

# RTLA50 absolute linear encoder scale system for EVOLUTE™



The range of RTLA50 absolute linear encoder scales from Renishaw give  $\pm 10 \mu\text{m}/\text{m}$  accuracy in the form of a rugged and easy-to-handle stainless-steel tape. RTLA50 scales can either be stuck to the substrate using their self-adhesive backing or mounted in the revolutionary **FASTRACK™** track system to offer total design flexibility.

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.

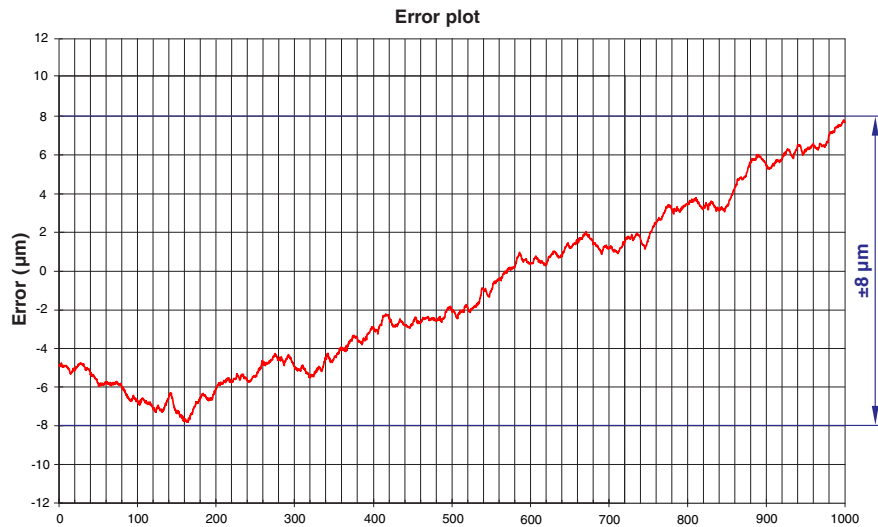
RTLA50-S and RTLA50 with **FASTRACK** carrier are suitable for any application where thermal expansion of the scale must be independent of the machine structure, including FPD manufacturing and inspection machines, PV manufacturing, linear motors with aluminium substrates, large CMMs, axes that are exposed 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  $\pm 10 \mu\text{m}/\text{m}$ . Further improvement possible with error compensation
- Independent RTLA50 scale expands at its own thermal coefficient ( $10.1 \pm 0.2 \mu\text{m}/\text{m}/^\circ\text{C}$  @  $20^\circ\text{C}$ )
- 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

