

# REXA ultra-high accuracy absolute angle encoder



**With zero coupling losses and exceptional repeatability, the REXA ultra-high accuracy angle encoder achieves better than  $\pm 1$  arc second total installed accuracy.**

**Like the RESM encoder, the REXA is a stainless steel ring with the scale graduations marked axially onto the periphery, but with a number of differences to improve upon RESM's already impressive accuracy.**

REXA has a thicker cross-section, to ensure that the only significant installation error is eccentricity. Eccentricity is easily removed by using 2 readheads, and combining the signals inside the host controller.

The only errors remaining are graduation errors and readhead SDE, both of which are so small they are often negligible.

As a non-contact encoder, REXA offers dynamic performance advantages, eliminating coupling losses, oscillation, shaft torsion and other hysteresis errors that plague enclosed encoders.

The REXA system operates at temperatures up to  $+80$  °C and speeds to 8 500 rev/min.

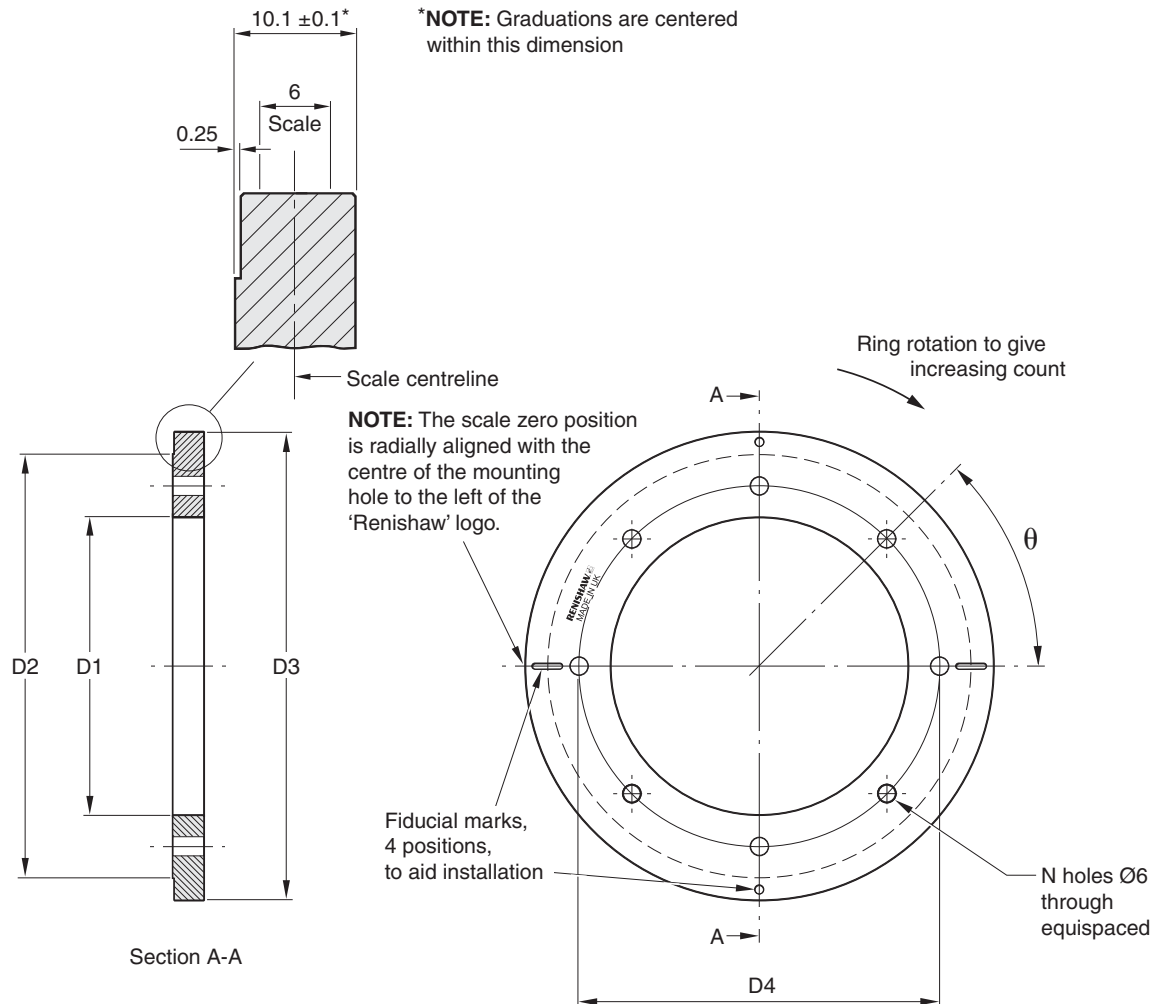
REXA total installed accuracy grades:

