

The Green Product Leader

JM Performance Products, Inc

The Industry Leader in Milling Machine Optimization

www.jmperformanceproducts.com

High Torque Knobs Lower Runout

Lee Knowlton, Northwest Machine Technologies

A local customer purchased a new 5-axis Mazak vertical mill for high tolerance stainless and aluminum machining. They are always concerned about tool runout for part finishes, tool life, and machined feature tolerances. Most of their tools are also small diameter so as little runout as possible is critical. I explained the concept of the JM High Torque knob and they decided to order a few for a trial. With a conventional, quality, retention knob the tool runout on the taper of a high quality ER collet chuck was .0003" to .0004". Using the JM High Torque knob it is consistently .00015" to .0002". They have since started using the JM High Torque knob throughout the shop.

Spindle Restoration

Paul Sedmak, S&S Tool Inc.

We had a spindle on our Milltronics Vertical Mill, with a 40 taper, run out about .006 over 5 inches after a crash. I called JM and talked with John and he indicated he could bring our spindle back to factory spec with their Spindle Restoration Kit. He came and spent about 20 minutes with the kit working on our machine and brought the machine spec back to within .0001 over 12 inches. There's no way I would have believed it without seeing the results for myself. JM saved us about \$6000 in repairing our spindle. If anyone has a spindle running out of spec, I suggest trying this procedure first.

"I will not run carbide tooling with a conventional retention knob again."

*Ken Humphrey,
Humphrey Pattern Works*

"Payback on this investment can be measured in hours and days, not weeks or months."

Kyle Tucker, Detroit Speed, Inc.

Detroit Speed & Engineering, in Mooresville, NC, custom builds 70's era muscle cars, and features an extensive catalog of parts for the maintenance and repair of similar vehicles by the do-it-yourself enthusiast. The catalog offering is designed in-house and most of the components are built in-house on state of the art CNC equipment. Greg Syverson manages the machine shop and was introduced to the concept of High Torque retention knobs by their tooling distributor Turning Concepts Inc. in Matthews, NC. A test knob was delivered for trial on his Haas VF-3 VMC. A stainless steel thick wall tube was being drilled and bored to size with circle interpolation using an AD style 90 degree indexable end mill. The tool holder was removed from the tool changer, the knob was changed, and the tool was returned to the tool changer. Upon machining the first part, the sound of the tool in the cut changed dramatically. The bored hole size changed .0025 in diameter requiring an offset tool change to correct the bore size. Spindle load declined 7%, and a burr generally protruding from the top and bottom edge of the hole reduced dramatically in size. Surface finish of the bored diameter also improved. By the end of the day, it became obvious that carbide insert life had improved at least 30%. Kyle Tucker, co-owner of DSE, acknowledged that the engineering principal of the High Torque knob made sense, and the observed results pointed to rapid payback. The initial tool cost is not very different from a standard Retention Knob, but the performance and improvement in carbide tool life make immediate conversion a "no brainer". "Payback on this investment can be measured in hours and days not weeks or months".

JM High Torque Knob is Best & Easiest Way to Remove Tool Point Variation

Dave Barton, BlueSwarf

The key to maximizing performance in milling is to eliminate tool point variations, whether that comes from vibration, run-out, or imbalance. Equal cutting teeth cut faster and last longer. Simple as that. One of the best and easiest ways to remove several sources of tool point variation is to use High Torque Retention Knobs from JM. We have tested thousands of tool assemblies and the vast majority have over-torqued pull studs that have created taper distortion and ultimately run-out. JM's new design solves this problem by reaching further down the threads where the taper is thicker. We have tested them in our lab and can see the difference."

Dave Barton has over 25 years of experience in the metalworking and machining fields. He founded BlueSwarf in the Silicon Valley in 2002, moving it to Penn State University's Innovation Park at the end of that year. He was chosen as one of the six original partners of National Center for Defense Manufacturing and Machining. In addition, Mr. Barton co-authored "Servization of the Cutting Tool Supply Chain" with Dr. Vittal Prabhu and Dr. Chen-Yang Cheng for the International Journal of Production Research. Barton was named the E.V. Bishoff Entrepreneur-in-Residence at Pennsylvania State University.

