IMTS 2012 Product Preview

STAR SU

Booth N-6924, W-1385

Star SU will exhibit a wide variety of products including coatings, carbide blanks, single-flute-gundrills, gear cutting solutions, carbide drills and reamers and the IMTS debut of the Star PTG-6L, a five-axis, CNC-controlled cutter/grinder for grinding, sharpening and re-conditioning a wide variety of cutting tools. Additionally, an extended version of the Bourn and Koch 100 H will be on display as well as the MAG H 400 hobber, configured for wet hobbing. Here's a breakdown of Star SU's technologies at IMTS:

***Advanced coatings*:** Balinite Alcrona Pro, the second generation of ALCr-based coatings, is now available on new and re-sharpened tools from Star SU. Developed by Oerlikon Balzers, Alcrona Pro can be used in a wider range of applications than other aluminum-based coatings because it provides better heat resistance for high temperatures and better wear resistance for tough cutting applications. Lower thermal conductivity allows Alcrona Pro-coated tools to work well in low temperature applications and allows faster hobbing speeds: 200 m/min is the new base speed. The cost savings include 30 percent lower tool costs, 50 percent longer tool life, 20 percent faster cutting parameters and 100 percent dry cutting.

***Pre-formed carbide blanks*:** Whether simply cut-to-length or machined into complex shapes, H.B. Carbide's high quality tungsten carbide, made-to-print preforms and extrusions have minimal grind stock, reducing the amount of time and energy needed to produce finished tools and wear parts. Choices include: rods, rectangles or squares, coolant holes, straight or angled cross holes, stepped diameters, centers (male or female), flats, chamfers, keyways, complex shapes and preformed sharpening angles.

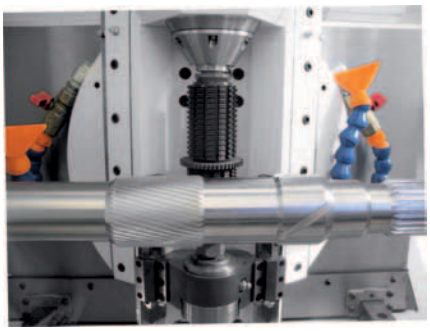
***Single-flute gundrills*:** Single-flute gundrills machine straight, deep holes in virtually any material in one pass. High-pressure coolant delivered through the tool keeps the cutting edges lubricated, allowing for adequate chip evacuation down the flute channel. Star SU gundrills are available in various lengths with diameters ranging from 0.078 to 0.75" (2–19 mm) for shipment within 24 hours. Larger diameter tools can be custom ordered.

***Gear cutting tool solutions*:** Precision tool re-sharpening services from Star SU and advanced coatings, including Oerlikon Balzer's Alcrona Pro, can extend the life of your tools and lower your costs. Need more help managing your tool room? Let Star SU monitor the life cycle of your tools and resharpen, recoat and replace them as needed. From new tools to design work to resharpening and recoating, we have the equipment and resources to help keep your gear cutting operation running smoothly. If your plant does its own tool sharpening, Star SU carries a variety of tool and cutter grinders including the PTG-1 and the GS 400. Star's PTG-1 sharpens both straight and spiral gash hob designs up to 8" OD × 10" OAL. Additionally, it sharpens disk, shank and helical type shaper cutters and a wide range of round tools, making it a versatile tool room machine. Designed to grind shaving cutters and master gears, the GS 400 sets new standards for precision, reliability and ease of use. An integrated measuring unit automatically checks the quality of the first tooth ground without unclamping the workpiece.

***Multiple diameter carbide drills and reamers*:** Custom-designed carbide drills and reamers are now available from Star SU, including single-pass port cavity tools that allow complete cavity machining, reduce cycle times and hold industry tolerances for size and finish. The Super Round Tool (SRT) produces extremely round holes within microns, reams holes with interrupted cuts and provides excellent finishes for spool bore applications.

***Tool grinder with integrated linear motor*:** Debuting at IMTS, the new Star PTG-6L tool and cutter grinder is a five axis, CNC controlled cutter grinder for grinding, sharpening and reconditioning a wide variety of cutting tools. Manufactured in the United States and equipped with a six-station wheel pack changer, the PTG-6L is built for high productivity and precision. The PTG-6L features integrated linear motor and direct-drive rotary technology, a traveling tool platform for CNC steady resting and workholding adjustment, next generation NUM Flexium controller, the latest enhancements in tool grinding software from *Numroto*, proven high volume loader and grinding wheel auto-sticking capabilities for unmanned operations.

