Rotating Boring Tools

ModBORE™ – Rotating Boring Tools

Kennametal ModBORE tools provide users with the most rigid modular joint available today. Taking care to use proper operating procedures will ensure long, safe, and trouble-free service of your KM tools. Please follow the steps below for operation.

Locking

The clamping mechanism must be in the unlocked position before inserting the cutting unit. To unlock, use a T-wrench to turn the torque screw counterclockwise until a positive stop is reached. **CAUTION: Do not turn the screw beyond the positive stop because this may damage the clamping unit!** Clean the contact face, the taper of the cutting unit, and the taper cavity. Do not use compressed air; this may lodge debris in the clamping mechanism, causing damage.

Insert the cutting unit into the clamping mechanism. There will be approximately .030 (0,75 mm) between the face of the cutting unit and the face of the clamping unit. Turn the torque screw in a clockwise direction. The cutting unit will be slowly drawn into the cavity and locked into position. The torque screw must be tightened to the specified torque with a torque wrench (see table below). Do not over tighten the torque screw. Preset torque wrenches may be purchased from Kennametal for this purpose.

Operating Position

When the torque screw is tightened to the specified torque setting, the cutting unit and shank adapter are firmly joined. The KM design employs face contact, a self-locking taper, and ball track clamping mechanism to provide a rigid lockup and positive transmission of torsional forces.

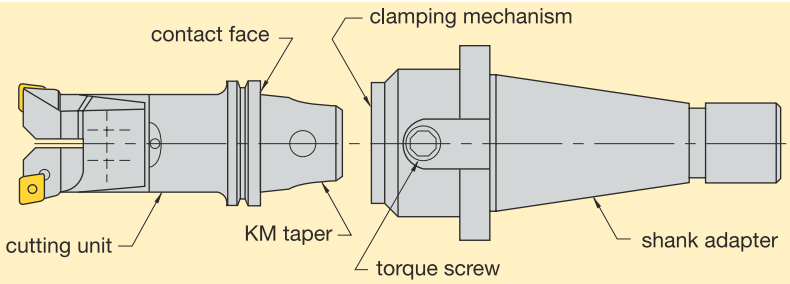
Unlocking

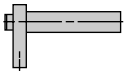
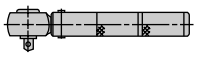
Turn the clamp screw in a counterclockwise direction to release the cutting unit. Initial force will be required to loosen the torque screw, and again at the end of the unlock cycle to free the cutting unit from the taper cavity. Do not turn the torque screw any further than necessary to remove the cutting unit; doing so could damage the clamping mechanism.

Maintenance

Take care not to nick or scratch the tapers on the KM cutting units. Store in individual containers.

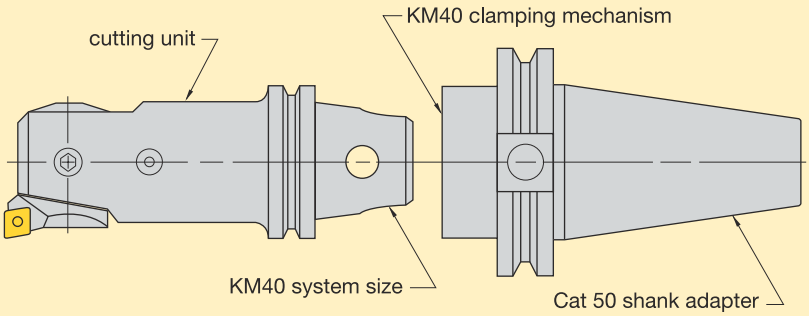
For detailed maintenance instructions on the KM clamping mechanism, ask your Kennametal representative.



KM size	torque ft.-lbs. (Nm)	torque screw hex size (mm)		
KM32	7-9 (10-12)	5	TW58	TW58R
KM40	9-12 (12-16)	6	TW610	TW610R
KM50	20-25 (28-34)	10	—	TW623R
KM63	35-39 (47-52)	12	—	TW1237R
KM80	58-61 (78-82)	14	—	TW1460R

Rotating Boring Tools

ModBORE – KM Tooling Rotating Boring



KM40-FBHS-40-90 **CV50-KM40-40**

KM System Sizes

Choose the appropriate shank adapter (CV, BT, MM) for the machine tool spindle. Each shank adapter has a KM clamping mechanism on the front portion of the tool. Match this KM clamping mechanism size with the KM size of the modular cutting units. All KM cutting units with the same KM system size are interchangeable with the shank adapter. For example, a CV50-KM40-40 has a KM40 clamping mechanism; any KM modular rotating tool with a KM40 system size will operate in this shank adapter.

Extensions and Reducers

Extensions may be used to increase the overall length of the tool, within the same KM system size. Reducers may be used to step down the KM system size, and lengthen the tool as well. For example, a KM40-S32-70 reducer may be connected to the same CV50-KM40-40 tool shown above. This will reduce the KM system size from KM40 to KM32. Kennametal recommends a maximum of two extensions or reducers per tool assembly.

