

# Recessing

## Automatic Recessing

### GENERATING HEADS & PRECISION CHAMFERING

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# Automatic Recessing

Cogsdill offers the widest array of standard tooling and the broadest range of solutions for precision grooving, recessing, and internal and external facing and chamfering.



We will design and manufacture a complete tooling package for your application, including **Automatic Recessing heads, cutters and pilots.** The wide variety of standard recessing heads described in this catalog are available from stock to suit most applications and machines. Special recessing heads can be designed and manufactured for unusual applications.

#### **GREATER ACCURACY, SHORTER CYCLE TIME, LOWER COST**

Cogsdill Automatic Recessing Tools will save you time and money. Cycle time is reduced from minutes or hours to **seconds**. The **precision is built into the head** so that grooves and recesses can be machined with **exceptional accuracy and repeatability**. The **Automatic Recessing** head changes the operational direction by 90° (i.e., axial spindle motion is converted to radial cutter movement). Recessing operations can be performed on a variety of machines, even on a drill press.

#### **SUPERIOR CRAFTSMANSHIP**

All moving parts in our recessing heads are hardened and precision ground to ensure lasting accuracy and low maintenance costs. Close tolerances virtually eliminate “backlash” during retraction, for accurate size on groove width as well as depth. All sliding surfaces have large, hardened, load-bearing areas for long life and durability.

#### **SUPERIOR CONSTRUCTION**

Compression of the head between the machine spindle and the workpiece or jig plate actuates a sliding inclined wedge mechanism, thereby extending the cutter. Groove depth can be machined with great accuracy.

The cutter retracts radially prior to axial withdrawal of the tool from the bore, for accurate control of groove width. This design also results in a constant linear relationship between spindle movement and cutter movement. The straight-line movement of the cutter makes cutter regrinding easier.



**AR Recessing Head**



**ARX Recessing Head**



**ARSP Recessing Head**



**Nobur®JA-2000 Tool**



**Nobur®JA Tool**



*Cutaway view of parts machined using Cogsdill Automatic Recessing Tools. Grooves and recesses are machined with exceptional accuracy and repeatability.*

# Automatic Recessing Quick Reference

## TOOL SELECTION CHART

Cogsdill Automatic Recessing heads are stocked in four basic categories, including the **AR** series and our **Nobur**<sup>®</sup> recessing heads. Head models are available to suit most applications and machining set-ups. The chart below provides a brief overview of each head type, and identifies the types of machines to which each head is suited.

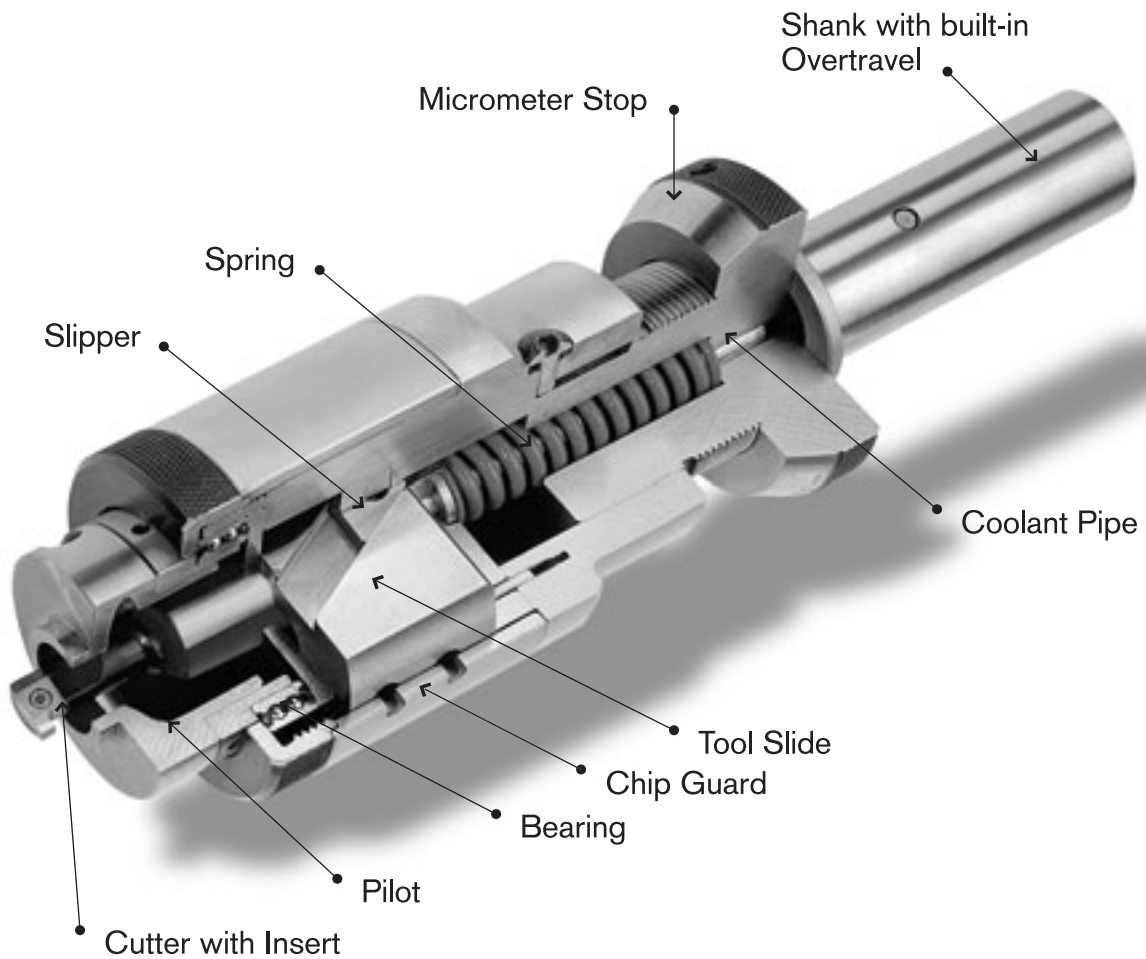
HEAD TYPE & DESCRIPTION  <i>NOTE: See photos on previous page</i>	MACHINE TYPE							
	DRILL PRESS	JIG BORE	MILLING MACHINE	CNC MACHINE	TOOL LATHE	TURRET LATHE	SCREW MACHINE	SPECIAL PURPOSE
<b>AR</b> Automatic Recessing Pilots off workpiece or jig plate. Micrometer stop controls depth of cut. Tool adjustment controls axial location. Through-shank coolant and overtravel shanks are standard.	■	■	■	■	■	■	■	■
<b>ARSP</b> Automatic Recessing — Short Pilot Short, compact design. For applications with work length restrictions. Minimal overall length. Pilots off workpiece. Micrometer stop controls depth of cut. Tool adjustment controls axial location. Through-tool coolant and overtravel shanks are standard.				■	■	■	■	■
<b>ARX</b> Automatic Recessing — External For external grooving. Pilots off workpiece. Micrometer stop controls depth of cut. Tool adjustment is controlled within the fitted tooling. Overtravel shanks are standard.	■		■	■		■	■	■
<b>Nobur<sup>®</sup> JA and JA-2000</b> Deep-Hole Recessing For deep-bore recessing and grooving. Pilot-supported cutting action. Micrometer-stop adjustment. Multiple grooves, chamfers, or metering lands. Back-chamfering and facing of deep bores.	■	■	■	■	■	■		■

# Operating Principle

**AR Series**  
AUTOMATIC RECESSING

The **AR** Series Automatic Recessing Tool is made up of three basic components: head, cutter, and pilot. The head is usually standard and consists of shank and tool body. All cutters and pilots are manufactured to suit your application.

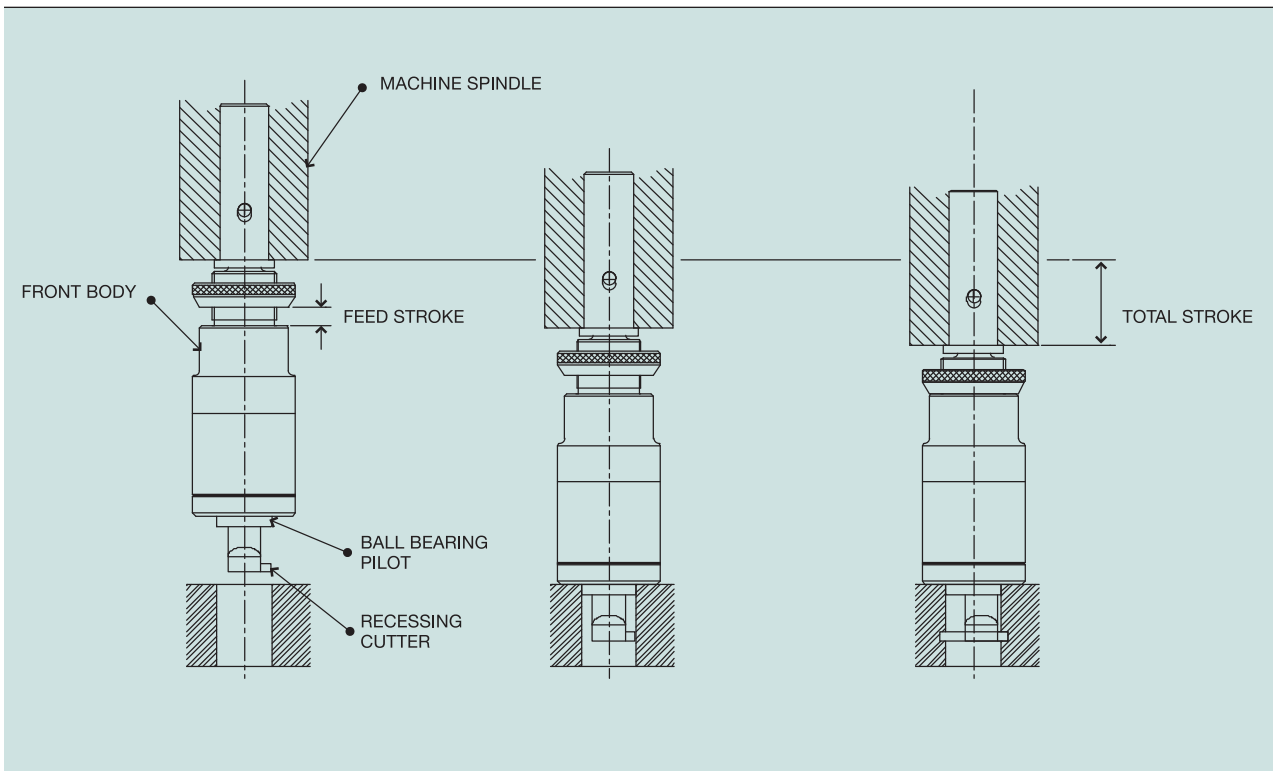
**AR16** Recessing Head



# Operating Principle

**AR Series**  
AUTOMATIC RECESSING

Illustrated below is the basic operating principle for **AR**, **ARSP** and **ARX** Recessing Heads. The head type shown below is the **AR** model.



## 1 Approach Stroke

The tool is rotating in a machine spindle. The spindle is lowered, and the tool moves into position.

## 2 Feed Stroke

The pilot is located in the bore against the face of the workpiece. Downward pressure causes compression of the recessing head, thereby actuating the slide mechanism which feeds the cutter out radially into the work.

## 3 End of Feed Stroke

The correct depth of cut is obtained when the micrometer stop bottoms against the front body, making it impossible to continue the cut. Groove location is controlled by the tool adjustment system on the shank end of the cutter.

When the spindle is retracted, pressure is relieved, and the tool is withdrawn from the bore. The cutter retracts and returns to its starting position. The piloted bearing absorbs both thrust and rotation. It remains stationary in the bore of the workpiece, under load, until the cutter is fully retracted, thereby preventing scoring of the workpiece.

## AR Recessing Head



**General purpose tool for use on:**

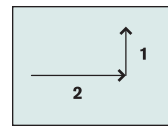
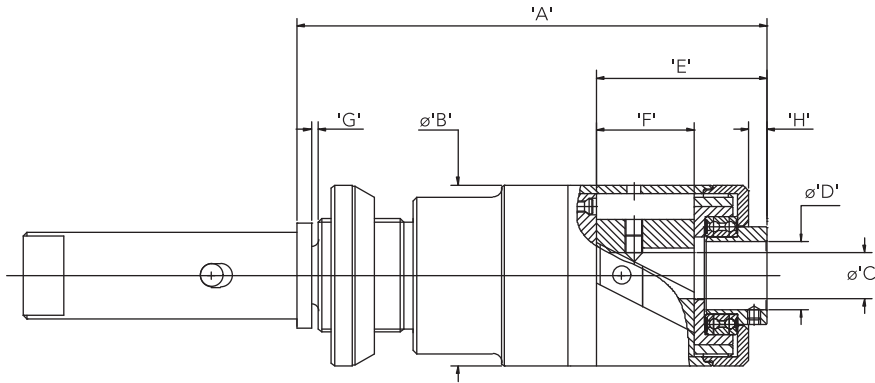
**AR16**

- Drill presses
- Jig boring machines
- Milling machines
- CNC machines
- Tool lathes
- Turret lathes
- Horizontal boring machines
- Screw machines
- Special purpose machines

**Features:**

- Pilots off workpiece or jig plate
- Micrometer stop controls depth of cut
- Tool adjustment controls axial location
- Through-shank coolant is standard
- Overtravel shanks are standard

### AR Recessing Head



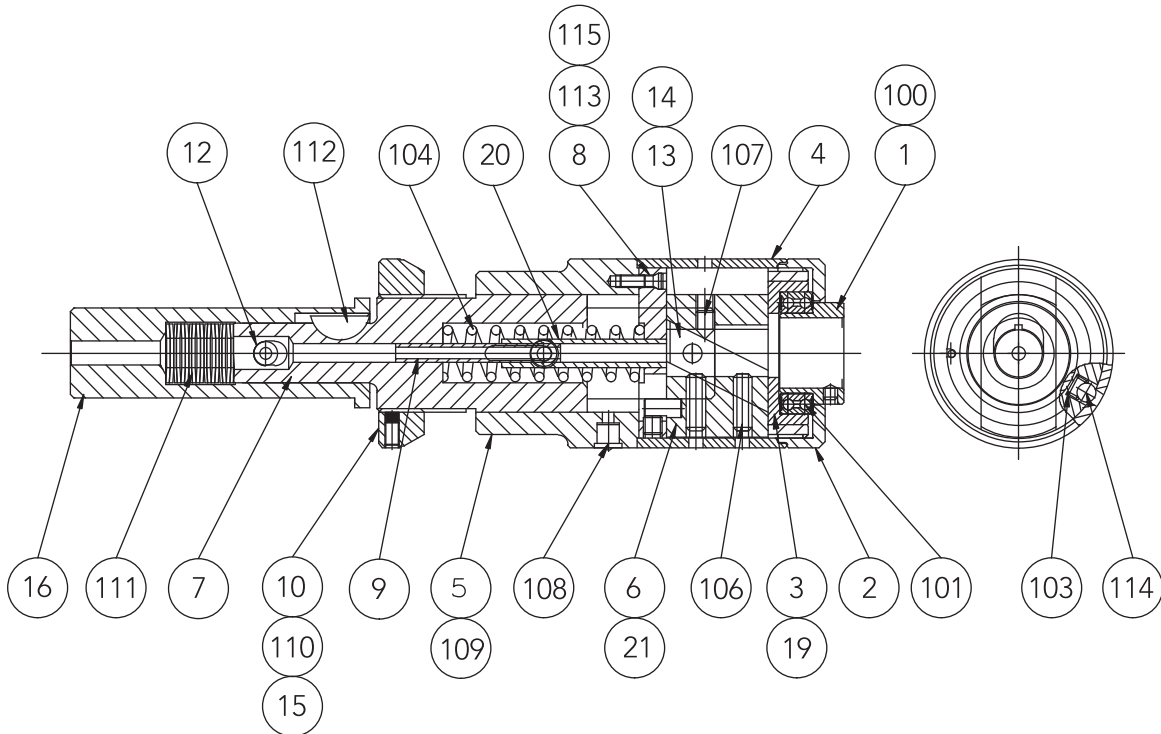
The **Feed Ratio** is the ratio of spindle to radial cutter movement

#### INCH [METRIC]

HEAD TYPE	APPROX. CAPACITY RANGE ★	MAXIMUM CUTTER TRAVEL	SHANKS	(A) FREE LENGTH	(B) TOOL BODY	(C) CUTTER SHANK	(D) MASTER PILOT	(E) REF MIN CUTTER LENGTH	(F) BORE DEPTH	(G) OVERTRAVEL	(H) REF TO FRONT NUT
AR10	0.216 [5.5] 0.984 [25.0]	0.197 [5.0]	0.750in/20mm	4.083 [103.70]	ø1.58 [ø40.0]	ø0.394 [ø10.0]	ø0.591 [ø15.0]	1.48 [37.6]	0.85 [21.60]	0.06 [1.5]	0.157 [4.0]
			No 2 MT	4.894 [124.32]							
			SK40/CAT40	6.248 [158.70]							
			BT40	5.657 [143.70]							
AR16	0.590 [15.0] 1.772 [45.0]	0.276 [7.0]	1.000in/25mm	5.547 [140.90]	ø2.56 [ø65.0]	ø0.630 [ø16.0]	ø1.416 [ø36.0]	2.03 [51.5]	1.19 [30.23]	0.06 [1.5]	0.187 [4.76]
			No 3 MT	5.796 [147.23]							
			SK40/CAT40	7.713 [195.90]							
			SK50/CAT50	6.299 [160.00]							
			BT40	7.122 [180.90]							
			BT50	8.152 [178.90]							
AR20	0.866 [22.0] 2.362 [60.0]	0.394 [10.0]	1.500in/40mm	6.591 [167.40]	ø3.15 [ø80.0]	ø0.787 [ø20.0]	ø1.772 [ø45.0]	2.43 [61.8]	1.46 [37.08]	0.12 [3.0]	0.224 [5.70]
			SK40/CAT40	8.756 [222.40]							
			SK50/CAT50	7.343 [186.50]							
			BT40	8.165 [207.40]							
			BT50	8.087 [205.40]							

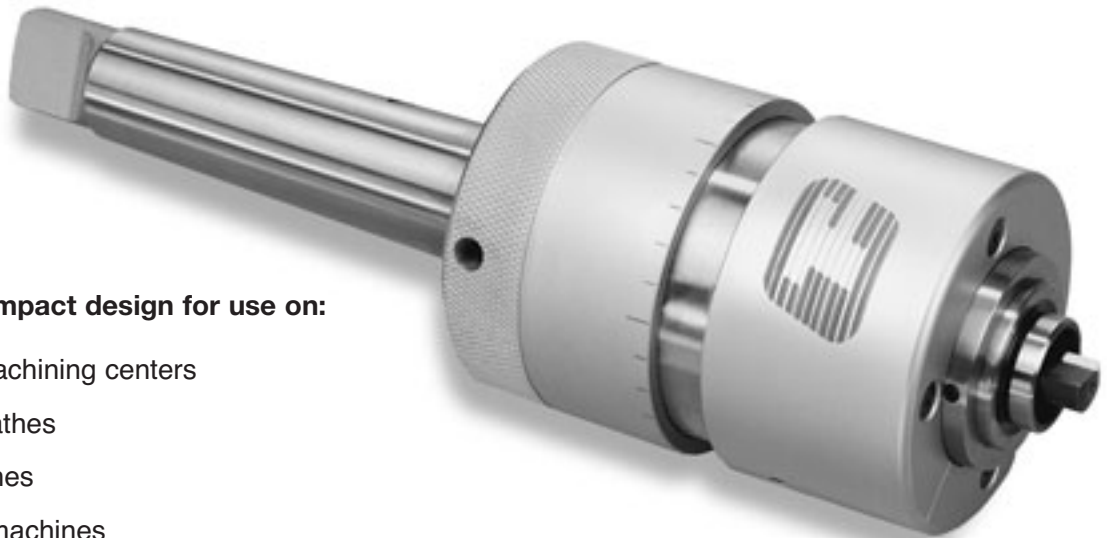
★ The capacity range shown is **not** intended as an absolute limitation. The maximum diameter shown in the chart is defined as the suggested maximum groove diameter, dependent upon cutting forces, and intended for the sake of comparison only.

