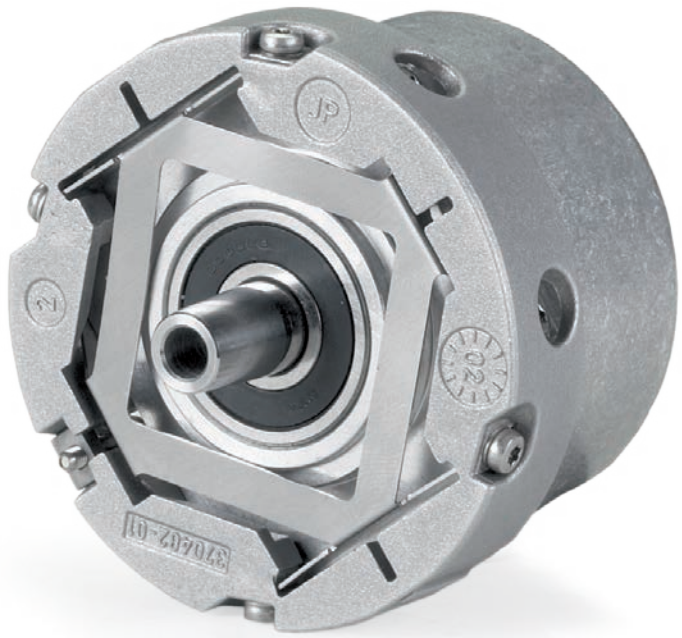
HEIDENHAIN

Iran
Motion
Control
تجهیزات
کنترل
حرکت
ایران



Product Information

ECN 1313
EQN 1325
ECN 1325
EQN 1337

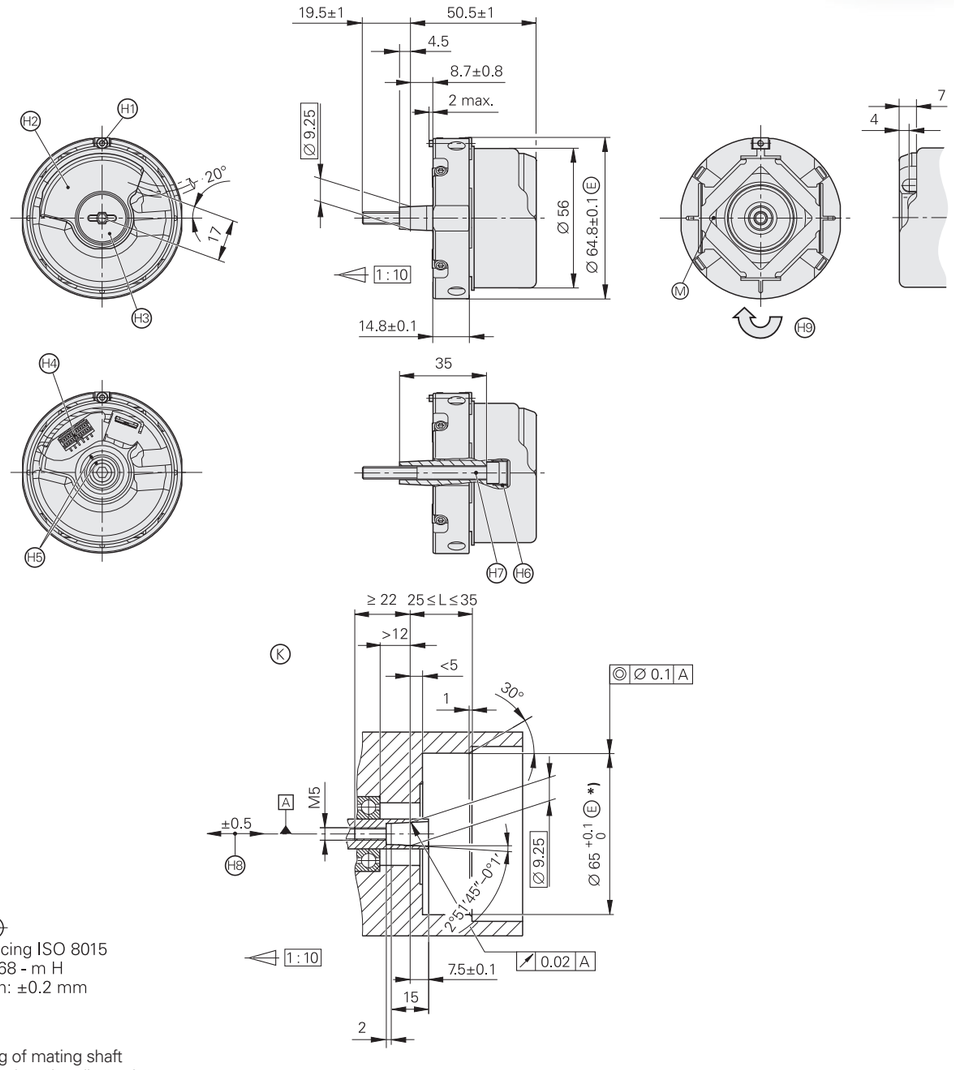
Absolute Rotary Encoders
with Tapered Shaft

