**Data sheet**
L-9517-9219-08-A

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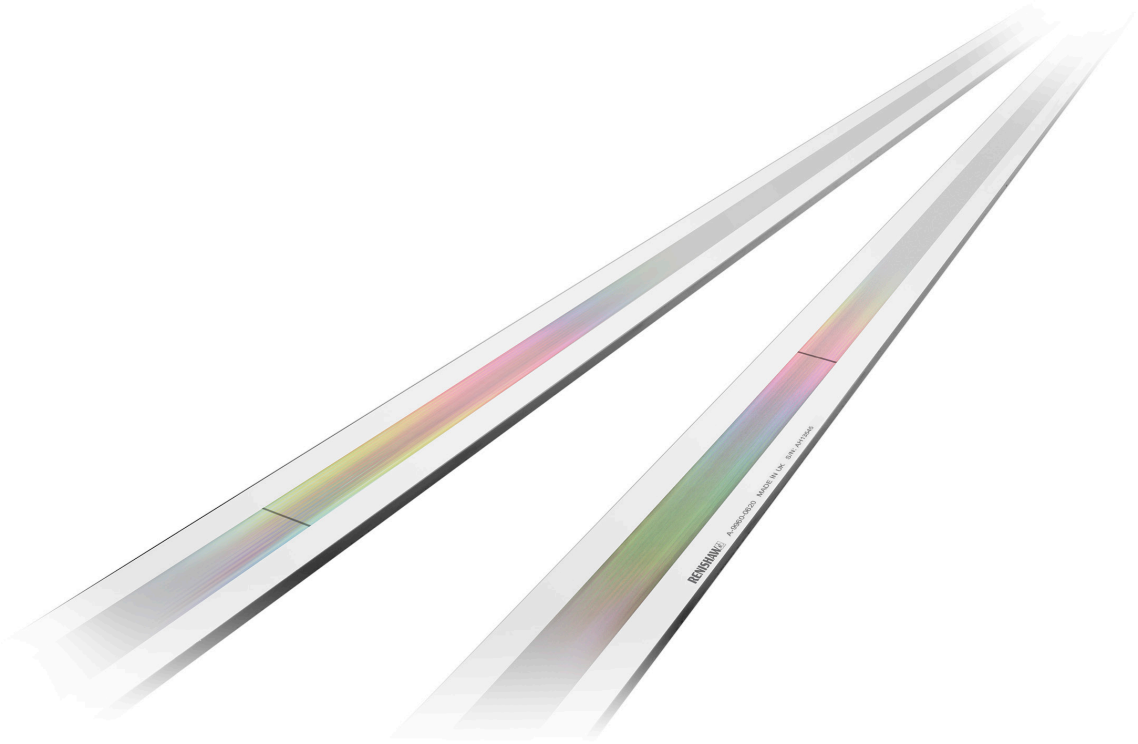
# RELM high accuracy incremental linear ZeroMet™ scale



## 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.<br>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** |

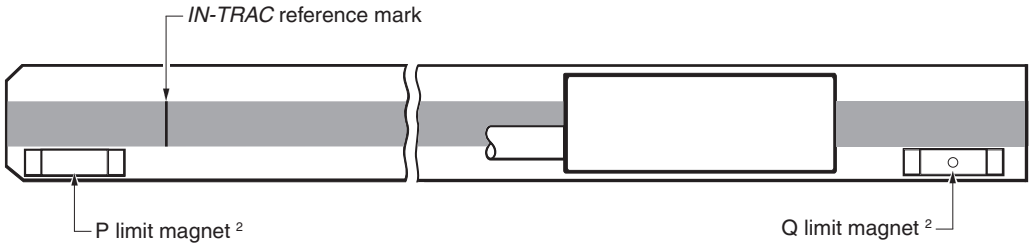
# Reference mark

| | | |
|---|---|---|
| **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 |

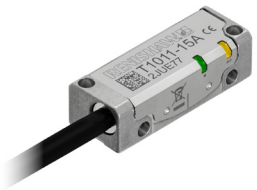
**NOTE:** Limit magnets are available in 10 mm (standard), 20 mm, 25 mm, and 50 mm lengths and provided on a back plate with self-adhesive tape.




