High Torque Retention Knob Technical Data

When a standard retention knob is installed into a toolholder, the threads create torsional stress that deforms the thin walls of the toolholder. A retention knob is like a fastener in that it relies on four threads for full engagement. The first engaged thread from the flange carries the most stress; the balance of stress is unevenly distributed through the threads with the last thread having the least amount. This uneven stress distribution is placed on the narrowest cross-section of the toolholder and deforms the small end of the toolholder. This taper deformation prevents the toolholder from having full taper contact with the spindle.

A High Torque Retention Knob has a unique patent pending design that prevents toolholder distortion. They are longer than a traditional retention knob, but share the same head dimensions of a standard retention knob. The additional length also increases durabilty to the High Torque Retention Knob; a standard retention knob has less shank elasticity and will fatigue faster. The extra length of the knob is added to the shank of the knob below the flange. This relief, along with a precision pilot and controlled threads, allows for the stress to be distributed into a deeper cross-section of the toolholder where it has more resistance.

Understanding Torque

Retention Knobs require a preload that is greater than the operating load to prevent them from separating from the toolholder. When properly installed, this will prevent the retention knob from failing under an operating load. A retention knob that has an insufficient preload is subject to fatigue failure. It will become brittle and fail due to cycle stress or will back out of the toolholder. An over-loaded retention knob is subject to higher torsional stresses and can break if past its yield point.

A standard retention knob will require a greater preload than a High Torque Retention Knob because the shorter shank has less elasticity which makes the knob more susceptible to torsional relaxation. The High Torque Retention Knob has a better stress distribution and will increase strength and cycle life.

Every milling machine has a specific load being applied to the toolholder. To insure proper preload when installing a High Torque Retention Knob, find the drawbar force of the machine for each individual application on the torque chart included with each High Torque Retention Knob. Due to their unique patent pending design characteristics, the torque values supplied on the chart are for High Torque Retention Knobs only and cannot be used with standard retention knobs.

Thread Friction

Toolholder and retention knob threads should be inspected before installation. Threads that become burnished, nicked, or smoothed can affect the load being applied on the High Torque Retention Knob. Lubricants or thread lockers are not recommended for High Torque Retention Knobs. Lubricants can affect preloads by 35% or more. Avoid excessive removal of High Torque Retention Knobs from toolholders.

High Torque Retention Knob

Due to the elastic nature of the thin walls of a toolholder, a retention knob, when is installed, will deform the precision taper. This taper deformation will prevent a toolholder from properly mating with the spindle of a CNC machine. When the toolholder is expanded, taper contact can be reduced by as much as 70% and no longer meet the AT3 taper tolerance specifications. (Referencing ISO 1947 angular taper tolerance (AT) specification for the toolholders are "AT3 or better").

High Torque Retention Knobs have a patent pending design that prevents toolholder distortion. When properly installed with a retention knob socket and torque wrench, High Torque Retention Knobs will not deform the taper of a toolholder.

Benefits

- **Increased toolholder rigidity, tool life, and spindle life.**
- **Reduced harmonics, run-out, and set-up times.**
- **Prevents toolholder tapers from deforming.**
- **Less chatter and better finishes**

Features

- **Individually laser marked with part number, serial number, and lot number.**
- **Hard turned, shot peened, and 32 micro finish**
- **Hot rolled 8620H or 9310**

Applications

- **Production milling, aerospace, boring application, multi-axis**

Available Sizes

- **30 Taper**
- **40 Taper**
- **45 Taper**
- **50 Taper**
- **60 Taper**

JM Performance Products, Inc.
1234 High Street
Fairport Harbor, OH 44077
1(800) 322-7750
www.jmperformanceproducts.com

JM PERFORMANCE PRODUCTS, INC.

The Industry Leader in Milling Machine Optimization