ID 768295-xx
ID 1178020-xx
ID 827039-xx
ID 1178019-xx

02/2022

ECN/EQN 1300 series

Absolute rotary encoders
- **06 stator coupling for axial mounting**
- **65B tapered shaft**



mm
Tolerancing ISO 8015
ISO 2768 - m H
< 6 mm: ±0.2 mm

A = Bearing of mating shaft
K = Required mating dimensions
M = Measuring point for operating temperature
1 = Clamping screw for coupling ring: width A/F 2; tightening torque: 1.25 Nm –0.2 Nm
2 = Die-cast cover
3 = Screw plug: widths A/F 3 and 4; tightening torque: 5 Nm +0.5 Nm
4 = ECN/EQN: 12-pin PCB connector
ECN/EQN: 14-pin + 4-pin PCB connector
5 = ECN/EQN: zero position of shaft and housing
6 = M10 back-off thread
7 = Self-locking screw: DIN 6912 M5x50; width A/F 4; tightening torque: 5 Nm +0.5 Nm
8 = Compensation of mounting tolerances and thermal expansion; no dynamic movement permitted
9 = Direction of shaft rotation for ascending position values

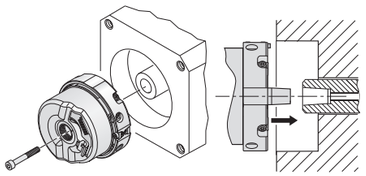
	Absolute			
	ECN 1313	**ECN 1325**	**EQN 1325**	**EQN 1337**
Interface	EnDat 2.2			
Ordering designation	EnDat01	EnDat22	EnDat01	EnDat22
Position values per rev.	8192 (13 bits)	33 554 432 (25 bits)	8192 (13 bits)	33 554 432 (25 bits)
Revolutions	–		4096 (12 bits)	
Elec. permiss. shaft speed/ deviations[2]	*512 lines:* 5 000 rpm/±1 LSB 12 000 rpm/±100 LSB *2048 lines:* 1500 rpm/±1 LSB 12 000 rpm/±50 LSB	15 000 rpm (for continuous position values)	*512 lines:* 5 000 rpm/±1 LSB 12 000 rpm/±100 LSB *2048 lines:* 1500 rpm/±1 LSB 12 000 rpm/±50 LSB	15 000 rpm (for continuous position values)
Calculation time t_{cal} Clock frequency	≤ 9 µs ≤ 2 MHz	≤ 7 µs ≤ 8 MHz	≤ 9 µs ≤ 2 MHz	≤ 7 µs ≤ 8 MHz
Incremental signals	∿ 1 V_{PP}[1]	–	∿ 1 V_{PP}[1]	–
Line count*	512 2048	2048	512 2048	2048
Cutoff frequency –3 dB	*2048 lines:* ≥ 400 kHz *512 lines:* ≥ 130 kHz	–	*2048 lines:* ≥ 400 kHz *512 lines:* ≥ 130 kHz	–
System accuracy	*512 lines:* ±60"; *2048 lines:* ±20"			
Electrical connection	12-pin	16-pin with connection for temperature sensor[3]	12-pin	16-pin with connection for temperature sensor[3]
Supply voltage	DC 3.6 V to 14 V			
Power consumption (maximum)	*3.6 V:* ≤ 0.6 W *14 V:* ≤ 0.7 W		*3.6 V:* ≤ 0.7 W *14 V:* ≤ 0.8 W	
Current consumption (typical)	*5 V:* 85 mA (without load)		*5 V:* 105 mA (without load)	
Shaft	Tapered shaft (Ø 9.25 mm); taper: 1:10			
Mech. permiss. shaft speed *n*	≤ 15 000 rpm		≤ 12 000 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			
Permissible 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)			
Operating temperature	–40 °C to 115 °C			
Protection EN 60529	IP40 when mounted			
Mass	≈ 0.25 kg			
ID number	768295-xx	1178019-xx	827039-xx	1178020-xx

* Please select when ordering
[1] Deviating tolerances
Signal amplitude: 0.8 V_{PP} to 1.2 V_{PP}
Asymmetry: 0.05
Amplitude ratio: 0.9 to 1.1
Phase angle: 90° elec. ±5° elec.
Signal-to-noise ratio E, F: ≥ 100 mV

[2] Speed-dependent deviations between absolute and incremental signals
[3] Evaluation optimized for KTY 84-130
[4] Valid as per standard at room temp.; the following applies at operating temps. up to 100 °C: ≤ 300 m/s^2; up to 115 °C: ≤ 150 m/s^2

Mounting

The tapered shaft of the rotary encoder is pressed onto the measured shaft and fastened with a central screw. The stator coupling is clamped by means of an axially tightenable screw in a location hole.