## AR Recessing Head



<b>1</b> Master Pilot	<b>9</b> Coolant Pipe	<b>20</b> Spring Plate Pipe	<b>108</b> Oiler
<b>2</b> Front Nut	<b>10</b> Micrometer Nut	<b>21</b> Centralising Pin	<b>109</b> Retaining Screw
<b>3</b> Back Plate	<b>12</b> Over-rider Dowel	<b>100</b> Set Screw	<b>110</b> Micrometer Screw
<b>4</b> Chip Guard	<b>13</b> Slipper	<b>101</b> Double Angular Contact Bearing	<b>111</b> Disc Springs
<b>5</b> Front Body	<b>14</b> Slipper Pin	<b>103</b> Spring	<b>112</b> Key
<b>6</b> Toolslide	<b>15</b> Copper Pad	<b>104</b> Spring	<b>113</b> Torx Screw
<b>7</b> Rear Body	<b>16</b> Shank	<b>106</b> Tool Clamp Screw	<b>114</b> Ball Bearing
<b>8</b> Spring Plate	<b>19</b> Back Plate Dowel	<b>107</b> Tool Adjust Screw	<b>115</b> Centralising Screw

## **ARSP** Short-Pilot Head



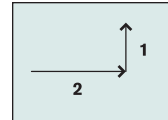
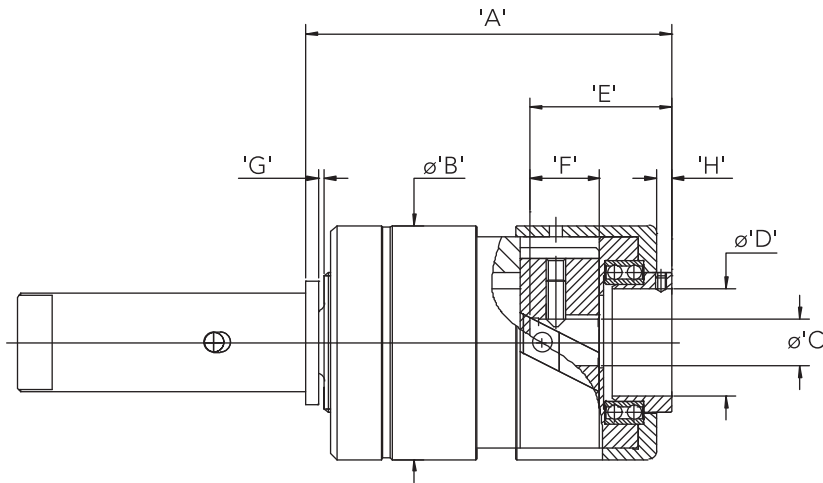
### **Short, compact design for use on:**

- CNC machining centers
- Turret lathes
- Tool lathes
- Screw machines
- Special purpose machines

### **Features:**

- For applications with work length restrictions
- Minimal overall length
- Pilots off workpiece
- Micrometer stop controls depth of cut
- Tool adjustment controls axial location
- Through-tool coolant
- Overtravel shanks are standard

### ARSP Short-Pilot Head



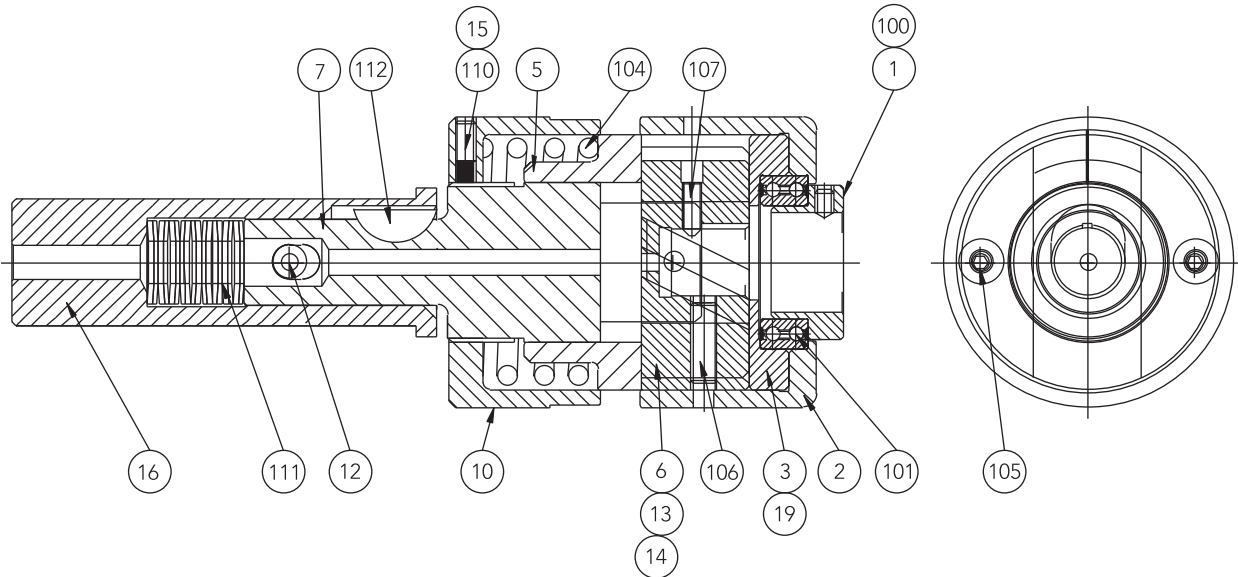
The **Feed Ratio** is the ratio of spindle to radial cutter movement

#### INCH [METRIC]

HEAD TYPE	APPROX. CAPACITY RANGE *	MAXIMUM CUTTER TRAVEL	SHANKS	(A) FREE LENGTH	(B) TOOL BODY	(C) CUTTER SHANK	(D) MASTER PILOT	(E) REF MIN CUTTER LENGTH	(F) BORE DEPTH	(G) OVERTRAVEL	(H) REF TO FRONT NUT
ARSP1	0.216 [5.5]	0.118 [3.0]	0.750in/20mm	2.510 [63.75]	ø1.70 [ø43.25]	ø0.394 [ø10.0]	ø0.591 [ø15.0]	1.09 [27.6]	0.63 [16.0]	0.06 [1.5]	0.160 [4.05]
	0.984 [25.0]		No 2 MT	3.322 [84.37]							
ARSP2	0.590 [15.0]	0.197 [5.0]	1.000in/25mm	3.699 [93.95]	ø2.36 [ø60.0]	ø0.472 [ø12.0]	ø1.091 [ø27.7]	1.44 [36.5]	0.81 [20.5]	0.06 [1.5]	0.158 [4.00]
	1.772 [45.0]		No 3 MT	3.948 [100.28]							

\* The capacity range shown is **not** intended as an absolute limitation. The maximum diameter shown in the chart is defined as the suggested maximum groove diameter, dependent upon cutting forces, and intended for the sake of comparison only.

## ARSP Short-Pilot Head



<b>1</b> Master Pilot	<b>10</b> Micrometer Nut	<b>19</b> Back Plate Dowel	<b>107</b> Tool Adjust Screw
<b>2</b> Front Shell	<b>12</b> Over-rider Dowel	<b>100</b> Set Screw	<b>110</b> Micrometer Screw
<b>3</b> Back Plate	<b>13</b> Slipper	<b>101</b> Double Angular Contact Bearing	<b>111</b> Disc Springs
<b>5</b> Front Body	<b>14</b> Slipper Pin	<b>104</b> Spring	<b>112</b> Key
<b>6</b> Toolslide	<b>15</b> Copper Pad	<b>105</b> Head Screw	
<b>7</b> Rear Body	<b>16</b> Shank	<b>106</b> Tool Clamp Screw	

## **ARX** External Head



### **External grooving tool for use on:**

- Drill presses
- Milling machines
- CNC machines
- Turret lathes
- Screw machines
- Special purpose machines

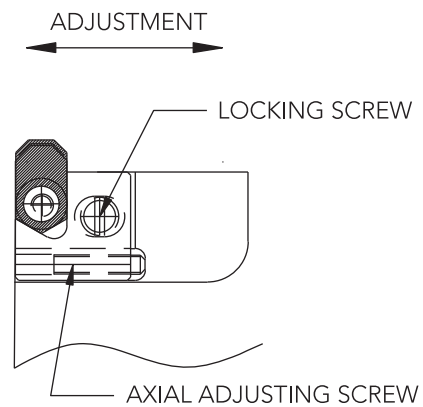
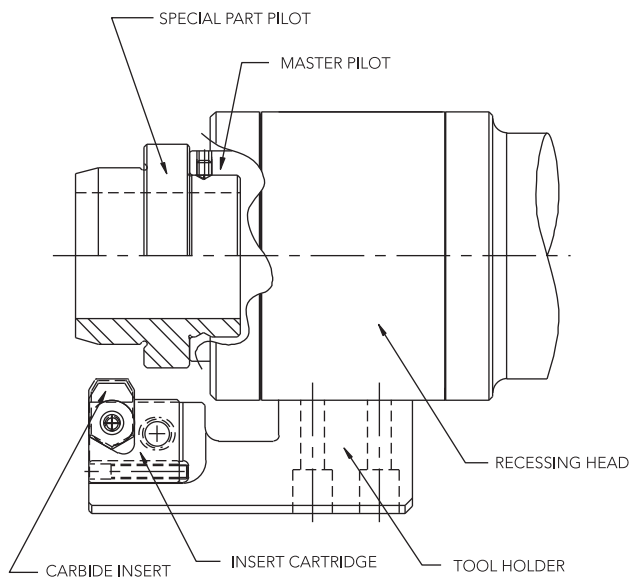
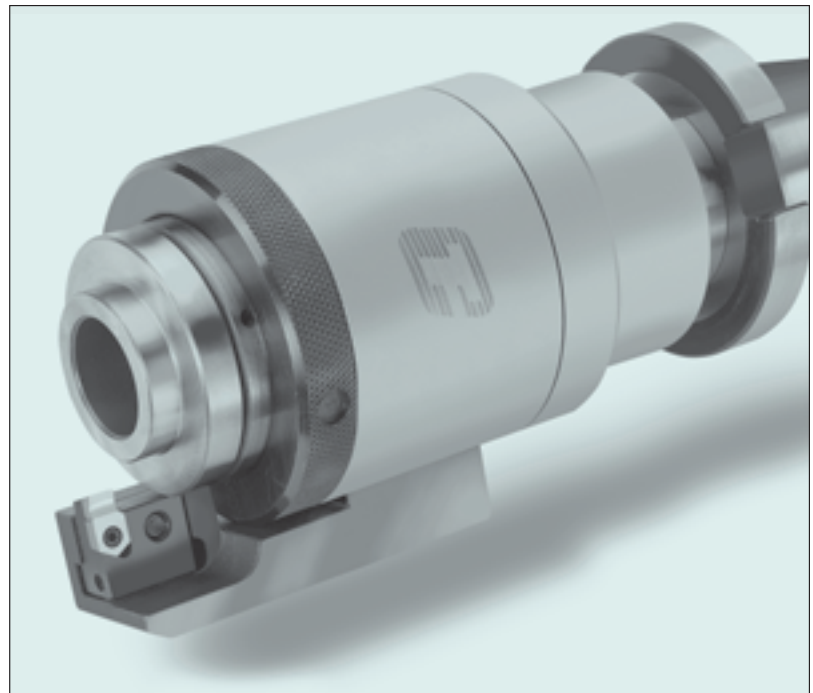
### **Features:**

- Pilots off workpiece
- Micrometer stop controls depth of cut
- Tool adjustment is controlled within the fitted tooling
- Overtravel shanks are standard
- Optional balance block available with two-slot chip guard for high-speed applications

# ARX Tooling Components

**AR Series**  
AUTOMATIC RECESSING

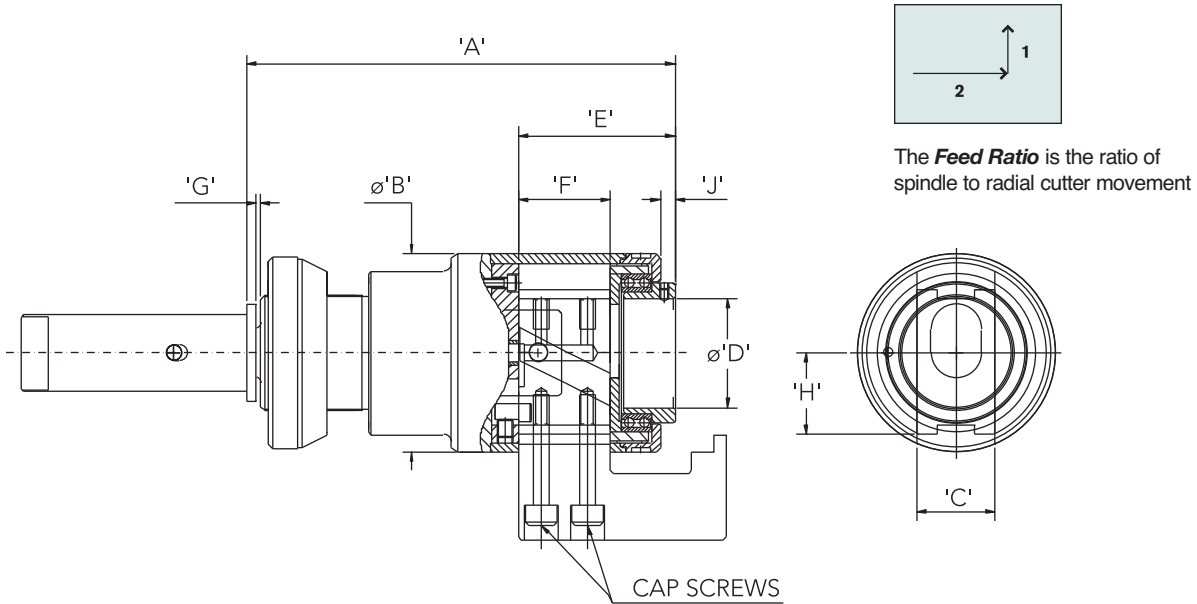
**ARX** toolholder, cartridge, and insert are shown below.  
Replaceable carbide inserts are used where applications permit.



Drawing depicts adjustment of groove location, as measured from the end of the part.

**ARX** toolholders, insert cartridges, and carbide inserts are made to order from standard blanks. Part pilots are designed and manufactured to suit the application; the master pilot is part of the recessing head.

### ARX External Head

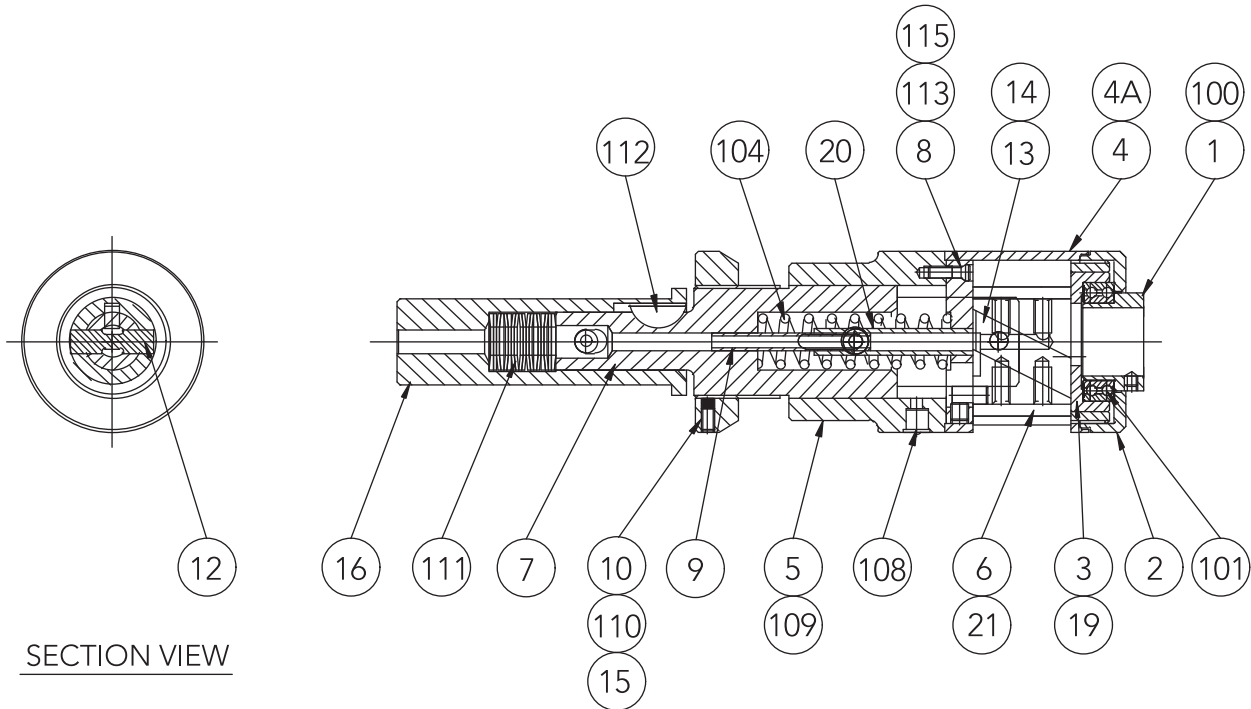


#### INCH [METRIC]

HEAD TYPE	CAPACITY RANGE *		MAXIMUM CUTTER TRAVEL	SHANKS	(A) FREE LENGTH	(B) TOOL BODY	(C) CUTTER SHANK	(D) MASTER PILOT	(E) REF MIN CUTTER LENGTH	(F) BORE DEPTH	(G) OVER TRAVEL	(H) MOUNTING	(J) REF TO FRONT NUT
	PART DIAMETER	GROOVE LOCATION											
ARX10	0.157–0.787 [4.0–20.0]	UP TO 1.250 [31.75]	0.197 [5.0]	0.750in/20mm	4.083 [103.70]	ø1.58 [ø40.0]	0.625 [15.88]	ø0.591 [ø15.0]	1.48 [37.6]	0.85 [21.60]	0.06 [1.5]	0.636 [16.16]	0.157 [4.0]
				No 2 MT	4.894 [124.32]								
				SK40/CAT40	6.248 [158.70]								
				BT40	5.657 [143.70]								
ARX16	0.630–1.654 [16.0–42.0]	UP TO 1.375 [34.93]	0.276 [7.0]	1.000in/25mm	5.547 [140.90]	ø2.56 [ø65.0]	1.000 [25.40]	ø1.416 [ø36.0]	2.03 [51.5]	1.19 [30.23]	0.06 [1.5]	1.048 [26.63]	0.187 [4.76]
				No 3 MT	5.796 [147.23]								
				SK40/CAT40	7.713 [195.90]								
				SK50/CAT50	6.299 [160.00]								
				BT40	7.122 [180.90]								
BT50	8.152 [178.90]												
ARX20	0.866–2.992 [22.0–76.0]	UP TO 1.500 [38.10]	0.394 [10.0]	1.500in/40mm	6.591 [167.40]	ø3.15 [ø80.0]	1.250 [31.75]	ø1.772 [ø45.0]	2.43 [61.8]	1.46 [37.08]	0.12 [3.0]	1.294 [32.87]	0.224 [5.70]
				SK40/CAT40	8.756 [222.40]								
				SK50/CAT50	7.343 [186.50]								
				BT40	8.165 [207.40]								
				BT50	8.087 [205.40]								

\* The capacity range shown is **not** intended as an absolute limitation. It defines the normal range when using standard components. The diameter range represents the approximate part diameter. The groove location is the approximate distance to the groove measured from the end of the part.

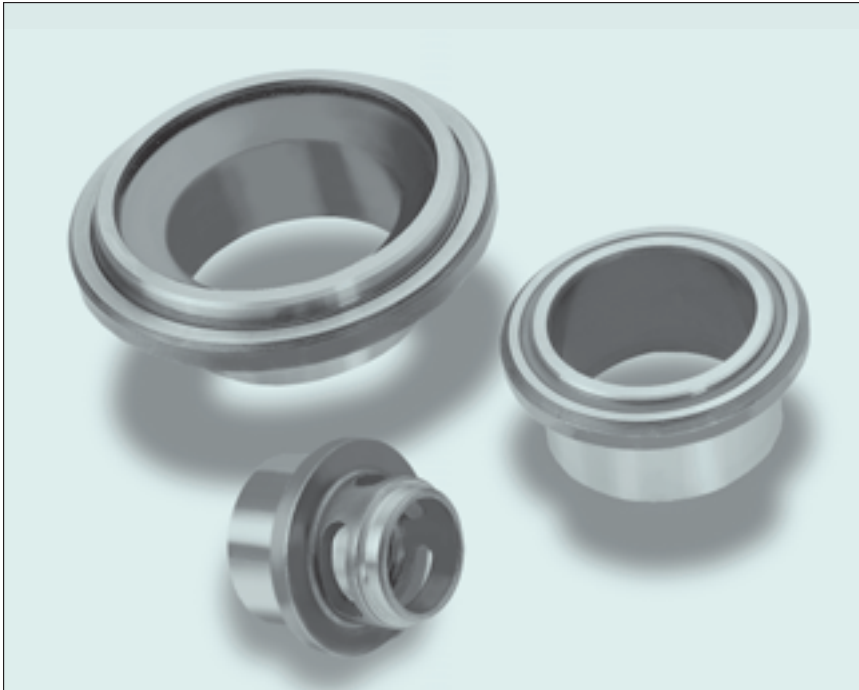
## ARX External Head



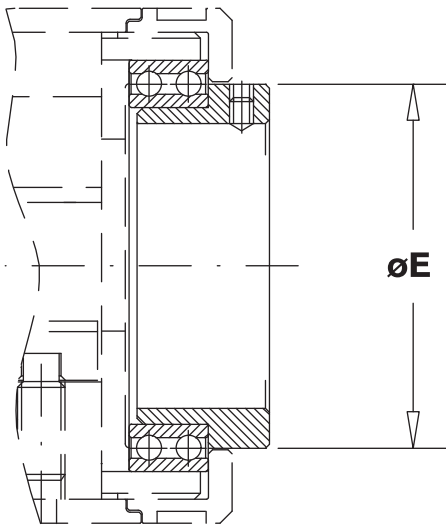
<b>1</b> Master Pilot	<b>8</b> Spring Plate	<b>19</b> Back Plate Dowel	<b>110</b> Micrometer Screw
<b>2</b> Front Nut	<b>9</b> Coolant Pipe	<b>20</b> Spring Plate Pipe	<b>111</b> Disc Springs
<b>3</b> Back Plate	<b>10</b> Micrometer Nut	<b>21</b> Centralising Pin	<b>112</b> Key
<b>4</b> Standard Chip Guard	<b>12</b> Over-rider Dowel	<b>100</b> Set Screw	<b>113</b> Torx Screw
<b>4A</b> Two Slot Chip Guard	<b>13</b> Slipper	<b>101</b> Double Angular Contact Bearing	<b>115</b> Centralizing Screw
<b>5</b> Front Body	<b>14</b> Slipper Pin	<b>104</b> Spring	
<b>6</b> Toolslide	<b>15</b> Copper Pad	<b>108</b> Oiler	
<b>7</b> Rear Body	<b>16</b> Shank	<b>109</b> Retaining Screw	

# Pilots

Pilots are required to locate and stabilize the recessing head in the component bore. All pilots are manufactured to suit the application. Although the basic design and dimensions are standardized as shown on page 18, the locating diameter of the pilot is designed specifically for your component. Part pilots are retained in the master pilot by three retaining screws.

