

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 TONiC	QUANTiC	ATOM ATOM DX	RESOLUTE
Form (H × W)	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*	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/s ² , 11 ms, ½ sine, 3 axes		
Vibration	Operating	300 m/s ² 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[†]	30 mm	26 mm	26 mm	50 mm

* To limit maximum tension in the scale $(CTE_{\text{substrate}} - CTE_{\text{scale}}) \times (T_{\text{use extreme}} - T_{\text{install}}) \leq 550 \mu\text{m/m}$ where $CTE_{\text{scale}} = \sim 10.1 \mu\text{m/m}/^\circ\text{C}$.

† For smaller radii contact your local Renishaw representative.

Reference mark

RKLC20-S and RKLC40-S

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.

NOTES:

- ▶ Only calibrated reference mark is phased
- ▶ Where a specific reference mark location is required, contact your local Renishaw representative for advice on the best method to achieve this

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.




NOTE: Only calibrated reference mark is phased

RKLA30-S

No reference mark

Compatible readheads

	Incremental		
	VIONiC	TONiC	QUANTiC
			
Readhead size (L × W × H 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 [†] (partial arc radius ≤ 67.5 mm)
Maximum speed	12 m/s	10 m/s	24 m/s [†]
Diagnostic tool	ADTi-100 and ADT View	TONiC diagnostic tool	ADTi-100 and ADT View

	Incremental		Absolute
	ATOM*	ATOM DX*	RESOLUTE
			
Readhead size (L × W × H in mm)	20.5 × 12.7 × 7.85 (FPC: 20.5 × 12.7 × 6.8)	20.5 × 12.7 × 10.85 (Top exit: 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 DRIVE-CLiQ, 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.

