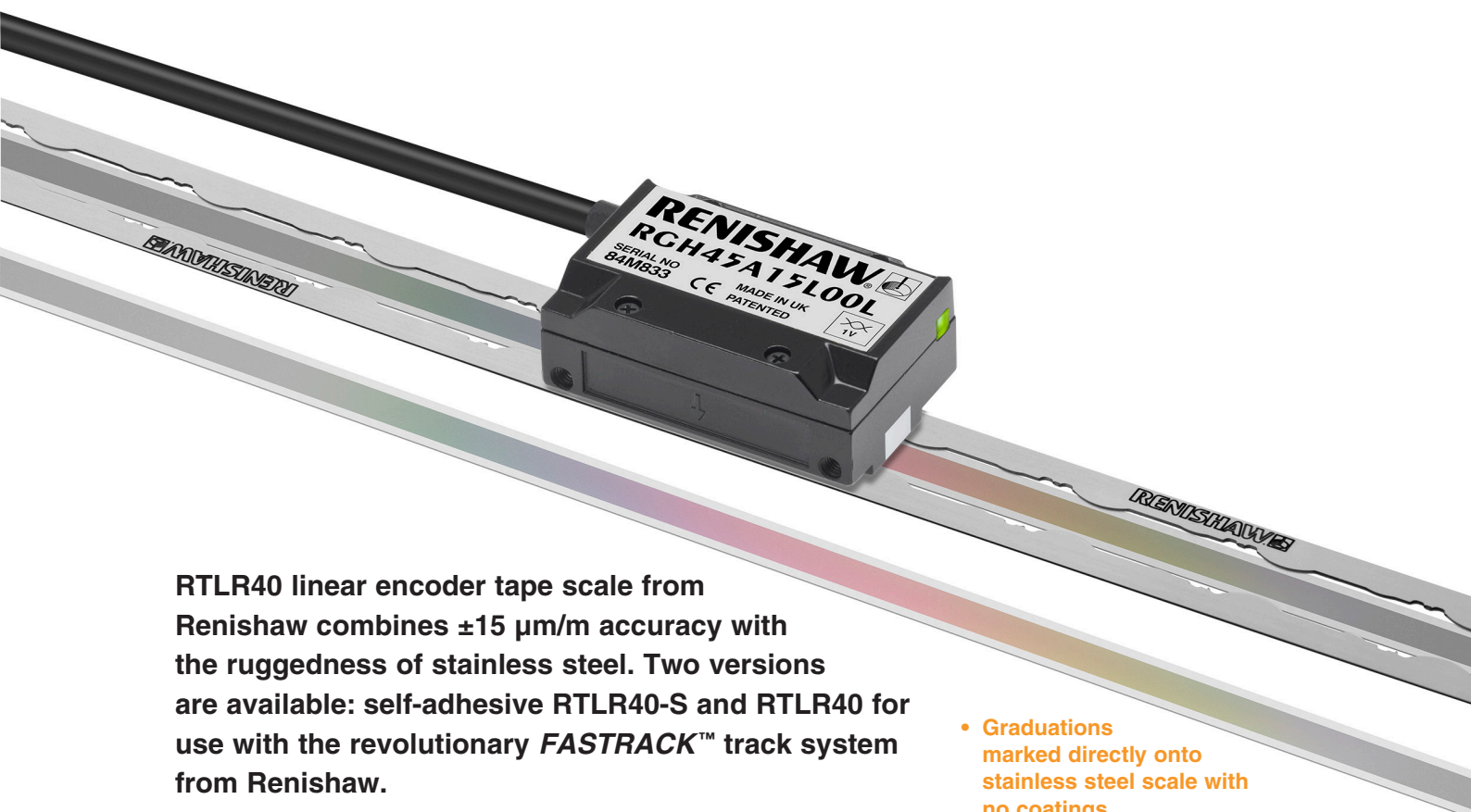


FASTRACK™ and RTLR40-S incremental linear encoder scale system



RTL40 linear encoder tape scale from Renishaw combines $\pm 15 \mu\text{m}/\text{m}$ accuracy with the ruggedness of stainless steel. Two versions are available: self-adhesive RTL40-S and RTL40 for use with the revolutionary *FASTRACK*™ track system from Renishaw.

