

# ZX Systems

**ZX**<sup>TM</sup>  
BORING,  
FACING, &  
CONTOURING  
SYSTEMS

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## ZX™ Modular Boring, Facing, & Contouring Systems

# overview

Cogsdill's **ZX Tooling System** provides the ultimate solution in terms of productivity, flexibility, and accuracy for machining **large parts that require multiple operations**. The ZX system can perform a variety of precision machining operations on horizontal boring mills, including:

- Boring
- Facing
- Contouring
- Taper boring
- Deep-cavity boring
- Grooving
- Back-spotfacing
- Chamfering
- Bottle-boring

... all in a **single tooling set-up**, or with a minimum number of tool changes. The internal actuation mechanism in each tool provides precise response to machine movement. The CNC control on the machine precisely determines radial cutter movement.

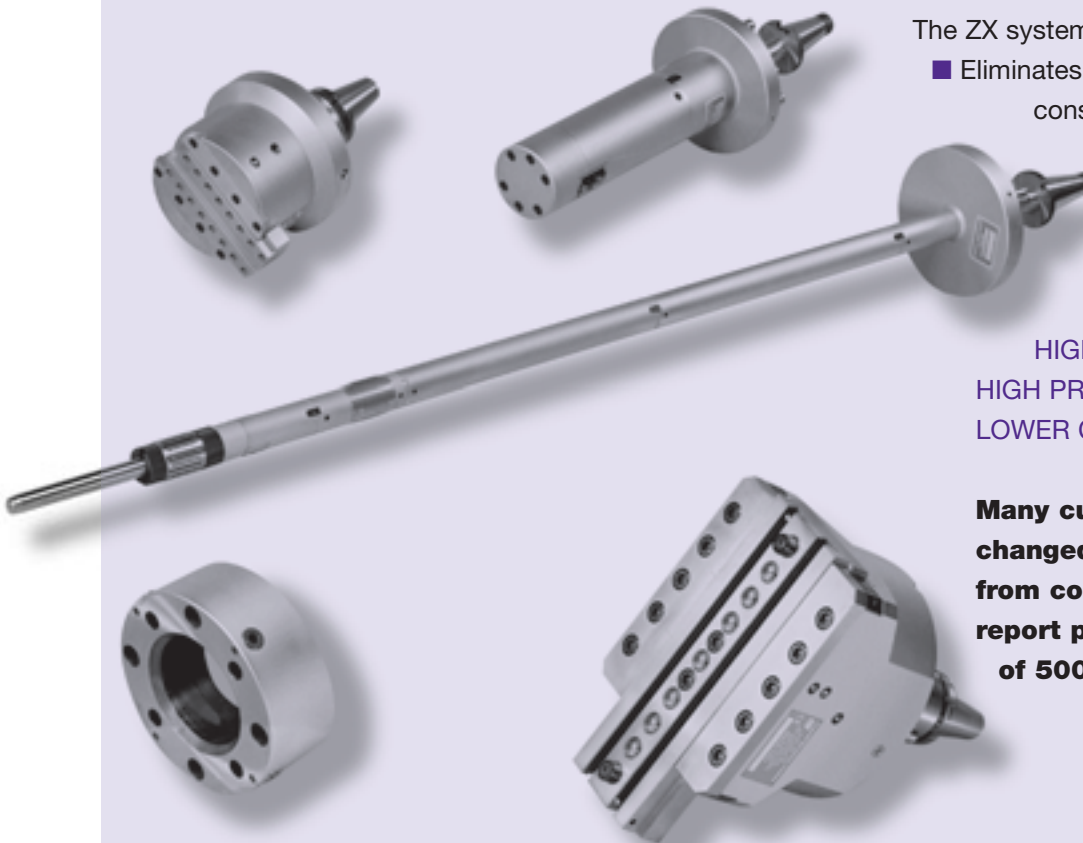
The ZX system **improves productivity**:

- Eliminates frequent (and time-consuming) tool changes
- Provides high material removal rates
- Reduces set up time

LOW SET UP TIME +  
HIGH MACHINING RATES =  
HIGH PRODUCTIVITY AND  
LOWER COSTS

**Many customers who have changed to the ZX system from conventional tooling report productivity increases of 500% or greater!**

ZX Tooling System



# Overview

## Other benefits:

- Improved accuracy
- Improved repeatability from part to part
- Improved part quality
- Improved surface finish
- Extremely rigid design for roughing and finishing - even in interrupted cuts
- Backlash-free actuation mechanism
- Modular design for maximum application flexibility
- High quality for long working life
- A wide array of solutions to suit a variety of applications

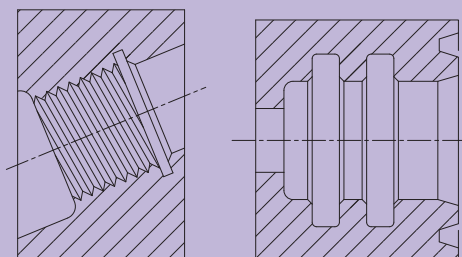
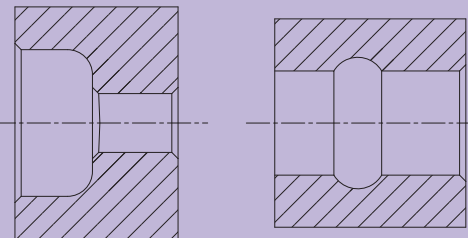
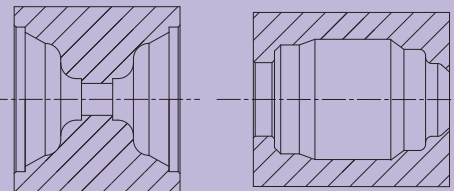
## MULTIPLE OPERATIONS, ONE SET-UP, VARIOUS PART GEOMETRIES

Conventional cutting tools are set to machine a specific diameter. A tool change is normally required to change diameters, or to machine a different feature (such as a face). With the ZX tooling system, the same tool can perform these operations; no tool change required. Relatively simple 2-axis CNC programs allow the tooling to perform a variety of operations. Part changes can be accommodated quickly and easily with program changes. Operations performed manually can be converted to CNC control. This not only improves productivity, it also enhances accuracy, part-to-part repeatability, and finish.

More importantly, by programming simultaneous movement of two axes (typically “W” and “Z”) complex geometries can be automatically machined, including tapers, radii, profiles, bottle bores, chamfers, and threading.

Part geometries shown at right are commonly found in parts such as oil valves and blowout preventers, gearboxes, pump housings, compressors, engine housings, aerospace components (such as landing gear), large castings, and heavy equipment components.

## Examples of internal configurations machined using ZX tools



# Overview

## MACHINE TOOL REQUIREMENTS

The ZX™ system requires the use of a horizontal boring mill with a programmable inner spindle that rotates in unison with the outer spindle, or milling sleeve. The axial movement of the inner spindle is converted within the tool into radial cutting stroke for diameter control. Movement of the table, or machine column, on a parallel axis controls the axial location of the cutting edge relative to the part. In most horizontal boring mills, these two axes are referred to as “W” and “Z”.

1. Controlled inner spindle movement is converted into radial cutter movement
2. Independently controlled column (A) or table (B) movement parallel to spindle

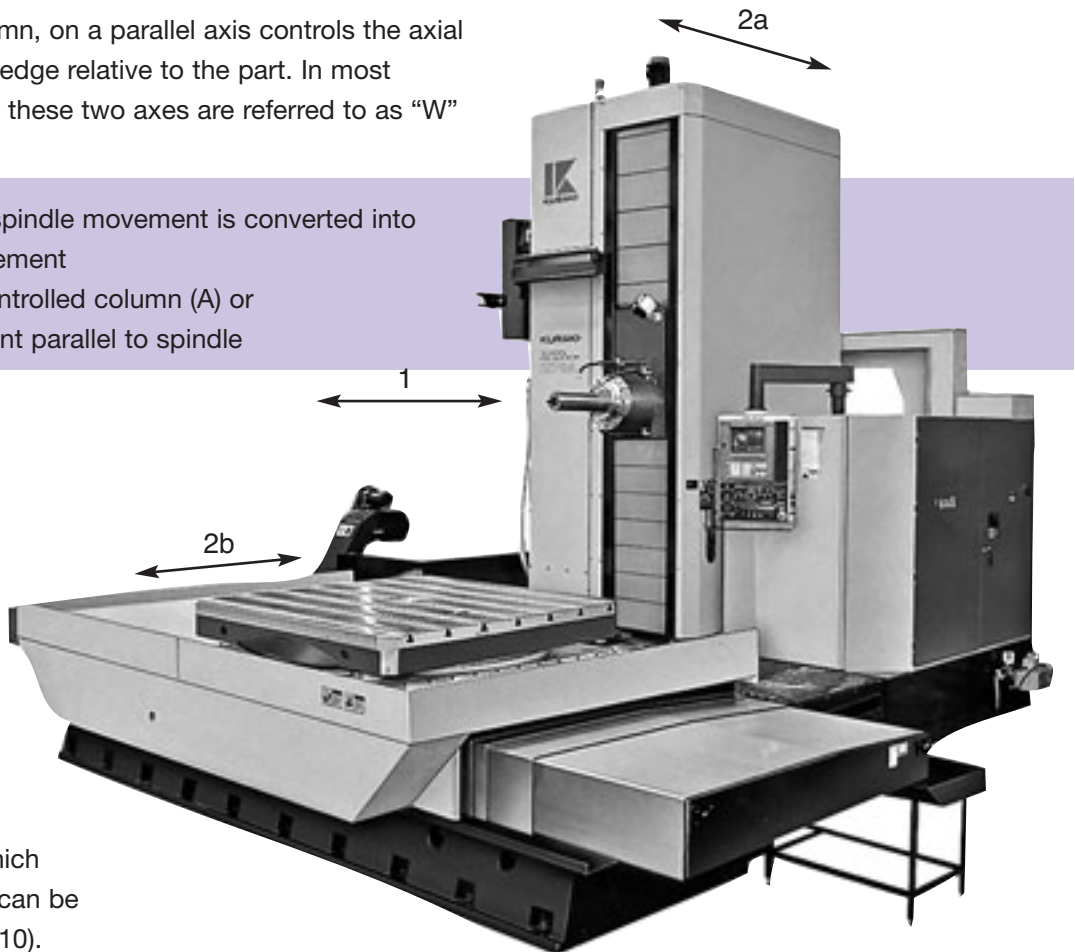
## OPERATING PRINCIPLES

The ZX system is comprised of **two basic styles of tools**:

- Facing / contouring heads, featuring a single slide onto which various top tooling can be installed (see page 10).
- Boring / contouring tools, used primarily in boring operations inside parts. (Refer to “Modular Boring Tools”, page 16, and “Valve Seat Pocket Tools”, page 22.)

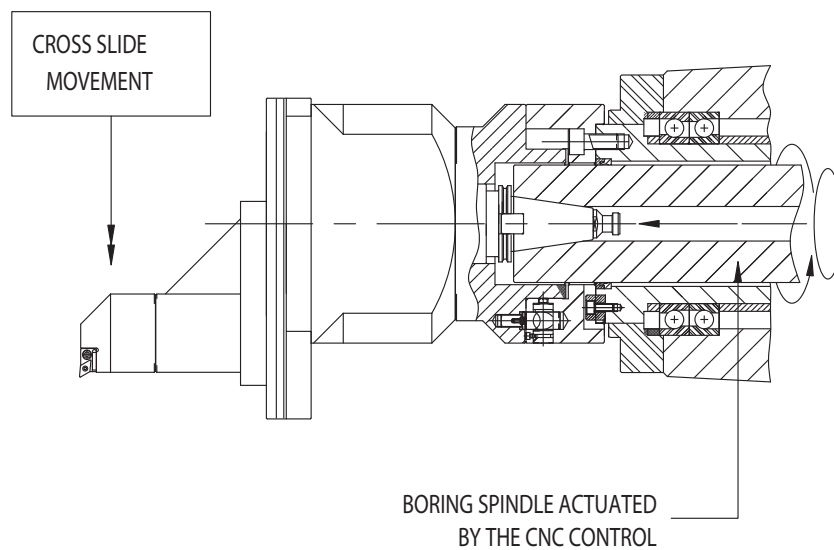
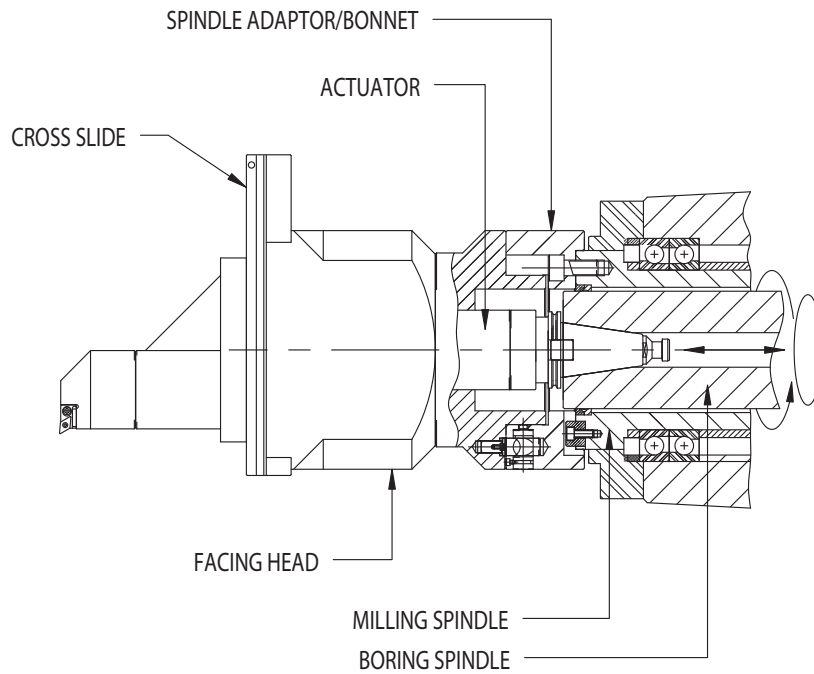
Regardless of head type, a **proven actuation mechanism** produces **radial cutter movement**. This sturdy design is based on the “sliding inclined wedge” principle for **backlash-free operation**; no sloppy gears or bell cranks are used. All parts are hardened and ground for **lasting accuracy and durability**.

The drawings on pages 5 and 6 depict both types of ZX heads.