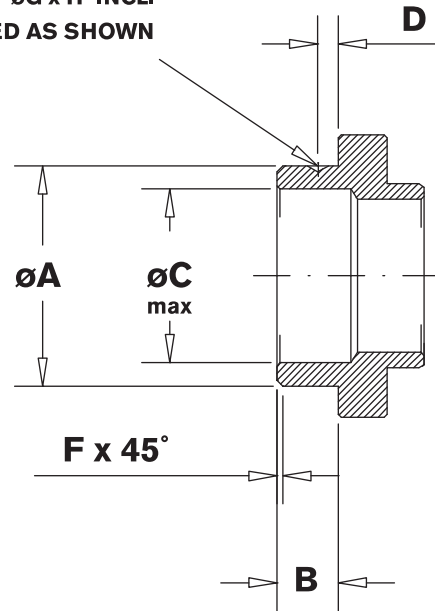


MASTER PILOT



PART PILOT

3-DRILL DIMPLES  
 $\phi G \times H^\circ$  INCL.  
 EQUI-SPACED AS SHOWN



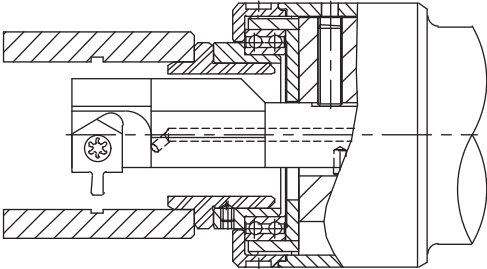
Note: If machine lacks internal coolant capability, part pilot must be designed with coolant windows

INCH [METRIC]

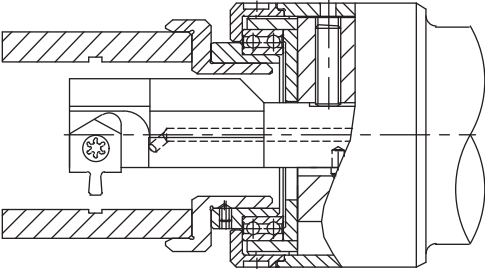
HEAD PILOTS	( $\phi A$ ) -.0003 [-0.008]	(B)	( $\phi C$ ) MAX	(D) -.005 [-0.13]	( $\phi E$ ) -.005 [-0.13]	(F)	(G)	(H)
<b>ARSP-1</b>	.5904 [14.995]	.394 [10.00]	.472 [12.00]	.098 [2.50]	.909 [23.10]	.394 [1.00]	.138 [3.50]	120°
<b>ARSP-2</b>	1.0896 [27.675]	.551 [14.00]	.969 [24.60]	.098 [2.50]	1.409 [35.80]	.394 [1.00]	.138 [3.50]	120°
<b>AR10 ARX10</b>	.5904 [14.995]	.500 [12.70]	.472 [12.00]	.100 [2.55]	.844 [21.45]	.394 [1.00]	.138 [3.50]	120°
<b>AR16 ARX16</b>	1.415 [35.95]	.551 [14.00]	1.295 [32.90]	.130 [3.30]	1.811 [46.00]	.394 [1.00]	.138 [3.50]	120°
<b>AR20 ARX20</b>	1.772 [44.99]	.748 [19.00]	1.63 [41.4]	.148 [3.75]	2.299 [58.40]	.394 [1.00]	.177 [4.50]	120°

ALL UNSPECIFIED DIMENSIONAL TOLERANCES ARE  $\pm 0.005$  [0.13]

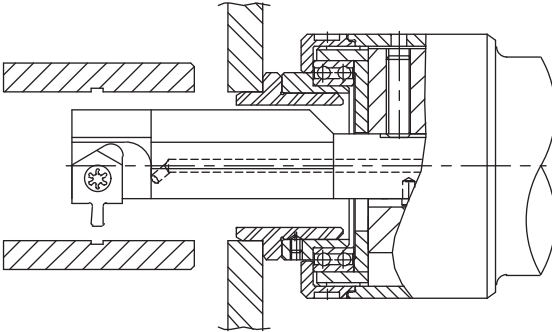
*Pilots on I.D. and stops on face of component.*



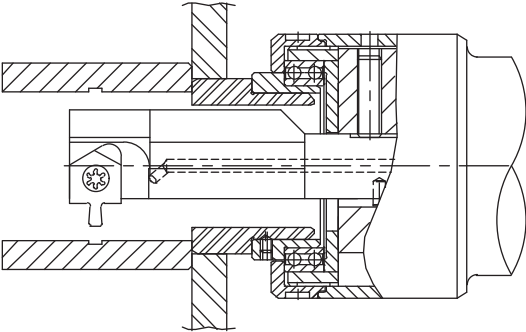
*Pilots on O.D. and stops on face of component.*



*Pilots and stops on fixture plate.*



*Pilots on fixture plate and stops on face of*



# Toolholders, Cutters, Inserts

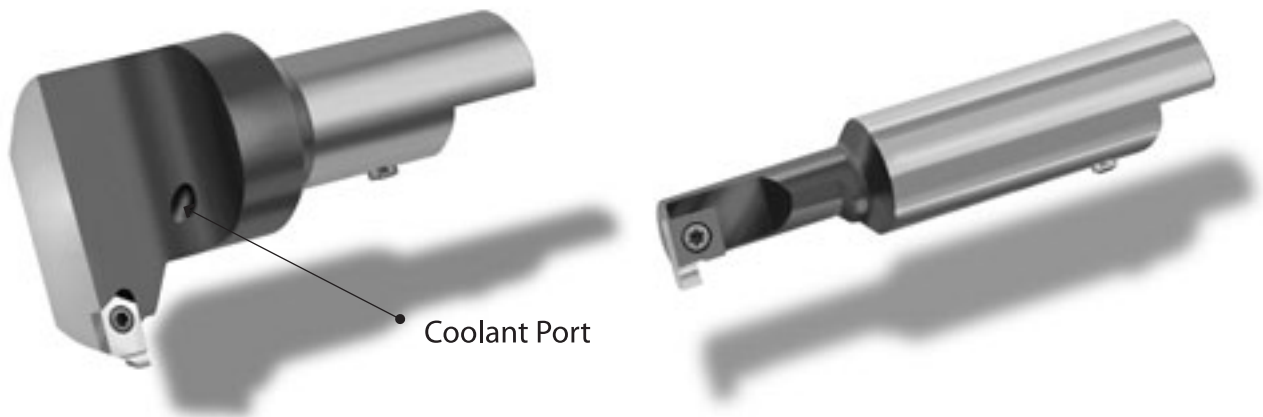
**AR Series**  
AUTOMATIC RECESSING

Toolholders are designed to suit the application. The basic design of the toolholder is standardized (see page 21), but the diameter and length of the holder is designed to suit your component.

Toolholders with replaceable inserts are used where application parameters permit. As a general rule, toolholders for holes 9/16 inch (approx. 14.5mm) and larger utilize replaceable inserts. Cutters for smaller diameters are usually of brazed-carbide or high-speed steel construction.

Our improved toolholder design allows fast and easy incremental adjustment of axial groove location without removing the toolholder from the head.

Many inserts can be manufactured from standard blanks (see bottom of page 21.) Toolholders and inserts can be designed for back-chamfers, thread reliefs, multiple grooves, and special groove geometries; submit a part print and request a quotation. Toolholders can be designed with an internal coolant port where required (see example below).



***Our improved toolholder design allows fast and easy incremental adjustment of axial groove location without removing the toolholder from the head.***

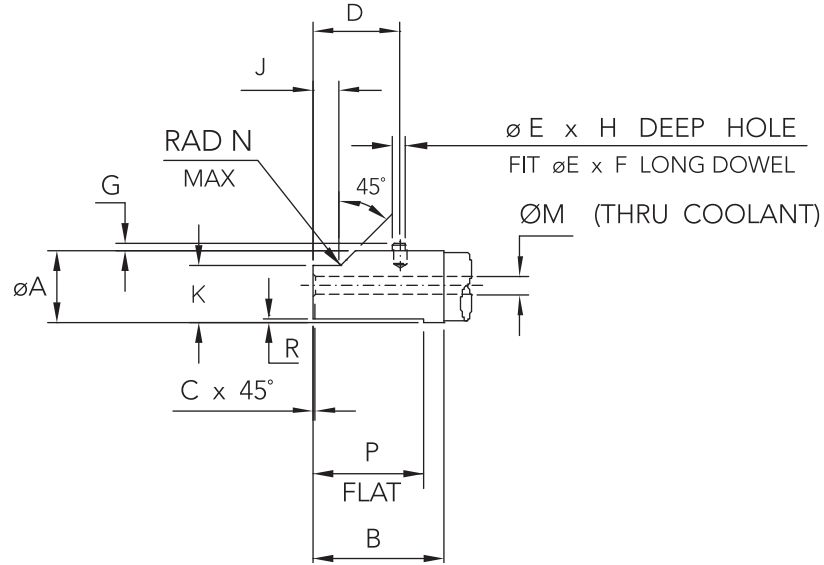
***(See set-up and operation guide on page 22 for more information)***

# Specifications

## TOOLHOLDER

## AR Series

## AUTOMATIC RECESSING



### METRIC [INCH]

HEAD TYPE	(A)	(B)	(C)	(D)	(E)	(F)	(G) h11	(H)	(J)	(K)	ø(M)	(N) max	(P)	(R)
<b>ARSP-1</b>	10.00 [0.394]	12.70 [0.500]	0.50 [0.020]	9.00 [0.354]	1.50 [0.059]	3.00 [0.118]	0.70 [0.028]	2.30 [0.091]	3.35 [0.132]	8.00 [0.315]	3.00 [0.118]	0.50 [0.020]	9.50 [0.374]	0.70 [0.028]
<b>ARSP-2</b>	12.00 [0.472]	17.25 [0.679]	0.50 [0.020]	12.50 [0.492]	3.00 [0.118]	5.00 [0.197]	1.60 [0.063]	3.40 [0.134]	5.75 [0.226]	9.50 [0.374]	3.00 [0.118]	0.50 [0.020]	15.50 [0.610]	0.80 [0.031]
<b>AR10</b>	10.00 [0.394]	20.80 [0.819]	0.50 [0.020]	15.25 [0.600]	1.50 [0.059]	3.00 [0.118]	0.80 [0.031]	2.20 [0.087]	6.70 [0.264]	7.75 [0.305]	3.00 [0.118]	0.50 [0.020]	19.00 [0.748]	0.70 [0.028]
<b>AR16</b>	16.00 [0.630]	29.50 [1.161]	0.50 [0.020]	19.50 [0.768]	3.00 [0.118]	5.00 [0.197]	1.60 [0.063]	3.40 [0.134]	6.10 [0.240]	12.50 [0.492]	4.00 [0.157]	0.50 [0.020]	26.50 [1.043]	0.80 [0.031]
<b>AR20</b>	20.00 [0.787]	36.30 [1.429]	0.50 [0.020]	25.40 [1.000]	5.00 [0.197]	6.00 [0.236]	1.75 [0.069]	4.25 [0.167]	10.00 [0.394]	15.50 [0.610]	5.00 [0.197]	0.50 [0.020]	33.30 [1.311]	1.00 [0.039]

### AR Series Replaceable Inserts



Standard insert blanks



Replaceable carbide inserts are used where applications permit. Special or intricate geometries are available.

There are four basic steps to the set-up of **AR** Series Automatic Recessing heads. (Set-up procedures differ somewhat for internal and external heads.)

### 1 Install pilot

For all head types, the pilot must be installed in the head.

The pilot will fit either directly into the sealed bearing or into a master pilot for quick and easy tool changes.

### 2 Install cutter/toolholder

The cutter normally comes in three different styles:

- High-speed steel cutter
- Tungsten carbide brazed-tip cutters
- Replaceable-insert toolholders

For **internal recessing heads**, install the cutter in the head with the cutting edge pointing in the direction of cut (i.e., in the direction of toolslide movement). The cutter is clamped and fixed in position by two set screws in the head. The cutter must be positioned radially in the head so that the cutting edge will be on center as the tool moves out to cut. This is facilitated by the use of a key in the cutter shank, which automatically aligns the cutting edge on center.

For **external recessing heads**, install the toolblock onto the toolslide and secure in place with two caphead screws. An adjustable cartridge is fitted to the toolblock and held in place by a buttonhead screw. An inexpensive, replaceable insert is fitted to this cartridge and secured in place by an insert screw. The cutting edge of the insert is automatically aligned on center as the toolblock is secured to the head.



### 3 Set cutter projection from pilot

For all head types, the projection of the cutter from the pilot must be set properly in order to achieve accurate groove location.

For **internal recessing heads**, groove location is controlled by the tool adjustment set screw, which is located in the toolslide. The tool adjustment screw is accessed through a hole in the chip guard on the front shell. Insert the toolholder until it bottoms out in the toolslide. Tighten tool adjustment screw and move cutter out until the set dimension (between cutter and pilot) is achieved. Then lock the cutter in place by tightening the locking set screws.

For **external recessing heads**, groove location is controlled by a set screw in the end of the adjustable cartridge that is mounted on the toolblock. Once the groove location is set, lock the cartridge in place with the buttonhead locking screw.

(continued)

### 4 Depth of cut/tool travel

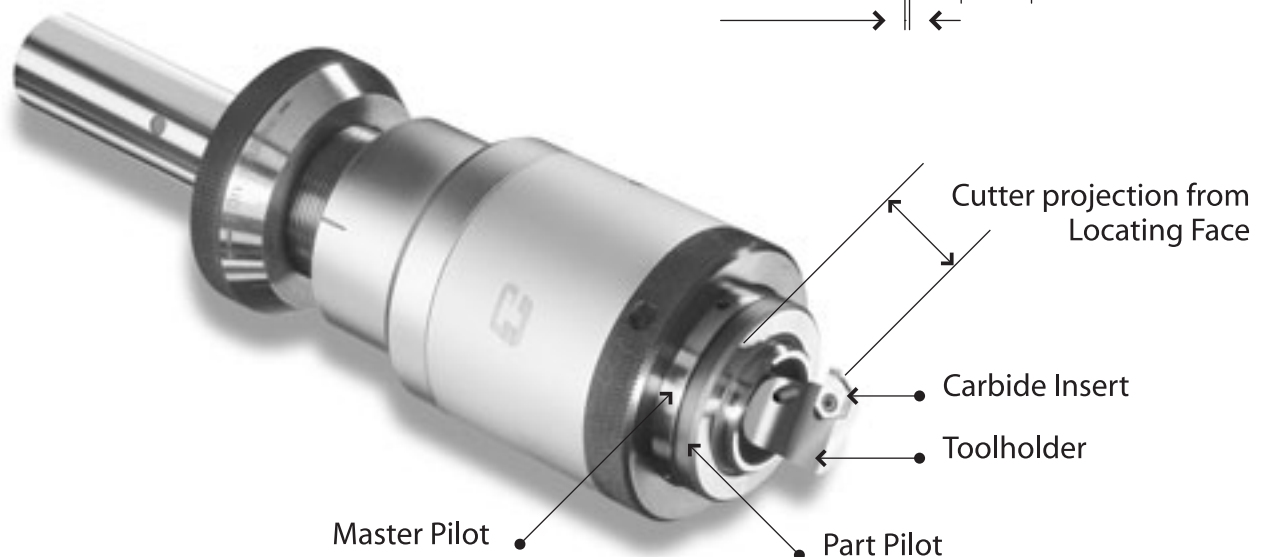
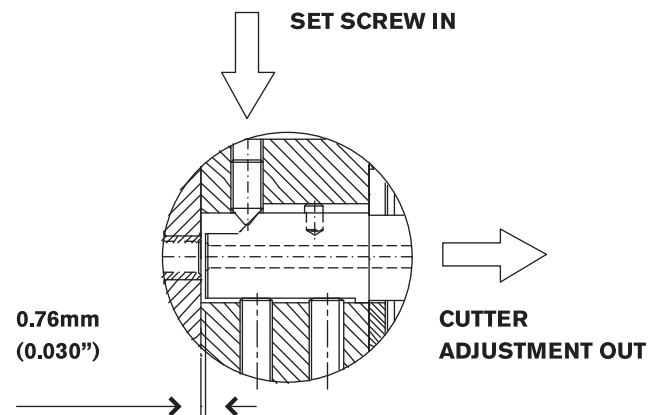
For all head types, depth of cut is controlled by a micrometer nut that allows the head to pre-set off the machine. The standard tool feed ratio for all heads is 2:1 (i.e., the ratio of spindle to radial cutter movement).

Refer to the drawing supplied with the tool for the set-up dimension. If the drawing is unavailable, follow this procedure: Add the depth of cut (the distance from the I.D. of the bore to the bottom of the groove) to the clearance between the cutter and the I.D. of the bore. Multiply this figure by the feed ratio (i.e., multiply by 2 for standard feed ratio) in order to arrive at the distance to set the micrometer nut from the front body. This distance should be set using gauge blocks or by fine-tuning the micrometer nut position manually to achieve the desired groove depth.

HEX WRENCHES REQUIRED FOR ADJUSTING AR HEADS

HEAD TYPE	MICROMETER NUT SCREW	INSERT TOOL HOLDER (LENGTH ADJ.)	MASTER PILOT
AR10	1.5mm	2.0mm	1.5mm
AR16	3.0mm	3.0mm	1.5mm
AR20	4.0mm	4.0mm	2.0mm
ARSP-1	1.5mm	1.5mm	1.5mm
ARSP-2	2.5mm	2.5mm	1.5mm

Approximate adjustment gap for all internal recessing heads, when tool is in set position.



## Speeds & Feeds

Please refer to the charts below for **speed and feed recommendations** for specific material types. The charts are intended as a guide or starting point; the actual speed and feed used will depend on a number of factors, including type of machine, condition of machine spindle, rigidity of fixturing, type of coolant used or dry cutting, tool length, cutter geometry, interrupted cut, etc.

### INCH

MATERIAL	CUTTING SPEED (FT/MIN)		FEED RATE (INCHES/REV)		TOP RAKE (DEGREES)	
	HSS	Carbide	HSS	Carbide	HSS	Carbide
Aluminum	200–300	400–700	.002–.005	.002–.005	10–15	8–12
Brass	100–200	200–525	.002–.005	.002–.005	0–3	0–3
Bronze	50–130	100–400	.002–.005	.002–.005	3–5	3–5
Cast Iron	50–90	100–180	.002–.004	.002–.005	0–3	0–3
Copper	100–200	200–400	.002–.004	.002–.005	10–15	8–12
Magnesium	200–300	400–700	.004–.006	.004–.006	10–15	8–12
Malleable Cast Iron	50–90	100–200	.002–.004	.003–.005	0–3	0–3
Resin (Plastic)	70–135	160–400	.004–.006	.004–.006	10–15	8–12
Free Cutting Steel	70–100	100–230	.002–.004	.003–.005	5–10	4–8
Annealed Steel	50–70	100–200	.002–.004	.003–.005	5–8	3–6
Wrought Steel	35–70	85–220	.002–.003	.003–.004	5–8	3–6
Alloy Steel	35–70	85–220	.002–.003	.003–.004	4–6	3–6
Tool Steel	35–50	85–150	.001–.002	.002–.003	4–6	3–6
Monel & Stainless	85–135	150–250	.001–.003	.002–.004	10–20	8–12

### METRIC

MATERIAL	CUTTING SPEED (M/MIN)		FEED RATE (MM/REV)		TOP RAKE (DEGREES)	
	HSS	Carbide	HSS	Carbide	HSS	Carbide
Aluminum	60–90	120–210	0,05–0,13	0,05–0,13	10–15	8–12
Brass	30–60	60–160	0,05–0,13	0,05–0,13	0–3	0–3
Bronze	15–40	30–120	0,05–0,13	0,05–0,13	3–5	3–5
Cast Iron	15–25	30–55	0,05–0,10	0,05–0,13	0–3	0–3
Copper	30–60	60–120	0,05–0,10	0,05–0,13	10–15	8–12
Magnesium	60–90	120–210	0,10–0,15	0,10–0,15	10–15	8–12
Malleable Cast Iron	15–25	30–60	0,05–0,10	0,08–0,13	0–3	0–3
Resin (Plastic)	20–40	50–120	0,10–0,15	0,10–0,15	10–15	8–12
Free Cutting Steel	20–30	30–70	0,05–0,10	0,08–0,13	5–10	4–8
Annealed Steel	15–20	30–60	0,05–0,10	0,08–0,13	5–8	3–6
Wrought Steel	10–20	25–65	0,05–0,08	0,08–0,10	5–8	3–6
Alloy Steel	10–20	25–65	0,05–0,08	0,08–0,10	4–6	3–6
Tool Steel	10–15	25–45	0,03–0,05	0,05–0,08	4–6	3–6
Monel & Stainless	25–40	45–75	0,03–0,08	0,05–0,10	10–20	8–12

*(continued)*

## Coolant

Regarding the use of **coolant**, follow normal machine shop procedures for the cutter material and the material to be machined.

## Lubrication

**1** We recommend a water resistant grease for use in these heads. **Kluber Altemp Q NB50** has been thoroughly tested and found to perform exceptionally well – it is the only grease we recommend. It should be applied to all moving parts and surfaces when the head is disassembled for cleaning and maintenance, or if the head will be stored for extended periods. Disassembly and cleaning should be done periodically.

**2** To lubricate the heads during use, apply **Kluber Altemp Q NB50** grease through the external oilers or grease fittings on the head. This should be done on a weekly basis, or more frequently if necessary. Lubrication frequency can vary depending on the working environment, operational speed, coolant used, and number of cycles. **Remember, adequate lubrication is vital to long head life and trouble-free performance.**

**3** A high-pressure hand pump lube gun is available from Cogsdill to make routine maintenance easy. (Ref. Part No. **CN-D24**)

# Other Non-Stocked and Special Recessing Solutions

**AR Series**  
AUTOMATIC RECESSING



## AR-S

A variation of the AR head for use on CNC machining or turning centers. No micrometer stop for depth control. Depth of cut is controlled by “Z” axis; axial adjustment is controlled by tool adjustment. Through-tool coolant.

## ARX-S

A variation of the ARX head for use on CNC machining or turning centers. No micrometer stop for depth control. Depth of cut is controlled by “Z” axis; axial adjustment is controlled by tool adjustment.



## ARJ

Designed to run in a rotating bushing mounted in a jig plate. Exceptional rigidity, especially at high cutting speeds. Micrometer stop controls depth of cut. Through-tool coolant.

## ARXJ

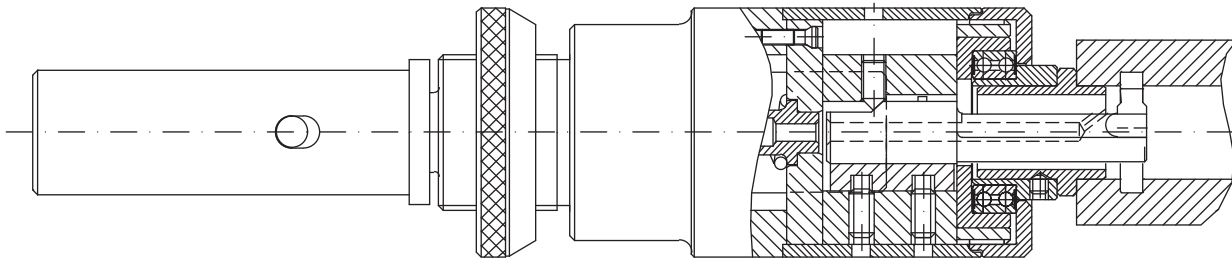
For machining grooves or forms in larger bores or for other special applications. Rigid support in heavy cuts. Micrometer stop controls depth of cut. Axial location controlled by adjustable thrust housing. Through-tool coolant.