Polishing Time Significantly Reduced

Justin London, Briney Tooling Systems

JM's High Torque knobs really do work. Like most people I was skeptical that the change from a standard retention knob to JM's new high torque style would have much, if any, improvement on our tool holding. When we received the test knob in plant, it was used on our toughest machining application; high speed surfacing on hardened YXR33 material at 50 Rc. The initial visual look at the part, after the cycle, showed that nothing really seemed any different. We did not see the real difference the knob made until our operator began to hand polish the part to the required surface finish. This process was taking 28 minutes per part, and after switching to the High Torque knob it only took the operator 2 minutes to polish the part into the correct surface finish (8 micro). That was an immediate savings of 26 minutes per part. This reason alone was enough to switch over all of our milling centers to High Torque Retention Knobs."

Instant 5% Spindle Load Reduction on Titanium Job

Curtis Sampson, Shop Lead-Man,
Hansen Engineering Co

On behalf of Hansen Engineering I would like to thank everybody at JM Performance Products for bringing us a great, newly designed retention knob (JM31275HT) for our 50 taper V-flange tool holders. These knobs were first introduced to us at the 2010 Westec show in Los Angeles. JM demonstrated the benefits of changing to these knobs and we knew that we had to try them on a few troubled jobs. We bought 25 pcs. and installed them following the torque specs and right away we noticed a 5% spindle load decrease using a 3.0" hi-feed insert mill, running titanium. We also installed them on an aluminum forging job we are running that always has chatter problems; among the tools we tested for this job were 1¼" knuckle rougher and 2.0" finisher and the results were great! The chatter was eliminated and it was the best finish we have ever seen on these parts. Since then we have bought 50 more pcs. and noticed improvements all around the table. These retention knobs have shown us lower spindle loads which are better for the machine and in turn we can increase speeds and feeds that gives us better cycle times. With improved finishes the quality of our parts is better and gives us peace-of-mind when running these jobs.

I would like to put a word out to the people who are not quite convinced yet. They are worth the small investment. You may not want to jump in with both feet but just try them on a job or two and I am sure that you will notice improvements. In this competitive world we live in today, we can use a product like these retention knobs that is something we can just screw in our tools to give us an upper hand on our competitors."

Aircraft Manufacturing Facility Runs Quieter

Daniel Nietzold, L.H. Thompson

I have been looking for retention knobs that are of the quality you need in an aircraft parts manufacturing facility and your High Torque Retention Knobs meet my requirements. We found that the machines are much quieter when roughing titanium and stainless steel. When roughing with your knobs, the power meter showed a significant reduction in power consumption and tool life was improved. Also our Fadal machines used to make a loud noise when changing tools and your knobs solved that problem. The retention knobs also eliminated the fretting of the toolholder shank. We have replaced all the retention knobs in the plant with JM's High Torque Retention Knobs and plan on using them on all new toolholders plant wide."

Dr. Thomas S. Delio on JM's High Torque Retention Knob

Manufacturing Laboratories Inc.

With the advent of high performance machines it is even more critical that the entire machining system be assembled with a higher level of precision than common today with conventional practices. Changing out worn toolholders and the use of high-quality, better-designed retention knobs is essential to step up the level of precision needed to get the desired level of performance from the latest machine tools. JM's High Torque retention knob design provides added precision by reducing taper distortion in addition to just overall better precision due to its high level of manufacturing tolerance. As a result, one can expect improved repeatability in the assembly of tool and spindle compared to conventional retention knobs. This can only serve to improve vibration behavior and result in better predictability and control of vibrations.

Dr. Tom Delio is considered one of the nation's leading authorities on high-speed machining and machine tool dynamics. Dr Delio is president of Manufacturing Laboratories, Inc. This work includes high-speed spindle development, design of high-speed and high-precision machine tools, adaptive controls for high-speed machining and dynamics characterization methods of machine tools. He has authored several papers in the area of spindle speed control and holds a patent that is utilized in several of MLI's products. Dr. Delio was selected as one of the six original partners of National Center for Defense Manufacturing and Machining; he is a Registered Professional Engineer; Certified Manufacturing Technologist and was the recipient of the 2003 Pinckney Award (American Helicopter Society). He holds a BS, MBA, and PhD from the University of Florida and a MS from Pennsylvania State University.



