

# Tomorrow's Gear Inspection Systems: Arriving Just in Time

The gear inspection systems of the future will be very different from those found in many of today's quality labs. Part setup and programming, regardless of part type or complexity, will be largely automated and require minimal operator experience. The operating system will be native Windows-based so that gear inspection data in dozens of languages can flow seamlessly into the user's network, and every major industrial standard—from AGMA to GOST—can be easily supported. Operators will work in a much more ergonomic environment than they're used to, in close proximity to the work area or using a remote hand-held pendant that puts Internet connectivity right at their fingertips, and supports voice notes, work messages, even video telephony for record-keeping and remote diagnostics. The system itself will be much more robust, and built for the rigors and temperature swings of the shop floor. Most importantly, these inspection systems will inspect *all* types of gears, gear cutting tools, and even prismatic parts at speeds anywhere from 20 to 45 percent faster than existing systems.

Those are just some of the reasons forward-thinking gear producers like Eaton have begun using Gleason's new GMS system.

## Wanted: An Inspection 'Workhorse' at Eaton.

For almost a century, Eaton has been supplying the trucking industry with products designed to improve vehicle performance and power, and increase profitability. Today, Eaton transmissions are used by many of the world's leading OEM vehicle manufacturers. At Eaton's Kings Mountain, North Carolina facility, meeting the company's growing demand for high-quality transmission gears that run smoother, quieter and more reliably has placed a heavy load squarely on the shoulders



With installation of the next-generation Gleason 350GMS Analytical Gear Inspection System, Eaton Kings Mountain's gear lab is able to meet its high-volume gear and gear cutting tool inspection requirements: 1,500 parts per week, three shifts a day.

of the gear inspection lab, according to Eaton gear engineer Angela Hastings.

"We had been relying on two older M&M Precision Systems (now Gleason Metrology Systems) machines and two older competitor machines to inspect an average of 1,500 parts per week," Hastings says. "The lab inspects parts three shifts per day and most weekends, performing inspections on internal teeth and external teeth at various states of manufacturing; any delays in the lab would cause unacceptable production losses. We also routinely inspect shave cutters and periodically, shaper cutters—the accuracy of these inspections helps keep our production running smoothly."

The search for a new inspection solution to augment these older machines began in 2011 when Hastings and other Eaton engineers and a gear lab technician visited several suppliers of gear inspection equipment, and evaluated their products. "Along with the normal characteristics of cost, delivery and cycle time, we also considered the operating system, ease of programming (both inspection and alignment), training requirements, technical assistance and repair parts supply," recalls

Hastings. "The Gleason GMS system emerged as the leader."

## GMS Improves on Gleason's GMM Series

At IMTS 2010, Gleason Metrology Systems introduced the first of its new line of GMS model inspection machines. Today the line is comprised of seven different models, with capacities from 0–3,000 mm gear diameter. According to Gleason Metrology Systems' sales manager, Dennis Traynor, the GMS series has evolved from the company's GMM series and incorporates a host of design improvements and enhancements that make the GMS machines faster, easier to operate and more reliable.

"The GMS incorporates everything that was unique to the GMM series, like *GAMA*, Gleason's native Windows-based operating system, but takes it to a new level, with *GAMA 2.0*," says Traynor.

Like the original *GAMA*, *GAMA 2.0* easily communicates inspection results across a customer's plant-wide network, a process much more difficult for competitors who don't operate with Windows, Traynor says. But *GAMA*

2.0 also helps reduce cycle times. GMS series machines offer a 20–45 percent reduction in cycle times as compared to the GMM systems, Traynor says, and they offer a 10–25 percent reduction in cycle times versus competitive systems. These improvements result from *GAMA 2.0*'s faster calculation speeds, coupled with axis movement optimizations that have been made in the GMS.

Traynor also points out that the *GAMA 2.0* applications suite makes programming a remarkably simple task for almost any operator, regardless of part type or inspection requirement.

“When you open the *GAMA* suite, whether you go to cylindrical gear, spiral bevel gear, hob, shaper cutter, shaver cutter—any package for gear or gear tool inspection—the graphical user interface (GUI) is virtually identical, so the operator is as comfortable programming a hob as he would be a cylindrical gear,” says Traynor. “You don’t have to remember a special routine or rely solely on an operator’s experience. Most importantly, we’re able to support all major industrial standards—AGMA, DIN, JIS, ISO, GOST—and some 20 different languages, thus accommodating the needs of almost any user globally. The user can additionally choose a variety of chart output styles and configurations for analysis, and save documentation in many formats, including .jpg, .bmp, .gif or PDF.”