**Inquire about these and other non-stocked and special Recessing tool designs. Submit a completed Application Data Sheet (see pages 62-63) and request a quotation, or contact our Customer Service Department for more information.**

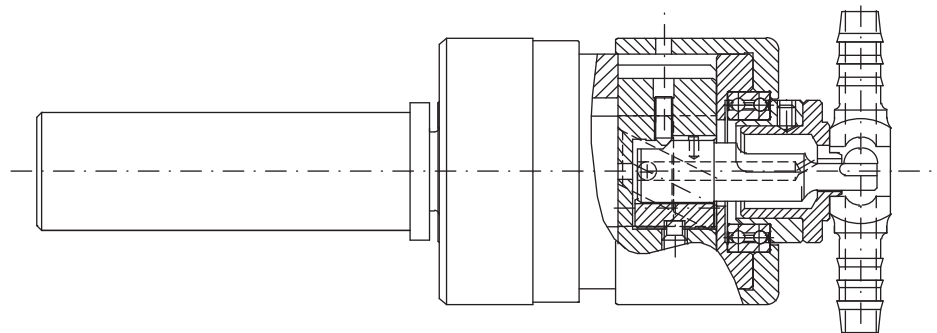
## **AR10** Internal Recessing Head

performing an I.D. grooving operation; pilots in part



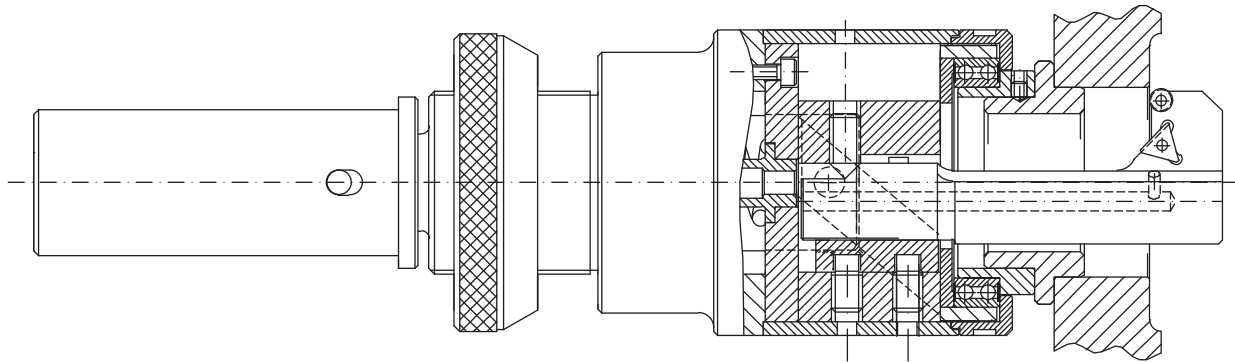
## **ARSP1** Internal Recessing Head

machining an I.D. groove with a radius on a banjo fitting; pilots in part



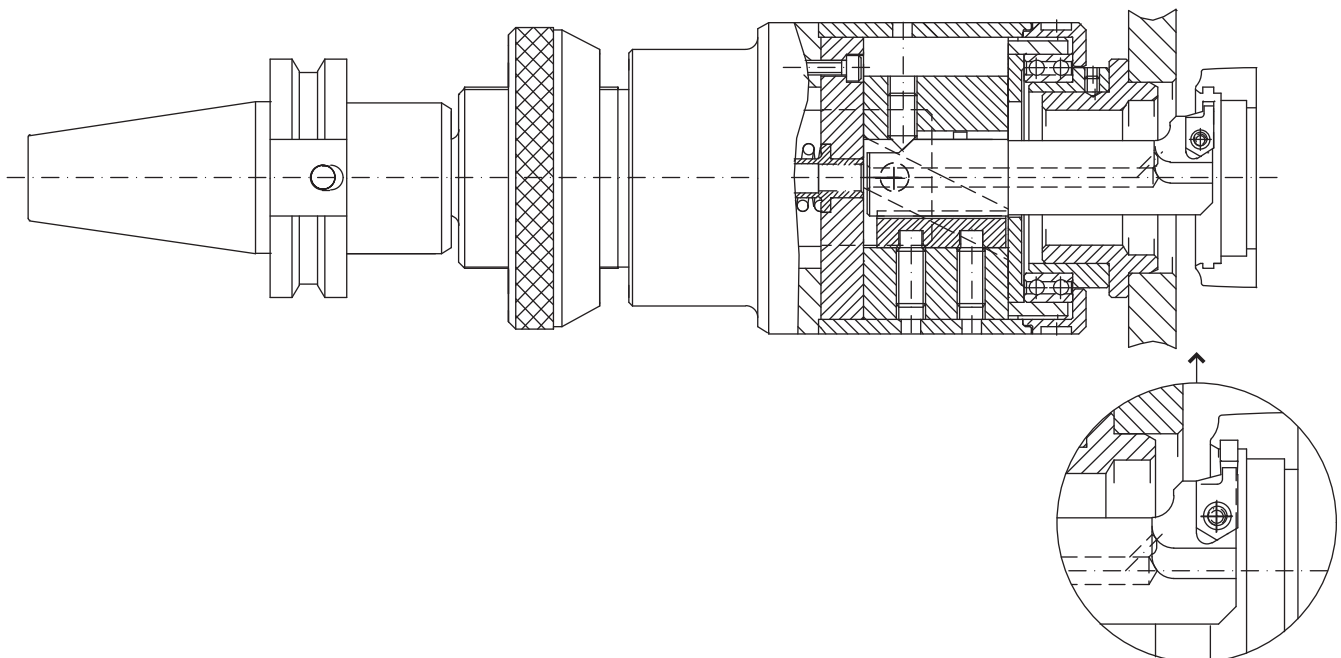
## **AR20** Internal Recessing Head

machining a back-spotface with an I.D. chamfer; pilots in part



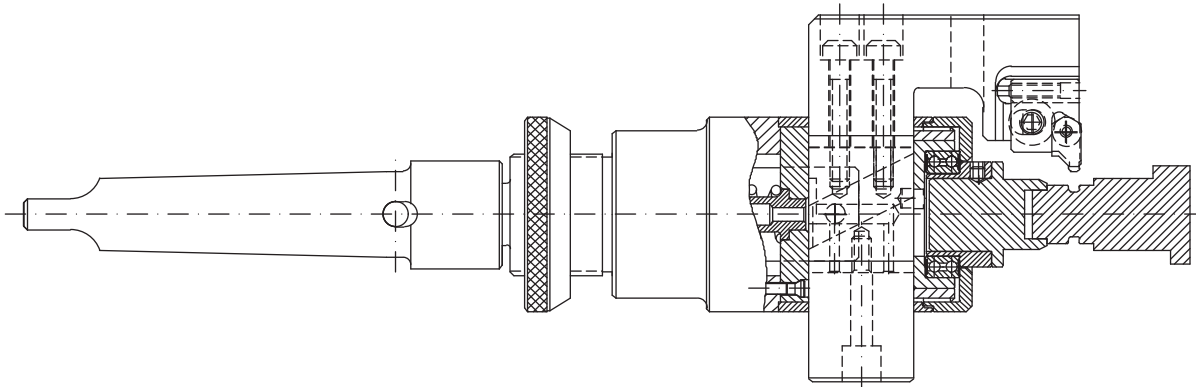
## **AR16** Internal Recessing Head

performing an I.D. grooving operation; pilots in fixture plate



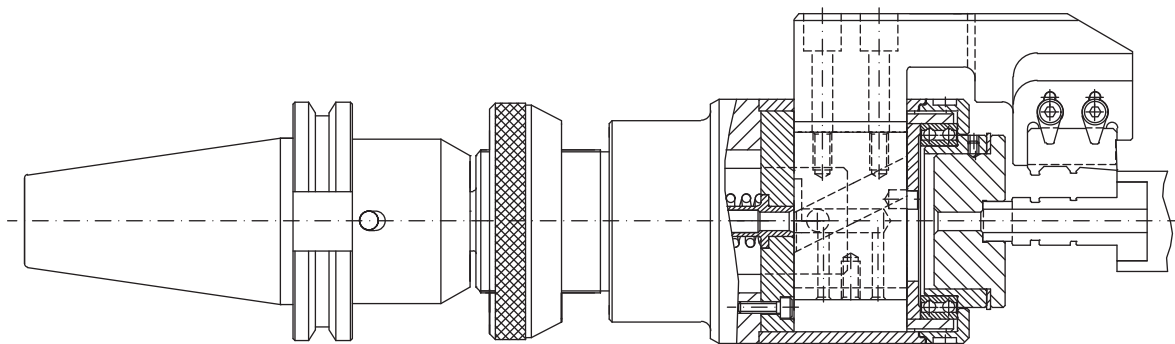
## **ARX10** External Recessing Head

performing an O.D. grooving operation; pilots on part O.D. and includes balance weight



## **ARX16** External Recessing Head

machining a face and a double groove on an O.D.; pilots on part O.D.



## Nobur® JA Recessing Head

**For deep bore recessing and grooving.**

**A tool for use on:**

- Drill presses
- Jig boring machines
- Milling machines
- CNC machines
- Tool or turret lathes
- Horizontal boring machines
- Special purpose machines



### **Features:**

- In-bore pilot supports cutter along its entire length – eliminates tool deflection; ensures concentricity through rigid cutting action
- Micrometer-stop adjustment
- Multiple grooves, chamfers, or metering lands
- O-ring and retaining ring grooves
- Relief grooves and tube sheet grooves
- Back-chamfering and facing of deep bores

## Nobur® JA2000 Recessing Head

### For deep bore recessing and grooving.

Designed for heavier cuts than the regular **JA**.

Innovative internal coolant system directs coolant to cutting edges for improved chip evacuation, longer tool life, better tool function, and improved repeatability.

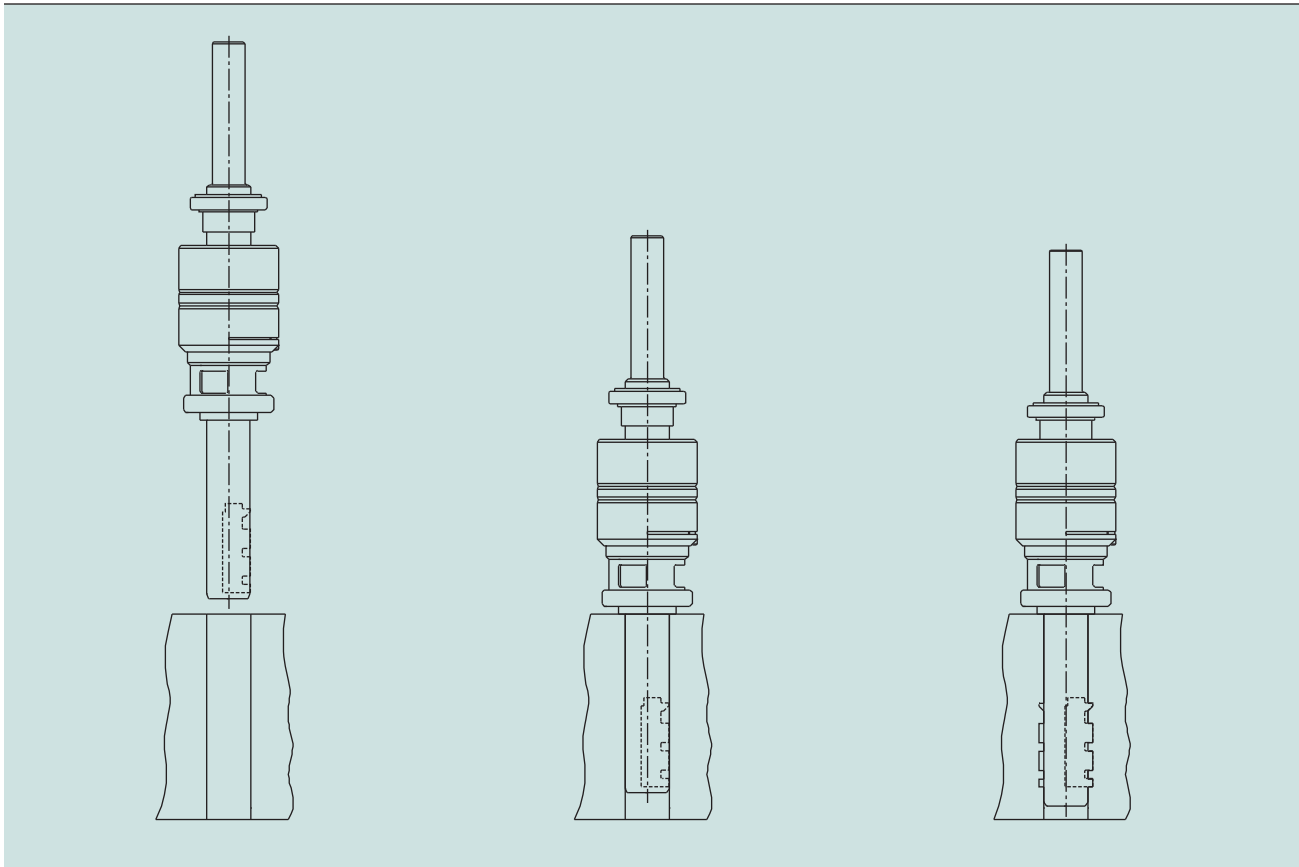
For use on machines with internal coolant capability. \*



### Features:

- Same in-bore pilot support and micrometer-stop adjustment as the regular **JA**
- Capable of wider cuts than the regular **JA** in some applications
- Extremely durable high-load precision dual bearings for long life
- Easy disassembly and reassembly for maintenance
- Overtravel units available upon request

\* **JA2000** Recessing Heads can be ordered in a Side-Port model for use on machines that do not have through-spindle coolant capability. Through-shank coolant is standard; specify side-port coolant if desired.



## 1 Approach Stroke

The **Nobur® JA** tool is rotating in a machine spindle. The spindle is lowered. The tool approaches entry into the bore.

## 2 Feed Stroke

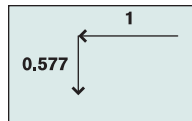
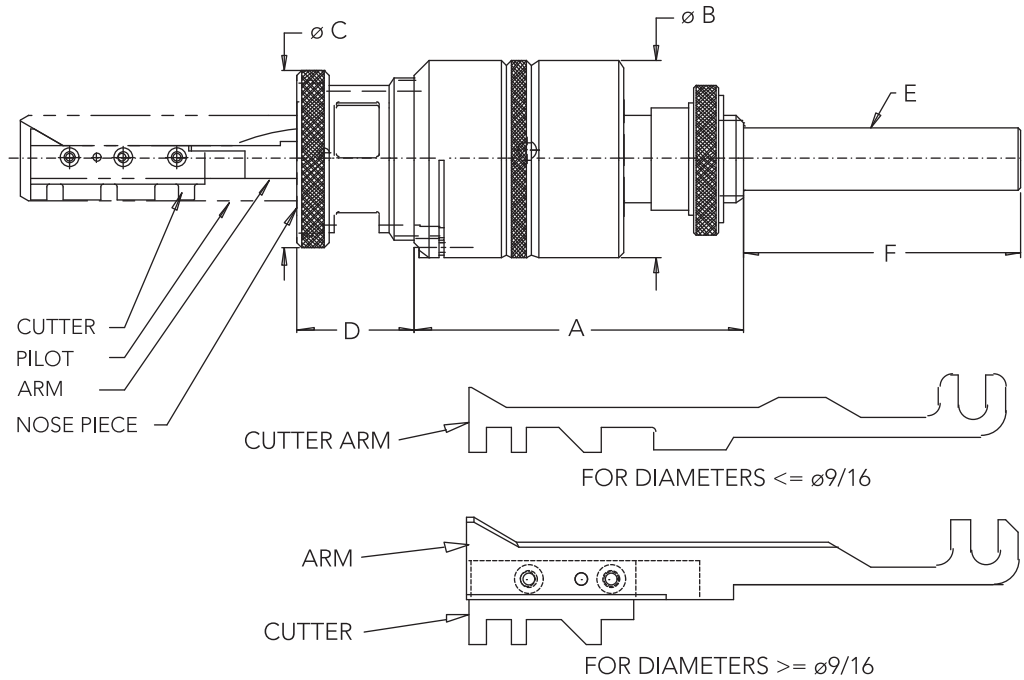
The pilot is located in the bore, stopping against the face of the workpiece. Downward travel of the machine spindle compresses the tool so that the cutter feeds out radially into the surface of the workpiece. The pilot rigidly supports the cutter along its entire length to eliminate deflection and ensure concentricity.

## 3 End of Feed Stroke

Radial depth of cut is obtained when the micrometer-stop nut bottoms out. Groove location is controlled by the adjusting stop-collar, which moves the nosepiece up or down to position the cutter arm for accurate groove location.

# Specifications

## Nobur® JA Series AUTOMATIC RECESSING DEEP HOLE



The **Feed Ratio** is the ratio of spindle to radial cutter movement

HEAD TYPE	CAPACITY <sup>1</sup>		(A) FREE		(B)		(C)		(D) MAXIMUM		(D) MINIMUM		(E) SHANKS <sup>2</sup>	(F)	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm		in	mm
<b>JA</b>	0.25	6.300	3.82	97.00	2.28	57.90	2.06	52.30	2.24	56.90	1.24	31.50	3/4" straight <sup>3</sup>	3.25	82.60
	1.85	47.10											1"-12 acme	3.63	92.20
													1-1/16"-12 acme	3.19	81.00
													#2 morse taper	3.88	98.60
<b>JA2000</b>	0.25	6.300	4.43	112.5	3.36	85.40	3.00	76.20	1.53	38.90	1.03	26.20	1" straight <sup>4</sup>	3.00	76.20
	1.85	47.10													

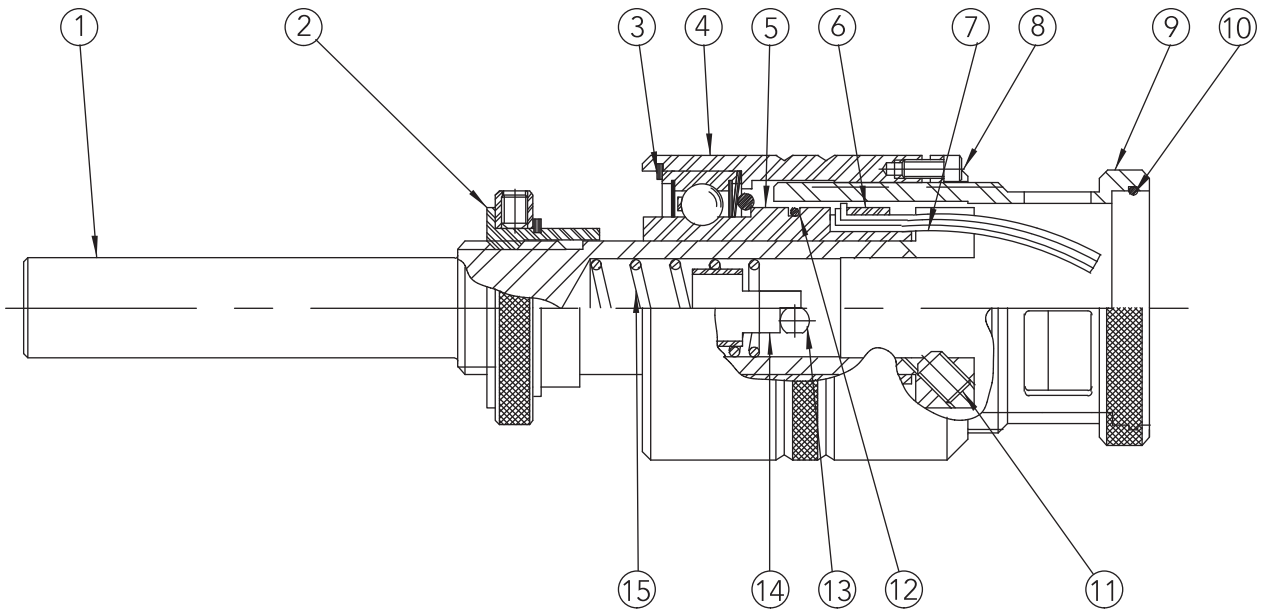
**1** Capacity means the suggested maximum groove diameter. Dependent upon cutting forces and bore diameter. Stated capacity is for steel.

