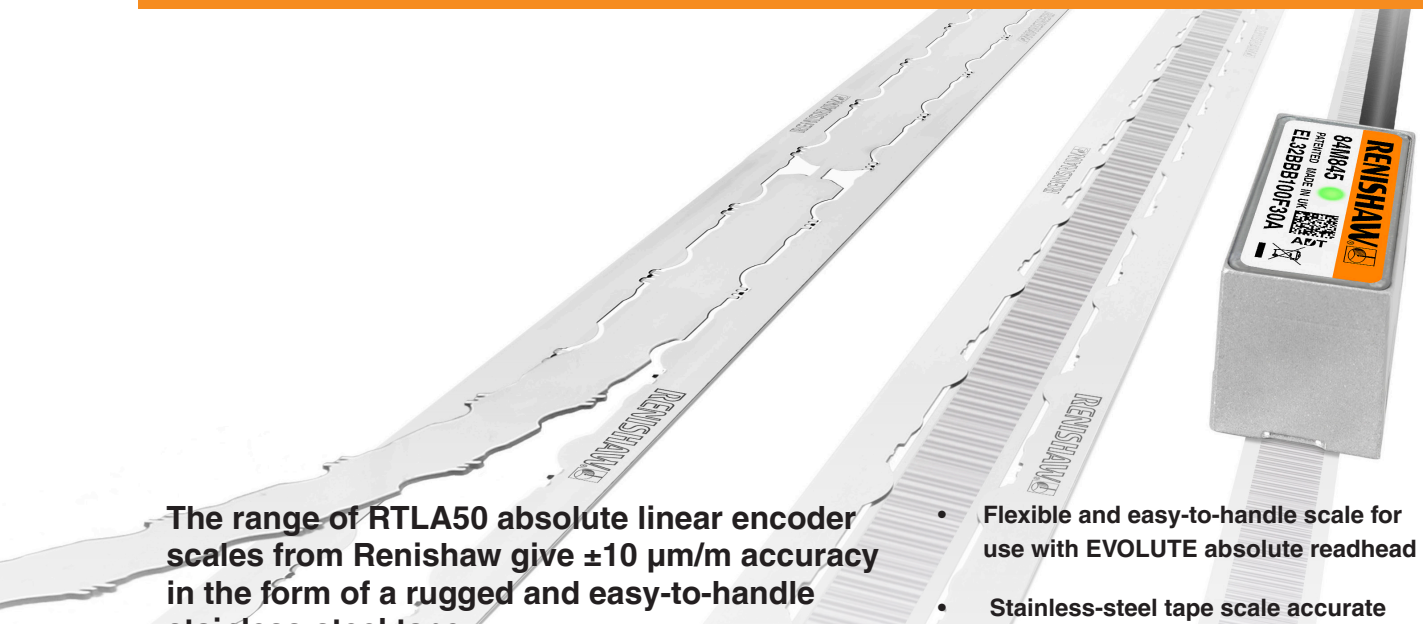
Data sheet
L-9517-9628-04-A

RENISHAW
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RTLA50 absolute linear scale



The range of RTLA50 absolute linear encoder scales from Renishaw give ±10 µm/m accuracy in the form of a rugged and easy-to-handle stainless-steel tape.

When combined with Renishaw's EVOLUTE readhead, the RTLA50 scales offer high accuracy and an independent expansion coefficient with resolutions down to 50 nm. The generous rideheight and installation tolerances, impressive dirt immunity and ease of assembly make this encoder ideally suited to a wide variety of applications.

RTLA50 can be used with *FASTRACK*™ carrier, Renishaw's cut-to-length track based mounting system, making it ideal for large machines that need to be sectioned for transportation. In this case the scale is held securely in place by two low-profile yet rugged guide rails and restrained at a single point to allow independent expansion with extremely low hysteresis, even over wide temperature ranges. If damaged, the scale can be slid out of the guide rails and quickly replaced, even where access is limited, thus reducing machine downtime.

When *FASTRACK* carrier is not used, an adhesive-backed version, RTLA50-S, can be laid directly onto the substrate using a patented application tool in a quick, simple and inexpensive process. Metrology is ensured by using the supplied clamp at a single point to lock the scale to the substrate.

