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Non-contact position encoders guide

Why choose Renishaw?

High accuracy

Easy installation

Superior reliability

Research and development

As an industry-leading innovator, Renishaw re-invests each year between 14% and 18% of turnover into engineering, research and development. The results are ground-breaking new solutions for our customers that demonstrate our commitment to creating unique technologies – pushing encoder performance to new levels.

Follow ‘Renishaw Position Encoders’

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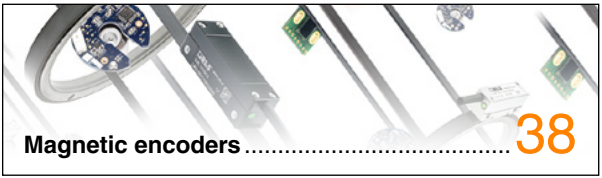

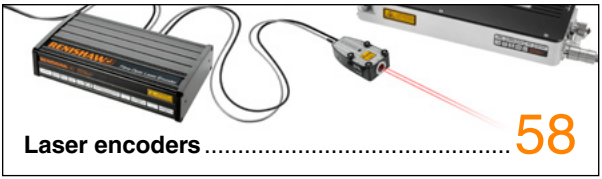


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FORTiS™ enclosed linear encoders

Next generation enclosed linear absolute encoders for use in harsh environments.

FORTiS™ enclosed absolute encoder systems

The FORTiS encoder series is a next generation enclosed linear absolute encoder for use in harsh environments such as machine tools. Application of Renishaw's proven absolute encoder technology within an exceptionally robust enclosed design, delivers high-performance and significant benefits over conventional systems. The technology is available in two sections; FORTiS-S™ standard 37 mm and FORTiS-N™ narrow 18 mm, with FORTiS-N ideally suited to applications in more confined spaces.

Technical specifications

Serial interfaces	BiSS® C, BiSS® Safety, FANUC, Mitsubishi, Panasonic, Siemens DRIVE-CLiQ®, Yaskawa
Measuring lengths FORTiS-N	70 mm to 2040 mm
Measuring lengths FORTiS-S	140 mm to 4240 mm
Resolutions	0.5 nm, 1 nm, 1.25 nm, 10 nm, 12.5 nm, 25 nm, 50 nm
Maximum speed	4 m/s
Accuracy grades	Standard: ±5 µm, High: ±3 µm
Other variants	Functional Safety (FS)
Compatible with	Advanced Diagnostic Tool ADTa-100

*See datasheet for relevant accuracy grade and serial interface

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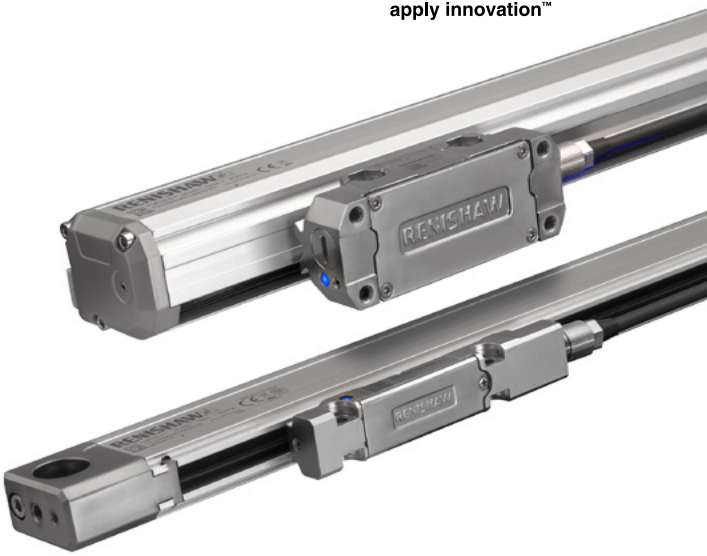

Industry-proven position measurement

Non-contact

IP64

Superior sealing

Class leading vibration resistance

Easy installation

Discover more

Open optical encoders

Optical encoders provide robust and high-performance linear, rotary and partial arc position measurement using a finely graduated scale and a compact optoelectronic readhead that converts motion relative to the scale into position data.

- Incremental and absolute position measurement available
- Non-contact design – zero hysteresis and no mechanical wear
- Robust optical design – high immunity to dirt, dust and scratches without compromising signal integrity

Customised encoder readheads and scales can be developed by Renishaw's experienced 'Specials' design team. Please contact your local Renishaw distributor if you have an unusual or specific application, as standard products can often be adapted to provide a custom solution to meet your exact requirements.


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0ABC13
PATENTED MADE IN UK
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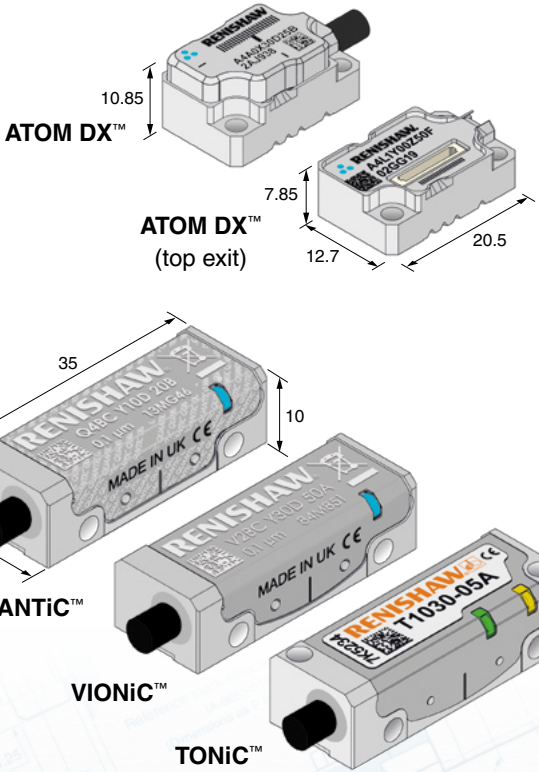
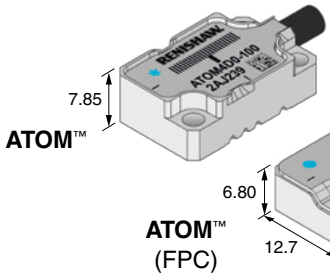
Readhead dimensions

