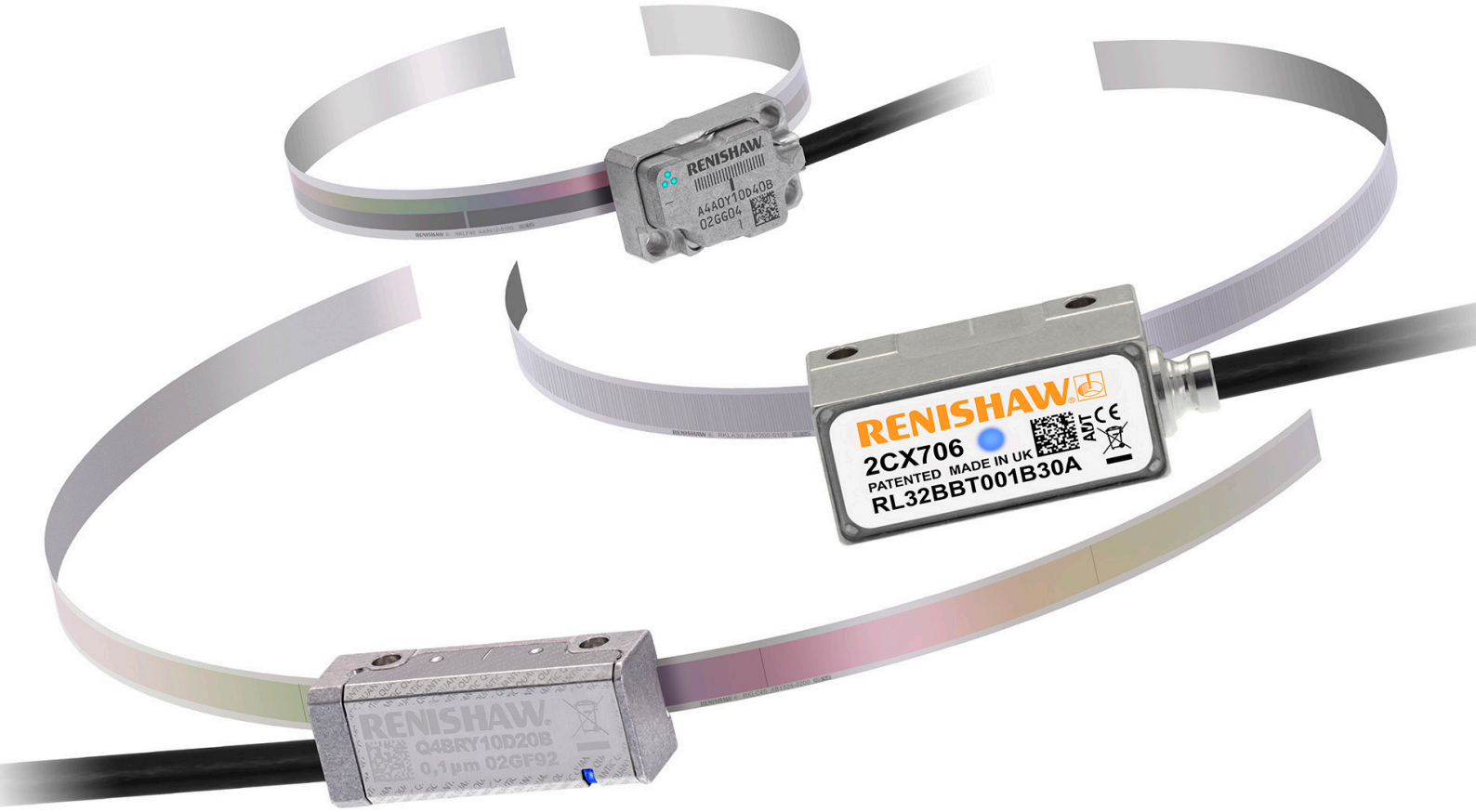
Data sheet
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RKL scale for partial arc applications



Measuring a partial arc of rotation is made easy with Renishaw's flexible RKL encoder scales. The flexible nature of the small cross-sectional area of these scales allows them to be wrapped around a drum, shaft or arc with a minimum radius of 26 mm.

RKL scale is compatible with Renishaw's QUANTiC™, VIONiC™, TONiC™, ATOM DX™, ATOM™ and RESOLUTE™ readheads providing a partial arc solution for a wide range of applications.