**2** Shank is included with head. Shanks other than shown can be supplied upon request.

**3** Supplied with through-tool coolant.

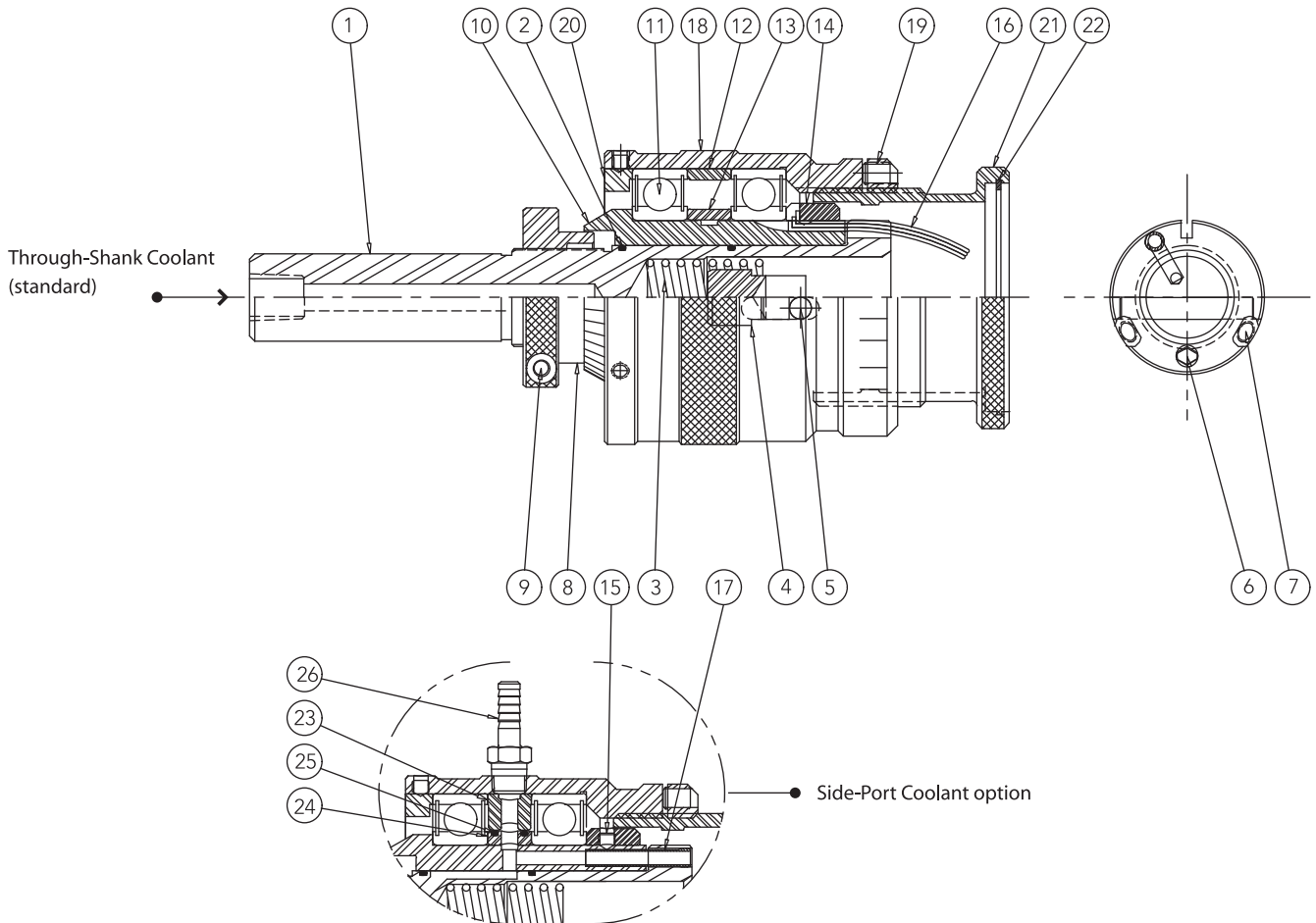
**4** Through-shank coolant is standard; specify side-port coolant if desired.

## Nobur<sup>®</sup> JA Recessing Head



<b>1</b> Body Holder	<b>5</b> Bearing Assembly	<b>9</b> Stop Collar-Adjustment	<b>13</b> Pin
<b>2</b> Adjustment Nut Assembly	<b>6</b> Collar Hub Mounting	<b>10</b> Retainer Ring-Insert	<b>14</b> Spacer/Bushing/Spring
<b>3</b> Snap Ring	<b>7</b> Leaf Spring (Quantity 3)	<b>11</b> Lock Screw	<b>15</b> Compression Spring Return
<b>4</b> Housing-Bearing Stop Collar	<b>8</b> Screw Locking-Housing	<b>12</b> Retainer Loop	

## Nobur® JA2000 Recessing Head



**NOTE:** Coolant location can be changed in the field; consult Sales Department.

1 Spindle	8 Stop Nut	15 Cone Point Screw	22 Retaining Ring
2 O-Ring	9 Socket Head Cap Screw	16 Leaf Spring	Details 23 thru 27 optional
3 Compression Spring	10 Bearing Sleeve	17 Coolant Tube	23 Outer Bearing Spacer
4 Spacer Bushing	11 Ball Bearing	18 Housing	24 Inner Bearing Spacer
5 Pin	12 Outer Bearing Spacer	19 Flat Point Set Screw	25 O-Ring
6 Drive Pin	13 Inner Bearing Spacer	20 Bearing Retainer	26 Coolant Nipple
7 Flat Point Set Screw	14 Bearing Collar	21 Stop Collar	27 Pipe Plug (not shown)

Cogsdill **Nobur<sup>®</sup> JA** tools are easily set. Since the precision feed motion is built into the head, only two adjustments are required in order to properly set up a tool for operation. Occasionally, compensating adjustments might be required if there is an error in the initial settings, or to compensate for cutter wear. However, by following the steps prescribed below, it will be easy to attain the initial set-up.

### 1 Set front stop collar

This setting determines the position of the groove(s) relative to the face of the part, or other surface from which the tool actuates. Simply adjust the threaded stop collar, measuring from the face of the collar to the top corner of the cutter until the correct distance is established (refer to photo **A**). Once set, the locking screw on the outer tool body should be tightened.

### 2 Set the groove diameter to be cut

On manually fed machines, this setting is established by adjusting the threaded diameter stop nut at the rear of the tool body. Because the cutter motion is radial, the groove cut diameter can be measured by using a micrometer to measure directly across the pilot and cutting edge when the head is compressed (refer to photo **B**). Since the pilot is .002 in. (0.05mm) under the smallest bore diameter, the cutter should project from the pilot for a distance equal to the required depth of cut. An alternative setting method is to measure the projection of the cutter using a surface plate indicator relative to the centerline of the bore.

Setting the groove diameter for machines with power feed requires that the diameter stop nut be backed away (toward the rear of the tool) so that it becomes non-operative. Tools with Acme-threaded shanks do not have the diameter stop nut. The automatic feed on the machine is then set to produce the cutter projection required to cut the desired groove diameter. Preset holders and gauges may also be used to establish the spindle travel limits.



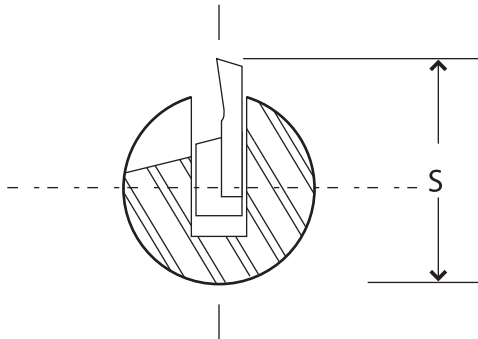
Since cutter deflection is eliminated due to the support of the cutter by the arm and pilot, no compensation is required. Once the above settings are verified, the tool is ready to use. However, please remember that variations in bore diameter can cause groove dimensions to vary. A variation of .001 in. (0.02mm) in bore diameter can result in a .002 in. (0.05mm) variation in groove diameter. Therefore, bore tolerances must be limited to less than 1/2 of the tolerance required for the groove diameter. If this tolerance requirement presents a problem, it might be necessary to pilot the tool in a fixture instead of piloting in the bore. The diagram on page 37 shows how to measure a tool to cut a specific diameter.



(continued)

## Diameter Setting Methods

### BY MICROMETER

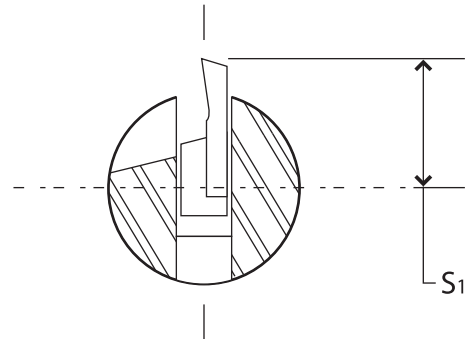


$$S = \frac{\text{Groove Dia.} + \text{Bore Dia.}}{2}$$

**OR**

$$S = \frac{\text{Groove Dia.} + \text{Pilot Dia.}}{2} + .002$$

### BY INDICATOR



$$S_1 = \frac{\text{Groove Dia.}}{2} + .002$$

In order to measure for a specific groove cut diameter, the tool must be actuated to the limit setting by compressing the actuating assembly against the diameter stop nut. The nominal clearance between the pilot diameter and the minimum bore diameter is .002" (.05mm).

### Tool Operation

Cogsdill **Nobur® JA** Recessing tools operate automatically as axial spindle travel is converted into radial cutter travel within the head. The pilot enters the bore and the stop collar contacts the front of the part. Continued spindle travel results in corresponding cutter travel which is rigidly supported within the part for extreme accuracy. A sealed bearing between the tool body and the stop collar prevents marking of the workpiece.

Radial cutter advancement is approximately 1/2 of spindle travel. Depth of cut is precisely controlled by an adjustable diameter stop nut located on the back end of the tool. A feed rate of .003–.005 IPR (0.08–0.13mm) is generally used.

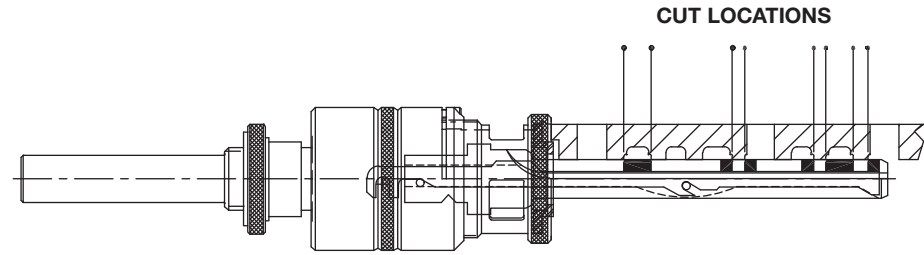
Upon completion of the cut, tool withdrawal feed should be at the cutting feed rate until the stop collar no longer contacts the part. This will ensure that the cutter has fully retracted into the pilot before the tool is withdrawn from the part.

### Tool Lubrication

In applications where water soluble or synthetic coolants are used, we recommend that, when the machine and tool are idle, the tool be removed from the spindle and immersed in oil to keep it lubricated and to prevent rusting of the internal mechanism.

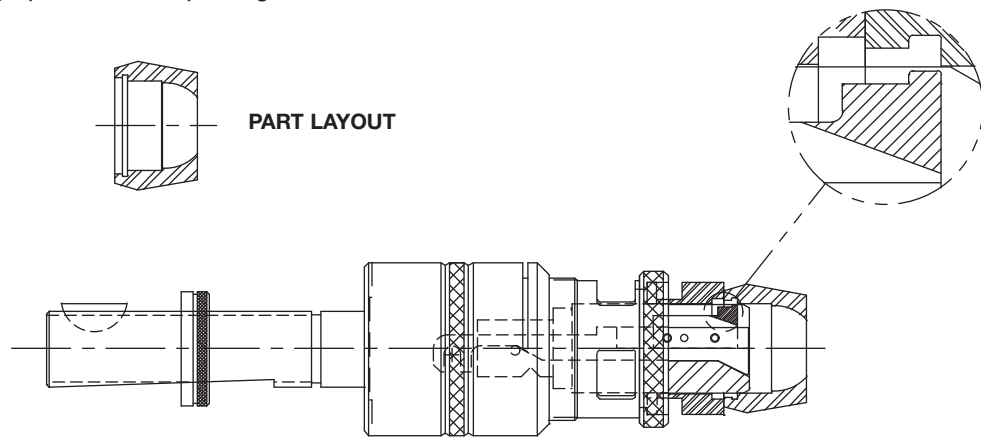
## Nobur® JA Recessing Head

machining eight metering lands in one pass



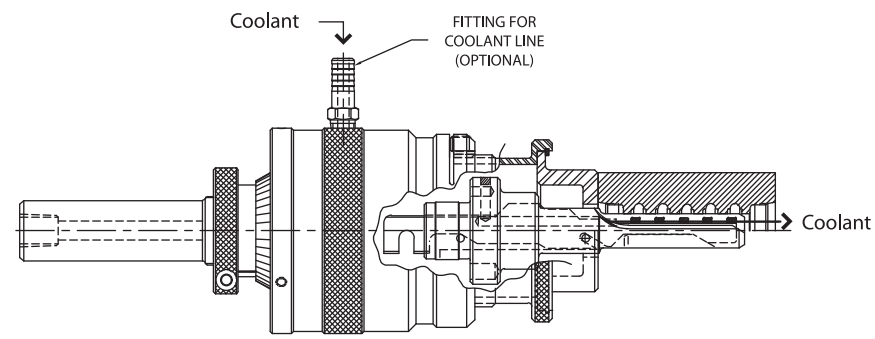
## Nobur® JA Recessing Head

performing grooving operation with piloting area in advance of cut



## Nobur® JA Recessing Head

back-cutting five locations



# Tube Sheet Pro™ Grooving Tool

For grooving tube sheets in heat exchangers, condensers, and boilers with maximum productivity and professional results. Available from stock for four standard tube diameters: 5/8, 3/4, 7/8, and 1 inch. Designed for industry-standard double-groove configuration.

**INDUSTRY-  
STANDARD  
DOUBLE-GROOVE  
CONFIGURATION**

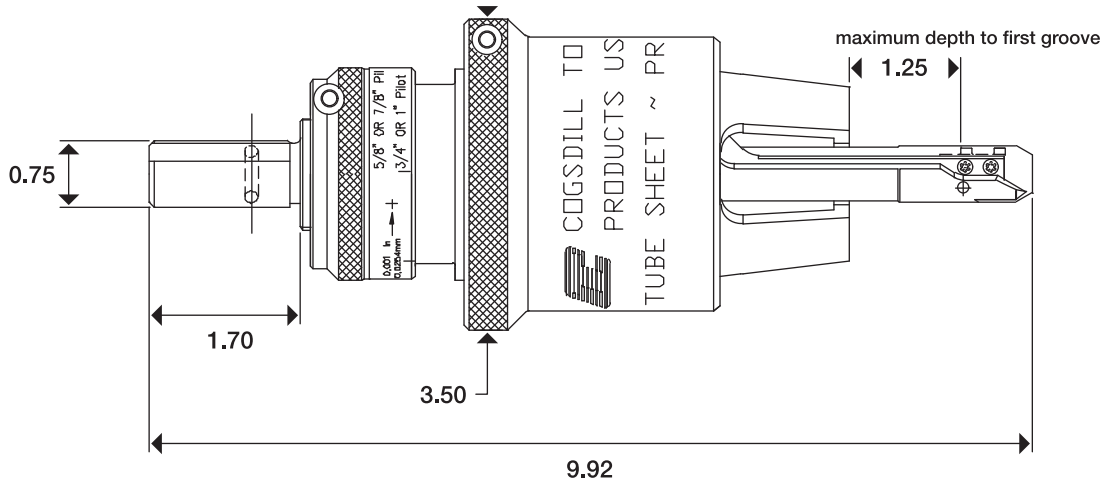
- High-quality tool with a proven design for grooving tube sheets of all standard materials.
- Smooth operation for accurate groove size and location, with good finishes.
- Easy to adjust for accuracy from the very first cut. Set-up instructions are marked on tool body for handy reference—no measurements are required.
- Easy cutter replacement—no disassembly required.
- Short tool stroke, with no exposed mechanism—no chip packing or “sticking.”
- TiN-coated high-speed steel cutters for long life.
- Pilots, specifically designed to maximize coolant flow for enhanced tool life, are interchangeable for easy diameter changes.
- Optional overtravel units available for use on CNC machines or other automated machinery, or when tube sheet is warped.



Interchangeable pilots allow easy diameter changes. Pilots are specifically designed to maximize coolant flow for enhanced tool life.



High-speed steel cutters are TiN-coated for long life.



Note: Pilots made to fit TEMA standard tube sheet hole diameters.  
(See under "Pilot Only," below.)

Overtravel and Morse taper shanks are available. (See below.)

### ■ COMPLETE TOOL ASSEMBLY

Part number	Description
■ TSP-00625	5/8 in. complete tool with 3/4 in. SS
■ TSP-00750	3/4 in. complete tool with 3/4 in. SS
■ TSP-00875	7/8 in. complete tool with 3/4 in. SS
■ TSP-01000	1 in. complete tool with 3/4 in. SS
■ TSP-00625-3MT	5/8 in. complete tool with #3MT
■ TSP-00750-3MT	3/4 in. complete tool with #3MT
■ TSP-00875-3MT	7/8 in. complete tool with #3MT
■ TSP-01000-3MT	1 in. complete tool with #3MT
■ TSP-00625-1OT	5/8 in. complete tool with 1 in. SS with OT*
■ TSP-00750-1OT	3/4 in. complete tool with 1 in. SS with OT*
■ TSP-00875-1OT	7/8 in. complete tool with 1 in. SS with OT*
■ TSP-01000-1OT	1 in. complete tool with 1 in. SS with OT*

### ■ HEAD ASSEMBLY ONLY

Part number	Description
■ TSPH-3/4SS	Tube Sheet Pro head with 3/4 in. SS
■ TSPH-3MT	Tube Sheet Pro head with #3MT
■ TSPH-1OT	Tube Sheet Pro head with 1 in. SS with OT*

\*OVERTRAVEL

### ■ ARM ONLY

Part number	Description
■ TSP-02	Small arm (5/8-3/4 in.)
■ TSP-03	Large arm (7/8 – 1 in.)

### ■ PILOT ONLY

Part number	Nominal Size (in.)	Actual Pilot Dia. (in.)
■ TSP-04	5/8 in. pilot	.629
■ TSP-05	3/4 in. pilot	.754
■ TSP-06	7/8 in. pilot	.879
■ TSP-07	1 in. pilot	1.006

### ■ CUTTER ONLY

Part number	Description
■ TTSP-08	Standard cutter 2 x 1/8 in. grooves (1/4 in. spacing)
■ TSP-08A	Optional cutter 2 x 1/8 in. grooves (3/8 in. spacing)

Refer to details drawing on next page.

### ■ MAKE SURE

- The cutter (**Detail #8**) is mounted in the arm (**D #2 or #3**) with two (**2**) #4-40 x 0.25" Torx screws (**D #9**).
- The pilot (**D #4, #5, #6, or #7**) and arm are installed at the same time.
- The pull yoke end of the arm (**opposite the cutter end of the arm**) is installed on the dowel (pull) pin (**D #34**) in the recessing head. The arm should be installed with the elevated platform contacting the leaf springs (**D #24**) in the head.
- Insert the pilot into the head, making sure the arm is mounted in the slot in the pilot. The pilot must be centered in the head and flush with the mounting face. The pilot is held into place with three (**3**) #10-24 x 5/8" cap screws (**D #38**).

### ■ DEPTH TO CUT (groove location)

- The stop (**D #25**) and housing (**D #23**) move together to adjust the tool to the desired depth to cut. This adjustment is made by loosening the locking screw (**D #30**) and screwing the housing/stop in or out. Do not force the housing; it should turn freely when the locking screw is backed off. Secure the position of the housing and the stop with the locking screw. The stop should rotate freely at all times.

### ■ DEPTH OF CUT (groove diameter)

- The depth of cut is controlled and adjusted by the adjusting collar (**D #21**). The adjusting collar is marked with details for setting the tool for standard tube sheet grooves. The adjusting collar is also marked so it can be adjusted in 0.001" increments. The locking screw must be loosened to adjust the adjusting collar. When the desired depth of cut is achieved, tighten the locking screw on the adjusting collar. If the machine holding the tool is controlling the depth of cut, back the adjusting collar off and secure it so it will not stop or restrict the tool. The adjusting collar must remain on the tool in order for the tool to operate correctly.



The adjusting collar is marked with details for setting the tool for standard tube sheet grooves. The adjusting collar is also marked so it can be adjusted in 0.001" increments.

### ■ MAKE SURE

- The tool must be centered over the hole to be grooved.
- Refer below for speeds and feeds.
- Coolant is strongly recommended for longer cutter life.
- With the tool rotating, feed the tool down until the pilot is in the hole and the nosepiece has come into contact with the surface of the part.
- At this time the cutter will begin to actuate.
- Feed the tool in until the cut is complete (the adjusting collar bottoms out).
- Feed the tool out at the same rate.

### ■ CUTTER CHANGE

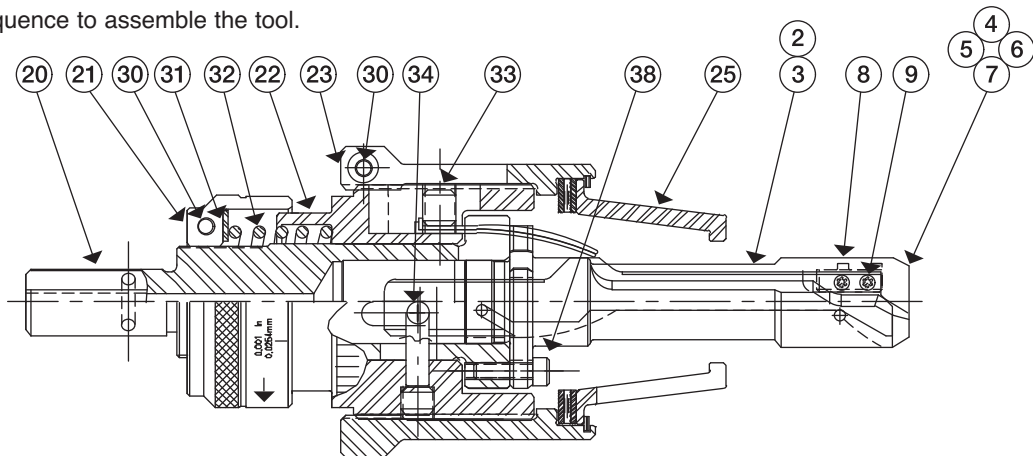
- The cutter can be replaced in the tool without removal from the machine or disassembly. Remove the two (2) #4-40 x 0.25 Torx screws holding the cutter in place. Flush the cutter pocket in the arm to remove any chips or foreign material. Replace the cutter and secure with two (2) #4-40 x 0.25 Torx screws.

### ■ PILOT CHANGE

- The **Tube Sheet Pro** head accepts four standard pilots: 5/8", 3/4", 7/8", and 1". There are two (2) standard arms: one arm (D #2) is used with the 5/8" and 3/4" pilots, and one arm (D #3) is used with the 7/8" and 1" pilots. Remove three (3) #10-24 x 5/8" cap screws that retain the pilot. Pull the pilot from the head. If an arm change is not necessary, install the new pilot by the instructions in the set-up procedure.
- If an arm change is required, rotate the arm in the head until it releases from the dowel pin. Install the new arm and pilot, then secure with cap screws.

### ■ DISASSEMBLY

- Loosen the locking screw (D #30) and remove the housing (D #23) and nosepiece (D #25) by screwing the housing out. Remove three (3) #10-24 x 5/8" cap screws (D #38) retaining the pilot. Pull the pilot out of the head. The arm will pivot off of the dowel pin (D #34) as described above, and can be removed from the recessing head.
- Loosen the locking screw on the adjusting collar (D #21) and remove the collar, thrust race washer (D #31), and spring (D #32) from the tool. Remove the two (2) 3/8-24 x 5/16" flat point set screws (D #33). Remove the dowel pin from the sleeve. The spindle (D #20) will now slip out of the bottom and the tool will be completely disassembled.
- Reverse this sequence to assemble the tool.