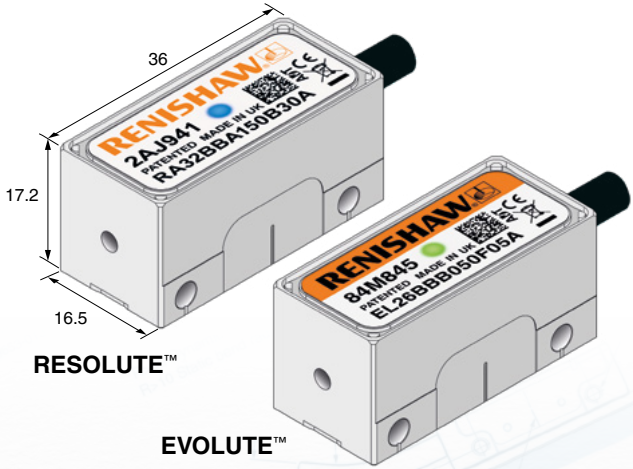
(all dimensions in mm)





ATOM™

ATOM™ (FPC)



RESOLUTE™

EVOLUTE™

RESOLUTE™ true-absolute encoder systems

The RESOLUTE true-absolute optical encoder system has excellent dirt immunity, and an impressive specification that delivers fine resolution position measurement at exceptional high speeds. Compatible with the Advanced Diagnostic Tool ADTa-100 and ADT View software for installation optimisation or in-field diagnostics.

Technical specifications

Readhead size	36 mm × 16.5 mm × 17.2 mm
Serial interfaces	BiSS® C, BiSS® Safety, FANUC, Mitsubishi, Panasonic, Siemens DRIVE-CLiQ®, Yaskawa
Linear resolutions	To 1 nm
Linear speed	Up to 100 m/s
Sub-Divisional Error (SDE)	Typically < ±40 nm
Linear accuracy	To ±1 µm/m
Rotary accuracy	To ±1 arc second
Other variants	Ultra-High Vacuum (UHV), Extended Temperature Range (ETR), Functional Safety (FS) and side cable outlet
Compatible with	Advanced Diagnostic Tool ADTa-100 ▶

High accuracy

High resolution

Scale options (see pages 30–37 for more information)

Stainless steel tape, ZeroMet™ spar, stainless steel spar, narrow stainless steel tape

Stainless steel ring, ultra-high accuracy stainless steel ring

Narrow stainless steel tape

Discover more

EVOLUTE™ true-absolute encoder systems

With a 50 µm scale period, the EVOLUTE true-absolute non-contact optical encoder provides generous installation tolerances and enhanced dirt immunity for applications that demand high operational integrity combined with fast and easy installation. Compatible with the Advanced Diagnostic Tool ADTa-100 and ADT View software for installation optimisation or in-field fault finding.

Technical specifications

Readhead size	36 mm × 16.5 mm × 17.2 mm
Serial interfaces	BiSS® C, FANUC, Mitsubishi, Panasonic, Siemens DRIVE-CLiQ, Yaskawa
Linear resolutions	To 50 nm
Linear speed	Up to 100 m/s
Sub-Divisional Error (SDE)	Typically < ±150 nm
Linear accuracy	To ±10 µm/m
Scale pitch	50 µm
Other variants	Side cable outlet
Compatible with	Advanced Diagnostic Tool ADTa-100 ▶

Easy installation

Low Sub-Divisional Error

Scale options (see pages 30–37 for more information)

Stainless steel tape

Discover more

VIONiC™ digital high performance incremental encoder systems

Superior metrology

Ultra-low
Sub-Divisional Error

The VIONiC encoder series is Renishaw's highest performing incremental optical encoder, with a direct digital output. It provides superior metrology with ultra-low Sub-Divisional Error (SDE), high operating speeds and excellent reliability. Compatible with the Advanced Diagnostic Tool ADTi-100 for real time encoder data feedback during installation or for in-field diagnostics.

Technical specifications

Readhead size	35 mm × 13.5 mm × 10 mm
Outputs	Digital
Linear resolutions	To 2.5 nm
Linear speed	Up to 12 m/s
Rotary (angular) speed	Up to 4400 rpm
Sub-Divisional Error (SDE)	Typically < ±15 nm
Scale pitch	20 µm
Linear accuracy	To ±1 µm/m
Rotary accuracy	To ±1 arc second
Compatible with	Advanced Diagnostic Tool ADTi-100 ▶

Scale options (see pages 30–37 for more information)

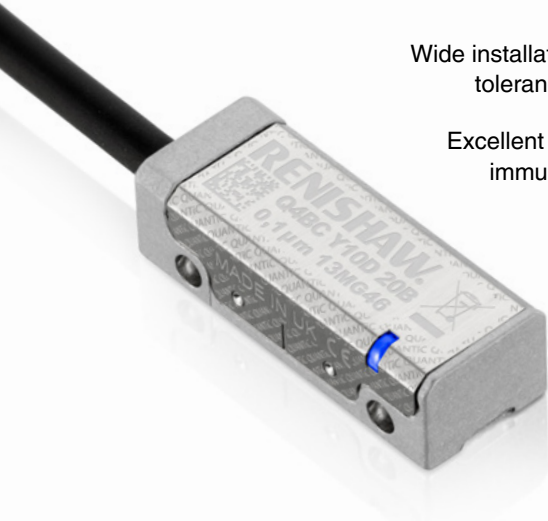
Stainless steel tape, ZeroMet™ spar, stainless steel spar, narrow stainless steel tape

