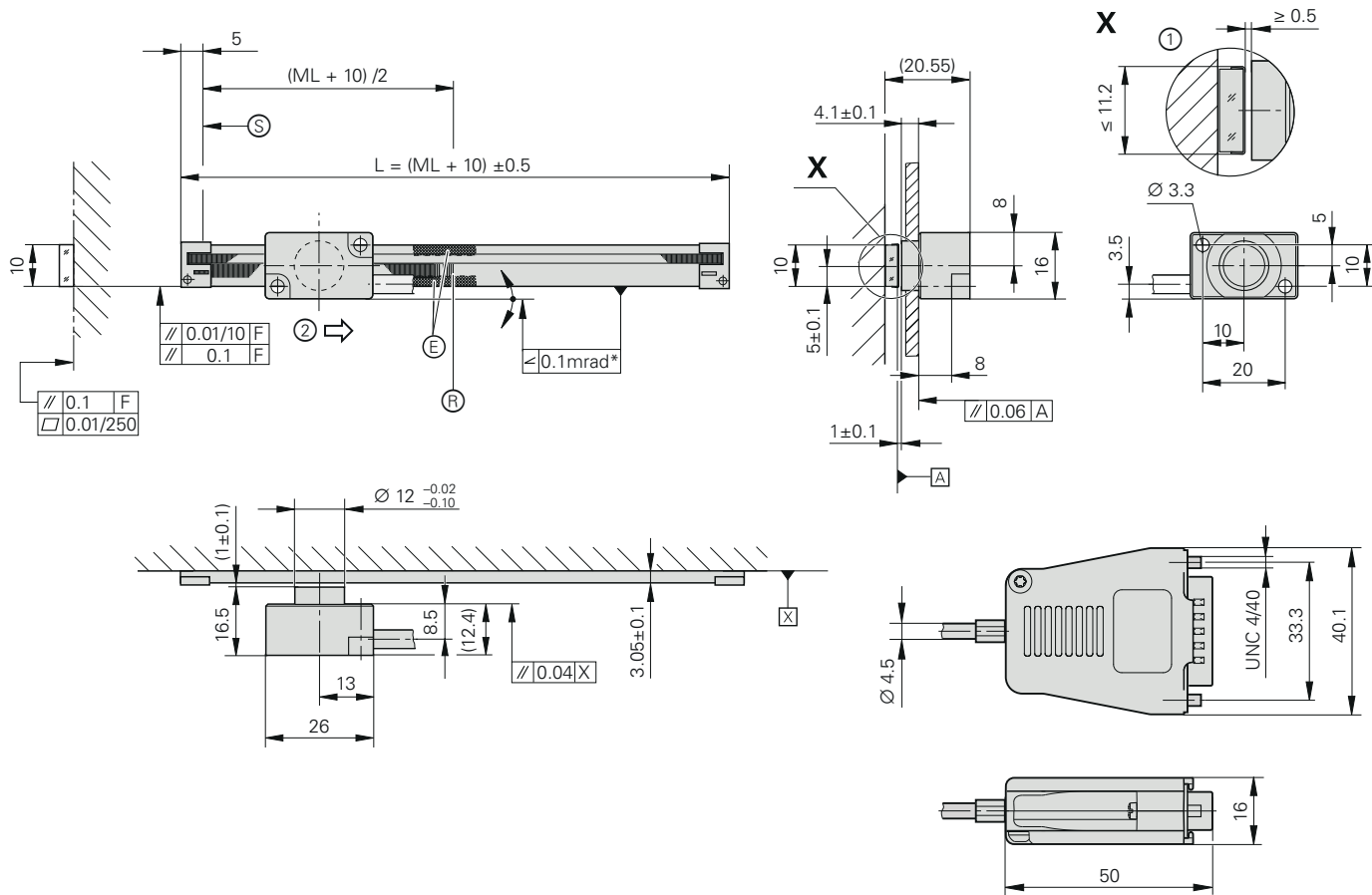


LIF 471, LIF 481

- Incremental linear encoders for simple installation
- For measuring steps of down to 2 nm
 - Position detection through homing track and limit switches
 - Measuring standard secured with adhesive film
 - Consisting of a linear scale and scanning head
 - Versions available for high vacuum (see *Product Information document*)
 - Interface electronics integrated in the connector



mm
Tolerancing ISO 8015
ISO 2768:1989-mH
≤ 6 mm: ±0.2 mm

F = Machine guideway
* = Maximum change during operation
ML = Measuring length
Ⓢ = Reference mark position
Ⓢ = Beginning of measuring length
Ⓢ = Epoxy for ML < 170
1 = Dimensions of limit plate
2 = Direction of motion of the scanning unit for increasing position values



For more information about vacuum variants, see the *LIF 471 V*, *LIF 481 V*, *LIF 481 U* Product Information document.



