



# HEIDENHAIN



Product Information

## **LIP 481 V** **LIP 481 U**

Exposed Linear Encoders  
for High and Ultrahigh  
Vacuum Technology

January 2013





Specifications	LIP 481V	LIP 481 U
<b>Area of application</b>	High vacuum, up to $10^{-7}$ mbar	Ultrahigh vacuum, up to $10^{-11}$ mbar
<b>Measuring standard*</b> Coefficient of linear expansion	DIADUR phase grating on glass or Zerodur glass ceramic Glass: $\alpha_{\text{therm}} \approx 8 \cdot 10^{-6} \text{ K}^{-1}$ ; Zerodur glass ceramic: $\alpha_{\text{therm}} \approx (0 \pm 0.1) \times 10^{-6} \text{ K}^{-1}$	
<b>Accuracy grade*</b>	$\pm 1 \mu\text{m}$ , $\pm 0.5 \mu\text{m}$	
<b>Position error</b> within one signal period	$\pm 0.02 \mu\text{m}$	
<b>Measuring length ML*</b> in mm	70 120 170 220 270 320 370 420	
Reference marks	One at midpoint of measuring length	
<b>Output signals</b>	$\sim 1 \text{ V}_{\text{PP}}$	
Signal period	2 $\mu\text{m}$	
Cutoff frequency -3 dB	$\geq 300 \text{ kHz}$	
<b>Traversing speed</b>	36 m/min	
<b>Power supply</b> Current consumption	5 V DC $\pm 5\%$ < 190 mA	
<b>Electrical connection</b>	D-sub connector (male) 15-pin, interface electronics integrated in the connector	
Housing lead-through* (see page 4)	<ul style="list-style-type: none"> <li>None (interface electronics in vacuum)</li> <li>High-vacuum compatible (interface electronics outside of vacuum)</li> </ul>	D sub (not included in delivery, interface electronics outside of vacuum)
Cable length of scanning head to APE*	<ul style="list-style-type: none"> <li>0.5 m or 1 m</li> <li>0.5 m or 1 m to the housing lead-through and 0.5 m to the APE</li> </ul>	0.5 m or 1 m to the housing lead-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)	
<b>Vibration</b> 55 to 2000 Hz <b>Shock</b> 11 ms	$\leq 200 \text{ m/s}^2$ (EN 60068-2-6) $\leq 500 \text{ m/s}^2$ (EN 60068-2-27)	
<b>Operating temperature</b>	0 °C to 40 °C	
<b>Bake-out temperature</b>	100 °C	120 °C
<b>Materials</b>	<i>PCB:</i> Ceramic <i>Adhesives:</i> UHV-compatible, temperature resistant	
<b>Weight</b> 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 481 V

The LIP 481 V is available with various cable versions:

- **Interface electronics outside of the high vacuum:**

The scanning head cable has a high-vacuum-compatible round connector. The items supplied include a suitable high-vacuum feedthrough and the adapter cable with 15-pin D-sub connector. The interface electronics are integrated in the D-sub connector.