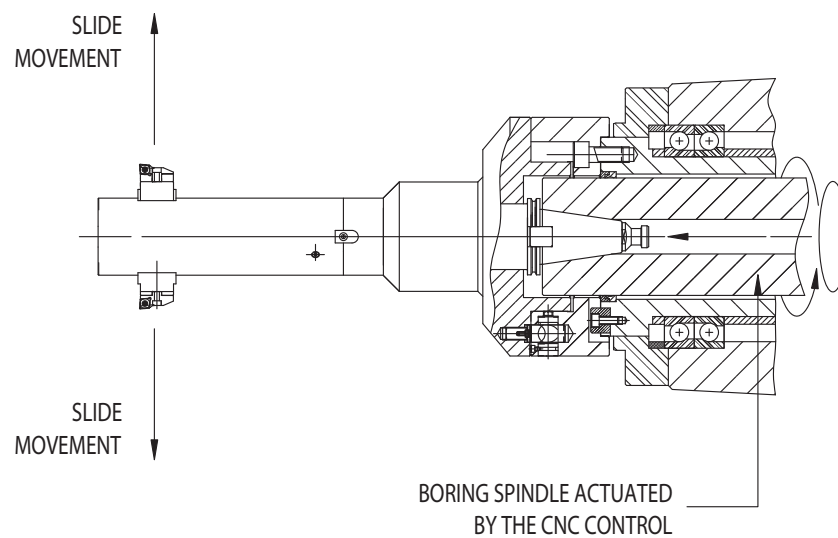
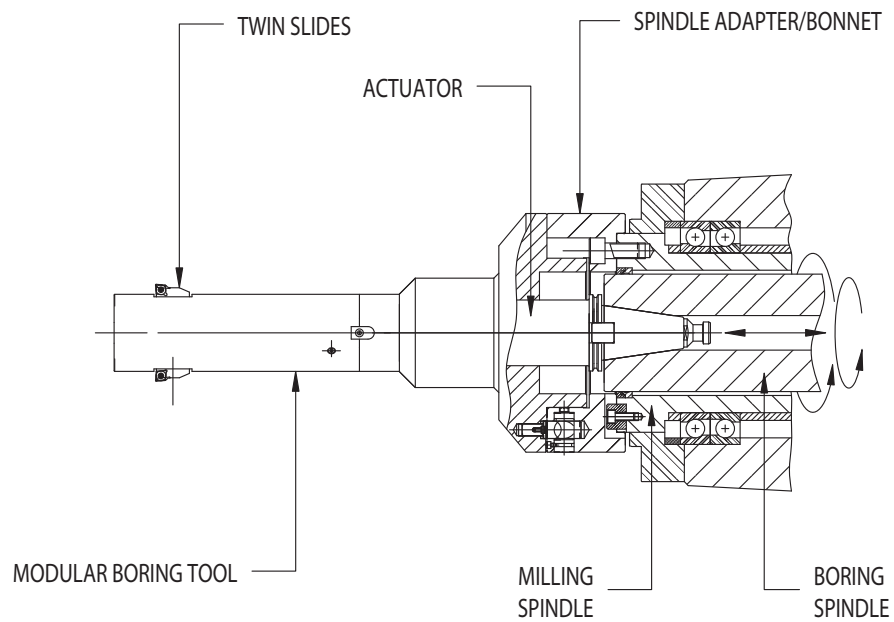
# Overview

## ZX CONTOURING/FACING HEAD SYSTEM



# Overview

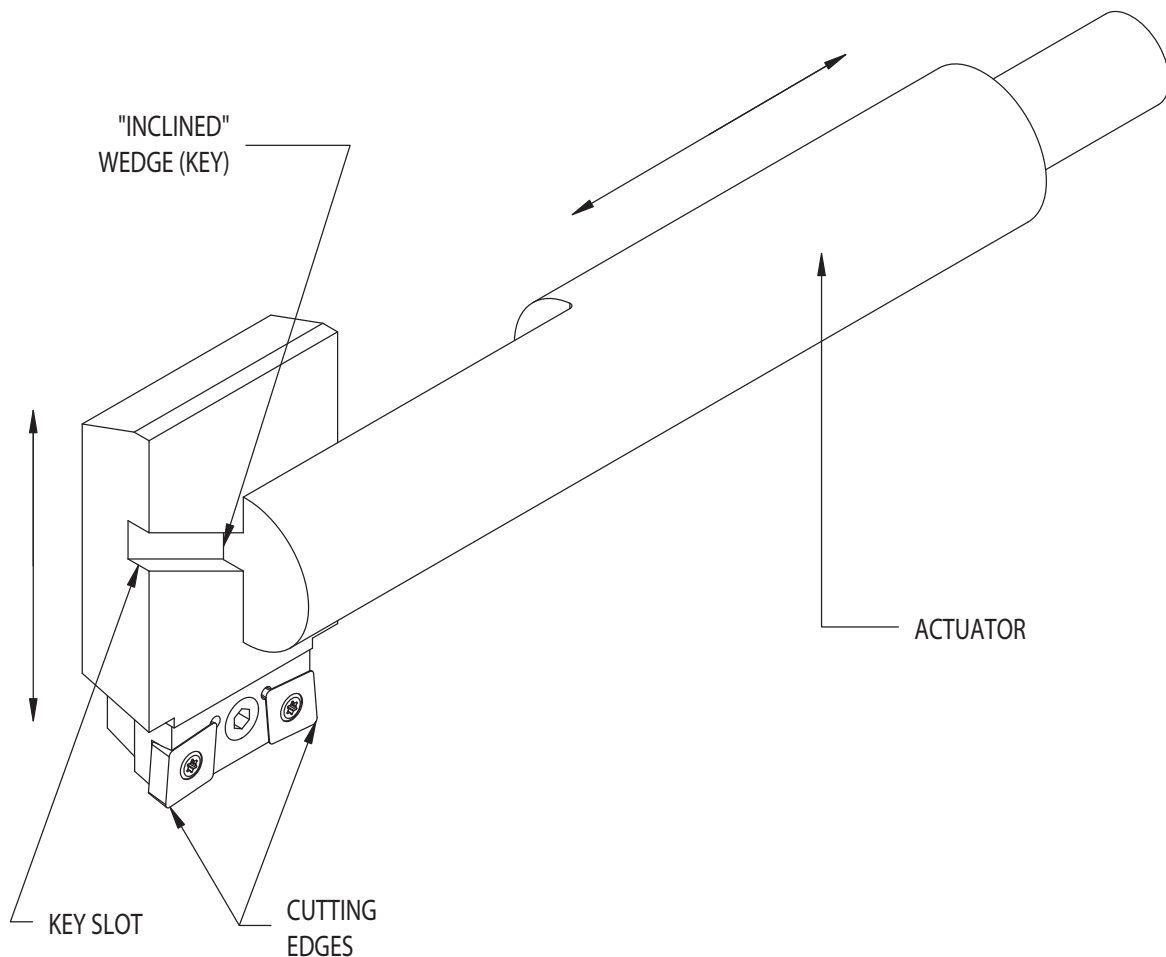
## ZX MODULAR BORING SYSTEM



## Overview

### INTERNAL MECHANISM

The body of the tool mounts to the outer spindle of the machine, which provides the rotational drive for the cutting edges. The actuator shaft is attached to the inner spindle via a typical machine tool shank (e.g., CAT 50). The tools convert the axial motion of the inner spindle into radial motion at the cutting edge. The actuator keys are a lapped fit into a corresponding slot in the tool slide(s). As the actuator-and-key assembly moves forward, the slide is forced outward; as the actuator moves rearward, the slide moves in.



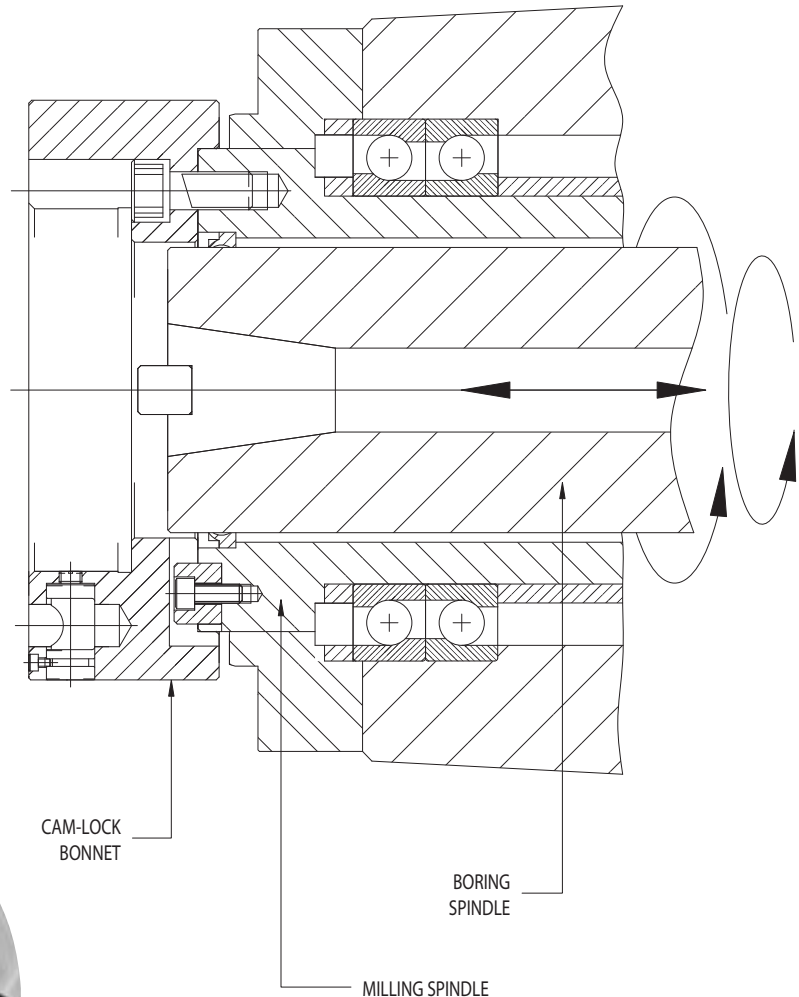
**Large sliding load-bearing surfaces provide extremely rigid tool performance.  
Wide keys and deep key slots ensure long wear life under heavy cutting loads.**

# Overview

## ZX CAM-LOCK BONNET

### CAM-LOCK BONNET FOR FAST AND EASY MOUNTING

The ZX system features a quick-release mounting device called a cam-lock bonnet. The cam-lock bonnet is precisely machined to fit the specific horizontal boring mill on which it will be installed. The bonnet bolts to the outer spindle of the machine, and features four (or six) cam-locking pins to retain the ZX tool on the bonnet. A simple 90-degree rotation of the cam-locking mechanism is all that is required to securely retain the head. A generous engagement surface between the bonnet and head provides maximum support and rigidity. When the head is installed, it literally functions as part of the machine.



ZX Cam-Lock Bonnet



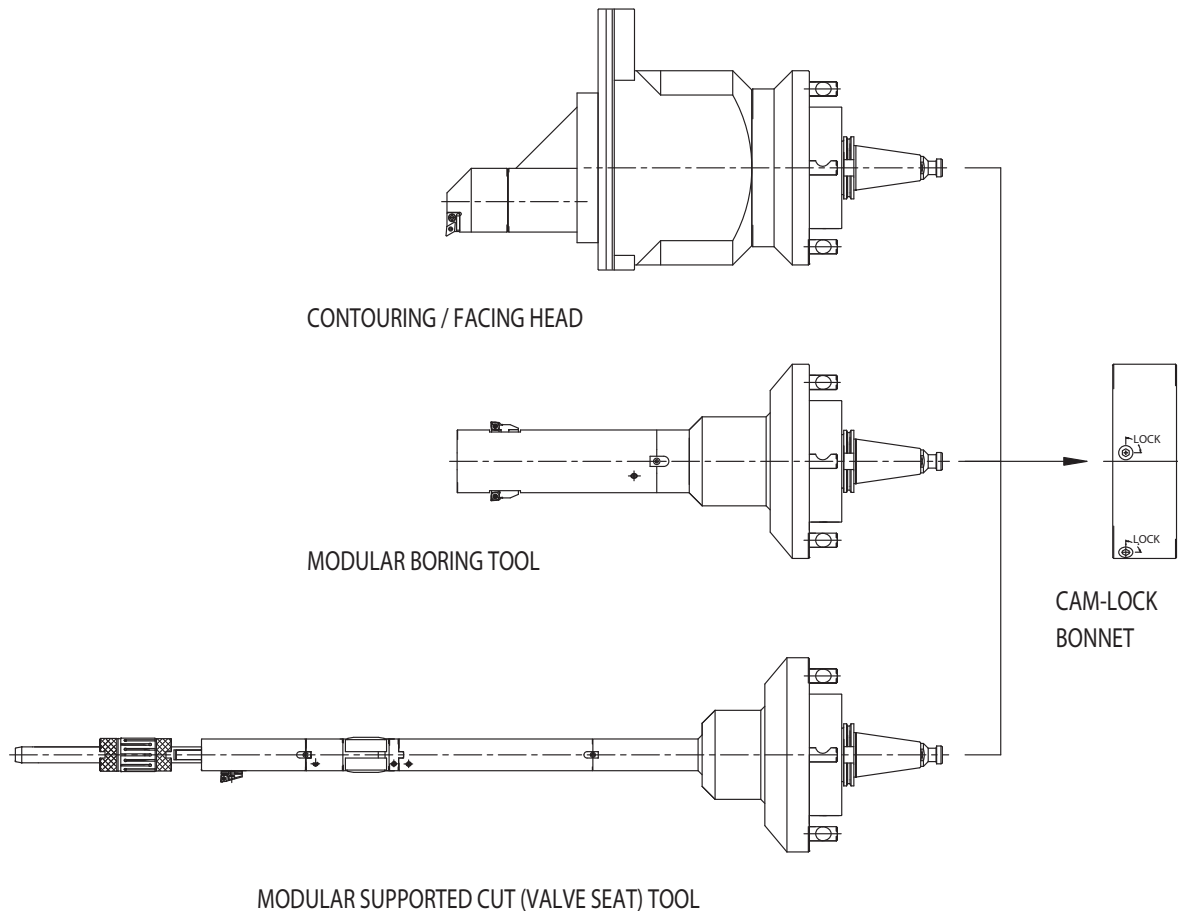
## Overview

### ZX CAM-LOCK BONNET

Cam-lock bonnets can be made to fit every make of horizontal boring mill, including Kuraki, Giddings & Lewis, Toshiba, Olympia, Lucas, Nomura, Ikegai, and others. When requesting a quotation, please submit a completed “ZX Spindle Nose Data Sheet,” found on page 36.

Options that may be ordered with a cam-lock bonnet include:

- Chip cover plates with wiper seals to keep the mounting surfaces clean
- Proximity switch plates to actuate automatic software switches on machines that are so equipped.



## ZX Facing/Contouring Heads

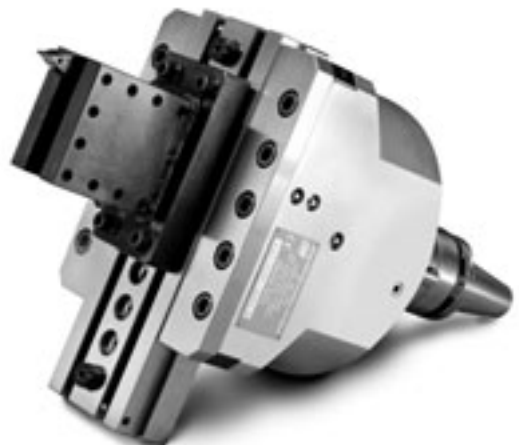
**ZX**<sup>TM</sup>  
BORING,  
FACING, &  
CONTOURING  
SYSTEMS

ZX Facing / Contouring heads offer the **greatest versatility** of all ZX tools. These heads have a single tool slide onto which top tooling is mounted into qualified locating holes. This provides for repeatable set-ups. With appropriate top tooling, these heads can perform boring, facing, O.D. turning, grooving, taper boring, radius forming, chamfering, recessing, and threading. Large parts can be machined in one set-up without removing the work piece from the machine tool table.

Internal coolant is optional.