***Bourn and Koch 100 H*:** The Bourn and Koch 100 H horizontal hobbing machine can hob splines and geared shafts up to 100 mm in diameter. Mount tools in combinations and cut different gearings on one workpiece or mill keyways and slots in one tool setup without re-clamping the workpiece. Since the chip conveyor is located directly under the tool spindle, chips are evacuated immediately from 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. This extended version can accommodate a workpiece up to 915 mm (36") long and 126 mm (5") in diameter.



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IMTS 2012

Booth N-7115

U.S. GEAR TOOLS™

www.usgeartools.com

***MAG H 400*:** Run small lots or mass produce straight and helical gears; crowned and tapered gears; worm gears; chain sprockets and toothed belt discs; cluster gears and special profiles with MAG's H 400 CNC hobbing machine. This machine can use standard hob or form milling technology, ranging from dry or wet machining with high capacity HSS or carbide tools to skive hobbing of heat-treated gears. The H 400 hobber includes: motorized hob head, direct drive table speed range of 400 rpm, maximum hob diameter of 175 mm, six CNC axes, Siemens control, aligning probe and MAG *Modul* dialogue software (metric or inches). Star SU will feature the H 400 hobber configured for wet hobbing.

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GLEASON CORPORATION

Booth N-7000

Gleason will introduce a host of advanced new machines, tooling and global customer support services at IMTS 2012, covering a wide array of processes for the complete production and inspection of all types of bevel and cylindrical gears. Among the new technologies exhibited at the show will be:

***The Genesis 400H vertical hobbing machine*:** On display for the first time in the U.S., the 400H is a new addition to the highly popular Genesis Series of gear hobbing machines. Its compact footprint and slim profile, optimized workholding and tool change, and universal automation make it suitable for the widest range of user requirements, whether small batch or automated high volume production. Additionally, the 400H is available with two direct-drive work spindles, three different high-performance hob heads, multiple tool interfaces and integrated chamfering, making it a versatile solution for the production of spur and helical gears and shafts up to 400 mm in diameter. A smaller Genesis 260H model also is available for workpieces up to 260 mm in diameter. Both models are designed as well to help customers meet the need for greater sustainability, with a host of features that greatly reduce energy consumption.

***The Gleason-Heller CT8000 bevel gear machining center*:** First of a new generation of five-axis machining centers resulting from an alliance between Gleason and Gebr. Heller Maschinenfabrik GmbH, the Gleason-Heller CT8000 delivers gear cutting speeds four to eight times faster than competitive machining centers, for bevel gears as large as 1,800 mm in diameter. With the CT8000, manufacturers can quickly and easily accommodate new part series, design variations and corrections, while producing gears at production rates that make single setup machining in small and medium batches attractive economically. In addition, the new Gleason Heller alliance enables manufacturers to simultaneously benefit from Heller's renowned five-axis machining solutions and Gleason's design and process expertise and software.

***The 350GMS analytical gear inspection system*:** On display at the show will be one of a new family of GMS series inspection systems (with models available for gears up to 3,000 mm in diameter). The 350GMS Analytical Gear Inspection System features a Renishaw 3-D probe head to provide maximum accuracy and flexibility for the complete inspection of all kinds of gears and gear-cutting tools. All Gleason analytical gear testers are equipped with the new Windows VB.NET-based Gleason *GAMA 2.0* software with intuitive user interface allowing for simple

input screens for programming of workpiece and cutting tool data. The GMS series is also equipped with new ergonomically mounted operator work stations and optional remote pendant controls—both designed to greatly improve the operator's effectiveness at every stage of the inspection process.

***Power skiving process*:** For these and other cylindrical gear applications, the newly developed power skiving process is fast emerging as a practical and highly productive alternative to typical gear shaping, forming, pressing, and broaching. Visitors to the Gleason booth will learn more about how Gleason combines machine, tool and technology for power kiving of small- and medium-sized workpieces, with modules up to 2.0 mm.

***A complete line of gear-cutting tools and workholding solutions*:** For the production of large cylindrical gears, Gleason offers the Opti-Cut family, which provides users with all the performance benefits of the latest replaceable, indexable, carbide insert technology. Opti-Cut can reduce cost-per-part by as much as 50 percent as compared to conventional high speed steel cutters. The family is versatile too, including gear gashing, hobbing and shaping products in a variety of cutter body sizes, insert types and geometries to meet a wide range of roughing and finishing, and internal and external gear production requirements.

