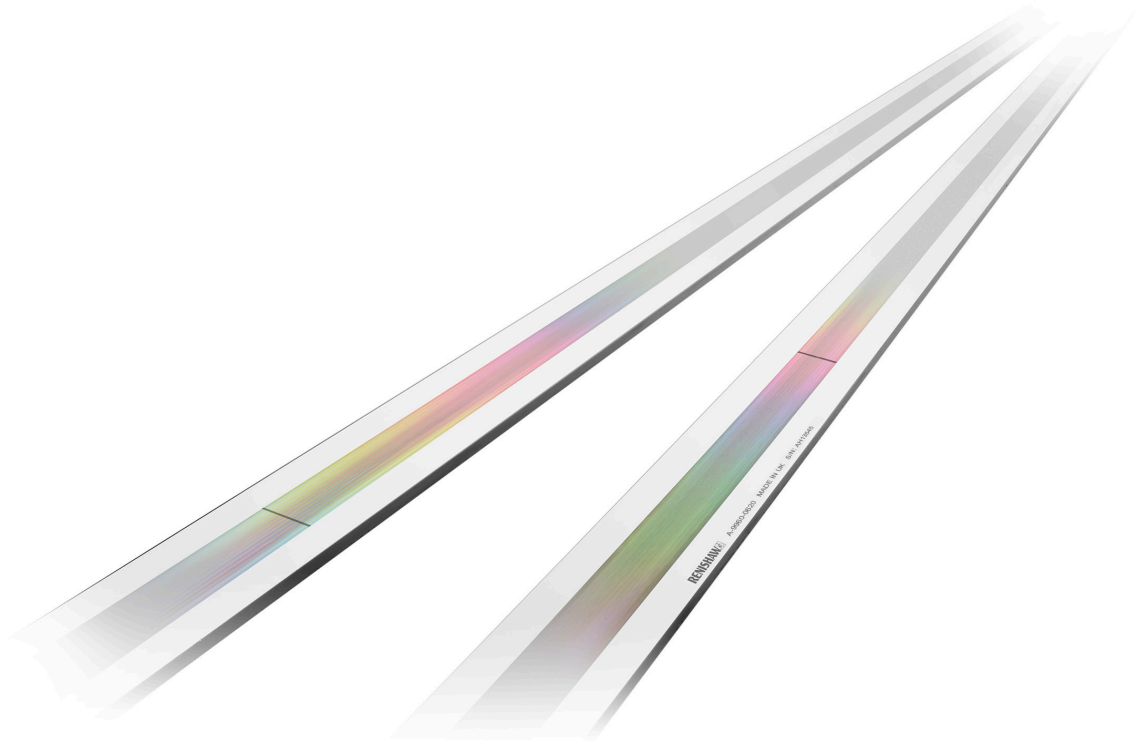
Data sheet
L-9517-9219-08-A

RENISHAW
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RELM high accuracy incremental linear ZeroMet™ scale



RELM20 ZeroMet™ scale is manufactured from near zero thermal expansion material, ensuring the high level of accuracy is maintained across the full temperature range.

It can be mounted direct to your machine, either mechanically or by the use of a self-adhesive backing tape. RELM20 scale also features the *IN-TRAC*™ optical reference mark allowing fast auto-phasing.

RELM20 is a 20 µm pitch scale and is compatible with Renishaw's VIONiC™ and TONiC™ range of encoders, offering levels of performance previously only available from delicate fine pitch systems.

- **Robust ZeroMet™ offers 0.75 ±0.35 µm/m/°C (at 20 °C) thermal expansion plus ease of handling and installation**
- **±1 µm guaranteed accuracy up to 1 metre**
- **Scale mounting options: self-adhesive or clips and clamps**
- **Available in lengths up to 1.7 m**
- ***IN-TRAC* bi-directional auto-phase optical reference mark**
- **Dual limits provide on-scale end of travel indication**
- **Compatible with VIONiC and TONiC incremental readheads**

RELM scale specifications

Description	High stability, low-expansion nickel-iron alloy ZeroMet spar scale for use with VIONiC and TONiC readheads
Pitch	20 µm
Form (height × width)	1.6 mm × 14.9 mm (excluding adhesive)
Accuracy (at 20 °C)	Certified to ±1 µm up to 1 m, ±1 µm/m for lengths > 1 m. Calibration traceable to International Standards
Coefficient of thermal expansion (at 20 °C)	0.75 ±0.35 µm/m/°C
Mass	184 g/m
Available lengths	20 mm to 1.7 m (available in increments of 10 mm)
Measuring length	See 'RELM20 scale measuring length' on page 8
Mounting	Epoxy datum point and adhesive tape or mechanical datum clamp and mounting clips.