ZX 420



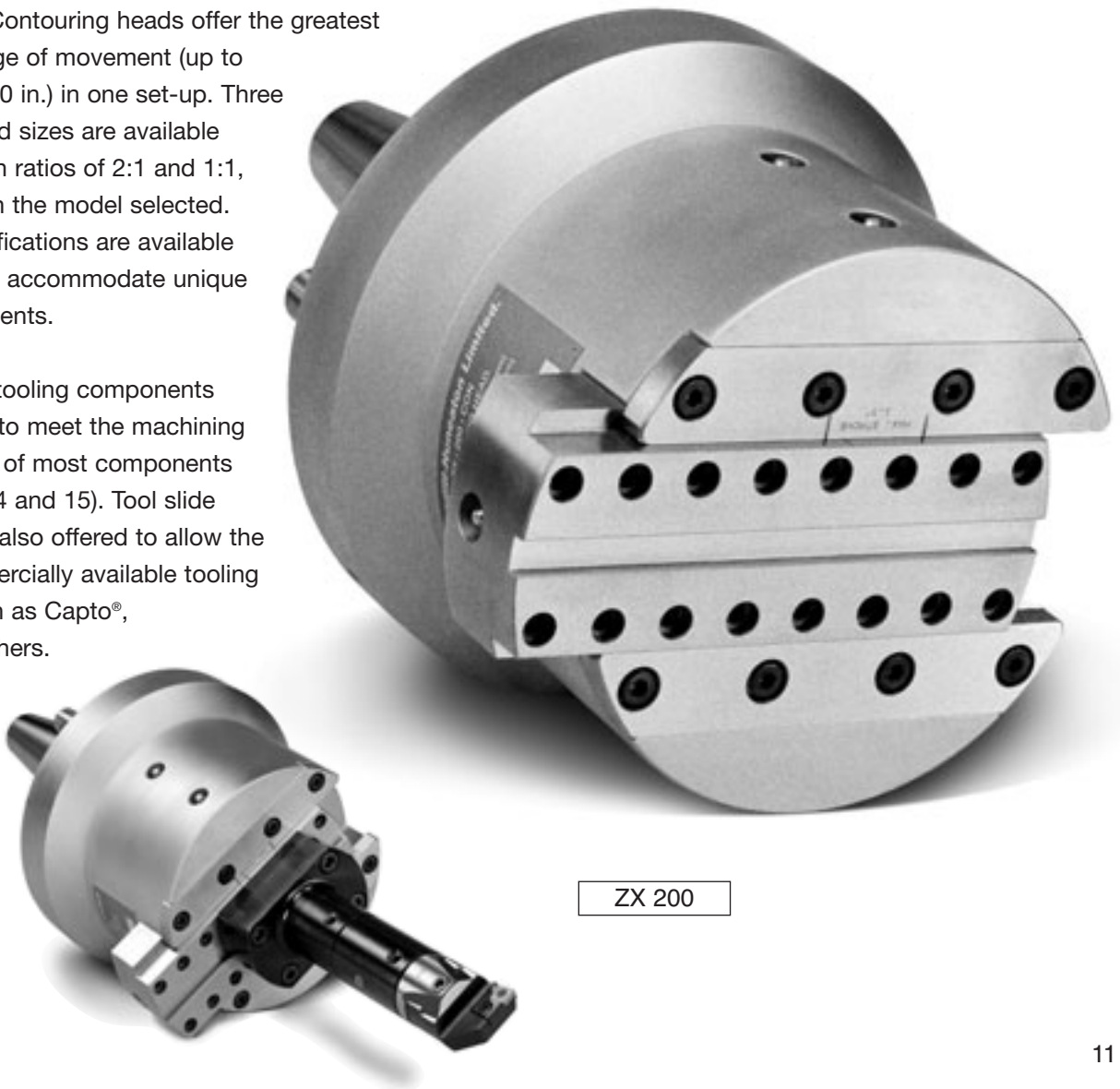
## ZX™ Facing/Contouring Heads

### Benefits:

- Perform lathe-type operations on horizontal boring mills.
- Maximum application flexibility – machine I.D.s, O.D.s, faces, tapers, radii, and contours.
- Large diameter range.
- Accepts industry-standard top tooling components and inserts; modular tooling packages also available.
- Qualified tool location points in tool slide for accurate and repeatable set-ups.
- Extremely rigid and durable design.
- Backlash-free operation.

ZX Facing / Contouring heads offer the greatest diameter range of movement (up to 203.2mm / 8.0 in.) in one set-up. Three standard head sizes are available with actuation ratios of 2:1 and 1:1, depending on the model selected. Special modifications are available on request to accommodate unique part requirements.

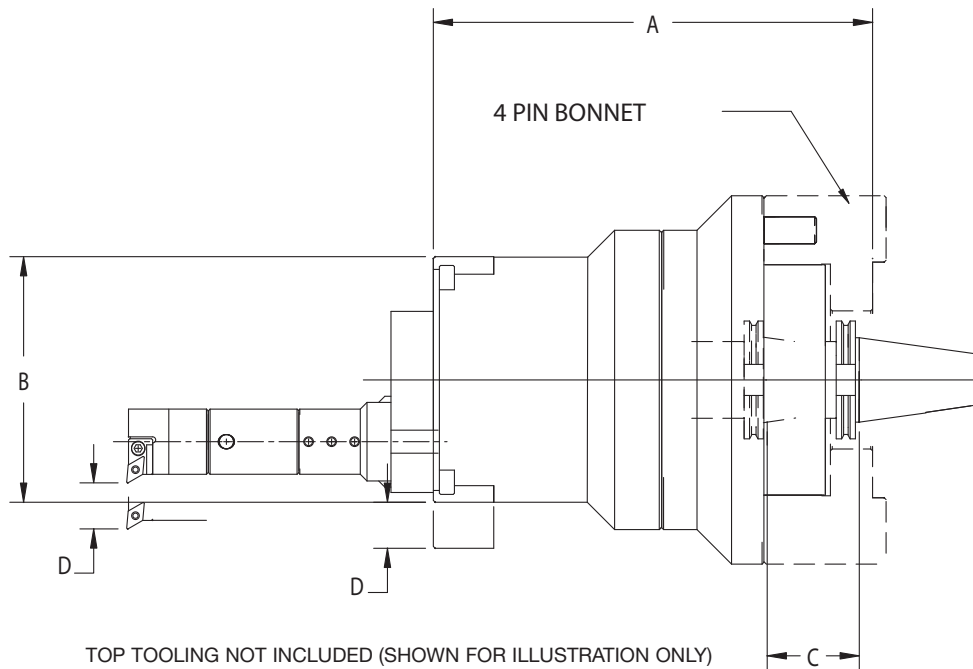
Modular top tooling components are available to meet the machining requirements of most components (see pages 14 and 15). Tool slide adapters are also offered to allow the use of commercially available tooling systems such as Capto®, ABS®, and others.



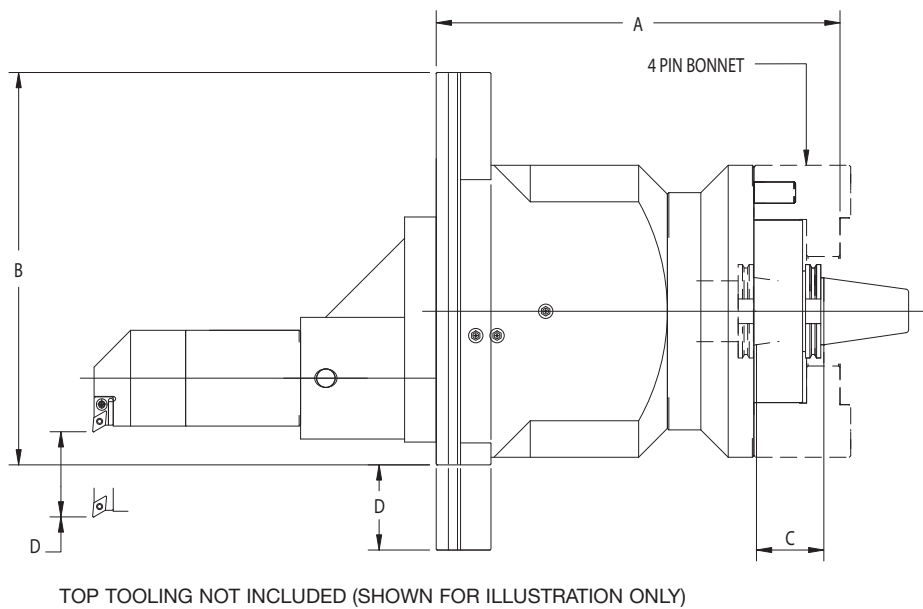
ZX 200

## Tool Specifications

### ZX-200

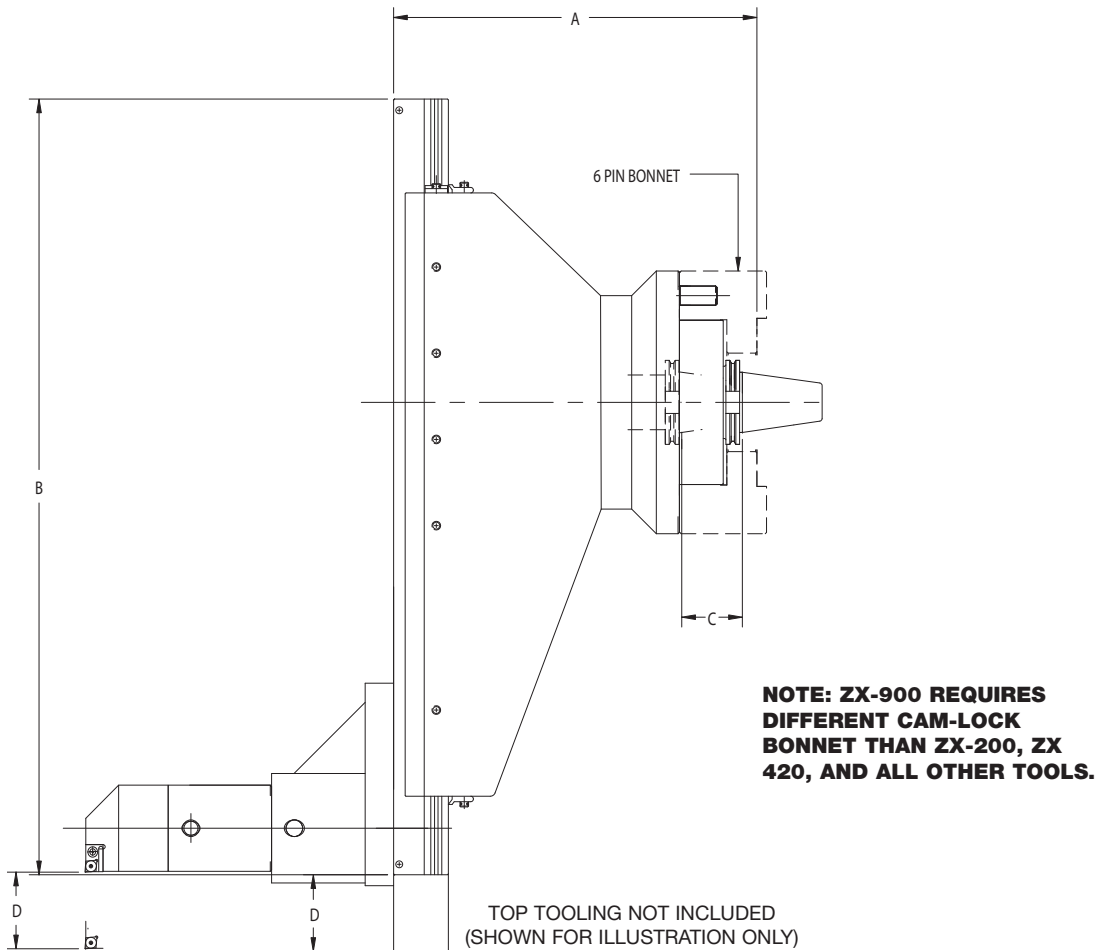


### ZX-420



# Tool specifications

## ZX-900

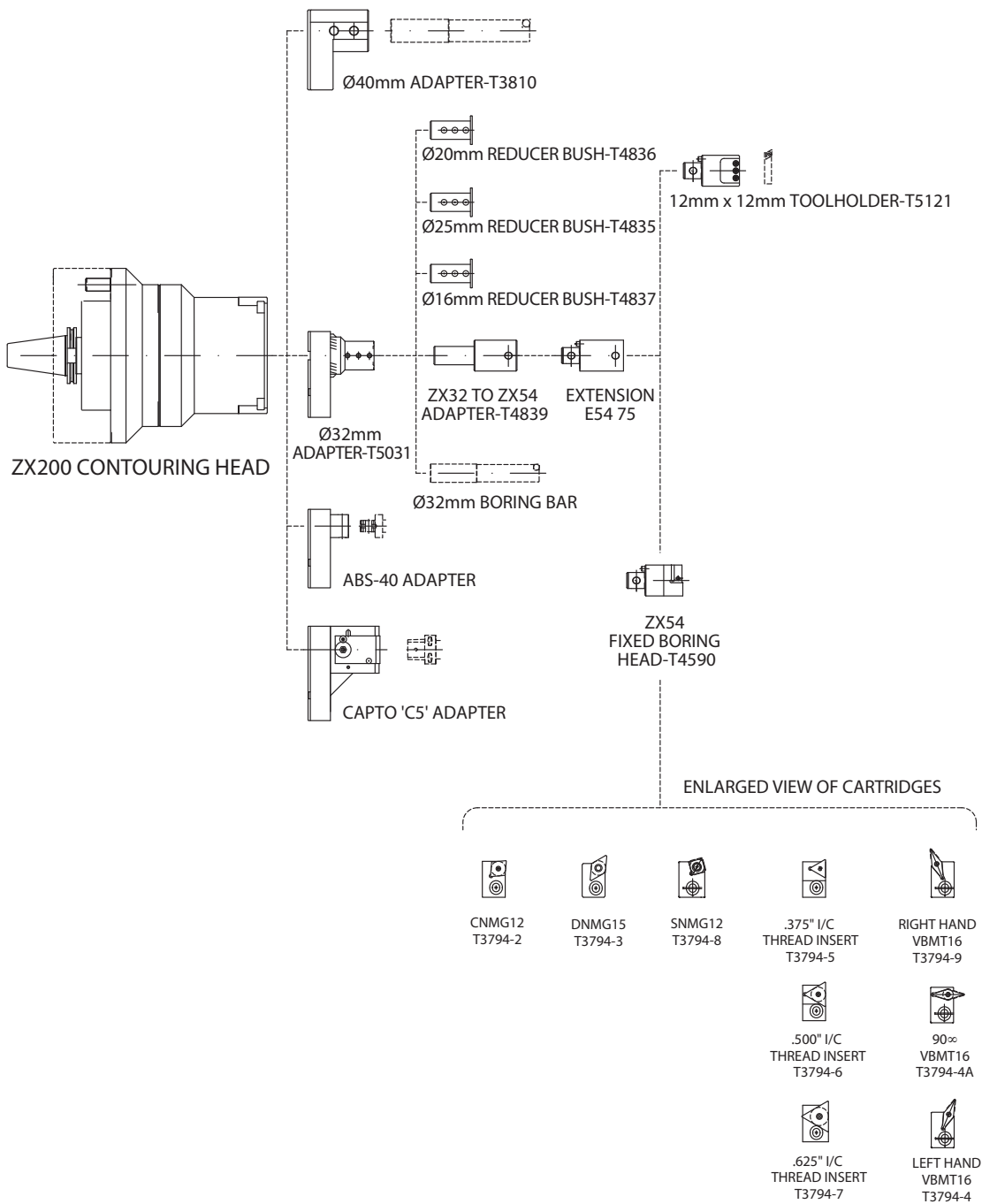


DETAILS		TOOL NUMBER					
		ZX-200-CON		ZX-420-CON		ZX-900-CON	
		Inch	mm	Inch	mm	Inch	mm
Length excluding tooling	A	14.94	380	17	432	17	432
Slide length	B	7.88	200	16.63	422	35.43	900
Machine spindle travel	C	3	76	4	102	4	102
Tool and slide travel	D	1.5	38	4	102	4	102
Diameter range		0-15	0-380	0-25	0-635	0-50	0-1270
Max. Recommended speed		800 RPM		300 RPM		150 RPM	
Weight		205 lbs	93kg	340 lbs	154 kg	500 lbs	230 kg

Internal coolant is optional. Special work lengths, tool slide strokes, tool body diameters, and other special requirements can be accommodated; contact us for a quotation.

