Product Information

**ECI 1119**
**EQI 1131**

Absolute Rotary Encoders
Without Integral Bearing
EnDat22

With additional measures: suitable for safety-related applications with up to SIL 3
ECI 1119, EQI 1131

Rotary encoders for absolute position values with safe singleturn information

- 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 M3×25 central screw

![Diagram of encoder](image)

Specifications for ECI 1119 singleturn

- Valid for 82A shaft: ID 1164809-05/55

Functional safety for applications with up to

- SIL 2 as per EN 61508
- Category 3, PL d as per EN ISO 13849-1:2015

With additional measurements as per document 1003344 for safety-related applications with up to SIL 3 or category 4, PL e

- Safe in the singleturn range

- SIL 2: ≤ 15 · 10⁻⁷ probability of dangerous failure per hour; SIL 3: ≤ 2 · 10⁻⁸

Safe position

- Encoder: ±0.88° (safety-related measuring step: 5M = 0.36°)
- Mechanical coupling of 82A shaft: ±0.2° (fault exclusion for the loosening of the shaft coupling and stator coupling; designed for accelerations at the stator of ≤ 400 m/s²; at the rotor: ≤ 600 m/s²)

Interface

- EnDat 2.2

Ordering designation

- EnDat22

Position values per revolution

- 524 288 (19 bits)

Revolutions

- 4096 (12 bits)

Calculation time tcalc

- ≤ 5 μs / ≤ 16 MHz

Analog delay time tAD (typical)

- 13.9 μs

System accuracy

- ±120°

Electrical connection

- 15-pin PCB connector (with connection for external temperature sensor)

Cable length

- ≤ 100 m (see the EnDat description in the Interfaced of HEIDENHAIN Encoders brochure)

Supply voltage

- DC 3.6 V to 14 V

Power consumption

- At 3.6 V: ≤ 650 mW; at 14 V: ≤ 700 mW
- At 3.6 V: ≤ 750 mW; at 14 V: ≤ 890 mW

Current consumption (typical)

- At 5 V: 95 mA (without load)
- At 5 V: 115 mA (without load)

Shaft

- 82A blind hollow shaft (ID 6 mm) for axial clamping, without positive-locking element

Speed

- ≤ 15 000 rpm
- ≤ 12 000 rpm

Moment of inertia of rotor

- 0.2 · 10⁻⁶ kgm²

Angular acceleration of rotor

- ≤ 1 · 10⁷ rad/s²

Axial motion of measured shaft

- ≤ 0.4 mm

Mounting clearance

- 2 mm (nominal value for checking the mounting quality in the ATS software, under “Mounting”)

Vibration

- 55 Hz to 2000 Hz
- Stator: ≤ 400 m/s²; rotor: ≤ 600 m/s²

Shock

- 6 ms
- ≤ 400 m/s²
- ≤ 2000 m/s²

Operating temperature

- -40 °C to 110 °C

Trigger threshold for error message
due to temperature exceedance

- 125 °C (measuring accuracy of internal temperature sensor: ± 1 K)

Relative humidity

- ≤ 93% RH (40 °C/21 d as per EN 60068-2-78), without condensation

Protection rating

- EN 60529
- IP00 (see Electrical safety under General electrical information in the Interfaces of HEIDENHAIN Encoders brochure)

Mass

- ≤ 0.04 kg

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1 Rotary encoders in collective package
2 Further tolerances may arise in the downstream device after position value comparison (contact mfr. of the downstream device)
3 See: Temperature measurement in motors in the Encoders for Servo Drives brochure
4 See General electrical information in the Interfaces of HEIDENHAIN Encoders brochure
5 At 10 Hz to 55 Hz, constant over 6.5 mm peak to peak (stator), 50 mm peak to peak (rotor)
6 For use at ≤ 2000 m above sea level (≤ 6000 m above sea level upon request)
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 axial direction. Then the blind hollow shaft of the rotary encoder is fastened to the customer’s drive shaft with a central screw (see the mounting instructions).

Further information:
For the customerside mounting design, aluminum and steel are permissible materials for the customerside 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 EQI 1131</th>
<th>Fastening elements</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central screw 1) for shaft fastening</td>
<td>ISO 4762-M3x25-8.8-MKL</td>
<td>10 or 100</td>
</tr>
<tr>
<td>Tolerance sleeve for clamping the flange</td>
<td>D 37.8 mm x L 15 mm</td>
<td>10 or 100</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).
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.

Further 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 instructions: ECI 1119, EQI 1131 Functional Safety
- Mounting Instructions: ECI 1119, EQI 1131
- For implementation in a safe control or inverter: Specification:
and Supplementary Measures Catalog (SIL 3, PL e):

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