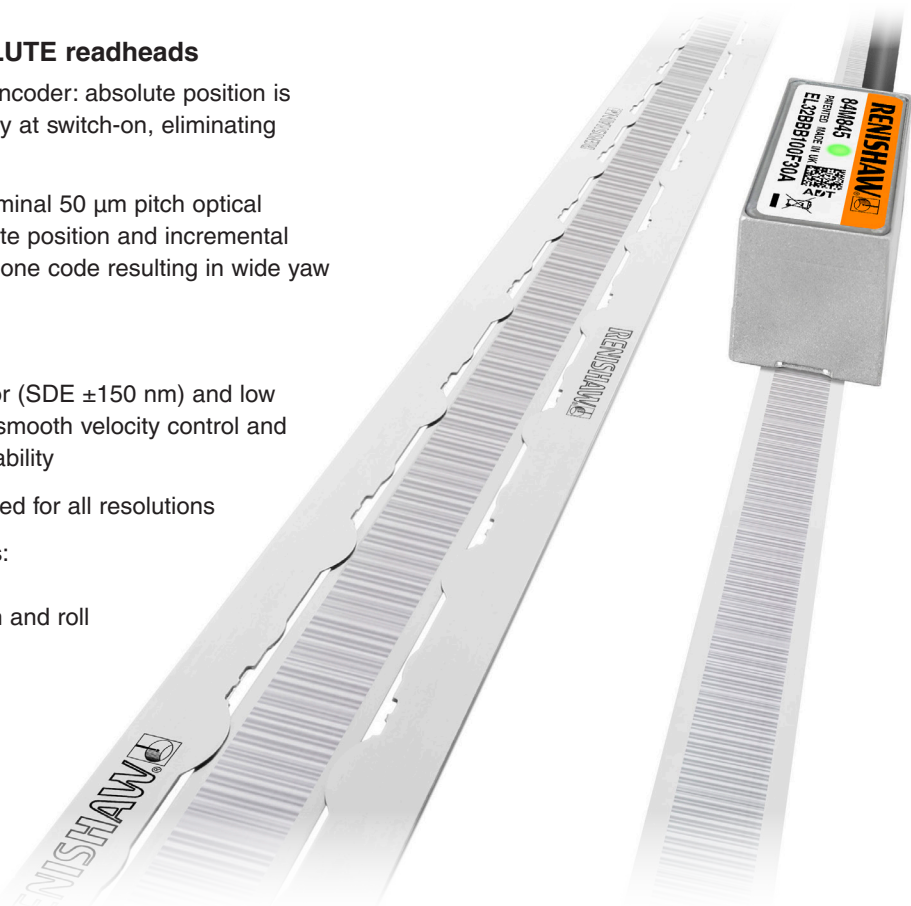
- ▶  $\pm 10 \mu\text{m}/\text{m}$  accuracy at  $20^\circ\text{C}$ , including slope and linearity. Further improvement possible with error correction
- ▶ Hardened stainless steel construction is rugged and reliable, with high scratch and solvent resistance
- ▶ Independent expansion coefficient ( $10.1 \pm 0.2 \mu\text{m}/\text{m}/^\circ\text{C}$  @  $20^\circ\text{C}$ )
- ▶ 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)