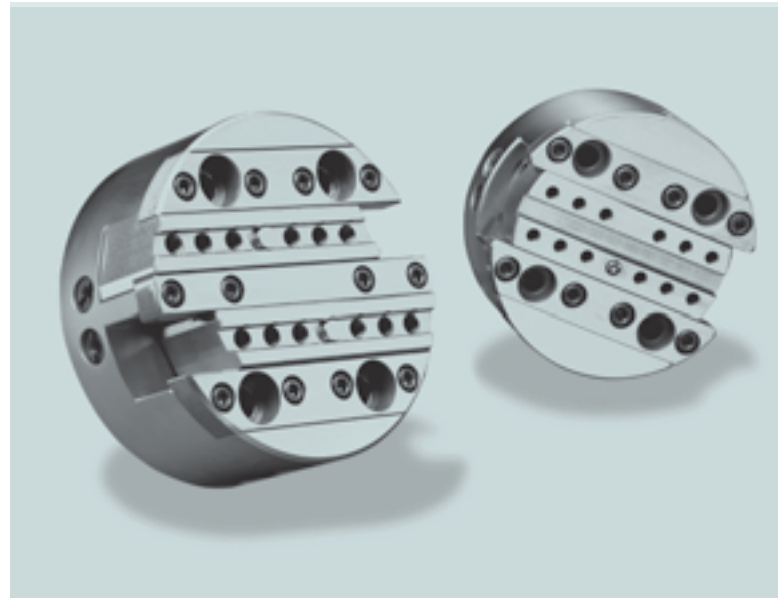
### ■ SUGGESTED OPERATING PARAMETERS

- 25 – 40 SFM
- 0.002 – 0.005 IPR (SPINDLE FEED RATE)

# Generating Heads

For facing, recessing, boring, and contouring. Multiple operations can be performed faster, more economically, with better quality, and at one spindle location. Used on special-purpose machines and other high production machinery, including transfer lines and dial machines.

- Single or double-slide models are available, designed for feed-out or feed-in
- Sizes from 100 to 250mm (3.937 to 9.842 in.) in diameter
- Drawbar actuation- no need to pilot in part or fixture
- Unique actuator design- smooth, accurate motion for precise repeatability
- Internal mechanism manufactured to exacting tolerances- backlash is virtually eliminated
- All moving parts are hardened and precision ground for lasting accuracy
- Built-in lubeways and easily accessible grease fittings
- Equipped with through-tool auto lube capability
- Special lightweight slides are available (optional) for higher cutting speeds and shorter cycle times- tooling can be balanced



Custom-designed top tooling is mounted in qualified holes on the tool slide. Standard inserts are used for most applications. Special head designs and special form cutters are available.

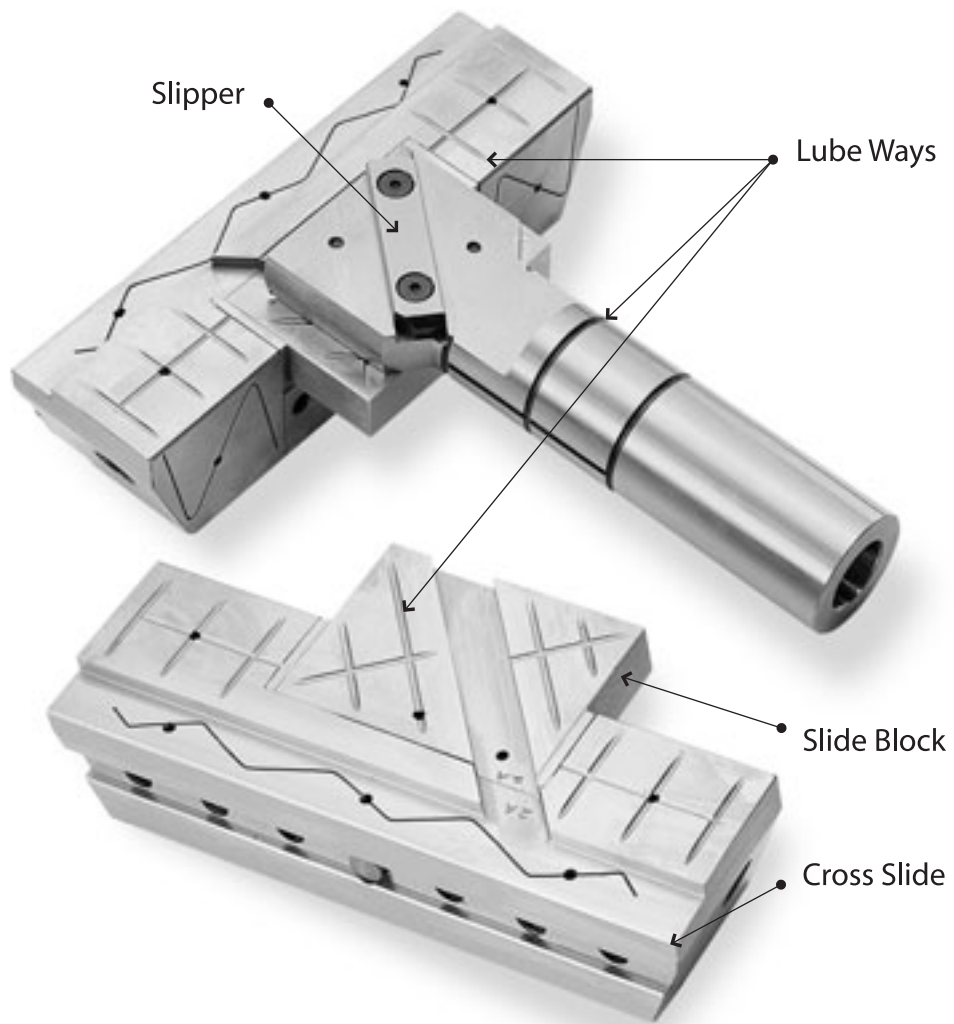
Cogsdill generating heads are designed to work on machines where the tool slide stroke is controlled by a drawbar. The drawbar can produce finite, accurate movements in the tool slide(s), allowing the head to perform accurate machining operations. Drawbars can either push or pull on the actuator, and may be controlled by CNC, hydraulic, or mechanical action.

Operations such as **boring, turning, facing, chamfering, and form cutting** can be easily performed. Generating heads can often be made to **perform multiple operations in a single pass** – this provides for optimum efficiency and performance in your machining operations.

Cogsdill generating heads are made from the highest quality materials, to exacting quality standards. Our engineers have built in quality features that ensure durability and consistent accuracy. These high-quality features include hardened and ground components, multiple grease fittings with internal lube ways, and anti-friction coatings on wear surfaces.

# Operating Principle

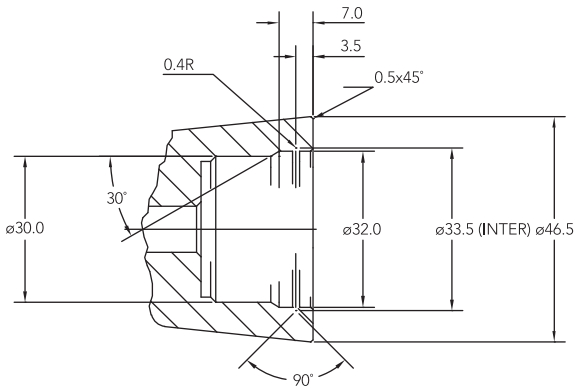
The method of operation incorporated in all Cogsdill generating heads is based on the principal of a sliding inclined wedge. This actuation mechanism produces smooth, linear cutter movement with little or no backlash.



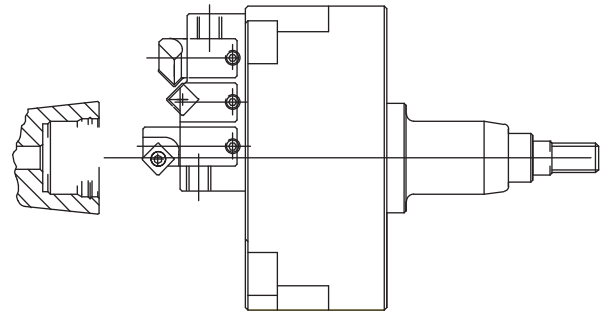
Generating Head sliding inclined wedge mechanism and lubeways  
**SHOWN ABOVE**

# Operating Principle

Cogsdill generating heads can be utilized on a variety of drawbar-equipped machines such as transfer lines, rotary transfer (dial type) machines, and other special purpose machines. The heads can be mounted on virtually any spindle that has a drawbar. Cogsdill can provide a complete tooling package for new machines, as well as for retrofitting an existing machine.



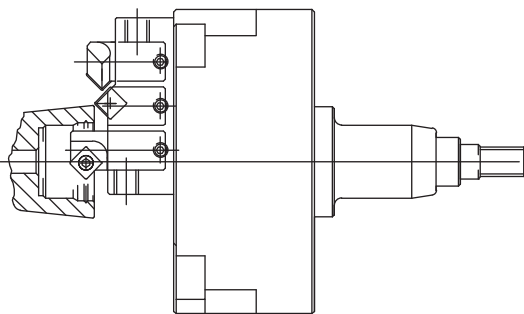
This typical component requires three machining operations: a face, an I.D. groove, and an O.D. chamfer. All operations will be completed at one station with one pass of the Cogsdill generating head. Drawbar stroke on the machine will control cutter movement.



← HEAD MOVEMENT

**1**

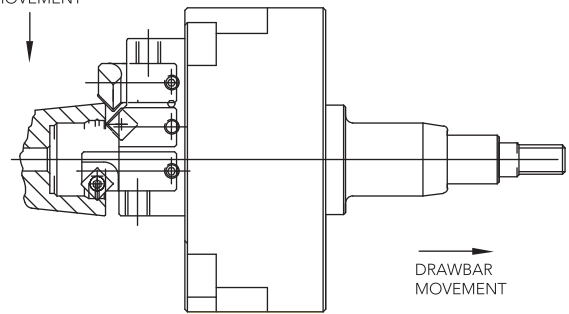
The part is in position. The rotating machine spindle moves the generating head toward the part to begin the operation sequence. The drawbar and cross slide are in the home position.



**2**

The head is now in position. The drawbar begins to pull, causing the cross slide and cutters to move radially across the part as the cutting stroke begins. The face is cut first, followed by the I.D. groove, and then the O.D. chamfer.

TOOL SLIDE MOVEMENT



**3**

The head is now at full drawbar stroke, and the cuts have been completed. The drawbar is then pushed back to the home position, thereby retracting the cutters. The spindle then retracts and the head is pulled away from the part and returned to the position shown in step one.

Cogsdill generating heads are available as standard products in single-slide and double-slide models, ranging in diameter from 100mm to 250mm (approximately 4 to 10 inches). The head type used generally depends on the operation(s) being performed and the speed at which the head is run. Top tooling packages can be designed by our engineers to suit individual requirements. Specially designed heads are available when required to meet unique part requirements or production challenges.

### Auto-lube

Our auto-lube feature enhances the longevity of the generating head by ensuring that all parts are consistently lubricated. Every Cogsdill generating head comes with auto-lubrication capability as a standard feature. Lubrication is fed to the head through the drawbar and actuator shaft. This feature can add many thousands of cycles to the life of the head, while eliminating the need to perform manual lubrication on a daily basis. Installation is easy on machines with spindles that have through-lube capability.

Most commercial auto-lube systems installed on machines are more than adequate for use with Cogsdill generating heads. The heads are usually lubricated automatically several times per shift, depending on the type of lubrication system available. When used in conjunction with an oil mist system (ISO68 grade oil), the flow rate is usually adjusted to a moderately low setting. For specific questions regarding the auto-lube feature, please consult with our engineering group.

### Lubrication Recommendations

All heads may be manually lubricated via grease fittings in the main body if a through-lube system is not available on your machine. If these heads are not used with an automatic lubrication system, it is necessary to manually lubricate them **at least** weekly. More frequent lubrication may be necessary depending on the operational speed, type of coolant used, rapid cycling, and other factors.

**Kluber Altemp Q NB50** has been thoroughly tested and found to perform exceptionally well – it is the only grease we recommend. Using a grease gun, inject one or two pumps of grease into each grease fitting.

**Remember, adequate lubrication is vital to long head life and trouble-free performance.**

It is also recommended that **Kluber Altemp Q NB50** grease be applied to all moving parts and surfaces when the head is disassembled for maintenance and cleaning, or if the head is to be stored for extended periods.

**(Note: if the head is being used with an oil mist automatic lube system, do not use the Kluber grease during disassembly and cleaning. Instead, use the same recommended ISO68 oil that is fed through the lube system. It is important not to mix the oil and grease – only one type of lubrication should be used at any one time.)**

A high-pressure hand pump gun is available from Cogsdill to make routine maintenance easy. (Ref. Part No. **CN-D24**)

### Actuation Ratios

The standard actuation ratio for our heads is based on a 40-degree actuation angle. Slide travels for the standard actuation ratio are shown in the specification charts on the following pages.

Special actuation ratios are available to accommodate unique applications (e.g., when an extremely short tool stroke is required). Please consult with our engineering group when a non-standard ratio is required.

### Adapter Plates

The bolt pattern in Cogsdill generating heads will fit a variety of spindles. However, when using a standard head, it may be necessary to use an adapter plate to mount the head due to different bolt patterns in the head and spindle. Cogsdill can design and manufacture adapter plates, when needed, to ensure accurate mounting of the head on any spindle. Special bolt patterns can also be built into specially designed heads.

### Top Tooling Packages/Counterbalance Weights

Cogsdill can provide full top tooling packages for your application. Standard ISO / ANSI inserts are used where possible. Special form inserts are supplied where required.

When using a double-slide head, the slides move in opposing directions. This allows the head to be balanced by mounting a counterbalance to the slide opposite the one with the cutting tool. The weight moves proportionately to the cutting edge, thus producing a balanced cut. (In double-slide applications where tooling is mounted on both slides, the tooling can be balanced.) Balance is particularly important as the size of the head, or the rotational speed, increases. The head can be dynamically balanced to a specific cut diameter and speed. (Single-slide heads are generally not balanced).

(continued)

### Drawbar Force Requirements

The drawbar force required to actuate the generating head is dependent upon three variable but interrelated factors:

- Size of generating head
- Spindle speed or cycle time requirement
- Weight of top tooling

As the size of the head increases, so does the required drawbar force. Cycle time requirements can also directly affect the spindle speed. In some cases, the use of high strength aluminum alloy cross slide(s) and/or top tooling may be necessary to keep the drawbar force requirements within the operational limits of the machine (see next section below).

**Due to variations in top tooling weight, it is difficult to predict the actual drawbar force required to operate a generating head in a given application until a thorough layout is completed. When submitting a generating head application for quotation, please provide the following information in addition to part prints and general machine specifications:**

- Spindle speed range available for your machine
- Desired cycle time (if known) for the operation(s) to be performed
- Drawbar actuation method (i.e. mechanical, CNC, or hydraulic) and force available

**Our engineering department will recommend the appropriate generating head, and will quote a complete tooling package to suit your requirements.**

### Lightweight Cross Slides and Top Tooling

When application requirements demand head operation at higher than normal speeds, Cogsdill engineers can specify a special lightweight, high strength, aluminum alloy for manufacturing cross slides and some top tooling. The use of this alloy reduces the rotational mass of the head, allowing the tool to be run at higher speeds without significantly affecting the drawbar force requirement for actuating the head.

### Requests for Quotation

All quote requests should be submitted through our customer service department.

**While most heads sold are standard heads, each application tends to be unique. In order for our engineers to prepare a formal and complete quotation, we need to know as much as possible about your application. In order to assure that we have the necessary data for quoting, please submit the following:**

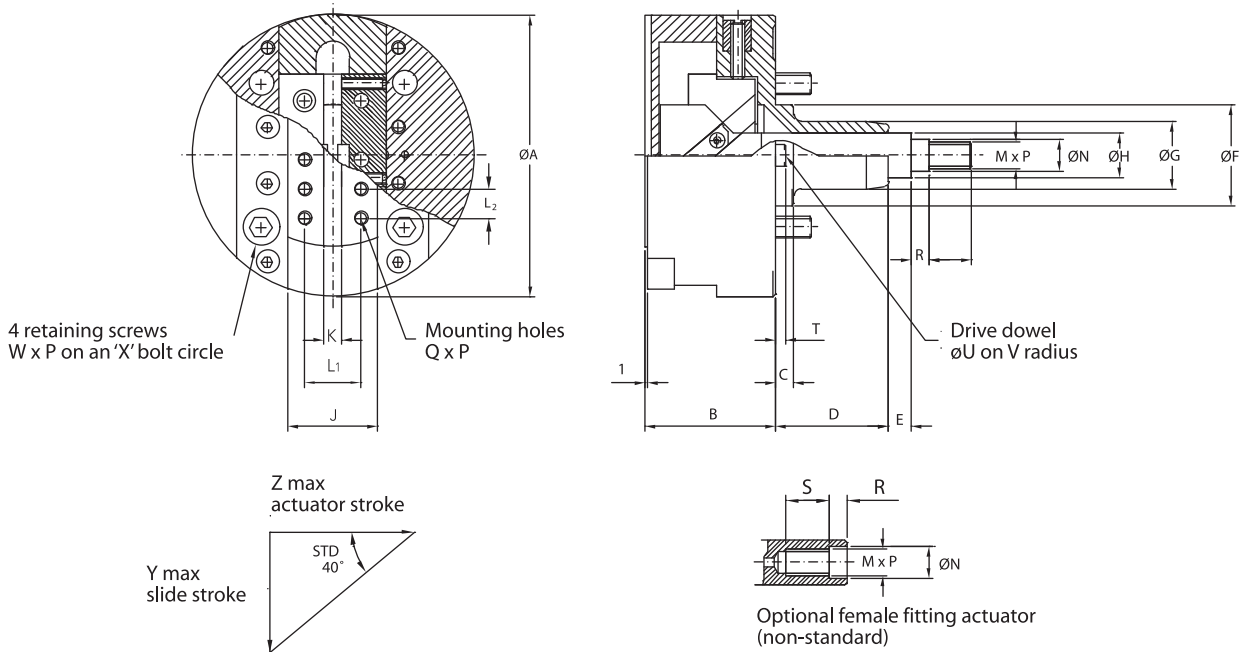
- A copy of the Application Data Sheet in the back of this catalog, filled out as completely as possible (material type, operations required, how the parts will be fixtured, etc.).
- A complete part drawing, and machine and spindle data. Please include spindle speed range, drawbar actuation method, and available drawbar force (if known).

### Other important information includes:

- Does the application require a head that feeds in or feeds out?
- What actuation ratio is required (if known)? (If unknown, our engineers will gladly make recommendations.)
- Single or double slide?
- What type of drawbar fitting? (I.e. male or female, thread size and pitch. Male is standard, female is available on request.)
- Is through-lube capability available on the machine spindle?
- What is your production volume requirement?
- What is the desired machining cycle time for the operations involved (if known)?

