HEIDENHAIN

Product Information

ECN 1313
ECN 1325
EQN 1325
EQN 1337
ERN 1326
ERN 1331
ERN 1387

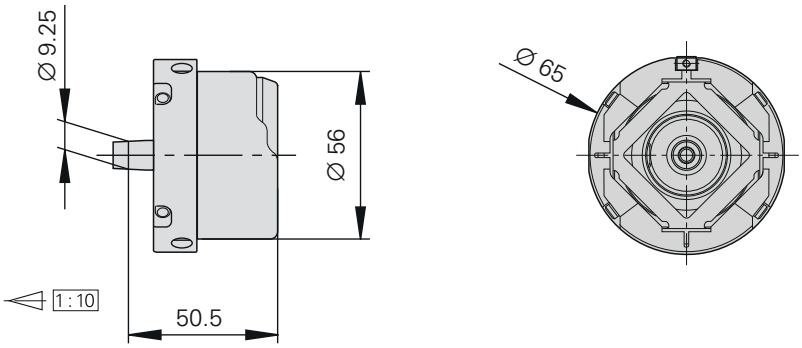
Absolute and Incremental Rotary Encoders with Integral Bearing and Stator Coupling

04/2026

ECN/EQN 1300 series

Absolute rotary encoders
- **Expanding ring coupling (type of coupling: 06)**
- **Tapered shaft (type of shaft: 65B)**

Overall dimensions indicated without tolerances



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

Mating dimensions for ECN/EQN 1300
ID 374033

	Absolute		
	ECN 1313 **EQN 1325**	**ECN 1325** **EQN 1337**	**ECN 1313** **EQN 1325**
Interface	EnDat 2.2		SSI
Ordering designation	EnDat01	EnDat22	SSI01r1 (ECN 1313)/ SSI07r1 (EQN 1325)
Position values/revolution	8192 (13 bits)	33554432 (25 bits)	8192 (13 bits)
Revolutions	ECN 1313: – EQN 1325: 4096 (12 bits)	ECN 1325: – EQN 1337: 4096 (12 bits)	ECN 1313: – EQN 1325: 4096 (12 bits)
Electrically permissible speed/ Deviation[2]	512 lines: 5000 rpm/±1 LSB 12000 rpm/±100 LSB 2048 lines: 1500 rpm/±1 LSB 12000 rpm/±50 LSB	15000 rpm (for continuous position value)	
Calc. time t_{cal}/clock freq.	≤ 9 µs/≤ 2 MHz	≤ 7 µs/≤ 8 MHz	≤ 5 µs/–
Incremental signals	~ 1 V_{PP}[1]	–	~ 1 V_{PP}[1]
Line count*	512 2048	–	512 2048
Cutoff frequency –3 dB	2048 lines: ≥ 400 kHz 512 lines: ≥ 130 kHz	–	2048 lines: ≥ 400 kHz 512 lines: ≥ 130 kHz
System accuracy	2048 lines: ±20“ 512 lines: ±60“	±20“	2048 lines: ±20“ 512 lines: ±60“
Electrical connection	12-pin	16-pin (12+4-pin); with connection for external temperature sensor	16-pin (12+4)
Supply voltage	DC 3.6 V to 14 V		4.75 V to 30 V DC
Power consumption (maximum)	ECN 1313 / ECN 1325 At 3.6 V: ≤ 0.6 W At 14 V: ≤ 0.7 W EQN 1325 / EQN 1337 At 3.6 V: ≤ 0.7 W At 14 V: ≤ 0.8 W		ECN 1313 At 4.75 V: ≤ 0.6 W At 30 V: ≤ 0.78 W EQN 1325 At 4.75 V: ≤ 0.68 W At 30 V: ≤ 0.88 W
Current consumption (typical) Without load	ECN 1313 / ECN 1325 At 5 V: 80 mA EQN 1325 / EQN 1337 At 5 V: 95 mA		ECN 1313 At 5 V: 70 mA At 24 V: 20 mA EQN 1325 At 5 V: 85 mA At 24 V: 20 mA
Shaft	Tapered shaft (Ø 9.25 mm); taper: 1:10		
Mech. permiss. shaft speed n	ECN 1313/ECN 1325: ≤ 15000 rpm; EQN 1325/EQN 1337: ≤ 12000 rpm		
Starting torque (typical)	0.01 Nm (at 20 °C)		
Moment of inertia of rotor	$2.6 \cdot 10^{-6}$ kgm^2		
Natural frequency f_N (typical)	1800 Hz		
Permiss. axial motion of measured shaft	±0.5 mm		
Vibration 55 Hz to 2000 Hz **Shock** 6 ms	≤ 300 m/s^2 [3] (EN 60068-2-6) ≤ 2000 m/s^2 (EN 60068-2-27)		
Operating temperature	–40 °C to 115 °C		
Protection EN 60529	IP40 when mounted		
Mass	≈ 0.3 kg		
ID number	ECN 1313: 1125020-xx/768295-xx EQN 1325: 1125021-xx/827039-xx	ECN 1325: 1178019-xx EQN 1337: 1178020-xx	ECN 1313: 1353128-xx EQN 1325: 1353130-xx

* Please select when ordering

[1] More rigorous tolerances

Signal amplitude:	0.8 V_{PP} to 1.2 V_{PP}
Asymmetry:	0.05
Signal ratio:	0.9 to 1.1
Phase angle:	90° ±5° el.
Signal-to-noise ratio E, F:	≥ 100 mV