RTLA50-S and RTLA50 with *FASTRACK* carrier are suitable for any application where thermal expansion of the scale must be independent of the machine structure, including FPD manufacturing and inspection machines, PV manufacturing, linear motors with aluminium substrates, large CMMs, axes that are exposed to potential damage, and any other machines that require the scale to be installed/removed for transit.

- **Flexible and easy-to-handle scale for use with EVOLUTE absolute readhead**
- **Stainless-steel tape scale accurate to ±10 µm/m. Further improvement possible with error compensation**
- **Independent RTLA50 scale expands at its own thermal coefficient (10.1 ±0.2 µm/m/°C @ 20 °C)**
- **Repeatable metrology: scale can be locked to the substrate at a single datum point anywhere along the axis**
- **High solvent immunity**
- **Scale lengths up to 10.02 m**
- **Quick installation. Use *FASTRACK* carrier for easy scale replacement**
- ***FASTRACK* carrier: sectional form is ideal for large machines and subassemblies**
- ***FASTRACK* guide rails are pre-aligned on reels for cut-to-suit flexibility**

System features

RTLA50 and RTLA50-S scale

- ±10 µm/m accuracy at 20 °C, including slope and linearity. Further improvement possible with error correction.

Example accuracy test result of 1000 mm length of RTLA50 scale



- Hardened stainless steel construction is rugged and reliable, with high scratch and solvent resistance.
- Independent expansion coefficient (10.1 ±0.2 µm/m/°C @ 20 °C).
- Very low hysteresis: sub-micron on a centre clamped 2 m axis over the entire operating temperature range.
- Scale can be cut to length using a guillotine for easy customisation.
- Track mounted using the revolutionary *FASTRACK* or self-adhesive mounted (RTLA50-S).

Compatible with EVOLUTE readheads

- True absolute optical encoder: absolute position is determined immediately at switch-on, eliminating reference returns.
- Unique single track nominal 50 µm pitch optical scale combines absolute position and incremental phase information into one code resulting in wide yaw tolerance.
- Resolutions to 50 nm.
- Low sub-divisional error (SDE ±150 nm) and low jitter (10 nm RMS) for smooth velocity control and rock-solid positional stability.
- 100 m/s maximum speed for all resolutions.
- Wide set-up tolerances: ±250 µm rideheight, ±0.75° yaw, ±0.5° pitch and roll.



RTLA50-S, RTLA50 and *FASTRACK* specifications

Description	RTLA50-S	Hardened and tempered martensitic stainless steel tape scale with self-adhesive backing tape for use with EVOLUTE readheads
	RTLA50	Hardened and tempered martensitic stainless steel tape scale for use with the FASTRACK carrier and EVOLUTE readheads.
	FASTRACK	Hardened stainless steel guide rails with integral sacrificial spacers, with self-adhesive backing tape for easy installation.
Pitch	RTLA50-S/RTLA50	50 µm
Form (height × width)	RTLA50-S	0.4 mm × 8 mm (including adhesive)
	FASTRACK	0.4 mm x 18 mm (including adhesive)
Accuracy (at 20 °C)	RTLA50-S/RTLA50	±10 µm/m
Coefficient of thermal expansion (at 20 °C)	RTLA50-S/RTLA50/ *FASTRACK*	10.1 ±0.2 µm/m/°C
Temperature (system)	Storage	–20 °C to +80 °C
	Operating	0 °C to +80 °C
Humidity (system)		95% relative humidity (non-condensing) to IEC 60068-2-78
Shock (system)	Non-operating	1000 m/s², 6 ms, ½ sine, 3 axes
Vibration (system)	Operating	Sinusoidal 100 m/s² maximum @ 55 to 2000 Hz, 3 axes
Mass	RTLA50-S	12.9 g/m
	RTLA50	12.2 g/m
	FASTRACK	24 g/m
Available lengths	RTLA50-S/RTLA50	20 mm to 10.02 m (available in increments of 10 mm)
	FASTRACK	100 mm to 25 m (available in increments of 25 mm)
Measuring length	RTLA50-S	See 'RTLA50-S installation drawing' on page 4
	RTLA50/*FASTRACK*	See 'RTLA50/FASTRACK installation drawing' on page 5