Designed for applications that demand accuracy and an independent expansion coefficient with tape scale convenience, RTL40-S and RTL40 are read by Renishaw's RGH45 readhead. RGH45 offers resolutions to $0.1 \mu\text{m}$, 10 m/s maximum speed, excellent dirt immunity and provides significant motion control performance improvements over magnetic, inductive or coarse-pitch optical encoders.

RTL40-S is laid onto the substrate using its self-adhesive backing tape. An application tool makes this a quick, simple and inexpensive process. A clamp is fitted at a single point to lock the scale to the substrate using fast curing Loctite® adhesive.

RTL40 (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 transit.

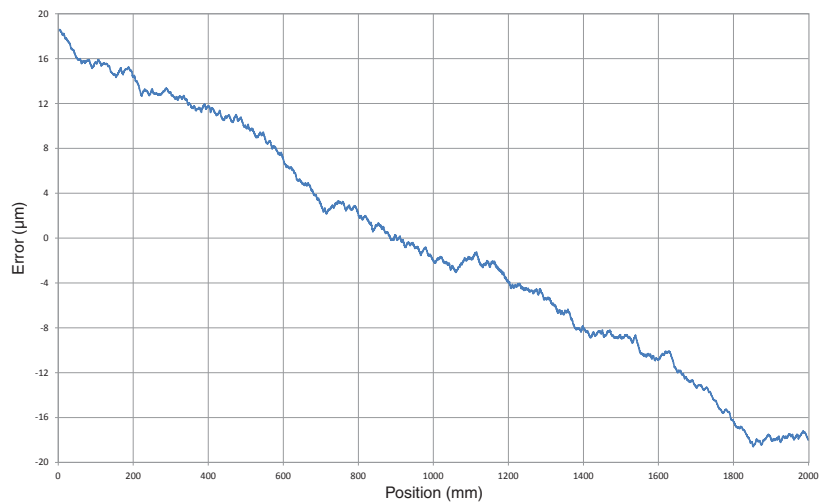
RTL40-S and RTL40 with *FASTRACK* are suitable for many applications, including FPD manufacturing and inspection machines, printing machines, linear motors, axes that are exposed to potential damage, large CMMs and other machines that require the scale to be installed/removed for transit, or simply for any application where thermal expansion of the scale must be independent of the machine structure.

- Graduations marked directly onto stainless steel scale with no coatings
- High accuracy ($\pm 15 \mu\text{m}/\text{m}$) scale. Further improvement possible with error correction
- Compatible with rugged and reliable RGH45 readheads
- RTL40 scale expands at its low thermal coefficient ($10.6 \mu\text{m}/\text{m}/^\circ\text{C}$)
- Use with *FASTRACK* for very low hysteresis
- *FASTRACK* and scale are available on reels for cut-to-suit flexibility
- Quick installation. *FASTRACK* adds fast scale replacement capability
- Locks to substrate via a single clamp that is fixed with fast-curing Loctite
- High solvent immunity

