

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.

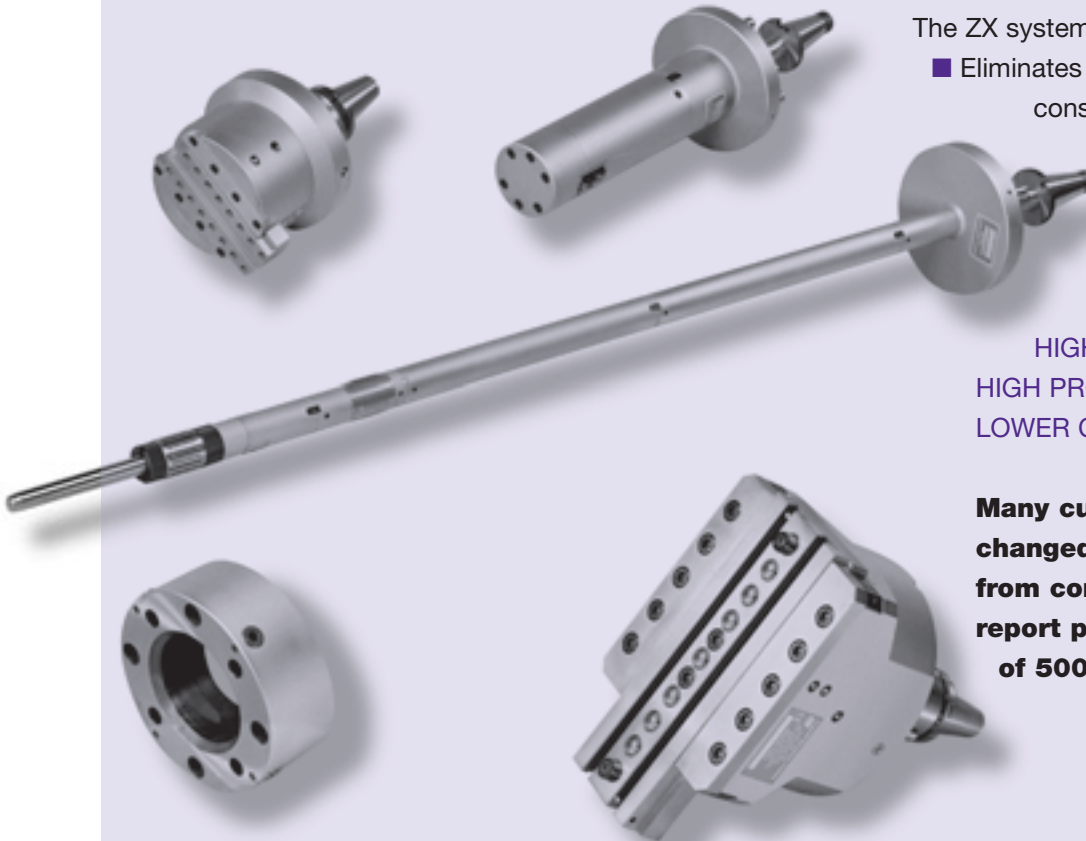
The ZX system **improves productivity**:

- 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

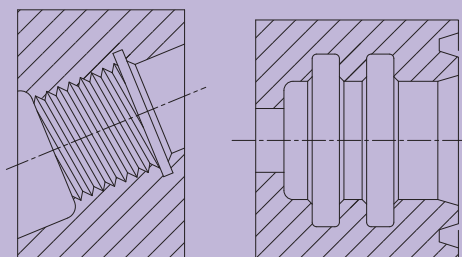
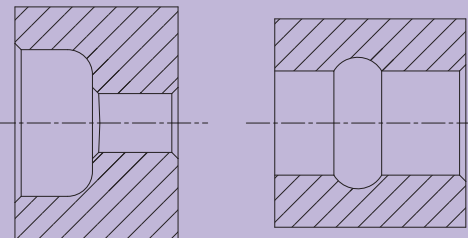
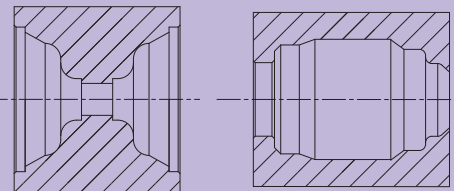
MULTIPLE OPERATIONS, ONE SET-UP, VARIOUS PART GEOMETRIES

