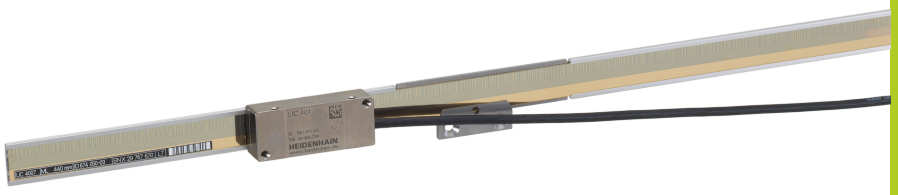
HEIDENHAIN



Product Information

# LIC 4000

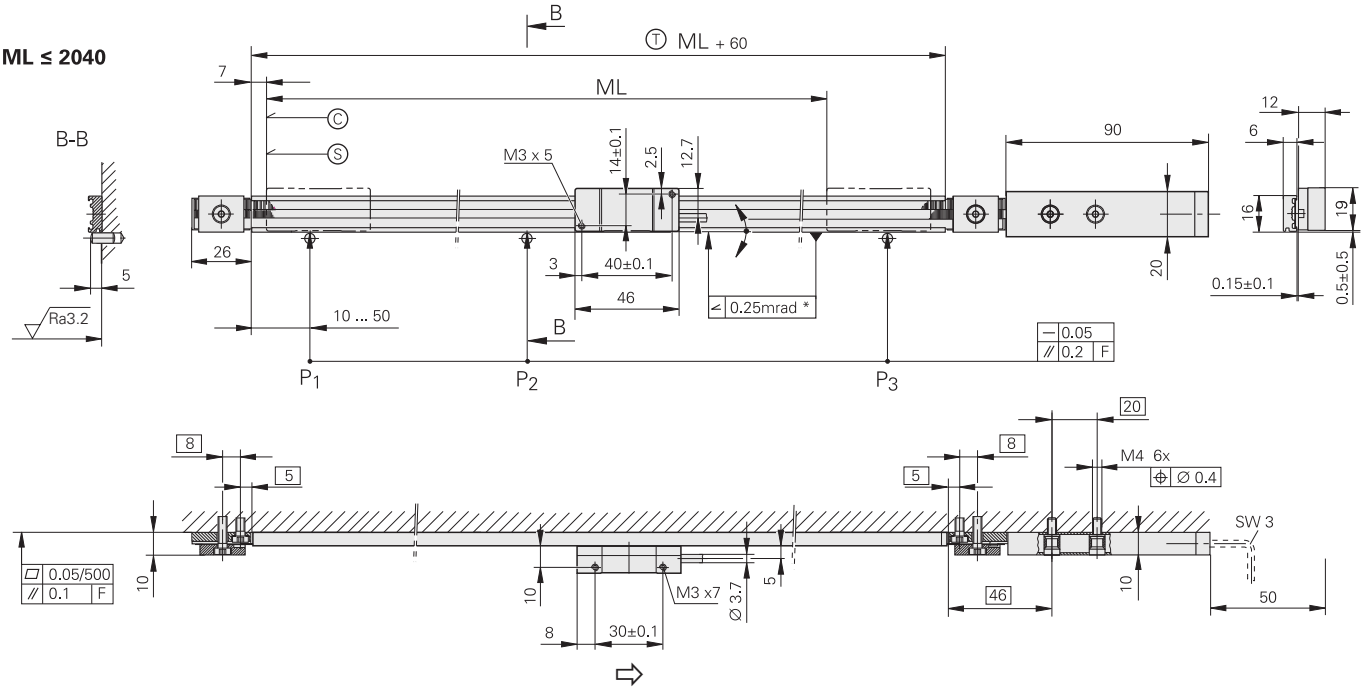
Absolute
Exposed Linear Encoders

11/2010

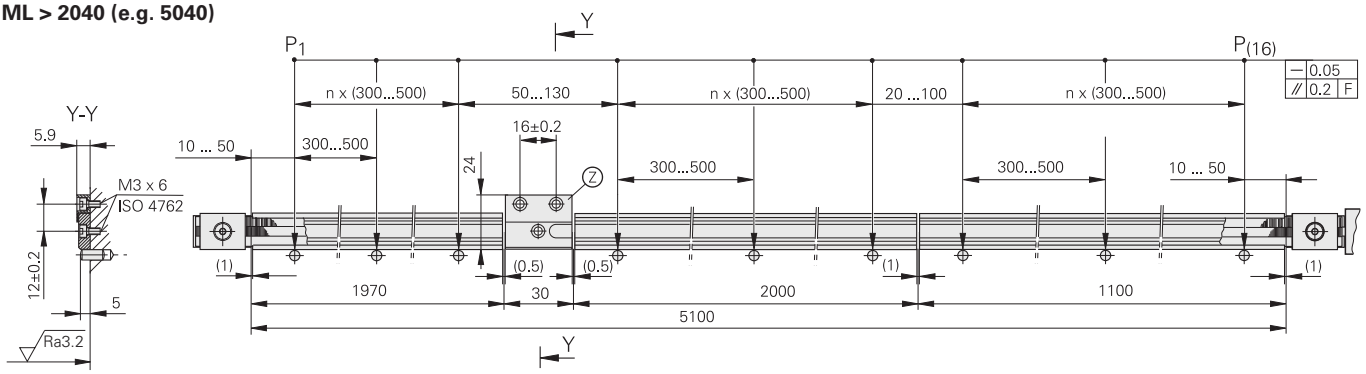
# LIC 4015

- **Absolute linear encoder for measuring lengths up to 27 m**
- **For measuring steps to 0.001 µm (1 nm)**
- **Steel scale-tape is drawn into aluminum extrusions and tensioned**

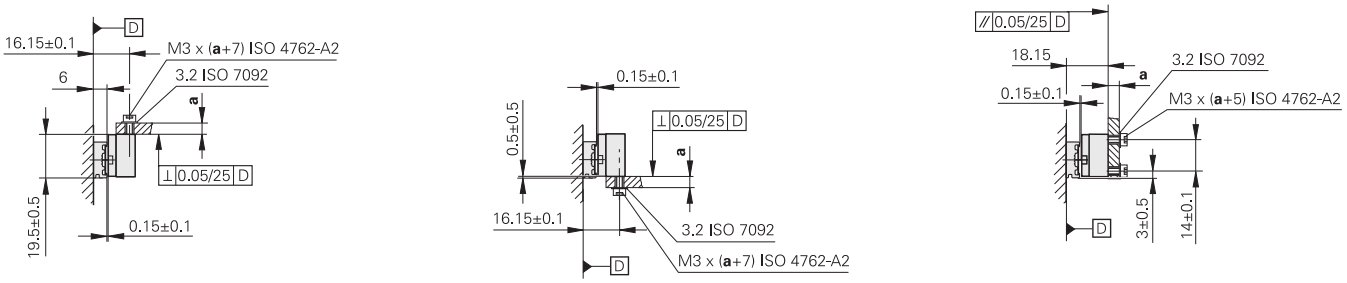
**ML ≤ 2040**




**ML > 2040 (e.g. 5040)**




**Possibilities for mounting the scanning head**




mm

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

F = Machine guideway
P = Gauging points for alignment
*= Max. change during operation
Ⓢ = Beginning of measuring length ML
Ⓒ = Code start value: 100 mm
Ⓣ = Carrier segment
Ⓩ = Spacer for measuring lengths from 3040 mm
⇨ = Direction of scanning unit motion for output signals in accordance with interface description

| Specifications | | Absolute |
|---|---|---|
| | | **LIC 4015** |
| **Measuring standard** | | Steel scale tape with METALLUR absolute code track |
| Coefficient of linear expansion | | Depends on the mounting surface |
| Accuracy grade | | ± 5 µm |