Example accuracy test result of 1000 mm length of RTLA50 scale

### Compatible with EVOLUTE readheads

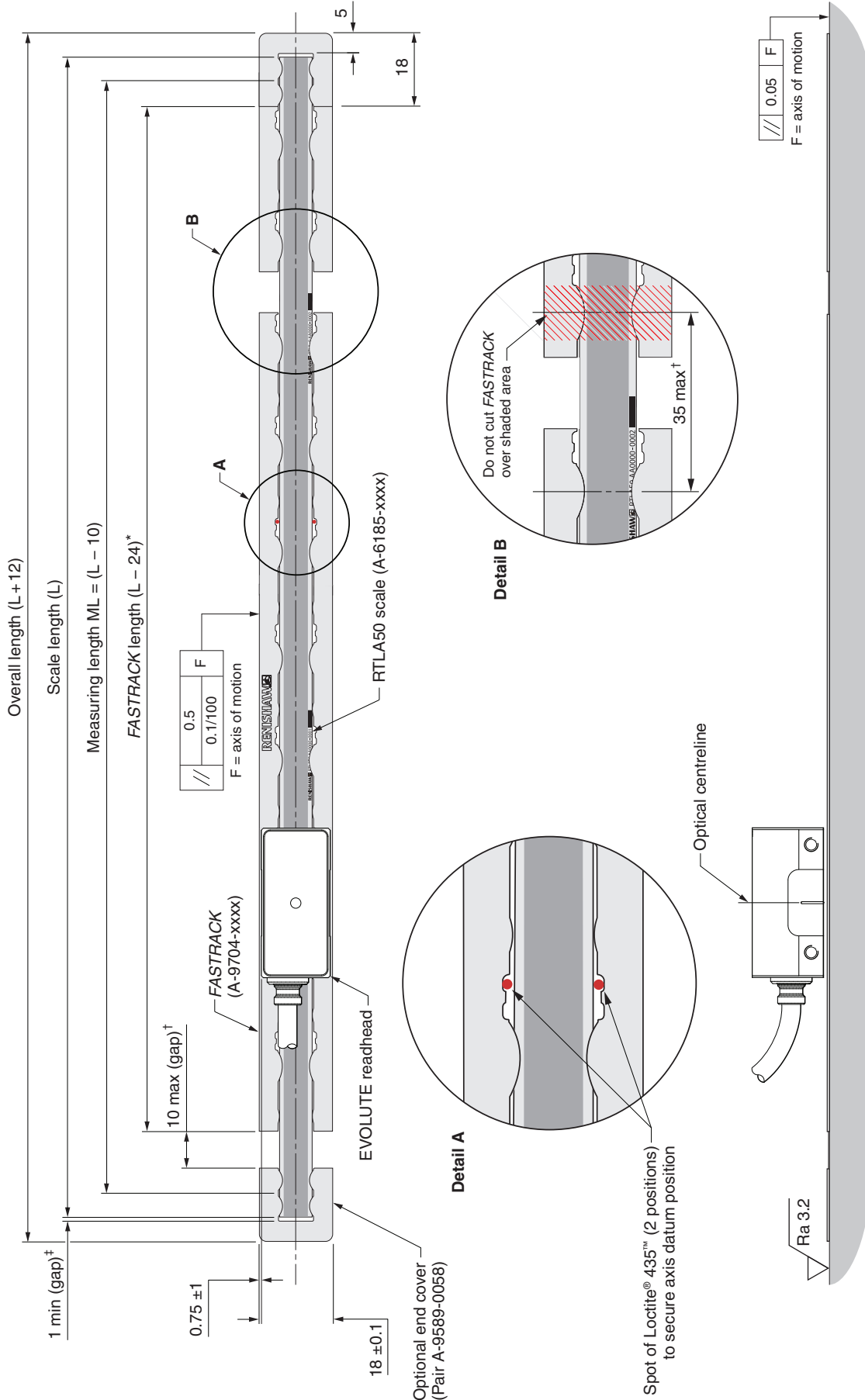
- ▶ True absolute optical encoder: absolute position is determined immediately at switch-on, eliminating reference returns
- ▶ Unique single track nominal  $50 \mu\text{m}$  pitch optical scale combines absolute position and incremental phase information into one code resulting in wide yaw tolerance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



### Installation drawing: RTLA50 in **FASTRACK** carrier

For further details, refer to EVOLUTE RTLA50/FASTRACK installation guide (M-6183-9040)

