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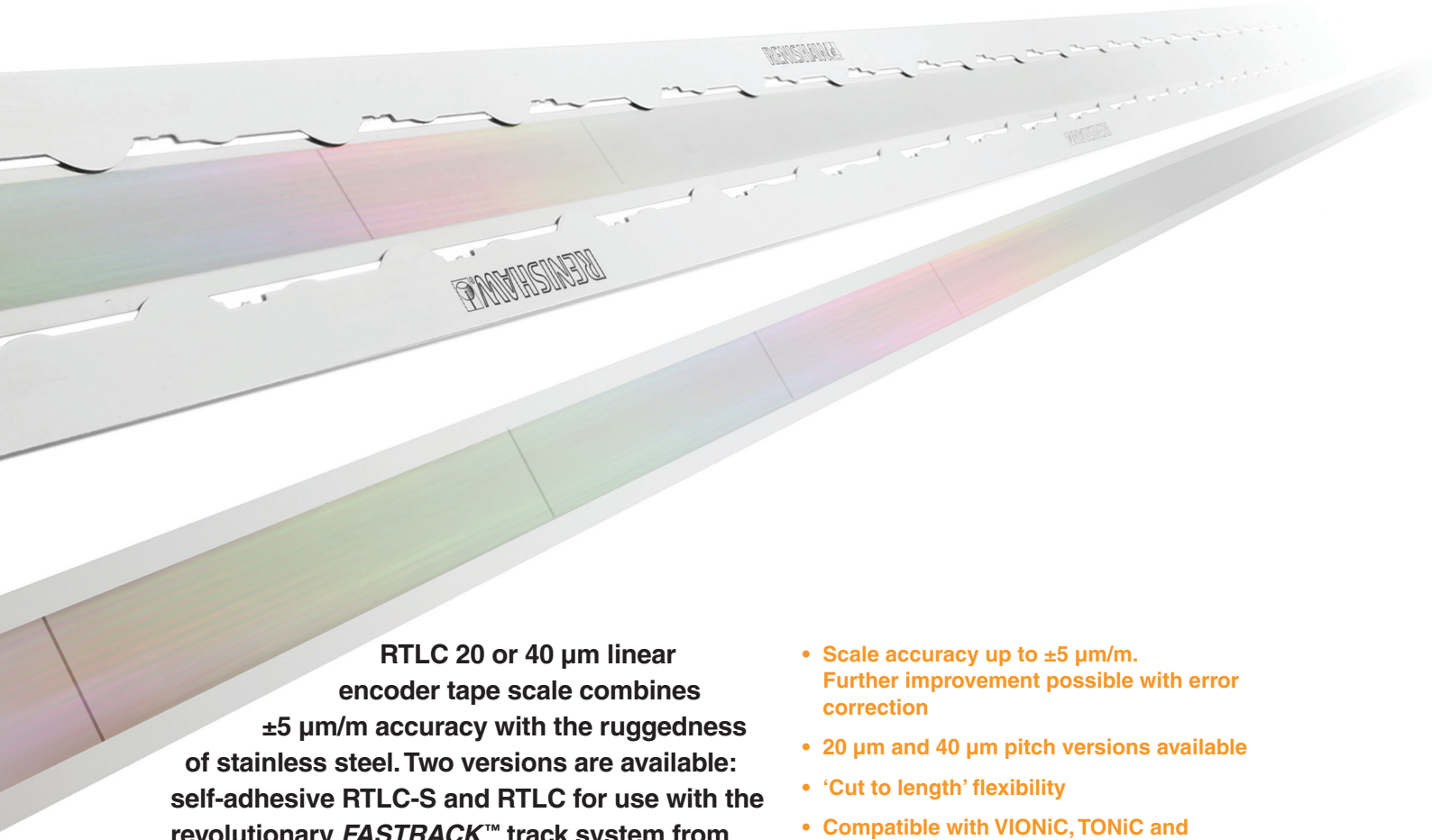
RTLC incremental linear scale



RTLC 20 or 40 µm linear encoder tape scale combines ±5 µm/m accuracy with the ruggedness of stainless steel. Two versions are available: self-adhesive RTLC-S and RTLC for use with the revolutionary *FASTRACK*™ track system from Renishaw.

Designed for applications that demand high accuracy and an independent expansion coefficient with tape scale convenience, RTLC is read by Renishaw's compact and reliable VIONiC™, TONiC™ and QUANTiC™ readheads.

