Product Information

ROD 200
ROD 700
ROD 800
Incremental Angle Encoders with Integral Bearing for Separate Shaft Coupling
ROD 200 series

- For a separate shaft coupling
- System accuracy: ±5"

Radial cable (can also be used axially)

Radial cable (can also be used axially)

For a separate shaft coupling

2

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Product Information ROD 200/700/800   07/2022

Product Information ROC 200/700/800   07/2022
**ROD 780/ROD 880**

- For a separate shaft coupling
- System accuracy: ±1" or ±2"

**Radial cable (can also be used axially)**

<table>
<thead>
<tr>
<th>ROD 780</th>
<th>ROD 880</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring standard</td>
<td>DIADUR circular scale with incremental track</td>
</tr>
<tr>
<td>Line count*</td>
<td>18000 36000</td>
</tr>
<tr>
<td>System accuracy</td>
<td>±2&quot; ±1&quot;</td>
</tr>
<tr>
<td>Position error per signal period</td>
<td>18000 lines: ±0.7&quot; 36000 lines: ±0.36&quot;</td>
</tr>
<tr>
<td>Interface</td>
<td>▲ 1 Vpp</td>
</tr>
<tr>
<td>Reference mark*</td>
<td>ROD x80: One  ROD x80C: Distance-coded</td>
</tr>
<tr>
<td>Cutoff frequency -3 dB</td>
<td>≥ 180 kHz</td>
</tr>
<tr>
<td>Electrical connection*</td>
<td>Cable (1 m), with or without a 12-pin M23 coupling (male)</td>
</tr>
<tr>
<td>Cable length†</td>
<td>≤ 150 m</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>DC 5 V ±0.5 V/150 mA (without load)</td>
</tr>
<tr>
<td>Shaft</td>
<td>Solid shaft D = 14 mm</td>
</tr>
<tr>
<td>Mech. permissible speed</td>
<td>≤ 1000 rpm</td>
</tr>
<tr>
<td>Starting torque</td>
<td>≤ 0.012 Nm at 20 °C</td>
</tr>
<tr>
<td>Moment of inertia of rotor</td>
<td>0.36 · 10⁻³ kgm²</td>
</tr>
<tr>
<td>Shaft load</td>
<td>Axial: 30 N  Radial: 30 N at shaft end</td>
</tr>
<tr>
<td>Vibration 55 Hz to 2000 Hz</td>
<td>≤ 100 m/s² (EN 60068-2-6) ≤ 200 m/s² (EN 60068-2-27)</td>
</tr>
<tr>
<td>Shock 6 ms</td>
<td>≤ 200 m/s² (EN 60068-2-27)</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>0 °C to 50 °C</td>
</tr>
<tr>
<td>Protection</td>
<td>EN 60529 IP64</td>
</tr>
<tr>
<td>Mass</td>
<td>≥ 2.4 kg</td>
</tr>
</tbody>
</table>

* Please select when ordering
† With HEIDENHAIN cable

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**Reference ISO 8016**

ISO 3768 – m = 4
< 6 mm: ±0.2 mm
Angle encoders of the ROD product family require a separate coupling for connection to the drive shaft. The shaft coupling compensates for axial movement and misalignment between the shafts, thereby preventing excessive encoder bearing loads. For realizing high accuracies, it is necessary that the shaft of the angle encoder be optimally aligned with the shaft of the machine. The HEIDENHAIN product portfolio includes diaphragm couplings and flat couplings designed for connecting the shaft of the ROD angle encoder to the drive shaft.

Mounting ROD angle encoders have an integral mounting flange with a centering collar. The encoder shaft is connected to the machine shaft by means of a diaphragm coupling or flat coupling.

### Shaft Couplings
The shaft coupling compensates for axial movement and misalignment between the encoder shaft and the drive shaft, thereby preventing excessive encoder bearing loads.

