBT-T and UBT-B tools

SPEED	
IPR	MM/REV.
0.001/0.006	0.02/0.15

FEED	
SFM	M/MIN.
750	230

Lubrication of UBT-T and UBT-B tools

All UBT-T and UBT-B tools should be periodically greased (approximately every 24 hours of operation). We recommend the use of high-quality Lithium complex grease.