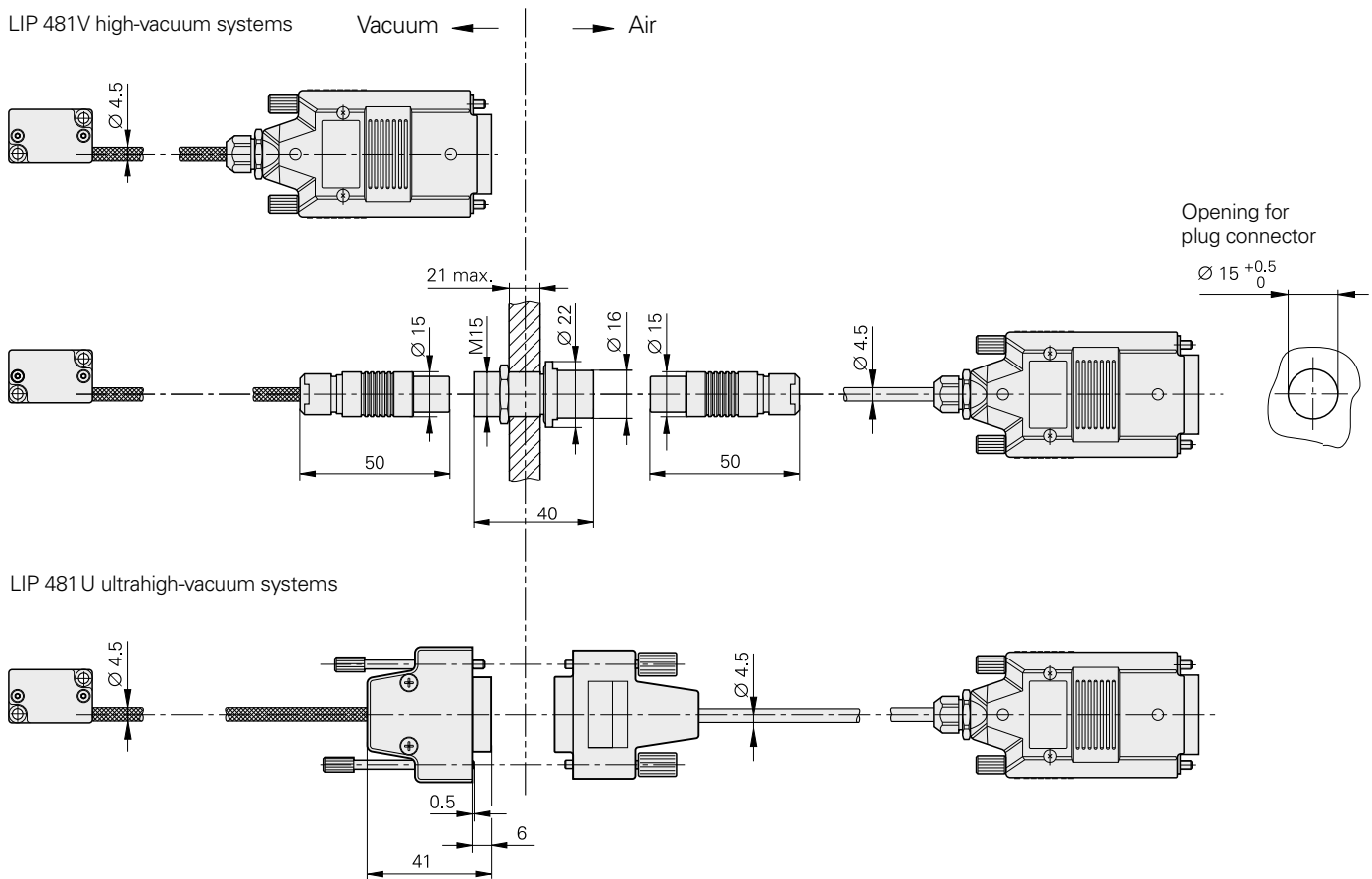
- **Interface electronics in high vacuum:**

The scanning head cable has a 15-pin D-sub connector within which the interface electronics are integrated. Available accessories are a vacuum feedthrough (15-pin D-sub connector on DN63CF flange) and an extension cable.

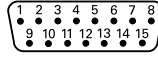
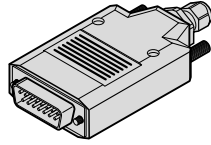
## LIP 481 U


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 feedthrough (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
	<b>Up</b>	<b>Sensor</b> 5V	<b>0V</b>	<b>Sensor</b> 0V	<b>A+</b>	<b>A-</b>	<b>B+</b>	<b>B-</b>	<b>R+</b>	<b>R-</b>	<b>Vacant</b>	/	/
	Brown/ Green	Blue	White/ Green	White	Brown	Green	Gray	Pink	Red	Black	Violet	Green/ Black	Yellow/ Black

**Shield** on housing; **Up** = power supply voltage

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

# HEIDENHAIN

**DR. JOHANNES HEIDENHAIN GmbH**

Dr.-Johannes-Heidenhain-Straße 5

**83301 Traunreut, Germany**

☎ +49 8669 31-0

FAX +49 8669 5061

E-mail: [info@heidenhain.de](mailto:info@heidenhain.de)

[www.heidenhain.de](http://www.heidenhain.de)

### For more information

- Brochure: *Exposed Linear Encoders*
- Technical Information: *Linear Encoders for Vacuum Technology*