| **Measuring length ML*** in mm | | 140 \| 240 \| 340 \| 440 \| 540 \| 640 \| 740 \| 840 \| 940 \| 1040 \| 1140 \| 1240 \| 1340 \| 1440 \| 1540 1640 \| 1740 \| 1840 \| 1940 \| 2040 |
| | | Larger measuring lengths up to 27 040 mm with a single-section scale tape and individual scale-carrier sections |
| **Mounting** | | Steel scale-tape is drawn into aluminum extrusions and tensioned |
| **Absolute position values** | | EnDat 2.2 |
| Ordering designation | | EnDat 22 |
| Resolution | | 0.001 µm (1 nm) |
| Calculation time $t_{cal}$ | | ≤ 6 µs |
| **Power supply** | | DC 3.6 to 14 V |
| Power consumption [1] (maximum) | | *At 14 V:* ≤ 1000 mW<br>*At 3.6 V:* ≤ 800 mW |
| Current consumption (typical) | | *At 5 V:* 110 mA |
| **Electrical connection*** | | Cable 1 m or 3 m with 8-pin M12 connector (male) |
| **Traversing speed** | | ≤ 480 m/min |
| **Vibration** 55 to 2000 Hz<br>**Shock** 11 ms | | ≤ 200 m/s² (EN 60068-2-6)<br>≤ 500 m/s² (EN 60068-2-27) |
| **Operating temperature** | | 0 °C to 50 °C |
| **Degree of protection** | | IP 40 |
| **Weight** | Scanning head:<br>Scale tape:<br>Parts kit:<br>Scale tape carrier:<br>Connecting cable:<br>Coupling: | 16 g (without connecting cable)<br>31 g/m<br>80 g + n [2] × 27 g<br>187 g/m<br>20 g/m<br>32 g |

