*June 2023*

**FORTiS™ enclosed encoders help machine tools drive sustainability in manufacturing**

Delegates at EMO Hannover 2023 are invited to Renishaw’s stand (B32, Hall 6) to learn about how the FORTiS enclosed encoder helps machine tool builders significantly reduce the cost of providing an effective air purge.

The innovative FORTiS enclosed linear scale is an absolute encoder designed for use in harsh environments such as machine tools. A key feature of the FORTiS encoder enables significant reductions in purge air consumption.

The FORTiS encoder design is built upon Renishaw’s industry-proven RESOLUTE™ encoder technology and provides high resistance to the ingress of liquids and solid debris contaminants. It features an extruded enclosure with longitudinally-attached interlocking lip seals and sealed end caps. The readhead body is joined to a sealed optical unit by a blade, which travels through a pair of DuraSeal™ lip seals along the length of the encoder. Linear axis movement causes the readhead and optics to traverse the encoder's absolute scale (which is fixed to the inside of the enclosure), without mechanical contact.

**Helping machine builders adopt a smarter approach to the encoder air purge**

Renishaw has 50 years of experience in both manufacturing and supplying the machine tool market with products such as probes, software, and calibration equipment. As a manufacturer itself, Renishaw faces many of the same challenges as its customers and has developed strategies and products that solve problems across the industry.

In terms of sustainability challenges relating to encoders, the largest source of electricity consumption over the encoder’s lifetime is the sealing air purge. Corrie Fearon, Product Manager for FORTiS encoders at Renishaw, explains how low purge air consumption can have a positive impact on the carbon footprint of a machine tool:

“The reliability benefits of using a clean, dry air purge to evacuate a machine tool’s linear encoders are well known, leading to widespread adoption by many machine builders. However, supplying that air purge over the lifetime of a machine tool consumes a considerable amount of electricity, resulting in a cost impact for the machine user. With the FORTiS range of linear encoders, Renishaw has developed a way to retain the reliability benefits of an air purge, whilst significantly reducing the cost of doing so. DuraSeal™ lip seals have been specially developed for FORTiS encoders and provide superior sealing properties for ultra-low leakage. Lower leakage enables lower purge air flow rates to be used while still maintaining the IP64 ingress protection that our customers expect. The design of the DuraSeal lip seals is so effective that they facilitate a 70% reduction in air consumption when compared with conventional enclosed encoders. As a result, reduced air purge requirements mean a corresponding reduction in the encoder's attributable CO2e emissions, and lower total cost of ownership for the machine user, due to less electricity required to provide that air purge.”

“Furthermore, Renishaw is promoting a smarter approach to encoder air purge use to help realise even greater savings.The sealing of the FORTiS encoder is so effective that the air purge pressure can be set according to the level of ingress protection required for each linear encoder axis of a machine tool. In high risk cases where encoders are heavily exposed to coolants and cutting chips, or when the machining operation generates aggressively abrasive particles, Renishaw recommends using the full 1 bar (0.1 MPa) air purge pressure. But many machine tools have linear encoders behind shielding or high up in the machine, so while these encoders will still be exposed to particulates, coolants and oils throughout their lifetime, it will be at a lesser rate and the risk is therefore lower. For medium-risk and low-risk axes, the purge air supply to the FORTiS encoder can be set at a lower pressure, which decreases the purge air usage even further. In many cases, machine builders can help boost their customers’ air consumption savings beyond 70% and up to 91%.”

**More on the FORTiS encoder**

FORTiS encoders use conventional form factors and bolt hole arrangements but benefit from an innovative non-contact mechanical design. Measuring lengths are also matched to existing machine designs, with the FORTiS-S™ (standard) model ranging from 140 mm to 3,040 mm and the space-saving FORTiS-N™ (narrow) models from 70 mm to 2,040 mm.

FORTiS encoders are available with the most popular controller communication protocols and with resolution options from 50 nm to 0.5 nm. Multi-readhead encoder systems and Functional Safety variants (SIL2 and PLd) are also available.

Unlike traditional installation methods, technician-level skills and equipment are not required. Renishaw's patented set-up LED and carefully designed installation accessories ensure intuitive and right-first-time installation that is substantially faster than more conventional systems, even in restricted locations.

For enhanced functionality, installers can connect the Advanced Diagnostic Tool, ADTa-100, via a standard USB connector to a PC running Renishaw’s ADT View software.

FORTiS encoder systems have CE approval and are manufactured in-house using strict quality-controlled processes that are certified to ISO 9001:2015 and backed by a global sales and support network.

Please contact your local Renishaw sales representative to discuss how the FORTiS enclosed absolute encoder series can help solve your metrology challenges.

[www.renishaw.com/fortis](http://www.renishaw.com/fortis)

**-ENDS-**