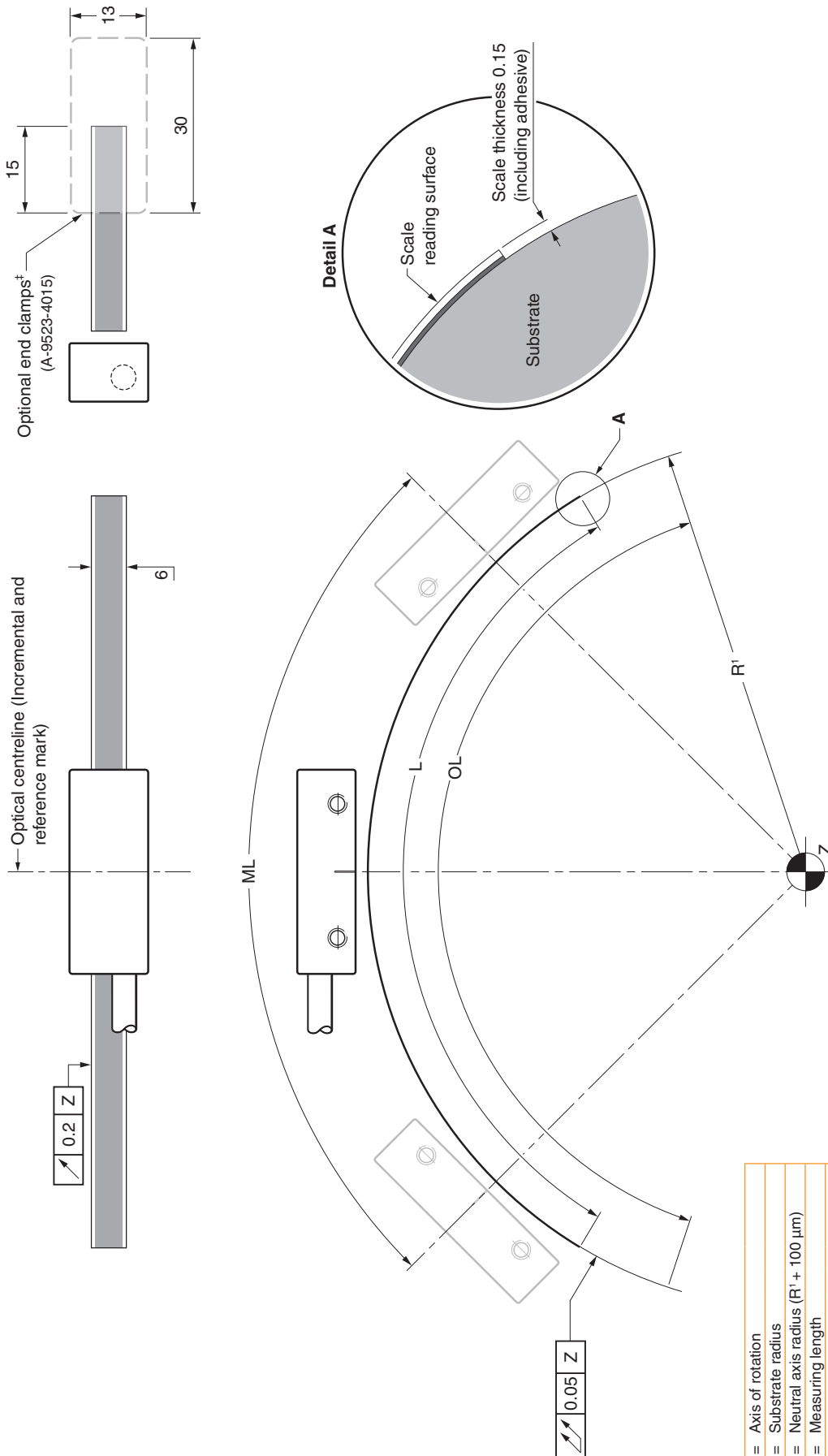
* 40 µm ATOM and ATOM DX variants only

[†] Digital variants

RKLC partial arc installation drawing (applicable for all compatible readheads)



Dimensions and tolerances in mm



Z	=	Axis of rotation	
R ¹	=	Substrate radius	
R ^N	=	Neutral axis radius (R ¹ + 100 μm)	
ML	=	Measuring length	
L	=	Scale length*	
		with end clamps	L = ML + 40 [†]
		without end clamps	L = ML + 20
OL	=	Overall length	
		with end clamps	OL = ML + 70 [†]

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.

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

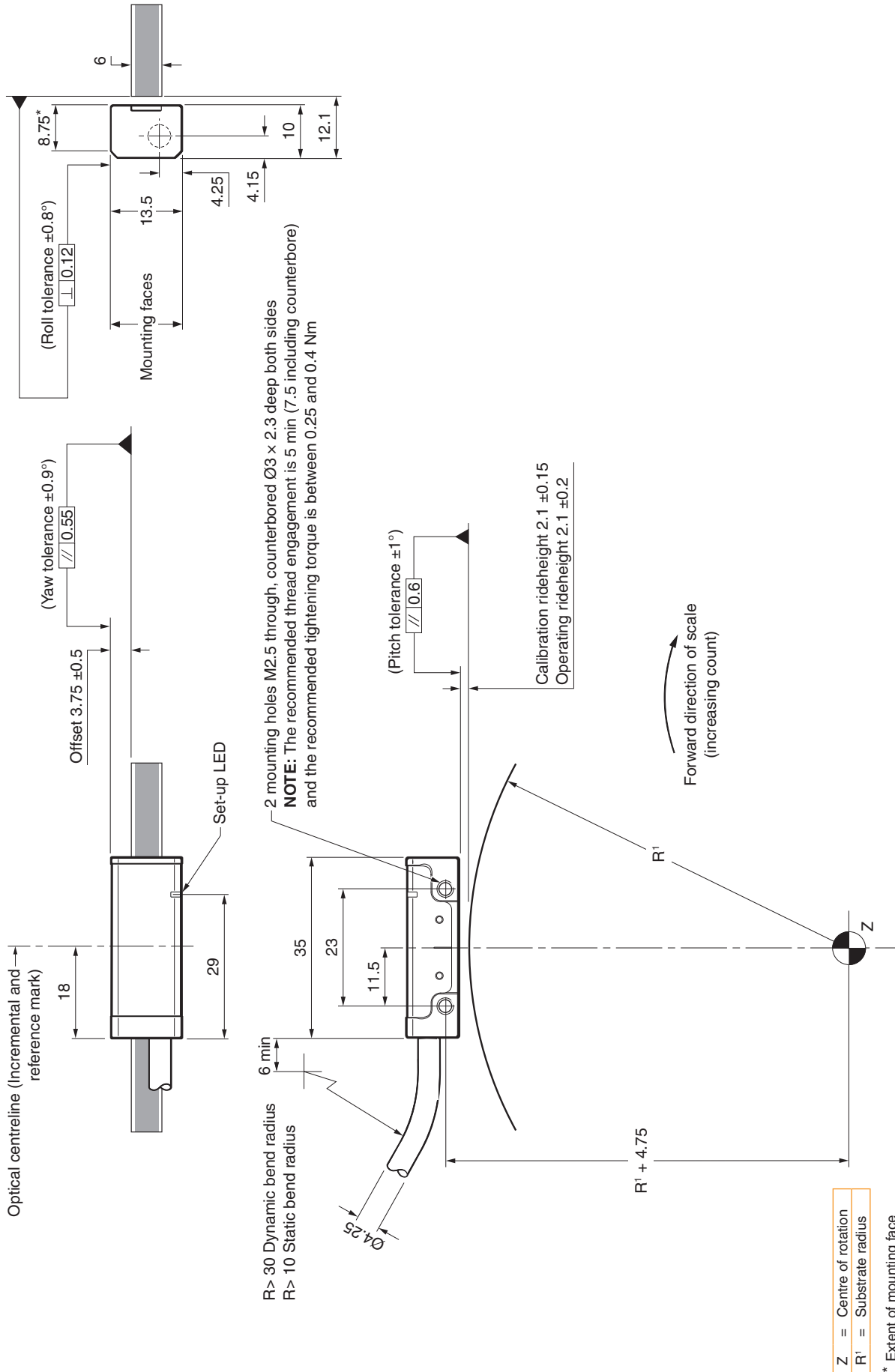
† For RESOLUTE systems: To ensure readhead does not clash with the end clamps, L = ML + 66 and OL = ML + 96