# Tool Specifications

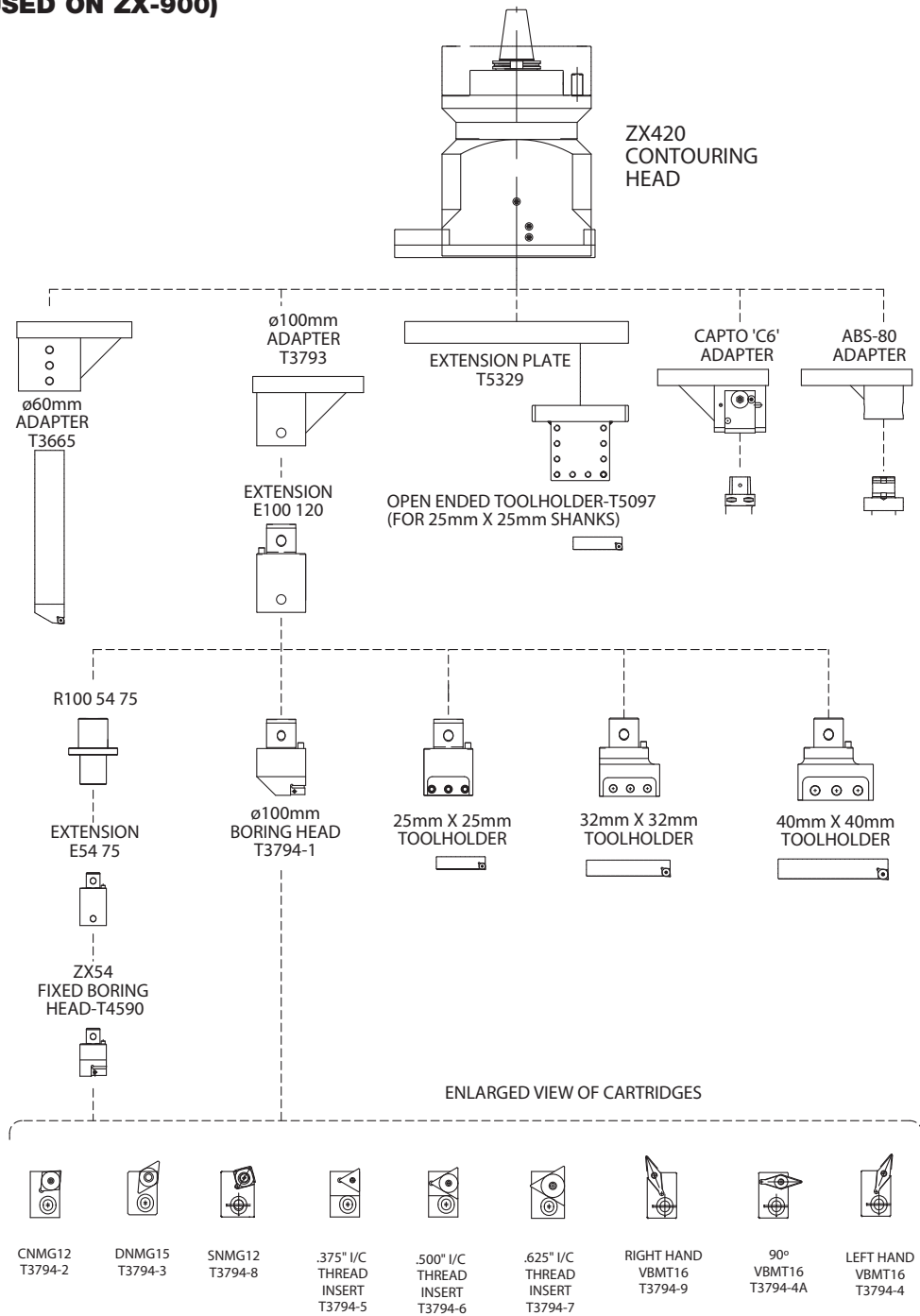
## ZX-200 CONTOURING HEAD MODULAR TOP TOOLING



# Tool specifications

## ZX-420 CONTOURING HEAD MODULAR TOP TOOLING

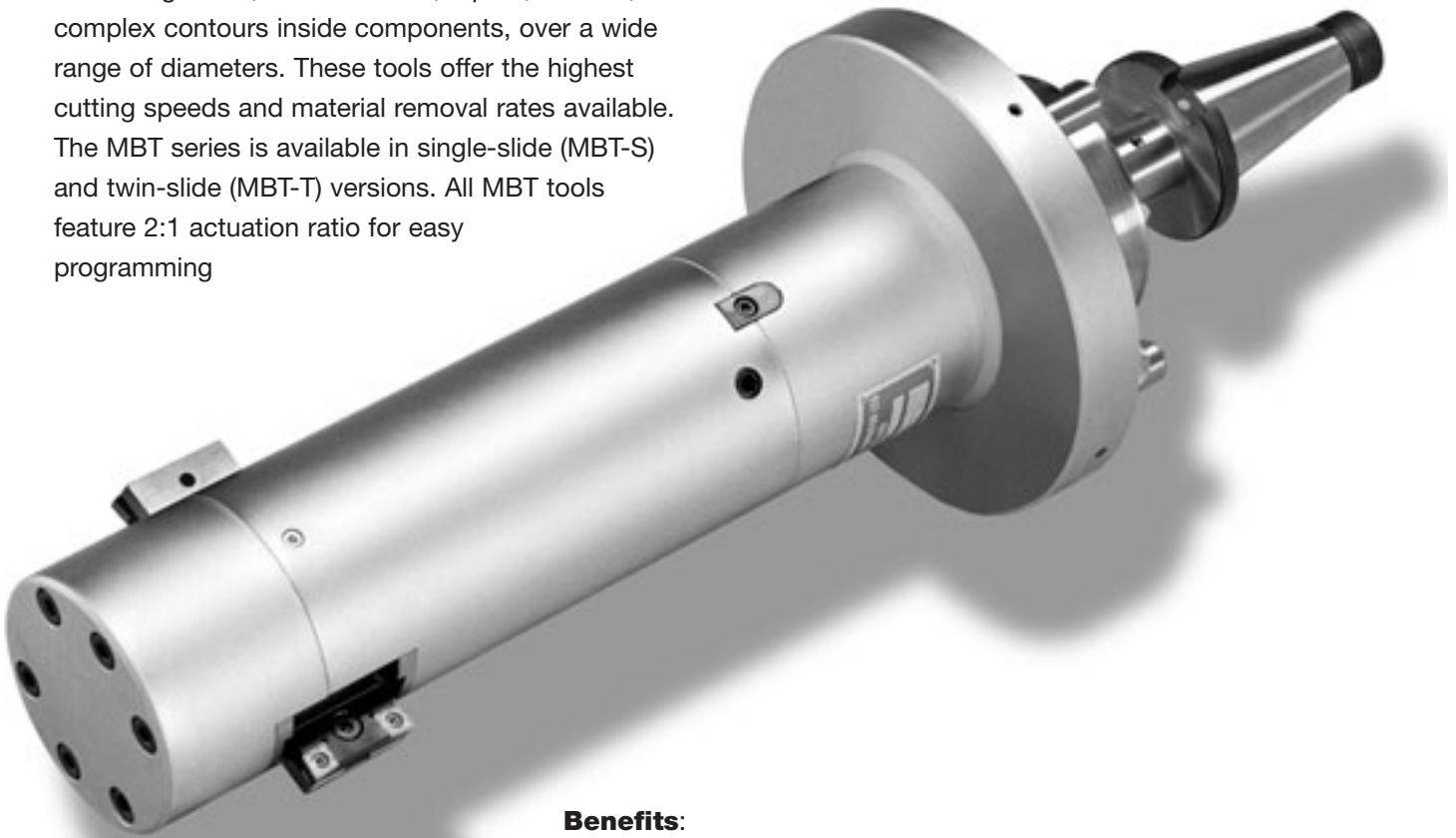
(ALSO USED ON ZX-900)



# ZX Modular Boring Tools (MBT)



ZX Modular Boring Tools (MBT) offer versatility and economy when machining bores, counter-bores, tapers, threads, and complex contours inside components, over a wide range of diameters. These tools offer the highest cutting speeds and material removal rates available. The MBT series is available in single-slide (MBT-S) and twin-slide (MBT-T) versions. All MBT tools feature 2:1 actuation ratio for easy programming



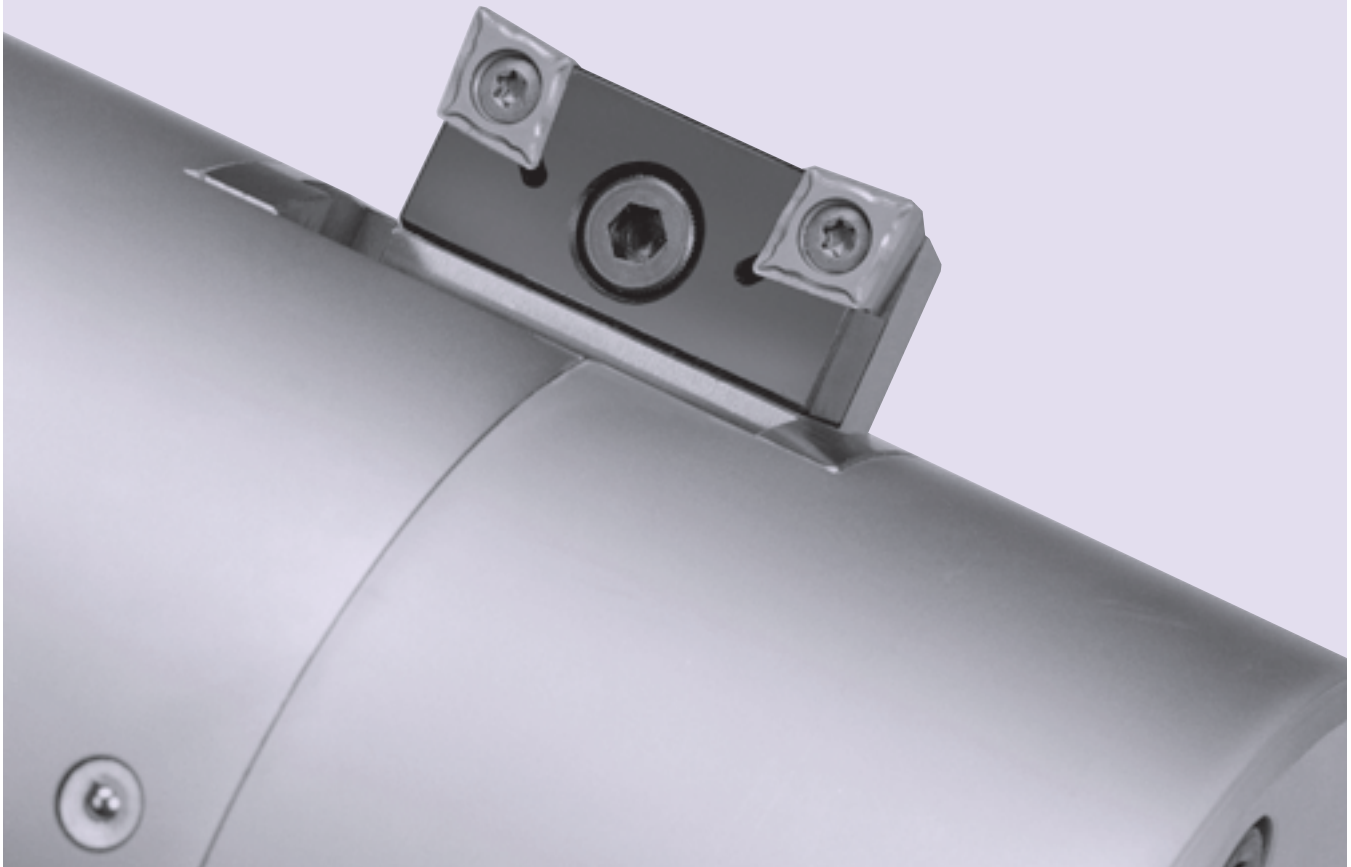
## Benefits:

- Broad size range: Each tool has a long tool slide stroke that is supplemented by using different cartridges to cover an even wider diameter range. No need to change the tool slide(s) or remove the head from the machine.
- Versatility: Performs forward and back boring operations (such as back counter-bores). Internal grooves, faces, and bottle bores can also be machined.
- Bottom-facing capability available for blind bores.
- Exceptional concentricity: Stepped and tapered bores are machined without tool changes. Concentricity is maintained as the tool slide(s) adjusts for various diameters while the tool stays on the same bore centerline.



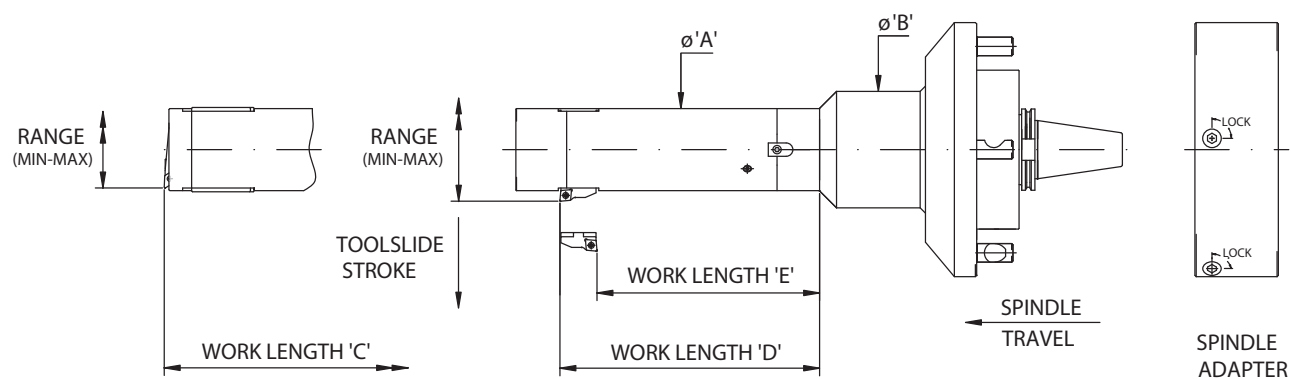
### **Benefits (continued):**

- Twin-slide tools offer balanced cutting forces for high feeds and speeds and high material removal rates.
- Internal through-tool coolant is standard.
- Fully enclosed actuation mechanism: No chip packing.
- Modular design makes adjustment of length and configuration fast and easy. This adds to the versatility of the tool. Some sizes can be converted for extended-reach applications with piloted support.
- Internal forward hard stop and anti-torque features protect the tool in case of mishaps.

