

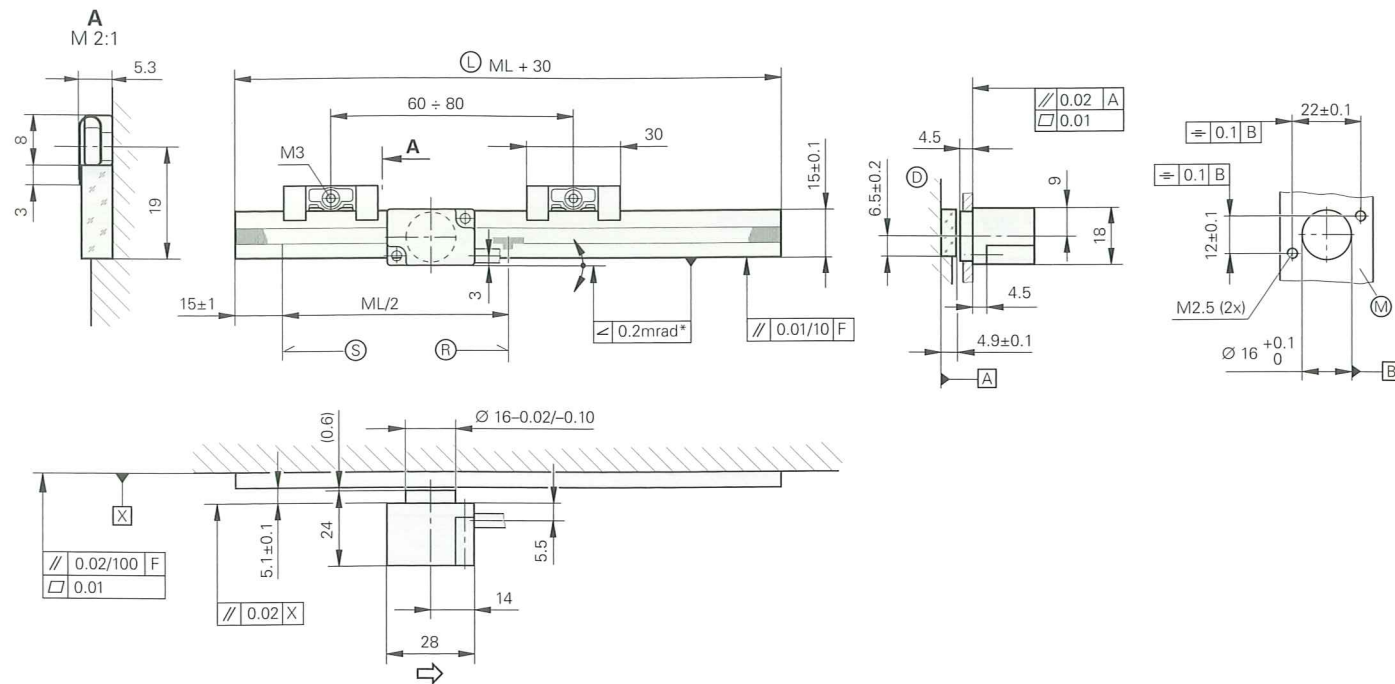
LIP 400 Series

Incremental linear encoders with very high accuracy

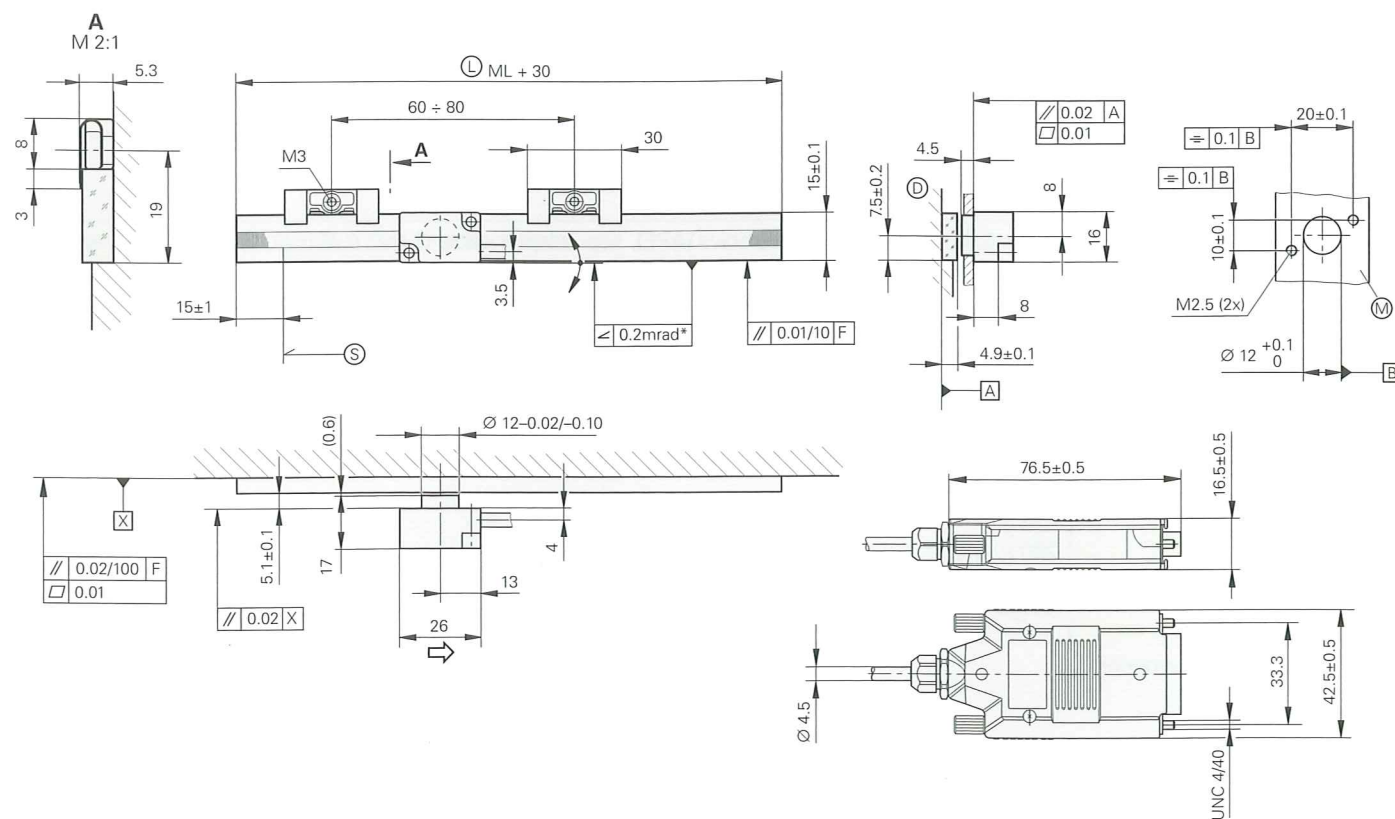
- For limited installation space
- For measuring steps of 1 µm to 0.005 µm



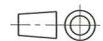
LIP 471R/LIP 481R



LIP 471A/LIP 481A



Dimensions in mm



Tolerancing ISO 8015
ISO 2768 - m H
< 6 mm: ±0.2 mm

- F = Machine guideway
- * = Max. change during operation
- Ⓡ = Reference-mark position on LIP 4x1 R
- Ⓢ = Beginning of measuring length (ML)
- ↗ = Direction of scanning head motion for output signals in accordance with interface description

Specifications	LIP 481	LIP 471						
Measuring standard*	DIADUR phase grating on Zerodur glass ceramic or glass							
Coefficient of linear expansion	$\alpha_{\text{therm}} \approx (0 \pm 0.1) \cdot 10^{-6} \text{ K}^{-1}$ (Zerodur glass ceramic) $\alpha_{\text{therm}} \approx 8 \cdot 10^{-6} \text{ K}^{-1}$ (glass)							
Accuracy grade*	± 1 µm, ± 0.5 µm (higher accuracy grades on request)							
Measuring length ML* in mm	70	120	170	220	270	320	370	420
Reference marks* LIP 4x1 R	One at midpoint of measuring length							