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

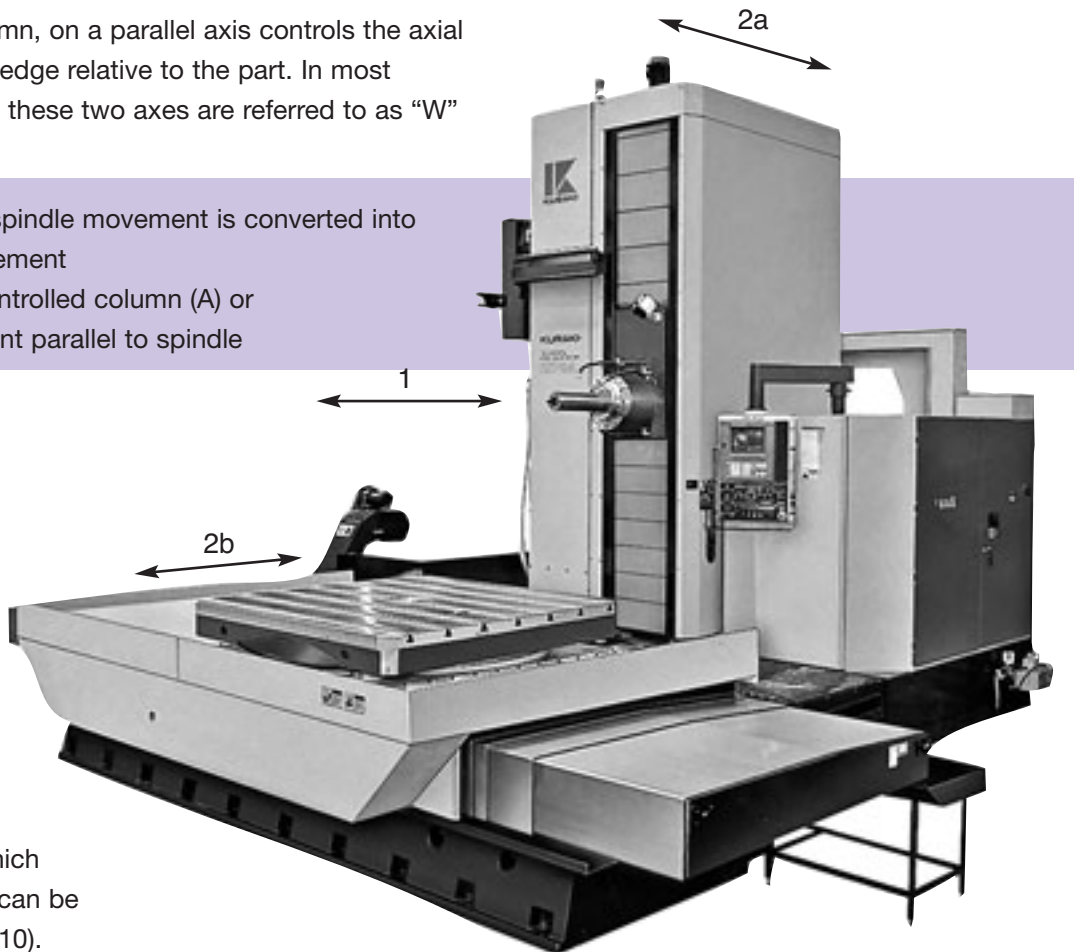
OPERATING PRINCIPLES

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.)