[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.<br>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

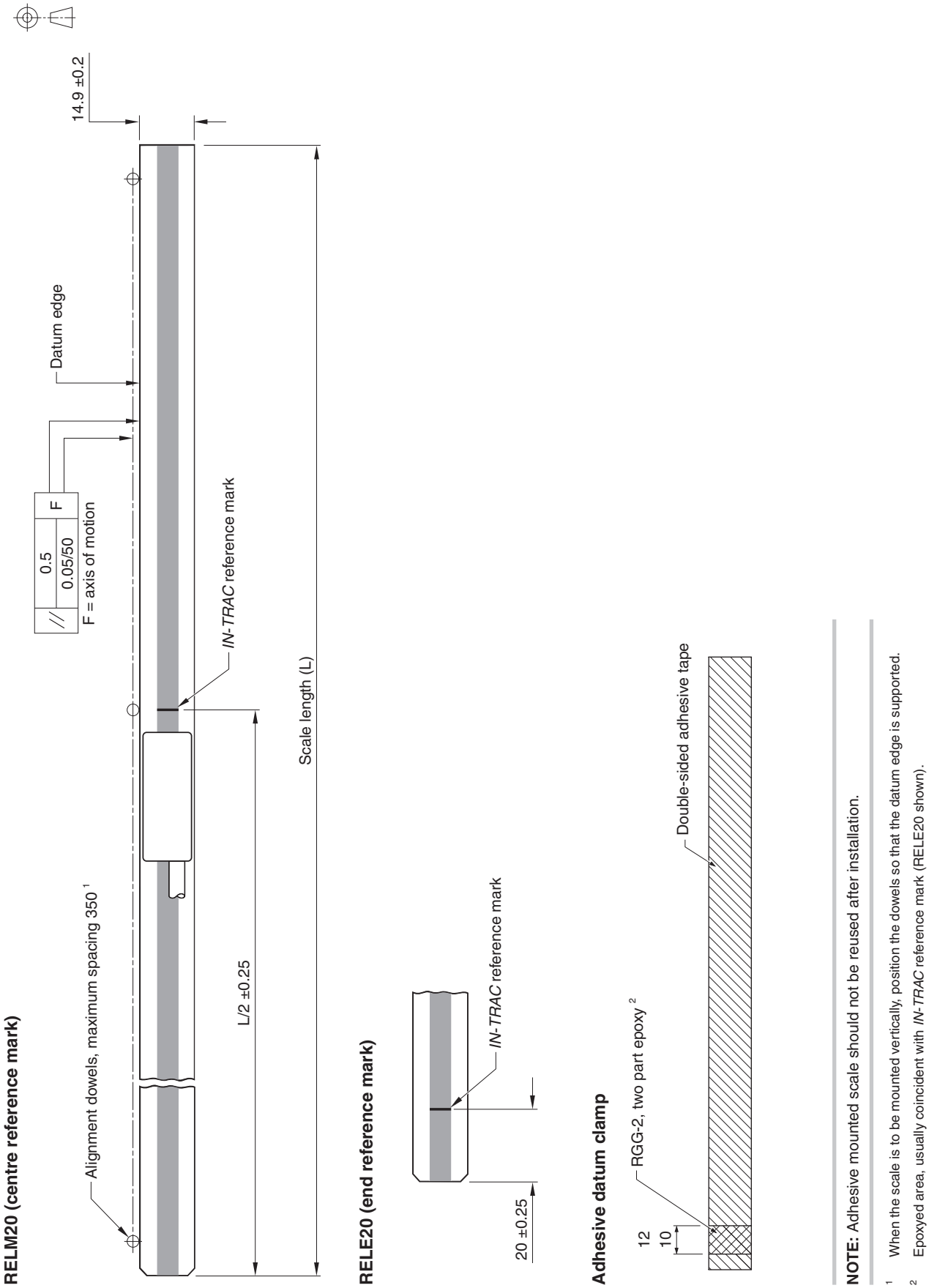
- Filtering optics and Auto Gain Control for high reliability and solid Lissajous signals.
- Dynamic signal processing ensures ultra-low sub-divisional error (SDE). Result: smoother scanning performance.
- High signal-to-noise ratio provides ultra-low jitter for optimum positional stability.
- Auto-phasing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