Hastings agrees. “The ease of programming for part inspections and alignment functions is simple enough for even our new gear lab technicians to learn quickly,” she says. “The ability to quickly change the part programs and parameters makes this our favorite machine to run prototypes or perform special inspections to troubleshoot production issues.”

## Support and Control Right at Your Fingertips

If and when one of Eaton’s gear lab technicians need support, whether creating a part program, or managing an inspection, or troubleshooting

a problem, there are only two things a Gleason engineer sitting hundreds of miles away can’t help with or solve in real time: (1) physically setting up the part, and (2) pushing the start button. This might be one of the GMS system’s most important new capabilities, says Traynor. “Through a simple Ethernet connection or a secure ‘Team Viewer’ web browser, we can view the screen, share part prints, even create a part program. We’ve also introduced a video telephony and voice mail messaging capability through a new remote pendant control, enabling the user to capture video, describe a particular programming issue and transmit it over the web to our support team.”

The remote pendant is also particularly useful during setup, because it enables the operator to answer program prompts from anywhere in the work area and is equipped with twin thumb-controlled joysticks for controlling the speed and positioning of each individual axis.

The main operator work station is situated in close proximity to the work area. A control pendant with twin variable speed joysticks mounted close to the work zone also gives the operator excellent manual control, with axes-selectable operation, feed rate override selection, drive ON, reference point and E-STOP.

## Better Sensors, Surface Roughness and Barkhausen.

GMS productivity and versatility are greatly enhanced through use of the Renishaw SP80H 3-D scanning probe, available in various probe configurations and stylus sizes, and with an automatic probe change system for every model. The Renishaw probe makes it possible for the GMS to deliver a faster, more accurate measurement capability for even the most complex gear tooth profiles, including crowning, hollow and taper. In addition, the SP80H is kinematically coupled to the drive system, thus helping minimize the potential for a costly collision and damage to the probe, part or machine.

GMS also has the capability to perform surface roughness testing for cylindrical gears (spiral bevel gear surface roughness testing is in development), with special probes pre-configured for the automatic probe changer.

Barkhausen inspection—a ‘non-destructive’ measurement of surface hardness and residual and compressive stresses—is also a GMS capability.

## Built for Reliability

The GMS systems easily meet VDI/VDE Class 1 specifications, with 2 micron system accuracy. Exceptional accuracy, repeatability and reliability can be attributed to a number of unique design features. For example, all axes are made from highly stable, robust Meehanite cast iron, as compared to more common cast irons or weldment designs. The GMS systems also use linear drives for improved speed and positioning accuracy on all axes. All models use a solid-granite base as well, providing greater stability as compared to designs using cast-iron weldments or partial-granite bases.

Even the controls cabinet on the GMS systems has been re-designed and relocated for better access, safety and reliability, with a simpler design, fewer failure points and reduced noise.

“We knew from our experience with our M&M Precision Systems machines that the service and parts side of the business is excellent,” concludes Eaton’s Hastings. “We know from these calibrations that the machines are built to keep running accurately through many inspections without problems or the need for adjustments. They are pure workhorses.”

## For more information:

Gleason Corporation  
1000 University Avenue  
P.O. Box 22970  
Rochester, NY 14692-2970  
Phone: (585) 473-1000  
Fax: (585) 461-4348  
sales@gleason.com  
www.gleason.com

# Seco to Offer Diverse Technologies at IMTS



Seco Tools will meet the increased productivity needs of various manufacturers, from aerospace to windpower to automotive to medical, by showcasing a broad range of innovative metal cutting solutions and diverse technologies for turning, milling and holemaking applications in booth W-1564 at IMTS in Chicago.

Products on display will include Duratomic TK insert grades for cast iron turning, Duratomic DP3000 heat-resistant inserts for Perfomax Indexable Drills, the Square 6-04 shoulder milling cutter, the Turbo 10 cutting tool, the Double Octomill-05 face milling cutter for smaller machines and a new generation of disc milling cutters for large slot width.