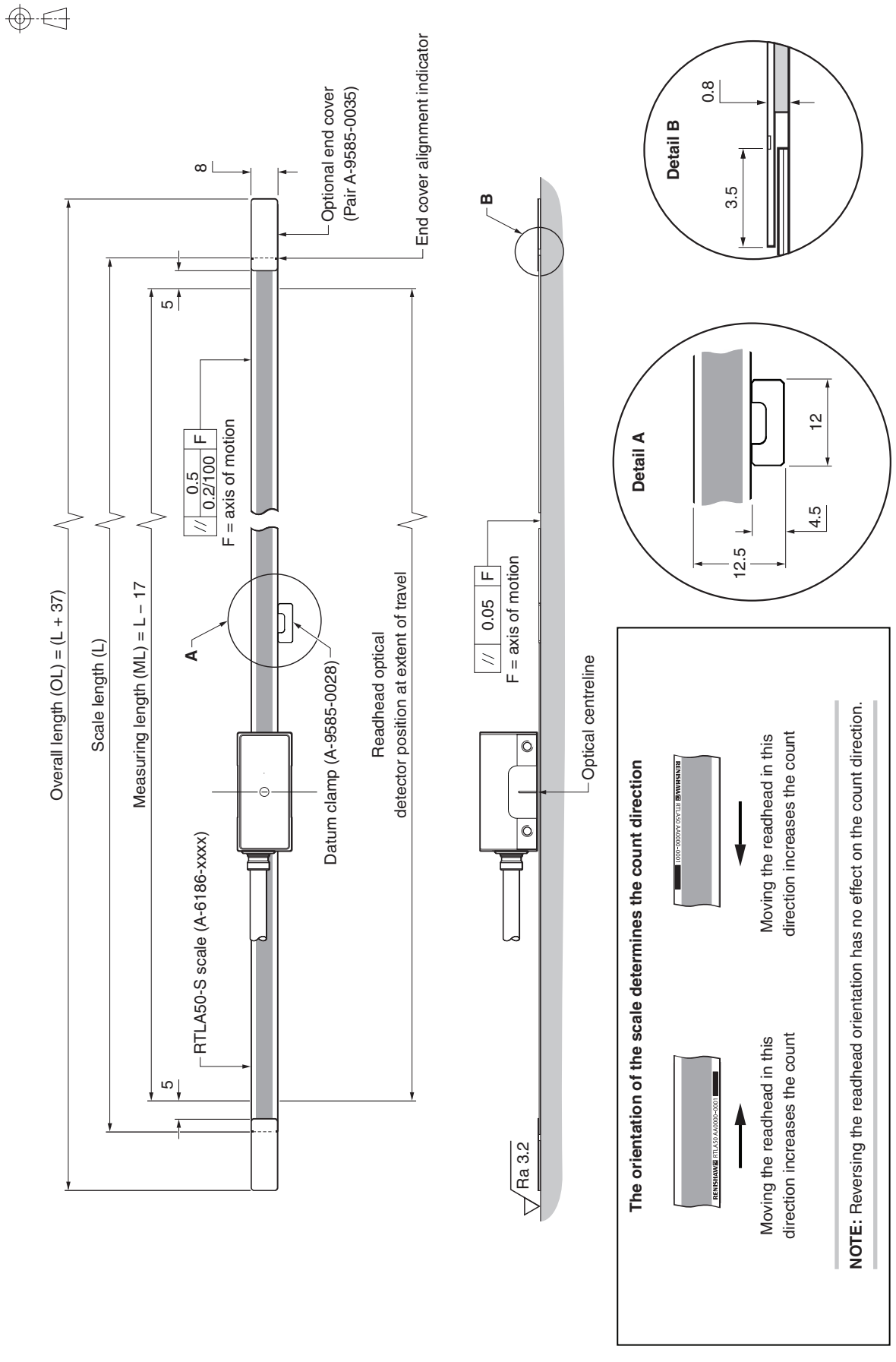
Resolution and scale lengths

EVOLUTE readheads are available with a variety of resolutions and scale lengths to meet the needs of a wide range of applications. The choice of resolution depends on the serial protocol being used. Refer to the *EVOLUTE™ absolute optical encoder system* data sheet (Renishaw part no. L-9518-0027) for more information.

For information on installation and mounting, refer to the *EVOLUTE™ and RTLA50-S absolute linear encoder system* installation guide (Renishaw part no. M-6183-9046) or *EVOLUTE™, RTLA50 and FASTRACK™ absolute linear encoder system* installation guide (Renishaw part no. M-6183-9040), which are available from the website at **www.renishaw.com/evolutedownloads**.