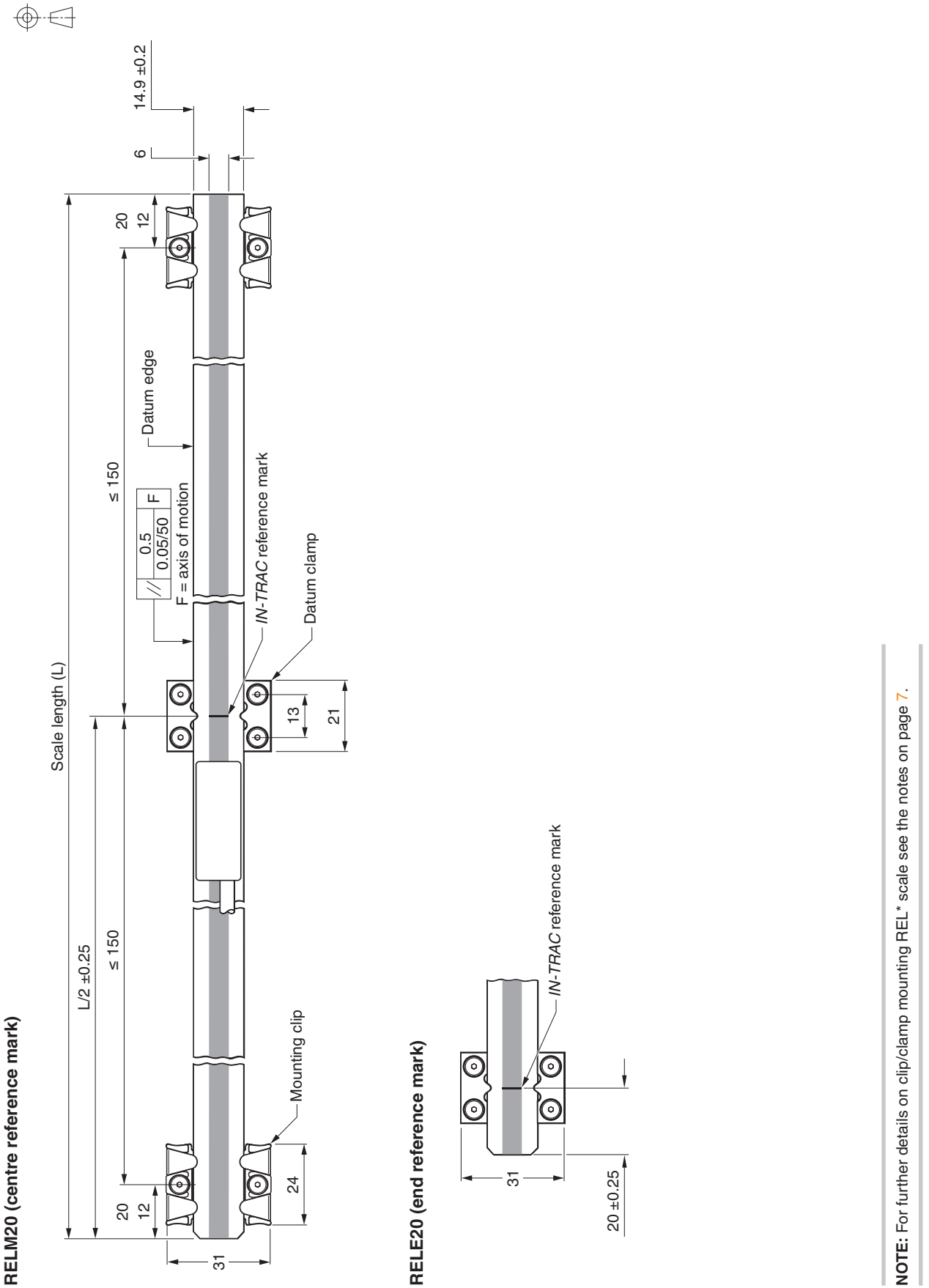

**NOTE:** Adhesive mounted scale should not be reused after installation.

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

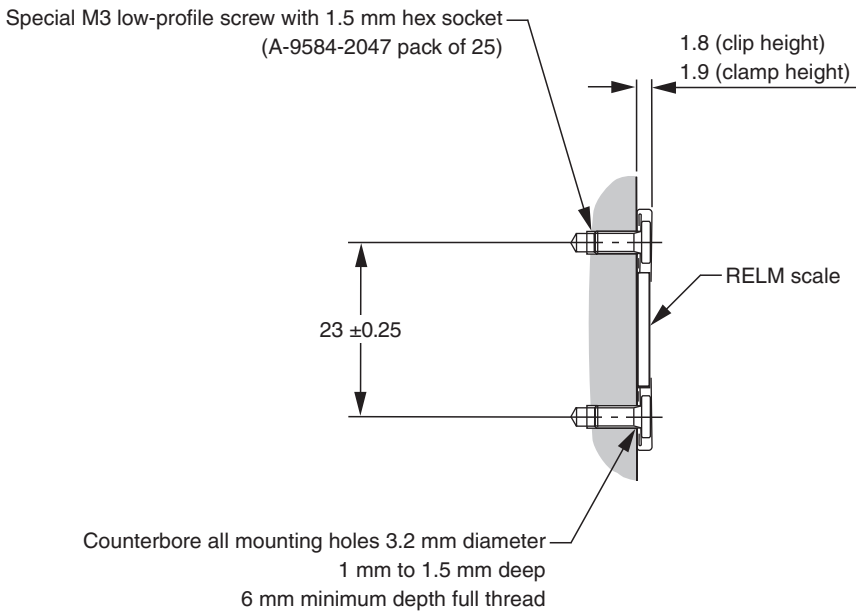



