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**Renishaw to showcase how its smart technologies are driving tomorrow’s production at EMO Hannover 2019, Germany**

Global precision engineering and manufacturing technologies company, Renishaw, will be showcasing its smart technologies and intelligent process control solutions across three stands at EMO Hannover 2019 in Germany, 16th–21st September 2019. These include high-speed, multi-sensor measurement systems for CMMs; high-accuracy and high-speed products for machine tool probing; flexible shop-floor gauging systems; new calibration and encoder innovations for machine builders; and new additive manufacturing solutions.

EMO Hannover is one of the world’s leading trade fairs for the metalworking industry. It is a showcase for innovations and an essential driver of global production technology. The event’s theme is, ‘Smart technologies driving tomorrow’s production’. Visitors to Renishaw’s stands in three halls will be able to discover Renishaw’s diverse portfolio of technologies for smart manufacturing and witness the benefits of Industry 4.0 in action, including process automation and innovations in collecting and managing actionable data about devices, processes and parts. As Paul Maxted, Director of Industrial Metrology Applications at Renishaw, explains, “Although ‘smart manufacturing’ is being widely discussed as a current theme, Renishaw has been evolving and implementing smart factory principles successfully for over 25 years across our own manufacturing operations. Trade fairs like EMO Hannover 2019 represent an ideal forum for us to share our own experiences and insights with international visitors from across a variety of industries, and to reinforce our role as a partner for innovative manufacturing.”

**CMM automation, speed and throughput – without compromising on accuracy**

The ‘Metrology and Quality Assurance zone’, located within Hall 6, will be home to Renishaw’s largest stand (stand D48). Here, visitors will be able to see Renishaw’s award-winning REVO® 5-axis measurement system in action and discover how it delivers high performance multi-dimensional inspection, including surface finish analysis. To showcase the REVO system’s latest blade measurement capabilities, there will be a demonstration of an aerospace component being inspected on a co‑ordinate measuring machine (CMM). Visitors will discover how the REVO system automates the part inspection process on a single, multi-sensor platform, and will learn how it is being used across industries where the highly accurate, but rapid, measurement of different forms and features are essential requirements.

The REVO 5-axis measurement system is the only scanning system for CMMs that simultaneously controls the motion of three machine and two head axes, whilst collecting workpiece data. Using its range of 2D and 3D tactile probes, surface finish measurement and non-contact vision probes, the REVO system brings dramatic speed and accuracy benefits to part inspection on CMMs.

Visitors will also be able to see Renishaw’s modular and custom metrology fixturing, as well as a demonstration of its first automated direct loader transfer system for use with CMMs, which complements the benefits of automation and rapid throughput that the REVO system brings.

Renishaw’s new OPTiMUM™ diamond styli range will be showcased, which has been specifically developed for use within metrology applications that require a hard-wearing stylus. The principal advantage of its diamond coated spheres is that they maintain their roundness and do not suffer material ‘pick up' or premature wear when scanning abrasive materials or soft alloys. This provides multiple benefits including an increased working life and reduction in recalibration and inspection downtime.

**Process control and automation for CNC machining operations**

Renishaw’s latest SPRINT™ technology will also be showcased – high-accuracy machine tool probing systems for rapid part set-up and machining process control. With the unique 3D sensor technology within Renishaw’s OSP60 probe, probing systems with SPRINT technology provide exceptional, high-speed, high-accuracy scanning for CNC machine tools.

SPRINT technology can be used with either Renishaw’s SupaScan solution or Productivity+™ Scanning Suite. SupaScan is ideal for setting simple parts quickly and easily, and it uses macro code to program cycles. The system has the capability to monitor workpiece surface condition and capture basic form measurements. Productivity+ Scanning Suite is perfect for advanced measurement of free-form surfaces, such as turbine blades and mould tools. The Suite comprises a variety of application-specific toolkits that can be programmed using Productivity+™ Active Editor Pro software.

Renishaw will demonstrate its range of high-accuracy machine tool probes with RENGAGE™ technology for workpiece set-up, in-process control and post-process inspection. The latest addition to Renishaw’s range of machine tool probes with RENGAGE technology is RMP400 – a new, ultra-compact and highly repeatable probe that uses radio transmission technology. Each probe in the range is tailored to suit different machine tool sizes and machining applications, combining proven silicon strain gauge technology with ultra-compact electronics to deliver world class 3D performance and sub-micron repeatability. Excelling in the measurement of complex shapes and contours, probes with RENGAGE technology are ideally suited to mould and die and aerospace applications, where the use of 5-axis machines is common. An ultra-low trigger force helps to eliminate surface and form damage on components; ideal for inspecting delicate workpieces. All the probes in the range can benefit from SupaTouch technology – embedded within the latest versions of Renishaw’s Inspection Plus macro software – which intelligently optimises on-machine probing cycles, leading to a cycle time reduction of up to 60% on CNC machine tools.

Building on the success of its enhanced NC4 range of tool setters launched at EMO Hannover 2017, Renishaw will launch the NC4+ Blue – its latest evolution of the non-contact tool setter, delivering a step-change in tool measurement accuracy. Compared to red laser sources found in conventional non-contact tool setters, blue laser technology (patent pending) has a shorter wavelength, resulting in improved diffraction effects and optimised laser beam geometry. This enables the measurement of very small tools, whilst minimising tool-to-tool measurement errors – a critical consideration when machining with a wide range of cutting tools.

