

Renishaw's new absolute linear and rotary encoders revolutionise position feedback

Renishaw, a world leader in measurement and encoder technology, is introducing RESOLUTE™, a true absolute, fine pitch optical encoder system that has excellent dirt immunity, and an impressive specification that breaks new ground in position feedback. RESOLUTE™ is the world's first absolute encoder capable of 27-bit resolution at 36,000 rev/min. It has an astonishing market-leading resolution of just 1 nanometre at up to 100 m/s for both linear and angle encoding applications.

The new system reads a unique single-track optical scale and offers further attractive benefits to machine designers by acquiring absolute position immediately upon switch-on, without the need for battery back-up. This completely eliminates the need for reference returns. Unique combinations of ruggedness, ultra-high speed and exceptional resolution, mean that RESOLUTE™ is already attracting high levels of interest from manufacturers of high-performance lathes as well as slower-moving axes requiring the highest levels of precision and motion control integrity.

RESOLUTE™ can serve this wide range of markets because it offers more than just raw speed and high resolution. The RESOLUTE™ absolute encoder uses sophisticated new optics to read the fine pitch 30 µm scale with impressive low noise levels (jitter <10 nm RMS) for outstanding positional stability, while the enhanced detection method intrinsically provides a very low sub-divisional error (SDE) of ±40 nm. The result is better surface finish of machined parts from CNC machine tools, better scanning and velocity control, and rock-solid servo stiffness on linear motors or rotary direct-drives when holding position.

RESOLUTE™ does not follow the conventional technique of using dual tracks side-by-side (one incremental, one absolute) which inherently suffer de-phasing problems when small amounts of angular misalignment are introduced. Instead, this new absolute encoder features a single



track, optical absolute scale, combining both the absolute position and embedded phase information into one single code. This technology provides RESOLUTE™ with far wider set-up tolerances for quick and easy installation and superior long-term reliability, even if the motion axes settle or move over time. To further aid installation and diagnostics, there is an integral set-up LED on the readhead.

The linear encoder version of RESOLUTE™ is available with a comprehensive range of scale options. RELA Invar spars offer “zero” expansion and ±1 µm accuracy on lengths up to 1 m. For high performance on long axes and significantly more robustness than glass scales, RSLA stainless steel spars have a total accuracy of ±4 µm over 5 m. Plus, for the quickest and easiest installation there's FASTRACK™ and RTLA tape scale with ±5 µm/m accuracy.

Angle encoder options are also well catered for; RESA rings are bolt-hole compatible with

Renishaw's leading SiGNUM™ RESM rings and are offered in a standard range of diameters from 52 mm to 550 mm, with even larger size options available to order. Like the SiGNUM™ RESM, RESA rings feature large through-holes for easy design-in and a patented taper mount for quick, easy and precise adjustment of eccentricity, whilst minimising shaft preparation costs.

Ultimate reliability is assured with RESOLUTE™'s IP64 sealed readhead with wipe-clean recovery. The precision optics give excellent immunity to dirt on the scale, which is further enhanced by extensive redundancy in the scale code. Safety is assured by a built-in separate and independent position checking algorithm. This actively checks every reading, ensuring any potential problem is flagged long before it reaches the controller. The revolutionary readhead also incorporates a temperature sensor to measure heat build-up giving extra system protection, by signalling an alarm condition if head temperature rises above +80°C. This alarm is in addition to the signal monitoring, position-checking and speed monitoring that is carried out constantly inside the readhead.

The RESOLUTE™ absolute encoder uses purely serial communication resulting in exceptional noise immunity. It is available with a variety of protocols to enable easy connection to a wide range of industry-standard controllers and potential customers are advised to check with Renishaw for the latest list.

As with all Renishaw encoders, RESOLUTE™ is backed by a truly responsive global sales and support network. Furthermore it satisfies the highest environmental standards, with both WEEE and RoHS compliance.

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