**NOTE:** For further details on clip/clamp mounting REL* scale see the notes on page 7.

# Clip/clamp mounting

Dimensions and tolerances in mm

## Mounting clip/Datum clamp

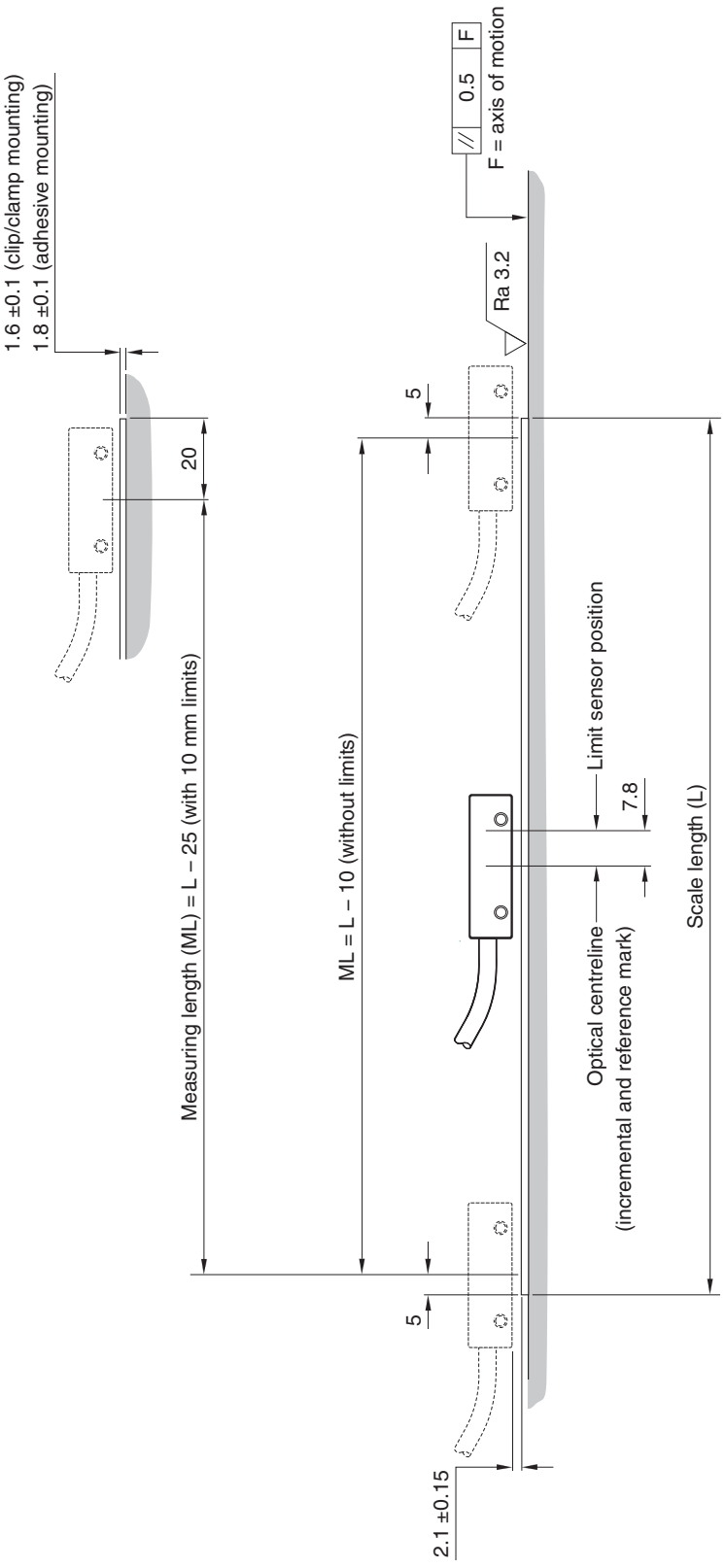