- **Radial offset** $\lambda$
- **Angular error** $\alpha$
- **Axial offset** $d$

#### Mounting example for the ROD 880
![Mounting example for the ROD 880](image)

#### Mounting an ROD with a flat coupling
![Mounting an ROD with a flat coupling](image)

### Shaft Couplings Table

<table>
<thead>
<tr>
<th>Shaft Coupling</th>
<th>ROD 200 series</th>
<th>ROD 700 series, ROD 800 series</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>K 03</strong> Diaphragm coupling</td>
<td>K 18 Flat coupling</td>
<td><strong>K 01</strong> Diaphragm coupling</td>
</tr>
<tr>
<td><strong>Hub bore</strong></td>
<td>10 mm</td>
<td>14 mm</td>
</tr>
<tr>
<td><strong>Kinematic transfer error</strong></td>
<td>±2&quot; At $\lambda \leq 0.1$ mm and $\alpha \leq 0.09^\circ$</td>
<td>±3&quot; At $\lambda \leq 0.05$ mm and $\alpha \leq 0.03^\circ$</td>
</tr>
<tr>
<td><strong>Torsional rigidity</strong></td>
<td>1500 Nm/rad</td>
<td>1200 Nm/rad</td>
</tr>
<tr>
<td><strong>Permissible torque</strong></td>
<td>0.2 Nm</td>
<td>0.5 Nm</td>
</tr>
<tr>
<td><strong>Perm. radial offset</strong> $\lambda$</td>
<td>≤ 0.3 mm</td>
<td></td>
</tr>
<tr>
<td><strong>Perm. angular error</strong> $\alpha$</td>
<td>≤ 0.5°</td>
<td>≤ 0.2°</td>
</tr>
<tr>
<td><strong>Perm. axial offset</strong> $d$</td>
<td>≤ 0.2 mm</td>
<td>≤ 0.1 mm</td>
</tr>
<tr>
<td><strong>Moment of inertia (approx.)</strong></td>
<td>20 · 10⁻⁶ kgm²</td>
<td>75 · 10⁻⁶ kgm²</td>
</tr>
<tr>
<td><strong>Permissible shaft speed</strong></td>
<td>10000 rpm</td>
<td>1000 rpm</td>
</tr>
<tr>
<td><strong>Tightening torque of clamping screws (approx.)</strong></td>
<td>1.2 Nm</td>
<td>2.5 Nm</td>
</tr>
<tr>
<td><strong>Mass</strong></td>
<td>100 g</td>
<td>117 g</td>
</tr>
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</table>
## Interfaces ~ 1VPP incremental signals

### Pin layout

12-pin M23 coupling 12-pin M23 connector

<table>
<thead>
<tr>
<th>12</th>
<th>2</th>
<th>10</th>
<th>11</th>
<th>5</th>
<th>6</th>
<th>8</th>
<th>1</th>
<th>3</th>
<th>4</th>
<th>9</th>
<th>7</th>
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<td>3</td>
<td>4</td>
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<td>10</td>
<td>12</td>
<td>5/8/13/15</td>
<td>14</td>
<td>/</td>
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<td>2</td>
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<td>/</td>
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</table>

**Power supply**

**Incremental signals**

**Other signals**

- U_p
- Sensor
- 0 V
- A+
- A–
- B+
- B–
- R+
- R–
- Vacant
- Vacant
- Vacant

**Brown/Green**

**Blue**

**White**

**Green**

**Gray**

**Pink**

**Red**

**Black**

/ Violet Yellow

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### TTL incremental signals

### Pin layout

12-pin M23 coupling 12-pin M23 connector

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<thead>
<tr>
<th>12</th>
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**Power supply**

**Incremental signals**

**Other signals**

- U_p
- Sensor
- 0 V
- U_{a1}
- U_{a2}
- U_{a3}
- U_{a4}
- U_{a5}
- Vacant
- Vacant

**Brown/Green**

**Blue**

**White**

**Green**

**Gray**

**Pink**

**Red**

**Black**

Violet / Yellow

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**Cable shield** connected to 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) LIDA 2xx: Vacant  
2) ERO 14xx: Vacant  
3) Exposed linear encoders: Conversion from TTL to 11µA+ for the PWT, otherwise unassigned

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**More information:**

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

- Brochure: Angle Encoders with Integral Bearing
- Brochure: Interfaces of HEIDENHAIN Encoders
- Brochure: Cables and Connectors

For brochures and Product Information documents, visit [www.heidenhain.com](http://www.heidenhain.com).