



HEIDENHAIN



Product Information

LIF 481 Dplus

Incremental Exposed
Linear Encoder *plus*
Perpendicular Added Track

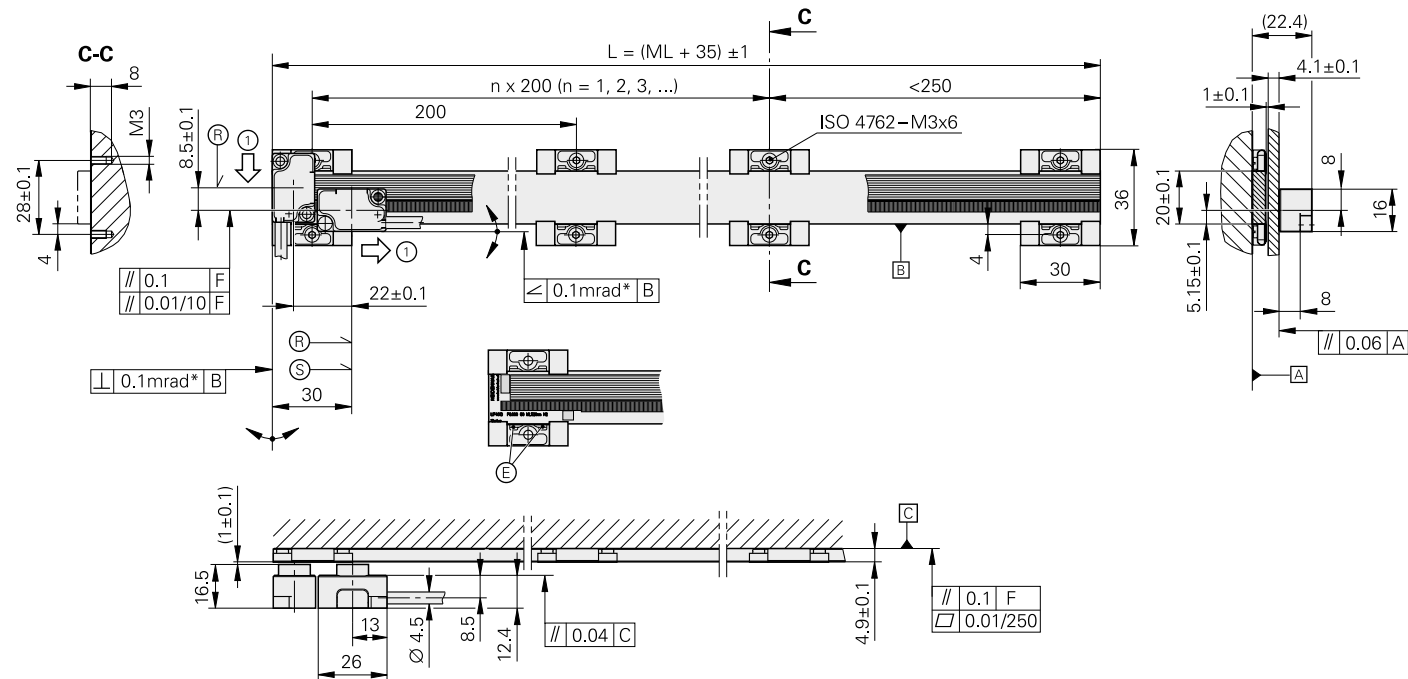
LIF 481 Dplus

Incremental exposed linear encoder

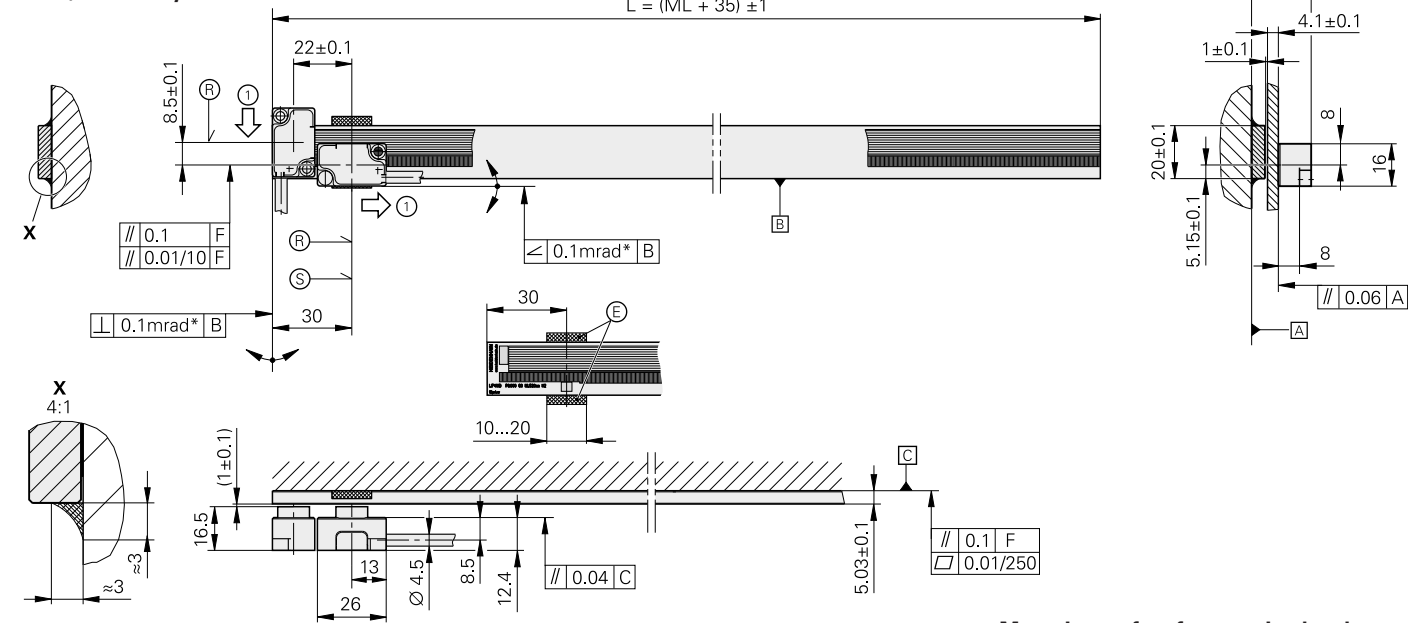
- Additional Y track for measurement of errors lateral to the direction of measurement
- Glass ceramic scale, fastened with PRECIMET or fixing clamps



