

# TONiC™ optical encoders support the latest generation of CMMs from COORD-3



## Customer:

COORD-3

## Industry:

Precision manufacturing

## Challenge:

Ensuring measurement repeatability in CMMs.

## Solution:

Axis feedback from the TONiC encoder system to produce high fidelity measurements and minimise thermal error.

A continuous product development cycle, horizontal organisational structure and streamlined range of model sizes have made COORD-3 a global CMM brand. Renishaw supplies a wide-range of precision metrology products to COORD-3 and both companies benefit from a long-standing and successful partnership.

COORD-3 CMMs make use of the following Renishaw solutions:

- Touch trigger motorized probe systems including the 3-axis PH10 PLUS and 5-axis PH20 heads
- Universal CMM Controllers (UCC) and software
- Laser calibration systems such as the XL-80 laser with XC-80 environmental compensation unit
- TONiC high-performance optical encoders with FASTRACK™ mounted RTLC stainless steel scale.

Renishaw enhances the COORD-3 customer solution with products that increase CMM throughput, accuracy and automation, resulting in increased sales backed by a strong global support network. Renishaw has also built valuable synergies with COORD-3 to support its demanding product design strategies.



Scales and readheads are of primary importance for CMMs and TONiC with FASTRACK embodies the COORD-3 design philosophy. Different materials are used to build a CMM and Renishaw's encoder scales help minimise the CMM measuring error and maximise precision.

COORD-3 (Italy)



Patrizio Vaccaro, marketing manager for COORD-3, says: "Since 2009, we have launched at least two products per year into the market. Our new bridge-type Universal CMM family features a brand-new design and was launched - only one year after the project started."

## TONiC and FASTRACK

COORD-3 is one of the few suppliers to manufacture its CMM structures from aluminium alloy and silicon-carbide, offering maximum metrology performance and productivity.

Even in a lab with environmental control, traditional granite CMM frames have significant thermal mass and take much longer to absorb and dissipate thermal changes, whereas, aluminium's high coefficient of thermal conductivity allows the machine structure to respond more rapidly and linearly with temperature fluctuations.

This is important as it is necessary to predict CMM thermal behaviour and compensate for it in order to ensure machine accuracy over its operating temperature range. CMMs that expand linearly without induced constraints are easier to compensate for, which improves measurement repeatability.

The low structural weight of aluminium also improves the CMM's acceleration and deceleration - enhancing overall traverse speed and ultimately increasing measurement throughput.

This allows the CMM to operate at relatively high speed, which is particularly important for in-line applications where inspection operations need to keep pace with production.

Renishaw provides real-time temperature compensation with its 3-axis UCC S3 and 5-axis UCC T5 controllers, allowing temperature monitoring of up to 16 different locations, using sensors which can be fixed to the X, Y, and Z axes of the CMM and to the workpiece being measured. The thermal data is then combined with axis feedback from the TONiC encoder system to produce high fidelity measurements that allow the machine to minimise thermal error and reduce measurement uncertainty.

A TONiC readhead, with 0.1 µm resolution, and RTLC FASTRACK scale, is installed on each CMM axis. FASTRACK is a scale carrier system, comprising two miniature guide rails, that securely retains Renishaw's 8 mm x 0.2 mm low-profile stainless steel scales and allows them to freely expand at their own CTE (Coefficient of Thermal Expansion) with almost zero hysteresis (for example, <1 µm on a centre-clamped 2 metre axis over the entire operating temperature range). Another advantage of this system is that damaged scale can be quickly removed and replaced, even when access is limited, thus reducing machine downtime. This feature is also ideal for large machines that need to be sectioned prior to transportation.

Fabrizio Tonellato, COORD-3's principal electronics engineer, explains:

"The main challenge with CMMs is ensuring measurement repeatability. Renishaw's TONiC encoders with FASTRACK have solved the problems associated with differential thermal expansion between the scale and machine axis on which it is applied. Strong points of the TONiC encoder series include:



Fabrizio Tonellato, principal engineer for COORD-3

high measurement precision, linear thermal expansion of scale due to CTE of scale, ease of installation and set-up and easily replaceable FASTRACK scale for straight-forward maintenance."

