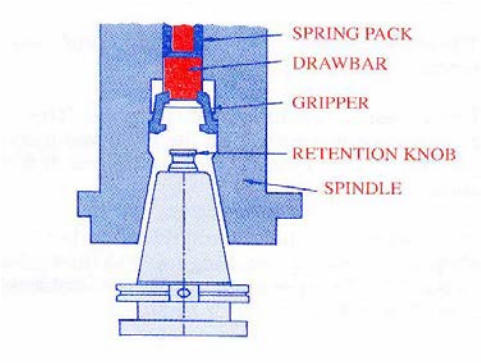
JM PERFORMANCE PRODUCTS, INC.

The Industry Leader in Milling Machine Optimization

Care of Machine Spindles & Tool Holders



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1). Setup on the table must be strong and solid enough to insure that the work piece will not move if the tool breaks.

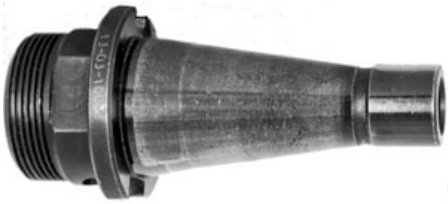
2). The Belleville washers must have at least 80% of the pull force that the machine was designed to have.

3). The cutting tools must be held securely by the toolholder so that push back or vibration will not occur.

4). Worn spindle bearings will cause chatter and noise. High speed machines sometimes have problems with chatter if they are run at slow RPM.

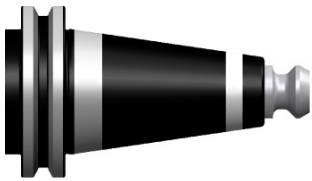
5). Toolholder must fit the spindle and show an even wear pattern from the gage line to the small end of the taper.

Correct Wear Pattern



Incorrect Wear Pattern

If the toolholder shows a wear pattern in two areas one at the gage line and the other at the small end of the taper, the toolholder does not fit the spindle.



The wear pattern occurs when the standard retention knob has been tightened and it is causing the small end of the toolholder to expand so the toolholder will not go into the spindle far enough to seat properly. This allows the large end of the spindle to move in random patterns while under cut and a burnished line results from the contact of the toolholder with the spindle.

Expansion of the small end of the toolholder also causes the inconsistent loading of the tools in the spindle. This is one reason why the CNC mills of today cannot hold very close tolerances when boring a hole or loading a touch probe.

JM Performance Products, Inc. manufactures a product for checking toolholder shanks to see if the retention knob has expanded the small end of the toolholder. The Taper Shank Test Fixture checks changes in diameter as small as .000007" of an inch. The test fixture can be used after installing a retention knob or checking a toolholder that was in the machine to see if the retention knob expanded the toolholder.

Taper Shank Test Fixture

JM Performance Products used the Taper Shank Test Fixture to test different retention knobs and toolholders on the market. JMPP was able to prove that standard retention knobs made to any of the 5 world standards, expand the toolholder shank at the small end when tightened to an adequate torque pressure.

JM Performance Products used the Taper Shank Test Fixture to develop a new retention knob that expanded the toolholder shank 2 to 10 times less than standard retention knobs. The new High Torque Retention Knobs are also balanced so they can be used in high speed applications.

High Torque Retention Knob

Standard ANSI Retention Knob

When installing High Torque Retention Knobs in a used toolholder, re-tap the toolholder to remove any dirt, chips, or dried oil in the threads.

Examine the retention knob for damage, nicks or scratched surfaces. They must be removed if they touch the toolholder or machine gripper fingers.

Always examine the face of the toolholder where the retention knob will seat against the tapered surface, make sure there are no burrs or nicks in either place.

Before installing retention knobs in the toolholder always compare the retention knob to a retention knob that is in the machine at the present time. The retention knob must be identical.

Always clean the retention knob and the toolholder before assembly.

Retention knobs with o-rings must be examined to make sure the o-rings do not show signs of wear, swelling, and flat spots or cracks. Vaseline should be used to lubricate o-rings and help seal off leaks.

Tighten retention knobs to JM's recommended torque settings.
Use a socket and torque wrench to tighten retention knobs. This will prevent over tightening and rounding off of the corners of the knob and insures that the person installing the knob is not injured if the wrench slips.