REXA diameter	Total installed accuracy
$\geq 100$ mm	$\pm 1$ arc second
75 mm	$\pm 1.5$ arc second
$\leq 57$ mm	$\pm 2$ arc second

- Use with two RESOLUTE<sup>®</sup> readheads to give ultra-high accuracy
- Installed accuracy to  $\pm 1$  arc second with dual readheads
- Sub-divisional error to  $\pm 0.04$  arc second
- Resolutions to 0.00030 arc second
- Repeatability to 0.01 arc second
- Wide range of standard sizes from 52 mm to 417 mm
- Large internal diameter for ease of integration
- Flange mounted with easy 4-point adjustment method

## Installation drawing

Dimensions and tolerances in mm

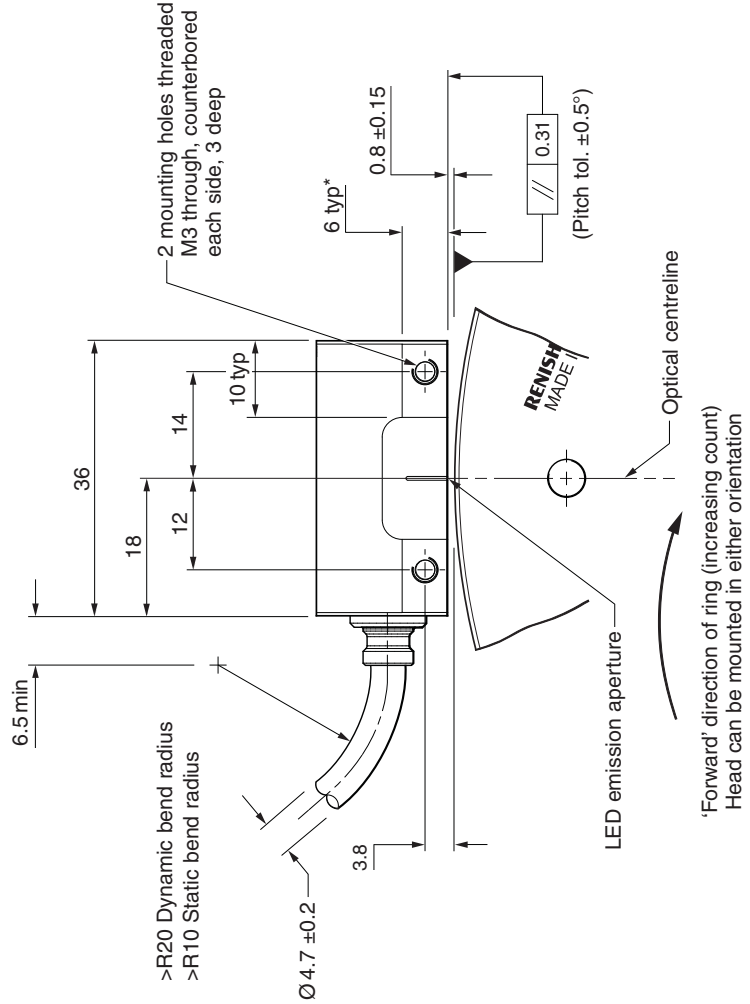
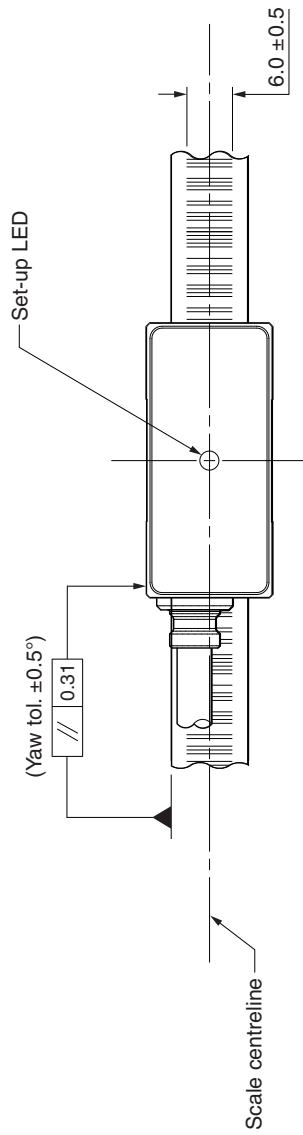