The TK1001 and TK2001 insert grades, featuring Duratomic coating process technology, offer high performance turning, allow for faster cutting speeds and increased tool life, and effectively reduce the number of grades needed in cast iron applications. TK1001 effectively tackles gray cast iron from finishing up to semi-stable conditions and nodular cast

iron under stable conditions as well as hardened steels in the 40–45 Rc range. The TK2001 steps in for the successful machining of nodular cast iron and gray cast iron in tougher applications, all the way to heavy interrupted cuts. The TK grades are available in 211 new geometries and chip grooves,



ensuring applicability across a broad range of operations.

The Duratomic DP3000 heat-resistant inserts for Perfomax Indexable Drills are suitable for very high feeds and speeds. This versatile insert grade provides for excellent wear resistance and edge toughness, and is suitable for most materials and applications. In combination with a strong drill body, DP3000 offers high productivity, long tool life and excellent application security. With the Duratomic process, as featured on TK1001, TK2001 and DP3000 product, aluminum and oxygen are manipulated at the atomic level to create insert coatings with unmatched toughness and abrasion resistance.

The Square 6-04 is the smaller version of Seco's Square 6 square shoulder milling cutters. It includes tool diameters down to 0.75" (20 mm). This addition allows the benefits of Square 6 to be applied to an even greater range of applications. Square 6-04 is well suited for small and medium milling machines. It incorporates trigonal inserts with six cutting edges and when combined with the close pitch cutter, Square 6-04 can result in improved cost-efficiency and increased productivity. The 90-degree setting angle ensures a true 90-degree square in one

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Seco will showcase another advancement in square shoulder milling with its Turbo 10 cutting tool, suitable for most roughing, semi-finishing and finishing operations. The cutter offers improved tool life and precision by optimizing cutting properties that reduce heat generation and cutting forces. Turbo 10 tackles slotting, contouring, helical interpolation and ramping applications with cutting diameters that range from 0.625" (16 mm) to 4" (100 mm) and a maximum cutting depth of 0.354" (9 mm). The Turbo 10 employs a coated, pre-hardened cutter body with two different pitch configurations for meeting tight tolerances and providing high reliability. Mounting types for the Turbo 10 include Cylindrical, Weldon, Arbor and Combimaster. With strong, highly positive geometries, optimized edges, a wide range of industry-leading carbide grades and two different corner radii, the inserts used in conjunction with the Turbo 10 offer maximum levels of adaptability, accuracy and reliability. Furthermore, inserts can be set to a true 90-degree cutting angle to create clean 90-degree walls and eliminate secondary operations. The Double Octomill-05 brings strong cost and performance benefits to smaller machines. This highly efficient and economical face milling cutter is available in diameters from 1" (25 mm) to 5" (125 mm) and provides optimal performance in applications requiring a maximum of 0.118" (3 mm) depth of cut. The insert pockets of the Double Octomill-05 incorporate a strong center lock screw and hardened HSS insert locating pins, simplifying the mounting of inserts and ensuring maximum stability during operation. The pockets also feature an 8-degree negative angle to allow the use of double sided inserts, while the inserts themselves are positive, creating a positive cutting rake to minimize power consumption. Seco offers four insert geometries for the Double Octomill-05, allowing the tool

to be successfully applied across various materials.

Seco will expand the disc milling range with the introduction of a new generation of disc cutters for large slot width (1" and 25 mm) fixed pocket cutters. This new generation of disc milling cutters has new features that allow application in all industry segments and include free cutting geometries, wiper flats, a broad range of corner radii, fixed pocket and adjustable versions, and optimized chip flow.

**For more information:**

Seco Tools Inc.  
2805 Bellingham Drive  
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Phone: (248) 528-5200  
www.secotools.com

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Exsys Tool, Inc. will display a variety of tooling system innovations for CNC turning centers in booth W-1664 at IMTS, taking place Sept. 10-15 at the McCormick Place in Chicago. Products to be highlighted include the company's Preci-Flex modular toolholder system and specialized tooling such as a gear hobbing system as well as Double Square Shank and Quad Square Shank static toolholders. The company's Preci-Flex tool-

holder system is a fast, accurate and cost-effective solution for lathe tooling changeovers. It is the first system of its kind to have a single base holder and multiple tooling adapters that utilize the ER collet pocket. The Preci-Flex's compact design assures maximum torque transmission and rigidity, resulting in increased machining accuracy and improved productivity. IMTS attendees will find Exsys manufactures specialized tooling systems for use with various machine tool models and brands. One such system is a special compact gear hobber system that allows shops to generate splines, spur or helical gears in one operation. As an adjustable toolholding system, it eliminates having to rough gears on one machine, and then transfer them to another for gear hobbing. Built for heavy machining loads, the gear hobber system delivers 45 N-m of torque and speeds of up to 3,000 rpm for hobs or slotting saws up to 2.48" (63 mm) in diameter. Designed to increase tool turret capacity, the Exsys Double Square Shank and Quad Square Shank static specialized toolholders allow for having two or four inserts, as opposed to just one, in a single tool turret station. With multiple insert capability, different types of inserts can be located in the same station, saving time and money.