***Advanced workholding solutions*:** In addition, Gleason designs and produces a complete series of quick-change, tool-less workholding equipment for both bevel gear and cylindrical gear, and non-gear production machines. These systems range from the Gleason X-Pandisk systems which automatically align workpieces weighing up to 2,000 kg to reduce changeover time by up to 70 percent, to Quick-Flex and a large variety of quick-change workholding solutions that significantly reduce change-over times for the production of both bevel and cylindrical gears. For inspection systems, Gleason offers the high-precision Gleason LeCount expanding mandrels line, renowned for accurate, easy, extremely rapid location of all types of bore parts.

***Gleason Global Services*.** Gleason customers can rely on 250 factory trained service professionals located in over 50 countries throughout the Americas, Europe, and Asia, working around the clock to support a full range of support requirements, including:

***Services*:** Complete new offering of service programs ranging from our simple Fast Check machine inspection to our extended service programs which provide "No Worry" guarantees.

***Service parts*:** Globally stocked OEM repair parts to reduce downtime.

***Training*:** The largest range of gear process and gear machinery operation and maintenance courses in our industry with training supported globally.

***Application support*:** Programs to improve process quality, cycle times and reduce Total Cost of Ownership.

***Equipment upgrades*:** Recontrols, rebuilds, recondition and upgrades to ensure maximum machine production.

***Gleason Connect*:** A new "remote service" technology enabling Gleason service specialists from anywhere in the world to quickly and cost effectively identify, diagnose, repair and monitor products and minimize cost due to downtime.

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KAPP TECHNOLOGIES

Booth N-7036

Two grinding machines with flexible process capabilities will be on display at booth N-7036 along with Kapp CBN and Diamond-plated tools, and scale models of numerous other machine types for special applications. The KX 500 Flex demonstrates how process flexibility optimizes cost and delivery for prototype through medium- to high- volume production. The KX 500 Flex uniquely incorporates an indexing table with a direct-drive work spindle, tailstock support, and dressing spindles. This simple design greatly improves operator access, while also enabling simple integration of automation.

Also being shown is the ZX 1000, the big brother of the KX 500 Flex. The ZX 1000 shares common machine elements and software with the KX 500, and comes standard with the same process flexibility for profile or generating grinding. The large ductile iron bed and torque motor for high load capacity, allows high-speed grinding of "frac bull gears" with a dressable worm tool. Special gear types, such as beveloid and non-involute gears, can be ground with generating grinding.

Kapp CBN tools for direct grinding, and DIA dressers for grinding and honing, will also be on display. Kapp and Niles application and tool design engineers will be on-site to answer questions about specific applications. Working modules will aid in understanding the different processes.

For more information:

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MITSUBISHI HEAVY INDUSTRIES AMERICA

Booth N-7046

Mitsubishi will proudly be showcasing two machines at IMTS 2012. The first is the ZE40A generating/form gear grinder. With the flexibility to generate grind gears for batch as well as high production and form grind gears for small lot production, the ZE40A, in combination with its CNC dresser and onboard gear inspection system, offers users the best of both worlds. Having been designed with direct drives for both table and grinding spindles, the machine offers unsurpassed accuracy for gears within its diameter capacity of 400 mm. Demonstrations for gen-

erating and form grinding will be shown on alternating days during the show. The second machine is Mitsubishi's SE25A CNC gear shaping machine. Long known for its flexibility in job shop use, the SE25A will be put through its high-speed paces, dry shaping gears up to 1800 strokes per minute. The live demo will highlight the dynamic and static stability of the machine under extreme reciprocating loads. With 250 mm part diameter and 4.23DP capability the machine is diversified enough to satisfy those with even the most varied gear demands.

Mitsubishi will also be introducing the newest member of the Mitsubishi family at IMTS. With the recent acquisition of Federal Broach Company of Harrison, Michigan, it is only fitting that they will have a strong presence in the Mitsubishi booth. Featured from Federal Broach will be an item for which they have become uniquely famous—namely a helical broach. Federal Broach has mastered the difficulties of manufacturing these tools by implementing methods and controls which offer unsurpassed quality and performance. These tools in conjunction with the latest in broaching machine technology can be discussed at length with experts on site.