Nominal external diameter (mm)	Dimensions			Holes		
	D1	D2	D3	N	D4	θ
52*	26	50	52.1 – 52.2	4	38	90°
75	40.5	64.5	75.3 – 75.4	8	52.5	45°
104	57.5	97.5	104.2 – 104.4	8	77.5	45°
115	68	108	114.5 – 114.7	8	88	45°
150	96	136	150.2 – 150.4	8	116	45°
209	140.5	180.5	208.4 – 208.8	12	160.5	30°
229	160.5	200.5	229.0 – 229.4	12	180.5	30°
255	180.5	220.5	254.4 – 254.8	12	200.5	30°
300	216	256	300.2 – 300.4	12	236	30°
350	256	296	350.2 – 350.4	16	276	22.5°
417	305	345	417.0 – 417.4	16	325	22.5°

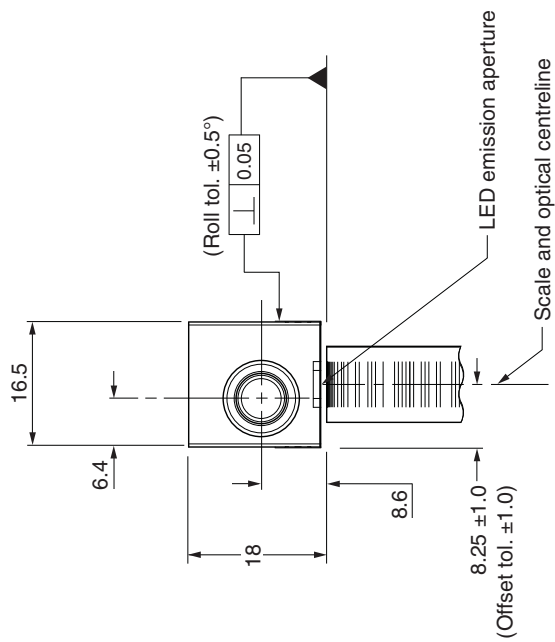
\*52 mm rings have dimple fiducial features and no slots.

## RESOLUTE installation drawing (on REXA ring)

Dimensions and tolerances in mm

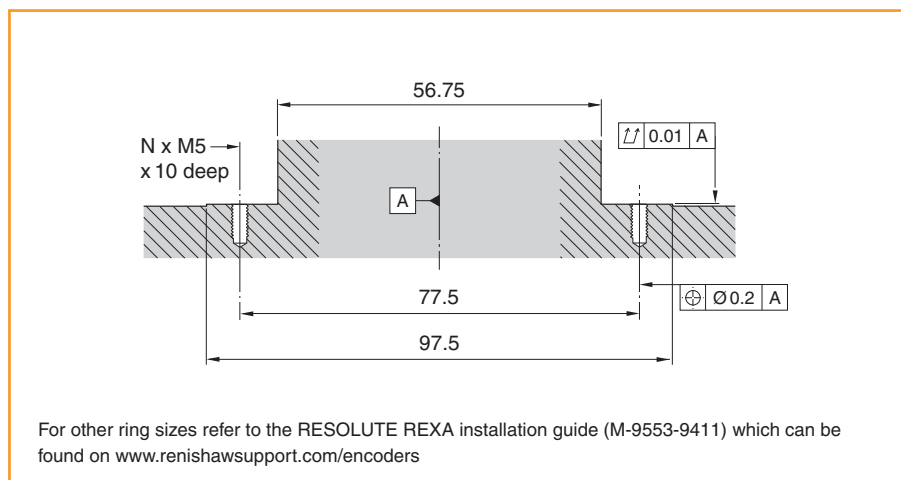


**NOTE:** Roll tolerance applies over mounting faces dimension\*



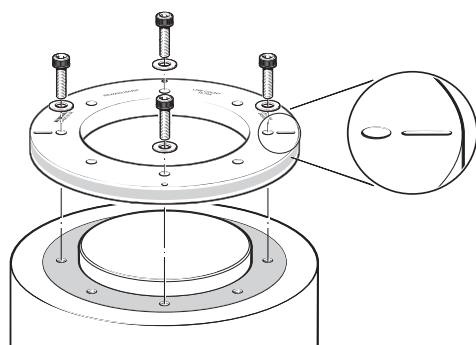
## Mounting method

(Important: flange mount only. Do **NOT** interference fit)



Example of mounting surface for 104 mm REXA

**Installation technique** (Please refer to the REXA installation guide (M-9553-9411) for full details).



REXA rings are made with 4 fiducial points engraved onto the top surface, which simplify alignment.

Using a suitable dial test indicator, positioned so that the stylus ball touches directly onto the scale surface, the ring only needs to be adjusted for run-out at the 4 fiducial points.

