Product Information

LIF 171
LIF 181
Incremental Linear Encoders
Incremental linear encoders
• For measuring steps down to 100 nm
• Easy mounting with PRECIMET® adhesive film, or fastening with fixing clamps
• Distance-coded reference marks
• For large measuring lengths of up to 3 m
• Measuring lengths of up to 6 m upon request

Scale in clamped condition
Fixed-point bond for even number of fixing clamps

Scale in bonded condition
Fixed-point bond for odd number of fixing clamps

With stop pin at center
**Scale**

<table>
<thead>
<tr>
<th>LIF 101</th>
</tr>
</thead>
</table>

**Measuring standard**

- Coefficient of linear expansion:
  - Supradur phase grating on Zerodur glass-ceramic or glass; grating period: 8 µm
  - \( \alpha_{\text{therm}} = (0 \pm 0.1) \times 10^{-6} \, \text{K}^{-1} \) (Zerodur glass-ceramic)
  - \( \alpha_{\text{therm}} = 8 \times 10^{-6} \, \text{K}^{-1} \) (glass)

**Accuracy grade**

±3 µm; ±1 µm (only in Zerodur and up to a measuring length of 1640 mm)

**Baseline error**

≤ ±0.175 µm/5 mm

**Measuring length ML* in mm**

- 70 120 170 220 270 320 370 420 470 520 570 620 670
- 720 770 820 870 920 970 1040 1140 1240 1340 1440 1540 1640
- 1840 2040 2240 2440 2640 2840 3040

**Reference marks**

- LIF 101 R
- LIF 101 C

One reference mark at midpoint of measuring length

**Distance-coded**

**Mass**

75 g + 0.25 g/mm of measuring length

**Scanning head**

<table>
<thead>
<tr>
<th>LIF 18</th>
<th>LIF 17</th>
</tr>
</thead>
</table>

**Interface**

- ~ 1 VPP
- TTL

**Integrated interpolation**

- 4 µm 5-fold
- 0.8 µm 10-fold

**Cutoff frequency**

- ≥ 1 MHz
- –

**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**

- 1) ≤ 240 m/min
- 1) ≥ 48 m/min
- 1) ≤ 24 m/min
- 1) ≥ 12 m/min
- 1) ≤ 12 m/min
- 1) ≤ 6 m/min

**Interpolation error**

- ±12 nm
- 0.6 nm (1 MHz²)

**Position noise RMS**

- –

**Electrical connection**

- Cable, 0.5 m/1 m/3 m, with 15-pin D-sub connector (male); interface electronics in connector

**Cable length**

- With HEIDENHAIN cable: ≤ 30 m

**Supply voltage**

- DC 5 V ±5 %
- DC 5 V ±5 %

**Current consumption**

- ≤ 150 mA
- ≤ 165 mA (without load)

**Vibration**

- 55 Hz to 2000 Hz
- ≤ 200 m/s² (IEC 60068-2-6)
- ≤ 500 m/s² (IEC 60068-2-27)

**Shock 6 ms**

- ≤ 200 m/s² (IEC 60068-2-6)
- ≤ 500 m/s² (IEC 60068-2-27)

**Operating temperature**

- 0 °C to 50 °C
- −20 °C to 70 °C

**Protection**

- EN 60529
- IP00; scanning head: IP50

**Mass**

- Scanning head
- Cable 25 g (without cable)
- 38 g/m
- 75 g
- Connector

* Please select when ordering

1) Only for TTL: Maximum traversing speed for referencing: 9.6 m/min · (40 kHz)

2) –3 dB cutoff frequency of the subsequent electronics

3) Measuring lengths of up to 6 m upon request
# Electrical connection

## LIF 171/181 pin layout

<table>
<thead>
<tr>
<th>Power supply</th>
<th>Incremental signals</th>
<th>Other signals</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>12 2 10</td>
<td>1 9 3 11 14 7</td>
</tr>
<tr>
<td>TTL</td>
<td>U_p Sensor 5 V</td>
<td>U_a1 U_a1 U_a2 U_a2 U_a0 U_a0 U_a0 U_a0 Vacant Vacant PWT</td>
</tr>
<tr>
<td>~1V_Pp</td>
<td>Sensor 0 V</td>
<td>A+ A- B+ B- R+ R- Not vacant Not vacant</td>
</tr>
</tbody>
</table>

### Shield on housing, U_p = Power supply

### Sensor: The sensor line is connected in the connector with the corresponding power supply

Unused pins or wires must not be assigned!

### Connecting cables

<table>
<thead>
<tr>
<th>PUR connecting cable</th>
<th>Cross section: 6 × (2 × 0.19 mm²); A_V = 0.19 mm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-pin D-sub (female) to free cable end</td>
<td>332433-xx</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PUR connecting cable</th>
<th>Cross section: 4 × (2 × 0.16 mm²) + (4 × 0.5 mm²); A_V = 0.5 mm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-pin D-sub connector (female) and 15-pin D-sub connector (male)</td>
<td>335074-xx</td>
</tr>
</tbody>
</table>

1) Max. total cable length: 9 m

A_V: Cross section of power supply lines

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Further information:

Comply with the requirements described in the following documents to ensure correct operation:

- Brochure: Interfaces of HEIDENHAIN Encoders 1078628-xx
- Brochure: Exposed Linear Encoders 208960-xx

This Product Information 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.