**For more information:**

Exsys Tool, Inc.  
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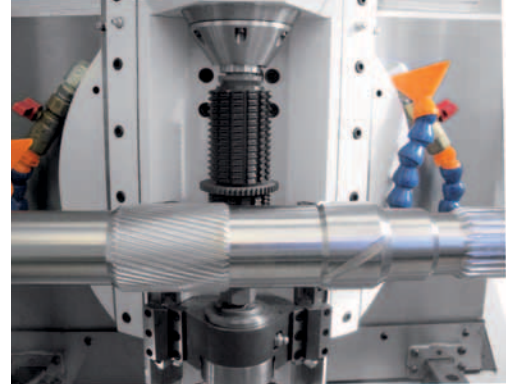
# PRODUCT NEWS

the machine to avoid any thermal distortions. In addition, the 100 H can optionally be ordered with automation for machining larger lots. Star SU plans to exhibit an extended version of the 100 H with a NUM Flexium 68 CNC control at IMTS 2012 in Chicago in September. This extended version can accommodate a workpiece up to

915 mm (36") long and 126 mm (5") in diameter.

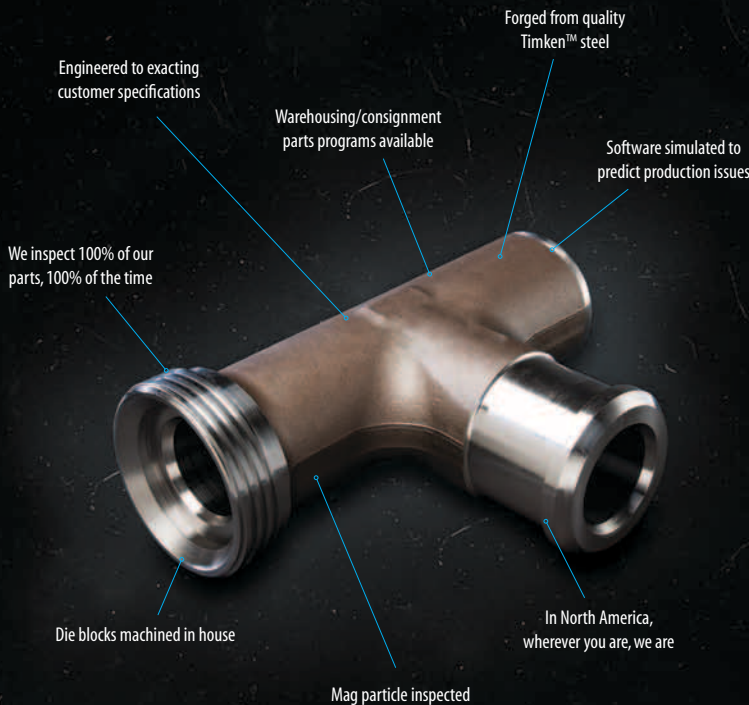
## For more information:

Star SU LLC.  
5200 Prairie Stone Parkway  
Suite 100  
Hoffman Estates, IL 60192  
Phone: (847) 649-1450  
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## Microprecision OFFERS NEW GEAR PRODUCTION MACHINES

Hemel Hempstead, U.K.-based Microprecision, a specialist in the field of precision component manufacturing, is now exclusively distributing a high precision and cost-effective range of CNC gear-production machine tools from South Korean company S&T Dynamics. The range of gear production machines, which includes hobbers, shapers, shavers, deburrers and associated accessories, offers quality levels normally seen on top-of-the-range machines, but without the price



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premium. The company's faith in the capabilities of the range is reflected in the fact that it uses two brand new S&T machines in its own 20,000 sq. ft. precision-manufacturing facility; which it uses not only for its own advanced production, but also for customer demonstrations.