## Operating specifications

<b>Material</b>	303/304 stainless steel
<b>Coefficient of expansion</b>	17 $\mu\text{m}/\text{m}/^\circ\text{C}$ (ppm/ $^\circ\text{C}$ )
<b>Temperature</b>	Storage -20 $^\circ\text{C}$ to +80 $^\circ\text{C}$ (complete system) Operating RESOLUTE 0 $^\circ\text{C}$ to +80 $^\circ\text{C}$

## Ring mass and inertia

<b>Ring diameter (mm)</b>	<b>52</b>	<b>75</b>	<b>104</b>	<b>115</b>	<b>150</b>	<b>209</b>
<b>Mass (kg)</b>	0.13	0.26	0.48	0.54	0.85	1.50
<b>Inertia (kg-cm<sup>2</sup>)</b>	0.55	2.3	8.5	12	34	120

<b>Ring diameter (mm)</b>	<b>229</b>	<b>255</b>	<b>300</b>	<b>350</b>	<b>417</b>
<b>Mass (kg)</b>	1.69	2.03	2.74	3.59	5.09
<b>Inertia (kg-cm<sup>2</sup>)</b>	165	250	470	845	1700

## Resolution

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RESOLUTE is available with a variety of resolutions, to meet the needs of a wide range of applications.

The choice of resolutions depends on the serial protocol being used, but there are no limitations due to ring size, eg FANUC 27 bit resolution is available on all ring sizes.

*BiSS* RESOLUTE resolution options:

18 bit (262 144 counts per revolution,  $\approx$  4.94 arc second)

26 bit (67 108 864 counts per revolution,  $\approx$  0.019 arc second)

32 bit (4 294 967 296 counts per revolution,  $\approx$  0.00030 arc second)

Note that 32 bit resolution is below the noise floor of the RESOLUTE encoder.

FANUC RESOLUTE resolution options:

23 bit (8 388 608 counts per revolution,  $\approx$  0.15 arc second)

27 bit (134 217 728 counts per revolution,  $\approx$  0.0097 arc second)

For resolution options on other protocols, please contact Renishaw.

## Speed

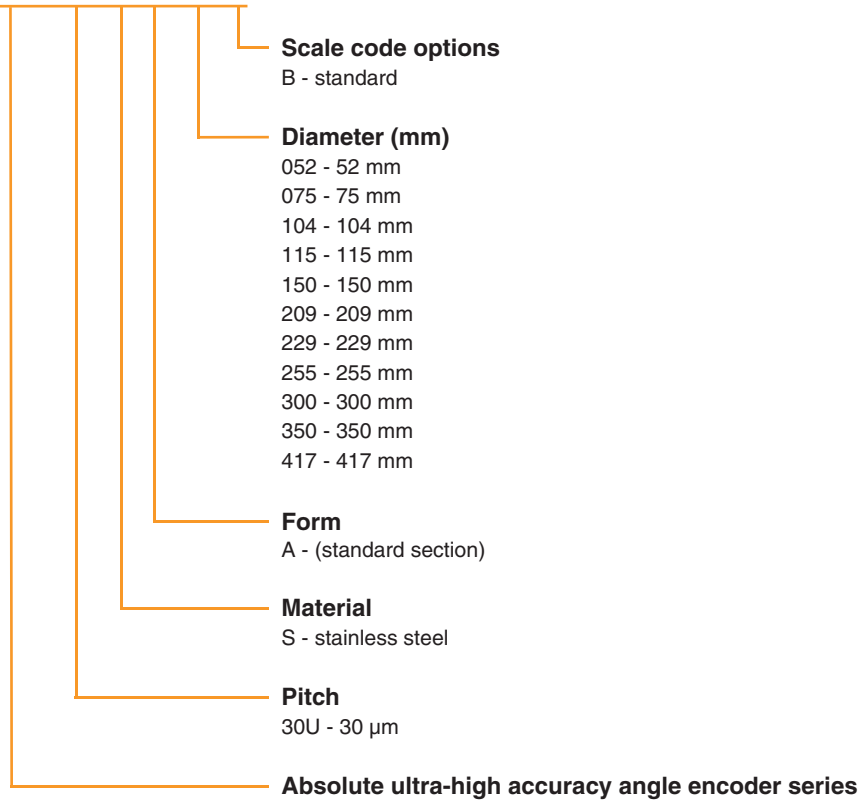
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REXA diameter (mm)	Maximum speed (rev/min)
52	8 500
75	7 100
104	4 400
115	3 800
150	2 700
209	2 000
229	1 800
255	1 600
300	1 200
350	12 00
417	900

**NOTE:** Maximum speed for REXA rings is limited by mechanical effects. The readhead is capable of reading much higher speeds. For more information and advice on using angle encoders at high speed, please contact Renishaw.

## REXA absolute ultra high accuracy angle encoder part numbers

REXA 30U S A 150 B



## REXA compatible readhead

REXA



## RESOLUTE

Installation guide M-9553-9411  
Data sheets L-9517-9442  
L-9517-9448

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