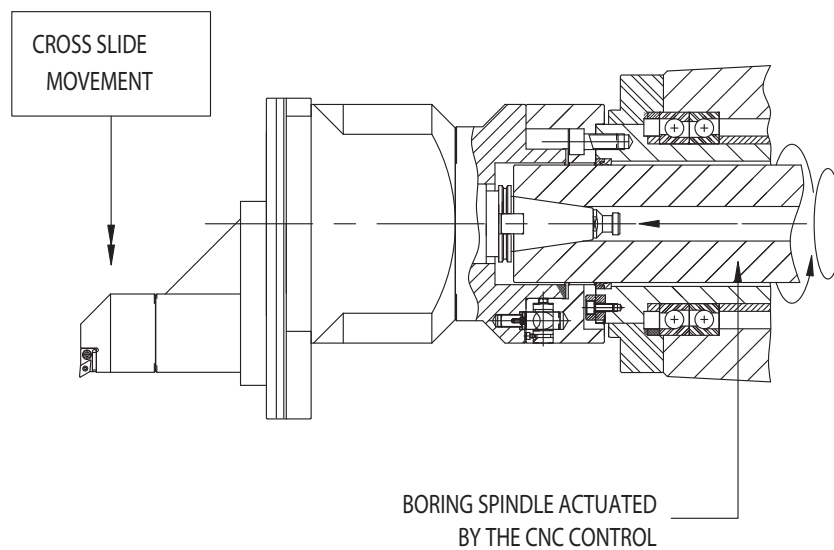
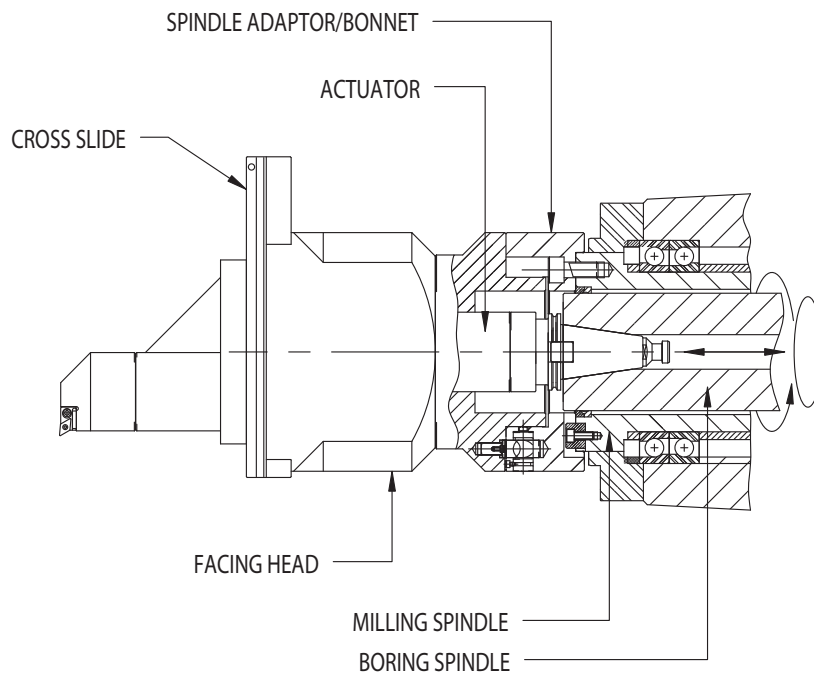
Regardless of head type, a **proven actuation mechanism** produces **radial cutter movement**. This sturdy design is based on the “sliding inclined wedge” principle for **backlash-free operation**; no sloppy gears or bell cranks are used. All parts are hardened and ground for **lasting accuracy and durability**.