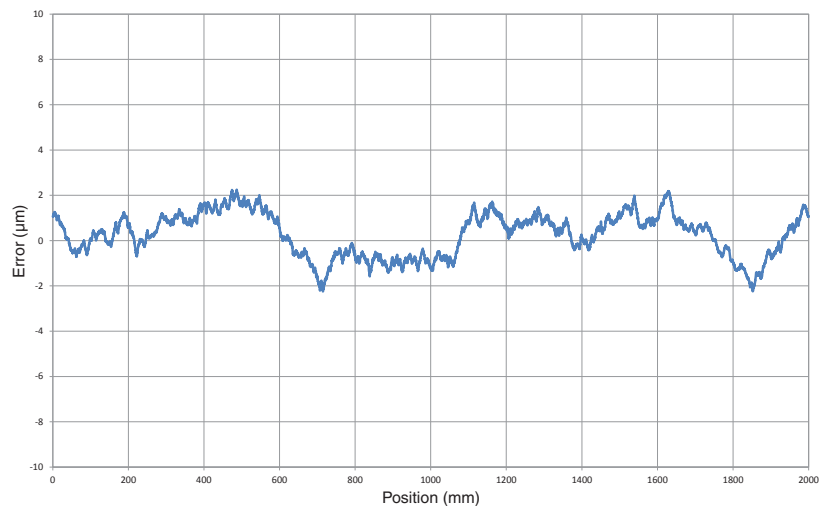
System features

High accuracy RTLR40 and RTLR40-S scale

- ▶ $\pm 15 \mu\text{m/m}$ accuracy@20 °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 ($10.6 \mu\text{m/m/}^\circ\text{C}$)
- ▶ Very low hysteresis: sub-micron on a centre-clamped 2 m axis over the entire operating temperature range, for example
- ▶ 40 μm scale pitch
- ▶ Scale can be cut to length using a guillotine, for easy customisation
- ▶ Track-mounted RTLR40 using the revolutionary *FASTRACK* or self-adhesive mounted RTLR40-S



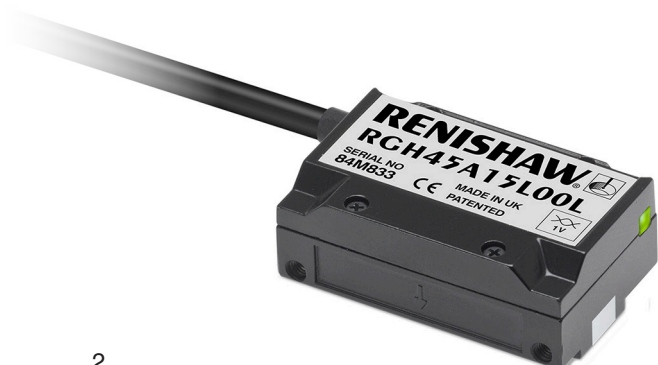
Example accuracy test result of 2000 mm length of RTLR scale