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HÖFLER MASCHINENBAU GMBH

Booth N-6837

The big news coming from Höfler is Klingelnberg's acquisition of the company in July. By joining forces with Höfler, Klingelnberg is becoming a one-stop-shop for gearing technology. "Besides extending our product range, we also significantly improve our gear-expertise, which is beneficial for bevel gear, spur gear and gear inspection applications," says Jan Klingelnberg, CEO of the Klingelnberg Group. This enhanced expertise, combined with the additional company locations, lays the groundwork for a strategically optimized service network all over the world. This will lead to shorter reaction times, improved availability of spare parts, and in the near future, more comprehensive training right near our customers manufacturing facilities.

"We take this alliance as a big opportunity to considerably improve the existing service and sales activities in North America and to pass on the resulting advantages and benefits to our customers", says Ralf-Georg Eitel, CEO of Höfler America Corp. The joint know-how base allows the company to focus even more on R&D, creating more innovations while at the same time continue to develop tailored solutions according to the users requirement. At IMTS 2012, Höfler will be featuring the Rapid 1250 W and the Helix 400 SK.

Höfler Rapid 1250 W

This Threaded Wheel Gear/Grinding machine is able to grind gears up to 1250 mm in diameter. Höfler, well known as a supplier of form grinders, shows its first grinder for the threaded gear grinding method at IMTS. The machine is useful as first in the world for modules up to Mn 16 mm and grinding wheels up to 400 mm in diameter. Both grinding methods: form grinding and threaded wheel grinding can be utilized on one machine.

Höfler Helix 400 SK

This form gear grinding machine is able to grind gears up to a diameter of 400 mm. The machine is equipped with a high speed grinding spindle for smallest grinding wheels. An additional shift axes allows the use of two

different grinding wheels in one set up. This offers customers a nice solution for grinding workpieces at a high quality level with two different gears like shafts.

For more information:

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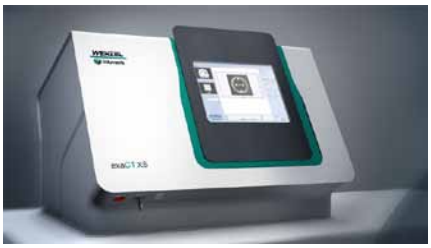
www.hofler.com

WENZEL AMERICA

Booth E-5261

The all new LH Generation will be the highlight of the Wenzel Booth at IMTS 2012 and the company will be presenting their new generation of CMMs. Wenzel has expanded the successful LH series with robust features and a new innovative design. With the new generation of air-bearing CMMs, Wenzel continues to improve precision, efficiency and longevity. The new LH Series models LH 65, LH 87 and LH 108 are extremely functional, effective, flexible, reliable and easy to operate.



Wenzel will also be showing their dedicated gear tester range, WGT, representing the ultimate in gear testing performance from Wenzel GearTec. All axes are made from natural South African Impala granite, guaranteeing excellent thermal behavior. Air bearings on all linear axes ensure smooth running and high accuracy performance with no mechanical wear over the life of the machine. WGT models feature fully counterbalanced tailstock, as standard, to support longer gears, tools and shafts with parts easily loaded due to its ergonomic design.

In the same booth, Wenzel will demonstrate the highly compact desktop CT exaCT XS. The exaCT XS is a suitable solution for the volume measurement of plastic parts and components with low density. Thanks to its optimized dimensions and low weight, it can be placed on desktops or portable trolleys easily. The device is controlled by a modern touch-screen monitor. The innovative and user-friendly operating concept allows the user to set up a measurement within a few minutes. All components of the exaCT XS are integrated in one unit. This ensures a very small footprint.

The final machine Wenzel will be showing is the XO5.7.5 equipped with a PH20 Renishaw probe. The Wenzel XO is a cost-effective derivative of the world renowned Wenzel LH series of intrinsically accurate CMMs. XO utilizes the industry standard Renishaw TP20 and TP200 probing systems. Wenzel XO is also available with the new high speed PH20 head, the probing system that will be on display in the Wenzel Booth.