RKL scale is installed onto the axis substrate by a self-adhesive backing tape making this a quick, straightforward and inexpensive process. The scale ends are rigidly fixed to the axis substrate by means of epoxy or epoxy fastened end clamps, eliminating the need to drill holes.

- **Small cross-sectional area making it ideal for partial arc rotation applications**
- **Suitable for external radii down to 26 mm**
- **Compatible with a wide range of Renishaw's incremental and absolute readheads**
- **20 µm, 30 µm and 40 µm pitch versions available**
- **'Cut-to-length' convenience**
- ***IN-TRAC*™ optical reference marks**
- **High solvent immunity**

RKL partial arc scale specifications

		Incremental			Absolute
		RKLC20-S	**RKLC40-S**	**RKLF40-S**	**RKLA30-S**
Compatible readheads		VIONiC and TONiC	QUANTiC	ATOM and ATOM DX [1]	RESOLUTE
Form (height × width)		0.15 mm × 6 mm (including adhesive)			
Pitch		20 µm	40 µm	40 µm	30 µm
Accuracy (at 20 °C) (based on neutral axis)		±5 µm/m	±15 µm/m	±15 µm/m	±5 µm/m (including slope and linearity)
Linearity (at 20 °C) (based on neutral axis)		±2.5 µm/m	±3 µm/m	±3 µm/m	-
Supplied length		20 mm to 20 m (> 20 m available on request)		20 mm to 10 m (> 10 m available on request)	20 mm to 21 m
Material		Hardened and tempered stainless steel			
Mass		4.6 g/m			
Coefficient of thermal expansion (at 20 °C)		10.1 ±0.2 µm/m/°C			
Temperature	Storage	–20 °C to +80 °C			
	Operating [2]	0 °C to +70 °C			
	Installation	+10 °C to +35 °C			
Humidity		95% relative humidity (non-condensing) to IEC 60068-2-78			
Shock	Operating	500 m/s², 11 ms, ½ sine, 3 axes			
Vibration	Operating	300 m/s² maximum @ 55 to 2000 Hz, 3 axes			
Recommended end fixing	R≥ 75 mm	Epoxy mounted end clamps (A-9523-4015)			
	R≥ 26 mm	Approved epoxy adhesive (A-9531-0342)			
Minimum arc radius [3]		30 mm	26 mm	26 mm	50 mm

Reference mark [4]

RKLC20-S and RKLC40-S [5]	*IN-TRAC* reference mark, directly embedded into incremental track. Bi-directional position repeatable to unit of resolution throughout specified speed. 50 mm spacing, first reference mark 50 mm from scale end. Reference mark at mid-point of scale length for lengths < 100 mm.
RKLF40-S	Customer de-selectable auto-phase optical reference mark. Bi-directional position repeatable to unit of resolution throughout specified speed. 50 mm spacing, first reference mark 50 mm from scale end. Reference mark at mid-point of scale length for lengths < 100 mm.
RKLA30-S	No reference mark

1 40 µm ATOM and ATOM DX readhead variants only.

2 To limit the maximum tension in the scale $(CTE_{substrate} - CTE_{scale}) \times (T_{use\ extreme} - T_{install}) \leq 550$ µm/m where CTE_{scale} = ~ 10.1 µm/m/°C.

3 For smaller radii contact your local Renishaw representative.

4 Only the calibrated reference mark is phased.

5 Where a specific reference mark location is required, contact your local Renishaw representative for advice on the best method to achieve this.

Compatible readheads

	Incremental		
	VIONiC	**TONiC**	**QUANTiC**
			
Readhead size (length × width × height in mm)	35 × 13.5 × 10	35 × 13.5 × 10	35 × 13.5 × 10
Interface	-	Ti, TD or DOP	-
Scale type	RKLC20-S	RKLC20-S	RKLC40-S
Output	Digital resolutions from 5 µm to 2.5 nm direct from the readhead	Analogue 1 Vpp. Digital resolutions from 5 µm to 1 nm from an interface.	Analogue 1 Vpp. Digital resolutions from 10 µm to 50 nm direct from the readhead.
Sub-divisional error (typical)	< ±15 nm	< ±30 nm	< ±150 nm (partial arc radius > 67.5 mm) < ±80 nm [1] (partial arc radius ≤ 67.5 mm)
Maximum speed	12 m/s	10 m/s	24 m/s [1]
Diagnostic tool	ADTi-100 and ADT View	TONiC diagnostic tool	ADTi-100 and ADT View