Dimensions and tolerances in mm



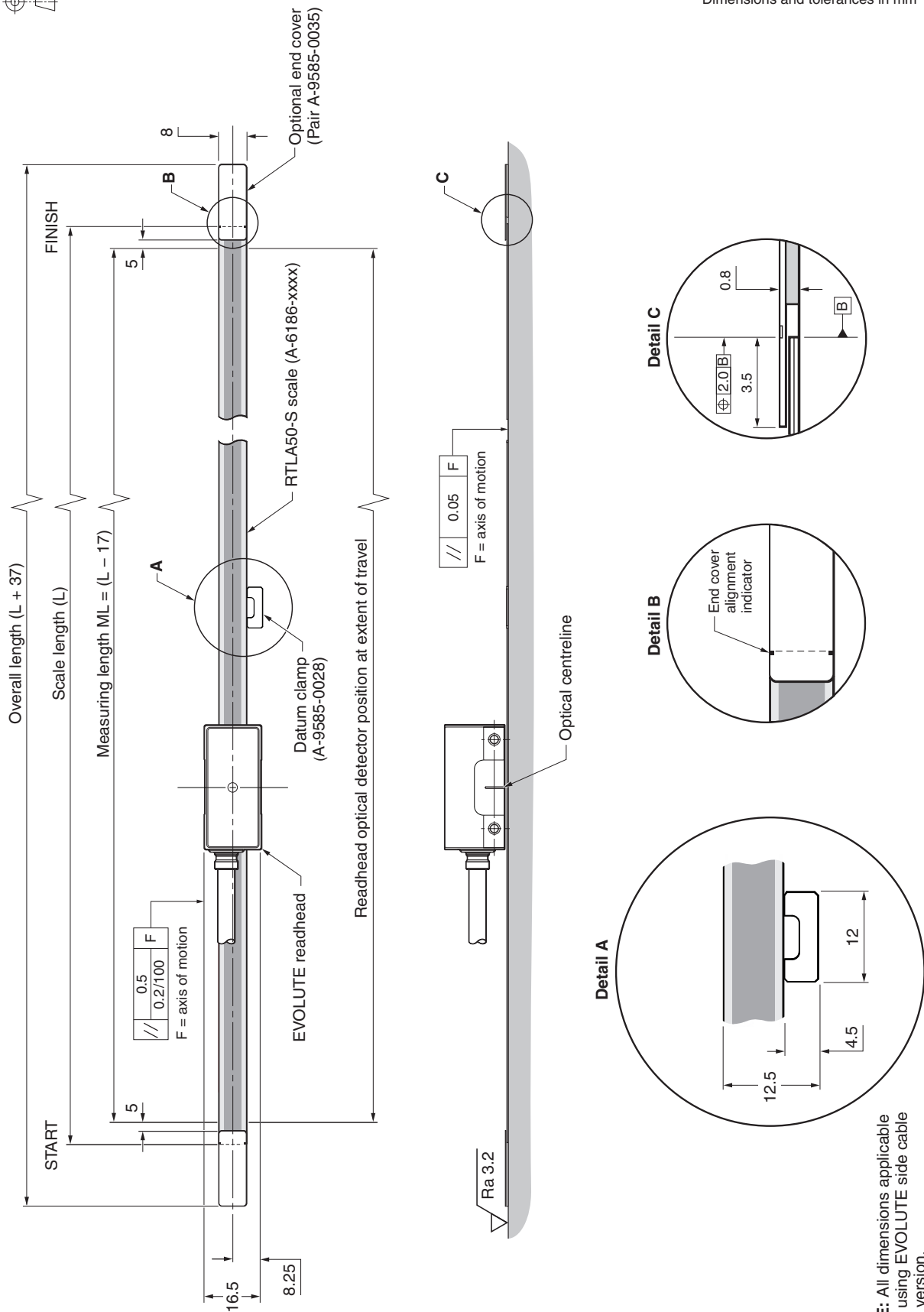
**NOTE:** Minimum recommended FASTRACK length = 100 mm. All dimensions applicable when using EVOLUTE side cable outlet version.  
\*Assumes 1 mm gap between scale and end covers and zero gap between FASTRACK and end covers. †Only required for sectional installations. ‡For thermal expansion.

**Installation drawing: RTLA50-S (with adhesive datum clamp)**

For further details, refer to EVOLUTE RTLA50-S installation guide (M-6183-9046)