LIP 4x1 A	None							
Incremental signals	~ 1 V _{PP}	TTL						
Grating period	4 µm							
Integrated interpolation*	-	5-fold				10-fold		
Signal period	2 µm	0.4 µm				0.2 µm		
Cutoff frequency	-3dB	≥ 250 kHz	-					
Scanning frequency*	-	≤ 200 kHz	≤ 100 kHz	≤ 50 kHz	≤ 100 kHz	≤ 50 kHz	≤ 25 kHz	
Edge separation a	-	≥ 0.220 µs	≥ 0.465 µs	≥ 0.950 µs	≥ 0.220 µs	≥ 0.465 µs	≥ 0.950 µs	
Traversing speed	≤ 30 m/min	≤ 24 m/min	≤ 12 m/min	≤ 6 m/min	≤ 12 m/min	≤ 6 m/min	≤ 3 m/min	
Power supply	5 V ± 5%	5 V ± 5%						
Current consumption	< 190 mA	< 200 mA (without load)						
Electrical connection*	Cable 0.5 m, 1 m, 2 m or 3 m with D-sub connector (15-pin), interface electronics in the connector							
Cable length	≤ 30 m (with HEIDENHAIN cable)							
Vibration 55 to 2000 Hz	≤ 200 m/s ² (EN 60068-2-6)							
Shock 11 ms	≤ 500 m/s ² (EN 60068-2-27)							
Operating temperature	0 °C to 40 °C							
Weight								
Scanning head	25 g (LIP 4x1 A), 50 g (LIP 4x1 R), each without connecting cable							
connector	140 g							
Scale	5.6 g + 0.2 g/mm measuring length							
Connecting cable	38 g/m							

* Please select when ordering