Product Information

ECI 1119
EQI 1131
Absolute Rotary Encoders
Without Integral Bearing
EnDat22
ECI 1119, EQI 1131

Rotary encoders for absolute position values

• Robust inductive scanning principle
• 79G flange for press-fitting with a tolerance sleeve
• 82A blind hollow shaft (ID 6 mm) for axial clamping without a positive-locking element
• Required mating dimensions with M3x25 central screw

- Bearing of mating shaft
- Required mating dimensions
- M1 = Measuring point for operation temperature
- M2 = Measuring point for vibration
- 1 = Direction of shaft rotation for ascending position values
- 2 = Shaft surface; ensure full-surface contact!
- 3 = Flange surface; ensure full-surface contact!
- 4 = Centering diameter
- 5 = Mounting clearance:
- 6 = Chamfer at start of thread is mandatory for material bonding anti-rotation lock
- 7 = Maximum permissible deviation between shaft surface and flange surface; compensation of mounting tolerances and thermal expansion; dynamic motion permitted over entire range.
- 8 = Attention! Not a clamping surface
- 9 = Flange fastening with tolerance sleeve (for press-fitting parameters, see the mounting instructions)
- 10 = Possible centering hole
- 11 = 15-pin PCB connector
- 12 = Dimension for JH standard cable
- 13 = Ensure space for cable
- 14 = Distance to cover; note the opening for PCB connector, header connector, and wires
- 15 = Min. wall thickness: 1.09 mm; no interruption permitted
- 16 = undercut
- 17 = Surface for application of force for press-fitting the encoder (ensure full-surface contact)

• 82A blind hollow shaft
• 70G flange for press-fitting with a tolerance sleeve
• Robust inductive scanning principle
• Rotary encoders for absolute position values

 Specifications

<table>
<thead>
<tr>
<th>Specifications</th>
<th>ECI 1119 singleturn</th>
<th>EQI 1131 multiturn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>EnDat 2.2</td>
<td></td>
</tr>
<tr>
<td>Ordering designation</td>
<td>EnDat22</td>
<td></td>
</tr>
<tr>
<td>Position values per revolution</td>
<td>524,288 (19 bits)</td>
<td></td>
</tr>
<tr>
<td>Revolutions</td>
<td></td>
<td>4096 (12 bits)</td>
</tr>
<tr>
<td>Calculation time t/cal /</td>
<td>≤ 5 μs / ≤ 16 MHz</td>
<td></td>
</tr>
<tr>
<td>Clock frequency</td>
<td>13.9 μs</td>
<td></td>
</tr>
<tr>
<td>System accuracy</td>
<td>±120°</td>
<td></td>
</tr>
<tr>
<td>Electrical connection</td>
<td>15-pin PCB connector (with connection for external temperature sensor[3])</td>
<td></td>
</tr>
<tr>
<td>Cable length</td>
<td>≤ 100 m</td>
<td>(see the EnDat description in the Interfaces of HEIDENHAIN Encoders brochure)</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>DC 3.6 V to 14 V</td>
<td></td>
</tr>
<tr>
<td>Power consumption[5] (maximum)</td>
<td>At 3.6 V: ≤ 650 mW;</td>
<td>At 3.6 V: ≤ 750 mW;</td>
</tr>
<tr>
<td></td>
<td>at 14 V: ≤ 700 mW</td>
<td>at 14 V: ≤ 890 mW</td>
</tr>
<tr>
<td>Current consumption (typical)</td>
<td>At 5 V: 96 mA (without load)</td>
<td>At 5 V: 115 mA (without load)</td>
</tr>
<tr>
<td>Shaft</td>
<td>82A blind hollow shaft (ID 6 mm) for axial clamping, without positive-locking element</td>
<td></td>
</tr>
<tr>
<td>Speed</td>
<td>≤ 15,000 rpm</td>
<td>≤ 12,000 rpm</td>
</tr>
<tr>
<td>Moment of inertia of rotor</td>
<td>0.2 · 10^–6 kgm²</td>
<td></td>
</tr>
<tr>
<td>Angular acceleration of rotor</td>
<td>≤ 1 · 10^5 rad/s²</td>
<td></td>
</tr>
<tr>
<td>Axial motion of measured shaft</td>
<td>≤ ±0.4 mm</td>
<td></td>
</tr>
<tr>
<td>Mounting clearance</td>
<td>2 mm (nominal value for checking the mounting quality in the ATS software, under &quot;Mounting&quot;)</td>
<td></td>
</tr>
<tr>
<td>Vibration 55 Hz to 2000 Hz[4]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shock 6 ms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating temperature</td>
<td>–40 °C to 110 °C</td>
<td></td>
</tr>
<tr>
<td>Trigger threshold for error</td>
<td>125 °C (measuring accuracy of internal temperature sensor: ±1 K)</td>
<td></td>
</tr>
<tr>
<td>message due to temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>exceedance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relative humidity</td>
<td>≥ 93% / 140 °C/21 d as per EN 60068-2-78, without condensation</td>
<td></td>
</tr>
<tr>
<td>Protection rating</td>
<td>EN 60529</td>
<td></td>
</tr>
<tr>
<td>Mass</td>
<td>≥ 0.04 kg</td>
<td></td>
</tr>
<tr>
<td>ID number</td>
<td>82A shaft: ID 1164812-03/-53</td>
<td>82A shaft: ID 1164813-03/-53</td>
</tr>
</tbody>
</table>