Taper Shank
Test Fixture

Briney Participates in JM's "High Torque Performance Partners" Program

Justin London, Briney Tooling Systems

"Briney is pleased to announce we are currently in the process of switching our toolholders over to JM's "High Torque Performance Partners" program. Briney's decision was based on our own internal findings and the fact that Briney has historically chosen quality processes and materials over profits. Briney only uses certified materials. Our carbon-hardened tools have twice the case depth as the majority of our competition. Briney's vacuum-hardened tools feature our proprietary Nu-Heat process developed in our state-of-the-art heat treat facility. Our taper shanks are of the highest quality. 85% or more of our tapers inspect within AT1.5 (due to our processes) and Briney guarantees AT3. Briney believes that the "High Torque Performance Partners" program will be another excellent addition to our quality features and that the coupling of our toolholders with JM's High Torque Retention Knobs will really go a long way for saving our customers both time and money. At Briney we are committed to reducing our customers' operational costs, not to selling them lots of cheap tools."

Improved From 8 hours to 10 hours on 1/2" carbide end mill

Timo Minx, CapTherm Systems, Inc

During the troubleshooting of wear patterns on our Cat 40 toolholders we started analyzing spindle and toolholder runout. We had always been torquing pull studs and collets and were very concerned about the poor performance of our machine. After having switched to JM's High Torque retention knobs, the problem completely disappeared. We switched all of our toolholders over to HT pull studs and now consistently achieve perfect wear patterns on our tools. Using Haas Advanced Tool Management we tracked tool life, and this improved from around 8 hours to 10 hours on a 1/2" carbide end mill.

Increase in Tool Life

Marc Politi, Jergens Industrial Sales

I have a customer that cuts aluminum and keeps track of tool life by hours. They switched a CAT 40 holder on their Haas VF2 machine from a standard retention knob to JM's High Torque JM31514HT and tightened as recommended. Tool life on an 1/8" diameter mill at same speeds and feeds went from 6 hours to 8 hours. Customer is very happy with results and wants to order 20 more knobs.

High Torque Retention Knobs at IMTS

Aaron Fike, Swiftcarb

Thank you for supplying Swiftcarb with your High Torque retention knobs for our demonstration. At IMTS 2012, we were machining 6Al4V titanium in a HAAS VF2SS, at a rate of 128 Inches Per Minute, with our Swiftcarb Rampmills. We started by ramping into the workpiece at seven degrees at 2062RPM and 38.4 inches per minute, until we reached 1 inch depth, and then interpolated out to remove the rest of the material from the pocket. At 450 SFPM and a .0035 actual chip thickness, the application sounded good, however we were very near the limits of the machine. On the second day of the show, we switched out the standard retention knobs that we were using for JM's High Torque Retention knobs. There was an immediate change in the pitch of the machining operation, and all 4 of us, with our hands on the machine, could feel the difference in the smoothness of the machining sound. After the part finished, we also noticed a smoother wall finish on the part than we were previously getting, and we have no doubt that if given the time, there would have been an increase in tool life as well. We are now firm believers in the productivity difference that a pull stud can make to a machining application, and we will be using JM's pull studs for all future demos, as well as recommending them to our customers as a necessary part of any rigid machining setup!

"You made me a believer, let's change them all...."

John Boesen, Texlon Plastics

Texlon Plastics in Gastonia, NC produces injection-molded plastic parts. John Boesen, their master mold maker, was skeptical of a simple retention knob redesign impacting his mold production. His JM distributor supplied him with a Cat 40, non-coolant style retention knob on a free trial basis. John was running a P20 mold cavity with a finish copy mill and experiencing chatter as the tool overhang increased. He changed the retention knob and made no additional
(Continued in next column)

(Continued from previous column)

adjustments. When the machine was restarted and the tool returned to the cut, the sound of the tool changed and the chatter disappeared. "I'm amazed" was his response. "You made me a believer, let's change them all. The modest cost will have an immediate payback in finish quality." The machine was a Haas VF3 with a 10,000 rpm spindle.

Positive Test on Worn Holder

Eddie Connell, Linco Tooling

The retention knob samples you sent to my customer had a positive test even though the holder already had a fair amount of distortion (it was very well worn). I will be selling all of your retention knobs in the future. Keep up the good work!

Quieter, Better Finishes

Frank Kokai, Kokai Machine

I thought the result (using the JM11122HT) was excellent. I noticed that my 2 inch, 3 flute face, running 8000 rpm in aluminum, ran quieter. Also, my 3 flute, 1/2 inch aluminum, end mills had better finishes when taking heavier cuts. I also found that on a job that I regularly run in 1018 steel, I was able to take heavier cuts and got longer tool life.