RTLC-S is laid onto the substrate using its self-adhesive backing tape. An application tool makes this a quick, simple and inexpensive process. A datum clamp is fitted at a single point to lock the scale to the substrate.

RTLC (without self-adhesive) is used with *FASTRACK*. In this case, the scale is held securely in place by two miniature, yet rugged, guide rails. Again, the scale is clamped in a single point to allow independent expansion with extremely low hysteresis, even over wide temperature ranges. If damaged, the scale can be pulled out of the guide rails and quickly replaced, even where access is limited, thus reducing machine downtime. This feature also makes the new linear encoder system ideal for large machines that need to be sectioned for transportation.

- **Scale accuracy up to ±5 µm/m. Further improvement possible with error correction**
- **20 µm and 40 µm pitch versions available**
- **'Cut to length' flexibility**
- **Compatible with VIONiC, TONiC and QUANTiC high-performance readheads**
- **RTLC scale expands at its own low thermal coefficient (10.1 ±0.2 µm/m/°C @ 20 °C)**
- **Use with *FASTRACK* for very low hysteresis**
- ***FASTRACK* guide rails are pre-aligned in reels for cut-to-suit flexibility**
- **Quick installation. *FASTRACK* adds fast scale replacement capability**
- **Scale can be locked to the substrate at a single datum point anywhere along the axis**
- **RTLC scale can bridge gaps in the *FASTRACK* up to 25 mm**
- **High solvent immunity**

General specifications

Coefficient of thermal expansion (at 20 °C)		10.1 ±0.2 µm/m/°C
Temperature (system)	Storage	–20 °C to +70 °C
	Operating	0 °C to +70 °C
Humidity (system)		95% relative humidity (non-condensing) to IEC 60068-2-78
Shock (system)	Operating	500 m/s², 11 ms, ½ sine, 3 axe
Vibration (system)	Operating	100 m/s² max @ 55 to 2000 Hz, 3 axes

RTLC-S scale specifications

Self-adhesive incremental scale

Form (H × W)		0.4 mm × 8 mm including adhesive
Pitch	RTLC20-S	20 µm
	RTLC40-S / RTLC40H-S	40 µm
Accuracy (at 20 °C)	RTLC20-S / RTLC40H-S	±5 µm/m
	RTLC40-S	±15 µm/m
Linearity	RTLC20-S / RTLC40H-S	±2.5 µm/m achievable with two point error correction
	RTLC40-S	±3 µm/m achievable with two point error correction
Maximum supplied length		10 m†
Material		Hardened and tempered stainless steel
Mass		12.9 g/m

RTLC scale and *FASTRACK* carrier specifications

Incremental scale for use with *FASTRACK* carrier self-adhesive mounting system

Form (H × W)		0.4 mm × 18 mm including adhesive
Pitch	RTLC20	20 µm
	RTLC40 / RTLC40H	40 µm
Accuracy (at 20 °C)	RTLC20 / RTLC40H	±5 µm/m
	RTLC40	±15 µm/m
Linearity	RTLC20 / RTLC40H	±2.5 µm/m achievable with two point error correction
	RTLC40	±5 µm/m achievable with two point error correction
Maximum supplied length	RTLC	10 m
	FASTRACK	25 m
Minimum recommended length of *FASTRACK*		100 mm
Material	RTLC	Hardened and tempered stainless steel
	FASTRACK	Hardened stainless steel
Mass	RTLC	12.2 g/m
	FASTRACK	24 g/m

† For lengths >2 m *FASTRACK* with RTLC is recommended.

Reference mark

Type	*IN-TRAC*™ reference mark, directly embedded into incremental track 50 mm (nominal) spacing. Bi-directional position repeatability
Selection	Single reference mark selection by magnetic actuator (A-9653-0143) customer positioned
Repeatability	Unit of resolution repeatability (bi-directional) across full system rated speed and temperature ranges

Limit switches

Type	Magnetic actuators; with dimple triggers Q limit, without dimple triggers P limit (see RTLC scale installation drawing)
Trigger point	The limit output is nominally asserted when the readhead limit switch sensor passes the limit magnet leading edge, but can trigger up to 3 mm before that edge
Mounting	Customer placed at desired locations
Repeatability	< 0.1 mm

Compatible readheads

	VIONiC	TONiC	QUANTiC
			
Scale type	RTLC20	RTLC20	RTLC40
Pitch	20 µm	20 µm	40 µm
Outputs	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.
SDE (typical)	< ±15 nm	±30 nm	< ±80 nm*
Jitter (RMS)	down to 1.6 nm	down to 0.5 nm	down to 2.73
Maximum speed	12 m/s	10 m/s	24 m/s*

*Digital variants.

