LIF 171, LIF 181
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

ISO 4762 M3x6
Md = 1 Nm

Scale in bonded condition

Fixed-point bond for odd number of fixing clamps

With stop pin at center

ISO 7092-3 (2x)
ISO 4762 M3x16 (2x)
Md = 1 Nm

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

Adhesive
Scale length
Machine guideway
Max. change during operation
Reference mark position LIF 101 R / 171 R / 181 R
Reference mark positions LIF 101 C / 171 C / 181 C
Beginning of measuring length ML
Permissible overtravel
Mounting surface for scanning head
Positive direction of motion
Mounting clearance between scanning head and scale
Scale stop surface
ML = Measuring length
### Scale LIF 101

<table>
<thead>
<tr>
<th>Measuring standard</th>
<th>SUPRADUR phase grating on Zerodur glass-ceramic or glass; grating period: 8 µm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient of linear expansion</td>
<td>$\alpha_{\text{therm}} = (0\pm0.1) \times 10^{-6} \text{ K}^{-1}$ (Zerodur glass-ceramic) $\alpha_{\text{therm}} = 8 \times 10^{-6} \text{ K}^{-1}$ (glass)</td>
</tr>
</tbody>
</table>

### Accuracy grade

- $\pm3 \mu m$; $\pm1 \mu m$ (only in Zerodur and up to a measuring length of 1640 mm)

### Measuring length ML* in mm

<table>
<thead>
<tr>
<th>Measuring length ML* in mm</th>
<th>70</th>
<th>120</th>
<th>170</th>
<th>220</th>
<th>270</th>
<th>320</th>
<th>370</th>
<th>420</th>
<th>470</th>
<th>520</th>
<th>570</th>
<th>620</th>
<th>670</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>720</td>
<td>770</td>
<td>820</td>
<td>870</td>
<td>920</td>
<td>970</td>
<td>1040</td>
<td>1140</td>
<td>1240</td>
<td>1340</td>
<td>1440</td>
<td>1540</td>
<td>1640</td>
</tr>
<tr>
<td></td>
<td>1840</td>
<td>2040</td>
<td>2240</td>
<td>2440</td>
<td>2640</td>
<td>2840</td>
<td>3040</td>
<td>3240</td>
<td>3440</td>
<td>3640</td>
<td>3840</td>
<td>4040</td>
<td>4240</td>
</tr>
</tbody>
</table>

### Reference marks*

- LIF 101 R
- LIF 101 C

- One reference mark at midpoint of measuring length
- Distance-coded

### Mass

- 7.5 g + 0.25 g/mm of measuring length

### Scanning head LIF 18 LIF 17

#### Interface

- LIF 18: $\sim$ 1 Vpp
- LIF 17: TTL

#### Integrated interpolation*

- Signal period
  - 4 µm
  - 5-fold
  - 0.8 µm
  - 10-fold
  - 0.4 µm

#### Cutoff frequency

- $\geq 1 \text{ MHz}$
- $\sim 3 \text{ dB}$

#### Scanning frequency

- $\leq 200 \text{ kHz}$
- $\leq 100 \text{ kHz}$
- $\leq 50 \text{ kHz}$
- $\leq 100 \text{ kHz}$
- $\leq 50 \text{ kHz}$
- $\leq 25 \text{ kHz}$

#### Edge separation $a$

- $\geq 0.220 \mu m$
- $\geq 0.465 \mu m$
- $\geq 0.950 \mu m$
- $\geq 0.220 \mu m$
- $\geq 0.465 \mu m$
- $\geq 0.950 \mu m$

#### Traversing speed

- $\leq 240 \text{ m/min}$
- $\leq 48 \text{ m/min}$
- $\leq 24 \text{ m/min}$
- $\leq 12 \text{ m/min}$
- $\leq 24 \text{ m/min}$
- $\leq 12 \text{ m/min}$
- $\leq 6 \text{ m/min}$

#### Interpolation error

- Position noise RMS
  - $\pm 12 \text{ nm}$
  - $0.6 \text{ nm}$
  - (1 MHz$^2$)
  - $\sim$

#### 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: $\leq 30 \text{ m}$

#### Supply voltage

- DC 5 V $\pm 5\%$
- DC 5 V $\pm 5\%$

#### Current consumption

- $\leq 150 \text{ mA}$
- $\leq 165 \text{ mA}$ (without load)

#### Vibration

- 55 Hz to 2000 Hz
- $\leq 200 \text{ m/s}^2$ (IEC 60068-2-6)
- $\leq 500 \text{ m/s}^2$ (IEC 60068-2-27)

#### Shock

- 6 ms
- $\leq 200 \text{ m/s}^2$ (IEC 60068-2-6)
- $\leq 500 \text{ m/s}^2$ (IEC 60068-2-27)

#### Operating temperature

- 0 °C to 50 °C
- 0 °C to 50 °C

#### Storage temperature

- 0 °C to 50 °C
- $-20 \degree \text{ C to 70 °C}$

#### Protection

- EN 60529
- IP00; scanning head: IP50

#### Mass

- Scanning head
- 25 g (without cable)
- 18 g/m
- 75 g

* Please select when ordering

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

2) $\sim 3 \text{ dB}$ cutoff frequency of the subsequent electronics

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

LIF 171/181 pin layout

15-pin D-sub connector

<table>
<thead>
<tr>
<th>Power supply</th>
<th>Incremental signals</th>
<th>Other signals</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>7</td>
<td>13</td>
<td>8</td>
</tr>
<tr>
<td>6</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>TTL</td>
<td>U_P</td>
<td>Sensor 5 V</td>
</tr>
<tr>
<td>~ 1 V_{PP}</td>
<td></td>
<td>Sensor 0 V</td>
</tr>
<tr>
<td>U_a1</td>
<td>U_a1</td>
<td>U_a2</td>
</tr>
<tr>
<td>U_a2</td>
<td>U_a0</td>
<td>U_a0</td>
</tr>
<tr>
<td>A+</td>
<td>A-</td>
<td>B+</td>
</tr>
<tr>
<td>B-</td>
<td>R+</td>
<td>R-</td>
</tr>
<tr>
<td>Not vacant</td>
<td>Vacant</td>
<td>Vacant</td>
</tr>
<tr>
<td>21</td>
<td>Brown/Blue</td>
<td>White/White</td>
</tr>
<tr>
<td>Shield</td>
<td>Green</td>
<td>Green</td>
</tr>
<tr>
<td>Sensor</td>
<td>The sensor line is connected in the connector with the corresponding power supply</td>
<td></td>
</tr>
<tr>
<td>Unused pins or wires must not be assigned!</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Connecting cables

<table>
<thead>
<tr>
<th>PUR connecting cable</th>
<th>6 × (2 × 0,19 mm²); A_V = 0,19 mm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUR connecting cable</td>
<td>4 × (2 × 0,16 mm²) + (4 × 0,5 mm²); A_V = 0,5 mm²</td>
</tr>
<tr>
<td>8 mm</td>
<td>6 mm ¹</td>
</tr>
</tbody>
</table>

¹) Max. total cable length: 9 m

AP: Cross section of power supply lines

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.