Bulging Found, Removed

Randy Bolt, River Rock Machine and Tool

After reading about your knob problem findings in a trade magazine, I checked my holders and found the bulging you described. I ordered two of your knobs and eliminated the problem. I rubbed the holder on my surface plate and could detect the bulge on new holders but after installing your knobs the rubbing left a straight line. My small VMC cuts quieter and acts like a bigger machine.

Pleased with new Knobs

Frank Camillieri

After reading about your new High Torque retention knobs it made sense to try them and we are very pleased. We will be using HT knobs as we replace the old and worn ones.

Bore Size Held True

Randy Collins, Southern Fabricators, Inc

Randy Collins, Manufacturing Manager, was skeptical that something as simple as a redesigned retention knob could impact the performance of a new machine. A part was being manufactured that required a rough drill followed by a critical bore in tool steel. The bore size had to be held within tenths. A tech service rep from Turning Concepts Inc, a distributor for JM Performance Products, structured a test utilizing the old tooling followed by back to back installation of the new knob. The part was run with existing tooling and the bore diameter was carefully measured. The tool was removed from the changer and the retention knobs were switched. A second part was run and measured and to the surprise of Collins, the bore size was .001 smaller. A third part ran and size held true to the second. Collins declared he had "seen enough" and immediately purchased additional knobs to cover all holders running carbide. He responded that he was glad to be on the scene to witness the test result since his initial reaction to the test offer was skeptical.

Milling to the Tune of Silence

Brian Dills, JIT Industries

In the parking lot going into a sales call, I could hear a mill screaming in the plant. The piece was 304SS pipe about 1' long with a 2.5" diam. welded to a flange. They were milling the face of the flange after it had been welded on the end of the pipe; it was very noisy, acting as a tuning fork. I asked the operator if he would like to try a new High Torque knob for his machine; it might quiet it down. He said everyone in the shop would be very happy if anything could help. We changed the knob to JM's HT knob. You could hear very little noise from the milling operation after changing the knob.



JM's Hydraulic ClampForce Gage

High Torque retention knobs doubled our tool life.

Jimmy Lytle, Daystar Machining Technologies, Inc.

Daystar Machining Technologies, Inc., operates Milltronics, Okuma, and Haas vertical machining centers in their production facility. In the facility, Jimmy Lytle was running a Walter, variable flute, solid carbide end mill doing perimeter work in 4140 steel. Running the manufacturer's recommended feeds and speeds yielded consistent tool life measured in linear inches. The Milltronics VMC was a cat 40, 25HP machine. Jimmy had the operator change to a High Torque retention knob when it became necessary to replace the 5/8 inch end mill. Replacing the end mill and retention knob in the existing holder had an immediate effect of reducing the perimeter width by a total of .010, or .005 per side. An offset adjustment had to be made to correct part size. This phenomenon baffled Jimmy since it implied the tool had changed on center. The next surprise was a doubling of tool life in linear inches produced. The tool life improvement repeated with each retooling. The bottom line calculation meant that every time they bought a \$76 dollar end mill and used it in conjunction with an HT retention knob they, doubled their tool life, thus saving \$76 with each use. The knob cost was \$22 making the payback relative to less than a third of the linear inches run by the end mill. Jimmy decided to convert all the retention knobs resulting in an immediate order for over 500 pieces.

**Are Your Toolholders Fully Engaged In The Spindle Of Your CNC Mill?
Most manufacturing problems are a result of tooling issues. Try our
Taper Contact Test below to check and see if you have this problem. If
tooling is the problem, High Torque Retention Knobs are the answer.**

--Machine Issue? Or Tooling Issue?--

Follow these 6 steps to determine the origin of your problem:

1. Touch off the tool in question and write down the tool tip reference position.
2. Remove the tool from the spindle and loosen the retention knob.
3. Re-tighten the retention knob, this time only finger tight, do not torque the knob.
4. Reload the toolholder in the machine.
5. Touch off the tool again and write down the tool tip reference position.
6. Compare the readings. If the numbers are different, the difference is the distance the toolholder stops short of full engagement with the spindle. If the numbers are the same, your toolholder is properly engaged with the spindle. Re-tighten the retention knob; no other adjustments need to be made.

If tooling is the issue, High Torque Retention Knobs are the solution.

Order HT knobs today.

Call (800-322-7750) or visit our website, www.jmperformanceproducts.com

**1234 High Street
Fairport Harbor, OH 44077
Phone: 1-800-322-7750
www.jmperformanceproducts.com**



**JM PERFORMANCE
PRODUCTS, INC.**

*The Industry Leader in
Milling Machine Optimization*