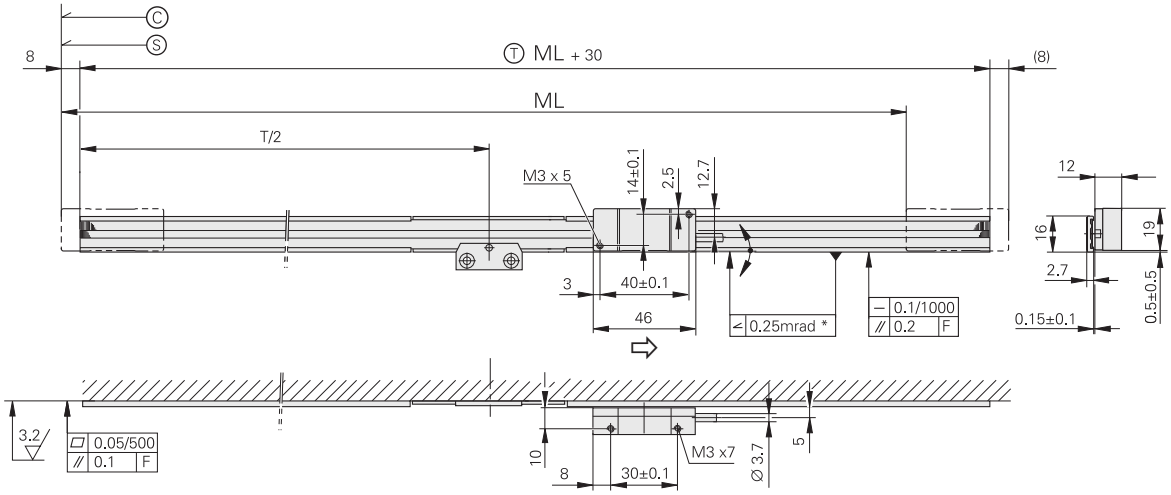
***** Please select when ordering

1) See *General Electrical Information* at www.heidenhain.de

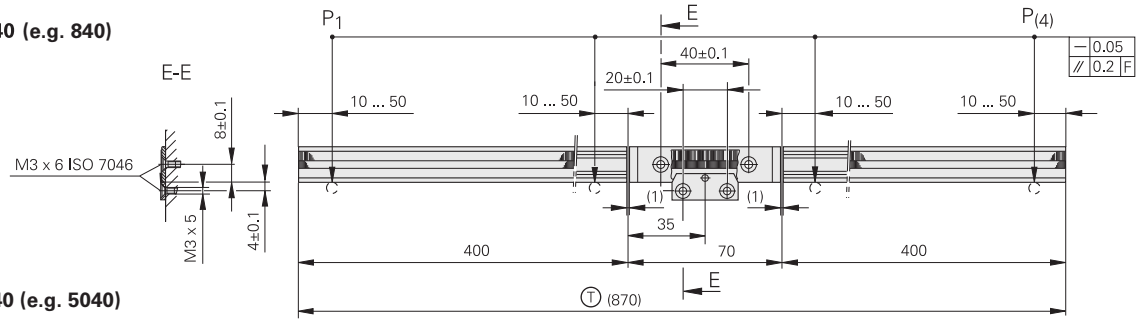
2) n = 1 for ML 3140 to 5040 mm; n =2 for ML 5140 to 7040 mm; etc.