	Incremental		
	ATOM [2]	**ATOM DX [2]**	**RESOLUTE**
			
Readhead size (length × width × height in mm)	20.5 × 12.7 × 7.85 (FPC variant: 20.5 × 12.7 × 6.8)	20.5 × 12.7 × 10.85 (Top exit variant: 20.5 × 12.7 × 7.85)	36 × 16.5 × 17.2
Interface	Ri, Ti, ACi	-	DRIVE-CLiQ only
Scale type	RKLF40-S	RKLF40-S	RKLA30-S
Output	Analogue 1 Vpp. Digital resolutions from 10 µm to 2 nm from an interface.	Digital resolutions from 10 µm to 5 nm direct from the readhead.	BiSS, Siemens DRIVECLiQ, FANUC, Mitsubishi, Panasonic, Yaskawa
Sub-divisional error (typical)	< ±120 nm	< ±120 nm	±40 nm
Maximum speed	20 m/s	20 m/s	100 m/s
Diagnostic tool	ATOM diagnostic tool	ADTi-100 and ADT View	ADTa-100 and ADT View

NOTE: If installing RKL scale on a partial arc for a UHV or ETR application, contact your local Renishaw representative for more information.

1 Digital variants only.

2 40 µm ATOM and ATOM DX readhead variants only.

RKLC partial arc installation drawing

Dimensions and tolerances in mm

Z	=	Axis of rotation
R1	=	Substrate radius
R^N	=	Neutral axis radius (R1 + 100 µm)
ML	=	Measuring length
L	=	Scale length [2]
		with end clamps L = ML + 40 [3]
		without end clamps L = ML + 20
OL	=	Overall length
		with end clamps OL = ML + 70 [3]

NOTE: The drawing is applicable for all compatible readheads.

NOTE: The surface roughness of the substrate must be better than 3.2 µm. The parallelism of the scale surface to the axis guideway (readhead ride height variation) must be within 0.05 mm.

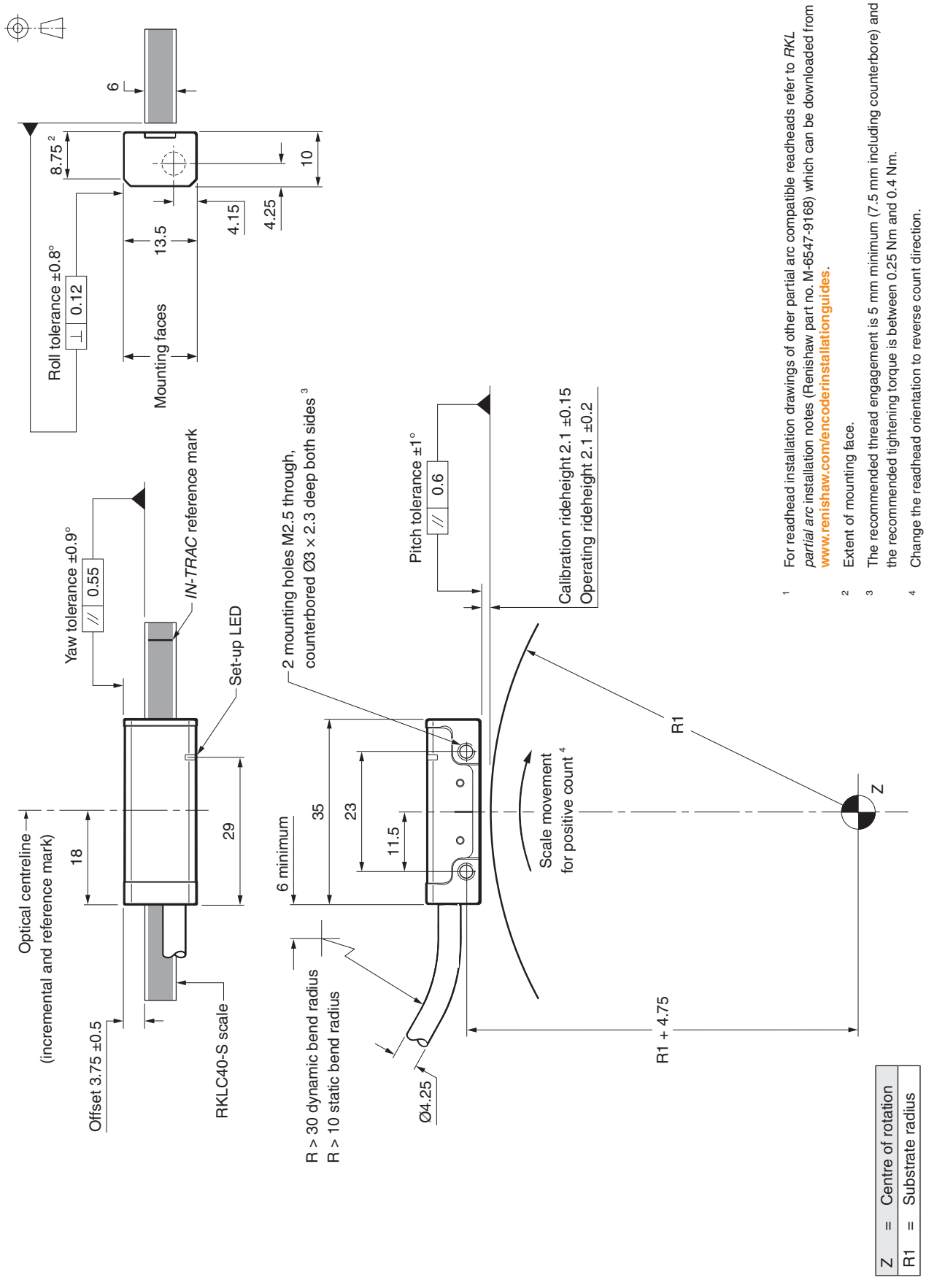
1 When not using end clamps, the scale ends must be secured using an alternative method. For further information refer to *RKL partial arc installation notes* (Renishaw part no. M-6547-9168) which can be downloaded from www.renishaw.com/encoderinstallationguides.