Renishaw's Equator™ shop-floor gauging systems are being used to great effect around the world to measure a vast array of manufactured parts, particularly in the aerospace and automotive industries. They enable intelligent process control of manufacturing cells and lines by delivering highly repeatable, thermally insensitive, versatile and reprogrammable shop-floor gauging. Renishaw will demonstrate the Equator gauging system in use on a range of components and assemblies, including those for electric motors. Featuring Renishaw’s intelligent process control (IPC) software, the Equator system provides manufacturers with the functionality to automate process control and tool offset correction directly to CNC machines. The proximity of the Equator gauging system to CNC processes allows rapid measurement and process adjustment at the point of manufacture, avoiding time delays or relying on finished part (‘tailgate’) inspection. Available in two size variants – the 300 and the 500 – the Equator gauging system is unique in its design and method of operation.

**Robust, automated process control solutions for machine builders**

There will be demonstrations of Renishaw’s machine calibration and diagnostic technologies, designed to monitor the static and dynamic performance of machine tools, co-ordinate measuring machines (CMMs) and other position-critical motion systems, to ultimately establish a known and repeatable level of process capability. These will include Renishaw’s new XK10 alignment laser system which has been developed to measure geometric and rotational errors of machine tools. Used with the XK10 machine tool fixturing kit, it enables faster and easier measurements over traditional methods, such as dial gauges, autocollimators and metrology artefacts. XK10 can be used on linear rails to ensure that they are straight, square, flat, parallel and level, as well as to assess spindle direction and coaxiality of rotary machines. Live error readings allow adjustments to be made to the machine during the alignment process.

Also, of critical interest to builders of machines and manufacturers looking for robust, proven and automated process control solutions, will be a display of Renishaw’s high quality optical, magnetic and laser encoders. This will include its new substrate mastered RKLC encoder scale that adopts the thermal behaviour of the underlying substrate. Its thin profile allows the scale, when rigidly fixed to a machine axis, to match the coefficient of thermal expansion of the machine substrate. The scale is compatible with Renishaw's VIONiC™, TONiC™ and QUANTiC™ incremental encoder families.

**Solving manufacturing challenges using Renishaw’s expertise**

Renishaw has built a strong reputation for developing custom products and solutions to meet the specific requirements of a variety of global manufacturers and machine builders. From the integration of specialist probing systems onto machines as part of a turnkey service, to developing bespoke software for specific machining applications, and producing custom styli (including those additively manufactured, for greater design freedom), Renishaw’s custom solutions address diverse manufacturing challenges and help drive tomorrow’s production.

On its stand in Hall 6 (stand D48) Renishaw will introduce its first ever ‘Solutions Bar’. Visitors will be able to ask Renishaw’s team of experts about a variety of process control, metrology products or manufacturing queries, whilst enjoying much-needed refreshments. The Solutions Bar will allow visitors to benefit from Renishaw’s rich experience in developing manufacturing technologies for global industries and it aims to reinforce Renishaw’s role as a proven partner for innovative manufacturing.

**A key enabler of automation for CNC machining operations**

In Hall 3 (stand E36) within the ‘Precision Tools’ zone,Renishaw will focus on smart manufacturing technologies for the metal cutting sector. Using its machining demonstration cell with automated part loading, on-machine probing and off-machine gauging, Renishaw will demonstrate how automation, measurement and feedback can deliver process control throughout all manufacturing stages. The cell demonstrates how complementary technologies can contribute, throughout the manufacturing process of a CNC machined part, to achieving high levels of productivity and manufacturing capability.

Visitors will also discover Renishaw’s full range of on-machine and smartphone apps which make installing, configuring, using and maintaining probing systems even easier, saving time and maximising shopfloor efficiency through enhanced automation**.** Providing information at a user's fingertips in a simple, convenient format, Renishaw’s smartphone apps are available globally in a wide range of languages and can be seamlessly integrated with a wide range of CNC controls.Also,an enhanced version of Renishaw’s Reporter on-machine probing app, complete with MTConnect data streaming capability, will be showcased. Furthermore, Renishaw’s IPC software will showcase connectivity between the demonstration cell’s Equator gauging system and the machine tool’s controller, providing automated updates to machine parameters and offsets.

**Metal 3D printing systems and solutions**

Extending Renishaw’s smart manufacturing technologies further up the process chain, Renishaw’s stand in Hall 9 (stand I23) within the ‘Additive Manufacturing’ zone, will showcase its latest additive manufacturing (AM) systems and solutions. This will include a live demonstration of the RenAM 500Q – its ultra-high productivity multi-laser system – building metal components. Featuring four high-power 500 W lasers, each able to access the whole powder bed surface simultaneously, the RenAM 500Q achieves high build rates and component quality vastly improving productivity and lowering cost per part. It features automated powder and waste handling systems that enable consistent process quality, reduce operator intervention time and ensure high standards of system safety.

InfiniAM Central – Renishaw’s remote process monitoring software for AM systems – will provide ready access to machine data. This Industry 4.0-ready, connected system, enables remote monitoring of AM build processes on computers and mobile devices, including near real-time insights into live AM builds and access to historic build analysis. System sensor and build information is displayed in graphic form to enable intuitive in-depth analysis.

**Benefit from the factory of the future, today**

“To remain globally competitive, manufacturers must machine parts to closer tolerances, within the context of reduced product life cycles and rapidly changing consumer demand for product variety”, explains Rainer Lotz, Renishaw’s Vice-President – EMEA. “This, coupled with a need for increased factory automation, requires a range of intelligent process control solutions throughout the factory, to ensure high standards of repeatability. That’s where Renishaw can add real value to our global customers across a multitude of industries. EMO Hannover 2019 provides us with a platform to showcase how we can help our global partners apply high levels of automation and connectivity to their production processes, so that they can benefit from the factory of the future, today. It will enable us to share our deep experience in embedding intelligent solutions into complex manufacturing processes. Indeed, ‘driving tomorrow’s production’ is what Renishaw has been successfully doing since we were founded almost 50 years ago”.

For further information on EMO 2019, visit www.renishaw.com/emo2019

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