

## Groundbreaking absolute linear encoder and rotary (angle) encoder is *BiSS*® protocol compatible

**Renishaw's new RESOLUTE™ absolute optical encoder is now available with *BiSS*® C high-speed serial communications, an open protocol that is available on a range of industry-standard servo drives, controllers, counter cards and encoders, promoting healthy competition between device manufacturers. With pure serial high-speed communications up to 10 MHz, *BiSS* C allows motion system developers to take full advantage of RESOLUTE's market-leading resolution of just 1 nanometre at up to 100 m/s for both linear encoder and angle encoder applications.**

Modern absolute encoders communicate using pure serial digital signals, which facilitate combinations of very high speeds and super-fine resolutions, whilst ensuring excellent immunity to electro-magnetic interference. Absolute encoders also have the benefit of knowing position immediately upon switch-on, eliminating reference returns and providing instant commutation for direct-drive linear or rotary motors.



However, historically absolute encoders had a hidden down-side; several industry-standard serial communications protocols were developed by encoder manufacturers with the intention of locking out competitors and the lack of alternatives meant that some were adopted by controller manufacturers. This situation was compounded by the uncompetitive open protocols (such as SSI) which were outdated and outperformed when it came to precision motion control. Overall it was not the ideal environment for motion system designers to achieve their performance specifications at competitive prices.

This was the market situation that led iC-Haus to develop the *BiSS* high-speed serial communications open protocol which can be licensed free-of-charge by encoder and controller manufacturers. The result is healthier competition between encoder manufacturers, and technical benefits of high data rates up to 10 MHz, low latency, fast repetition rates and data propagation delay compensation. Such is the appeal of *BiSS*, that currently over 150 device manufacturers have licensed the free-of-charge *BiSS* interface Intellectual Property, services and tools.

Renishaw identified *BiSS* as an ideal open protocol for use with its groundbreaking RESOLUTE absolute encoder, a patented non-contact absolute encoder which has a unique advanced optical scheme that reads from a fine-pitch single-track scale. Not only does this endow the encoder with greater set-up tolerances, but it also delivers excellent immunity to dirt, scratches and light oils.

With speeds up to 100 m/s and 1 nm resolution, only a pure serial interface such as *BiSS* could match RESOLUTE's performance. Furthermore, the high speed serial protocol enables the user to reap the full benefits of RESOLUTE's low sub-divisional error (SDE) of  $\pm 40$  nm and low jitter (noise) of 7 nm RMS, for superior motion control performance, giving the ideal solution for dynamic axes that require high speed, high acceleration, smooth velocity control and rock-solid positional stability.

# **BiSS** **INTERFACE**

The absolute linear encoder version of RESOLUTE is available with a comprehensive range of scale options. RELA Invar® spars offer “zero” thermal expansion and  $\pm 1 \mu\text{m}$  accuracy on lengths up to 1130 mm. For high performance on long axes and significantly more robustness than glass scales, RSLA stainless steel spars have a total accuracy of  $\pm 4 \mu\text{m}$  over 5 m, with lengths up to 10 m available to. Plus, for the quickest and easiest installation there's the new *FASTRACK*™ linear encoder scale system with low-profile RTLA tape scale offering  $\pm 5 \mu\text{m/m}$  accuracy.

Absolute angle encoder options are also well catered for; RESA rings are bolt-hole compatible with Renishaw's leading SiGNUM™ RESM angle encoder 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 angle encoder 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.

Absolute linear encoder versions of RESOLUTE with the *BiSS* protocol have resolution options of 1 nm, 5 nm and 50 nm, whilst RESOLUTE absolute angle encoders with *BiSS* protocol have resolution options of 18 bits (4.94 arc seconds), 26 bits (0.02 arc seconds) and 32 bits (0.0003 arc seconds). In all cases, the maximum speed is 100 metres/second.

The RESOLUTE absolute encoder range is also available with other protocols and like all Renishaw encoders is backed by a truly responsive global sales and support network. Furthermore the product satisfies the highest environmental standards, with both WEEE and RoHS compliance.

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