



HEIDENHAIN



Product Information

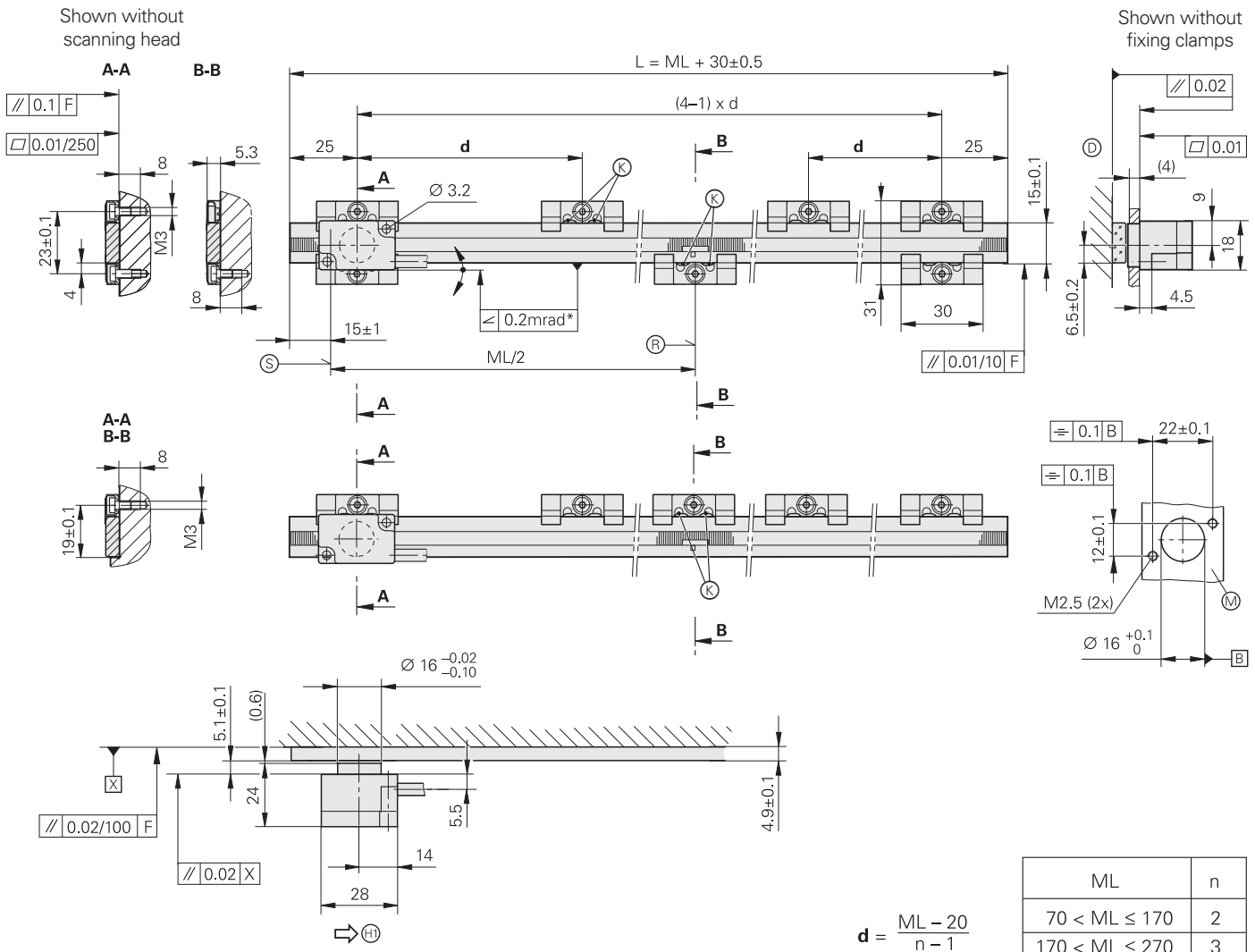
LIP 481V **LIP 481U**

Exposed Linear Encoders for
High and Ultrahigh Vacuum
Technology

LIP 481V; LIP 481 U

Incremental linear encoders with very high accuracy

- Special vacuum-compatible design for high and ultrahigh vacuum
- For measuring steps of less than 3 nm
- Measuring standard is fastened with fixing clamps



mm

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

- F = Machine guideway
- * = Maximum change during operation
- L = Scale length
- Ⓢ = Adhesive dries at room temperature in 24 h
- Ⓣ = Beginning of measuring length (ML)
- Ⓜ = Reference mark position
- Ⓜ = Mounting surface for scanning head
- n = Quantity of fixing clamp pairs
- d = Distance between fixing clamps
- Ⓜ = Direction of motion of scanning unit for ascending position values