# LIC 4017

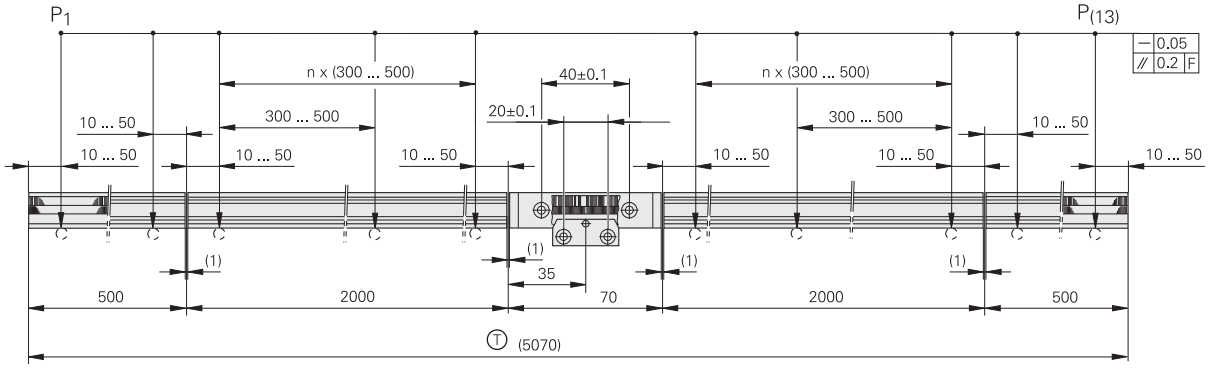
- Absolute linear encoder for measuring lengths up to 6 m
- For measuring steps to 0.001 µm (1 nm)
- Steel scale-tape is drawn into aluminum extrusions and fixed at center



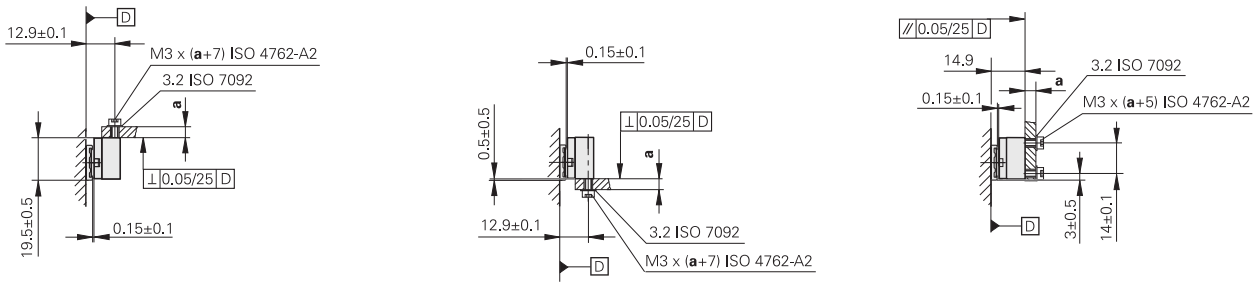

**ML ≤ 2040 (e.g. 840)**




**ML > 2040 (e.g. 5040)**




**Possibilities for mounting the scanning head**




mm

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

F = Machine guideway
P = Gauging points for alignment
* = Max. change during operation
Ⓒ = Code start value: 100 mm
Ⓢ = Beginning of measuring length ML
Ⓣ = Carrier segment
⇨ = Direction of scanning unit motion for output signals in accordance with interface description