Example accuracy after 2 point compensation

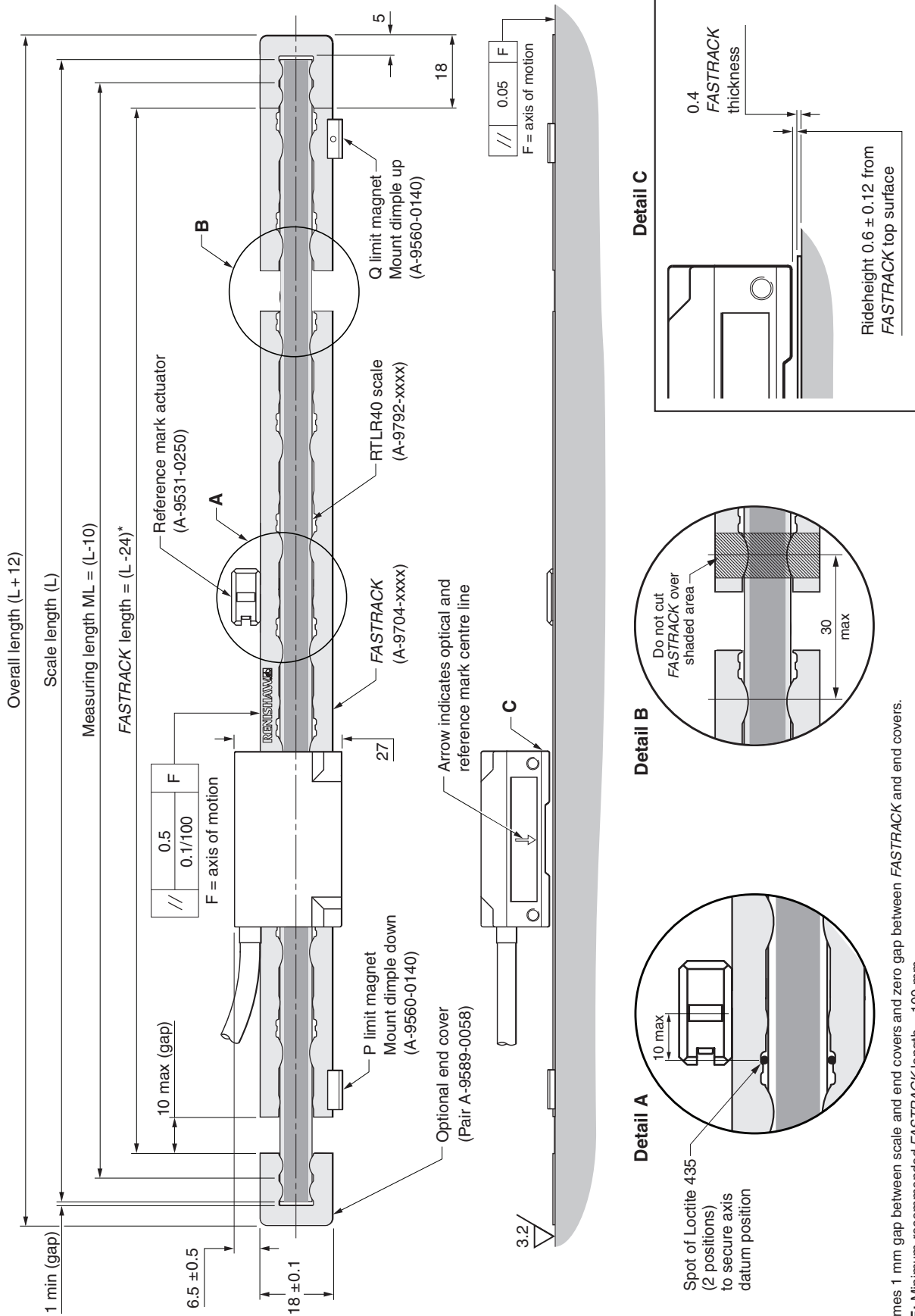
Compatible with RGH45 readheads

- ▶ Unique filtering optics and DC light servo combine to provide high immunity to dirt and contamination
- ▶ Wide installation tolerances enable quick and easy installation, while the integral set-up LED gives an instant confirmation that optimum alignment has been achieved
- ▶ Output options include analogue 1 Vpp and digital RS422 with resolutions to $0.1 \mu\text{m}$ for connection to industry-standard drives and controllers
- ▶ Double-shielded cable with high flex life for reliable use over a long service life, even in high-EMI environments
- ▶ Repeatable reference mark (datum) and dual limit switches
- ▶ Significantly out-performs inductive, magnetic and coarse-pitch optical encoders
- ▶ Based on established, well-proven Renishaw encoder technology with huge installed base



FASTRACK with RGH45 installation drawing (adhesive datum clamp)

For further details please refer to RGH45 FASTRACK installation guide
Dimensions and tolerances in mm