Specifications	LIP 481V	LIP 481U
Areas of application	High vacuum, up to $1 \cdot 10^{-7}$ mbar	Ultrahigh vacuum, up to $1 \cdot 10^{-11}$ mbar
Measuring standard* Coefficient of linear expansion	SUPRADUR phase grating on glass or Zerodur glass ceramic Glass: $\alpha_{\text{therm}} \approx 8 \cdot 10^{-6} \text{ K}^{-1}$; Zerodur glass ceramic: $\alpha_{\text{therm}} \approx (0 \pm 0.1) \cdot 10^{-6} \text{ K}^{-1}$	
Accuracy grade*	$\pm 1 \mu\text{m}$, $\pm 0.5 \mu\text{m}$	
Baseline error	$\leq \pm 0.175 \mu\text{m}/5 \text{ mm}$	
Measuring length ML* in mm	70 120 170 220 270 320 370 420	
Reference marks	One at midpoint of measuring length	
Output signals	$\sim 1 \text{ V}_{\text{PP}}$	
Signal period	2 μm	
Cutoff frequency -3 dB	$\geq 300 \text{ kHz}$	
Traversing speed	36 m/min	
Interpolation error Position noise RMS	$\pm 7 \text{ nm}$ 2 nm (450 kHz)	
Supply voltage Current consumption	DC 5 V $\pm 5\%$ < 190 mA	
Electrical connection	15-pin D-sub connector (male); interface electronics integrated in connector	
Housing feed-through* (see page 4)	None (interface electronics in a vacuum)	D-sub connector (not included in delivery; interface electronics not in a vacuum)
Cable length of scanning head to APE*	0.5 m or 1 m	0.5 m or 1 m to the housing feed-through and 0.5 m to the APE
	Other cable lengths on request, but $\leq 3 \text{ m}$ between scanning head and APE	
Cable length after APE	$\leq 20 \text{ m}$ (with HEIDENHAIN cable)	
Vibration 55 Hz to 2000 Hz Shock 11 ms	$\leq 200 \text{ m/s}^2$ (EN 60068-2-6) $\leq 500 \text{ m/s}^2$ (EN 60068-2-27)	
Operating temperature	0 °C to 40 °C	
Baking temperature	100 °C	120 °C
Materials	PCB: Ceramic Adhesives: UHV-compatible, temperature resistant	
Mass Scanning head Connector Scale Connecting cable	50 g (without cable) 32 g; <i>with integrated interface electronics</i> : 140 g 5.6 g + 0.2 g/mm measuring length 38 g/m	

* Please select when ordering

Electrical connection

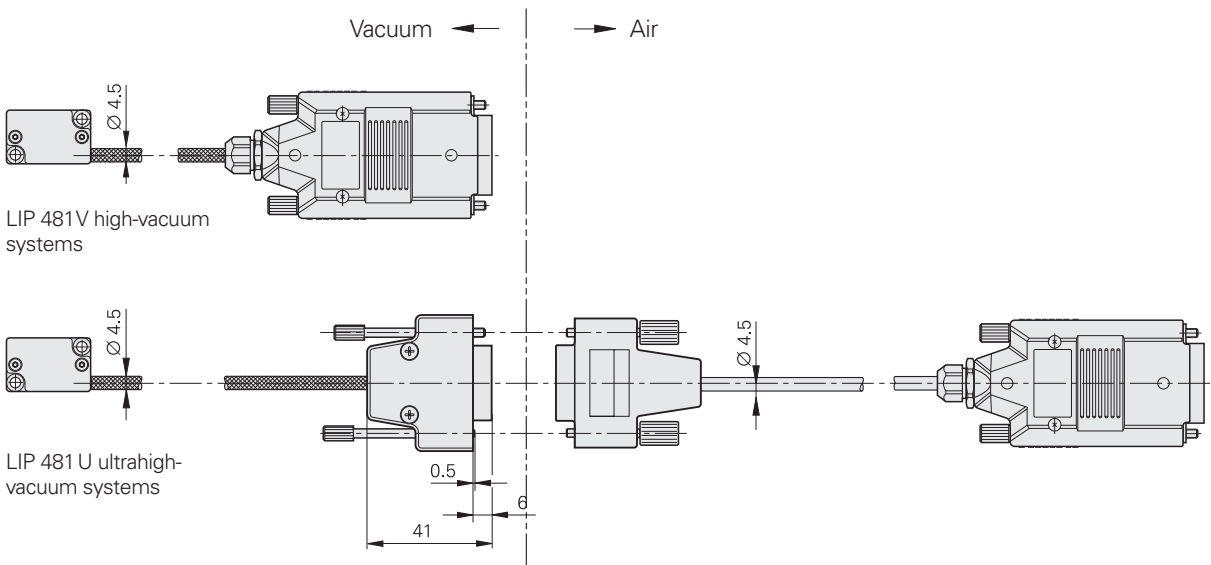
LIP 481V

The scanning head cable has a 15-pin D-sub connector that contains the interface electronics. A vacuum feed-through (15-pin D-sub connector on DN63CF flange) and an extension cable are available as accessories.

LIP 481U

The encoder must contain no electronic components during use in ultrahigh vacuum. For this reason, the necessary interface electronics are outside of the UHV area.

The LIP 481 U is equipped with a cable and a UHV-compatible D-sub connector. An adapter cable with the interface electronics integrated in its D-sub connector is included in delivery. A vacuum feed-through (15-pin D-sub connector on DN63CF flange) and an extension cable are available as accessories.



15-pin D-sub connector with integrated interface electronics													
Power supply				Incremental signals						Other signals			
4	12	2	10	1	9	3	11	14	7	13	8	6	
U_P	Sensor 5 V	0V	Sensor 0 V	A+	A-	B+	B-	R+	R-	Vacant	/	/	
Brown/ Green	Blue	White/ Green	White	Brown	Green	Gray	Pink	Red	Black	Violet	Green/ Black	Yellow/ Black	

Shield on housing; **U_P** = Power supply voltage

Sensor: The sense line is connected internally with the corresponding power line.

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This Product Information document supersedes all previous editions, which thereby become invalid.

The basis for ordering from HEIDENHAIN is always the Product Information document edition valid when the order is made.

Further information:

Comply with the requirements described in the following documents to ensure the correct and intended operation of the encoder:

- Brochure: *Exposed Linear Encoders*

- Technical Information: *Linear Encoders for Vacuum Technology*

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