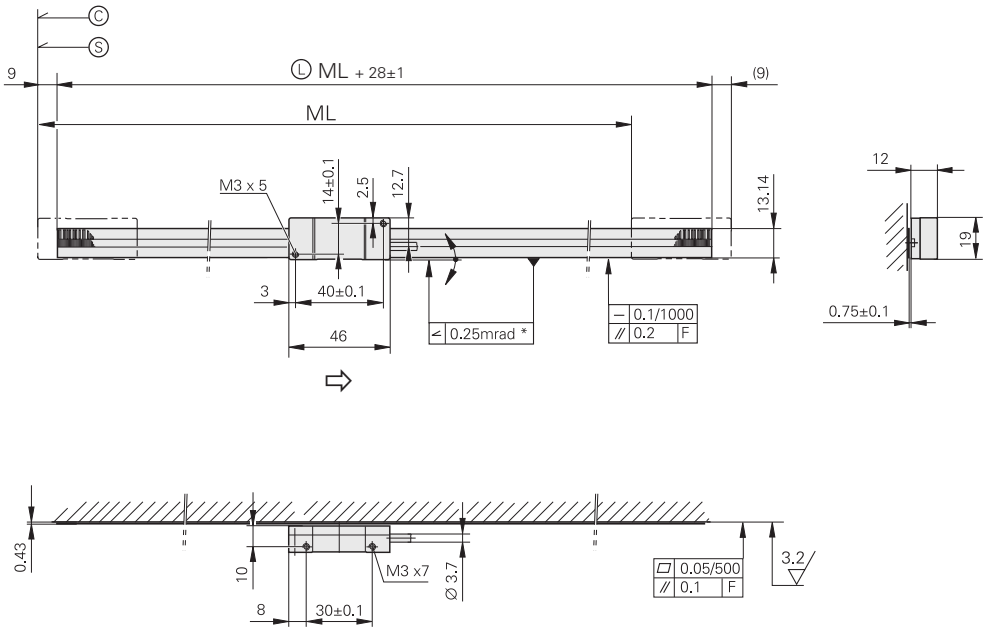
| Specifications | | Absolute |
|---|---|---|
| | | **LIC 4017** |
| **Measuring standard** | | Steel scale tape with METALLUR absolute code track |
| Coefficient of linear expansion | | $\alpha_{therm} \approx 10 \times 10^{-6}\ K^{-1}$ |
| Accuracy grade | | ± 15 µm or ± 5 µm after linear length-error compensation in the subsequent electronics |
| **Measuring length ML*** in mm | | 240 \| 440 \| 640 \| 840 \| 1040 \| 1240 \| 1440 \| 1640 \| 1840 \| 2040 \| 2240 \| 2440 \| 2640 \| 2840 \| 3040 \| 3240 \| 3440 \| 3640 \| 3840 \| 4040 \| 4240 \| 4440 \| 4640 \| 4840 \| 5040 \| 5240 \| 5440 \| 5640 \| 5840 \| 6040 |
| **Mounting** | | Steel scale-tape is drawn into aluminum extrusions and fixed at center |
| **Absolute position values** | | EnDat 2.2 |
| Ordering designation | | EnDat 22 |
| Resolution | | 0.001 µm (1 nm) |
| Calculation time $t_{cal}$ | | ≤ 6 µs |
| **Power supply** | | DC 3.6 to 14 V |
| Power consumption [1] (maximum) | | *At 14 V:* ≤ 1000 mW<br>*At 3.6 V:* ≤ 800 mW |
| Current consumption (typical) | | *At 5 V:* 110 mA |
| **Electrical connection*** | | Cable 1 m or 3 m with 8-pin M12 connector (male) |
| **Traversing speed** | | ≤ 480 m/min |
| **Vibration** 55 to 2000 Hz<br>**Shock** 11 ms | | ≤ 200 m/s² (EN 60068-2-6)<br>≤ 500 m/s² (EN 60068-2-27) |
| **Operating temperature** | | 0 °C to 50 °C |
| **Degree of protection** | | IP 40 |
| **Weight** | Scanning head:<br>Scale tape:<br>Parts kit:<br>Scale tape carrier:<br>Connecting cable:<br>Coupling: | 16 g (without connecting cable)<br>31 g/m<br>20 g<br>68 g/m<br>20 g/m<br>32 g |

***** Please select when ordering

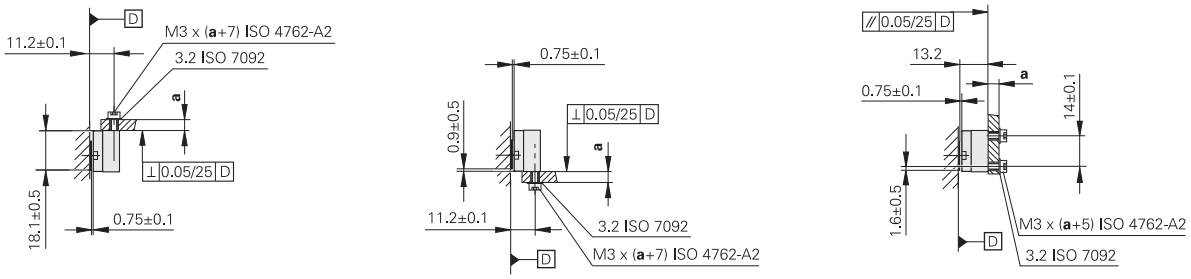
1) See *General Electrical Information* at www.heidenhain.de