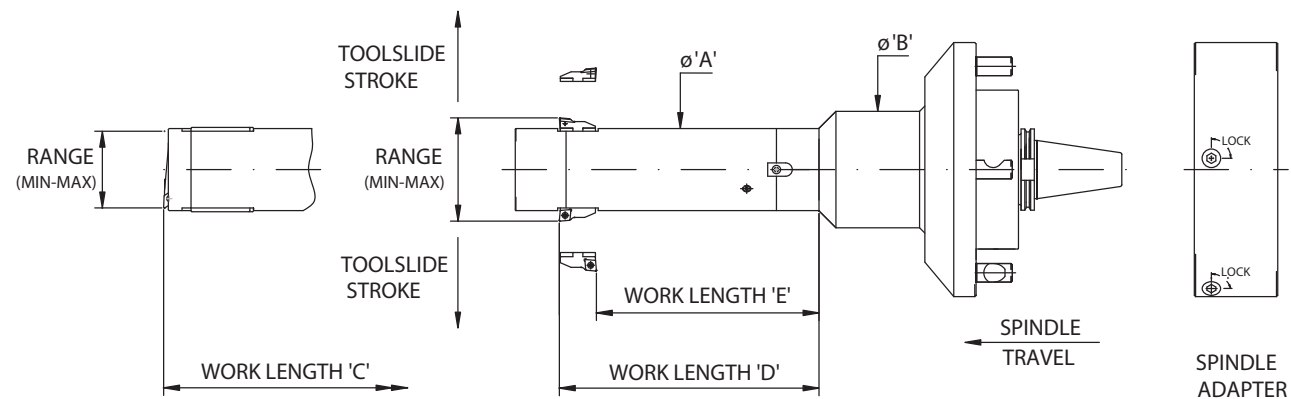


# Tool Specifications

**ZX MBT SERIES**



**BOTTOMING TYPE, SINGLE SLIDE | THROUGH TYPE, SINGLE SLIDE**



**BOTTOMING TYPE, TWIN SLIDE | THROUGH TYPE, TWIN SLIDE**

# Tool Specifications

## INCH PROGRAM

BOTTOMING TYPE							
HEAD SIZE	HEAD TYPE	RANGE (Min-Max)	TOOL SLIDE STROKE	SPINDLE TRAVEL	TOOL BODY ØA	TOOL BODY ØB	WORK LENGTH (BORE) C
MBT 73	Twin	3.000-4.800	.900	1.800	2.875	5.500	15.300
MBT 100	Twin	4.000-5.800	.900	1.800	3.875	5.500	17.300
MBT 125	Twin	6.700-8.950	1.125	2.250	4.875	—	22.000
MBT 175	Twin	8.700-10.950	1.125	2.250	6.875	—	22.000
stated sizes in inch							

BOTTOMING TYPE							
HEAD SIZE	HEAD TYPE	RANGE (Min-Max)	TOOL SLIDE STROKE	SPINDLE TRAVEL	TOOL BODY ØA	TOOL BODY ØB	WORK LENGTH (BORE) C
MBT 45	Single	1.780-2.680	.450	.900	1.750	5.500	9.000
MBT 50	Single	2.032-3.032	.500	1.000	1.960	5.500	11.500
MBT 73	Single	3.000-4.800	.900	1.800	2.875	5.500	15.300
MBT 100	Single	4.000-5.800	.900	1.800	3.875	5.500	17.300
MBT 125	Single	6.700-8.950	1.125	2.250	4.875	—	22.000
MBT 175	Single	8.700-10.950	1.125	2.250	6.875	—	22.000
stated sizes in inch							

THROUGH TYPE								
HEAD SIZE	HEAD TYPE	RANGE (Min-Max)	TOOL SLIDE STROKE	SPINDLE TRAVEL	TOOL BODY ØA	TOOL BODY ØB	WORK LENGTH (BORE) D	WORK LENGTH (BACK BORE) E
MBT 73	Twin	3.000-5.000	1.000	2.000	2.875	5.500	14.000	12.250
MBT 100	Twin	4.000-6.000	1.000	2.000	3.875	5.500	16.000	14.250
MBT 125	Twin	5.020-7.520	1.250	2.500	4.875	—	20.000	17.500
MBT 175	Twin	6.940-9.440	1.250	2.500	6.875	—	20.000	17.500
stated sizes in inch								

THROUGH TYPE								
HEAD SIZE	HEAD TYPE	RANGE (Min-Max)	TOOL SLIDE STROKE	SPINDLE TRAVEL	TOOL BODY ØA	TOOL BODY ØB	WORK LENGTH (BORE) D	WORK LENGTH (BACK BORE) E
MBT 45	Single	1.780-3.404	.812	1.625	1.750	5.500	8.000	6.820
MBT 50	Single	2.032-3.782	.875	1.750	1.960	5.500	10.500	9.122
MBT 73	Single	3.000-5.000	1.000	2.000	2.875	5.500	14.000	12.250
MBT 100	Single	4.000-6.000	1.000	2.000	3.875	5.500	16.000	14.250
MBT 125	Single	5.020-7.520	1.250	2.500	4.875	—	20.000	17.500
MBT 175	Single	6.940-9.440	1.250	2.500	6.875	—	20.000	17.500
stated sizes in inch								

Special work lengths, tool slide strokes, tool body diameters, and other special requirements can be accommodated; contact us for a quotation.

# Tool Specifications

## METRIC PROGRAM

BOTTOMING TYPE							
HEAD SIZE	HEAD TYPE	RANGE (Min-Max)	TOOL SLIDE STROKE	SPINDLE TRAVEL	TOOL BODY ØA	TOOL BODY ØB	WORK LENGTH (BORE) C
MBT 73	Twin	76,2-121,9	22,9	45,7	73,03	139,7	388,6
MBT 100	Twin	101,6-147,3	22,9	45,7	98,43	139,7	439,4
MBT 125	Twin	170,2-227,3	28,58	57,15	123,83	—	558,8
MBT 175	Twin	221,0-278,1	28,58	57,15	174,63	—	558,8
stated sizes in mm							

BOTTOMING TYPE							
HEAD SIZE	HEAD TYPE	RANGE (Min-Max)	TOOL SLIDE STROKE	SPINDLE TRAVEL	TOOL BODY ØA	TOOL BODY ØB	WORK LENGTH (BORE) C
MBT 45	Single	45,2-68,07	11,4	22,9	44,45	139,7	228,6
MBT 50	Single	51,6-77,01	12,7	25,4	49,78	139,7	292,1
MBT 73	Single	76,2-121,9	22,9	45,7	73,03	139,7	388,6
MBT 100	Single	101,6-147,3	22,9	45,7	98,43	139,7	439,4
MBT 125	Single	170,2-227,3	28,58	57,15	123,83	—	558,8
MBT 175	Single	221,0-278,1	28,58	57,15	174,63	—	558,8
stated sizes in mm							

THROUGH TYPE								
HEAD SIZE	HEAD TYPE	RANGE (Min-Max)	TOOL SLIDE STROKE	SPINDLE TRAVEL	TOOL BODY ØA	TOOL BODY ØB	WORK LENGTH (BORE) D	WORK LENGTH (BACK BORE) E
MBT 73	Twin	76,2-127,0	25,4	50,8	73,03	139,7	355,6	311,15
MBT 100	Twin	101,6-152,4	25,4	50,8	98,43	139,7	406,4	361,95
MBT 125	Twin	127,5-191,0	31,75	63,5	123,83	—	508,0	454,03
MBT 175	Twin	176,27-239,7	31,75	63,5	174,63	—	508,0	454,03
stated sizes in mm								

THROUGH TYPE								
HEAD SIZE	HEAD TYPE	RANGE (Min-Max)	TOOL SLIDE STROKE	SPINDLE TRAVEL	TOOL BODY ØA	TOOL BODY ØB	WORK LENGTH (BORE) D	WORK LENGTH (BACK BORE) E
MBT 45	Single	45,21-86,46	20,6	41,28	44,45	139,7	203,2	173,2
MBT 50	Single	51,61-96,06	22,2	44,45	49,78	139,7	266,7	231,7
MBT 73	Single	76,2-127,0	25,4	50,8	73,03	139,7	355,6	311,15
MBT 100	Single	101,6-152,4	25,4	50,8	98,43	139,7	406,4	361,95
MBT 125	Single	127,5-191,0	31,75	63,5	123,83	—	508,0	444,5
MBT 175	Single	176,27-239,7	31,75	63,5	174,63	—	508,0	444,5
stated sizes in mm								

Special work lengths, tool slide strokes, tool body diameters, and other special requirements can be accommodated; contact us for a quotation.

# Tool Operation

## FEEDS AND SPEEDS

**The guidelines below are intended as a starting point.**

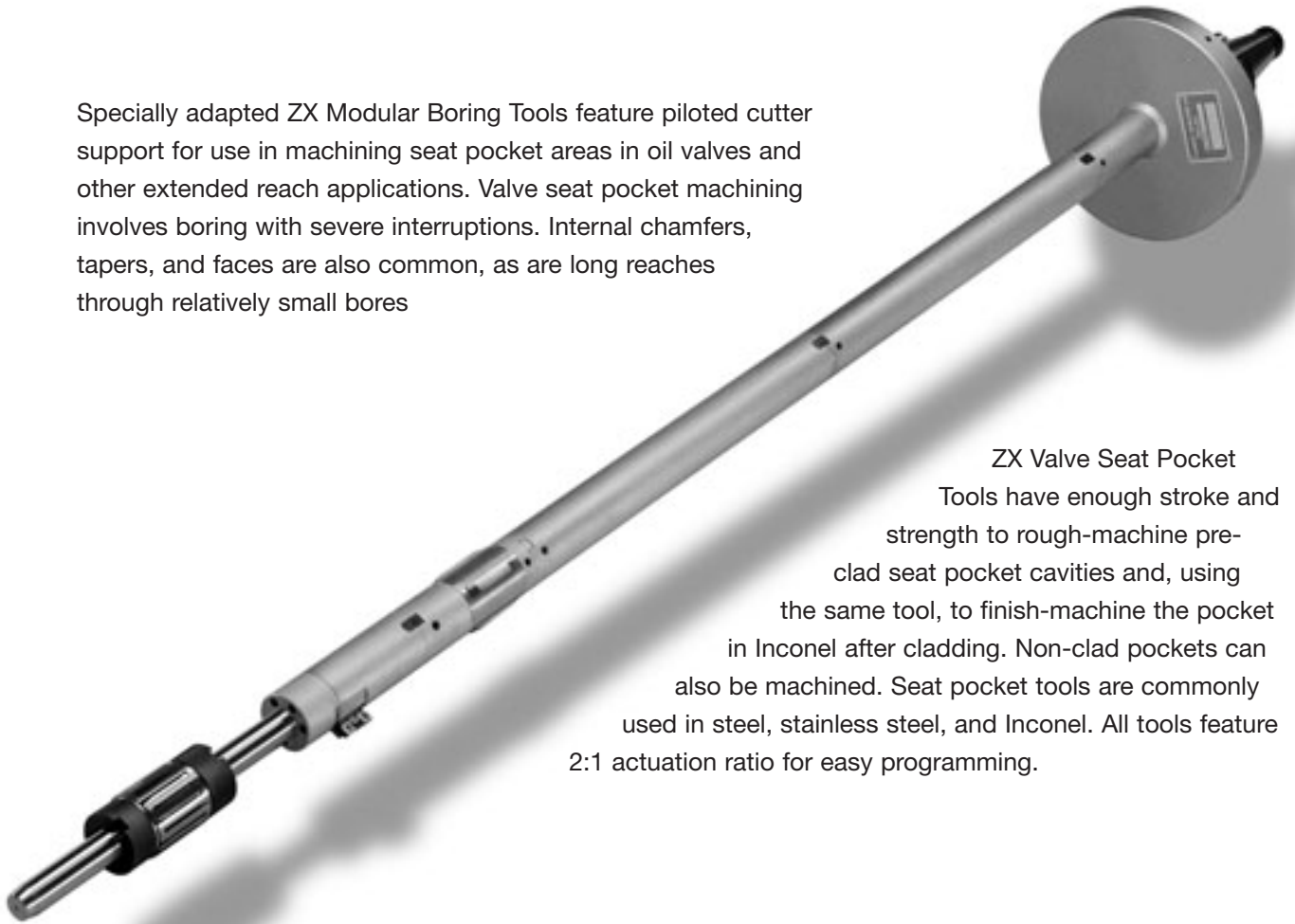
METRIC PROGRAM						
	ROUGHING			FINISHING		
	SPEED	FEED	D.O.C.	SPEED	FEED	D.O.C.
	M/Min	mm/Rev	mm	M/Min	mm/Rev	mm
STEEL (4140)	90-175	0,2-0,3	1,5-3,0	130-240	0,1-0,13	0,4-1,0
INCONEL	18-25	0,1-0,3		25-35		
STAINLESS STEEL	80-180	0,2-0,3		120-250		
ALUMINIUM	160-350	0,3-0,4	3,0	405-570		0,5-1,0

INCH PROGRAM						
	ROUGHING			FINISHING		
	SPEED	FEED	D.O.C.	SPEED	FEED	D.O.C.
	Ft/Min	Inch/Rev	Inch	Ft/Min	Inch/Rev	Inch
STEEL (4140)	295-575	.008-.010	.060-.125	425-780	.004-.005	.015-.040
INCONEL	60-80	.004-.010		80-115		
STAINLESS STEEL	260-590	.008-.010		390-820		
ALUMINIUM	500-1150	.012-.016	.125	1300-1870		.020-.060

# ZX Valve Seat Pocket Tools



Specially adapted ZX Modular Boring Tools feature piloted cutter support for use in machining seat pocket areas in oil valves and other extended reach applications. Valve seat pocket machining involves boring with severe interruptions. Internal chamfers, tapers, and faces are also common, as are long reaches through relatively small bores



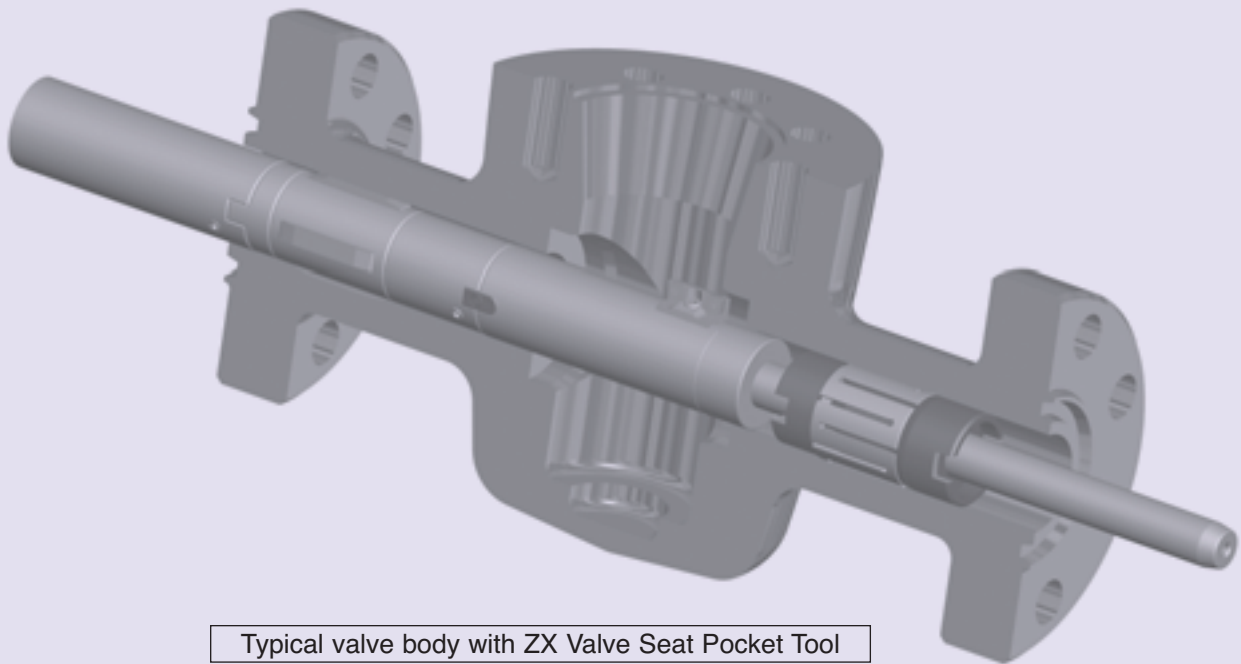
ZX Valve Seat Pocket Tools have enough stroke and strength to rough-machine pre-clad seat pocket cavities and, using the same tool, to finish-machine the pocket in Inconel after cladding. Non-clad pockets can also be machined. Seat pocket tools are commonly used in steel, stainless steel, and Inconel. All tools feature 2:1 actuation ratio for easy programming.

