



HEIDENHAIN



Product Information

ECI 1119

EQI 1131

Absolute Rotary Encoders
without Integral Bearing

With additional measures:
suitable for safety-related
applications with up to
SIL 3

EnDat 3

70I flange (82A, 82E)

08/2025

ECI 1119, EQI 1131

[ECI/EBI/EQI 1100 series](#)



Rotary encoders for absolute position values with safe singletum information

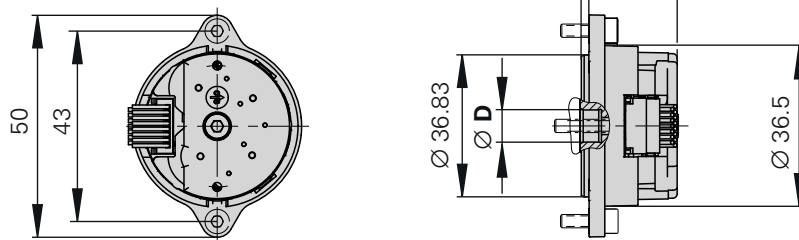
- Robust inductive scanning principle
- 70I fastening flange (compatible with 70C)
- Blind hollow shaft for axial clamping: \varnothing 6 mm (82A) or \varnothing 8.8 mm (82E)
- Other mating dimensions available upon request for the versatile mounting of various HEIDENHAIN rotary encoders



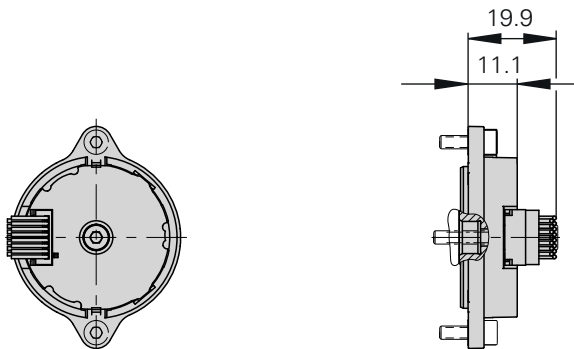
Main dimensions are stated without tolerances

Dimensions that are the same in both drawings are entered only once.

EQI



ECI



Shaft	R
82A	6
82E	8.8

For technical drawings, visit: www.heidenhain.com/documentation



Mating dimensions

[ID 1414810](#) (82A shaft)

[ID 1434716](#) (82E shaft)

Specifications	ECI 1119 singletum	EQI 1131 multitum
Functional safety for applications with up to	As a single-encoder system for monitoring functions and control-loop functions: <ul style="list-style-type: none"> • SIL 2 as per EN 61508 and IEC 61800-5-3 • Category 3, PL d as per EN ISO 13849-1 Safe in the singletum range	
PFH ¹⁾	$\leq 15 \cdot 10^{-9}$ (probability of dangerous failure per hour)	
	With additional measures as per Document 3000006, suitable for safety-related applications with up to SIL 3 or Category 4, PL e $\leq 2 \cdot 10^{-9}$ (probability of dangerous failure per hour)	
Safe position ²⁾	Encoder: $\pm 1.16^\circ$ (safety-relevant measuring step SM = $\pm 0.35^\circ$) Mechanical coupling: $\pm 0^\circ$; (fault exclusion for the loosening of the shaft and stator coupling)	
Interface	EnDat 3	
Ordering designation	E30-R2	
Position values per rev.	524288 (19 bits)	
Revolutions	–	4096 (12 bits)
Availability of position value³⁾	$\leq 11 \mu\text{s}$ at 12.5 Mbit/s $\leq 8.2 \mu\text{s}$ at 25 Mbit/s	
Analog delay time t_{AD} (typical)	22.7 μs	
System accuracy	$\pm 120''$	
Electrical connection	15-pin PCB connector, with connection for external temperature sensor	
Cable length	$\leq 100 \text{ m}$ at 12.5 Mbit/s $\leq 40 \text{ m}$ at 25 Mbit/s	
Supply voltage	DC 4 V to 14 V	
Power consumption ⁴⁾ (max.)	$\leq 615 \text{ mW}$	$\leq 700 \text{ mW}$
Current consumption (typical)	At 12 V: 28 mA	At 12 V: 34 mA

¹⁾ For use at $\leq 2000 \text{ m}$ above sea level (other elevations upon request)

²⁾ Further tolerances may arise in the downstream electronics after position value comparison (contact mfr.)