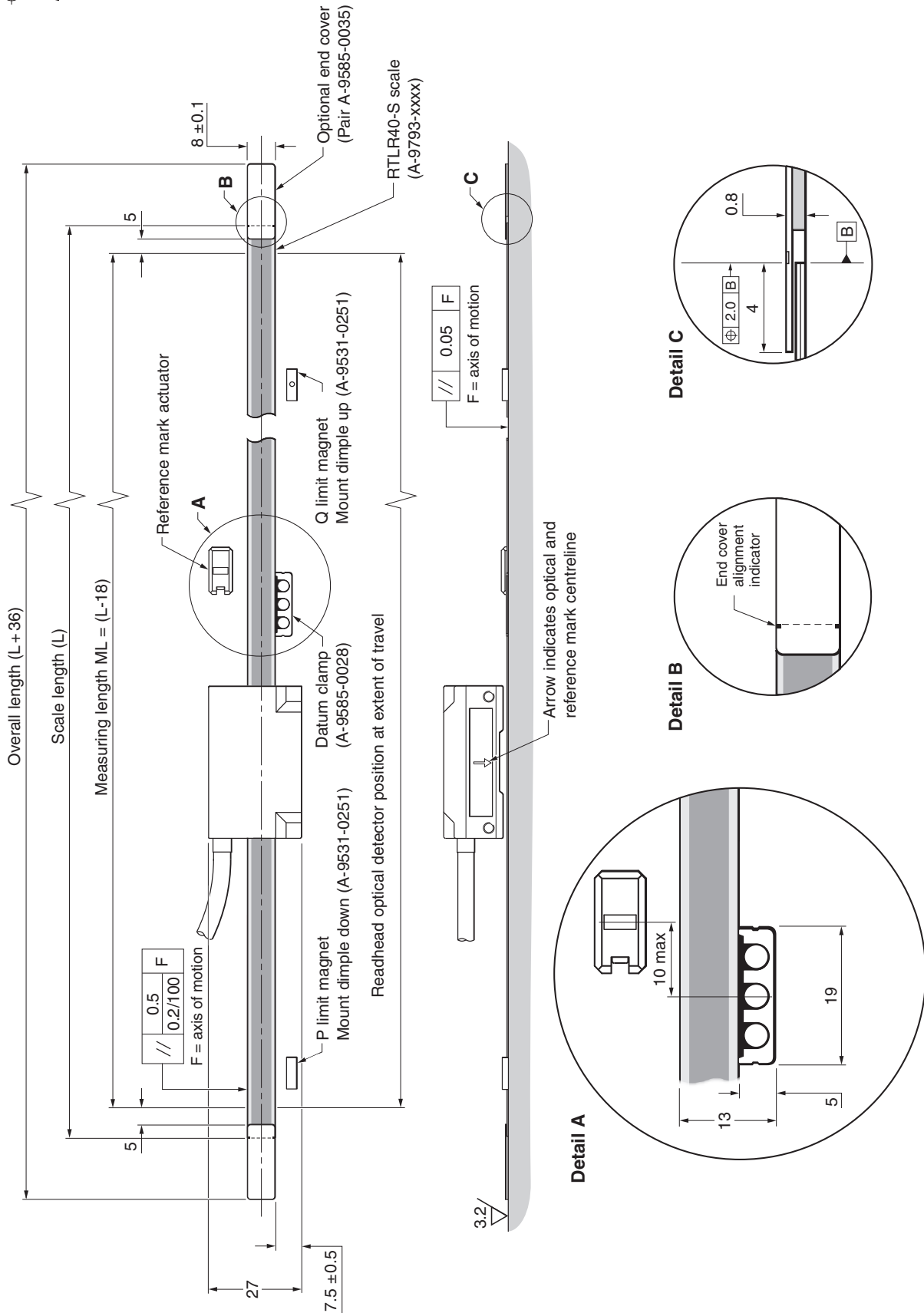


* Assumes 1 mm gap between scale and end covers and zero gap between FASTRACK and end covers.
NOTE: Minimum recommended FASTRACK length = 100 mm

RTL40-S with RGH45 installation drawing (adhesive datum clamp)