Sockets and Torque Wrench

Wipe off the toolholder and retention knob with a clean shop towel before installing tools in the tool carousel. Make sure the taper angle on the toolholders is in good condition with no nicks or scratches. Clean the tool carousel before installing the toolholder. Use a shop towel to remove grease and chips from the chain. Next, spray the tool socket with Stoddard Solvent, and blow off with an air hose, then spray on a light coating of oil such as WD-40.

Examine the transfer arm (which changes the tool in the spindle), make sure keys and all parts are tight and in good condition. Clean and lubricate the transfer arm in the same way as the tool carousel.

Remember to clean the spindle of the machine daily, with a clean shop towel, to prevent grease and oil build up. Examine the surfaces of the inside of the spindle for metal that is galled to the sides, and for chips and or scratches. If necessary remove them with a scraper or small file, being diligent to remove only matter that galled onto the sidewalls of the spindle.

If the finish on the inside of the spindle is still too rough, then use a spindle lap to smooth the surface. Start the spindle, set the speed to 120 RPM and insert the spindle lap. This will smooth the sides of the spindle and remove small particles and scratches that are on the sidewalls.

If the spindle has large amounts of material built up on the sidewalls or if the material has been torn out of the spindle, it is time to have the spindle re-ground. There are repair services that can regrind your spindle in your plant if required.

If all else fails, call the machine tool manufacturer and make arrangements to have the spindle removed from your machine and sent out for repair or replacement. Some manufacturers can exchange spindles for just this type of situation. They can be installed in your machine immediately after removing the damaged spindle.

Retention knobs are designed to be the weakest link between the spindle and the toolholder. For this reason they are not intended to last forever. Monitor their condition and be sure to include retention knobs in your **Safety Program**.

Retention knob life is approximately 6000 to 8000 hours of use. Mark the date on the knob so it can clearly be seen when the tools are changed.

JM Performance Products laser marks their retention knobs so there is never a problem with traceability or how long the knob has been in service.

R02

The JM High Torque Retention Knob Difference

- ✓ Made from **hot rolled 8620H fine grain steel**
  - Improves durability
  - Extends part life
  - Reduces distortion from heat treat
- ✓ Shot peened to relieve stress
- ✓ Deburred with radius corners for better finish
- ✓ Better finishes than required by International Standards
- ✓ Written inspection records on every mfg. lot
- ✓ Made in the USA from USA manufactured materials
- ✓ 2X to 10X less expansion of the toolholder shank
- ✓ Laser-marked with month/year of purchase to help determine life span
- ✓ Laser-marked with part number, serial number for traceability

All the Qualities You Should Look For In a High-Torque Retention Knob

- ✓**REDUCES TOOLHOLDER EXPANSION**
- ✓REDUCES COSTS
- ✓INCREASES PROFIT
- ✓INCREASES PRODUCTION
- ✓INCREASES TOOL LIFE
- ✓INCREASES FEED RATES
- ✓INCREASES RIGIDITY
- ✓IMPROVES TOOLHOLDER BALANCE

Did You Know Your Toolholders Don't Fit Your CNC Mills?

JM Performance Products ran the tests and we found standard retention knobs cause the toolholder shank to expand at the small end. Once you install the standard retention knobs into your toolholders, we're willing to bet they are outside the AT3 spec.

That's why we developed the **TAPER SHANK TEST FIXTURE** (patent pending). When toolholders are distorted, the large end is free to move from side to side in the spindle while cutting. The affects of this movement are:

- Toolholder run-out
- Vibration
- Breakage of tool razor edges

By using this Test Fixture, you'll be able to grade your toolholders to determine which meet or exceed the spec, which are just "OK", and which ones you should replace.

Why is this important?

- Proper seating of holders in the spindles
- Reduces toolholder movement while cutting
- Increases tool life
- Ensures better finishes
- Yields increased feed rates
- Allows for maintenance of closer tolerances
- Eliminates run-out and vibration
- Better balance = less tool life variance
- Reduces tool breakage
- Helps guarantee retention knobs are not over-torqued during installation
- Reduces down-time for machine and spindle maintenance
- Reduces milling costs

For a distributor near you, contact us: sales@jmppinc.com or www.jmperformanceproducts.com