For further information on installation and mounting options, refer to the following documentation:

Encoder system	Document name	Document part number	Website link
VIONiC	*VIONiC™ RSLM20/RELM20 high-accuracy incremental linear encoder system* installation guide	M-6195-9232	**www.renishaw.com/vionicdownloads**
TONiC	*TONiC™ RSLM20/RELM20 high-accuracy incremental linear encoder system* installation guide	M-9653-9225	**www.renishaw.com/tonicdownloads**

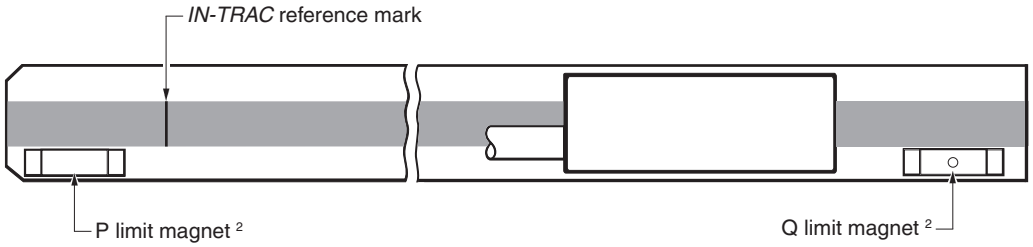
Reference mark

Type		*IN-TRAC*™ autophase optical reference mark; no physical adjustment required
Position	RELM20 [1]	Midpoint of the scale length
	RELE20 [1]	20 mm from the end of the scale length
Phasing		Auto-phased by readhead calibration routine
Repeatability		Repeatable to unit of resolution throughout the specified temperature and speed range

Limit switches

Type	Magnetic actuators; with dimple triggers Q limit, without dimple triggers P limit (see image below)
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

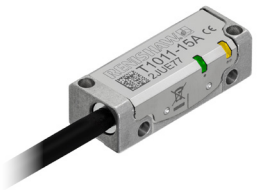
NOTE: Limit magnets are available in 10 mm (standard), 20 mm, 25 mm, and 50 mm lengths and provided on a back plate with self-adhesive tape.



[1] VIONiC and TONiC readheads should be ordered with all reference marks output (No reference mark selector is required.)

[2] The limit magnet locations are correct for the readhead orientation shown.

Compatible readheads

	VIONiC	TONiC
		
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 when connected to a Ti, TD or DOP interface.
Sub-divisional error (typical)	< ±15 nm	±30 nm
Jitter (RMS)	Down to 1.6 nm	Down to 0.5 nm
Maximum speed	12 m/s	10 m/s
UHV variant	No	Yes [1]
Functional Safety variant	No	Yes [2]