For further details please refer to RGH45/RTL40-S installation guide

Dimensions and tolerances in mm

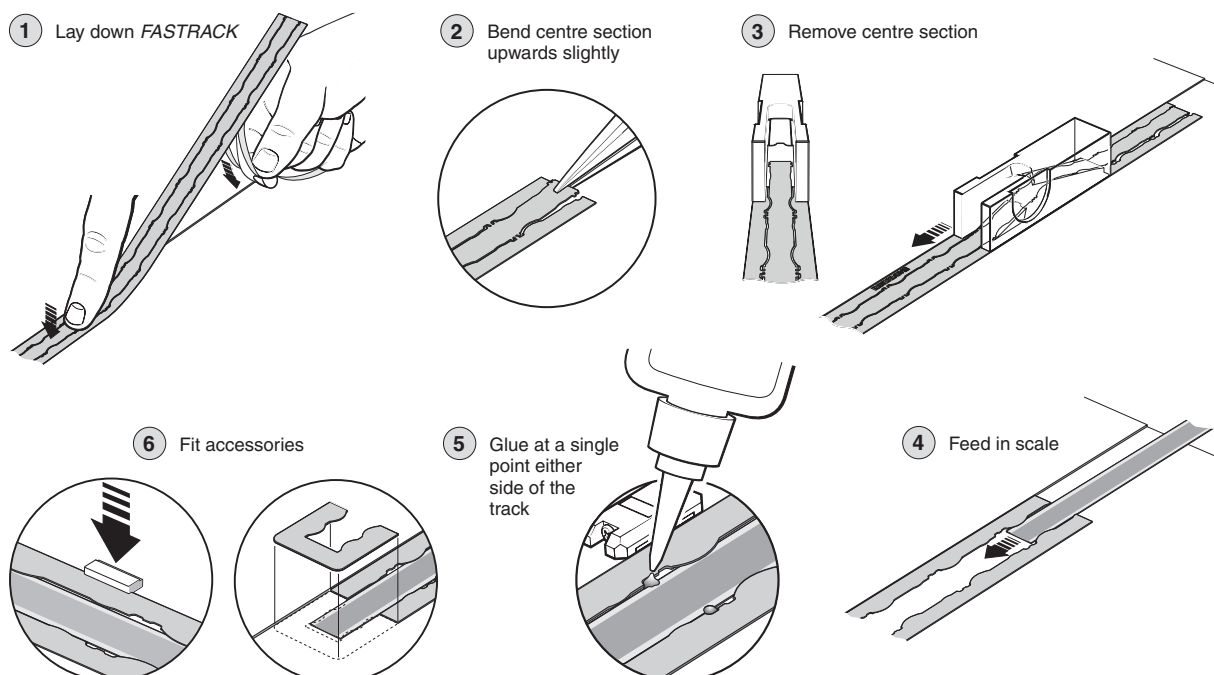


FASTRACK/RTLR40-S specifications

Description	<i>FASTRACK</i>	Hardened stainless steel guide rails with integral sacrificial spacers, with self-adhesive backing tape for easy installation
	RTLR40	Incremental high-accuracy hardened and tempered martensitic stainless steel scale for use with <i>FASTRACK</i> and RGH45 readheads.
	RTLR40-S	Self-adhesive incremental high-accuracy hardened and tempered martensitic stainless steel for use with RGH45 readheads.
Form	<i>FASTRACK</i>	0.4 mm x 18 mm (H x W) including adhesive
	RTLR40-S	0.4 mm x 8 mm (H x W) including adhesive
Accuracy	RTLR40/RTLR40-S	L > 1 m ±15 µm/m@20 °C L ≤ 1 m ±15 µm@20 °C
	<i>FASTRACK</i>	~10.6 µm/m/°C
Thermal expansion	RTLR40/RTLR40-S	~10.6 µm/m/°C
	Storage	-20 °C to +70 °C
Temperature (system)	Operating	0 °C to +55 °C
	Humidity (system)	Rated up to +40 °C, 95% relative humidity (non-condensing)
Shock (system)		500 m/s ² , 11 ms, ½ sine, 3 axes, BS EN 60068-2-27:2009
Vibration (system)		300 m/s ² max @ 55 to 2000 Hz, 3 axes, BS EN 60068-2-6: 2008
Mass	<i>FASTRACK</i>	24 g/m
	RTLR40	12.5 g/m
	RTLR40-S	12.9 g/m
Minimum recommended length	<i>FASTRACK</i>	100 mm
Maximum supplied length	<i>FASTRACK</i>	25 m
	RTLR40/RTLR40-S	20 m (For lengths >2 m <i>FASTRACK</i> with RTLR40 is recommended)
Reference mark		Magnetic actuator
		Output synchronised with incremental channels
		Repeatability of position (uni-directional) maintained within these conditions:
		Temperature ±10 °C from installation temperature, speeds <0.5 m/s, magnetic field steady ±0.02 T or changing ±7.5 T/s
Limit switches		Magnetic actuator at user selected locations
		Repeatability 0.1 mm