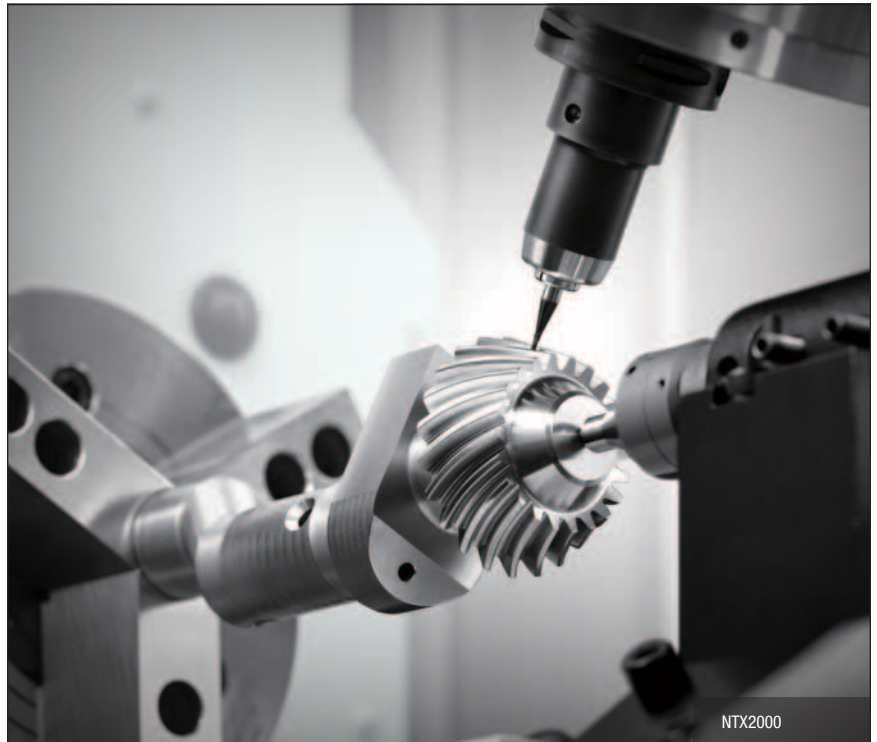
Before making the decision to act as a distributor, Microprecision made sure the machines could meet the demands of the aerospace industry—with extensive inspection and testing of machined components before they were shipped. Once the machines and the manufactured components passed Microprecision's exhaustive quality control standards the decision to distribute the machines was given the green light.

The S&T Gear Manufacturing range comprises: GHO-200, -350 & -500 CNC vertical gear hobbing machines, each with corresponding bed capacity. This range of machines offers high-precision capabilities thanks to low surface pressure and high cutting resistance. With a Global User Data (GUD) resource, separate programming is unnecessary and gear production is easy—all that is required is the cutter specifications, the workpiece specifications and the cutting conditions.

There are two GHO-200 machines installed at Microprecision in constant use and available for inspection and machining trials. Having the two machines in operation in the U.K. by the vendor means that any prospective purchasers can draw upon firsthand experience on set-up and operating procedures, plus the capacity to sub-contract work and train operators on

the machines before new machines are delivered onsite, aiding changeovers and ensuring any purchaser is up and running quickly and smoothly, with the ability to ramp up production progressively.

GSP Series CNC Shaping Machines are also included in the range; these three-axis shaping machines offer high-precision shaping thanks to high-



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strength columns and counter columns. They also offer reduced installation space thanks to a front-loading cabinet and the GUD environment for easy programming.

GSV Series CNC Shaving machines are next in the range; the 4.9 kW spindle motors and three-axis motion combine to offer power, easy operation and high precision. They also come complete with a magnetic chip separator to aid chip processing. The GSV range also uses the GUD environment for easier programming.

TCR Chamfering (Deburring) machines offer high strength, high-precision cutting spindles. An inverter also gives them the capability to offer a variable speed transmission for optimal control of the work spindle and work slide. Convenience is improved with the simple arm-type control panel that allows the operator to adjust its position.

TCG Chamfering machines offer the same high strength, high-precision spindle, inverter control, and arm-type control panel as the TCR range. In addition, no separate change gear is needed thanks to the deployment of a settable split plate.