Dimensions and tolerances in mm



**NOTE:** All dimensions applicable when using EVOLUTE side cable outlet version.

## RTL50-S, RTL50 and *FASTRACK* specifications

<b>Description</b>	RTL50-S	Self-adhesive absolute high-accuracy hardened and tempered martensitic stainless steel for use with EVOLUTE readheads.
	RTL50	Absolute high-accuracy hardened and tempered martensitic stainless-steel scale for use with <i>FASTRACK</i> and EVOLUTE readheads.
	<i>FASTRACK</i>	Hardened and tempered stainless-steel guide rails with removable alignment strip and self-adhesive backing tape for easy installation.
<b>Form (H × W)</b>	RTL50-S	0.4 mm × 8 mm (including adhesive)
	<i>FASTRACK</i>	0.4 mm × 18 mm (including adhesive)
<b>Scale accuracy (at 20 °C)</b>		±10 µm/m
<b>Scale thermal expansion (at 20 °C)</b>		10.1 ±0.2 µm/m/°C
<b>Temperature (system)</b>	Storage	-20 °C to +80 °C
	Operating	0 °C to +80 °C
<b>Humidity (system)</b>		95% maximum relative humidity (non-condensing) to IEC 60068-2-78
<b>Shock (system)</b>	Non-operating	1000 m/s <sup>2</sup> , 6 ms, ½ sine, 3 axes
<b>Vibration (system)</b>	Operating	100 m/s <sup>2</sup> max @ 55 to 2000 Hz, 3 axes
<b>Mass</b>	RTL50-S	12.9 g/m
	RTL50	12.2 g/m
	<i>FASTRACK</i>	24 g/m
<b>Minimum recommended length</b>	<i>FASTRACK</i>	100 mm (including end covers)
<b>Maximum supplied length</b>	RTL50-S	10.02 m
	RTL50	10.02 m
	<i>FASTRACK</i>	25 m

### Resolution and scale lengths

EVOLUTE is 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 relevant EVOLUTE data sheet for more information.

For further information on installation and mounting options, refer to the EVOLUTE linear installation guides (M-6183-9046 or M-6183-9040), which are available from your local Renishaw representative or can be downloaded from [www.renishaw.com/encoderinstallationguides](http://www.renishaw.com/encoderinstallationguides)

## RTL50-S, RTL50 and FASTRACK part numbers

Part type	Length	Available in increments of:	Part number (where xxxx is the length in cm)
RTL50-S	20 mm to 10.02 m	10 mm	A-6186-xxxx
RTL50	20 mm to 10.02 m	10 mm	A-6185-xxxx
FASTRACK	100 mm to 25 m	25 mm	A-9704-xxxx

\*NOTE: 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

### Accessories

#### Datum clamp

Adhesive datum clamp (RTL50-S only)	A-9585-0028
Adhesive for clamp (Loctite 435) 20 g	P-AD03-0012
18 gauge dispensing tip	P-TL50-0209
Bolted datum clamp (FASTRACK only)	A-9589-0096

#### Setting shim

FASTRACK with RTL50 0.6 mm setting shim (red)	M-9589-0090
RTL50-S 0.8 mm setting shim (blue)	M-9517-0122

#### Separator kit (FASTRACK only)

Centre section removal tool	A-9589-0066
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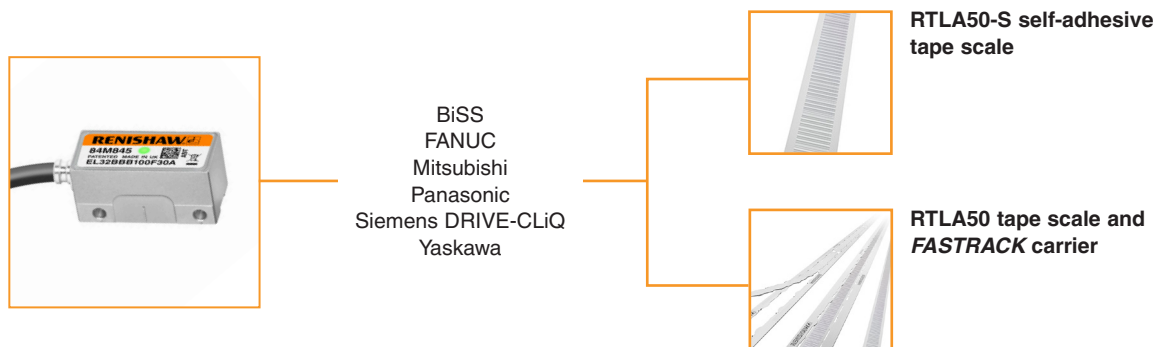
#### End cover

End cover (for use with FASTRACK carrier)	A-9589-0058
End cover kit (for use with RTL50-S only)	A-9585-0035

#### Scale/carrier cutting jig

Guillotine kit	A-9589-0071
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## EVOLUTE compatible products



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