FASTRACK installation

NOTE: For full details of *FASTRACK* installation, please refer to the RGH45 *FASTRACK* installation guide. *FASTRACK* features a unique installation technique that allows the encoder to be installed quicker, easier and allows wider cutting tolerances. For machines that are sectioned before being shipped to their installation site, simply lay down multiple lengths of *FASTRACK* with gaps up to 25 mm at the point where the substrate mates together, the scale can then be removed and re-installed as many times as necessary. For details on installing RTLR40-S refer to RGH45 RTLR40-S installation guide.



FASTRACK, RTL40 and RTL40-S part numbers

Scale type	Length	Increments	Part number (where xxxx is the length in cm)
FASTRACK	100 mm to 25 m	25 mm*	A-9704-xxxx
RTL40	100 mm to 20 m	50 mm	A-9792-xxxx
RTL40-S	100 mm to 20 m	50 mm	A-9793-xxxx
*NOTE: Part numbers for <i>FASTRACK</i> ending in 25 mm are:			A-9704-xxx3
Part numbers for <i>FASTRACK</i> ending in 75 mm are:			A-9704-xxx8

Accessories

Reference and limit magnets

Reference mark actuator	A-9531-0250
FASTRACK+RTL40 - P and Q limit switch actuator magnet	A-9560-0140
RTL40-S - P and Q limit switch actuator magnet	A-9531-0251
Adhesive for reference mark and limits	A-9531-0342

Datum clamp

Adhesive datum clamp (RTL40-S only)	A-9585-0028
Adhesive for datum clamp (Loctite 435)	P-AD03-0015

Setting gauge

FASTRACK+RTL40 0.6 mm setting shim (red)	M-9517-0124
RTL40-S 0.8 mm setting shim (blue)	M-9517-0122
RTL40-S Reference mark and limit setting shim	M-9787-0004

Separator kit (FASTRACK only)

Centre section removal tool	A-9589-0066
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End cover

End cover kit (FASTRACK only)	A-9589-0058
End cover kit (RTL40-S only)	A-9585-0035

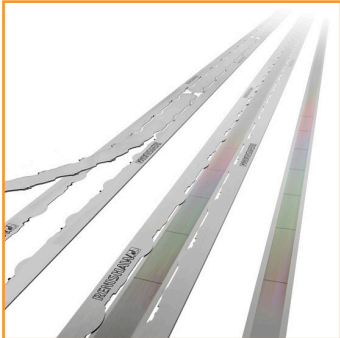
Scale/track cutting jig

Guillotine kit	A-9589-0071
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Scale applicator

Scale applicator (RTL40-S only)	A-9787-0006
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Compatible products

	FASTRACK/RTL40	RGH45 FASTRACK/RTL40 Installation guide M-9787-9017 RGH45 Data sheet L-9517-9537
	RTL40-S	RGH45 RTL40-S Installation guide M-9787-9035 RGH45 Data sheet L-9517-9537

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