For distance-coded reference marks or larger measuring lengths, see the *LIF 171*, *LIF 181* Product Information document.



Scale	LIF 401 R												
Measuring standard* Coefficient of linear expansion	SUPRADUR phase grating on Zerodur glass ceramic or glass; grating period: 8 µm $\alpha_{\text{therm}} = (0 \pm 0.1) \cdot 10^{-6} \text{ K}^{-1}$ (Zerodur glass ceramic) $\alpha_{\text{therm}} \approx 8 \cdot 10^{-6} \text{ K}^{-1}$ (glass)												
Accuracy grade*	±1 µm (only for Zerodur glass ceramic up to a measuring length of 1020 mm), ±3 µm												
Baseline error	≤ ±0.225 µm/5 mm												
Measuring length (ML)* in mm	70 720	120 770	170 820	220 870	270 920	320 970	370 1020	420 1140	470 1240	520 1340	570 1440	620 1540	670 1640
Reference marks	One at midpoint of measuring length												
Mass	0.8 g + 0.08 g/mm of measuring length												

Scanning head	LIF 48	LIF 47				
Interface	~ 1 V _{PP}	□□TTL				
Integrated interpolation* Signal period	– 4 µm	5-fold 0.8 µm	10-fold 0.4 µm	20-fold 0.2 µm	50-fold 0.08 µm	100-fold 0.04 µm
Cutoff frequency –3 dB	≥ 1 MHz	–				
Scanning frequency*	–	≤ 500 kHz ≤ 250 kHz ≤ 125 kHz	≤ 250 kHz ≤ 125 kHz ≤ 62.5 kHz	≤ 250 kHz ≤ 125 kHz ≤ 62.5 kHz	≤ 100 kHz ≤ 50 kHz ≤ 25 kHz	≤ 50 kHz ≤ 25 kHz ≤ 12.5 kHz
Edge separation <i>a</i>	–	≥ 0.080 µs ≥ 0.175 µs ≥ 0.370 µs	≥ 0.080 µs ≥ 0.175 µs ≥ 0.370 µs	≥ 0.040 µs ≥ 0.080 µs ≥ 0.175 µs	≥ 0.040 µs ≥ 0.080 µs ≥ 0.175 µs	≥ 0.040 µs ≥ 0.080 µs ≥ 0.175 µs
Traversing speed ¹⁾	≤ 240 m/min	≤ 120 m/min ≤ 60 m/min ≤ 30 m/min	≤ 60 m/min ≤ 30 m/min ≤ 15 m/min	≤ 60 m/min ≤ 30 m/min ≤ 15 m/min	≤ 24 m/min ≤ 12 m/min ≤ 6 m/min	≤ 12 m/min ≤ 6 m/min ≤ 3 m/min
Interpolation error RMS position noise	±12 nm 0.6 nm (1 MHz ²⁾)	–				
Electrical connection*	Cable (0.5 m / 1 m / 3 m) with 15-pin D-sub connector (male); interface electronics in the connector					
Cable length	See interface description; however: <i>Incremental</i> : ≤ 30 m; <i>homing, limit</i> : ≤ 10 m (with HEIDENHAIN cable)					
Supply voltage	DC 5 V ±0.25 V					
Power consumption (max.)	Scanning head: 130 mW; LIF 48 connector: 640 mW; LIF 47 connector: 720 mW (without load)					
Current consumption	< 150 mA	< 165 mA (without load)				
Vibration 55 Hz to 2000 Hz Shock 11 ms	≤ 400 m/s ² (EN 60068-2-6) ≤ 500 m/s ² (EN 60068-2-27)					
Operating temperature	0 °C to 50 °C					
Mass	Scanning head*: For scale made of Zerodur glass ceramic: 25 g For scale made of glass: 9 g Cable: 38 g/m Connector: 75 g					

* Please select when ordering
¹⁾ With TTL: maximum traversing speed during referencing: 9.6 m/min (40 kHz)
²⁾ –3 dB cutoff frequency of the downstream electronics