## Benefits:

- In-bore piloting for rigid cutter support.
- Available in single and twin-slide designs to fit industry-standard flow bore sizes. Supplemental cartridges can be supplied to increase diameter range in special applications.
- Modular construction, in standard lengths: stub, medium, and long reach. (Non-threaded design allows for easy assembly and disassembly of modular sections.)
- Support collet pilots with wrench sets are included on medium and long-reach tools (optional air collets are available).

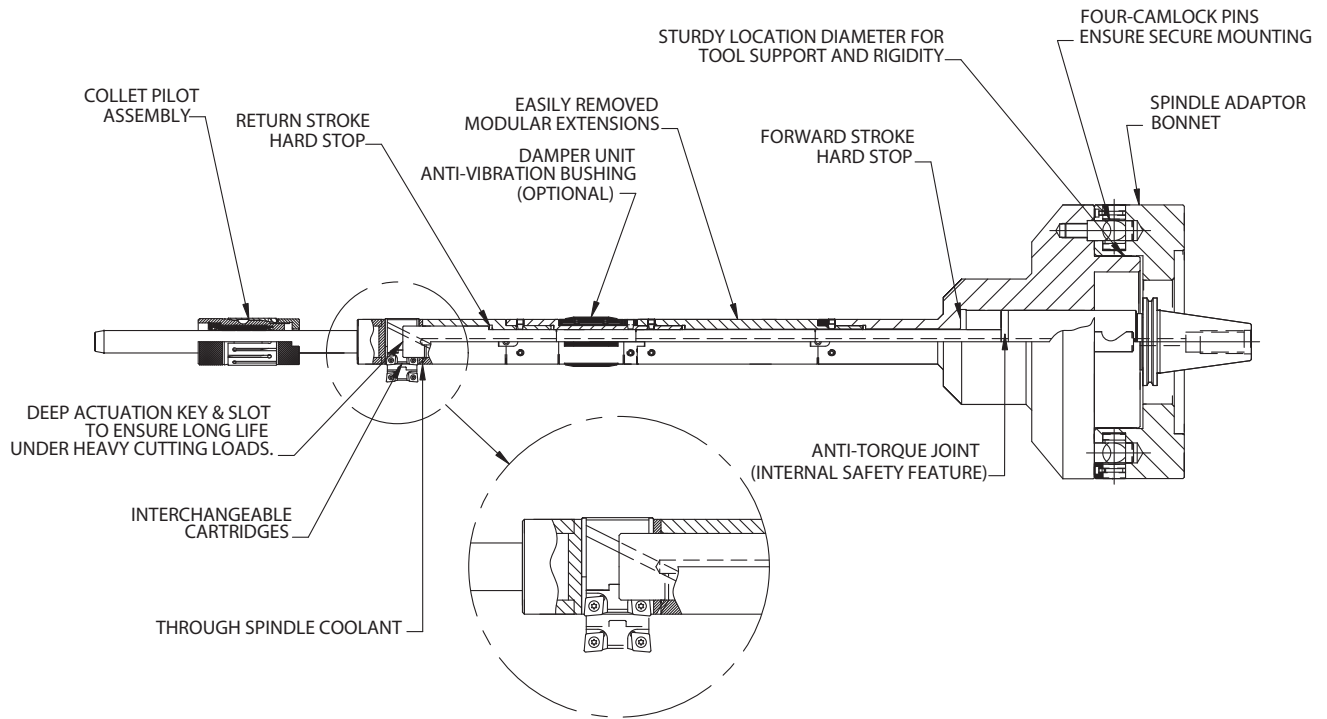
### **Benefits (continued):**

- Longest tool slide strokes available, for maximum diameter range.
- Internal through-tool coolant is optional.
- Fully enclosed actuation mechanism – no chip packing.
- Internal forward hard stop and anti-torque features protect the tool in case of mishaps.
- Modular damper units are available on smaller-bore tools to dampen vibrations.
- Conversion kits provide ability to easily change tool for use in valves of various sizes.
- A variety of insert cartridges are available, utilizing industry-standard inserts (see chart on page 29).

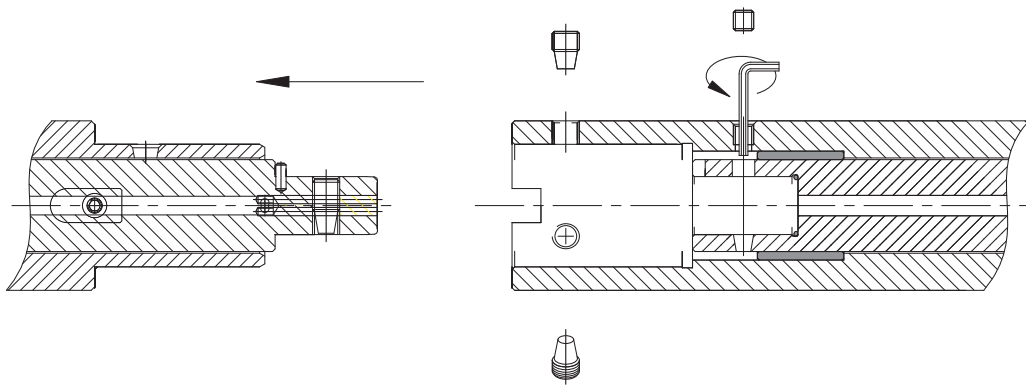


Typical valve body with ZX Valve Seat Pocket Tool

## ZX VALVE SEAT POCKET TOOL

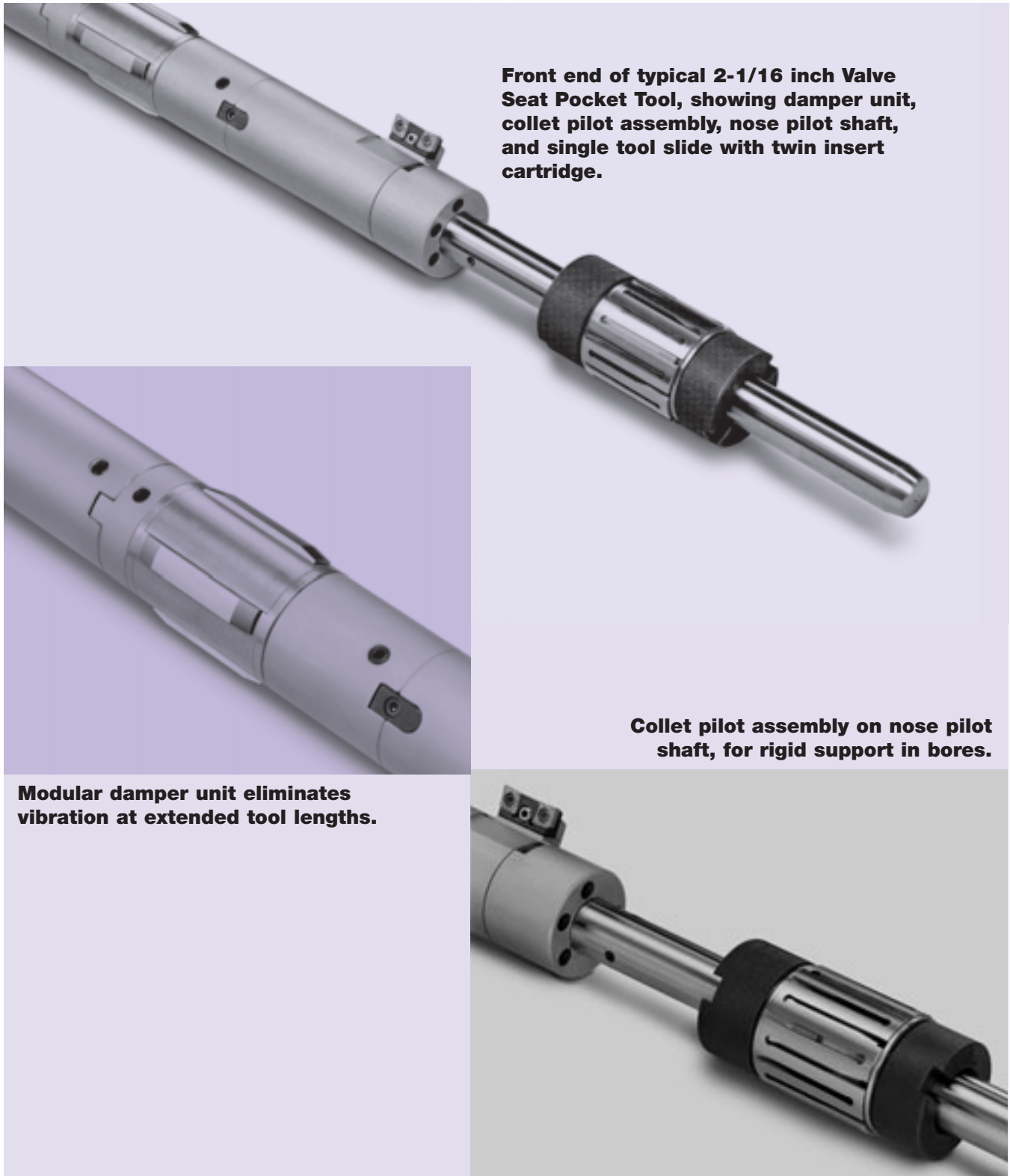


## EXTENSION COUPLING





## **ZX™** Valve Seat Pocket Tools

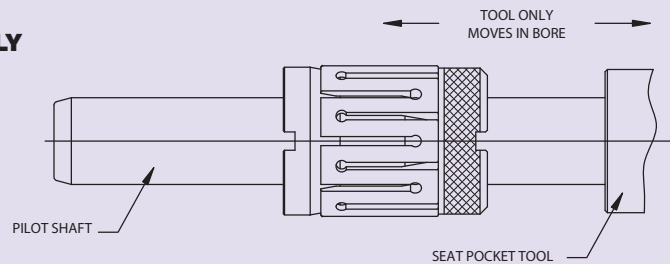


## **ZX PILOT ASSEMBLIES**

### **STANDARD**

#### **MANUALLY-OPERATED COLLET PILOT ASSEMBLY**

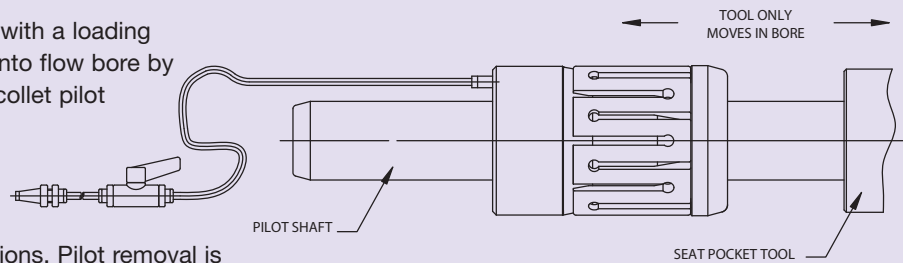
Loaded and expanded into component flow bore with a single-acting collet spanner. Pilot remains fixed in bore while pilot shaft attached to seat pocket tool moves axially through the collet pilot assembly during machining operations. Pilot removal is again by use of the single-acting collet spanner. Provides a rigidly supported cutting action on long-length seat pocket tools.



### **OPTIONAL**

#### **AIR-OPERATED COLLET PILOT ASSEMBLY**

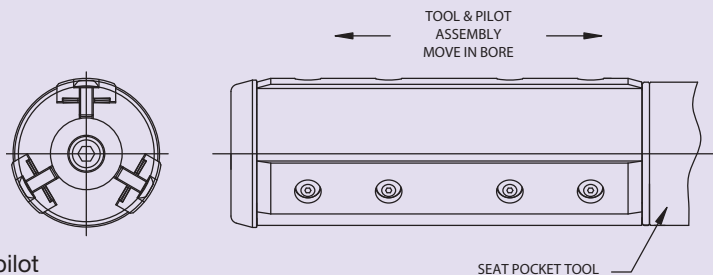
Loaded into component flow bore with a loading tool. Collet ring is then expanded into flow bore by use of air line attached to front of collet pilot assembly. Pilot remains fixed in bore while pilot shaft attached to seat pocket tool moves axially through the collet pilot assembly during machining operations. Pilot removal is again by use of loading tool after the air has been turned off. Provides a rigidly supported cutting action on long-length seat pocket tools.



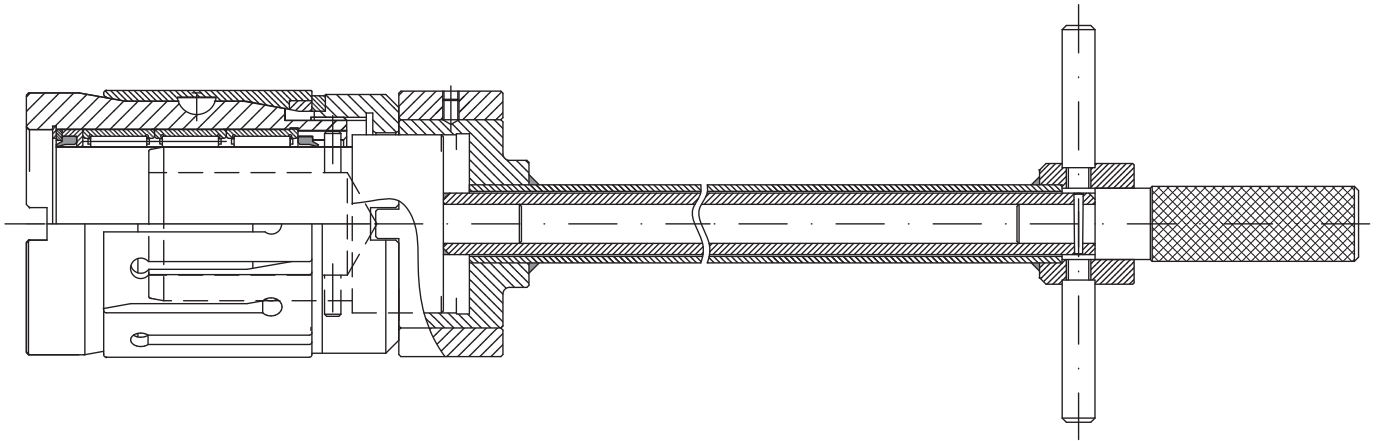
### **OPTIONAL**

#### **SPRING-LOADED FIXED PILOT ASSEMBLY**

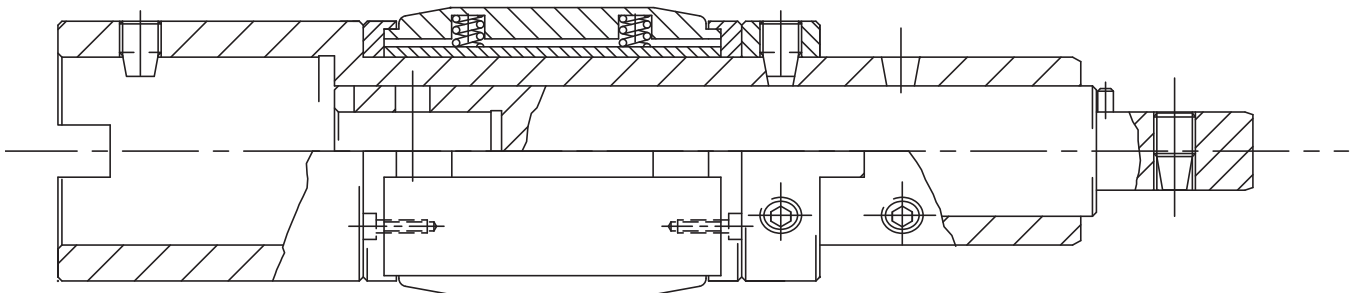
Permanently fixed to the front of the seat pocket tool. The fixed pilot assembly moves with the tool during machining operations. The three spring-loaded pads are pre-set to the flow bore diameter before the seat pocket tool is loaded into the component flow bore. Once correctly set, the fixed pilot assembly has the advantage of offering operator-free use, as no further setting of the pilot assembly is required. Set-up times are reduced.