**Our customer service personnel will be pleased to assist you in answering questions about your application.**

## Single-Slide Head



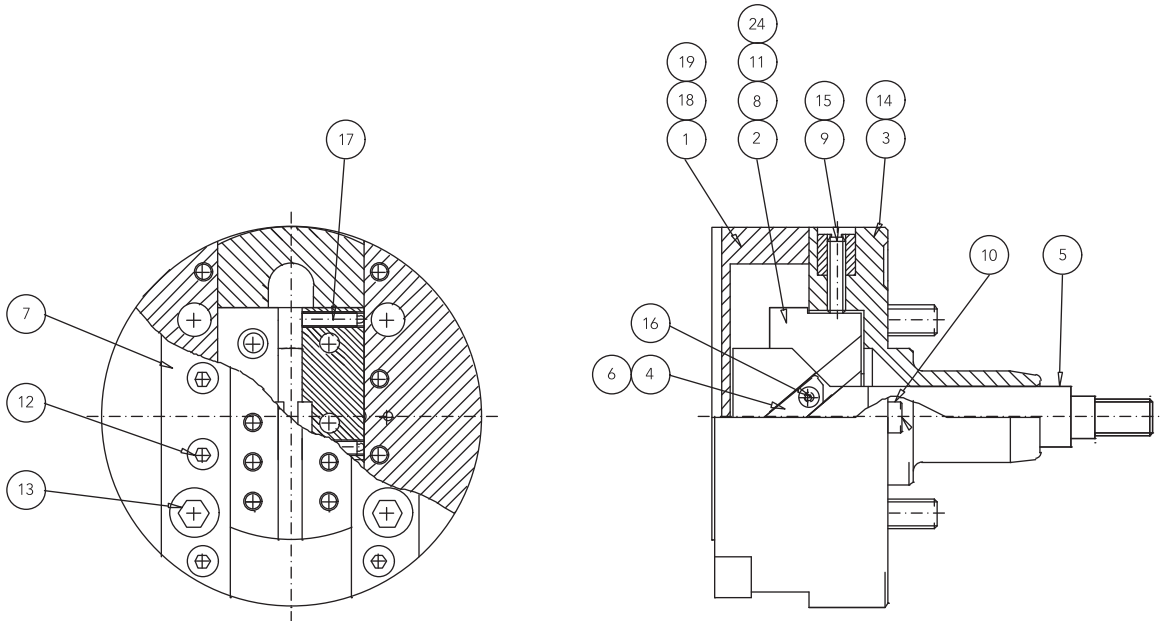
### INCH [METRIC]

HEAD TYPE	(A)	(B)	(C)	(D)	(E)	(F <sup>h5</sup> )	(G)	(H)	(J)	(K <sup>H7</sup> x DP)	(L)	(L <sub>2</sub> )
<b>CN100SA</b>	3.937 [100]	1.969 [50]	0.236 [6]	1.772 [45]	0.394 [10]	1.260 [32]	0.984 [25]	0.630 [16]	1.181 [30]	0.315 x 0.118 [8 x 3]	0.669 [17]	0.433 [11]
<b>CN125SA</b>	4.921 [125]	2.283 [58]	0.315 [8]	1.969 [50]	0.394 [10]	1.772 [45]	1.181 [30]	0.787 [20]	1.575 [40]	0.315 x 0.118 [8 x 3]	0.984 [25]	0.512 [13]
<b>CN160SA</b>	6.300 [160]	2.756 [70]	0.374 [9.5]	2.362 [60]	0.394 [10]	3.937 [100]	1.378 [35]	0.984 [25]	1.969 [50]	0.394 x 0.157 [10 x 4]	1.181 [30]	0.630 [16]
<b>CN200SA</b>	7.874 [200]	3.346 [85]	0.472 [12]	2.756 [70]	0.394 [10]	5.315 [135]	1.969 [50]	1.260 [32]	2.756 [70]	0.472 x 0.157 [12 x 4]	1.772 [45]	0.787 [20]
<b>CN250SA</b>	9.843 [250]	3.937 [100]	0.591 [15]	3.543 [90]	0.394 [10]	6.300 [160]	1.969 [50]	1.260 [32]	3.543 [90]	0.472 x 0.157 [12 x 4]	2.362 [60]	0.787 [20]

### INCH [METRIC]

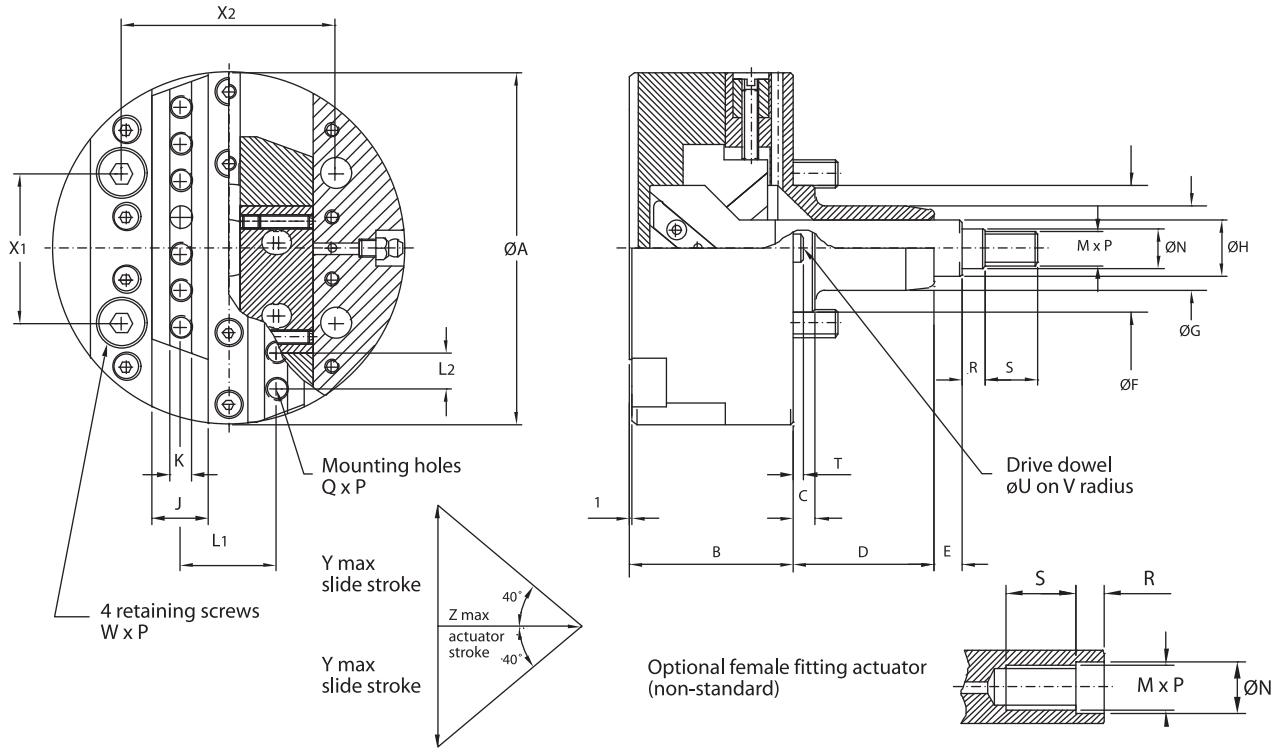
HEAD TYPE	(M x P/LH)	(N <sup>h7</sup> )	(Q x P)	(R)	(S)	(T)	(U <sup>m5</sup> )	(V)	(W x P)	(X)	(Y)	(Z)
<b>CN100SA</b>	M10 x 1.0	0.472 [12]	M5 x 0.8	0.315 [8]	0.669 [17]	0.197 [5]	0.315 [8]	1.575 [40]	M8 x 1.25	2.756 [70]	0.669 [17]	0.795 [20.2]
<b>CN125SA</b>	M12 x 1.5	0.551 [14]	M6 x 1.0	0.315 [8]	0.748 [19]	0.236 [6]	0.394 [10]	1.969 [50]	M10 x 1.50	3.543 [90]	0.866 [22]	1.031 [26.2]
<b>CN160SA</b>	M16 x 1.5	0.709 [18]	M8 x 1.25	0.394 [10]	0.984 [25]	0.256 [6.5]	0.472 [12]	2.559 [65]	M12 x 1.75	4.724 [120]	1.181 [30]	1.406 [35.7]
<b>CN200SA</b>	M16 x 1.5	0.709 [18]	M10 x 1.5	0.394 [10]	0.984 [25]	0.394 [10]	0.630 [16]	3.346 [85]	M12 x 1.75	6.300 [160]	1.575 [40]	1.878 [47.7]
<b>CN250SA</b>	M16 x 1.5	0.709 [18]	M12 x 1.75	0.394 [10]	0.984 [25]	0.472 [12]	0.787 [20]	3.937 [100]	M16 x 2.0	7.480 [190]	1.969 [50]	2.346 [59.6]

## Single-Slide Head



<b>1</b> Cross-slide	<b>7</b> Keeper Plate	<b>13</b> Caphead Screw	<b>19</b> Location Dowel
<b>2</b> Slide Block	<b>8</b> Slide Block	<b>14</b> Grease Nipple	<b>24</b> Spring Washer
<b>3</b> Body	<b>9</b> Locknut	<b>15</b> Dog Point Screw	
<b>4</b> Key	<b>10</b> Drive Dowel	<b>16</b> Head Screw	
<b>5</b> Actuator	<b>11</b> Lock Screw	<b>17</b> Spring Plunger	
<b>6</b> Key	<b>12</b> Caphead Screw	<b>18</b> Wiper	

### Double-Slide Head



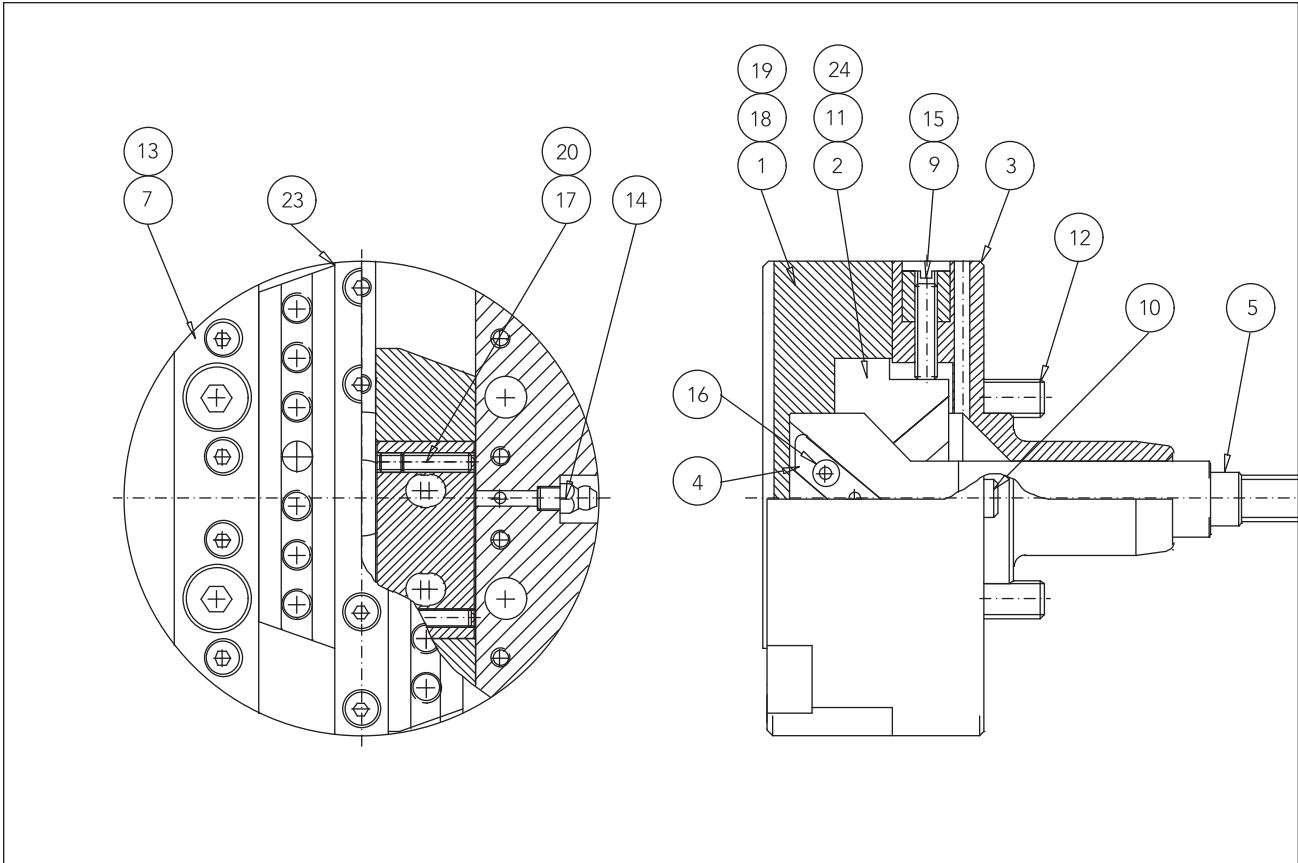
#### INCH [METRIC]

HEAD TYPE	(A)	(B)	(C)	(D)	(E)	(Fh <sup>5</sup> )	(G)	(H)	(J)	(K <sup>H7</sup> x DP)	(L <sub>1</sub> )	(L <sub>2</sub> )
<b>CN100DA</b>	3.937 [100]	1.969 [50]	0.236 [6]	1.772 [45]	0.394 [10]	1.260 [32]	0.984 [25]	0.630 [16]	0.630 [16]	0.236 x 0.118 [6 x 3]	1.102 [28]	0.394 [10]
<b>CN125DA</b>	4.921 [125]	2.283 [58]	0.315 [8]	1.969 [50]	0.394 [10]	1.772 [45]	1.181 [30]	0.787 [20]	0.787 [20]	0.315 x 0.118 [8 x 3]	1.339 [34]	0.512 [13]
<b>CN160DA</b>	6.300 [160]	2.756 [70]	0.374 [9.5]	2.362 [60]	0.394 [10]	3.937 [100]	1.378 [35]	0.984 [25]	0.984 [25]	0.315 x 0.118 [8 x 3]	1.772 [45]	0.630 [16]
<b>CN200DA</b>	7.874 [200]	3.346 [85]	0.472 [12]	2.756 [70]	0.394 [10]	5.315 [135]	1.969 [50]	1.260 [32]	1.260 [32]	0.315 x 0.118 [8 x 3]	2.126 [54]	0.787 [20]
<b>CN250DA</b>	9.843 [250]	3.937 [100]	0.591 [15]	3.543 [90]	0.394 [10]	6.300 [160]	1.969 [50]	1.260 [32]	1.772 [45]	0.394 x 0.157 [10 x 4]	2.756 [70]	0.787 [20]

#### INCH [METRIC]

HEAD TYPE	(M x P/LH)	(N <sup>h7</sup> )	(Q x P)	(R)	(S)	(T)	(U <sup>m5</sup> )	(V)	(W x P)	(X <sub>1</sub> )	(X <sub>2</sub> )	(Y)	(Z)
<b>CN100DA</b>	M10 x 1.0	0.472 [12]	M6 x 1.0	0.315 [8]	0.669 [17]	0.197 [5]	0.315 [8]	1.575 [40]	M8 x 1.25	1.811 [46]	2.441 [62]	0.669 [17]	0.795 [20.2]
<b>CN125DA</b>	M12 x 1.5	0.551 [14]	M8 x 1.25	0.315 [8]	0.748 [19]	0.236 [6]	0.394 [10]	1.969 [50]	M10 x 1.5	2.087 [53]	2.992 [76]	0.866 [22]	1.031 [26.2]
<b>CN160DA</b>	M16 x 1.5	0.709 [18]	M8 x 1.25	0.394 [10]	0.984 [25]	0.256 [6.5]	0.472 [12]	2.559 [65]	M12 x 1.75	2.520 [64]	3.937 [100]	1.181 [30]	1.406 [35.7]
<b>CN200DA</b>	M16 x 1.5	0.709 [18]	M8 x 1.25	0.394 [10]	0.984 [25]	0.394 [10]	0.630 [16]	3.346 [85]	M12 x 1.75	4.016 [102]	4.409 [112]	1.575 [40]	1.878 [47.7]
<b>CN250DA</b>	M16 x 1.5	0.709 [18]	M10 x 1.5	0.394 [10]	0.984 [25]	0.472 [12]	0.787 [20]	3.937 [100]	M16 x 2.0	5.000 [127]	5.984 [152]	1.969 [50]	2.346 [59.6]

## Double-Slide Head



**1** Cross-slide

**2** Slide Block

**3** Body

**4** Key

**5** Actuator

**7** Keeper Plate

**9** Locknut

**10** Drive Dowel

**11** Lock Screw

**12** Caphead Screw

**13** Caphead Screw

**14** Grease Nipple

**15** Dog Point Screw

**16** Head Screw

**17** Spring Plunger

**18** Wiper

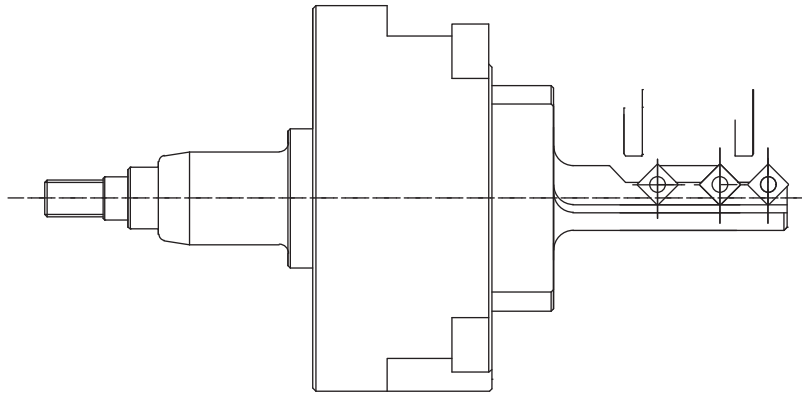
**19** Location Dowel

**20** Set Screw

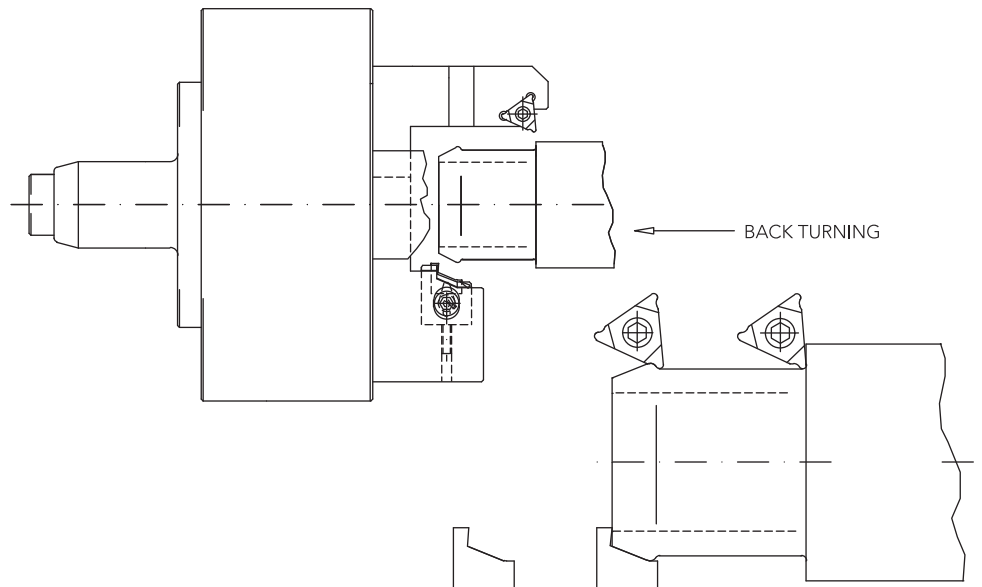
**23** Keeper Plate

**24** Spring Washer

## 125mm (approx. 5 in.) Single-Slide Feed-Out Head machining three chamfers in one pass

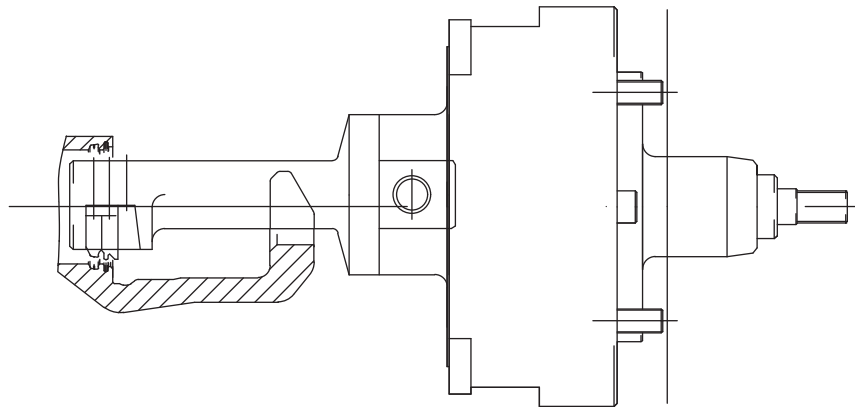


## 160mm (approx. 6.25 in.) Double-Slide Feed-In Head machining aluminum barb end fitting complete in one pass



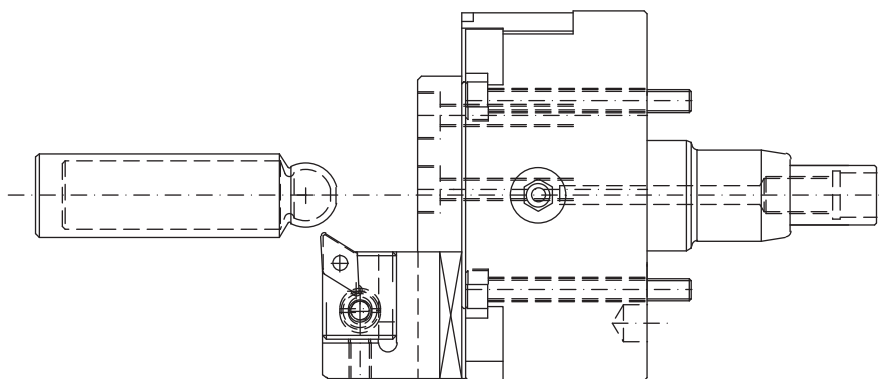
## 200mm (approx. 8 in.) Single-Slide Feed-Out Head

machining boot groove in brake caliper



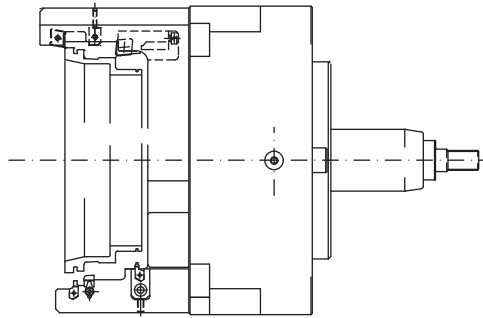
## 100mm (approx. 4 in.) Double-Slide Generating Head

machining spherical radius



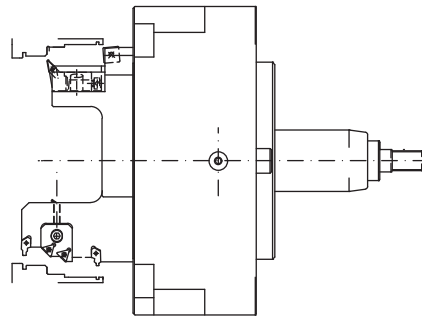
### 250mm (approx. 10 in.) Double-Slide Feed-In Head

performing ten operations: three faces, three grooves, and four chamfers



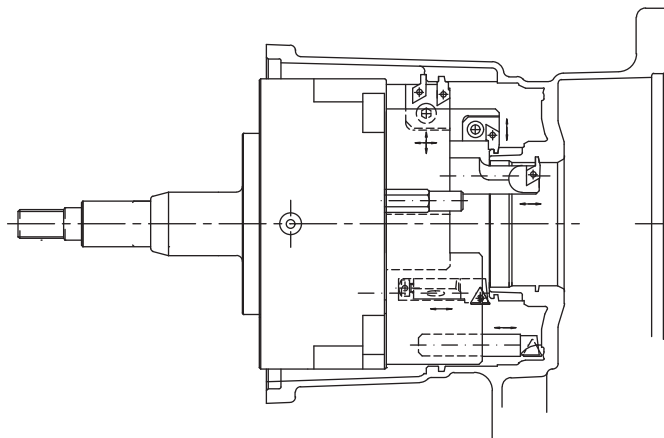
### 250mm (approx. 10 in.) Double-Slide Feed-Out Head

performing ten operations on an aluminum housing: three grooves, five chamfers, and two faces



### 160mm (approx. 6.25 in.) Double-Slide Feed-Out Head

performing six operations: three grooves, one face, one chamfer, and one I.D. turning operation



# Precision Chamfering

## **Nobur® JB** Automatic Back-Chamfering Tool

For back-chamfering or deburring on drill presses, CNC machines, tool or turret lathes, multi-spindle machines and jig boring machines.