Inserts and Grades

The ModBORE system uses industry standard insert sizes. Kennametal offers a wide variety of insert chip control geometries, grades, and coatings. See the boring inserts section of this catalog for further details.

Coolant

The use of through-the-tool coolant greatly improves insert life, surface finish, and chip removal. Use of thru coolant is strongly recommended for most boring applications.

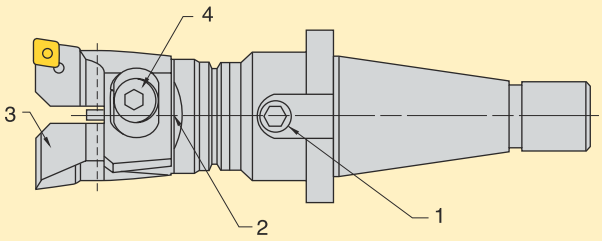
All KM tools have coolant capability. Also, the KM clamping mechanism and ModBORE cutting units are completely sealed against the potential harmful effects of coolant.

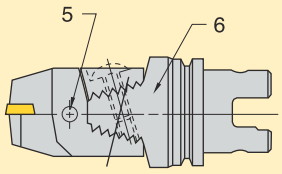
Coolant pressure of 45 psi is recommended. Also, an efficient coolant filtration system will keep coolant passages in the tools clear of chips and other debris.

ModBORE – Rotating Boring Tools

ModBORE Roughing/Semi-Finishing Twin Cutters

Tool Assembly





1. KM lock screw
2. coolant port
3. blade
4. blade lock screw
5. body
6. adjustment screw

A tool presetter is recommended to radially set the independently adjustable blades of ModBORE twin cutters.

This will ensure balanced cutting forces and even insert wear. After the tool has been assembled, according to the steps on page H649, follow these three easy steps to preset the tools:

1. Lightly lock the two blades so they are slightly undersize for the desired bore diameter.
2. Using the fine thread adjustment screw, preset each blade (with insert) to the desired bore diameter.
3. Lock the blades into place for operation with the lockscrew. DO NOT over tighten.

Close tolerance grinding of the serrated mating surfaces makes axial adjustment unnecessary.

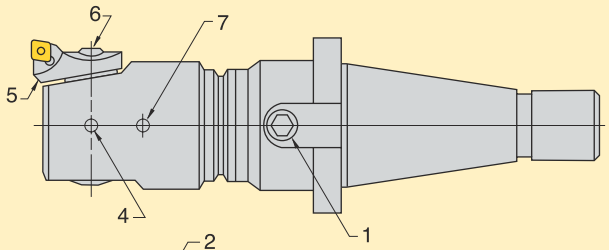
Feeds and speeds are dependent upon the insert chip control geometry, carbide grade, depth of cut, and rigidity of the setup.

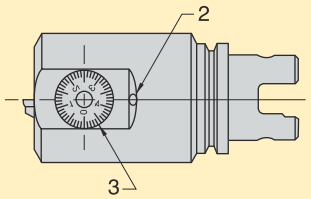
For programming purposes, the twin cutters have two effective cutting inserts. For example, if a certain carbide grade is recommended to be used at 300 sfm and .006 ipr, the twin cutter would be programmed at 300 sfm and .012 ipr. Your feed is doubled compared to single-point cutting tools.

Zero-degree lead cutters are for general purpose roughing and semi-finishing. Twenty-degree lead cutters may be used for through-bores and as problem-solvers on materials where bottom breakout damage occurs. However, 20° lead cutters increase cutting forces. As a result, feed rates or depths of cut may have to be less with the 20°-style cutter than with the 0°-style cutter.

ModBORE Fine Boring

Tool Assembly





1. KM lock screw
2. coolant port
3. adjustment dial
4. adjustment lock screw
5. insert holder
6. insert holder screw
7. lubrication fitting

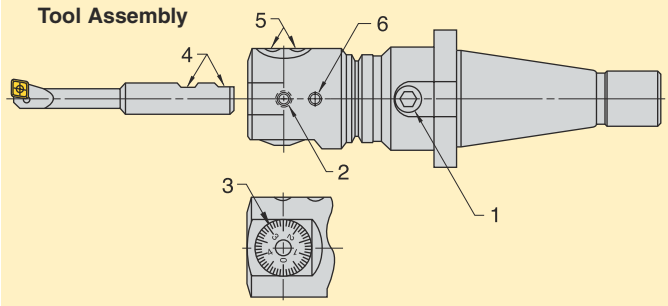
The fine adjustment for ModBORE finishing units is achieved by turning a precision ground micrometric screw that is matched with a hard bronze nut. A large dial enables easy reading of the adjustment. One division on the dial corresponds to .0004 (0,01 mm) adjustment on diameter. The wide space between graduations enables easy diameter corrections of .0001 (0,0025 mm). The adjustment mechanism will not move when locked in place. After the tool has been assembled, according to the instructions on page H649, follow these easy steps for operation:

1. Loosen the adjustment mechanism lock screw located on the OD of the unit. This will unlock the adjustment mechanism. DO NOT attempt to turn the dial with the adjustment locked because this will damage the unit.
2. Turn the adjustment dial to the desired preset diameter. All adjustments are made on diameter. Clockwise rotation increases the bore diameter. Do not attempt to force the adjustment beyond the range of the unit.
3. Tighten the adjustment mechanism lock screw. DO NOT over tighten.