Mounting accessories

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 mounting quality can be inspected with the PWM 21 and ATS software.

Electrical connection: cables

Output cables for ECN 1313/EQN 1325 with EnDat01

EPG output cables inside the motor housing ∅ 4.5 mm (with shield crimp ∅ 6.1 mm); [16 × 0.057 mm^2] and TPE wires 2 × 0.25 mm^2 for temperature sensor		
With 12-pin PCB connector and 17-pin M23 angle flange socket (male)		ID 332201-xx
With 12-pin PCB connector and unstripped cable end		ID 332202-xx

Output cables for ECN 1325/EQN 1337 with EnDat22

EPG output cables inside the motor housing ∅ 3.7 mm (with shield crimp ∅ 6.1 mm); [1 × (4 × 0.06 mm^2) + 4 × 0.06 mm^2] and TPE wires 2 × 0.16 mm^2 for temperature sensor		
With 16-pin PCB connector and 9-pin M23 SpeedTEC angle flange socket (male)		ID 1120948-xx
With 16-pin PCB connector and stripped cable end		ID 1143830-xx

Comply with the EMC requirements under "General electrical information" in the *Interfaces of HEIDENHAIN Encoders* brochure

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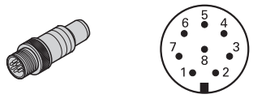
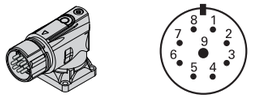
Electrical connection

EnDat22 pin layout

8-pin M12 coupling or flange socket

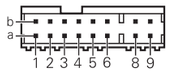


9-pin M23 SpeedTEC angle flange socket



16-pin PCB connector

16



	Power supply				Serial data transmission				Other signals[1]	
M12	**8**	**2**	**5**	**1**	**3**	**4**	**7**	**6**	**/**	**/**
M23	**3**	**7**	**4**	**8**	**5**	**6**	**1**	**2**	**/**	**/**
16	**1b**	**6a**	**4b**	**3a**	**6b**	**1a**	**2b**	**5a**	**8a**	**8b**
	U_P	**Sensor** U_P	**0 V**	**Sensor** 0 V	**DATA**	**$\overline{\text{DATA}}$**	**CLOCK**	**$\overline{\text{CLOCK}}$**	**T+**[2]	**T–**[2]
	Brown/ Green	Blue	White/ Green	White	Gray	Pink	Violet	Yellow	Brown	Green

[1] Only for adapter 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)

Cable shield connected to housing; **U_P** = Power supply voltage; **T** = Temperature
Sensor: The sense line is connected in the encoder with the corresponding power line.
Vacant pins or wires must not be used!
Note for safety-related applications: Only completely assembled HEIDENHAIN cables are qualified.
Do not modify cables or exchange their connectors without first consulting with HEIDENHAIN Traunreut.

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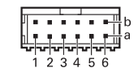
EnDat01 pin layout

17-pin M23 coupling or flange socket

12-pin PCB connector

12



	Power supply					Incremental signals[1]				Serial data transmission			
	7	**1**	**10**	**4**	**11**	**15**	**16**	**12**	**13**	**14**	**17**	**8**	**9**
12	**1b**	**6a**	**4b**	**3a**	**/**	**2a**	**5b**	**4a**	**3b**	**6b**	**1a**	**2b**	**5a**
	U_P	**Sensor** U_P	**0 V**	**Sensor** 0 V	**Internal shield**	**A+**	**A–**	**B+**	**B–**	**DATA**	**$\overline{\text{DATA}}$**	**CLOCK**	**$\overline{\text{CLOCK}}$**
	Brown/ Green	Blue	White/ Green	White	/	Green/ Black	Yellow/ Black	Blue/ Black	Red/ Black	Gray	Pink	Violet	Yellow

	Other signals	
	5	**6**
12	**/**	**/**
	T+[2]	**T–**[2]
	Brown[2]	White[2]

Cable shield connected with housing; **U_P** = Power supply voltage; **T** = Temperature
Sensor: The sense line is connected in the encoder with the corresponding power line.
Vacant pins or wires must not be used!
[1] Only with the EnDat01 ordering designation
[2] Connections for an external temperature sensor (only for output cables inside the motor, see *Temperature measurement in motors*); if used, please refer to the information about electromagnetic compatibility in the *General electrical information* section of the *Interfaces of HEIDENHAIN Encoders* brochure.

Iran Motion Control
تجهیزات کنترل حرکت ایران

IMC
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