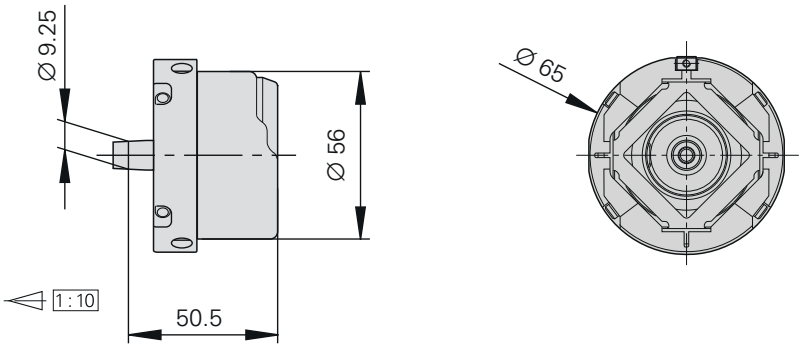
[2] Speed-dependent deviations between absolute and incremental signals

[3] Valid as per standard at room temp;
at an operating temp. of up to 100 °C: ≤ 300 m/s^2;
up to 115 °C: ≤ 150 m/s^2

ERN 1300 series

Incremental rotary encoders
- **Expanding ring coupling (type of coupling: 06)**
- **Tapered shaft (type of shaft: 65B)**

Overall dimensions indicated without tolerances



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Mating dimensions for ERN 1300
ID 374033

	Incremental		
	ERN 1331	**ERN 1387**	**ERN 1326**
Interface	⊓⊔ HTL	∿ 1 V_{PP} [1]	⊓⊔ TTL
Line count/ System accuracy	1024/±64″	2048/±20″	4096 [5]/±32″
Reference mark	One		
Output frequency Edge separation *a* Cutoff frequency –3 dB	≤ 300 kHz ≥ 0.39 µs –	– – ≥ 210 kHz	≤ 300 kHz ≥ 0.35 µs –
Commutation signals	–	∿ 1 V_{PP} [1]	⊓⊔ TTL
Width	–	Z1 track [2]	3 x 120° [3]
Electrical connection	12-pin	14-pin	16-pin
Supply voltage	10 V to 30 V DC	DC 5 V ±0.25 V	DC 5 V ±0.5 V
Current consumption (without load)	≤ 150 mA (at U_P = 10 V)	≤ 130 mA	≤ 150 mA
Shaft	Tapered shaft (Ø 9.25 mm); taper 1:10		
Mech. permiss. shaft speed n	≤ 15000 rpm		
Starting torque (typical)	0.01 Nm (at 20 °C)		
Moment of inertia of rotor	2.6 · 10^{-6} kgm^2		
Natural frequency f_N (typical)	1800 Hz		
Permiss. axial motion of measured shaft	±0.5 mm		
Vibration 55 Hz to 2000 Hz **Shock** 6 ms	≤ 300 m/s^2 [4] (EN 60068-2-6) ≤ 2000 m/s^2 (EN 60068-2-27)		
Max. operating temp.	100 °C		120 °C
Min. operating temp.	–40 °C		
Protection EN 60529	IP40 when mounted		
Mass	≈ 0.3 kg		
ID number	577790-02	749144-16 749144-59 [6]	574485-05

[1] More rigorous tolerances
Signal amplitude: 0.75 V_{PP} to 1.2 V_{PP}
Asymmetry: 0.05
Signal ratio: 0.9 to 1.1
Phase angle: 90° ±5° el.
Signal-to-noise ratio E, F: ≥ 100 mV

[2] One sine and one cosine signal per revolution; see the *Interfaces of HEIDENHAIN Encoders* brochure

[3] Three square-wave signals with signal periods with 90° or 120° mech. phase shift; see the *Interfaces of HEIDENHAIN Encoders* brochure

[4] Valid as per standard at room temp; at an operating temp. of up to 100 °C: ≤ 300 m/s^2
up to 120 °C: ≤ 150 m/s^2

[5] Via integrated signal doubling

[6] Device in collective package upon request

Interface
SSI position values

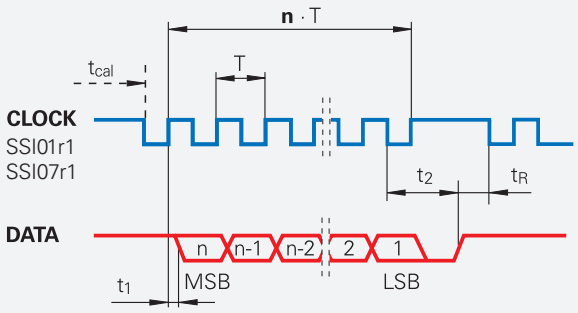
The **position value** is transmitted, starting with the most significant bit (MSB), over the data lines (DATA) in synchronism with a clock signal (CLOCK) provided by the control. The SSI standard data word length for singleturn encoders is 13 bits, and for multiturn encoders, 25 bits. In addition to the absolute position values, **incremental signals** can transmitted as well. For a description of the signals, see *1 V_{PP}* incremental signals in the *Rotary Encoders* brochure.

The following **functions** cannot be activated via programming inputs:
- **Direction of rotation**
- **Zero reset** (setting to zero)

Data transmission

T = 1 to 10 µs
t_{cal} See the specifications
$t_1 \leq$ 0.4 µs (without cable)
t_2 = 17 to 20 µs
$t_R \geq$ 5 µs
n = Data word length
13 bits for ECN/ROC
25 bits for EQN/ROQ

$\overline{\text{CLOCK}}$ and $\overline{\text{DATA}}$ not shown



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 1403368-xx