*(Editors' Note: S&T Dynamics' gear machines are sold in the United States by Toolink Engineering, [www.toolink-eng.com](http://www.toolink-eng.com)).*

## For more information:

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## Jenoptik Wavemore System

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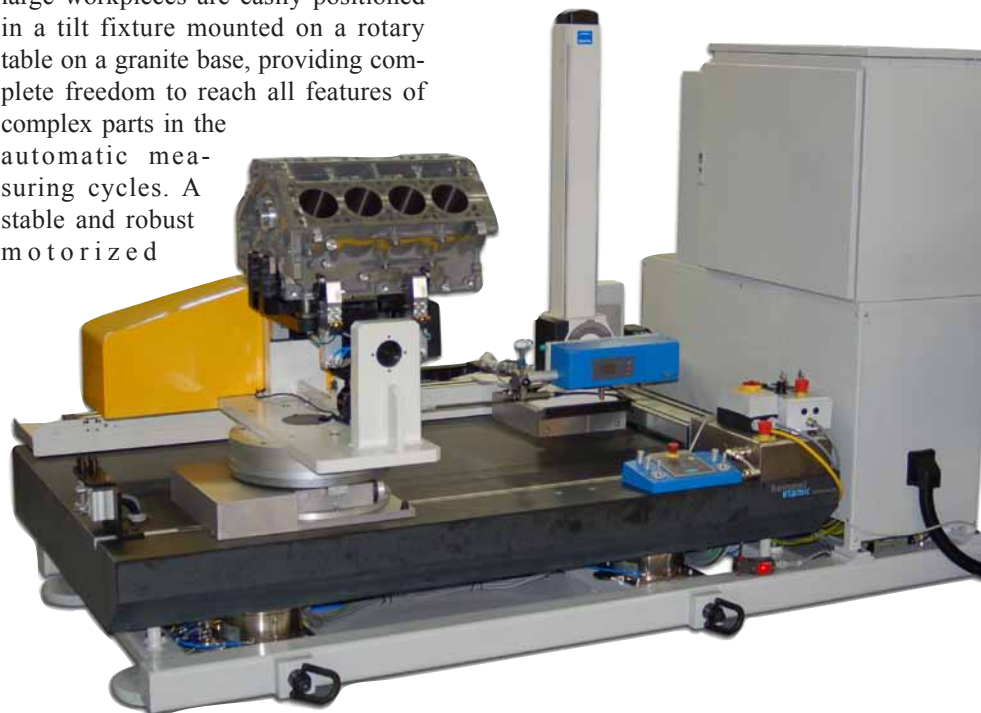
The new Jenoptik Wavemove automated surface roughness and contour measuring system includes up to seven CNC axes for complete high-accuracy measurement and evaluation of complex shaft or prismatic parts such as automotive crankshaft, cylinder heads, engine blocks, transmission housings, and more on the production floor, close to manufacturing processes. Detailed, exportable analyses of the measuring results provide exact statements about the quality of the production process, based on many special parameters from the automotive industry. The automated system eliminates reproducibility concerns and allows the user to track part quality through the entire manufacturing process.

In the ergonomic measuring station, large workpieces are easily positioned in a tilt fixture mounted on a rotary table on a granite base, providing complete freedom to reach all features of complex parts in the automatic measuring cycles. A stable and robust motorized

measuring column automatically positions pick-ups. The system automatically verifies the proper orientation of each part prior to measurement routine.

Roughness and contour measurement is easily accomplished through the intelligent arrangement of probing systems for each type of measurement. The drive bar positions the roughness pick-up even in hard-to-reach measuring positions. The contour probe is easy to change and can be operated parallel to the roughness pick-up if necessary. The Wavemove provides: uniform user interface for roughness and contour evaluations, calculation of all common profile, roughness and waviness parameters (more than 90), evaluation of geometric characteristics such as distances, angles and radii and traverse lengths of 120 mm, or 200 mm, for roughness and contour measurement.

Measurement routines are selectable for specific features, as necessary. The *Turbo Wave* software for roughness and contour measuring provides an icon-based, user-friendly, uniform interface for complex CNC measurement runs and automatic evaluations. Custom screen and print forms are easily designed, allowing efficient creation





of measuring programs, and extensive evaluation of measuring results. *Turbo Wave* software for contour and roughness measuring includes interactive control of the measuring station, individual measuring programs with automatic measurement runs, extensive profile analysis functions for profile and material ratio curves and Fourier analysis and more than 90 roughness and waviness parameters according to ISO 4287 and other ISO and national standards (ASME, DIN, JIS, Motif etc.) plus evaluation of workpiece characteristics including radii, distances and angles.

The Wavemove system can also evaluate 'twist' on ground shafts, according to MBN 31007-07. Twist structures at sealing surfaces occur during grinding and impair the sealing function between the shaft and the sealing ring. The most important properties of these surface structures are measured three-dimensionally and the parameters relevant to the tightness determined.