Stainless steel ring, ultra-high accuracy stainless steel ring

Narrow stainless steel tape

Discover more

QUANTiC™ easy to install incremental encoder systems



Wide installation tolerances

Excellent dirt immunity

The QUANTiC encoder series integrates proven filtering optics and interpolation technology into a super-compact, analogue or digital incremental open optical encoder, with wide installation tolerances and built-in calibration functions. Compatible with the Advanced Diagnostic Tool ADTi-100 and ADT View software for installation optimisation or in-field fault finding.

Technical specifications

Readhead size	35 mm × 13.5 mm × 10 mm
Outputs	Analogue or digital
Linear resolutions	To 50 nm
Linear speed	Up to 24 m/s
Rotary (angular) speed	Up to 8815 rpm
Sub-Divisional Error (SDE)	Typically < ±80 nm (with digital variant)
Scale pitch	40 µm
Linear accuracy	To ±5 µm/m
Rotary accuracy	To ±2 arc seconds
Compatible with	Advanced Diagnostic Tool ADTi-100 ▶

Scale options (see pages 30–37 for more information)


Stainless steel tape, narrow stainless steel tape


Stainless steel ring


Narrow stainless steel tape

Discover more

TONiC™ ultra-fine resolution incremental encoder systems

(Very) low jitter

Fine resolutions down to 1 nm

The TONiC series is a compact, non-contact incremental encoder system offering exceptional metrology in a wide range of linear, rotary and partial arc applications.

Technical specifications

Readhead size	35 mm × 13.5 mm × 10 mm
Outputs	Analogue or digital (with interface)
Linear resolutions	To 1 nm
Linear speed	Up to 10 m/s
Rotary (angular) speed	Up to 3700 rpm
Sub-Divisional Error (SDE)	Typically ±30 nm
Scale pitch	20 µm
Linear accuracy	To ±1 µm/m
Rotary accuracy	To ±1 arc second
Other variants	Functional Safety (FS) and Ultra-High Vacuum (UHV)
Compatible with	TONiC diagnostic tool ▶

Scale options (see pages 30–37 for more information)

Stainless steel tape, ZeroMet™ spar, stainless steel spar, narrow stainless steel tape

Ultra-high accuracy stainless steel ring, stainless steel ring

Narrow stainless steel tape

Discover more

ATOM™ miniature incremental encoder systems

The ATOM miniature optical incremental linear and rotary encoder system offers innovative design combining miniaturisation with leading-edge signal stability, dirt immunity and reliability.

Technical specifications

Readhead size (mm)	20.5 × 12.7 × 7.85 (40 µm cabled variant) 20.5 × 12.7 × 8.35 (20 µm cabled variant) 20.5 × 12.7 × 6.80 (40 µm FPC variant) 20.5 × 12.7 × 7.30 (20 µm FPC variant)
Outputs	Analogue or digital (with interface)
Linear resolutions	To 1 nm
Linear speed	Up to 20 m/s
Rotary (angular) speed	Up to 29 300 rpm
Sub-Divisional Error (SDE)	Typically < ±120 nm for 40 µm version Typically < ±75 nm for 20 µm version
Scale pitch	20 µm and 40 µm
Linear accuracy	To ±5 µm/m
Compatible with	ATOM diagnostic tool ▶

Miniature

Reliability

Scale options (see pages 30–37 for more information)

Stainless steel tape, glass spar

Glass disc

Narrow stainless steel tape

Discover more

ATOM DX™ digital miniature incremental encoder systems

The ATOM DX digital encoder is Renishaw's smallest incremental optical encoder with digital output direct from the readhead, providing positional feedback, onboard interpolation and filtering optics all in a miniature package. Compatible with the Advanced Diagnostic Tool ADTi-100 and ADT View software for installation optimisation or in-field fault finding.

Technical specifications

Readhead size (mm)	20.5 × 12.7 × 10.85 (40 µm cabled variant) 20.5 × 12.7 × 11.35 (20 µm cabled variant) 20.5 × 12.7 × 7.85 (40 µm top exit variant) 20.5 × 12.7 × 8.35 (20 µm top exit variant)
Outputs	Digital
Linear resolutions	To 2.5 nm
Linear speed	Up to 20 m/s
Rotary (angular) speed	Up to 29 300 rpm (RCDM) Up to 12 100 rpm (CENTRUM)
Sub-Divisional Error (SDE)	Typically < ±120 nm for 40 µm version Typically < ±75 nm for 20 µm version
Scale pitch	20 µm and 40 µm
Linear accuracy	To ±5 µm/m
Compatible with	Advanced Diagnostic Tool ADTi-100 ▶