Mr Vaccaro emphasises: "Scales and readheads are of primary importance for CMMs and TONiC with FASTRACK embodies the COORD-3 design philosophy. Different materials are used to build a CMM and Renishaw's encoder scales help minimize the CMM measuring error and maximize precision." Mr Vaccaro adds: "COORD-3 CMMs are built largely from aluminium and Renishaw's encoders help to compensate for expansion and thermal movement. In creating our CMMs, we are not bound in the choice of the materials because Renishaw's FASTRACK mounted scale is largely free to expand independently of the machine structure. TONiC with FASTRACK and the UCC S3 / T5 controllers are stable, flexible and well-designed products, which have helped to triple our sales."

## The PH20 probe

COORD-3 CMMs can also feature a Renishaw PH20 touch-trigger system, which allows easy access to features at any angle and can deliver a 3-fold increase in measurement throughput over traditional systems. Unlike conventional touch-trigger measurement methods, which rely on speeding up the motion of the CMM to measure quickly, PH20 utilizes head motion technology developed for the multi-award winning REVO® system to minimize the dynamic errors of the CMM at higher measurement speeds.

"For us, Renishaw's products sell themselves and really drive our business – the PH20 gave us a great competitive advantage and in 2014, thanks to PH20, 5-axis CMM sales were 10 times higher than in 2013."

## Global support

A great strength of COORD-3 is its after-market service, since the real value of CMM products is in the customer experience and overall lifetime costs. High-quality and rapid customer support enhances the customers' perception of value and trust in the COORD-3 brand.

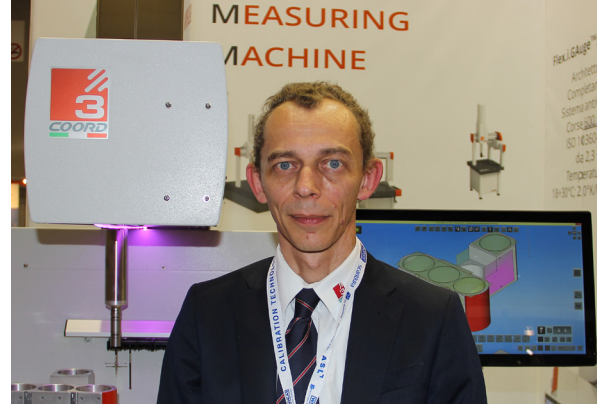


COORD-3 manufactures its CMM structures from aluminium alloy and silicon-carbide offering maximum metrology performance and productivity





PH20 probe head mounted on COORD-3 CMMs for 5-axis measurement



Patrizio Vaccaro, marketing manager for COORD-3

Mr Vaccaro concludes: "If a foreign COORD-3 customer needs some assistance, say a probe installed on one of our machines, we can always count on the quality of Renishaw's global support. Renishaw's global network allows us to give our customers the best after market service, wherever they are."

### About COORD-3

COORD-3 was founded in 1973 and is headquartered in Bruzolo, Italy – where it manufactures a comprehensive range of CMM equipment including gantry, bridge and horizontal-arm types. Customers typically use CMMs for mechanical part ideation and conception, design and assembly, quality control and certification. COORD-3 also develops software solutions such as TouchDMIS, for touch interface CMM control, to facilitate CMM utilization.

In February 2015, in-line metrology specialist Perceptron Inc. announced its acquisition of COORD-3. This became effective from 1st March 2015 leading to the establishment of a new company, COORD-3 Industries s.r.l, fully owned by Perceptron.

### A winning team

Renishaw's TONiC encoder system with RTLC scale on FASTRACK, PH20 probe heads and many other leading metrology products give COORD-3 the tools it needs to grow its business with cutting-edge CMM technology. This technical collaboration allows both companies to remain at the forefront of new product development.

For more information about Renishaw's full range of TONiC encoders please visit [www.renishaw.com/tonic](http://www.renishaw.com/tonic)

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H - 3000 - 5023 - 01

Part no.: H-3000-5023-01-A  
Issued: 07.2015