**For more information:**

Hommel-Etamic America Corp.  
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Saint-Gobain Abrasives has recently introduced Norton Paradigm Diamond and CBN Wheels. Paradigm wheels feature a new proprietary, patent-pending bond delivering high grinding performance on carbide and high-speed steel round tool fluting, resulting in fast cycle times and low cost per parts. "The new patent pending bond on Paradigm Diamond and CBN



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wheels enables high performance one-pass flute grinding for highly efficient round tool manufacturing operations," says Matt Simmers, product manager at Norton.

For maximum productivity, new Norton Paradigm wheels are online and offline truable. Wheels are wear/load resistant for grinding on 6 to 12 percent cobalt, and offer better control

over core growth. A high grain retention and uniform structure provides a high G-ratio (ratio of material removal rate versus wheel wear) up to 2.5x longer wheel life and a 30 percent higher material removal rate than other superabrasive wheels. Paradigm Diamond and CBN Wheels also offer low specific cutting energy, which enables faster grinding with a lower power draw

and less burn. All Paradigm Diamond and CBN Wheels are custom-manufactured to precisely meet end-user requirements. Wheels are available for Anca, Makino, Rollomatic, Star, Walter and other grinding systems. Diamond wheels are available for tungsten carbide and CBN wheels are offered for high-speed steel applications.

## For more information:

Saint-Gobain North America  
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[www.saint-gobain-northamerica.com](http://www.saint-gobain-northamerica.com)

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## American Wera

### EXPANDS OPERATIONS

American Wera represents various German metalworking machine builders, including Profilator, Pittler, Praewema, Diskus, WMZ and MAE. These machines are sold for gear and spline production, as well as bar, pipe and tube straightening plus wheelset pressing. The company's target markets include automotive, off-highway, oil and gas, rail and other heavy equipment manufacturing. Caterpillar recently selected Pittler as manufacturing partner for a new cylinder liner project. The Peoria, Illinois location will use inverted spindle turning centers with 16 spindles for high production. Linamar Mexico added a second



scudding machine from Profilator at its Nuevo Laredo plant for use on a Getrag Ford project. American Wera is expanding its facility in Ann Arbor, Michigan with additional staff to be added soon; full application engineering assistance, sales, service and training offered for customers and field sales representatives. The company will be exhibiting at IMTS in Chicago (Booth N6260) this September.

### For more information:

American Wera  
4630 Freedom Drive  
Ann Arbor, MI 48108  
Phone: (734) 973-7800  
Fax: (734) 973-3053  
[www.american-wera.com](http://www.american-wera.com)

## Portable CMM

### DEBUTS AT HEXAGON 2012

Hexagon Metrology recently announced the North American debut of its new Romer Absolute Arm series. The new series was launched at the Hexagon 2012 conference that took place June 4-7 in Las Vegas. The upgraded design innovations increase the accuracy of the portable coordinate measuring machine (PCMM) by up to 23 percent compared to previous versions. With point repeatability values

from 0.016 mm, the Romer Absolute Arm is the most accurate portable measuring arm produced by Hexagon Metrology. Other features include SmartLock technology, which securely locks the arm in its rest position using a simple switch at the base. SmartLock enables users to lock the arm in any intermediate position to ease inspections in physically limited areas. The

new version also contains an easy-to-access battery pack to minimize downtime required for battery changes. Absolute encoders recognize the position of the arm at all times, effectively eliminating the need for complex homing procedures. Automatic probe recognition allows operators to change probes within seconds without the need for recalibration. Its optional integrated

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scanning solution is factory calibrated and certified with the arm and scanner as a complete system.

The Romer Absolute Arm is available in seven lengths, from 1.5 m to 4.5 m. “The Absolute Arm was already the most accurate arm on the market, but with advancements in design, the new version is even more accurate than before. This pushes the enve-

lope of what is possible with portable measurement technology,” states Eric Hollenbeck, product manager for portable technology at Hexagon Metrology. “The most dramatic improvements will be seen on the larger models including our 4 m and 4.5 m arms—the largest in the industry.” All new orders will be shipped from the state-of-the-art facility in Oceanside,

California with the revised specifications.

## For more information:

Hexagon Metrology  
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# Mitutoyo

## OFFERS SOLAR ABS DIGIMATIC INDICATOR

The new ID-S Solar ABS Digimatic Indicator available from Mitutoyo America Corporation combines, for the first time in an indicator, the convenience of ABS origin memory with “always ready” solar power to provide highest levels of availability.

