Product Information

ECN 2000
Absolute Angle Encoders with Integral Bearing
ECN 2000

- Mounted stator coupling
- Hollow through shaft: Ø 50 mm
- System accuracy: ±10"

Measuring standard
- ECN 2100: DIADUR circular scale with absolute and incremental track (2048 lines)
- ECN 2190: Measuring standard

System accuracy
- ±10"

Position error per signal period
- ≤ ±15"

Interface
- ECN 2100: Fanuc Serial Interface
- ECN 2190: Mitsubishi High Speed Interface

Ordering designation*
- ECN 2100: EnDat22
- ECN 2190: Fanuc05, Mtx03-4

Position values per rev.
- 3354432 (25 bits); with Fanuc Serial Interface: 388608 (23 bits)

Electrical permissible speed
- ≤ 3000 rpm for continuous position value

Clock frequency
- ≤ 16 MHz
- ≤ 2 MHz

Calculation time $t_{calc}$
- ≤ 6 µs
- ≤ 9 µs

Incremental signals
- ~ 1 Vpp

Cutoff frequency ~3 dB
- ≥ 400 kHz

Electrical connection*
- Cable (1 m) with 8-pin M12 coupling (male)
- Cable (1 m) with 17-pin M23 coupling (male)
- Cable (1 m) with or without an 8-pin M12 coupling (male)

Cable length 1)
- ≤ 150 m
- ≤ 50 m
- ≤ 30 m

Supply voltage (DC)
- 3.6 V to 14 V

Power consumption (maximum)
- 3.6 V: ≤ 0.7 W
- 14 V: ≤ 0.8 W

Current consumption (typical)
- 5 V: 100 mA (without load)

Shaft
- Hollow through shaft, Ø 50 mm

Mech. permissible speed
- ≤ 3000 rpm

Starting torque (at 20 °C)
- ≤ 0.2 Nm

Moment of inertia of rotor
- 220 · 10⁻⁶ kgm²

Permiss. axial motion of measured shaft
- ±0.1 mm

Natural frequency
- ≥ 1000 Hz

Vibration
- 55 Hz to 2000 Hz
- ≤ 100 mV/µ
- ≤ 200 mV/µ (EN 60068-2-6)

Shock 6 ms
- ≤ 100 mV/µ (EN 60068-2-27)

Operating temperature
- Moving cable: ~10 °C to 60 °C
- Stationary cable: ~20 °C to 60 °C

Protection
- EN 60529: IP64

Mass
- ≤ 0.7 kg

* Please select when ordering
1) With HEIDENHAIN cable
2) See General electrical information in the Interfaces of HEIDENHAIN Encoders brochure
Mounting

The ECN 2000 angle encoders have an integral bearing, a hollow shaft and a statorside coupling. The measured shaft is directly connected to the shaft of the angle encoder.

The circular scale is firmly connected to the hollow shaft. The scanning unit rides on the shaft on ball bearings and is connected to the housing with a statorside coupling. The stator coupling and the sealing design greatly compensate for axial and radial mounting errors without restricting functionality or accuracy. This therefore simplifies mounting. During angular acceleration of the shaft, the coupling must absorb only the torque resulting from friction within the bearing. Angle encoders with a stator coupling therefore exhibit excellent dynamic performance.

Materials to be used for mounting

The machine shaft and the fastening components must be made of steel. The material must exhibit a coefficient of thermal expansion of

\[ \alpha = (10 \text{ to } 16) \times 10^{-6} \text{ K}^{-1}. \]

Additionally, the material must meet the following specifications:

- For a hollow shaft connection
  \[ F_u \geq 650 \text{ N/mm}^2 \]

- For a housing connection
  \[ F_p \geq 370 \text{ N/mm}^2 \]

Electrical connection

EnDat connecting cable without incremental signals

<table>
<thead>
<tr>
<th>PUR adapter cables and connecting cable Ø 6 mm; ( 2(2 \times 0.09 \text{ mm}^2) + 2(2 \times 0.16 \text{ mm}^2) )</th>
<th>Ap = 2 x 0.16 mm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adapter cable with 8-pin M12 connector (female) and 15-pin D-sub connector (female)</td>
<td>1036521.xx</td>
</tr>
<tr>
<td>Adapter cable with 15-pin connector (female) and 3-pin D-sub connector (male)</td>
<td>1036526.xx</td>
</tr>
<tr>
<td>Connecting cable with 8-pin M12 connector (female) and 8-pin M12 coupling (male)</td>
<td>1036372.xx</td>
</tr>
</tbody>
</table>

EnDat adapter cable with incremental signals

<table>
<thead>
<tr>
<th>PUR adapter cables and connecting cable Ø 8 mm; ( 4(2 \times 0.16 \text{ mm}^2) + 4 \times 0.5 \text{ mm}^2 + 4 \times 0.16 \text{ mm}^2 )</th>
<th>Ap = 0.5 mm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adapter cable with 17-pin M23 connector (female) and 15-pin D-sub connector (female)</td>
<td>322115.xx</td>
</tr>
<tr>
<td>Adapter cable with 17-pin M23 connector (female) and 15-pin D-sub connector (male)</td>
<td>324544.xx</td>
</tr>
<tr>
<td>Connecting cable with 17-pin M23 connector (female)</td>
<td>309778.xx</td>
</tr>
</tbody>
</table>

Fanuc/Mitsubishi connecting cable

<table>
<thead>
<tr>
<th>PUR connecting cable Ø 6 mm; ( 2(2 \times 0.09 \text{ mm}^2) + 2(2 \times 0.16 \text{ mm}^2) )</th>
<th>Ap = 2 x 0.16 mm²</th>
</tr>
</thead>
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<tr>
<td>Fully assembled with 8-pin M12 connector (female) and 8-pin M12 coupling (male)</td>
<td>1036372.xx</td>
</tr>
</tbody>
</table>

Ap: Cross section of power supply lines

Ø: Cable diameter (for bend radii, see the Interfaces of HEIDENHAIN Encoders brochure)

For more cables, see the brochure Angle Encoders with Integral Bearing.