Readhead features

- Filtering optics and Auto Gain Control for high reliability and solid Lissajous signals.
- Dynamic signal processing ensures ultra-low sub-divisional error (SDE).
  Result: smoother scanning performance.
- High signal-to-noise ratio provides ultra-low jitter for optimum positional stability.
- Auto-phasing of *IN-TRAC* reference mark.
- Clocked outputs ensure optimised speed performance for all resolutions, for a wide variety of industry-standard controllers.
- DOP Dual output interfaces available to provide simultaneous analogue and digital outputs (TONiC systems only).

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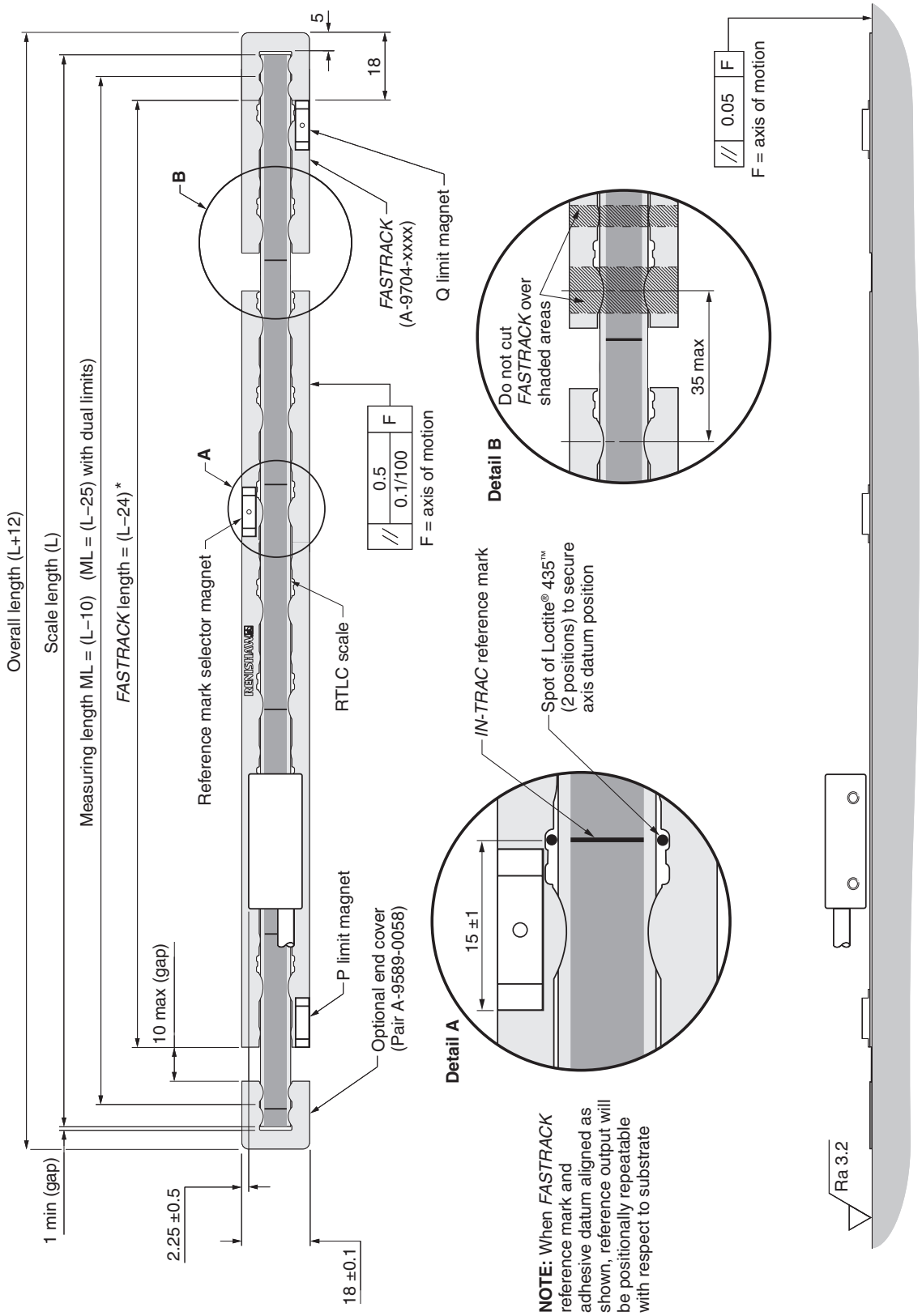
RTLC and *FASTRACK* carrier installation drawing

(adhesive datum clamp method†)

For further details, please refer to the relevant system installation guides.