Readhead features

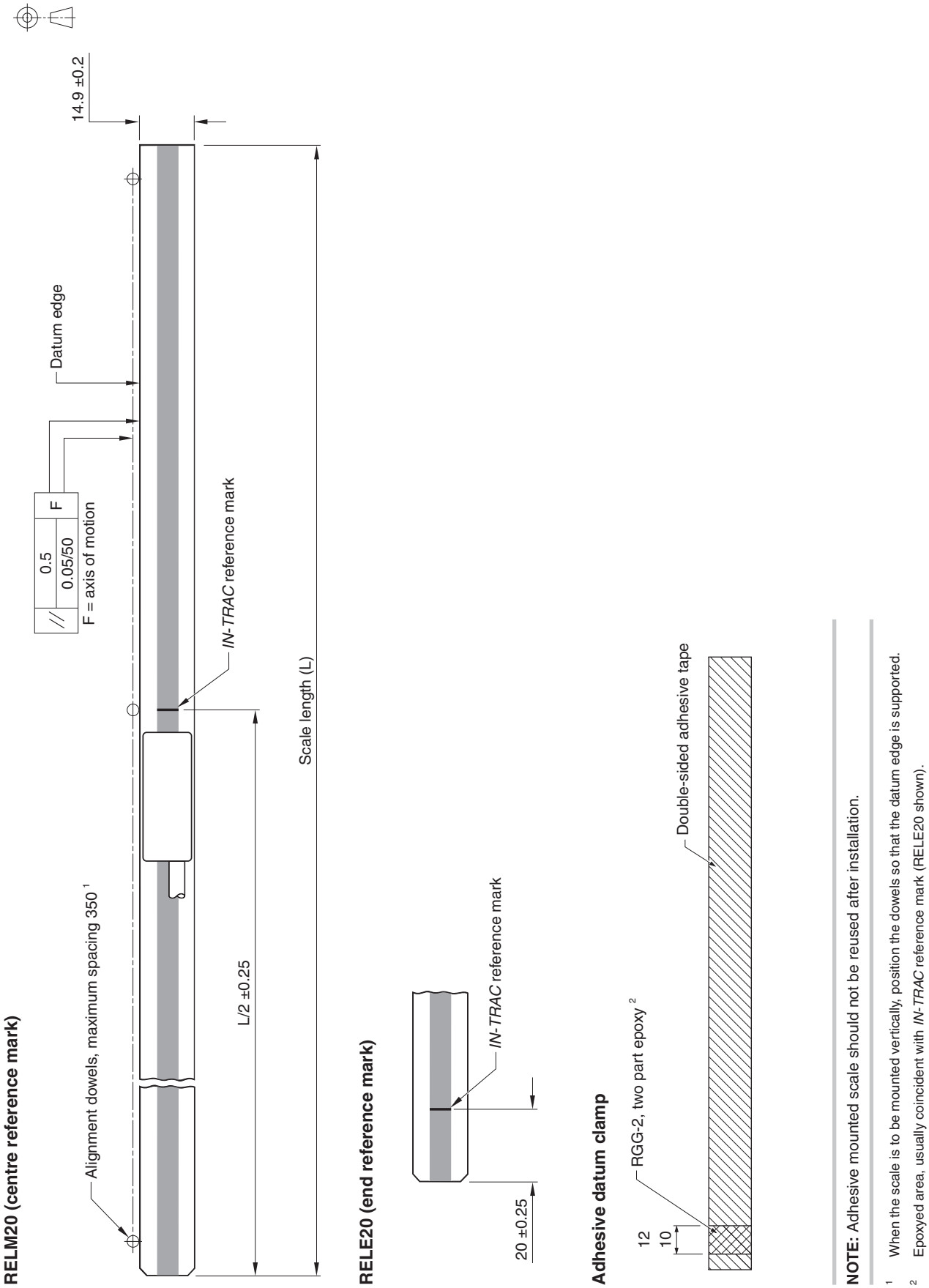
- Filtering optics and Auto Gain Control for high reliability and solid Lissajous signals.
- Dynamic signal processing ensures ultra-low sub-divisional error (SDE). Result: smoother scanning performance.
- High signal-to-noise ratio provides ultra-low jitter for optimum positional stability.
- Auto-phasing 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).

[1] See *TONiC™ UHV encoder syste*m data sheet (Renishaw part no. L-9517-9426) for further details.

[2] See *TONiC™ Functional Safety incremental encoder system* data sheet (Renishaw part no. L-9517-9878) for further details.