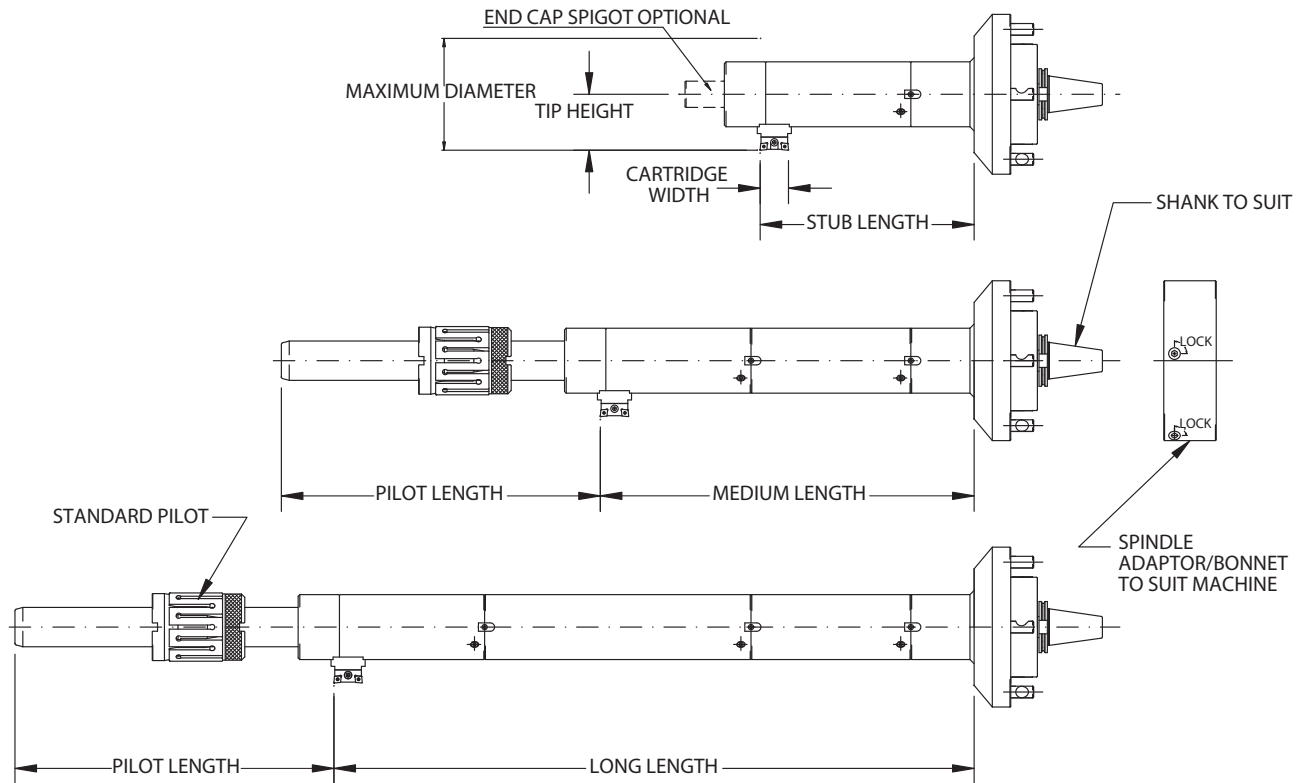
**TYPICAL SINGLE-ACTING LOCKING SPANNER FOR MECHANICAL COLLET ASSEMBLY**



**TYPICAL DAMPER UNIT**



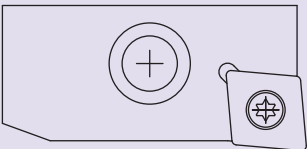
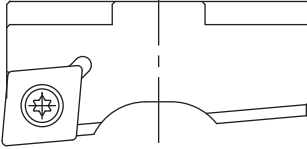
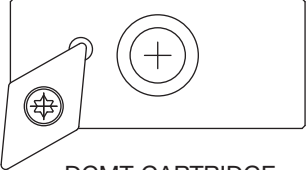
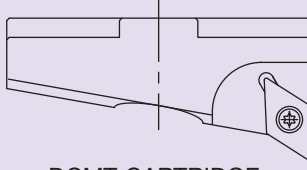
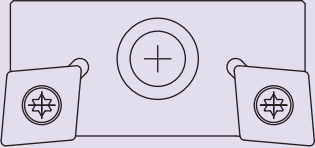
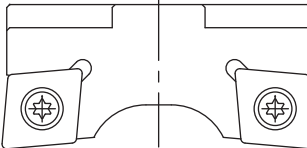
# Tool Specifications



Tool Size	Tool/Conversion	Collet Pilot	Slide Stroke	Spindle Travel	Max Diameter	Tip Height	Tool Diameter	Pilot Shaft	Stub Length	Medium Length	Long Length
1-13/16* & 2-1/16 single or twin	1-13/16 tool*	1.810 to 1.890	0.812	1.625	3.440	0.890	1.750	13.000	8	28	48
	2-1/16 conversion	2.050 to 2.130			3.656	1.016					
2-1/16 & 2-9/16 single or twin	2-1/16 tool	2.050 to 2.130	0.875	1.750	3.782	1.016	1.960	13.000	10		
	2-9/16 conversion	2.550 to 2.630			4.282	1.266					
3-1/16 & 4- 1/16 single or twin	3-1/16 tool	3.050 to 3.130	1.250	2.500	5.500	1.500	2.875	18.000	14		
	4-1/16 conversion	4.050 to 4.190			6.500	2.000					
5-1/8 & 6-3/8 & 7-1/16 single or twin slide	5-1/8 tool	5.110 to 5.250	1.680	3.360	8.380	2.510	4.875	23.500	20	28	52
	6-3/8 conversion	6.345 to 6.485			9.620	3.130					
	7-1/16 conversion	7.040 to 7.180			10.300	3.470					
7-1/16 & 9-1/16 single or twin	7-1/16 tool	7.040 to 7.180	1.680	3.360	10.300	3.470	6.875	23.500	20		
	9-1/16 conversion	9.040 to 9.180			12.300	4.470					

All dimensions shown in inches. Special work lengths, tool slide strokes, tool body diameters, and other special requirements can be accommodated; contact us for a quotation. \* 1 - 13/16 tool is available only in single-slide design.

# Insert Cartridges

<p><b>STYLE "E"</b></p>  <p>CCMT CARTRIDGE (RH/LH AVAILABLE)</p>	<p><b>STYLE "E"</b></p>  <p>CCMT CARTRIDGE (RH/LH AVAILABLE)</p>
<p><b>STYLE "E"</b></p>  <p>DCMT CARTRIDGE (RH/LH AVAILABLE)</p>	<p><b>STYLE "E"</b></p>  <p>DCMT CARTRIDGE (RH/LH AVAILABLE)</p>
<p><b>STYLE "B"</b></p>  <p>CCMT CARTRIDGE (DUAL CUTTING)</p>	<p><b>STYLE "B"</b></p>  <p>CCMT CARTRIDGE (DUAL CUTTING)</p>
<p><b>TOP MOUNTED</b></p>	<p><b>END MOUNTED THROUGH COOLANT</b></p>

**Other special cartridge designs available on request**

## FEEDS AND SPEEDS

The guidelines below are intended as a starting point.

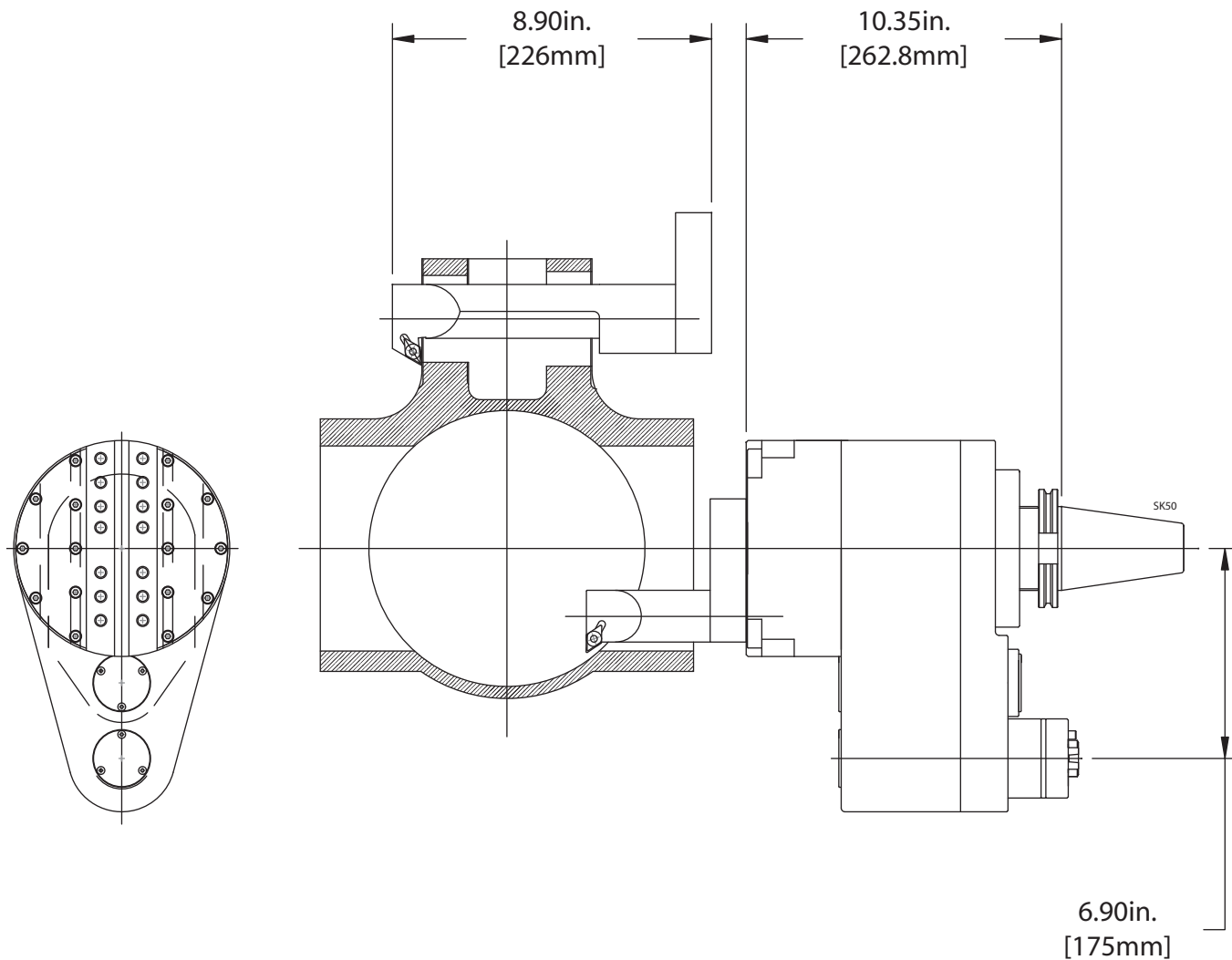
METRIC PROGRAM						
	ROUGHING			FINISHING		
	SPEED	FEED	D.O.C.	SPEED	FEED	D.O.C.
	M/Min	mm/Rev	mm	M/Min	mm/Rev	mm
STEEL (4140)	60-120	0,2-0,3	1,5-3,0	65-150	0,1-0,13	0,4-1,0
INCONEL	18-25	0,1-0,3		25-30		
STAINLESS STEEL	80-135	0,2-0,3		95-180		

INCH PROGRAM						
	ROUGHING			FINISHING		
	SPEED	FEED	D.O.C.	SPEED	FEED	D.O.C.
	Ft/Min	Inch/Rev	Inch	Ft/Min	Inch/Rev	Inch
STEEL (4140)	200-400	.008-.010	.060-.125	300-500	.004-.005	.015-.040
INCONEL	60-80	.004-.010		80-100		
STAINLESS STEEL	260-440	.008-.010		300-590		

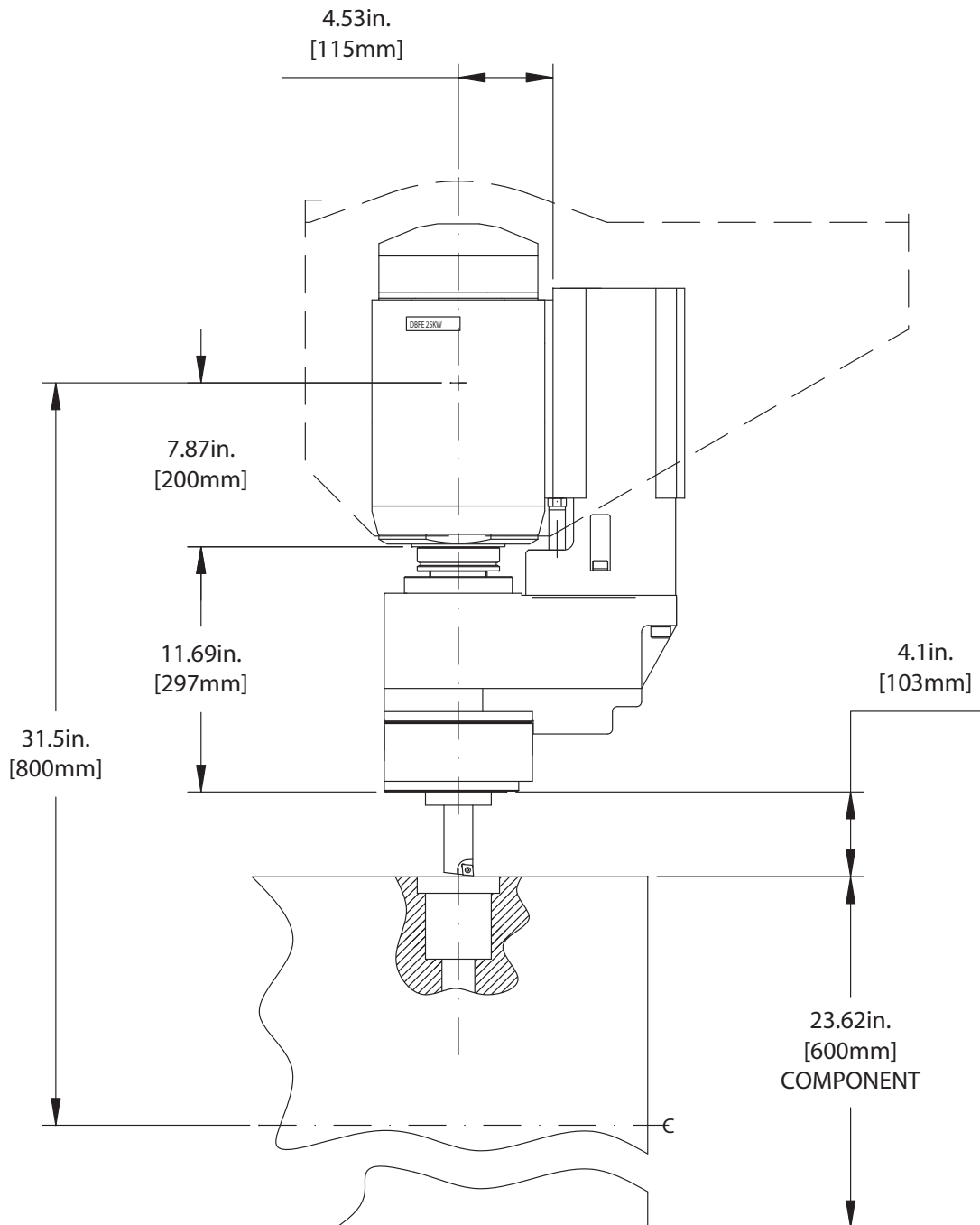
## Special Applications

Shown below are examples of special applications and requirements that can be accommodated in the design of ZX tooling. Send us a detailed part print and request a quotation.

