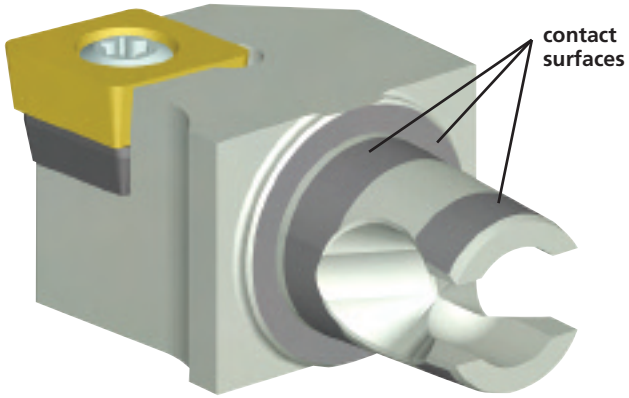
The KM25 Coupling

The rigidity and stiffness of the patented KM25 joint is achieved through a combination of unique design elements incorporated in both the shank of the tool and the clamping mechanism. The KM25 joint was developed as a system and takes full advantage of both the tool shank and the mechanism to obtain maximum benefit from the space utilized.



Taper Shank

All KM25 tooling is designed around a short 10:1 tapered shank. Extensive testing of many different lengths and angles proves this combination provides the maximum stiffness and input forces required for locking/unlocking. The taper is self-centering to promote easy tool loading and unloading.

Face and Taper Contact

KM25 tooling is designed to have simultaneous taper and face contact. With KM25 tooling, elastic deformation takes the form of expansion of the female taper (on the clamping unit) as the larger male taper (on the cutting unit) is pulled back during lockup. Our testing proved that an optimum combination of pull-back force and elastic deformation (rather than a close tolerance) provides greater static and dynamic stiffness, achieves a metal-to-metal fit, and is less costly to manufacture.

Clamping Mechanism

The mechanism design consists of two components: the torque screw and the wedge nut. This simple, yet highly effective, clamping mechanism enables the user to lock and unlock the cutting unit by simply using a preset torque wrench.

Reliability

The KM25 cutting unit and clamping mechanism are on a shared axis and provide accurate axial and radial repeatability of ± .00008 inch (± 2 micron) for a specific cutting unit in a specific clamping unit.

When more than one cutting unit is used, the accuracy of each cutting unit must be considered. Pre-gaging (when changing tools) measures the deviations of each tool from the nominal. These deviations can then be compensated for by the machine tool control offsets.

Locking Sequence

The clamping sequence starts by inserting the cutting unit into the female taper of the clamping unit. The torque screw is activated by a preset torque wrench at a right angle to the centerline of the cutting tool, located behind the gage face of the clamping unit.

A small amount of elastic deformation takes place at the front of the female taper as the locking force is applied. As the torque screw is tightened to the preset torque of 25-30 ft-lbs (34-40 Nm), (4-1/4 turns), the cutting unit advances until the gage face makes contact with the face of the clamping unit. The final amount of torque applied enables the tail of the cutting unit to spread to clamp securely between the clamping mechanism and the clamping unit inside diameter.

Installation

When first clamping the KM25 shank in a machine tool slot, a cutting unit should be in the shank.

Lubrication

Using a hex wrench, back out the torque screw against the positive stop and generously apply grease to the threads and conical surface of the component hardware. Also, apply grease to the female taper surface. Do this periodically. Recommended grease: Gleitmo 805.

Summary

The KM25 coupling offers a very rigid joint with a high degree of repeatability while maintaining a very compact envelope. This permits a high degree of versatility without sacrificing cutting performance.

KM25 Tooling – Technical Information

Operating Instructions for KM25

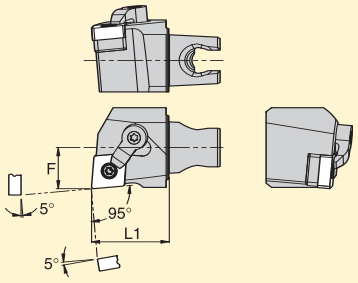
To change tooling, the machine operator simply releases the locking system, changes the KM25 cutting unit, and locks the new tool into position. The operator then makes the offset adjustments according to the previously recorded pre-gaged data. This process takes about 30 seconds versus up to 10 minutes, yielding dramatic productivity improvements.

Specific steps in the tool change process:

1. Use shop air to clean the clamping unit/cutting unit.
2. Using the appropriate wrench, turn the torque screw in a counterclockwise direction until it reaches an internal stop.
3. Remove the cutting unit. (Note: If cutting unit does not release, internal stop has not been reached.)
4. Use shop air to clean the clamping unit/cutting unit.
5. Insert the new cutting unit into the taper.
6. Tighten the torque screw by turning it in a clockwise direction, until the required torque specification is achieved.
7. If the machine being used has the ability to pre-gage, adjust machine offsets as required.

Maximum Tangential Load – KM25 Cutting Units

F dimension (mm)	L1 dimension (mm)	tangential load (lbf)	tangential load (kN)
16	30	1600	7,12
22	30	1100	4,89
28,5	30	750	3,34
24	30	950	4,23
16	35	1250	5,56
16	45	750	3,34
25,3	30	850	3,78
32	30	600	2,67



Depth of Cut (inch) and Feed Rate (ipr) vs. Tangential Forces (lbs.) for KM25