³⁾ This value is stored in the encoder as the parameter XEL.timeHPFout and outputs the time interval between the position-value request (latch) and the availability of the position value in the Master (without cable factors)

⁴⁾ See *General electrical information* in the *Interfaces of HEIDENHAIN Encoders* brochure

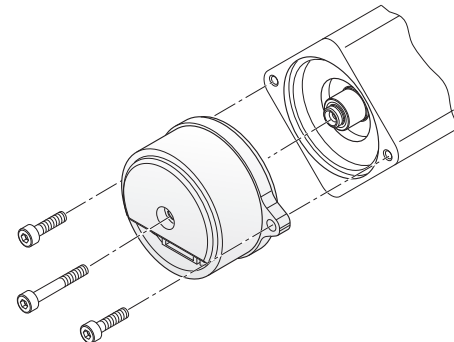
Specifications	ECI 1119 singletum	EQI 1131 multitum
Shaft	Blind hollow shaft for axial clamping: Ø 6 mm (82A) or Ø 8.8 mm (82E)	
Spindle speed	≤ 12000 rpm	≤ 8000 rpm
Moment of inertia of rotor	0.25 · 10 ⁻⁶ kgm ²	
Angular acceleration of rotor	≤ 1 · 10 ⁵ rad/s ²	
Axial motion of measured shaft	≤ ±0.5 mm	
Vibration 55 Hz to 2000 Hz ¹⁾ Shock 6 ms	Stator: ≤ 400 m/s ² ; rotor: ≤ 600 m/s ² (EN 60068-2-6) ≤ 2000 m/s ² (EN 60068-2-27)	
Operating temperature	Permissible temperature range of the stator (M1): -20 °C to 115 °C Permissible temperature range of the internal sensor in the ASIC (M3): -20 °C to 125°C The temperature value of the internal sensor is provided via EnDat 3 in FID 0x21 SENSOR_TEMP_INT. Compliance with the operating temperature at measuring points M1 and M3 is required for adherence to the encoder's proper and intended use.	
Trigger threshold of error message for excessive temperature	126 °C (measuring accuracy of the internal temperature sensor: ±1 K)	
Relative humidity	≤ 93% (40 °C/21 d as per EN 60068-2-78), without condensation	
Protection EN 60529	IP00	
Mass	≈ 0.025 kg	
ID number ²⁾	82A shaft: 1391221-01/1391221-51 82E shaft: 1391221-02/1391221-52	82A shaft: 1391222-01/1391222-51 82E shaft: 1391222-02/1391222-52

¹⁾ 10 Hz to 55 Hz constant over 6.5 mm (stator) / 10 mm (rotor) peak to peak

²⁾ Single or collective packaging

Mounting

The blind hollow shaft of the rotary encoder is pressed onto the measured shaft and fastened with a central screw. Mounting on the stator side is performed via a centering diameter with three mounting screws. Use screws with material-bonding anti-rotation lock (see "Mounting accessories").



Mounting accessories

Screws

Screws (central screw, mounting screws) are not included in delivery and can be ordered separately.

ECI 1119 EQI 1131	Screws ¹⁾		Lot size
Central screw for shaft fastening	ECI 1119 (82A shaft): ISO 4762 – M3x16 – 8.8 – MKL	ID 202264-0R	10 or 100
	ECI 1119 (82E shaft): ISO 4762 – M3x30 – 8.8 – MKL	ID 202264-90	
	EQI 1131 (82A shaft): ISO 4762 – M3x25 – 8.8 – MKL	ID 202264-86	
	EQI 1131 (82E shaft): ISO 4762 – M3x40 – 8.8 – MKL	ID 202264-82	
Mounting screw for flange	ISO 4762 – M3x10 – 8.8 – MKL	ID 202264-87	20 or 200

¹⁾ With coating for material-bonding anti-rotation lock as per DIN 267-27

Please note the information on screws from HEIDENHAIN in the *Encoders for Servo Drives* brochure, under the heading "Screws with material bonding anti-rotation lock" 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. Apply pulling force 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 1308573).

EnDat 3 adapter

Adapter for connecting an encoder with EnDat 3 (E30-R2) to the PWM 21.

ID 1317260-01



More information:

A steel mating shaft and aluminum mating stator are assumed for the fault exclusion design for functional safety.