### ZX CONTOURING TOOL WITH U-AXIS DRIVE

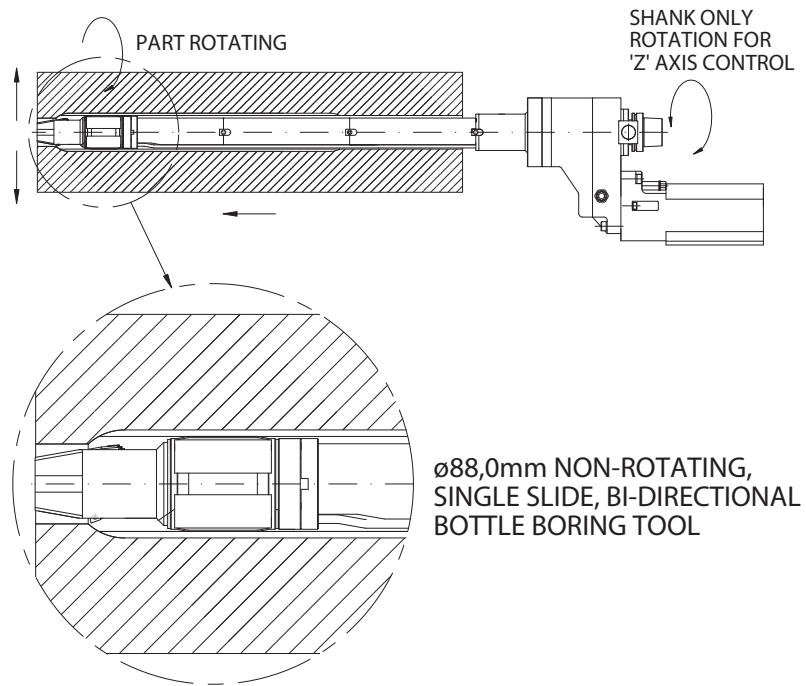


**ZX CONTOURING TOOL WITH SPECIAL DRIVE**

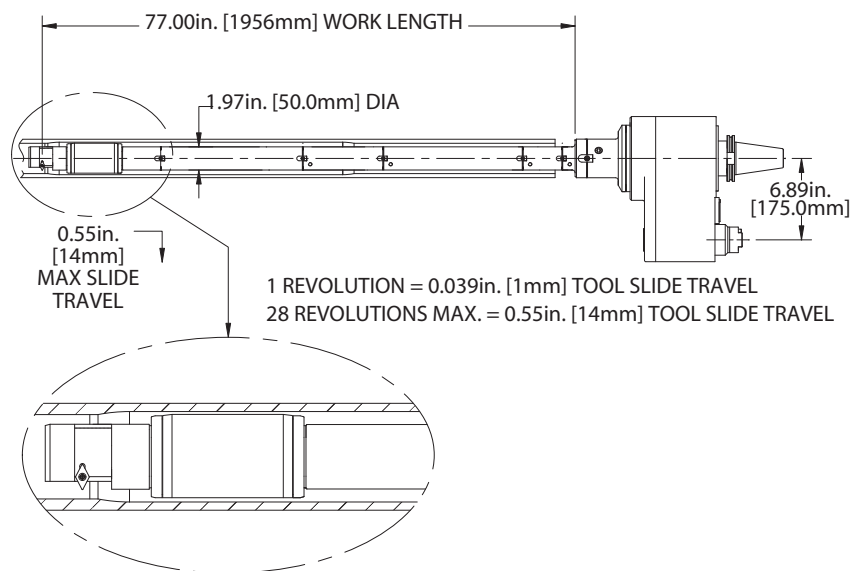




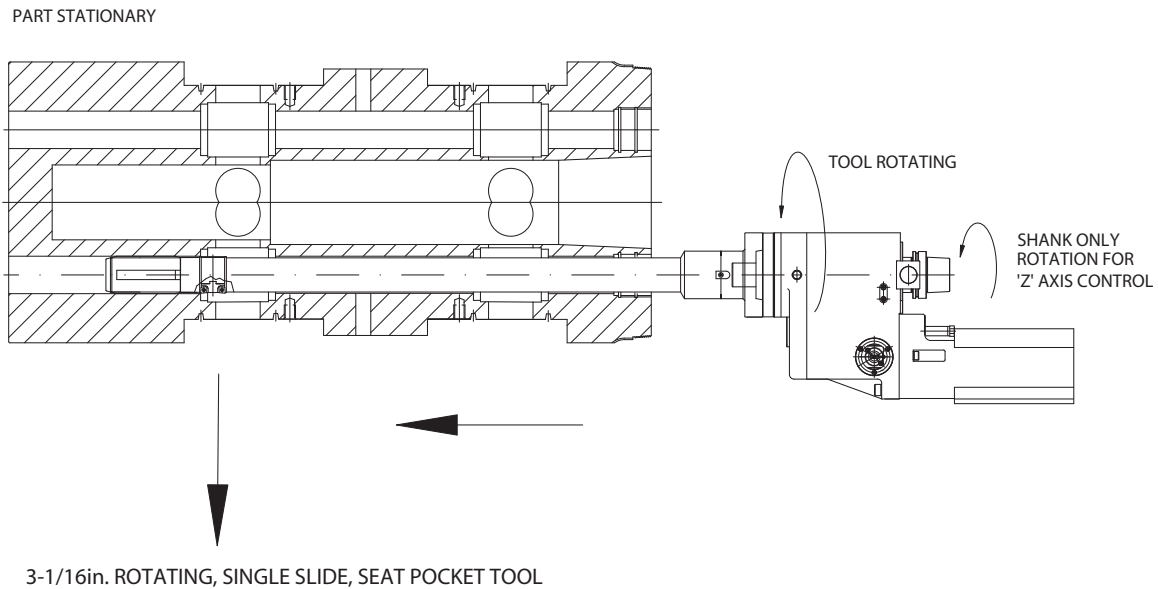
## ZX TOOL FOR BOTTLE-BORING APPLICATION WITH SPECIAL DRIVE



## ZX TOOL FOR BOTTLE-BORING APPLICATION WITH U-AXIS DRIVE



## **ZX VALVE SEAT POCKET TOOL WITH SPECIAL DRIVE**



## **HOW TO REQUEST A QUOTATION**

Often several different types of ZX tooling can be applied to a given job. In order to obtain the optimum tooling solution (and the most versatile and cost effective), let us evaluate your part requirements and determine what other machining operations can be performed with our recommended tooling.

### **Please provide the following items when requesting a quotation:**

- Part drawings and specifications (material, required finish, etc.).
- Make and model of horizontal boring mill on which ZX tooling will be used.
- Completed "ZX Spindle Nose Data Sheet" (see page 36). This provides the necessary information for us to design and build a cam-lock bonnet.
- Note any special requirements or special features on the machine (such as proximity switches).

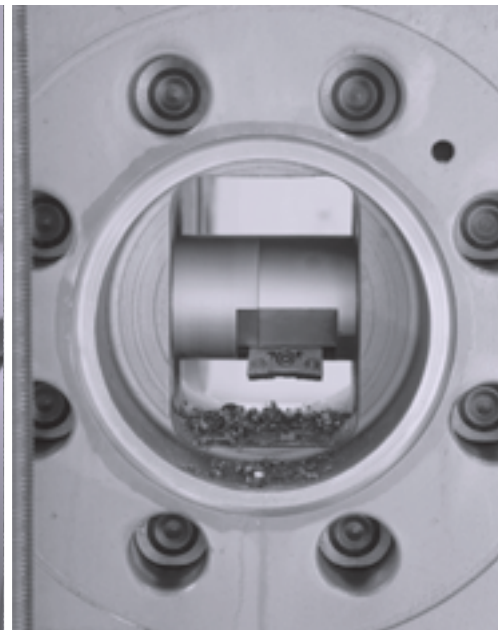
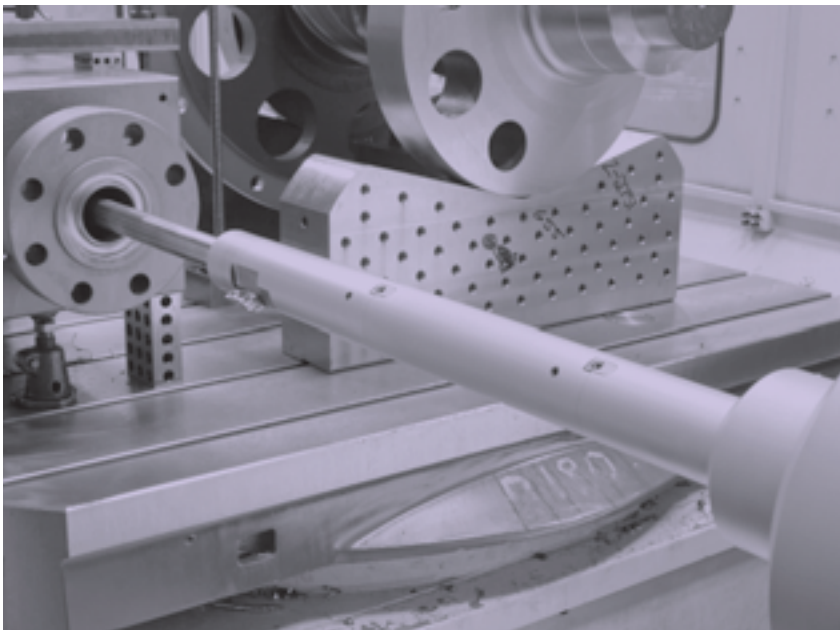
## ZX Tooling in Action



**ZX-420 Facing/Contouring Tool machines O.D. tapers on a 24 in. "Y" block.**



**ZX-200 Facing/Contouring Tool performs back-boring operation on a face and taper on the outer sleeve of a hydraulic pump for an oil rig.**



**ZX Valve Seat Pocket Tool machines four internal seat pockets in the flow bore on a dual valve body.**

# Spindle Nose Data Sheet

FOR ZX™ APPLICATIONS



**COGSDILL TOOL**

products, inc.

CUSTOMER \_\_\_\_\_ DATE \_\_\_\_\_

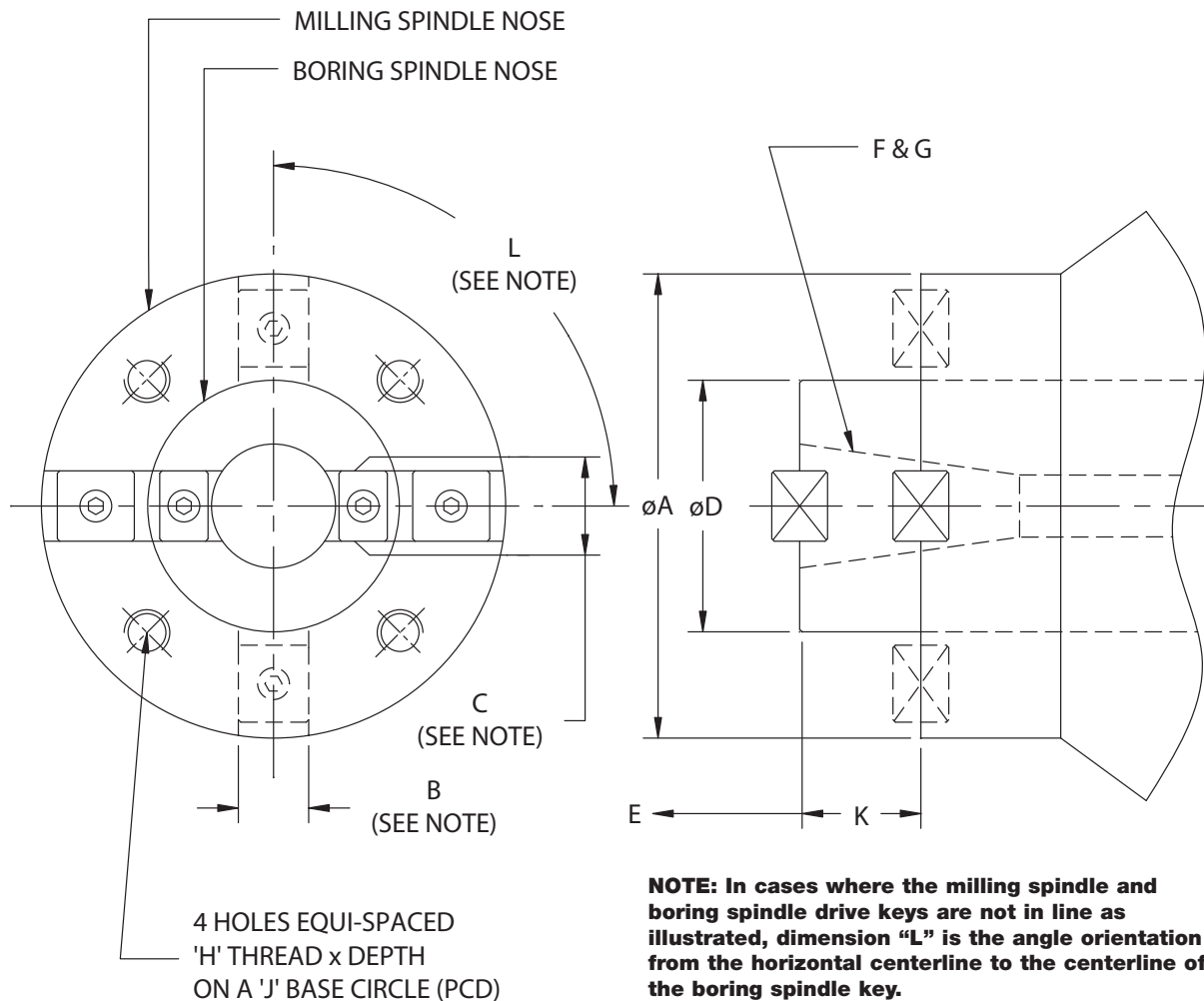
ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

CONTACT \_\_\_\_\_ PHONE \_\_\_\_\_

FAX \_\_\_\_\_ E-MAIL ADDRESS \_\_\_\_\_

MACHINE TYPE \_\_\_\_\_ MODEL # \_\_\_\_\_



DIM.	DESCRIPTION	SIZE	DIM.	DESCRIPTION	SIZE
A	MILLING SPINDLE DIAMETER		G	SHANK PULL STUD THREAD	
B	BORING SPINDLE DRIVE KEY		H	HOLE THREAD & DEPTH	
C	MILLING SPINDLE DRIVE KEY		J	BASE CIRCLE DIAMETER (PCD)	
D	BORING SPINDLE DIAMETER		K	SPINDLE HOME POSITION*	
E	MAXIMUM SPINDLE TRAVEL		L	(IF IN LINE THEN ZERO)	
F	SHANK SIZE (ISO/ANSI STD)				

\*NOTE: State "Zero" if spindle faces are flush.