RTLA50-S installation drawing

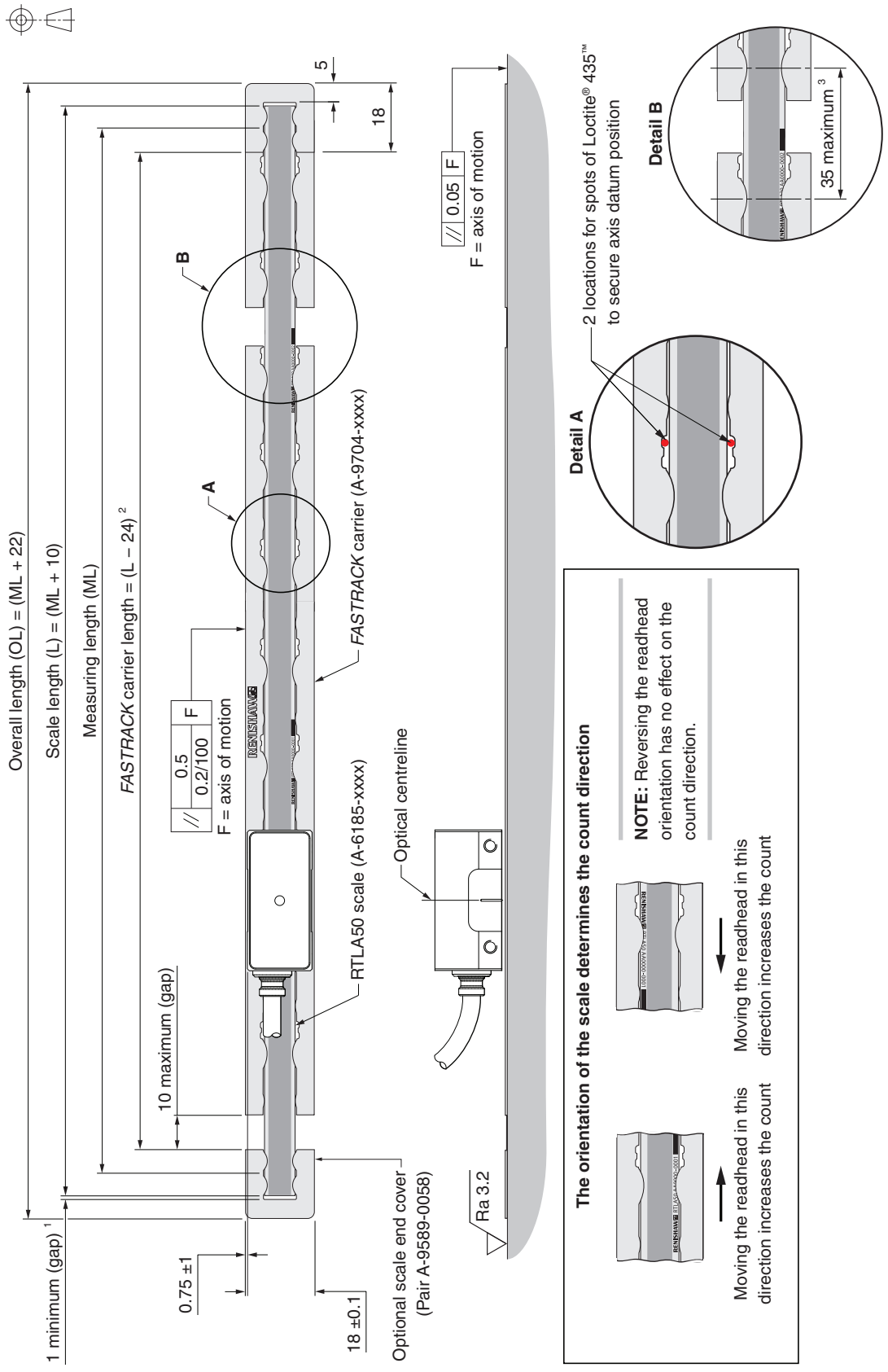
Dimensions and tolerances in mm



For further information on installation, refer to the *EVOLUTE™ and RTLA50-S absolute linear encoder system* installation guide (Renishaw part no. M-6183-9046), which is available from the website at www.renishaw.com/evolutedownloads.