# LIC 4019

- Absolute linear encoder for measuring length up to 1 m
- Measuring step to 0.001 µm (1 nm)
- Steel scale tape cemented on mounting surface with PRECIMET




**Possibilities for mounting the scanning head**




mm

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

F = Machine guideway
* = Max. change during operation
Ⓒ = Code start value: 100 mm
Ⓢ = Beginning of measuring length ML
Ⓛ = Scale tape length
⇨ = Direction of scanning unit motion for output signals in accordance with interface description

| Specifications | | Absolute |
|---|---|---|
| | | **LIC 4019** |
| **Measuring standard** | | Steel scale tape with METALLUR absolute code track |
| Coefficient of linear expansion | | $\alpha_{therm} \approx 10 \times 10^{-6}\ K^{-1}$ |
| Accuracy grade | | ± 15 µm or ± 5 µm after linear length-error compensation in the subsequent electronics |
| **Measuring length ML*** in mm | | 70 \| 120 \| 170 \| 220 \| 270 \| 320 \| 370 \| 420 \| 520 \| 620 \| 720 \| 820 \| 920 \| 1020 |
| **Mounting** | | Steel scale tape is cemented on mounting surface with PRECIMET |
| **Absolute position values** | | EnDat 2.2 |
| Ordering designation | | EnDat 22 |
| Resolution | | 0.001 µm (1 nm) |
| Calculation time $t_{cal}$ | | ≤ 6 µs |
| **Power supply** | | DC 3.6 to 14 V |
| Power consumption [1] (maximum) | | *At 14 V:* ≤ 1000 mW<br>*At 3.6 V:* ≤ 800 mW |
| Current consumption (typical) | | *At 5 V:* 110 mA |
| **Electrical connection*** | | Cable 1 m or 3 m with 8-pin M12 connector (male) |
| **Traversing speed** | | ≤ 480 m/min |
| **Vibration** 55 to 2000 Hz<br>**Shock** 11 ms | | ≤ 200 m/s² (EN 60068-2-6)<br>≤ 500 m/s² (EN 60068-2-27) |
| **Operating temperature** | | 0 °C to 50 °C |
| **Degree of protection** | | IP 40 |
| **Weight** | Scanning head:<br>Scale tape:<br>Connecting cable:<br>Coupling: | 16 g (without connecting cable)<br>31 g/m<br>20 g/m<br>32 g |

***** Please select when ordering

1) See *General Electrical Information* at www.heidenhain.de

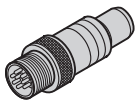
# Electrical Connection

## Connecting cables

| **PUR connecting cables** ∅ 6 mm; **8-pin** [(4×0.14 mm²) + (4×0.34 mm²) | | |
|---|---|---|
| **Complete** with M12 connector (female) and M12 coupling (male), 8 pins each |  | 368 330-xx |
| **Complete** with 8-pin M12 connector (female) and 15-pin D-sub connector (female) |  | 533 627-xx |
| **Complete** with 8-pin M12 connector (female) and 15-pin D-sub connector (male) |  | 524 599-xx |
| **With one** 8-pin M12 connector (female) |  | 634 265-xx [1] |

1) Connecting element must be suitable for the maximum clock frequency used

## Pin layout

| **8-pin M12 coupling** |  |  |  | | | | |
|---|---|---|---|---|---|---|---|
| | Power supply | | | | Absolute position values | | |
|  | **8** | **2** | **5** | **1** | **3** | **4** | **7** | **6** |
| | **$U_P$** | Sensor **$U_P$** | **0 V** | Sensor **0 V** | **DATA** | **$\overline{\text{DATA}}$** | **CLOCK** | **$\overline{\text{CLOCK}}$** |
|  | Brown/Green | Blue | White/Green | White | Gray | Pink | Violet | Yellow |

**Cable shield** connected to housing; **Up** = Power supply
**Sensor:** The sensor line is connected in the encoder with the corresponding power line
Vacant pins or wires must not be used!
**Note:** Only HEIDENHAIN cables complete with connectors are qualified for use in safety-related applications. Only exchange connectors or modify cables after consultation with HEIDENHAIN Traunreut.


**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

**www.heidenhain.de**


**Related documents**
- *Exposed Linear Encoders* brochure
- *EnDat* Technical Information


681879 · 00 · B · 02 · 11/2010 · PDF