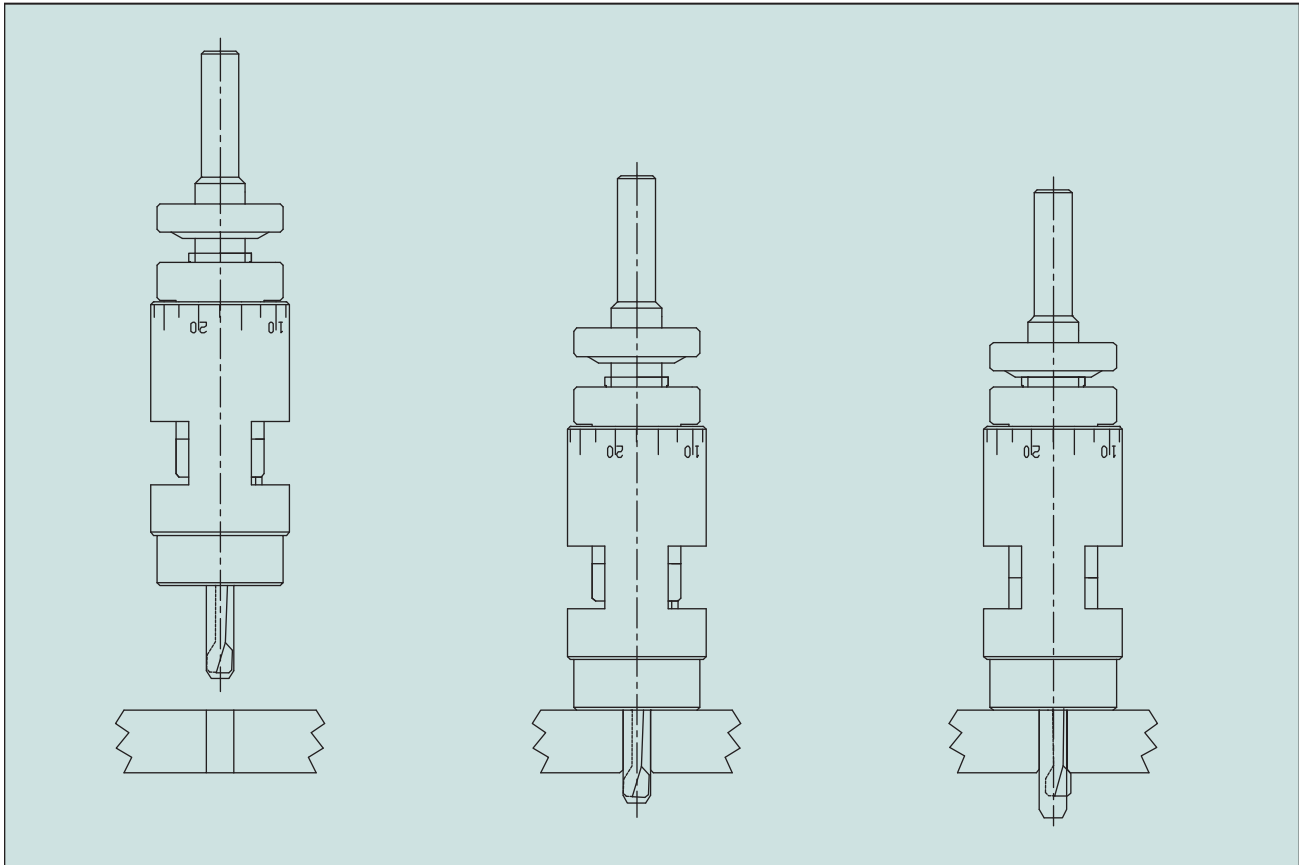


- Consistently accurate back-chamfering, deburring, and back-countersinking operations
- Pilots in hole for precise concentricity
- Rigid support of the cutter virtually eliminates deflection
- Micrometer-stop adjustment
- Standard pilots and cutters for hole sizes from 3/16 to 3/4" (4.75 to 19.05mm)
- Special pilots and cutters available upon request

# Operating Principle

**Nobur® JB Series**  
AUTOMATIC  
BACK-CHAMFERING

Illustrated below is the basic operating principle for the **Nobur® JB** Automatic Back-Chamfering tool.



## 1 Approach Stroke

The **Nobur® JB** tool is rotating in a machine spindle. The spindle is lowered to bring the tool into position to enter the bore.

## 2 Feed Stroke

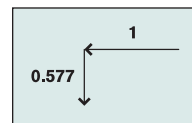
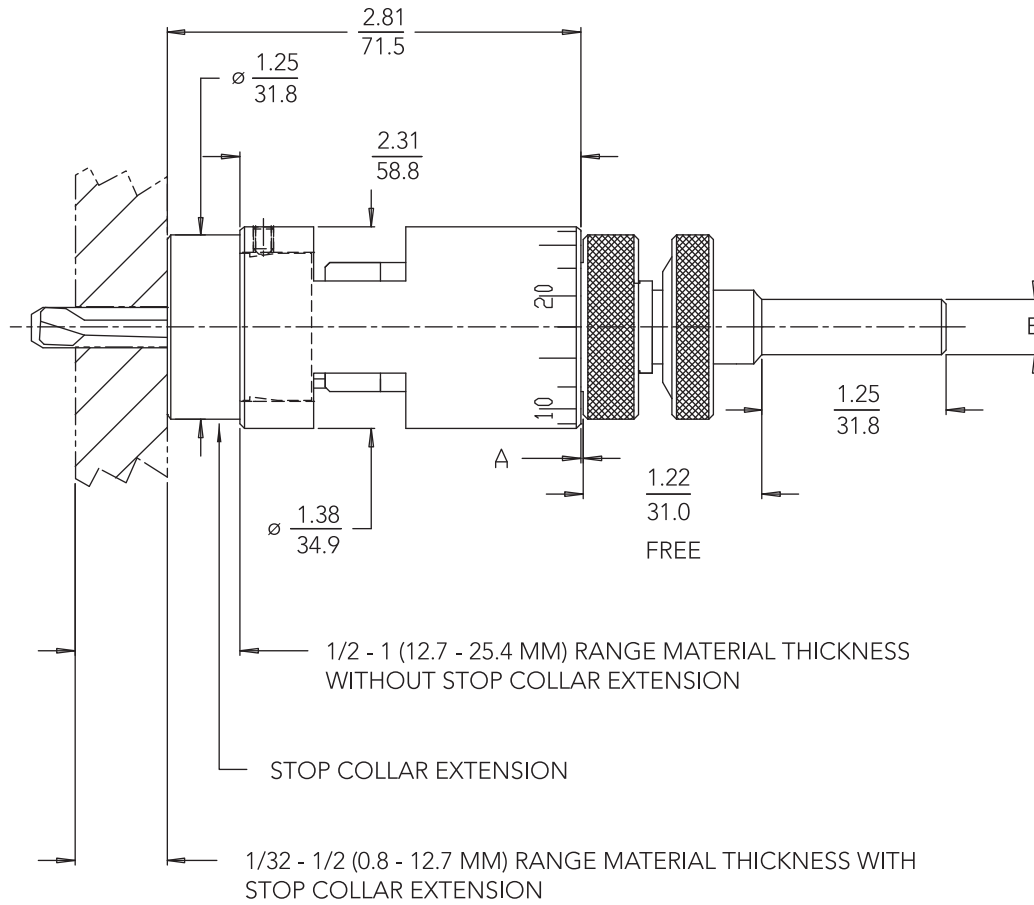
The pilot locates in the bore, stopping against the face of the workpiece. As the spindle continues to travel, the tool is compressed so that the cutter feeds out radially into the work. The cutter is rigidly supported in the bore by the pilot to eliminate deflection and ensure concentricity.

## 3 End of Feed Stroke

Radial depth of cut is obtained when the micrometer-stop nut bottoms out. Chamfer location is controlled by rotation of the stop collar, which moves the stop collar extension up or down to position the cutter for accurate chamfer location.

# Specifications

**Nobur® JB Series**  
**AUTOMATIC**  
**BACK-CHAMFERING**



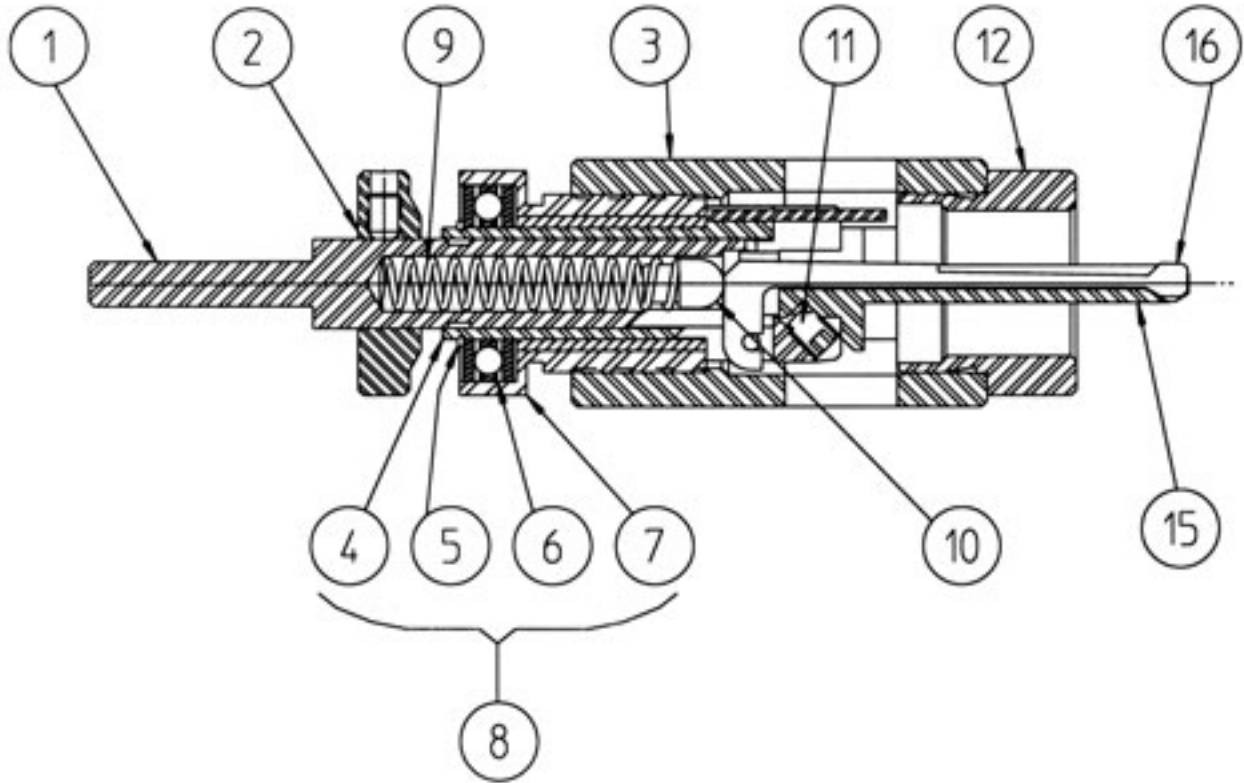
The **Feed Ratio** is the ratio of vertical to horizontal movement. The **Maximum Feed Stroke** is 0.38 in. (9.4mm)

## INCH [METRIC]

CAPACITY *		(A) MAX.		(B) SHANKS **
IN	MM	IN	MM	STRAIGHT SHANKS
0.88	22.4	0.78	19.8	1/4 3/8 w/tang

\* Capacity means the suggested maximum chamfer diameter. Dependent upon cutting forces and bore diameter. Stated capacity is for steel.

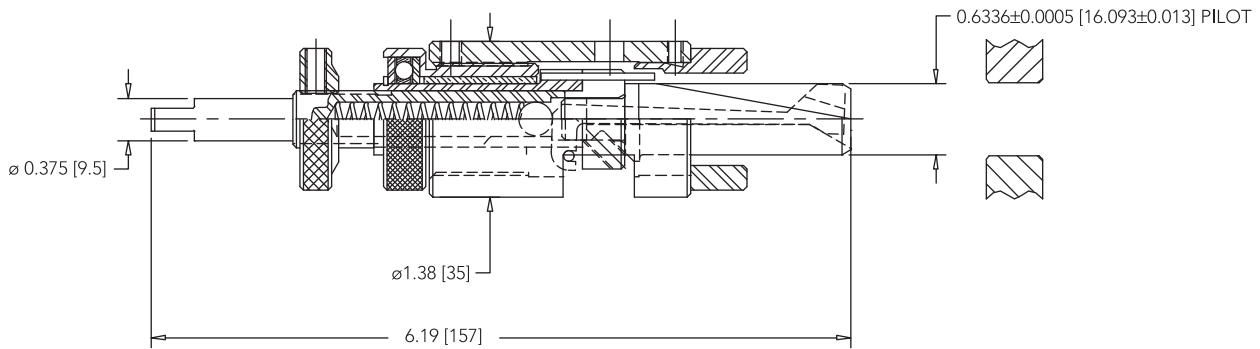
\*\* Shank is included with head. Shanks other than shown can be supplied upon request.



1 Body Holder	5 Retaining Ring	9 Compression Spring	15 Pilot
2 Stop Nut	6 Ball Thrust Bearing	10 Ball (19/64) diameter	16 Blade
3 Stop Collar	7 Bearing Cage	11 Pilot Retaining Screw	
4 Keyed Transport Sleeve	8 Transport Assembly	12 Stop Collar Extension	

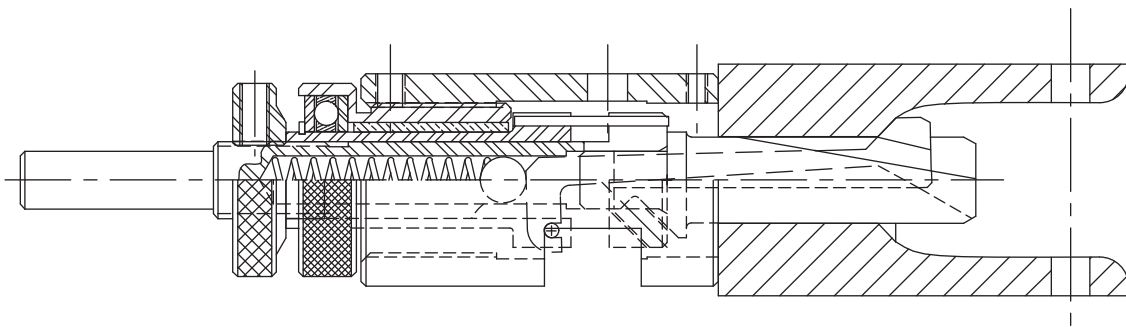
## Nobur<sup>®</sup> JB Tool

back-chamfers both sides of holes in large single-speed gear ring



## Nobur<sup>®</sup> JB Tool

deburrs back side of yoke



## CNF Precision Chamfering

Cogsdill **CNF** Series Precision Chamfering tools produce controlled chamfers on both sides of drilled or reamed holes. Designed for high production, these highly accurate tools require only one pass to generate consistent chamfers on the front and back of holes.

### Features:

- Fast cycle times
- Available with high-speed steel or solid carbide cutters for diameters from 0.059 to 0.390 inch (1.50 to 9.90mm)
- Tools for diameters of 10mm or larger use standard replaceable ISO inserts

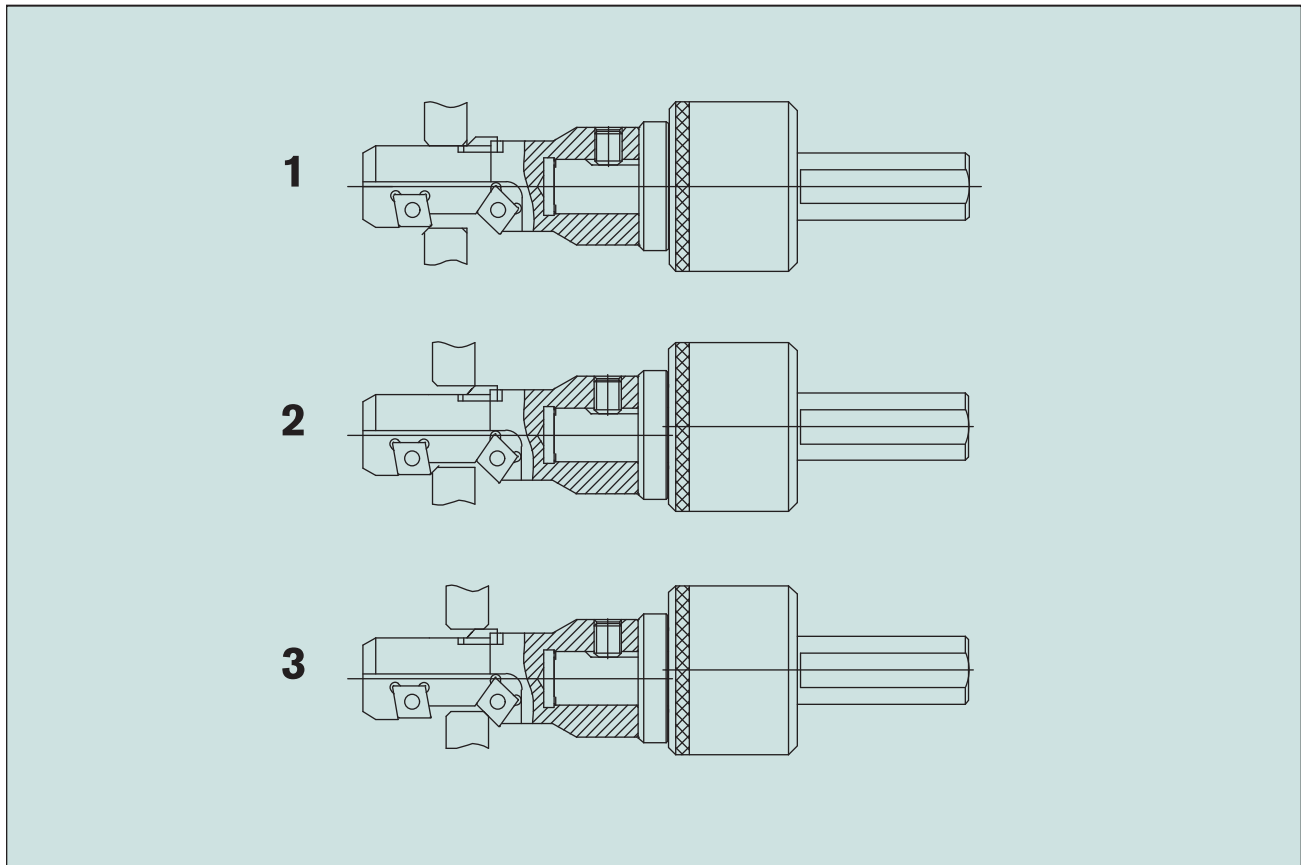
**CNF1** shown here with automotive-style shank. All shank styles are available to suit the application – please specify when ordering.



# Operating Principle

**Special Solution**  
PRECISION CHAMFERING

Illustrated below is the basic operating principle for the **CNF** Precision Chamfering tool.



## **1** Piloting

The tool diameter pilots into the hole up to the pre-formed cam opposite to the cutting edge.

## **2** Actuation

The tool travels forward and is actuated by the cam, generating the back chamfer.

## **3** Chamfering

The tool continues to travel forward, forming the top chamfer.

# Application Data Sheet

To ensure that the correct tool is furnished for your particular application, please photocopy, complete this data sheet, and enclose it with your order or request for quotation. This is a requirement for ALL recessing applications, including internal and external facing, chamfering, and back-spot facing, as well as grooving.

Date \_\_\_\_\_

Quote No. \_\_\_\_\_

## Customer Information

Customer \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Attn \_\_\_\_\_

Phone \_\_\_\_\_ Fax \_\_\_\_\_

Sales Agent/Distributor \_\_\_\_\_

## Application Specifications

1 Machine make/type \_\_\_\_\_

2 Shank style \_\_\_\_\_

\_\_\_\_\_ If shank is threaded for retention knob or drawbar, specify thread size

3 Groove diameter (B) \_\_\_\_\_ 4 Groove width (W) \_\_\_\_\_

5 Groove to face dimension (L) \_\_\_\_\_

6 Bore diameter (A) / Groove depth (D) \_\_\_\_\_

7 Is surface finish required in groove? \_\_\_\_\_ If yes, specify \_\_\_\_\_

8 Material \_\_\_\_\_ Type and condition \_\_\_\_\_

9 Are there any restrictions? Length \_\_\_\_\_ Diameter \_\_\_\_\_ Rotating \_\_\_\_\_

\_\_\_\_\_ If there is a weight limit, please specify \_\_\_\_\_ Used in a tool changer? Yes No

10 Is tool running: Horizontal \_\_\_\_\_ Vertical \_\_\_\_\_ Stationary \_\_\_\_\_

11 Is recessing tool to be used with a fixture? Yes No \_\_\_\_\_

\_\_\_\_\_ If yes, full layout drawings must be attached or sketched

12 How is part to be held or clamped? \_\_\_\_\_

13 What type of feed will be used? Hand \_\_\_\_\_ Power \_\_\_\_\_

14 Desired coolant feed: External \_\_\_\_\_ Internal through spindle \_\_\_\_\_

Internal with rotating collar \_\_\_\_\_

15 If SPC or CPK applies, please specify \_\_\_\_\_

*(continued on next page)*

# Application Data Sheet

Automatic  
**Recessing**

**GENERATING HEADS &  
PRECISION CHAMFERING**

*(continued)*

## Additional Comments

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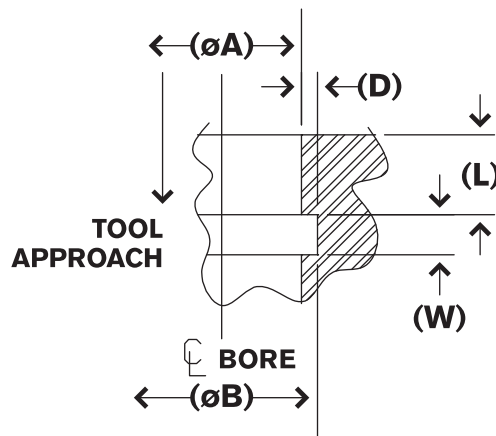
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### IMPORTANT

#### PART PRINT OR DETAILED SKETCH MUST BE SUPPLIED

Please indicate location of grooves or recesses, dimensions, tolerances, and direction of tool approach. In multiple groove applications, supply **(L)**, **(W)** and **(B)** dimensions for each groove.



**FAX**  
803 438 5263

**MAIL**  
**Cogsdill Tool Products, Inc.**  
P.O. Box 7007  
Camden SC 29021-7007  
Attn: Sales Department

