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Microlithography exhibition to feature high precision encoder systems

Renishaw will be focusing on its high precision range of laser and optical position feedback encoder systems when it attends the Microlithography 2006 exhibition being held in San Jose, California, USA, from 21st to 22nd February 2006. Renishaw will be exhibiting at booth 405.

Organised by SPIE, the International Society for Optical Engineering, the Microlithography exhibition is claimed to be the premier international event for all aspects of IC design, fabrication, processing, and manufacturing. Visitors can see the latest tools, instruments, components, and devices in lithographic technologies presented by over 130 companies. The organiser states that the exhibition will appeal to scientists, engineers, product developers, chip designers, or packagers, as it covers everything from traditional optical lithography to cutting-edge technologies like immersion, EUV, and nano-imprint.

Visitors to Microlithography 2006 will be able to see Renishaw's high resolution laser interferometer encoders, additions to the innovative SiGNUM™ range of encoders, including the new RELM high accuracy linear scale and SiGNUM™ software for real-time system diagnostics, plus new miniature magnetic rotary encoders. There will also be the chance see a range of high-performance ultra-high-vacuum (UHV) encoders, and hear about improvements in speed, resolution and reliability to Renishaw's standard optical encoder lines of RG2 and RG4 linear encoders.

Renishaw's unique RLE fiber optic laser interferometer encoders deliver interferometer-based nanometer positioning accuracy from a remote laser source - even to two axes. New detector head choices (six in all) allow careful matching to a wide range of application requirements, including capability for picometer-level resolutions.

Fiberoptic beam delivery greatly reduces optical path complexity, saves space on miniature machines, and keeps heat of the laser from affecting measurement axes. Simple 'bolt down/dial in' laser alignment enables ease of installation comparable to traditional tape- or glass-based encoders.

Applications include X-Y stages, fiberoptic alignment machines, glass grinding machines, photomask machines, and other precision motion systems. An optional real-time compensation system enables positional accuracy of 1 ppm (1 micron/m) in a wide range of environmental conditions.

Microlithography visitors will see that the new SiGNUM™ family of rotary and linear encoders continues Renishaw's reputation for delivering encoders that offer ruggedness and precision, resulting in levels of performance previously possible only from fine-pitch systems too delicate for many industrial roles.

The new SiGNUM™ encoder range offers high accuracy, resolution and repeatability with high speed, high operating temperatures, ultra-low cyclic error (typically <±40 nm) and innovative *IN-TRAC*™ optical reference mark, which remains phased over the entire speed and temperature specification. The system offers intelligent signal processing, ensuring excellent reliability, whilst comprehensive SiGNUM™ software enables optimum set-up and real-time system diagnostics via a PC's USB port.

The SiGNUM™ RELM high accuracy linear encoder comprises the SR readhead, Si interface and 20 micron RELM scale, which is offered in defined lengths. Initially available in Invar, which provides a low thermal expansion of 1.4 micron/m/°C, the RELM scale is offered with a choice of *IN-TRAC*™ reference mark positions and dual optical limits. Together with the robust, yet highly precise 20 micron spars, this enables the RELM to offer accuracy to ±1 micron and resolution to 20 nm, satisfying the most demanding precision motion requirements.

For visitors to Microlithography interested in rotary encoder technology, they should be interested in the SiGNUM™ RESM angle encoder, a one-piece stainless steel ring with 20 micron scale marked directly on the periphery. It features the *IN-TRAC*™ optical reference mark, which repeats, regardless of direction, at operational speeds of over 4,500 rev/min (52 mm diameter) and up to 85 °C.

A powerful component of Renishaw's new SiGNUM™ family of rotary and linear encoders is the PC-based SiGNUM™ software that provides comprehensive calibration, set-up optimisation and real-time diagnostics. The result is both simplified installation of the encoder system and on-going system maintenance, further enhancing a rugged encoder range that delivers levels of performance previously possible only from fine-pitch systems too delicate for many industrial roles.

The SiGNUM™ Si interface is connected to the PC via a USB connector and offers a range of features and benefits, including real time signal monitoring, readhead pitch adjustment, calibration of the encoder reference mark and incremental signals, remote system monitoring, advanced error logging and system configuration analysis.

Meeting the market demand for reliable, low-cost, high-speed rotary encoders, Renishaw's miniature magnetic rotary encoders provide class-leading performance along with ruggedness and durability. Microlithography visitors will be able to see that the magnetic encoders are available in component, modular and packaged shaft-style models, including the RM family of magnetic encoders which offers up to 4,096-count positioning resolution, accuracy to 0.3°, and operating speeds to over 30,000 rev/min.

Non-contact magnetic design eliminates seals, bearings and moving parts for lifetime reliability. Standard models provide excellent shock and vibration resistance, while optional sealed models allow application in harsh environments and even immersion. Low cost, compact size and design simplicity enable use in a wide range of industries.

Other technologies being shown at Microlithography include: cameras and CCD components; chemical and biological sensing; clinical, chemical and biological Instrumentation; electron-beam lithography; electronic imaging components; EUV lithography; fiber optic components and systems; high speed imaging and sensing; illumination engineering; ion-beam lithography; metrology, inspection and process control; nanotechnology; non-optical lithography; optical detectors; optical test and measurement equipment; optical/laser microlithography; optics manufacturing; photonics equipment; sensor and sensor systems; vacuum, cooling, gas handling equipment; x-ray lithography.