Dimensions and tolerances in mm



*Assumes 1 mm gap between scale and end covers and zero gap between *FASTRACK* and end covers. †For alternative mechanical datum clamp method refer to the relevant system Installation guide.
NOTES: Minimum recommended *FASTRACK* length = 100 mm. The reference mark selector and limit actuator locations are correct for the readhead orientation shown.

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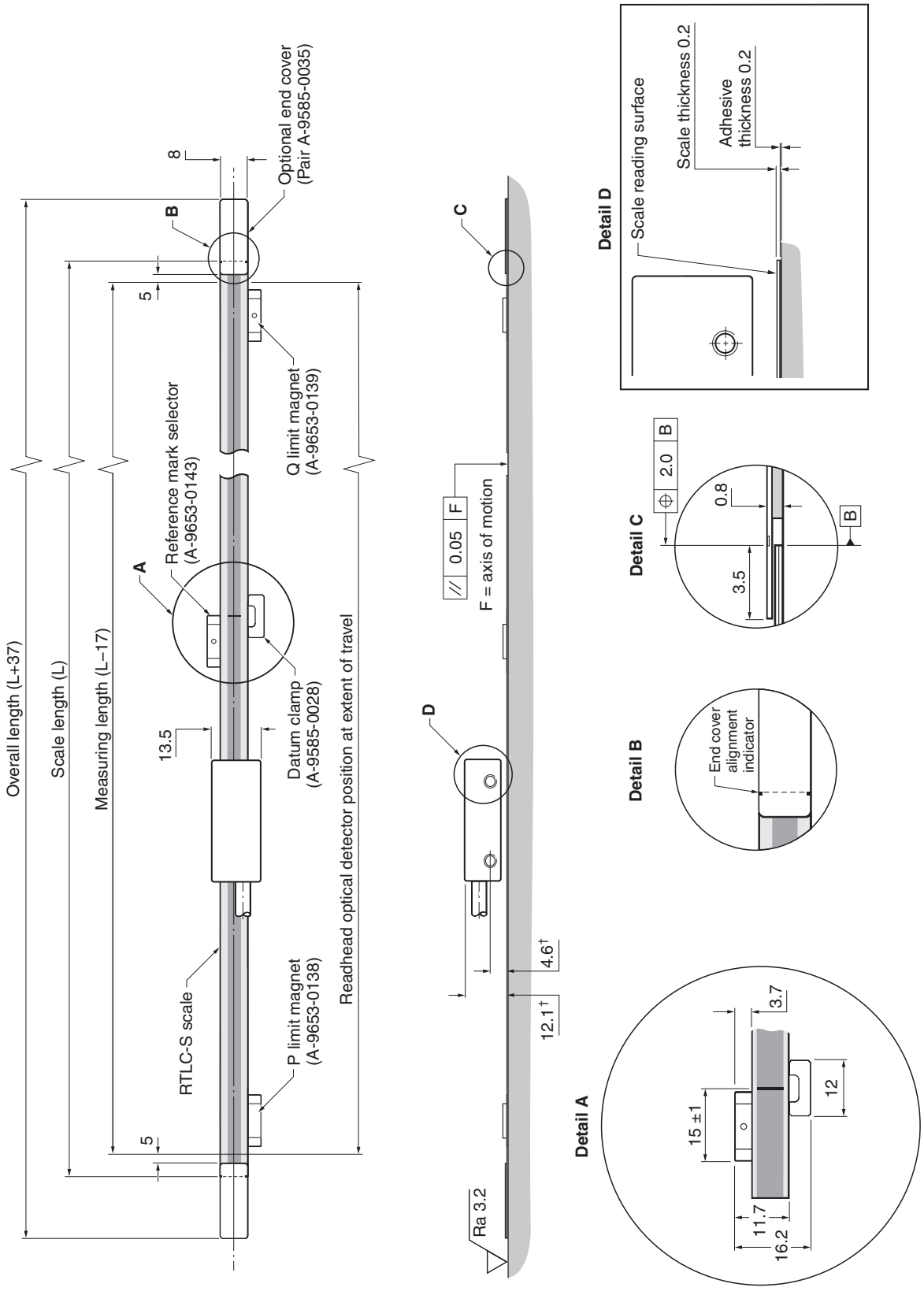
RTLC-S installation drawing

(Adhesive datum clamp method)

For further details, please refer to the relevant system installation guides.

