



## Product summary

### RESOLUTE ETR true absolute optical encoder system

- Operation guaranteed from -40 to +80 °C in non-condensing environments
- Resolution to 1 nm at speeds up to 50 m/s (27-bit resolution at 18,000 rpm)
- High shock and high vibration resistance to 30 g
- Non-contact encoder system is directly mounted to eliminate flexible couplings
- Very low sub-divisional error (SDE) of  $\pm 40$  nm for smooth velocity control
- Ultra-low noise (jitter) of less than 10 nm RMS for increased stability and repeatability
- Integral checking algorithm for ultimate reliability



### RoLin encoder system

- Miniature encoder module just 10 x 5 x 8.5 mm
- Linear, axial and radial reading
- Low mass
- Resolutions to 0.244  $\mu$ m
- High speed operation to 40 m/s
- Bidirectional reference mark
- Wide operational temperature range
- Resistant to extreme vibration, shock and acceleration



### OnAxis encoder modules

- Solutions from just 6.5 mm diameter
- Low mass design
- -40 to 125 °C operation
- Resistant to extreme vibration, shock and acceleration
- 3.3 or 5 V power supply
- Industry standard absolute, incremental, analogue and linear output formats
- Programmable zero position
- High speed operation to 60,000 rpm
- Absolute to 13 bit resolution (8,192 counts per revolution)
- Accuracy to  $\pm 0.5^\circ$



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## About us...

Renishaw is a global metrology and healthcare company with core skills in measurement, motion control, spectroscopy and precision machining.

An established world leader in metrology, Renishaw has over 27 years experience in designing and manufacturing optical encoder systems for high accuracy position feedback. We work closely with our associate company RLS d.o.o., to produce robust magnetic rotary and linear motion sensors. Furthermore, a worldwide network of subsidiary companies and distributors, in over 31 countries, provide exceptional service and responsive local support.

Our innovative encoder products significantly advance our customers' operational performance and withstand high shock and vibration environments. Exceptional motion control in harsh environments makes our products perfect for use in demanding applications such as targeting systems, remotely-operated weapons, unmanned air vehicles, precision-guided munitions, long-range vision systems, surveillance systems, radar installations and underwater robotics.

For more information about Renishaw's encoder products please visit:

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

For worldwide contact details please visit:

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



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## High performance position encoders for mission critical reliability



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



**Lock onto target position faster**  
**Accelerate harder**  
**Decelerate harder**

By eliminating the weak links in the servo control loop, your motion system can react faster than ever before. How? The unique detection scheme employed by RESOLUTE ETR provides lower noise and significantly improved velocity ripple. This allows motion system designers the freedom to increase servo loop gain and therefore realise higher acceleration profiles, which also means the axis locks onto target position faster. Peak angular velocity can also be increased because RESOLUTE ETR achieves a maximum speed of up to 18,000 rev/min. In all senses, coarse-pitch inductive systems simply can't keep up!



**Tighter servo response**  
**Rock-solid positional stability**  
**Zero mechanical hysteresis**

All Renishaw encoders have a non-contact format; the scale is mounted directly on the rotor, the readhead is mounted directly on the stator. This format banishes couplings with their inherent hysteresis from the control loop, so the encoder measures the true position of the rotor. That's crucial to metrology because an encoder with a coupling acts like a sprung mass, overshooting and undershooting position and limiting system bandwidth. Furthermore, RESOLUTE ETR benefits from very low jitter, so positions are held with unequalled steadiness and precision.



**Accurate tracking of targets**  
**Smooth velocity control**  
**Less blur on vision systems**

Not only do Renishaw encoders provide high speed and high accuracy, they also excel in dynamic performance. The advanced optical scheme of RESOLUTE ETR is designed to minimise short-term errors (often known as Sub-Divisional Errors) that affect velocity ripple. As a result, deviation from the programmed velocity profile can be up to 10 times better than that of competitor systems. This provides you with far more accurate tracking of targets, less motion blur on vision systems and also helps reduce heat build-up on direct-drive axes.



**Ultra-high accuracy**  
**Fine resolution**  
**Repeatable position**

Renishaw angle encoders feature monolithic stainless steel ring scales, directly graduated with extreme precision. This completely eliminates the risk of cracking or shattering associated with fragile glass discs. Worried about 'design requirements creep' or ever-increasing demands from end users? Be assured that Renishaw are your metrology partners who can meet or exceed your needs.

For the ultimate in accuracy, REXA rings are guaranteed to achieve better than  $\pm 1$  arc second total installed accuracy (0.0003 degrees), yet can be operated in high-shock, high-vibration environments. The impressive accuracy of our encoders is complemented by fine resolutions (up to 32 bits) and outstanding repeatability (to 0.01 arc second), thanks to superior position detection technology.



**Low mass, low profile**  
**Proven technology for military and aerospace**

Renishaw works closely with its associate company RLS d.o.o, to produce a range of compact, high-speed rotary and linear magnetic encoders. These encoders are used within military and aerospace applications, including missile control systems, surveillance systems, robotics, bomb disposal and UAVs. These encoders are virtually indestructible, providing extreme performance in hostile environments.

With many years of experience supporting such integration challenges, we offer customised products within weeks of initial consultation. We encourage direct engineering team discussions to ensure that custom solutions are quickly integrated for rapid field deployment.