JM PERFORMANCE PRODUCTS, INC.

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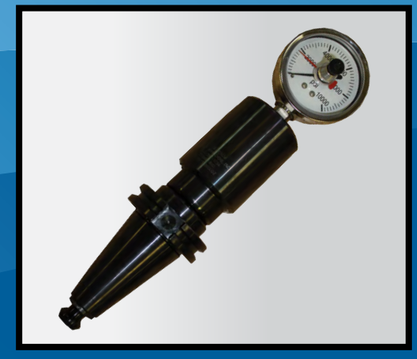
Product Guide



ClampForce Drawbar Gage

Monitoring drawbar force is critical in preventing a machine crash and wasted tool life. As drawbar force drops, clamping force is lost and the toolholder is able to move in the spindle. This allows for chatter, poor tool life, or left unchecked, a machine crash. Our hydraulic ClampForce Gage is the easiest product to use for checking drawbar force. In seconds, it indicates in ft/lbs the amount of force being applied to the toolholder. Once a drawbar force drops below 80% of the original manufacturer's setting, it is time to schedule maintenance.

ClampForce Gage hydraulic heads are available in 3,000, 5,000, 10,000, and 15,000 ft/lb configurations. It is the perfect solution for the smaller shop that is looking for a quick and inexpensive method to check drawbar force. The hydraulic gage head comes with a toolbox and protective packaging. One gage head will work in many applications. Adapters are available for CAT, BT, KM, CAPTO and HSK spindles. Yearly recalibration is recommended and can be provided by JM Performance Products, Inc.

Electronic ClampForce Gage

The Electronic ClampForce Gage is perfect for the shop with multiple machines to monitor. The gage quickly reads in pounds of force or kilo newtons. The gage is wireless so there are no awkward wires to deal with. Powering the unit is simple with just a replaceable battery.

The electronic version features a large memory storage that allows data from multiple machines to be stored. Machine information can be uploaded through the built-in USB port to the software that is provided with the Electronic ClampForce Gage. The software will track the date, user ID, and current pull force of each machine. Using this data can help predict when a machine needs to be scheduled for maintenance.

Like the hydraulic version, the adapters are universal and can be easily switched from CAT, BT, KM, CAPTO and HSK. Adapters are available in many sizes and work with the electronic and hydraulic version.

1234 High Street, Fairport Harbor, OH 44077 Toll Free 800-322-7750

www.jmperformanceproducts.com

Retention Knobs

High Torque Retention Knob

Standard Retention Knob

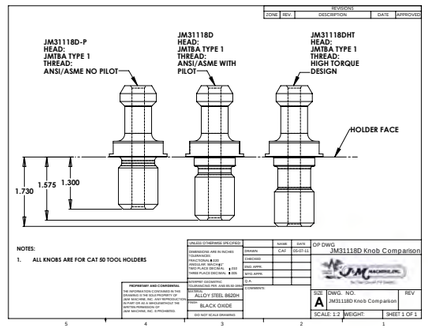
JM Performance Product's retention knobs are manufactured from hot-rolled 8620H fine grain steel. They are shot peened to relieve stress, and hard turned for superior fit and finish. Our knobs are laser marked with the date of purchase to help determine life span. For traceability purposes, each knob is lasered with a part number, serial number, and lot number. All of our knobs are made in the USA from USA manufactured materials. We manufacture and stock over 400 different styles of retention knobs including adapters for NMTB toolholders. Retention knobs come packaged in individual containers with identification prints on each container. Retention knobs should be inspected yearly for cracks and wear, and replaced every three years. (Based on a 40 hour week under normal conditions.)