**NOTES:**

- 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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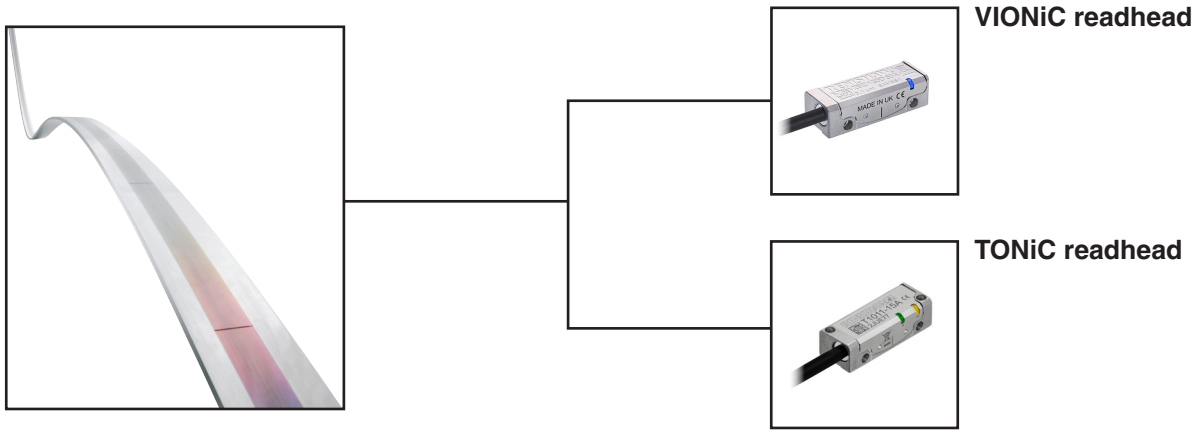
# Compatible products



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