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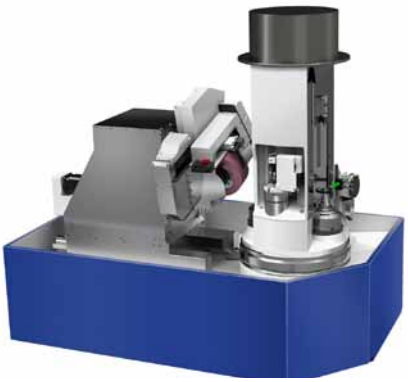
REISHAUER

Booth N-7018

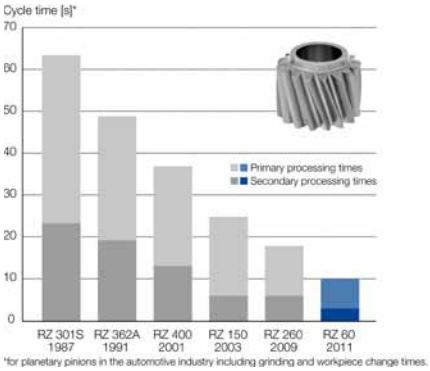
The RZ 60 on display at IMTS has been optimized for machining planetary pinions for the automotive industry. When grinding planetary gears, the cycle times are very short due to the small size of the workpieces and large batch volumes. The large batches are primarily a result of using three to five identical planetary pinions for every automatic transmission produced. In contrast,



Design of a gear grinding machine with two work spindles.

each component occurs only once in manual or double-clutch transmission. For the machine tool, this means that high priority has been given to the reduction of the cycle times, while compromises if required can be made for change-over times.

Due to numerous, innovative measures, the primary machining times for grinding planetary pinions on the RZ 60 has been drastically reduced in comparison with previous applications. The robust machine structure, adopted from the much larger RZ 260, allows for the use of aggressive grinding parameters without negative effects on



Development of the cycle times for Reishauer generating grinding of planetary pinions.

workpiece quality. At maximum speed the grinding and workpiece spindle positions are controlled with the new "Precision-Drive" electronic gearbox developed by Reishauer. This also enables the use of multiple-start grinding wheels for planetary pinions, which typically have a relatively small number of teeth, resulting in high workpiece speeds and tooth meshing frequencies. In addition, it is possible to increase the cutting speed from the previous limit of 80 m/sec. to 100 m/sec due to the development and manufacture of new grinding wheels by Reishauer. Overall, these new advancements permit grinding times that can be as short as seven seconds for some gears.

With such short grinding times, the reduction of the unproductive or secondary times has become increasingly important. The RZ 60 incorporates the familiar two-spindle concept that was successfully introduced on the RZ 150 in 2003. This enables grinding of a workpiece on one spindle while the workpiece on the second spindle is changed and synchronized with the threads of the grinding wheel.

The basic difference of the RZ 60 as compared with the RZ 160/RZ 260 is that each work spindle has its own meshing probe. In contrast to the other machines, the probes are not fixed in a stationary position on the machine bed but on the work spindle turret, allowing the synchronization of grinding wheel and workpiece during the turret rotation. High workpiece spindle speeds of up to 3,000 rpm make it possible to spin the grinding oil off the part during the turret rotation when the grinding operation is completed. All axis movements have been optimized to significantly reduce unproductive segments of the cycle.

All these efforts to minimize the primary processing and secondary times result in cycle times which could be reduced to approximately ten seconds (*see table above*) excluding the proportionate dressing times. The technology for these extremely short cycle times is no longer in development; the previously described processes are already successfully being applied in industry today. Previous productivity puts the high investment costs for generating grinding into perspective when considering the other necessary precision machining processes. This means that excellent quality for generating grinding does not have to be paid for with

high machining costs in combination with reasonable perishable costs and high process reliability. Reishauer makes it possible to fulfil increasing requirements for load capacity and noise reduction of automatic transmissions in the automotive industry.

RZ 60 with Felsomat automation—completely automated production of planetary pinions in the automotive industry.

Felsomat, another member of the Reishauer Group, has developed an automation system that is optimally matched to the specific requirements of the RZ 60.In combination with the Felsomat Flex Stacking Cell FSC 600, the machine can exploit high productivity and operate autonomously without operator intervention over a period of several hours. The complete system can be integrated in the Reishauer & Felsomat FlexLine.

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EMAG

Booth N-6846

The VL 2 P is an innovative vertical turning production center, equipped with two spindles and pendulum technology to increase precision and efficiency, for workpieces that have a diameter of up to 100 mm. The focus during the design of the VL 2 P was to make the machine extremely efficient by eliminating idle times. With this technology, non-productive times due to loading and unloading have been completely eliminated. The machine is suitable for workpieces with short machining times since the ratio of machining time to idle time is vital for the economy of the process.