2 When calculating scale length, the first reference mark is 50 mm from scale end.

3 For RESOLUTE systems: To ensure readhead does not clash with the end clamps, L = ML + 66 and OL = ML + 96.

QUANTiC readhead installation drawing [1]

Dimensions and tolerances in mm



1 For readhead installation drawings of other partial arc compatible readheads refer to *RKL partial arc* installation notes (Renishaw part no. M-6547-9168) which can be downloaded from www.renishaw.com/encoderinstallationguides.

2 Extent of mounting face.

3 The recommended thread engagement is 5 mm minimum (7.5 mm including counterbore) and the recommended tightening torque is between 0.25 Nm and 0.4 Nm.

4 Change the readhead orientation to reverse count direction.

Scale part numbers

Scale type	Part number (where xxxx is the scale length in cm) [1]	Available lengths	Compatible readheads
RKLC40-S	A-6665-xxxx	20 mm to 20 m (> 20 m available on request)	QUANTiC
RKLC20-S	A-6663-xxxx	20 mm to 20 m (> 20 m available on request)	VIONiC and TONiC
RKLF40-S	A-6769-xxxx	20 mm to 20 m (> 20 m available on request)	ATOM and ATOM DX [2]
RKLA30-S	A-6667-xxxx	20 mm to 21 m	RESOLUTE

[1] For example, ordering A-6663-0110 will result in a 110 cm length of RKLC20-S.

[2] 40 µm ATOM and ATOM DX readhead variants only.

Accesssory part numbers

RKL scale accessories

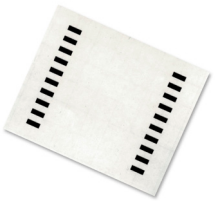
Part description	Part number	Product image
Guillotine (for cutting RKL scale)	A-9589-0071	
Shears (for cutting RKL scale)	A-9589-0133	
RKLC-S side mount scale applicator (compatible with VIONiC, TONiC and QUANTiC side mount systems)	A-6547-1912	
RKLC-S top mount scale applicator (required for TONiC top mounted systems only)	A-6547-1915	
RKLF-S side mount applicator (compatible with ATOM and ATOM DX)	A-6547-1943	
RKLF-S top mount applicator (compatible with ATOM and ATOM DX)	A-6547-1939	
RKLF-S slim side mount applicator (compatible with ATOM and ATOM DX)	A-6547-1947	
RKLA-S scale applicator (compatible with RESOLUTE)	A-6547-1918	

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End clamp accessories

Part description	Part number	Product image
RGC-F end clamp kit - epoxy mounted (the RGC-F end clamps fix the ends of the partial arc scale to the substrate material)	A-9523-4015	
RGG-2 two part epoxy (the RGG-2 epoxy is recommended for the mounting of end clamps and scale ends)	A-9531-0342	

Reference mark accessories

Part description	Part number	Product image
Reference mark de-selector stickers (pack of 20 de-selector stickers - RKLF ATOM /ATOM DX systems only)	A-9402-0049	

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