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



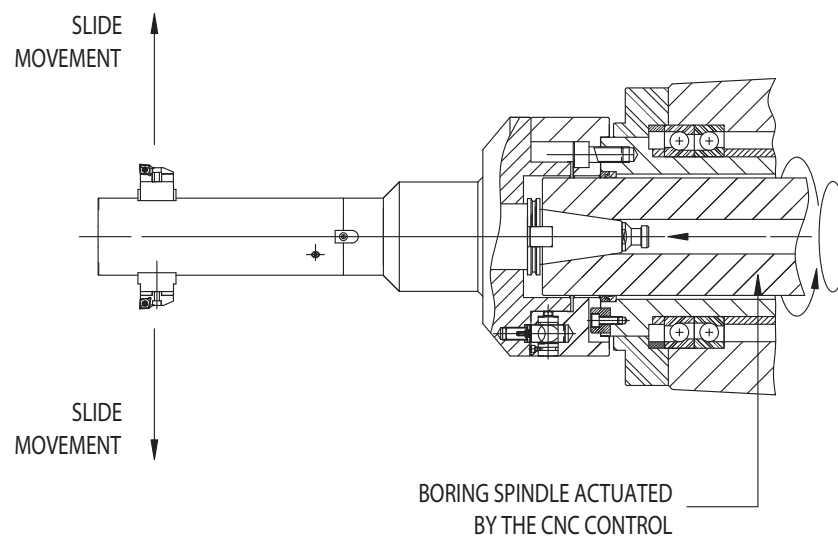
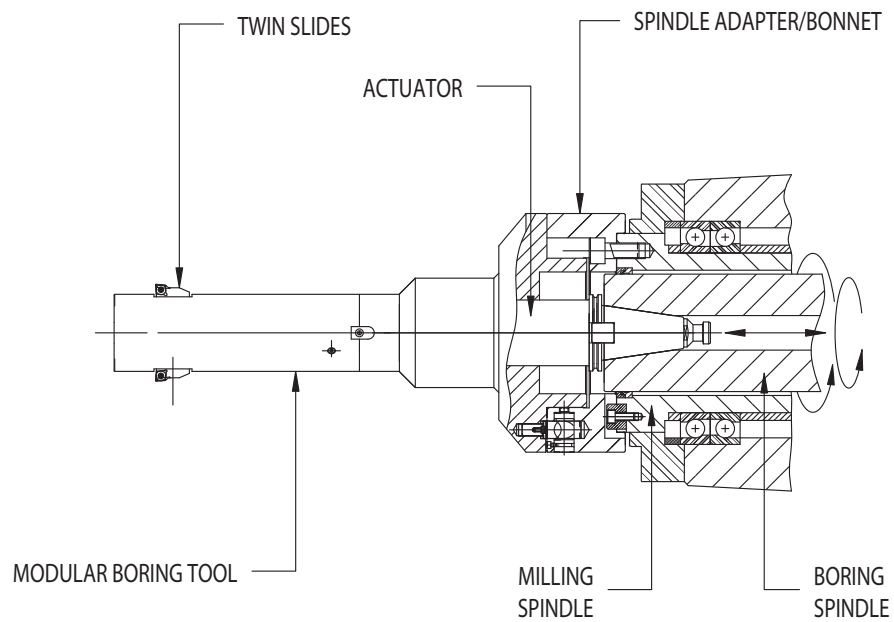
Overview

