

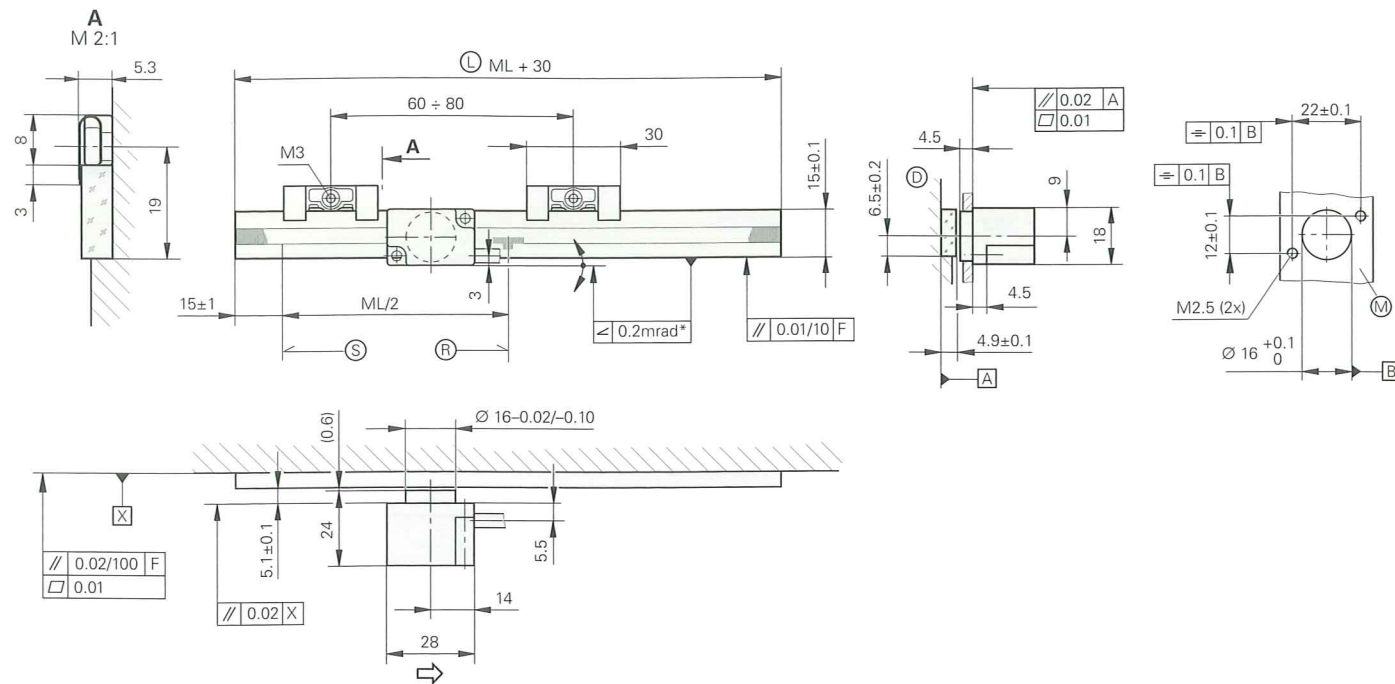
LIP 400 Series

Incremental linear encoders with very high accuracy

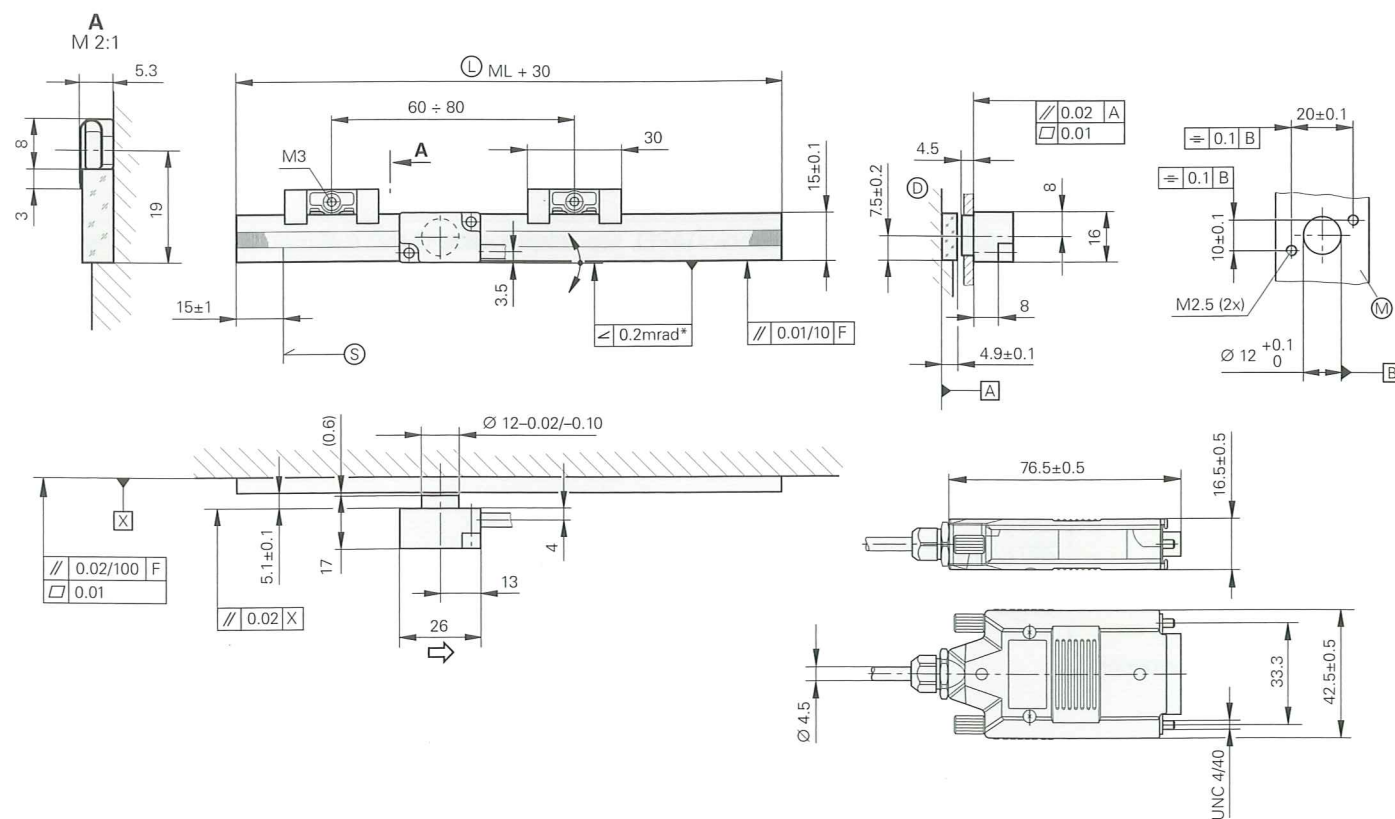
- For limited installation space
- For measuring steps of 1 µm to 0.005 µm



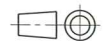
LIP 471R/LIP 481R



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