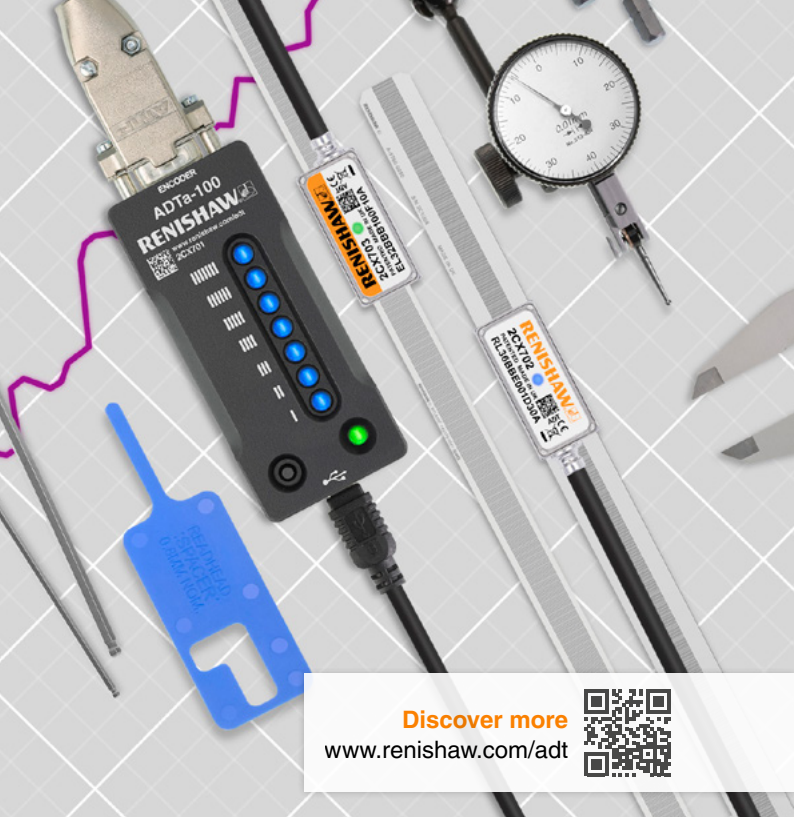
Scale options (see pages 30–37 for more information)


Stainless steel tape, glass spar


Glass and stainless steel disc


Narrow stainless steel tape

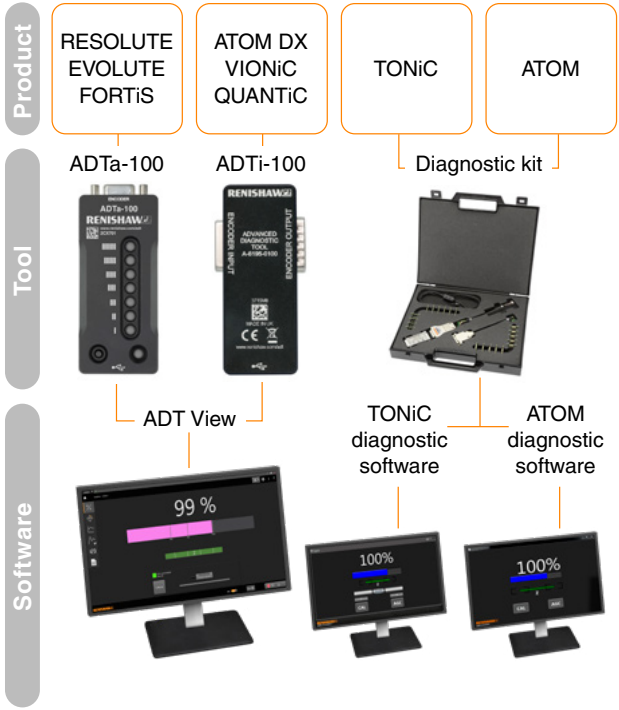
Discover more



Encoder diagnostic tools

Diagnostic tools are used to aid the installation of both incremental and absolute readheads as well as providing a suite of tools to allow engineers to track down system faults.

The encoder diagnostic family



ADT View software for use with diagnostics tools

- Compatible with a range of incremental and absolute encoders
- Simple to use

N.B. Screenshots have been taken from ADT View 3.9

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- Screenshot and data export to assist with machine documentation
- Ideal for more challenging installations

Discover more

Encoder scales

Renishaw supplies both linear and rotary (angle) encoder scales, manufactured using robust processes certified to ISO 9001:2015. These encoder scales are the foundation of excellent encoder performance. A wide range of scale types, including rugged scale, high-accuracy scale and low expansion scale, provide the customer with options for every type of application. Scale mounting is either by mechanical means or self-adhesive backing tape.

Linear scales

RTL stainless steel tape scale

Scale	Readhead	Pitch	Accuracy	Supplied length
RTLF-S	ATOM ATOM DX	20 µm	±5 µm/m	Up to 10 m
		40 µm	±5 µm/m ±15 µm/m	
RTLC-S	VIONiC TONiC	20 µm	±5 µm/m	Up to 10 m (> 10 m on request)
	QUANTiC	40 µm	±5 µm/m ±15 µm/m	
RTLA-S	RESOLUTE	30 µm	±5 µm/m	Up to 21 m
	EVOLUTE	50 µm	±10 µm/m	Up to 10.02 m

RTL scale is a robust 8 mm wide stainless steel tape scale. When mounted with a self-adhesive backing tape, it displays a defined coefficient of thermal expansion that is independent of the mounting substrate.

Mounting: Self-adhesive backing tape

Material: Stainless steel

CTE: 10.1 ±0.2 µm/m/°C

Discover more

RTL *FASTRACK*™ stainless steel tape scale

Scale	Readhead	Pitch	Accuracy	Supplied length
RTLC	VIONiC TONiC	20 µm	±5 µm/m	Up to 10 m (> 10 m on request)
	QUANTiC	40 µm	±5 µm/m ±15 µm/m	
RTLA	RESOLUTE	30 µm	±5 µm/m	Up to 21 m
	EVOLUTE	50 µm	±10 µm/m	Up to 10.02 m

FASTRACK is a market proven track-mounting system. If damaged, the scale can be pulled out of the guide rails and quickly replaced, thus reducing machine downtime.