RTLA50/*FASTRACK* installation drawing

Dimensions and tolerances in mm



1 The gap allows for thermal expansion.

2 Assumes a 1 mm gap between the scale and the end covers and a zero gap between the *FASTRACK* carrier and the end covers. The minimum recommended *FASTRACK* carrier length = 100 mm.

3 Only required for sectional installations.

For further information on installation, refer to the *EVOLUTE™*, *RTLA50 and FASTRACK™ absolute linear encoder system* installation guide (Renishaw part no. M-6183-9040), which is available from the website at www.renishaw.com/evolutedownloads.

Scale and *FASTRACK* carrier part numbers

RTLA50-S

Stainless steel tape scale with self-adhesive backing tape.

Part number	Available lengths	Available in increments of	Ordering instructions
A-6186-xxxx	20 mm to 10.02 m	10 mm	xxxx is the length in cm. Ordering A-6186-0450 for example will result in a length of 4500 mm.

RTLA50

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

Part number	Available lengths	Available in increments of	Ordering instructions
A-6185-xxxx	20 mm to 10.02 m	10 mm	xxxx is the length in cm. Ordering A-6185-0450 for example will result in a length of 4500 mm.

FASTRACK carrier

Stainless steel carrier for use with the RTLA50 tape scale.

Part number	Available lengths	Available in increments of	Ordering instructions
A-9704-xxxx	100 mm to 25 m	25 mm [1]	xxxx is the length in cm. Ordering A-9704-0450 for example will result in a length of 4500 mm.

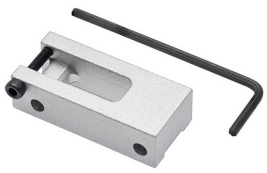
[1] Part numbers for *FASTRACK* carrier lengths ending in 25 mm are: A-9704-xxx3.
Part numbers for *FASTRACK* carrier lengths ending in 75 mm are: A-9704-xxx8.

Scale accessory part numbers

General accesories

Part description	Part numbers	Product image
Loctite® 435™ adhesive - 20 g bottle For securing the axis datum position	P-AD03-0012	
Dispensing tip for Loctite® 435™ adhesive	P-TL50-0209	
Guillotine For cutting RTLA50-S scale, RTLA50 scale, and *FASTRACK* carrier	A-9589-0071	
Shears For cutting RTLA50-S scale, RTLA50 scale, and *FASTRACK* carrier	A-9589-0133	

RTLA50-S accesories

Part description	Part numbers	Product image
Self-adhesive datum clamp	A-9585-0028	
0.8 mm blue setting shim [1] Used for setting the correct distance (rideheight) between the readhead and the RTLA50-S scale.	M-9517-0122	
RTLA50-S scale applicator For easy installation of the RTLA50-S scale	A-9589-0095	
End cover kit	A-9585-0035	

[1] The shim is supplied with the readhead.

RTLA50 and *FASTRACK* accesories

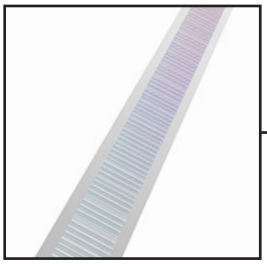
Part description	Part numbers	Product image
0.6 mm red setting shim [1] Used for setting the correct distance (rideheight) between the readhead and the *FASTRACK* carrier.	M-9517-0124	
***FASTRACK* centre section removal tool** Removes centre section of *FASTRACK* when carrier has been mounted	A-9589-0066	
***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	
Scale pulling tool Aids installation of RTLA50 scale through the *FASTRACK* carrier	A-9589-0420	
***FASTRACK* end cover kit**	A-9589-0058	

[1] The shim is supplied with the readhead.

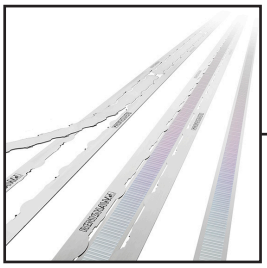
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Compatible products

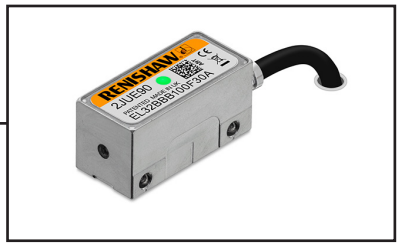
RTLA50-S



RTLA50/*FASTRACK*



EVOLUTE readheads



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Part no.: L-9517-9628-04-A
Issued: 09.2025