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TONiC™ encoder series

The TONiC™ series is a compact, non-contact incremental encoder system that offers speeds up to 10 m/s and, when combined with the Ti interface, resolutions down to 1 nm for both linear and rotary applications. Advanced filtering optics within the readhead give TONiC very low jitter, resulting in excellent positional stability and smoother velocity control. This makes TONiC the ideal encoder for applications where movement must be tightly controlled.

The TONiC encoder also features exceptional signal stability with low Sub-Divisional Error (SDE) to help realise superior motion control performance. TONiC features an integrated set-up LED for intuitive and efficient installation.

Additionally, the TONiC™ encoder series offers a variety of external interfaces that can be configured to meet the speed and resolution requirements of the application. With late-stage integration and configuration of the external interface, one versatile TONiC readhead offers many options for end user customisation.



Very low jitter for stable machine positioning



The TONiC™ encoder series features Renishaw's market-proven filtering optics and advanced signal processing. Auto Gain Control (AGC) and Auto Offset Control (AOC) technologies reduce analogue signal noise and digital jitter within the readhead. TONiC encoders deliver exceptionally low signal output jitter of $\leq \pm 0.5$ nm RMS and low Sub-Divisional Error (SDE) of $\leq \pm 30$ nm, enabling systems to hold position better and generate less heat in linear motor applications.

Fine resolution down to 1 nm



When combined with the optional Ti interface, the TONiC™ encoder series offers ultra-fine resolution down to 1 nm. This capability makes TONiC the ideal choice for applications requiring precise velocity and positional control, especially in low speed applications.

Ultra-High Vacuum and Functional Safety variants



The TONiC™ encoder offers a single solution for various applications, with the same exceptional metrology capability offered by TONiC UHV, for Ultra-High Vacuum applications, and TONiC FS, for systems requiring Functional Safety certification to SiL2 and PLd.

Standard

Linear

Scale type	Scale name	Accuracy	Scale pitch	Thermal expansion coefficient at 20 °C	Supplied length
Stainless steel tape with track option 	RTLC with optional FASTRACK	±5 µm/m	20 µm	10.1 ±0.2 µm/m/°C	Up to 10 m (> 10 m on request)
Narrow stainless steel tape scale 	RKLC20-S	±5 µm/m	20 µm	Matched to substrate material when scale ends are fixed with end clamps	Up to 20 m (> 20 m on request)
ZeroMet spar 	RELM20/RELE20	±1 µm for up to 1 m, then ±1 µm/m	20 µm	0.75 ±0.35 µm/m/°C	Up to 1.5 m
Stainless steel spar 	RSLM20/RSLE20/RSLC20	±1.5 µm up to 1 m, ±2.25 µm up to 2 m, ±3 µm up to	20 µm	10.1 ±0.2 µm/m/°C	Up to 5 m

		3 m, $\pm 4 \mu\text{m}$ up to 5 m			
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Partial arc

Scale type	Scale name	Accuracy	Scale pitch	Thermal expansion coefficient at 20 °C	Supplied length
	RKLC20-S	$\pm 5 \mu\text{m/m}$	20 μm	Matched to substrate material when scale ends are fixed with end clamps	Up to 20 m (> 20 m on request)

Rotary

Scale type	Scale name	Accuracy (depending on ring diameter)	Scale pitch	Thermal expansion coefficient at 20 °C	Ring diameter
	RESM20/REST20	Graduation accuracy: ± 3.97 to ± 0.38 arc seconds	20 μm	$15.5 \pm 0.5 \mu\text{m/m/}^\circ\text{C}$	52 to 550 mm
	REXM20/REXT20	Installed accuracy: (≥ 100 mm diameter) ± 1 arc second (75 mm diameter) ± 1.5 arc seconds (≤ 57 mm diameter) ± 2 arc seconds	20 μm	$15.5 \pm 0.5 \mu\text{m/m/}^\circ\text{C}$	52 to 417 mm

Ultra-High Vacuum

Linear

Scale type	Scale name	Accuracy	Scale pitch	Thermal expansion coefficient at 20 °C	Supplied length
Stainless steel tape with track option	RTL20 with optional	$\pm 5 \mu\text{m/m}$	20	10.1 ± 0.2	Up to 10

	FASTRACK		μm	$\mu\text{m}/\text{m}/^{\circ}\text{C}$	m (> 10 m on request)
Narrow stainless steel tape scale 	RKLC20-S	$\pm 5 \mu\text{m}/\text{m}$	20 μm	Matched to substrate material when scale ends are fixed with end clamps	Up to 20 m (> 20 m on request)
ZeroMet spar 	RELM20/RELE20	$\pm 1 \mu\text{m}$ for up to 1 m, then $\pm 1 \mu\text{m}/\text{m}$	20 μm	0.75 $\pm 0.35 \mu\text{m}/\text{m}/^{\circ}\text{C}$	Up to 1.5 m
Stainless steel spar 	RSLM20/RSLE20/RSLC20	$\pm 1.5 \mu\text{m}$ up to 1 m, $\pm 2.25 \mu\text{m}$ up to 2 m, $\pm 3 \mu\text{m}$ up to 3 m, $\pm 4 \mu\text{m}$ up to 5 m	20 μm	10.1 $\pm 0.2 \mu\text{m}/\text{m}/^{\circ}\text{C}$	Up to 5 m

Rotary

Scale type	Scale name	Accuracy (depending on ring diameter)	Scale pitch	Thermal expansion coefficient at 20 °C	Ring diameter
Stainless steel ring 	RESM20/REST20	Graduation accuracy: ± 3.97 to ± 0.38 arc seconds	20 μm	15.5 $\pm 0.5 \mu\text{m}/\text{m}/^{\circ}\text{C}$	52 to 550 mm
Ultra-high accuracy stainless steel ring 	REXM20/REXT20	Installed accuracy: (≥ 100 mm diameter) ± 1 arc second (75 mm diameter) ± 1.5 arc seconds (≤ 57 mm diameter) ± 2 arc seconds	20 μm	15.5 $\pm 0.5 \mu\text{m}/\text{m}/^{\circ}\text{C}$	52 to 417 mm

Linear

Scale type	Scale name	Accuracy	Scale pitch	Thermal expansion coefficient at 20 °C	Supplied length
Stainless steel tape with track option 	RTLC20 with optional FASTRACK	±5 µm/m	20 µm	10.1 ±0.2 µm/m/°C	Up to 10 m (> 10 m on request)
ZeroMet spar 	RELM20/RELE20	±1 µm for up to 1 m, then ±1 µm/m	20 µm	0.75 ±0.35 µm/m/°C	Up to 1.5 m
Stainless steel spar 	RSLM20/RSLE20/RSLC20	±1.5 µm up to 1 m, ±2.25 µm up to 2 m, ±3 µm up to 3 m, ±4 µm up to 5 m	20 µm	10.1 ±0.2 µm/m/°C	Up to 5 m

Rotary

Scale type	Scale name	Accuracy (depending on ring diameter)	Scale pitch	Thermal expansion coefficient at 20 °C	Ring diameter
Stainless steel ring 	RESM20/REST20	Graduation accuracy: ±3.97 to ±0.38 arc seconds	20 µm	15.5 ±0.5 µm/m/°C	52 to 550 mm

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