Mounting: *FASTRACK* track system
Material: Stainless steel **CTE:** 10.1 ±0.2 µm/m/°C

RCL glass spar scale

Scale	Readhead	Pitch	Accuracy	Supplied length
RCLC	ATOM ATOM DX	20 µm 40 µm	±3 µm	Up to 130 mm

RCLC is a short-length glass spar scale for the ATOM™ and ATOM DX™ encoder series.

Mounting: Self-adhesive backing tape
Material: Soda lime glass **CTE:** ~ 8 µm/m/°C

REL ZeroMet™ spar scale

Scale	Readhead	Pitch	Accuracy	Supplied length
RELM/ RELE	VIONiC TONiC	20 µm	±1 µm up to 1 m then ±1 µm/m	Up to 1.5 m
RELA	RESOLUTE	30 µm		

REL high-accuracy spar scales are manufactured from ZeroMet, a metrologically stable low-expansion nickel-iron alloy.

Mounting: Self-adhesive backing tape or clip and clamp mounting
Material: ZeroMet low expansion nickel-iron alloy
CTE: 0.75 ±0.35 µm/m/°C

RSL stainless steel spar scale

Scale	Readhead	Pitch	Accuracy	Supplied length
RSLM/ RSLE/ RSLC	VIONiC TONiC	20 µm	±1.5 µm up to 1 m ±2.25 µm up to 2 m ±3 µm up to 3 m	Up to 5 m
RSLA	RESOLUTE	30 µm	±4 µm up to 5 m	

RSL spar scales offer performance comparable with fine pitch glass scales yet are available in lengths up to 5 m.

Mounting: Self-adhesive backing tape or clip and clamp mounting
Material: Stainless steel **CTE:** 10.1 ±0.2 µm/m/°C

RKL narrow stainless steel tape scale

Scale	Readhead	Pitch	Accuracy	Supplied length
RKLF-S	ATOM ATOM DX	20 µm	±5 µm/m	Up to 10 m
		40 µm	±5 µm/m ±15 µm/m	
RKLC-S	VIONiC TONiC	20 µm	±5 µm/m	Up to 20 m (> 20 m on request)
	QUANTiC	40 µm	±5 µm/m ±15 µm/m	
RKLA-S	RESOLUTE	30 µm	±5 µm/m	Up to 21 m

RKL scales are robust, 6 mm wide stainless steel tape scales with a thickness of 0.15 mm (including adhesive). This small cross-section allows the scale, when rigidly fixed to a machine axis, to become ‘mastered’ to the machine substrate, matching its thermal expansion coefficient and behaviour.

Mounting: Self-adhesive backing tape

Material: Stainless steel

CTE: Matched to substrate material when scale ends are fixed with end clamps

Partial arc scales

RKL narrow stainless steel tape scale

Scale	Readhead	Pitch	Minimum bend radius
RKLF-S	ATOM ATOM DX	40 µm	26 mm
RKLC-S	VIONiC TONiC	20 µm	30 mm
	QUANTiC	40 µm	26 mm
RKLA-S	RESOLUTE	30 µm	50 mm

The flexible RKL scale is suitable for partial arc measurement where the small cross-sectional area allows it to be wrapped around a drum, shaft or arc.

RCD glass disc scale

Scale	Readhead	Pitch	Diameter (mm)
RCDM	ATOM ATOM DX	20 µm	30 to 108
		40 µm	17 to 108

RCDM is a one-piece glass disc featuring graduations marked directly onto its face and a single reference mark position. An optical alignment band can be used to minimise alignment errors and improve installed accuracy.

Mounting: Glue to mounting hub **Material:** Soda lime glass
CTE: ~ 8 µm/m/°C

CENTRUM™ stainless steel disc scale

Scale	Readhead	Pitch	Diameter (mm)
CSF40	ATOM DX	40 µm	24 to 120

CENTRUM CSF40 is a stainless steel encoder scale disc. It includes alignment flexures that automatically centre the scale when pushed onto a shaft, providing improved metrology performance.

Mounting: Bolted, clamped, glue to mounting hub
Material: Stainless steel
CTE: 15.5 ±0.5 µm/m/°C

RES stainless steel ring scale

Scale	Readhead	Pitch	Diameter (mm)
RESM	TONiC VIONiC	20 µm	52 to 550
	QUANTiC	40 µm	
RESA	RESOLUTE	30 µm	

A rugged and versatile low profile stainless steel ring scale with large internal diameter for easy installation.

Mounting: Taper mount or interference fit
Material: Stainless steel **CTE:** 15.5 ±0.5 µm/m/°C

REX ultra-high accuracy stainless steel ring scale

Scale	Readhead	Pitch	Diameter (mm)
REXT/ **REXM**	TONiC VIONiC	20 µm	52 to 417
REXA	RESOLUTE	30 µm	

An ultra-high accuracy ring scale with thick cross-section for demanding applications.

Mounting: Flange mounted **Material:** Stainless steel
CTE: 15.5 ±0.5 µm/m/°C

RLS® | A RENISHAW associate company

Rugged performance encoders. Over the last few decades RLS and Renishaw have worked closely with companies from a broad range of industries. Experience, knowledge and innovative ideas combine to enable RLS to offer custom product solutions for every application. From heavy machinery, advanced surgical and collaborative robots, aerospace and submarine applications to one of the largest solar power plants in the world, RLS encoders comply with even the toughest requirements.

All RLS magnetic encoders have CE approval, RoHS compliance, and are manufactured by RLS d.o.o. under strict quality controls that are certified to ISO 9001:2015.

Our associate company RLS d.o.o. produces a range of robust magnetic rotary and linear motion sensors to meet growing global market demands.