The VL 2 P represents a comprehensive solution to vertical turning. This vertical turning machine offers complete machining in two setups (using a variety of technologies, such as vertical turning, milling, drilling).The machine is equipped with two work spindles working in pendulum mode, i.e. whilst the first spindle holds the workpiece during the machining process, the second spindle utilizes the pick-up method to automatically load itself with raw parts. This ensures that the follow-on raw part is always ready for

vertical turning (machining). After completion of the vertical turning operation on the first component the turret swings (like a pendulum) to the second workspindle. On the VL 2 P, the work spindles are mounted to the left and right of the machine base and carry out the movement in the Z axis. The turret is located at the front and moves in the X axis. The focus of the VL 2 P design has been on reducing the idle times in vertical turning. Unproductive times for loading and unloading work are almost totally eliminated. The vertical turning machine is particularly suit-

able for the machining of workpieces with short cycle times, where the decisive factor in judging the efficiency level of the process is the ratio between machining and idle times. Additionally, the company will feature PECM technology, production laser welding and heat shrink assembly technology at IMTS.

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SUNNEN PRODUCTS COMPANY

Booth N-7400

Sunnen's IMTS demonstration of the VSS Series 2 Single Stroke Honing system will highlight the accuracy, reliability and flexibility that have made the machine a mainstay of Chinese manufacturing in the air conditioning, automotive and hydraulics sectors. According to Sunnen, more than 100 U.S.-made VSS machines have been sold in China since its introduction.

"Value-added fixturing and strong application support from Shanghai Sunnen Mechanical Co. Ltd. make the VSS Series 2 highly competitive in the China market," said Mike Burton, Sunnen managing director, Asia. "The machine's reliability and consistent accuracy in 24/7 production led a single Chinese company to purchase nearly 70 of the machines over the past three years for manufacturing air conditioner parts. We have also had success with customers making turbochargers, power steering valves, hydraulic valves and connecting rods. At IMTS, we will demonstrate single-pass honing of cast iron hydraulic valve bodies."

VSS-2 machines incorporate up to six spindles to progressively size and finish part bores with tools of preset diameter and grit size. The machines are suitable for precision sizing of bores 3.9-50 mm (0.149-2.0") diameter in stamped parts, hydraulic valve bodies, gears and sprockets, parking pawls, rocker arms, turbocharger housings and similar parts. Materials include cast iron, powdered metals, ceramic, glass, graphite and other free-cutting materials.

"The VSS Series 2 sets a new standard for single-pass bore sizing efficiency," Burton added. "If a part is suitable for single-pass honing, the VSS-2 provides a level of precision not available in other designs. And, with the new touch screen control, the machine is very operator-friendly. No custom electronics or special training is needed and the control is designed to interface with part handling automation systems."

The VSS-2 utilizes a belt-drive spindle cartridge with a 724 mm (28.5") stroke and 2-105 mm/sec (2–250 ipm) stroking speed for increased flexibility with a wide variety of parts and tooling combinations. The servo-powered stroke system provides process flexibility and is hand-wheel-controlled for quick setup.

The menu-driven touchscreen control allows the column feed and spindle speed to be easily varied throughout the cycle. Operational flexibility is enhanced by the use of six available profiles, including pecking, short stroke and dwell, which are easily added to a setup. More than 100 setups can be stored. Additional I/O and memory are standard for ease of automation.

The VSS Series 2 is available in three models—the 84 (eight-station, four-spindle), the 86 (eight-station, 6-spindle) and the 64 (six-station, four-spindle)—to meet various mid- to high- production needs. Spacing between spindles is 190 mm (7.48"). The 7.5 kW (10 hp) spindle drive provides a speed range of 100–2,500 rpm. Removable, maintenance-free stainless steel guarding and electrical panel mounted to the rear of the machine allow easy access to the work envelope from either side of the machine to facilitate tool change or integration of custom part handling systems.

When properly applied, Single Stroke Honing is a quick, cost-effective method to get a precise bore size, geometry and surface finish. Parts made of cast iron, powdered metals, ceramic, glass, graphite and other free cutting materials–with L/D ratios up to 1:1–are suitable for the process. Single-pass bore sizing is also appropriate for splined bores or longer L/D ratios if cross holes or other interruptions are present to allow chip flushing. Sunnen offers a range of single-pass plated-diamond tooling for the VSS-2 for precise, accurate and consistent bore sizing.