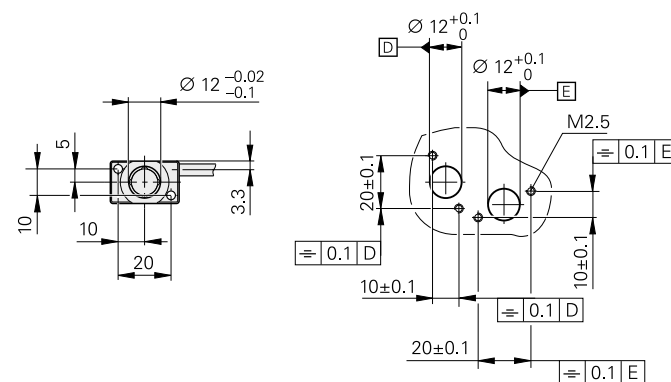
Scale, clamped



Scale, adhesively bonded



Mounting surface for scanning heads



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

- F = Machine guideway
- * = Maximum change during operation
- L = Overall length
- ML = Measuring length
- ⊙ = Beginning of measuring length (ML)
- ⊕ = Reference mark position
- ⊗ = Epoxy bond fixed point, shown at the reference marks (possible alternative at ML/2, for example)
- 1 = Direction of scanning unit motion for output signals in accordance with interface description

Scale	LIF 401 Dplus
Measuring standard	SUPRADUR phase grating on Zerodur glass ceramic
Coefficient of linear expansion	$\alpha_{\text{therm}} \approx (0 \pm 0.1) \cdot 10^{-6} \text{ K}^{-1}$
Grating period	8 μm
Accuracy grade*	X direction: $\pm 3 \mu\text{m}$; Y direction: $\pm 20 \mu\text{m}$
Measuring length (ML)* in mm	70 120 170 220 270 320 370 420 470 520 570 620 670 720 770 820 870 920 970 1020 1140 1240 1340 1440 1540 1640 1740 1840 1940 2040 2140 2240 2340 2440 2540 2640 2740 2840 2940 3040
Measuring range of Y track	$\pm 1 \text{ mm}$
Reference marks	One reference mark at beginning of measuring length
Mass	247 g/m