High Torque Retention Knobs

High Torque Retention Knobs are designed to improve the fit of the toolholder with the spindle. When a retention knob is installed into a toolholder, the threads expand the thin walls of the small end of the toolholder. The expanded area becomes the contact point which prevents the full taper from engaging. When this occurs, it allows the toolholder to vibrate in the spindle which creates harmonics, chatter, poor tool life, and excessive toolholder and spindle wear. JM's patent pending High Torque Retention Knobs have been engineered to prevent the small end of the toolholder from expanding. By using a precision pilot and a deep undercut, the force of the threads are placed into a deeper cross-section of the toolholder where there is more resistance. The toolholder now properly mates with the spindle, increasing rigidity and tool life, improving finishes while reducing toolholder harmonics.
Visit **www.jmperformanceproducts.com** to see tool test results.

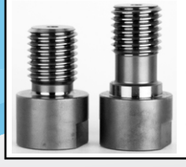
Key Points

- Prevent toolholders from expanding the small end of the taper
- Reduce toolholder harmonics/increase rigidity
- Increase spindle life
- Available in 8620H, 9310, and H13 Tool Steel
- Hard-turned with a 32 micro finish
- Fit existing toolholders
- Torque chart provided for installation
- Improve toolholder life
- Balanced threads by design
- Improved feeds and speeds



Taper Shank Test Fixture and Thread Masters

The Taper Shank Test Fixture is ground to mirror the AT3 taper of a CNC mill spindle. The gage measures movement changes in increments of 1/10,000 of an inch. It is used to measure radius changes of the toolholder along with any movement perpendicular to the axis of the toolholder. The gage can be used in conjunction with our thread masters. The Thread Masters are made from hardened steel and can be used as a non-destructive way to test toolholders for expansion. The Thread Masters are torqued at predetermined amounts into a toolholder and the Taper Shank Test Fixture is used to measure changes in the radius of the toolholder. Toolholders with a variance of .0004" or larger should be returned and exchanged.



Taper Restoration Kit

Proper taper contact between the toolholder and the spindle is critical for tool performance. After time, grease, dirt, and materials get galled into the spindle affecting tooling performance. To recondition spindle tapers, JM Performance Products has introduced its Spindle Taper Restoration Kit. The precision taper head used with the refinishing media can be used to restore the original taper finish. The media will remove all material that has been galled into the spindle taper without damaging the original taper. The kit consists of four different micron finishes of material, a spindle cleaner, a precision taper restoration head, a handle and a carrying case. The cleaning strips are pressure sensitive and coated with an aluminum oxide media. Available in 30, 40, 45 and 50 tapers.

Spindle Cleaners

Proper spindle maintenance is required to maintain good tool life and to hold tight tolerances. JM Spindle Cleaners are made from anodized aluminum and are strong enough to not collapse in the spindle while cleaning. They are available in 30, 40, 45 and 50 tapers and feature replaceable cleaning strips. Spindle cleaner kits come with a carrying case, cleaner inserts, spindle cleaner and cleaning solvent. Spindle cleaners feature a removable handle that can be used with all cleaning head tapers.

JM Combo Spindle Cleaning Kit Pictured

Retention Knob Sockets and Torque Wrenches

Proper installation of a retention knob in the toolholder is critical. Improper retention knob installation can lead to stress on the knobs which can break or damage the toolholder and spindle. JM Performance Products manufactures retention knob sockets and sells torque wrenches that are designed to properly install retention knobs. Our retention knob sockets are available for DIN, ANSI, and JMTBA styles for tapers from 30 to 60. Torque wrenches are available in 10-100 ft/lbs, 20-150 ft/lbs, and 80- 400 ft/lbs. Adapters are available for 1/2" to 3/8".

Smart Tool Setters

The multi-functioning and positioning of the Smart Tool Setter allows the operator to switch quickly and easily from one operation to another without loss of time. The Smart Tool Setter's precise and heavy duty construction make the tool setter very rigid, and able to endure extreme forces without causing any damage to tools or the Smart Tool Setter. Features four holes on the base of the tool setter for mounting purposes. Able to hold CAT, BT, or HSK Toolholders.