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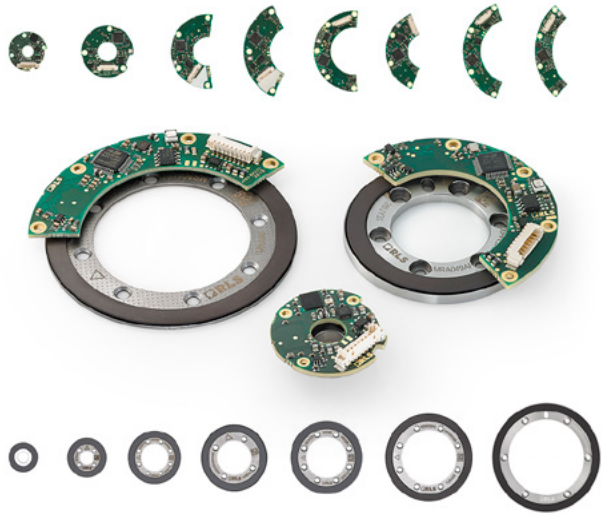
Magnetic encoders

Magnetic encoders provide linear and rotary position measurement at a low cost, with high reliability and capable of operating in harsh environments.

- Incremental and absolute position measurement available
- Non-contact design ensures no mechanical wear
- Robust magnetic position sensing technology provides excellent resistance to most forms of contamination

AksIM-2™ & AksIM-4™ off-axis rotary absolute magnetic encoders



The AksIM-2 & AksIM-4 series of RLS' non-contact high-performance rotary absolute encoders have been designed for integration into space-constrained applications. True-absolute functionality, high-speed operation and a large internal diameter ring scale make this encoder particularly well suited to robotic applications.

Technical specifications

Readhead sizes (outer diameter)	AksIM-2: 29 mm, 38 mm, 54 mm, 59 mm, 74 mm, 90 mm AksIM-4: 125 mm, 163 mm
Ring sizes (outer diameter)	AksIM-2: 22 mm, 29 mm, 39 mm, 49 mm, 53 mm, 64 mm, 80 mm, 95 mm AksIM-4: 115 mm, 150 mm
Serial interfaces	BiSS® C, PWM, SPI, SSI, UART
Resolution	From 16-bit to 20-bit*
Maximum speed	10 000 rpm
Current consumption	Typically 130 mA, max. 150 mA (without load on the outputs)
Rideheight	0.05 mm to 0.35 mm
Encoder accuracy	±0.05° / 180 arc seconds
Final system accuracy	Typically ±0.025° / 90 arc seconds (after encoder self-calibration)
Temperature range	–40 °C to +105 °C (standard)
Diagnostics	Built-in self-monitoring
Status indicator	Status bits, LED

* Multiturn counter option available

Discover more

HiLin™ high-accuracy linear incremental encoders

The HiLin series of high accuracy magnetic encoders is a family of robust linear incremental systems suitable for a variety of demanding applications. The incremental encoder system consists of a compact sealed readhead and a separate magnetic scale. The readheads are available in high resolution and offer customer-selectable interpolation factors that allow much more freedom in designing advanced systems.

Technical specifications

Readhead size	50 mm × 20 mm × 18 mm
Outputs	Digital incremental
Resolutions	From 0.10 µm to 5 µm DPI: From 0.1016 µm to 5.08 µm
Speed	25.28 m/s with 1 µm resolution
System accuracy	Up to ±5 µm/m
Short range accuracy	Up to ±3 µm / 30 mm
Pole length	2 mm, 2.032 mm (DPI)

Scale options

Scales without cover, scales on a solid substrate, fully welded solid scales.

Discover more

Orbis™ true-absolute rotary encoders

Magnet options

Various sizes of magnets for integration along the shaft.

The Orbis true-absolute through-hole rotary encoder is suitable for applications where a typical OnAxis™ encoder cannot be mounted at the end of the rotating shaft due to space constraints.

Technical specifications

Magnets in holders (internal diameter)	From Ø6 mm to Ø20 mm
Magnets (internal diameter)	Ø12 mm, Ø16 mm, Ø22 mm, Ø30 mm
Serial interfaces	BiSS® C, PWM, SPI, SSI, UART
Resolution	14-bit*
Maximum speed	12 000 rpm
Rideheight	4 mm ±1 mm (Ø12 and Ø30 mm magnet) 5.5 mm ±1 mm (Ø16 mm magnet) 6.5 mm ±1 mm (Ø22 mm magnet)
Accuracy	±0.25° (BR10), ±0.3° (BR20), ±0.5° (BR30)
Diagnostics	Built-in self-diagnostics
Status indicator	Status bits, LED

* Battery powered multiturn counter option available. 16-bit multiturn counter option available.

Discover more

OnAxis™ commutation and incremental encoders

The RMC commutation and incremental encoder solutions are designed for use in motor feedback applications requiring both ABZ incremental and UVW commutation signals.

Magnet options

Magnets for integration onto shaft, or for direct recessing in non-ferrous shafts.

Discover more

Technical specifications

	RMC22	RMC35
Readhead size	Ø22 mm body	Ø35 mm body
Outputs	Analogue sine/cosine, UVW commutation signals with up to 16 poles and incremental ABZ	UVW commutation signals with up to 16 poles and incremental ABZ
Resolutions	Up to 12-bit	Up to 13-bit
Accuracy	±0.5°	
Speed (rpm)	Up to 30 000	
Temperature	From –40 °C to +105 °C	

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LinACE™ absolute linear encoder

LinACE™ is an extremely robust absolute linear cylindrical encoder system designed to be integrated into the servomechanism as a transducer, providing accurate measurements with excellent resolution and repeatability.