ZX CONTOURING/FACING HEAD SYSTEM



Overview

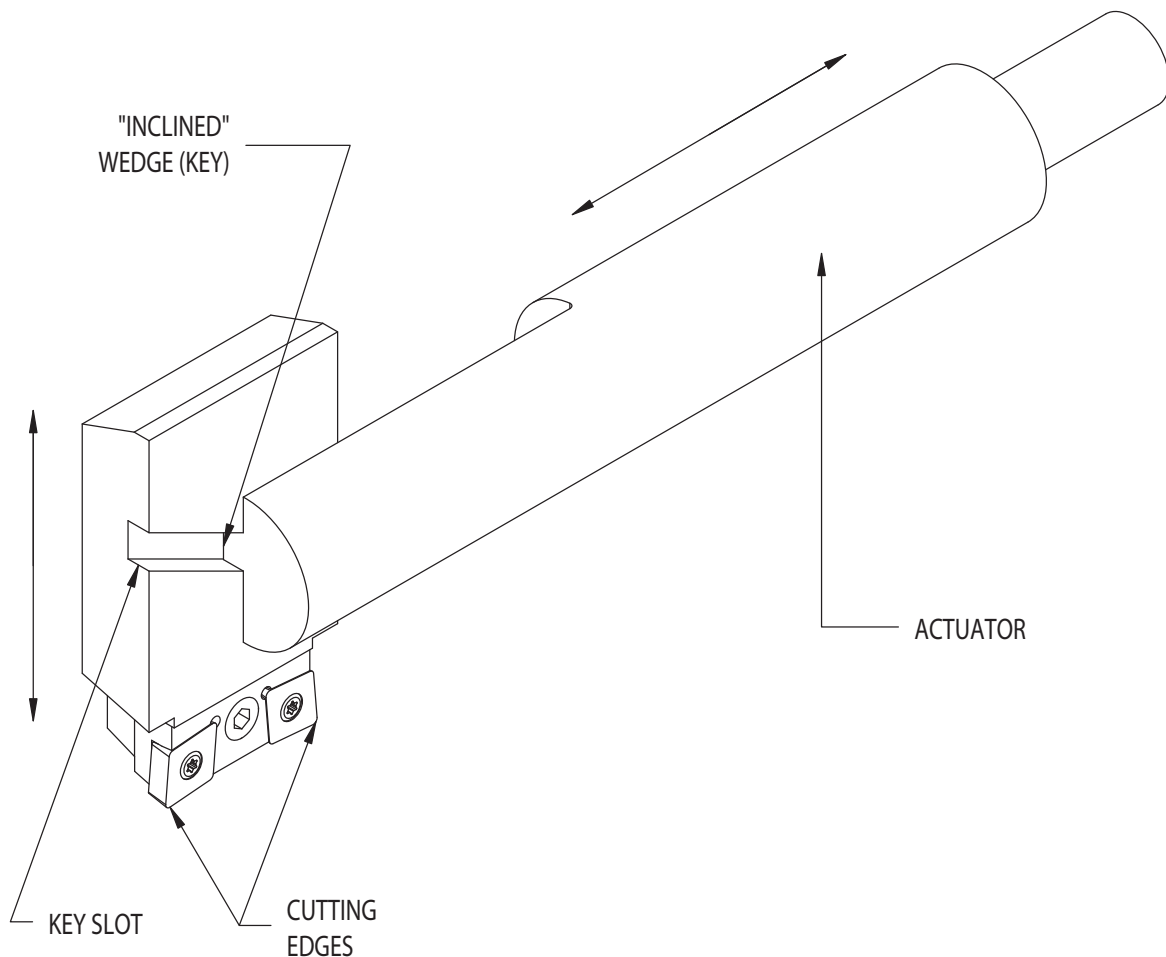
ZX MODULAR BORING SYSTEM



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.



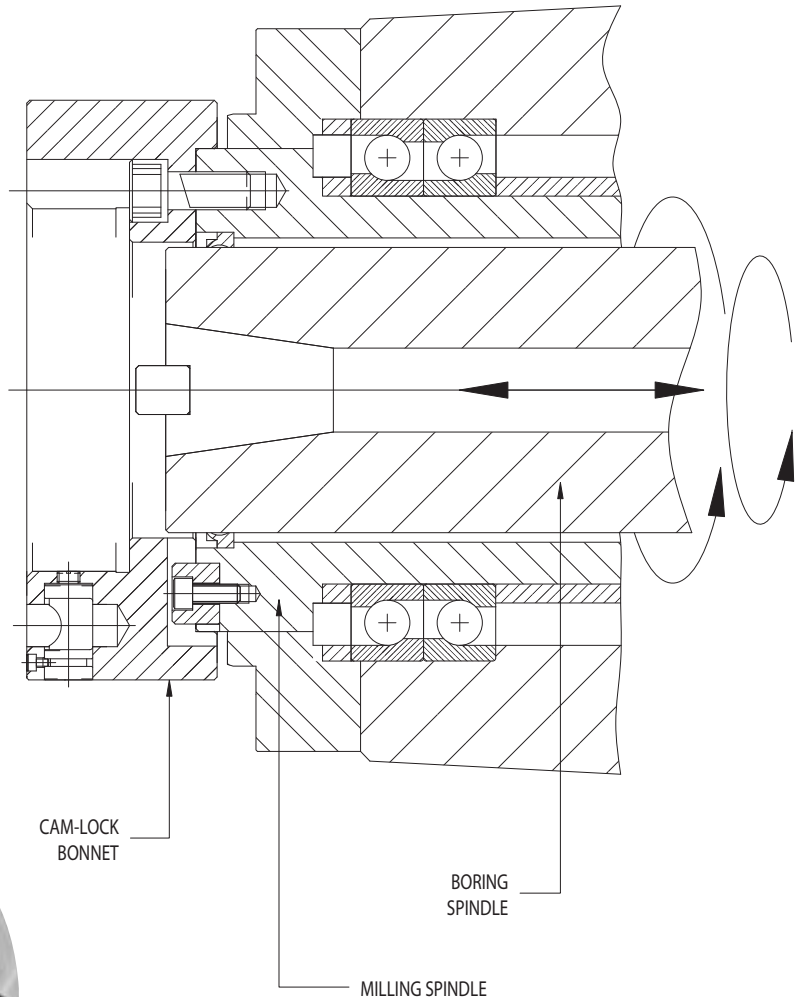
**Large sliding load-bearing surfaces provide extremely rigid tool performance.
Wide keys and deep key slots ensure long wear life under heavy cutting loads.**

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.