REQUEST FOR RETENTION KNOB IDENTIFICATION

COMPANY _____

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PHONE (_____) _____ FAX (_____) _____

Number of Knobs required _____

Machine Make _____

Machine Model _____

Spindle Size _____ Max RPM _____

Tool Holder Thread: Metric ☐ English ☐

Coolant through Spindle? Yes ☐ No ☐

Spindle Coolant High Pressure? Yes ☐ No ☐

Does Retention Knob have O-Ring? Yes ☐ No ☐

Location of O-Ring _____

Pilot? Yes ☐ No ☐

Previously Purchased Retention Knob Information

Manufacturer _____

Part # _____

Notes: _____

MAKE AS MANY COPIES OF THIS FORM AS NEEDED AND FAX IT TO YOUR DISTRIBUTOR

For Distributor use only

Retention Knob ordering information

Use Retention Knob # _____

Price Each _____

Can Ship Parts _____

Ship Via. _____

Note: Before installing this Retention Knob, compare this knob to the Retention Knob in the machine at the present time, or in the machine tool operators manual. If the knobs are not identical, do not use the new Retention Knob. Call your Distributor and give him the details.

DISTRIBUTED BY

Select Style and fill in the blanks

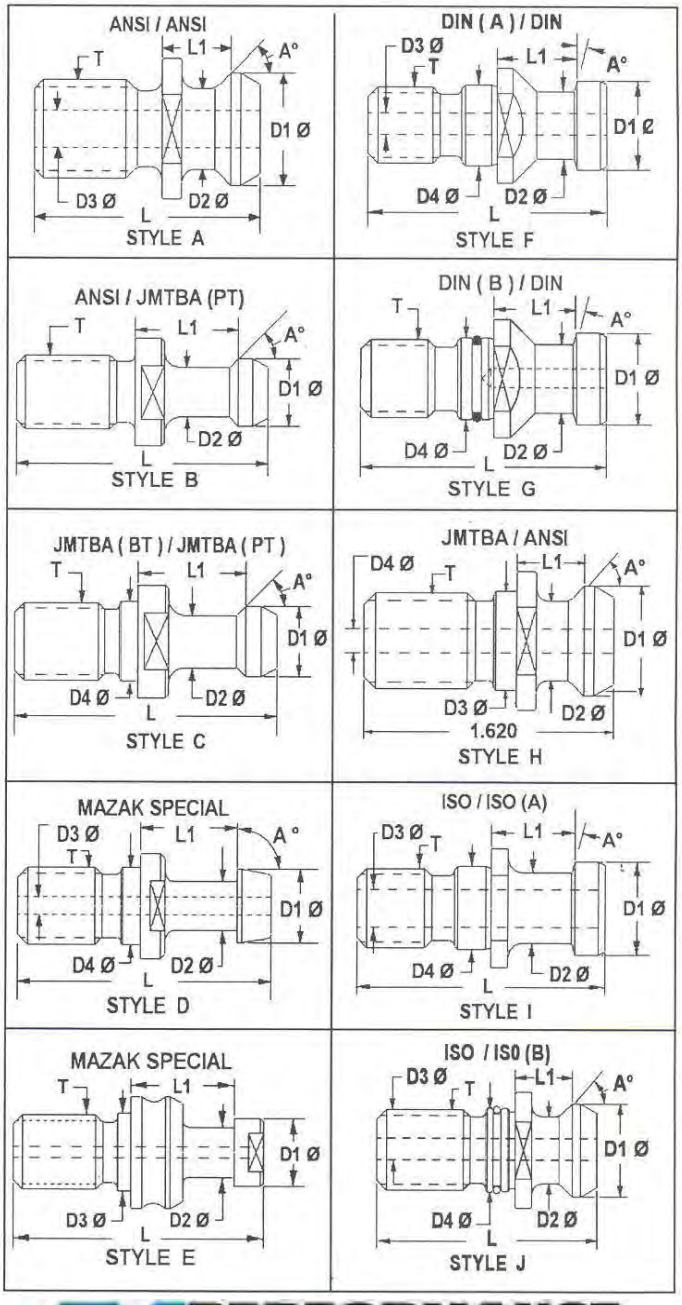
Style _____

"T" _____ "D2" _____ "L" _____

"A" _____ "D3" _____ "L1" _____

"D1" _____ "D4" _____ "L2" _____

"L 2" = Shoulder to head end of part.