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

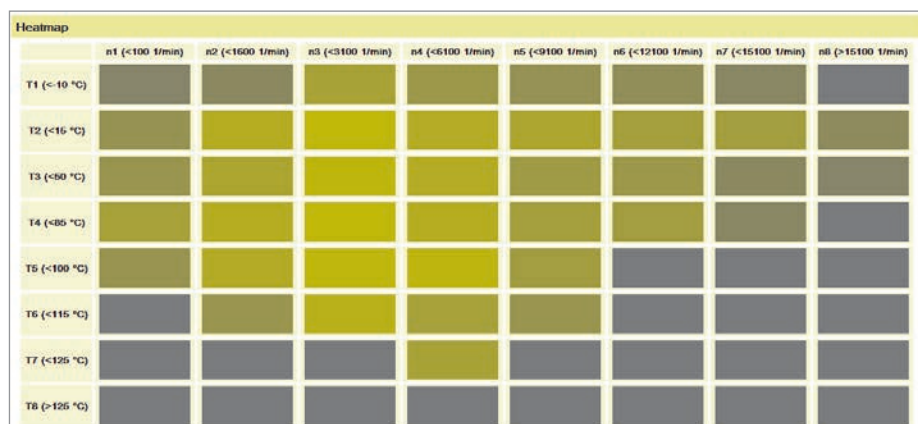
Operating status data

These HEIDENHAIN encoders support the collection of operating data. While the encoder is operating in the application, different data are collected and stored in the device (recorded in permanent memory via a data logger):

- Periodic data (status, histogram, and operating statuses, such as operating time and number of reversals)
- Status-based data (extreme values such as temperature, shaft speed, and acceleration)
- Status-triggered data (alarm-triggered data such as temperature, valuation numbers, and position with time stamp)

This application-specific data can be used for the current analysis of the application or as an input value for higher-level condition monitoring. The data can also be output to help during servicing or for quality management. In such cases, the specific mounting situation of the encoder must be taken into account because it may affect the collected values (mainly the temperatures).

The data can be output directly via the EnDat 3 interface or through an inspection or testing device from HEIDENHAIN. The software belonging to the inspection or testing device (e.g., the ATS software used with the PWM 21) enables visualization of the collected data in the form of tables and histograms.



A typical heat map (showing temperature relative to shaft speed during operation)

Built-in temperature evaluation

This rotary encoder features an internal temperature sensor built into its electronics and an evaluation circuit for an external temperature sensor. In both cases, the respective digitized temperature value is transmitted purely serially over the EnDat protocol. Please bear in mind that neither the measurement nor the transmission of the temperature value is safe in terms of functional safety.

Connectible external temperature sensors

The following external temperature sensors can be evaluated in the encoder:

- PT 1000 (activated by default)
- KTY84-130
- KTY83-110

See "Sensor settings" in the EnDat 3 interface specification (Document 3000001).



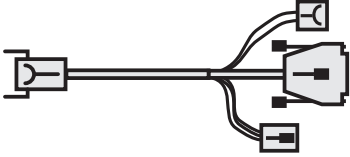


More information:

For more information, see the *Encoders for Servo Drives* brochure (chapter on "Temperature measurement in motors").

Electrical connection

Cables

ETFE output cables inside the motor \varnothing 1.8 mm $2 \times 0.15 \text{ mm}^2$, without shield and with ETFE wires \varnothing 2.2 mm $2 \times 0.15 \text{ mm}^2$ for temperature sensor; $A_P = 0.15 \text{ mm}^2$		
15-pin PCB connector (female) and stripped cable end 2 x ETFE twisted single wires (communication); 2 x ETFE single wires (length: 0.10 m) with heat-shrink tubing (temperature sensor)		1302347-xx
15-pin PCB connector (female) and 8-pin M12 SpeedTech angle flange socket (male) 2 x ETFE twisted single wires (communication); 2 x ETFE single wires (length: 0.10 m) with heat-shrink tubing and 2-pin connector (male, for a temperature sensor)		1279930-xx
PUR adapter cable \varnothing 9.3 mm with external shield 4 x 0.5 mm^2 (power wires) 2 x 0.34 mm^2 (brake wires, shielded) 2 x 0.14 mm^2 (communication wires, shielded); $A_P = 0.14 \text{ mm}^2$		
8-pin M12 SpeedTEC straight connector (female), and 3-pin header connector (power), and 4-pin header (brake wires), and 15-pin D-sub connector (male, for communication)		1279881-xx

The connecting element must be suitable for the maximum clock frequency used.

Note for safety-related applications:

- Conformity with the EMC Directive must be ensured in the complete system!

SpeedTEC is a registered trademark of TE Connectivity Industrial GmbH.



More information:

For more cables, see the *Cables and Connectors* brochure (ID 1206103-xx).

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:

- Operating Instructions

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