Discover more

Technical specifications

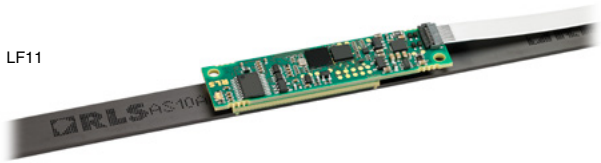
Shaft diameter	6 mm, 8 mm or 12 mm
Serial interfaces	Asynchronous serial, BiSS® C, PWM, SSI
Resolutions	0.5 µm, 1 µm, 5 µm, 10 µm
Maximum speed	5 m/s
System accuracy	Up to ±5 µm
Short range accuracy	Better than ±10 µm / 10 mm
Pole length	2 mm

LA11, LA12 and LF11
absolute linear encoders

LA11 and LA12 are absolute magnetic linear encoder systems designed for motion control applications as a position and velocity control loop feedback element. LF11 is a board-level absolute linear magnetic encoder system. The miniature design and low weight of the encoder system make it suitable for applications with limited space.

LA12

LF11



LA11

Scale options

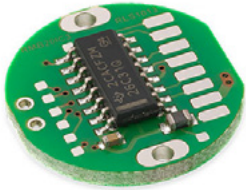
Scales with or without cover

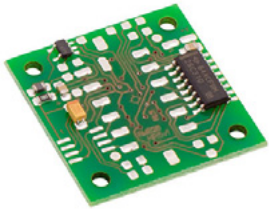
Discover more

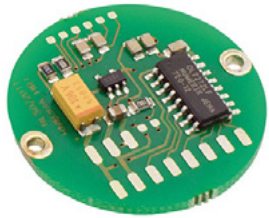
Technical specifications

Readhead size	LA11: 52 x 17 x 16 mm LA12: 52 x 19 x 16 mm LF11: 50 x 5 x 12 mm
Serial interfaces	LA11: Incremental, Absolute, SSI, SPI, BiSS C LA12: Mitsubishi, Yaskawa and Fanuc LF11: BiSS C
Resolutions	From 0.244 µm to 125 µm
Speed	7 m/s at 0.977 µm resolution
System accuracy	±20 µm/m
Short range accuracy	Better than ±10 µm / 10 mm
Pole length	2 mm

OnAxis™ encoder modules







Magnet options

Magnets for integration onto shaft, or for direct recessing in non-ferrous shafts.

Rotary magnetic encoder modules consist of a magnet and a separate sensor board. A wide range of package configurations makes them ideal for integration into original equipment manufacturer (OEM) systems. RLS's range of magnetic encoders provides incremental and absolute output formats, including AB quadrature, analogue voltage, UVW commutation, and linear voltage.

Technical specifications

	RMB20	RMB28	RMB29	RMB
PCB size	Ø20 mm	28 mm	29 mm	Ø30 mm
PCB shape	Round	Square	Square	Round
Outputs	Absolute, incremental, analogue sine/cosine, commutation, linear voltage format			
Resolution	Up to 13-bit			
Accuracy	Up to ±0.5°			
Speed (rpm)	60 000			30 000
Temperature	From –40 °C to +125 °C			

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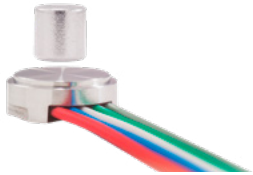
OnAxis™ housed encoders

The OnAxis family of compact, high-speed encoders is designed for use in harsh environments. Available in different sizes and allowing various mounting options, these encoders provide reliable position feedback for OEMs.



Magnet options

Magnets for integration onto shaft, or for direct recessing in non-ferrous shafts.

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Technical specifications

	RM08	RM22 / RE22
Size	Ø8 mm	Ø22 mm
Outputs	Analogue sine / cosine, incremental, SSI and linear voltage formats	Analogue sine / cosine, incremental, absolute and linear voltage formats
Resolutions	Up to 12-bit	Up to 13-bit
Accuracy	±0.3°	RM22: ±0.5° RE22: ±0.3°
Speed (rpm)	Up to 30 000	
Temperature	–40 °C to +85 °C	–40 °C to +125 °C

	RM36 / RE36	RM44
Size	Ø36 mm	Ø44 mm
Outputs	Incremental, absolute and linear voltage / current formats	Same as RM22 / RE22
Resolutions	Up to 13-bit	
Accuracy	RM36: ±0.5° RE36: ±0.3°	±0.5°
Speed (rpm)	RM36: Up to 30 000 RE36: Up to 20 000	Up to 60 000
Temperature	RM36: (–40 to +125) °C (IP64), (–40 to +85) °C (IP68), RE36: (–40 to +120) °C	–40 °C to +125 °C (IP64), –40 °C to +85 °C (IP68)

LM robust incremental encoders

Engineered for harsh environments and extreme service, the solid-state LM range of encoders are highly resistant to shock, vibration and pressure. The robust magnetic scale or rings are also resistant to a range of chemicals commonly found in industry.

Technical specifications

	LM10	LM13	LM15
Readhead size (mm)	32 × 24 × 10	36 × 24 × 13	32 × 24 × 10
Outputs	Analogue or digital		
Application	Linear, rotary (axial or radial reading)		
Resolution	0.244 µm to 250 µm		0.61 µm to 625 µm
Speed	Up to 80 m/s		Up to 200 m/s
Pole length	2 mm		5 mm
Accuracy*	±10 µm (for lengths < 20 m) ±20 µm and ±40 µm		±100 µm
Accessories	E201 interface		

* Accuracy grade for MS scales

Scale options

Scales with or without cover

Axial rings, radial rings

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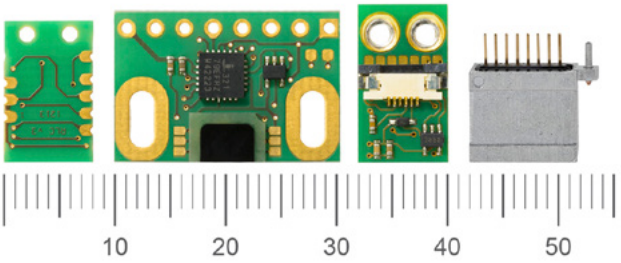
RoLin™ miniature encoder family

The RoLin miniature encoder family has been specifically designed for integration into high volume OEMs.
High-speed operation, high reliability and fine resolutions combined with large installation tolerances to ensure that this sensor can be installed quickly and cost effectively.