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1-800-322-7750

Customer Testimonials

Increase Tool Life

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 a 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.

Marc Politi, Jergens Industrial Sales

Better Finishes

"I thought the result (using the JM11122HT) was excellent. I noticed that my 2 inch, 3 flute face, running 8000 rpms in aluminum, ran quieter. Also, my 3 flute, ½ 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."

Frank Kokai

To read more testimonials visit us online at:
www.jmperformanceproducts.com

JM's High Torque Retention Knobs at IMTS 2012

Thank you for supplying Swiftcarb with your High Torque retention knobs for our demonstration at IMTS 2012. We were machining 6A14V 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 7 degreees at 2062 rpm and 38.4 inches per minute until we reached 1 inch depth. Then we 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 we were using for JM's High Torque retention knobs. There was an immediate change in the pitch of the machining operation. All four of us could feel, with our hands on the machine, the difference in the smoothness of the machining sound. After the part finished we also noticed a smoother wall finish than we were previously getting. We have no doubt 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. We will be using JM's High Torque retention knobs for all future demos, as well as recommending them to our customers as a necessary part of any rigid machining setup.

Aaron Fike, Swiftcarb

Increased Feed Rates

I will not run a test with our Digital Boring Bar without a JM High Torque knob. We had one helluva test and I attribute much of the success to the HT knob. We increased their feed rate from .625 IPM to 6.89 IPM and the finish was the best they'd ever seen. Test details: HT knob JM35000VCHT. Material: 8620 Rockwell. Machine: Matsura BT40 Vertical, 1600 ft/ lbs drawbar. **Dan Carlstrom**

High Torque Knobs Lower Runout

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 higher quality ER collet chuck was .0003" to .0004". Using the JM HT knob it is consistently .00015" to .0002". They have since started using the JM HT knob throughout the shop.

Lee Knowlton, Northwest Machine Technologies

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

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 High Torque 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 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 VF3with a 10,000 rpm spindle.

John Boesen, Texlon Plastics

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Guide To Improving Tool Performance

Improving the connection between the toolholder and the spindle is key to improving tooling performance. JM Performance Products has assembled this guide as a way to help improve the mating of the toolholder to the spindle. Following these steps can lead to increase in tooling life from 10 to 30% and the ability to bore .0001" in production.

Clean the Spindle

The accumulation of grease, dirt, and other materials can cause build-up between the taper of the toolholder and spindle. Build-up prevents the toolholder taper from properly seating with the taper of the spindle, which causes variable positioning of the toolholder. Proper cleaning of the spindle needs to be performed on a regular basis, as well as when new tooling is installed.

Check the Toolholder

Spindles and toolholders are ground to have an AT3 Taper (Cone Angle Tolerance). Tolerances greater than an AT3 are not acceptable and prevent the toolholder and spindle from properly seating. The slightest mismatch in this connection allows the toolholder to move in the spindle. This mismatch in the mating of the tapers is magnified at higher speeds. This movement will cause run out, chatter, harmonics, excessive tool and spindle wear. The main cause of the mismatch of tapers is toolholder tapers that have been distorted by the retention knob. To determine if toolholders are distorted, the Taper Shank Test Fixture must be used.

The Taper Shank Test Fixture is ground to mirror the taper of a CNC spindle. It measures the change of diameter by monitoring any movement of the toolholder perpendicular to the axis of the toolholder. The indicators measure movement of the toolholder in increments of 1/10,000 of an inch. The AT3 grind limit is .000059". Two graduation lines on the Taper Shank Test Fixture dial = .000058".