Other standard features of the VSS-2 include an electric rotary index table and solid tool holder. Available options include floating or rigid/adjustable tool holders, 12- and 16-port programmable rotary air unions for index output, base coolant evacuation pump, automatic lubrication system, work area light kit, stack light and tool alignment indicator.

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www.sunnen.com

INDEX CORPORATION

Booth S-8450

Index Corporation will introduce a new concept machine tool featuring two independent 5-axis subsystems, each with one motorized milling spindle and one assigned work spindle, able to completely machine complex parts, short bars up to 102 mm and chucking up to 315 mm diameter, simultaneously. The new Index R300 turning/milling center is the most recent addition to the RatioLine series and introduces a highly productive version for machining short bars up to 102 mm and chuck parts up to 315 mm in diameter. The R200 covers the range for bar diameters up to 65 mm. The new Index R300 is geared toward applications where larger chuck parts require a large amount of milling and drilling work, such as machine and farm machinery construction, in tool and mold making or in the aerospace industry.

From very simple to highly complex components, the main benefit is that the complex machining operations are possible simultaneously on the front and rear side - and, at the same time, are highly productive with two motorized milling spindles. The use of HSK tools instead of live tool holders on turrets reduces tool costs. Suitable for difficult milling operations, the R300 is also capable of hobbing or deep-hole drilling with single-lip tools and high-pressure coolant to 80 bar to the tool edge through the motorized milling spindle. Grinding operations with a grinding point or an external grinding wheel up to 150 mm are additional machining options.

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IMTS (International Manufacturing Technology Show): Connecting Global Technology September 10–15, 2012; Chicago, IL

Show Sponsor: **AMT (Association for Manufacturing Technology)**
Show Dates: **September 10–15, 2012**
Show Location: **McCormick Place, Chicago, IL USA**

Attendees. Manufacturing industry professionals from all over the world attend IMTS to see more than 15,000 new machine tools, controls, computers, software, components, systems and processes that can improve their efficiency.

Exhibitors. Over 1,100 exhibitors from the metalworking industry will display their products and productivity solutions covering 1.2 million net square foot of show floor.

- ***Metal cutting***. Contains everything from machining centers and assembly automation to flexible manufacturing systems and lathes.
- ***Tooling/workholding systems***: features jigs, fixtures, cutting tools of all types and related accessories.
- ***Metal forming/fabricating/laser processes***: home to waterjet, plasma-arc and laser systems, welding equipment, heat treating and more.
- ***Other pavilions at IMTS***: Abrasive Machining/Sawing/Finishing; Controls & CAD-CAM; EDM; Gear Generation; Industrial Automation North America; Machine Components/Cleaning/Environmental and Quality Assurance.

IMTS conference. The IMTS 2012 Conference brings the industry together, under one roof and at one time, to discuss new opportunities.

IMTS 2012 individual registration

- * $30 per person through August 10, 2012
- * $50 per person August 11–September 15, 2012

Group registration. To qualify as a group, you must have five or more people from the same company, and everyone must register at the same time.

- * $15 per person through August 10, 2012
- * $30 per person August 11, 2012–September 15, 2012
- * Includes access to the exhibit hall floor for all 6 days of the show

* IMTS 2012 registration is non-refundable.

International visitors. An International Visitor is a person working in the manufacturing industry outside the U.S. Exhibits only registration is free for international visitors.

Students. Individuals at all levels of learning are invited to attend IMTS 2012 at no charge. Students, educators, administrators and guidance counselors, check out the NIMS Student Skills Center program and register for free!

Conference registration. Conference registration is open. You may register for more than one conference at the same time. Includes access to the exhibit hall for all six days of the show.

- **IMTS 2012 Conference**
  (Full Pass: $495; Day Pass: $295; Special Combo Pass: $695)
- **Motion, Drives & Automation Conference**
  (Early Bird: $165; Standard: $195; Discount Package: $295; Special Combo Pass: $695)
- **ISA Inside**
  (ISA Member Rate: $445 per course; Community Member/List Rate: $630 per course)
- **EHS Today's America's Safest Companies**
  (Rate: $395)
- **IANA Global Automation & Manufacturing Summit**
  (Early Bird: $165; Standard: $195; Discount Package: $295; Special Combo Pass: $695)
- **TRAM3 Aerospace Conference**—Trends in Advanced Machining, Manufacturing and Materials