RELM scale installation drawing - adhesive mounted

Dimensions and tolerances in mm



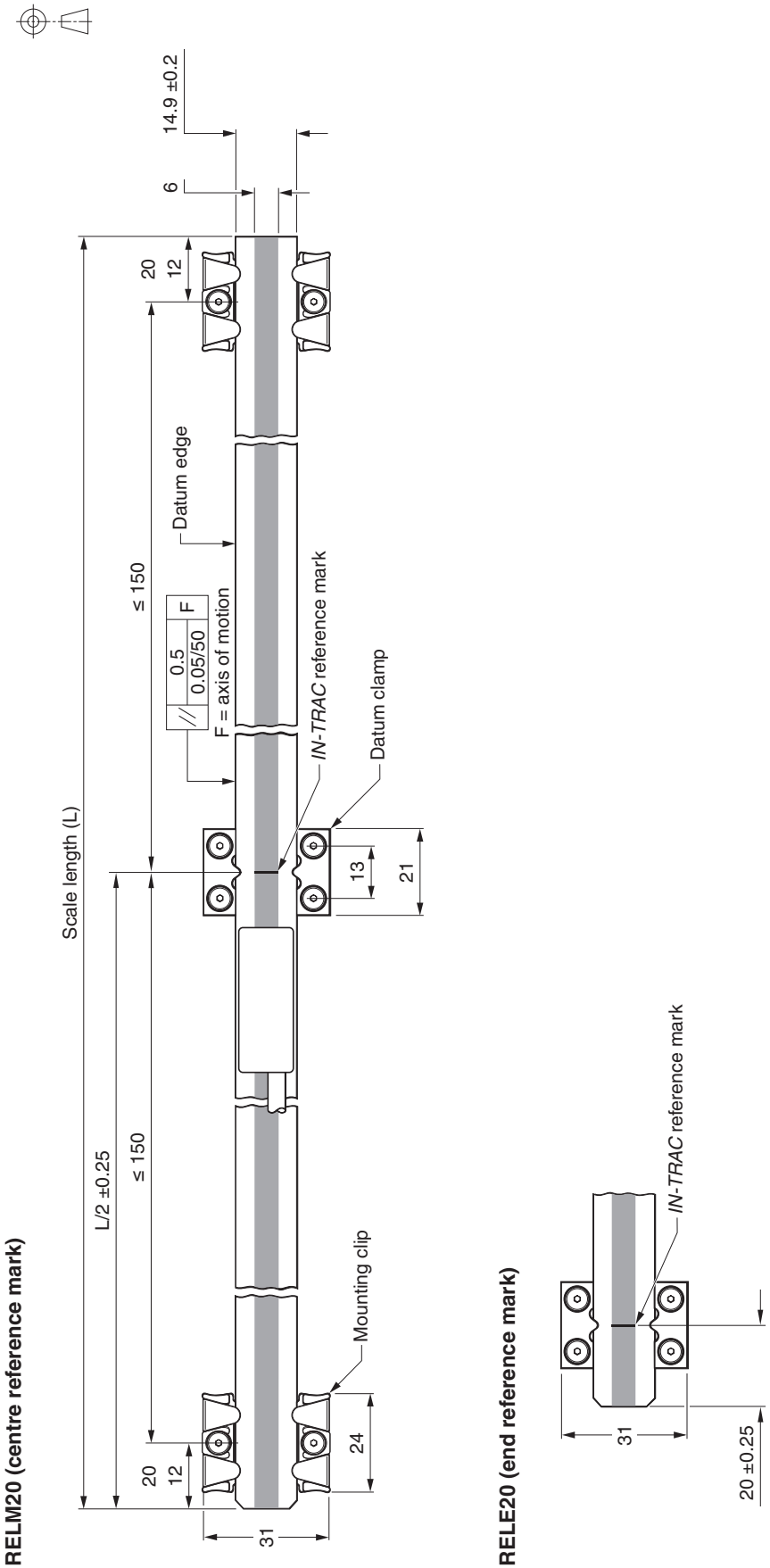
NOTE: Adhesive mounted scale should not be reused after installation.