‡ 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/encoderrinstallationguides.

RKLC partial arc installation drawing (QUANTiC readhead shown)



Dimensions and tolerances in mm



Scale part numbers

	RKLC40-S (compatible with QUANTiC)	RKLC20-S (compatible with VIONiC and TONiC)	RKLF40-S (compatible with ATOM and ATOM DX)	RKLA30-S (compatible with RESOLUTE)
Available lengths	20 mm to 20 m (> 20 m available on request)			20 mm to 21 m
Part number (where xxxx is the length in cm)*	A-6665-xxxx	A-6663-xxxx	A-6769-xxxx	A-6667-xxxx

* For example, ordering A-6663-0070 will result in a 70 cm length of RKLC20-S



Accessory part numbers

RKL scale accessories

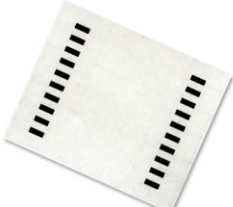
Part description	Part number	Product image
Guillotine (For cutting RKL scale)	A-9589-0071	
Shears (For cutting RKL scale)	A-9589-0133	
RKLC-S side mount scale applicator (Compatible with VIONiC, TONiC and QUANTiC side mount systems)	A-6547-1912	
RKLC-S top mount scale applicator (Required for TONiC top mounted systems only)	A-6547-1915	
RKLF-S side mount applicator (Compatible with ATOM and ATOM DX)	A-6547-1943	

<p>RKLF-S top mount applicator (Compatible with ATOM and ATOM DX)</p>	<p>A-6547-1939</p>	
<p>RKLF-S slim side mount applicator (Compatible with ATOM and ATOM DX)</p>	<p>A-6547-1947</p>	
<p>RKLA-S scale applicator (Compatible with RESOLUTE)</p>	<p>A-6547-1918</p>	

End clamp accessories

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

Reference mark accessories

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

For worldwide contact details, visit www.renishaw.com/contact

RENISHAW HAS MADE CONSIDERABLE EFFORTS TO ENSURE THE CONTENT OF THIS DOCUMENT IS CORRECT AT THE DATE OF PUBLICATION BUT MAKES NO WARRANTIES OR REPRESENTATIONS REGARDING THE CONTENT. RENISHAW EXCLUDES LIABILITY, HOWSOEVER ARISING, FOR ANY INACCURACIES IN THIS DOCUMENT.

© 2019-2020 Renishaw plc. All rights reserved.

Renishaw reserves the right to change specifications without notice.

RENISHAW and the probe symbol used in the RENISHAW logo are registered trade marks of Renishaw plc in the United Kingdom and other countries.

apply innovation and names and designations of other Renishaw products and technologies are trade marks of Renishaw plc or its subsidiaries.

All other brand names and product names used in this document are trade names, trade marks or registered trade marks of their respective owners.



L - 9517 - 9897 - 01

Part no.: L-9517-9897-01-C
Issued: 12.2020