The new Mitutoyo ID-S Solar ABS Digimatic Indicator’s solar power source can function effectively at light levels as low as 40 lux illumination—significantly below values typically found in even low-light work conditions. In addition the ID-S Solar ABS Digimatic Indicator incorporates a super capacitor to maintain a power reserve of approximately 3.5 hours for instances when even lower light levels are encountered.

The ID-S Solar ABS Digimatic Indicator features Mitutoyo’s proprietary ABS (Absolute) measuring system. When the indicator is turned on, ABS automatically restores the most recent origin position. This eliminates the need to re-set the origin at power-on, which can be especially helpful in

multipoint measurement—saving time and improving repeatability.

Data-hold and data-output functions are included in the new ID-S Solar ABS Digimatic Indicators enhancing the operator’s ability to manage measurement results. Data functions include a lock to prevent mis-operation. The indicator’s measuring range is 0.5" (12.7 mm) while its resolution

is selectable at 0.0005"/0.01 mm or 0.00005"/0.001 mm.

Additionally, the Mitutoyo ID-S Solar ABS Digimatic Indicator supports output to measurement data applications such as MeasurLink, Mitutoyo’s proprietary statistical-processing and process-control program which performs statistical analysis and provides real-time display of measure-



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ment results for SPC applications. The program can also be linked to a higher-level network environment for enterprise-wide functionality.

## For more information:

Mitutoyo America Corporation  
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Aurora, IL 60502  
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## GH Induction Atmospheres

### DEVELOPS INDUCTION HARDENING MACHINE



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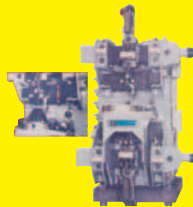
### Manual Low-Profile Circle Divider

Basic A.G. Davis CIRCLE DIVIDER™ features standard indexing of 360° or 720° positions. Round or square face plates with diameters up to 48". Patented fail-safe lock. Automatic systems available. 36/72 position economy model also available.



### Ball Bearing Rotary Table

Angular contact, double row, preloaded ball bearings provide the optimum combination of accuracy, stillness and low friction. Digital readout-radial runout to .000005".



### 5-Axis CMM

The 5-axes computer controlled special coordinate measuring machine has four air bearing precision linear motions and an air bearing rotary table. Laser measurement incorporating a unique path layout and environmental monitoring compensates for pitch and sag. Air bearing electronic probes contact the part contour. The total system accuracy is .0000050" within the envelope of travel.



### Two-Axis Servo/Rate Rotary System

Vertical 16" faceplate dia. table and horizontal 9" dia. air bearing table with integral motor drive and precision encoder.



### Astro Guidance Test Platform

References the north star three axis (Ultradex) index system. System accuracy 0.3 arc second band, PC based control, IEEE-488 interface.



### Air Bearing Rotary Table

The ultimate precision rotary table for CMM and other high accuracy applications. Radial runout to .000001 T.I.R. Can be used vertical or horizontal. Servo or standard motor drives.



### Automatic NC Precision Trunnion

4th & 5th axis machining capabilities. Three available grades of angular accuracy on both the rotational axis and tilting axis: ± 3 arc second, ± 2 arc second, and ± 0.25 arc second. Face plate platens from 350 mm to 630 mm. Larger sizes available upon request.



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GH Induction Atmospheres (GH IA), part of the worldwide GH Group, has built an induction heating machine that hardens, tempers, and quenches automotive parts on a rotating turntable. A global supplier of quality products for automotive and other industrial markets will use GH IA's new machine to harden automotive ball studs with increased speed, economy, and consistency. The development of this machine marks the first comprehensive technology transfer between GH IA and its new parent, GH Group. GH Group completed the basic system design at its engineering center in Valencia Spain; final design and manufacturing were completed at GH IA's Rochester, New York facility. The new induction hardening machine can process up to 240 parts per hour. "This new machine fulfills the promise of our exciting partnership with GH Group," said Dale Wilcox, GH IA's CTO. "With our combined engineering expertise and GH IA's American manufacturing and service capabilities, this machine is just the first of many innovative induction heating solutions we'll be developing for our customers."

## For more information:

GH Induction Atmospheres LLC  
35 Industrial Park Circle  
Rochester NY 14624  
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www.gi-ia.com