Dimensions and tolerances in mm



†Dimensions from scale surface. **NOTE:** Bolted reference mark selector and limits also available. See the relevant system installation guide for details.

Scale part numbers

RTLC

Stainless steel tape scale for use with the *FASTRACK* carrier.

Available lengths	Available in increments of	Reference mark spacing	Distance from scale end to first reference mark	Part number (where xxxx is the length in cm)*		
				RTLC20 (Compatible with VIONiC and TONiC)	RTLC40 (Compatible with QUANTiC)	RTLC40H (Compatible with QUANTiC)
20 mm to 100 mm	10 mm	Middle of scale length	Middle of scale length	A-9705-xxxx	A-6566-xxxx	A-6668-xxxx
> 100 mm to 10 m	10 mm	50 mm	50 mm			

FASTRACK carrier

Stainless steel carrier for use with RTLC tape scale.

Available lengths	Available in increments of	Part number (where xxxx is the length in cm)*
100 mm to 25 m	25 mm†	A-9704-xxxx

† Part numbers for *FASTRACK* lengths ending in 25 mm are: A-9704-xxx3
Part numbers for *FASTRACK* lengths ending in 75 mm are: A-9704-xxx8

RTLC-S

Stainless steel tape scale with self-adhesive backing tape.

Available lengths	Available in increments of	Reference mark spacing	Distance from scale end to first reference mark	Part number (where xxxx is the length in cm)*		
				RTLC20-S (Compatible with VIONiC and TONiC)	RTLC40-S (Compatible with QUANTiC)	RTLC40H-S (Compatible with QUANTiC)
20 mm to 100 mm	10 mm	Middle of scale length	Middle of scale length	A-9715-xxxx	A-6567-xxxx	A-6670-xxxx
> 100 mm to 10 m	10 mm	50 mm	50 mm			

*Ordering A-9705-0070, for example, will result in a length of 70 cm of RTLC20.

Accessory part numbers

Reference mark and limit magnets†

Part description	Part number	Product image
Reference mark selector magnet – Adhesive mounted	A-9653-0143	
Bolted reference mark selector magnet (For use with RTLC-S only)	A-9653-0290	
Q limit switch actuator magnet – Adhesive mounted	A-9653-0139	
Bolted Q limit switch actuator magnet (For use with RTLC-S only)	A-9653-0291	
P limit switch actuator magnet – Adhesive mounted	A-9653-0138	
Bolted P limit switch actuator magnet (For use with RTLC-S only)	A-9653-0292	
Magnet applicator device (Aids positioning)	A-9653-0201	

†Longer limit magnets are available. Contact your local Renishaw representative for more information.

Datum clamps

Part description	Part number	Product image
Self-adhesive datum clamp (For use with RTLC-S only)	A-9585-0028	
Loctite 435 adhesive – 20 g bottle (For securing axis datum position of RTLC in *FASTRACK* carrier or RTLC-S)	P-AD03-0012	
Dispensing tip for Loctite 435 adhesive	P-TL50-0209	
Bolted datum clamp (For use with RTLC and *FASTRACK* only)	A-9589-0077	

Accessory part numbers (continued)

RTLC/RTLC-S scale and *FASTRACK* accessories

Part description	Part number	Product image
Guillotine (For cutting RTLC/RTLC-S scale and *FASTRACK* carrier)	A-9589-0071	
Shears (For cutting RTLC/RTLC-S scale and *FASTRACK* carrier)	A-9589-0133	
RTLC-S scale applicator	A-9589-0115	
FASTRACK centre section removal tool (Removes centre section of *FASTRACK* when carrier has been mounted)	A-9589-0066	
FASTRACK separator assembly (Removes centre section of *FASTRACK* when carrier has been mounted – includes removable side panels for use when *FASTRACK* is mounted against a ledge or dowels)	A-9589-0122	
RTLC scale pulling tool (Aids installation of RTLC scale through the *FASTRACK* carrier)	A-9589-0420	
End cover kit (RTLC-S only)	A-9585-0035	
End cover kit (*FASTRACK* only)	A-9589-0058	

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Compatible products

RTLC20
RTLC20-S

VIONiC

TONiC

RTLC40
RTLC40-S
RTLC40H
RTLC40H-S

QUANTiC

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

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