For very tight tolerance finish boring, the unit may be preset slightly undersize. The unit can be dialed in on the machine after a trial cut.

A lubrication fitting is located on the OD of the fine boring unit. Frequently lube the adjustment mechanism with a light machine oil such as Mobil® DTE24 or an equivalent lubricant.

Offset Boring Heads



1. KM lock screw
2. adjustment lock screw
3. adjustment dial
4. boring bar flats
5. boring bar lock screws
6. lubrication fitting

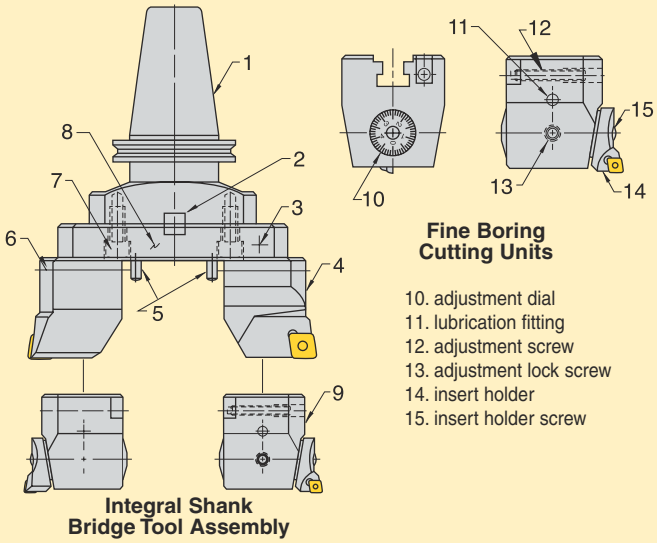
Small diameter boring is easily and accurately accomplished with ModBORE offset boring heads. These tools offer the same features as the ModBORE fine boring units. In addition, the boring bars shown on page H492 provide through-coolant capability, indexable inserts, and positioning flats for easy centerline mounting. Follow these steps for operation:

1. Place the boring bar (with insert) into the slide with flattened surfaces facing the lock screws. Secure with two boring bar lock screws.
2. Loosen the adjustment mechanism lock screw located on the OD of the unit. This will unlock the adjustment mechanism. DO NOT attempt to turn the dial with the adjustment locked as this will damage the unit.
3. Turn the adjustment dial to the desired preset diameter. All adjustments are made on diameter. Clockwise rotation increases the bore diameter. DO NOT attempt to force the adjustment beyond the built-in positive stop.
4. Tighten the adjustment mechanism lock screw. DO NOT over tighten.

For very tight tolerance finish boring, the unit may be preset slightly undersize. The unit can be dialed in on the machine after a trial cut.

Accessories are also available for the offset boring unit. Although best results can be achieved with the boring bars sold with this unit, reduction sleeves enable the use of other boring bars. Chamfering rings may also be purchased to combine finish boring and chamfering operations.

Bridge Tools



1. integral shank
2. location key
3. cutting unit lock screw
4. rough boring unit
5. adjustment stop pins
6. adjustment screw
7. extension bridge screw
8. extension bridge
9. fine boring unit
10. adjustment dial
11. lubrication fitting
12. adjustment screw
13. adjustment lock screw
14. insert holder
15. insert holder screw

Large ModBORE boring tools use bridge extensions to accommodate both roughing and fine boring units. The mating surfaces are rigidly locked together with the help of precision profile-ground serrated surfaces. Two cutting units (either roughing or finishing) are mounted on the bridge extension to balance the cut and provide smooth operation. Follow these steps for operation:

1. Choose the appropriate shank adapter and bridge tool based on the tool's capacity and bore requirements of the application. KM tooling modular types are available. For very large bore diameters, integral shank tools are offered.
2. Select the correct extension bridge for the bore diameter required, and the rough and/or fine boring units needed for the application.
3. Bolt the extension bridge to the shank or KM adapter.
4. Back out the cutting unit lock screw located on the side of the extension bridge. Assemble the cutting units and lightly lock into place. Set the bore diameter undersize for the desired bore diameter.
5. Using the fine thread adjustment screw, preset each cutting unit (with insert) to the desired bore diameter.
6. Lock the cutting units into operating position with the cutting unit lock screw located on the side of the bridge extension. DO NOT over tighten. For finishing operations, follow the directions outlined under ModBORE fine boring (page H648).

For very tight tolerance finishing cuts, the bore diameter may be set slightly undersize and dialed into tolerance on the machine after a trial cut.

For programming purposes, the bridge tools have two effective cutting inserts.