1 When the scale is to be mounted vertically, position the dowels so that the datum edge is supported.

2 Epoxyed area, usually coincident with *IN-TRAC* reference mark (RELE20 shown).

RELM scale installation drawing - clip/clamp mounted

Dimensions and tolerances in mm

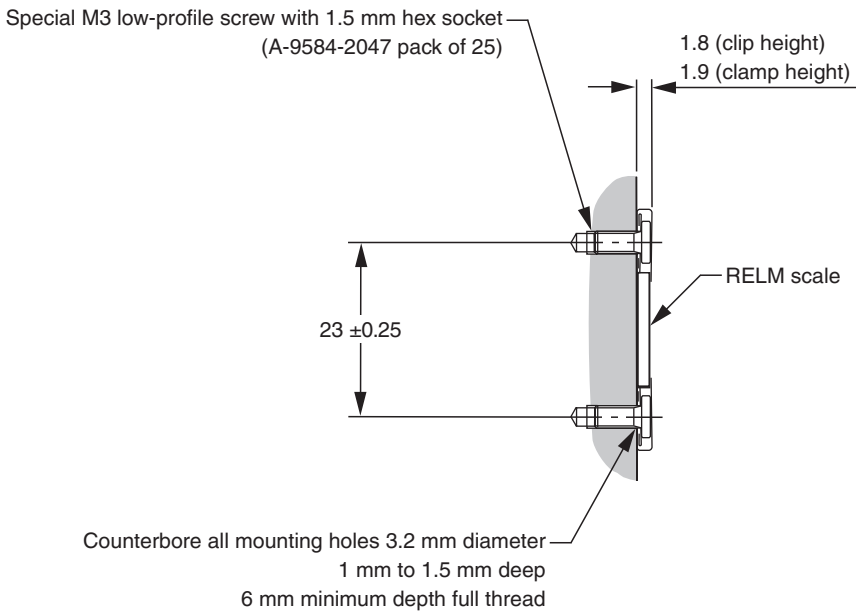


NOTE: For further details on clip/clamp mounting REL* scale see the notes on page 7.

Clip/clamp mounting

Dimensions and tolerances in mm

Mounting clip/Datum clamp

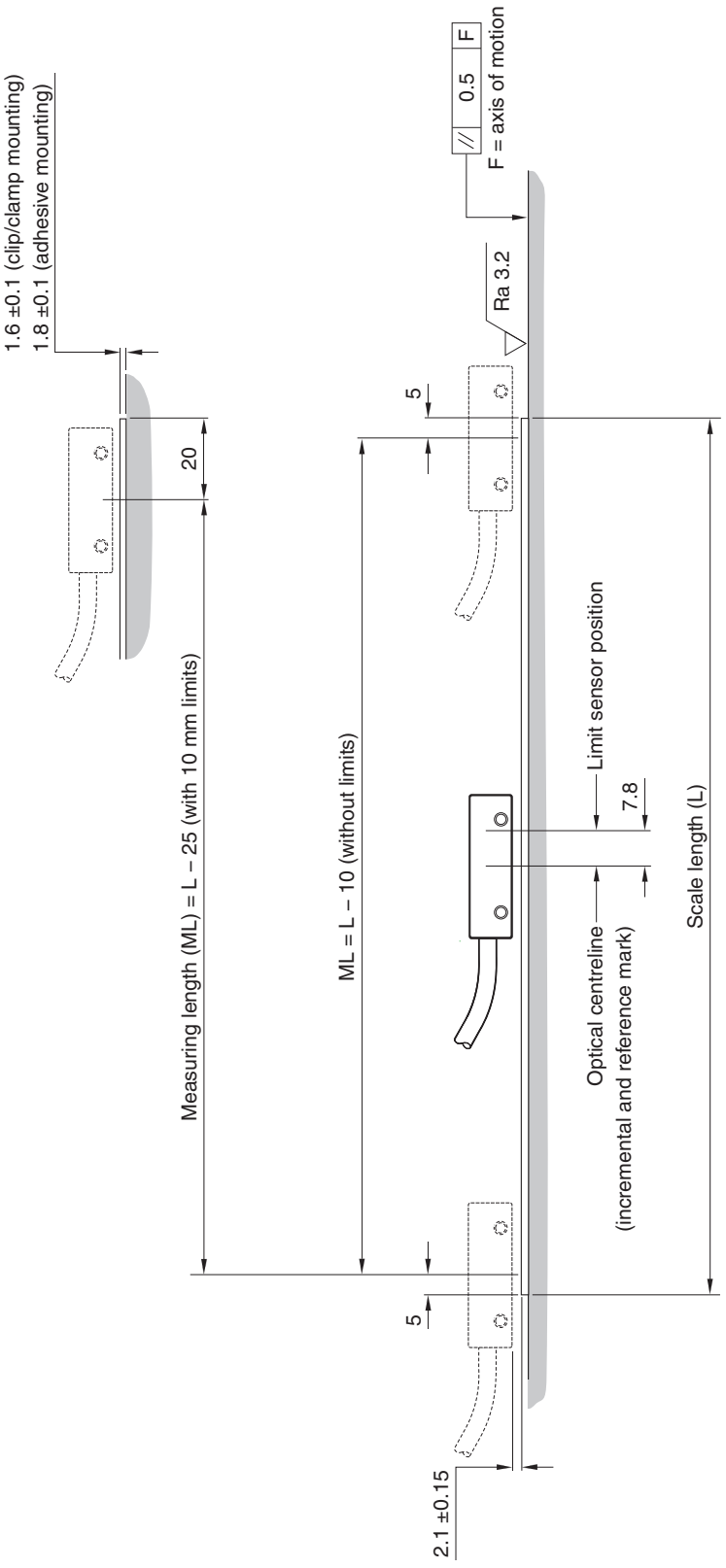


NOTES:

- The datum clamp is usually coincident with the selected *IN-TRAC* reference mark. However, the position is user selectable depending upon application.
- For lengths 80 ≤ L ≤ 190 ensure that the scale is clamped or clipped in the middle as well as at both ends.
  - The installation should use the least number of clips as possible.
  - For lengths not specified, contact your local Renishaw representative for further advice.
- For optimum performance the readhead should be installed close to nominal geometry.
- Care should be taken to ensure sufficient clearance between the readhead/mounting bracket and clips/datum clamp.
- Only special low-profile screws should be used. Screws are provided with all clips/datum clamps, and spares can be supplied if required.

RELM20 scale measuring length

Dimensions and tolerances in mm



Scale part numbers

20 µm pitch ZeroMet spar scale

Series	Reference mark	Available lengths	Available in increments of	Part number (where xxxx is the length in mm) [1]
RELM20	Single *IN-TRAC* reference mark at mid-point of scale length	20 mm to 1700 mm	10 mm	A-9660-xxxx
RELE20	Single *IN-TRAC* reference mark 20 mm from scale end	30 mm to 1700 mm	10 mm	A-9661-xxxx

Accessory part numbers

Limit magnets [2]

Part description	Part number	Product image
10 mm long Q limit switch actuator magnet (Adhesive mounted)	A-9653-0139	
10 mm long P limit switch actuator magnet (Adhesive mounted)	A-9653-0138	
Magnet applicator device (Aids positioning)	A-9653-0201	

Self-adhesive mounting accessories

Part description	Part number	Product image
Adhesive backing tape (5 m) (nominal thickness 0.2 mm)	A-9584-2111	
Adhesive backing tape applicator Aids the application of the adhesive backing tape to the scale	A-9584-0601	
RGG-2 two part epoxy adhesive Used to create a datum point	A-9531-0342	

[1] Ordering A-9660-0070, for example, will result in a length of 70 mm of RELM20.

[2] Longer limit magnets are available. Contact your local Renishaw representative for more information.

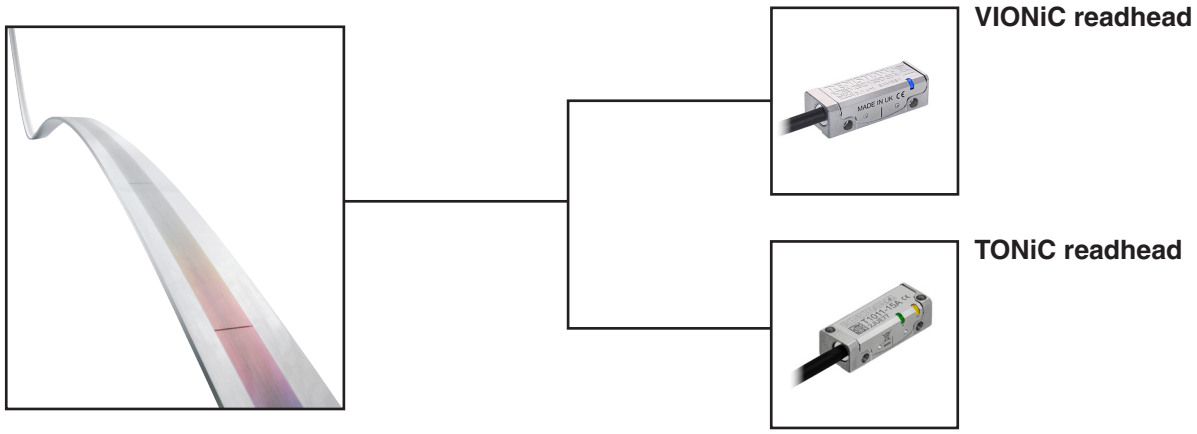
Clip/clamp mounting accessories

Part description	Part number	Product image
Mounting clips [1]	A-9584-2049	
Datum clamp kit [1]	A-9584-2050	
Replacement M3 screws (pack of 25)	A-9584-2047	
Spare clip setting shim	M-9584-0928	

[1] UHV and extra wide clip/clamp accessories are available. Contact your local Renishaw subsidiary for more information.

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Compatible products



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