Scale options

Scales with or without cover

Axial rings, radial rings

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Technical specifications

	RLC2HD	RLC2IC
Size (mm)	12.5 × 8 × 2	20 × 13.5 × 4
Application	Linear, rotary (axial or radial reading)	
Outputs	Incremental, no line driver	Incremental, RS422
Resolutions†	From 0.244 µm	
Speed†	Up to 80 m/s	
Pole length	2 mm	
Accuracy*	±40 µm/m	
Accessories	E201 / RLACC interfaces	

	RLM	RLB
Size (mm)	12 × 8.5 × 5	14 × 8 × 2
Application	Linear, rotary (axial or radial reading)	
Outputs	Incremental quadrature, TTL output signals A, B and index Z	Incremental, no line driver
Resolutions†	From 0.244 µm	
Speed†	Up to 80 m/s	
Pole length	2 mm	
Accuracy*	±40 µm/m	
Accessories	E201 / RLACC interfaces	

* Accuracy grade for MS scales. † For linear and corresponding CPR for rotary applications (depends on ring diameter)


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Fibre Optic Laser Encoder

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Laser encoders

Laser encoders provide high resolution and low cyclic error (SDE) linear position measurement. They combine the measurement and positioning performance expected from a displacement interferometer, with the ease of installation and use associated with a traditional tape or glass scale based encoder.

RLE fibre optic laser encoders

The RLE system is a unique, advanced homodyne laser interferometer system specifically designed for position feedback applications. Each RLE system consists of an RLU laser unit and one or two RLD10 detector heads (differential, plane mirror or retroreflector), the model of which is dependent upon the requirements of the specific application.

Technical specifications

	RLU10	RLU20
Fibre lengths	3 m or 6 m	3 m only
Number of axes	Single or dual	Single or dual
Laser source	Class 2 HeNe	Class 2 HeNe
Outputs	Analogue / digital quadrature	
Velocities	Up to 2 m/s	Up to 2 m/s
Laser frequency stability (1 minute)	< ±10 ppb	< ±1 ppb
Laser frequency stability (1 hour)	< ±50 ppb	< ±2 ppb
Laser frequency stability (8 hours)	< ±50 ppb	< ±20 ppb
Vacuum wavelength stability (1 minute)	±0.1 ppm	±0.1 ppm

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HS20 long range laser encoders

The Renishaw HS20 laser encoder system combines the ultimate accuracy of a laser interferometer with the robustness needed for machine tool applications. The HS20 laser head, in combination with an external linear optics kit, forms a non-contact interferometric laser encoder system for long axis, high-accuracy linear position feedback applications.

The HS20 laser system is suitable for use in harsh machine shop environments with ±1.0 part per million (ppm or µm/m) being achievable for axes lengths up to 60 m.

Technical specifications

Compensated system accuracy	±1.0 ppm (µm/m)
Range	0 m to 60 m
Analogue output signal period	316 nm
Digital quadrature output resolutions	79 nm, 158 nm, 316 nm and 633 nm
Output update rates (MHz)	1, 2, 4, 8 and 16
Maximum speed	Up to 2 m/s

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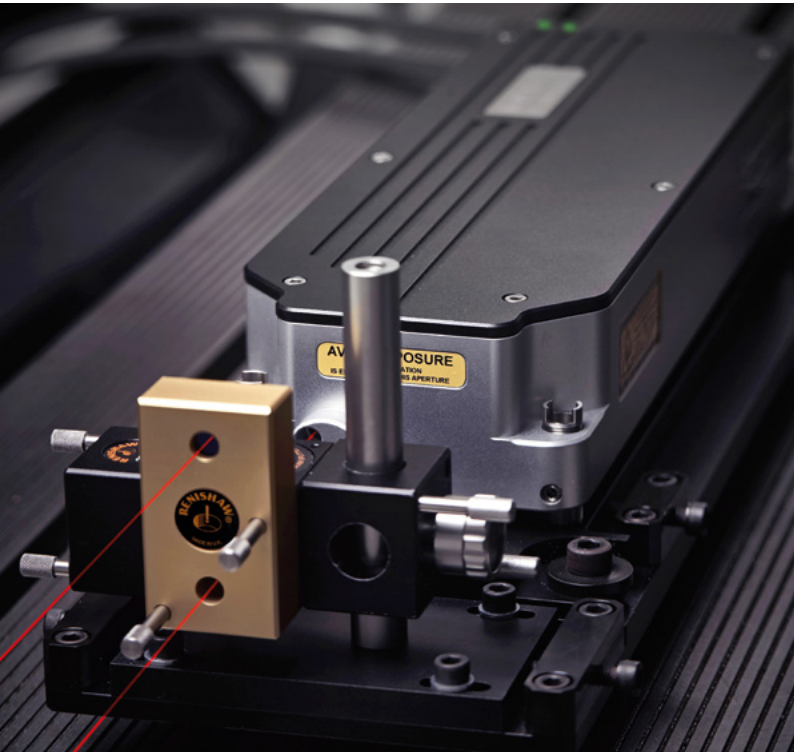

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