[1] Rotary encoders in collective package
[3] See General electrical information in the Interfaces of HEIDENHAIN Encoders brochure
[4] At 10 Hz to 55 Hz, constant over 6.5 mm peak to peak (stator), 10 mm peak to peak (rotor)
[5] Measured at 10 Hz, without load

Workpiece edges

as per ISO 13716

- Flange of mating shaft
- Required mating dimensions
- M1 = Measuring point for operation temperature
- M2 = Measuring point for vibration
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Mounting

After inserting the tolerance sleeve (see Mounting accessories) in the customer’s machine, the encoder flange is press-fit until it comes to a stop in the axial direction. Then the blind hollow shaft of the rotary encoder is fastened to the customer-side motor shaft with a central screw (see the mounting instructions).

Further information:
For the customer-side mounting design, aluminum and steel are permissible materials for the customer-side shaft and stator.

In addition, comply with the material specifications and other material characteristics in the Encoders for Servo Drives brochure (ID 208922-xx).

Mounting accessories

Fastening elements
The central screw and the tolerance sleeve are not included in delivery and can be ordered separately.

<table>
<thead>
<tr>
<th>ECI 1119</th>
<th>Fastening elements</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>EQI 1131</td>
<td>Central screw</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>for shaft fastening</td>
<td>1) ISO 4762-M3x25-8.8-MKL</td>
</tr>
<tr>
<td></td>
<td>Tolerance sleeve for clamping the flange</td>
<td>D 37.8 mm x L 15 mm</td>
</tr>
</tbody>
</table>

1) With coating for material bonding anti-rotation lock

Please note the information on screws from HEIDENHAIN in the Encoders for Servo Drives brochure, under the heading Rotary encoders with functional safety in the chapter General mechanical information.

Mounting aid
To avoid damage to the cable, use the mounting aid to connect and disconnect the cable assembly. The pulling force must be applied solely to the connector and not to the wires.

ID 1075573-01

For more mounting information and mounting aids, see the Mounting Instructions and the Encoders for Servo Drives brochure. The installation can be inspected with the PWM 21 and the ATS software (see Document 1082415).
Electrical connection

Pin assignment

Pin layout

8-pin M12 flange socket

Encoder

<table>
<thead>
<tr>
<th></th>
<th>Power supply</th>
<th>Serial data transmission</th>
<th>Other signals</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12</td>
<td>8 2 5 1</td>
<td>3 4 7 6</td>
<td>/ /</td>
</tr>
<tr>
<td>15</td>
<td>13 11 14 12</td>
<td>7 8 9 10 5 6</td>
<td></td>
</tr>
</tbody>
</table>

Encoder

- Power supply: 8, 2, 5, 1
- Serial data transmission: 3, 4, 7, 6
- Other signals: / /

Pin assignment:

- U_P: Sensor
- 0 V: Sensor
- DATA: DATA
- CLOCK: CLOCK
- T+: T+
- T-: T-

Pin Colors:

<table>
<thead>
<tr>
<th>Brown/ Green</th>
<th>Blue</th>
<th>White/ Green</th>
<th>White</th>
<th>Gray</th>
<th>Pink</th>
<th>Violet</th>
<th>Yellow</th>
</tr>
</thead>
</table>

1) Only with output cables inside the motor housing
2) Connections for external temperature sensor; evaluation optimized for KTY 84-130 (see Temperature measurement in motors in the Encoders for Servo Drives brochure)

More information:

For encoder cables, connecting cables, and adapter cables, see the Cables and Connectors brochure (ID 1206103-xx).

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HEIDENHAIN

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This Product Information document 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 placed.

More information:

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

- Brochure: Encoders for Servo Drives
- Brochure: Interfaces of HEIDENHAIN Encoders
- Brochure: Cables and Connectors
- Operating Instruction: ECI 1119, EQI 1131
- Mounting Instructions: ECI 1119, EQI 1131