The Test Fixture can be used with a toolholder; with or without a retention knob installed. When a holder has a retention knob installed, the fixture can be used to measure the holder. The retention knob is then removed and the holder is re-measured. This process is used to calculate any change in size of the toolholder. The process can be reversed and measure any growth of the toolholder when a retention knob is installed.

Non Destructive Hardness Test

The Taper Shank Test Fixture can also be used as a non-destructive way to test new toolholders to make sure they have been properly heat treated. Holders that are soft will not perform properly and should be removed from production. This process of testing toolholders requires the use of a Test Master. The Test Master is made of through-hardening material with threads and has the same flange diameter and flats that retention knobs have. The Test Master is installed at a predetermined torque setting into the toolholder. The Taper Test Fixture is then used to measure dimensional changes. Toolholders that read a variance of .0004" or greater should be returned and exchanged.

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Retention Knob Information

When a standard retention knob is inserted into the toolholder and tightened, the pressure of the threads expands the small end of the toolholder causing a radius to form. This expansion of the toolholder prevents it from properly seating with the spindle. When this occurs, it allows the large end of the toolholder to move in the spindle creating harmonics. Evidence of a loose toolholder is fretting marks on the toolholder.

The High Torque Retention Knob was designed to stop toolholders from expanding. They work by placing the force of the threads of the retention knob into a deeper cross-section of the toolholder. By removing contact with the thin wall cross section of the toolholder, expansion is eliminated.

Pictured to the right is a standard retention knob and and a High Torque Retention Knob. The High Torque knob is a newly designed and engineered retention knob by JM Performance Products. The High Torque Retention Knob is the only knob to stop toolholders from expanding when installed properly. The High Torque Knob will work in any toolholder that is built to industry standard specifications.

The picture to the right shows the fretting marks often found on expanded toolholders .

Proper torque settings are essential for installation. Over tightening a retention knob will expand the holder. Installed without enough torque due to the elasticity of steel, a retention knob will stretch and eventually snap. Once a retention knob has been installed, hold it and the toolholder up to a light and visually check to make sure no light can be seen under the flange of the retention knob and face of the toolholder. When changing tools, retention knobs should be examined for damage, stress fatigue, nicks, or scratched surfaces. If these conditions exist, the retention knobs should be immediately replaced. Also examine the face of the toolholder where the retention knob seats and make sure there are no burrs or nicks in either place. If the knob has o-rings, they should be examined and replaced if they show signs of wear, swelling, flat spots, or cracks. JM Performance Products recommends retention knobs be replaced every three years under normal wear. (Based on a 40 hour work week).

Checking The Drawbar Force

Drawbar force is critical for properly holding the toolholder in the spindle. When a tool is not properly clamped, it allows the toolholder to move in the spindle, which leads to problems with repeatability, bad finishes, and poor tool life. A low drawbar force can be from normal wear, broken springs in the drawbar, or an out-of-adjustment gripper mechanism. Broken springs or a loose gripper mechanism can allow tools to be pulled from the spindle during machining. Left unchecked, a tool could eventually pull out during a cut, possibly damaging the spindle, cutter, toolholder, and work piece.

The ClampForce Gage is a quick and easy way to check drawbar force. It works by simulating a tool in the spindle and measuring the clamping force in pounds of force. The first step is to make sure you are using a pressure gage that has capacity over that of the drawbar that you are checking. Select the proper taper size spindle adapter for your machine. Install the spindle adapter onto the gage head using the transfer screw along with the retention knob from your machine. Using the manual tool change method, install the ClampForce Gage into the spindle and energize the drawbar. Consult with a qualified technician if a low drawbar force is detected in your spindle.

Spindles with low drawbar force should be repaired before continuing, especially where high spindle speeds, precision boring, or heavy cutting forces are required. Frequent testing will tell you if something is quickly failing and needs immediate attention. Long term test records should be kept; they can be very helpful when diagnosing spindle drawbar problems. This will help you avoid downtime and the expense of a machine crash from a dislodged tool.

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