Scanning head	LIF 48	LIF 47				
Interface	$\sim 1 \text{ V}_{\text{PP}}$	\square TTL				
Integrated interpolation* Signal period Measuring step ¹⁾	– 4 μm –	5-fold 0.8 μm 0.2 μm	10-fold 0.4 μm 0.1 μm	20-fold 0.2 μm 0.05 μm	50-fold 0.08 μm 0.02 μm	100-fold 0.04 μm 0.01 μm
Cutoff frequency –3 dB	$\geq 1 \text{ MHz}$	–				
Scanning frequency*	–	$\leq 500 \text{ kHz}$ $\leq 250 \text{ kHz}$ $\leq 125 \text{ kHz}$	$\leq 250 \text{ kHz}$ $\leq 125 \text{ kHz}$ $\leq 62.5 \text{ kHz}$	$\leq 250 \text{ kHz}$ $\leq 125 \text{ kHz}$ $\leq 62.5 \text{ kHz}$	$\leq 100 \text{ kHz}$ $\leq 50 \text{ kHz}$ $\leq 25 \text{ kHz}$	$\leq 50 \text{ kHz}$ $\leq 25 \text{ kHz}$ $\leq 12.5 \text{ kHz}$
Edge separation <i>a</i>	–	$\geq 0.080 \mu\text{s}$ $\geq 0.175 \mu\text{s}$ $\geq 0.370 \mu\text{s}$	$\geq 0.080 \mu\text{s}$ $\geq 0.175 \mu\text{s}$ $\geq 0.370 \mu\text{s}$	$\geq 0.040 \mu\text{s}$ $\geq 0.080 \mu\text{s}$ $\geq 0.175 \mu\text{s}$	$\geq 0.040 \mu\text{s}$ $\geq 0.080 \mu\text{s}$ $\geq 0.175 \mu\text{s}$	$\geq 0.040 \mu\text{s}$ $\geq 0.080 \mu\text{s}$ $\geq 0.175 \mu\text{s}$
Traversing speed²⁾	$\leq 240 \text{ m/min}$	$\leq 120 \text{ m/min}$ $\leq 60 \text{ m/min}$ $\leq 30 \text{ m/min}$	$\leq 60 \text{ m/min}$ $\leq 30 \text{ m/min}$ $\leq 15 \text{ m/min}$	$\leq 60 \text{ m/min}$ $\leq 30 \text{ m/min}$ $\leq 15 \text{ m/min}$	$\leq 24 \text{ m/min}$ $\leq 12 \text{ m/min}$ $\leq 6 \text{ m/min}$	$\leq 12 \text{ m/min}$ $\leq 6 \text{ m/min}$ $\leq 3 \text{ m/min}$
Interpolation error RMS position noise	$\pm 12 \text{ nm}$ 0.6 nm (1 MHz ³⁾)	–				
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> : $\leq 30 \text{ m}$; <i>homing, limit</i> : $\leq 10 \text{ m}$; (with HEIDENHAIN cable)					
Supply voltage	DC 5 V $\pm 0.25 \text{ V}$					
Current consumption	$< 150 \text{ mA}$	$< 165 \text{ mA}$ (without load)				
Vibration 55 Hz to 2000 Hz Shock 11 ms	$\leq 400 \text{ m/s}^2$ (EN 60068-2-6) $\leq 500 \text{ m/s}^2$ (EN 60068-2-27)					
Operating temperature	0 °C to 50 °C					
Mass	Scanning head* Cable Connector	For scale made of Zerodur glass ceramic: 25 g 38 g/m 75 g				

* Please select when ordering



¹⁾ After 4-fold evaluation

²⁾ With TTL: maximum traversing speed during referencing: 9.6 m/min (40 kHz)

³⁾ –3 dB cutoff frequency of the downstream electronics

Electrical connection

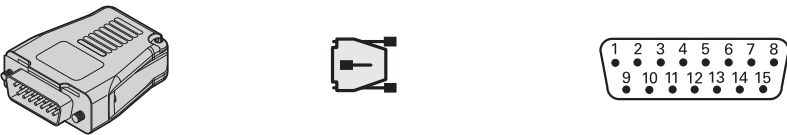



Connecting cables

PUR connecting cable $[6(2 \times 0.09 \text{ mm}^2) + (4 \times 0.16 \text{ mm}^2)] A_P = 0.16 \text{ mm}^2$			
PUR connecting cable $[6(2 \times 0.16 \text{ mm}^2) + (4 \times 0.5 \text{ mm}^2)] A_P = 0.5 \text{ mm}^2$		Ø 8 mm	Ø 6 mm ¹⁾
With one 15-pin D-sub connector (female)		354411-xx	355398-xx
Complete with 15-pin D-sub connector (female) and 15-pin D-sub connector (male)		354379-xx	355397-xx

¹⁾ Max. total cable length: 9 m

A_P: Cross section of power supply lines

Pin layout

15-pin D-sub connector															
															
	Power supply				Incremental signals						Other signals				
	4	12	2	10	1	9	3	11	14	7	13	8	6	15	5
	U_P	Sensor 5 V	0 V	Sensor 0 V	U_{a1}	\overline{U}_{a1}	U_{a2}	\overline{U}_{a2}	U_{a0}	\overline{U}_{a0}	\overline{U}_{aS}	H³⁾	L³⁾	PWT¹⁾	Vacant
	●—●		●—●		A+	A-	B+	B-	R+	R-	As-signed			As-signed	Vacant
	Brown/ Green	Blue	White/ Green	White	Brown	Green	Gray	Pink	Red	Black	Violet	Green/ Black	Yellow/ Black	Yellow	/

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

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

Vacant pins or wires must not be used!

¹⁾ TTL/11 μA_{PP} conversion for the PWT

²⁾ Color assignment of the connecting cable

³⁾ Valid only for the LIP 6000/LIF 400

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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 valid when the contract is made.



Further information:

To ensure proper and intended use, comply with the specifications in the following documents:

- Brochure: *Interfaces of HEIDENHAIN Encoders* 1078628-xx
- Brochure: *Exposed Linear Encoders* 208960-xx
- Brochure: *MULTI-DOF Measurement Technology for Multiple Degrees of Freedom* 1349070-xx