HEIDENHAIN

Product Information

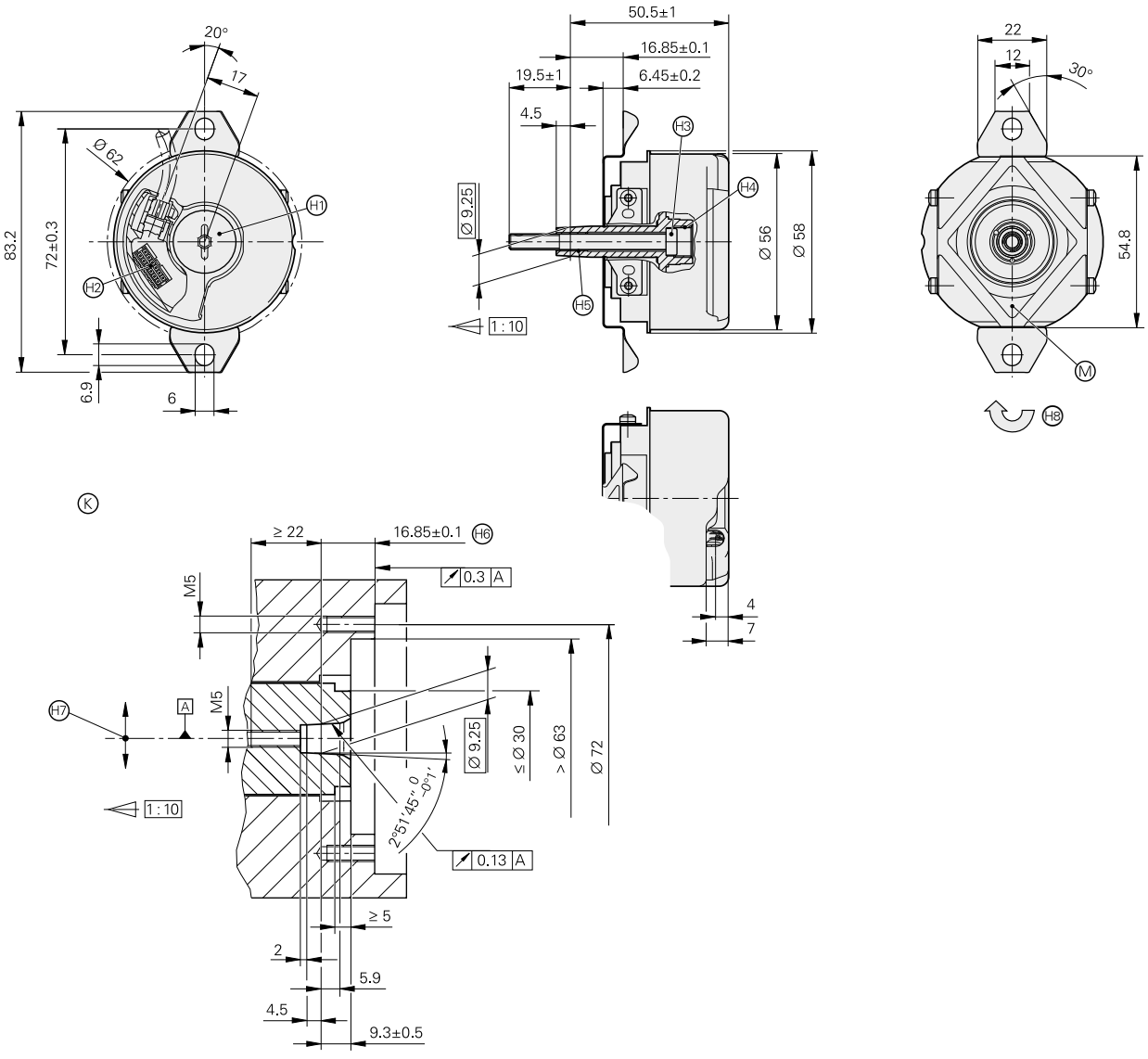
ECN 1313
ECN 1325
ERN 1321
ERN 1387

Rotary Encoders with Plane-Surface Coupling for Elevator Servo Drive Control

October 2013

ECN/ERN 1300 series

Rotary Encoders with integral bearings for elevator technology
- **Simple installation**
- **Rigid shaft coupling**
- **Plane-surface coupling for large mounting tolerances**
- **Uniform dimensions for various interfaces**



mm

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

A = Bearing of mating shaft
B = Bearing of encoder
K = Required mating dimensions
M = Measuring point for operating temperature
H1 = Screw plug, widths A/F 3 and 4, tightening torque 5+0.5 Nm
H2 = 12-pin PCB connector
H3 = Self-tightening screw M5 x 50 DIN 6912 SW4, tightening torque 5 +0.5 Nm
H4 = M10 back-off thread
H6 = M6 back-off thread
H6 = Max. permissible tolerance with moving motor shaft ± 1.5
H7 = Max. permissible static radial offset of motor shaft in indicated direction ± 0.13 mm
H8 = Direction of scanning unit motion for output signals in accordance with interface description

	Absolute		*Incremental*	
	ECN 1325	**ECN 1313**	**ERN 1387**	**ERN 1321**
Interface[1]	EnDat 2.2		∿ 1 V_{PP}	⊓⊔ TTL
Ordering designation	EnDat22	EnDat01	–	
Position values/rev	33 554 432 (25 bits)	8192 (13 bits)	Z1 track[3]	–
Elec. permissible speed/ Deviation[2]	≤ 12 000 min^{-1} (for continuous position value)	≤ 1 500 min^{-1}/± 1 LSB ≤ 12 000 min^{-1}/± 50 LSB	–	
Calculation time t_{cal} Clock frequency	≤ 7 µs ≤ 8 MHz	≤ 9 µs ≤ 2 MHz	– –	
Incremental signals[1]	–	∿ 1 V_{PP}	∿ 1 V_{PP}	⊓⊔ TTL
Line count*/ system accuracy	2048/± 20"		2048/± 20"	1024/± 64" 2048/± 32" 4096/± 16" 5000/± 13"
Reference mark	–		One	
Cutoff frequency –3 dB	–	≥ 400 kHz	≥ 210 kHz	–
Scanning frequency Edge separation	– –		– –	≤ 300 kHz ≥ 0.35 µs
Electrical connection Via PCB connector	*Rotary encoder:* 12-pin *Temperature sensor*[4]: 4-pin	12-pin	14-pin	12-pin
Voltage supply	3.6 V to 14 V DC		5 V ± 0.25 V	5 V ± 0.5 V
Power consumption[1] (maximum)	*3.6 V:* ≤ 600 mW *14 V:* ≤ 700 mW		–	–
Current consumption	*5 V:* 85 mA (typical, without load)		≤ 130 mA (without load)	≤ 120 mA (without load)
Stator coupling	Plane-surface coupling			
Shaft	Taper shaft Ø 9.25 mm; taper 1:10			
Mech. permissible speed n	≤ 12 000 min^{-1}			
Starting torque	≤ 0.01 Nm (at 20 °C)			
Moment of inertia of rotor	2.6 · 10^{-6} kgm^2			
Permissible axial motion of measured shaft[5]	± 1.5 mm			
Radial runout of the measured shaft	0.13 mm (static, radial offset ± 0.13 mm)			
Vibration 55 to 2000 Hz **Shock** 6 ms	≤ 300 m/s^2[6] (EN 60 068-2-6) ≤ 2000 m/s^2 (EN 60 068-2-27)			
Operating temperature	–40 °C to 115 °C		–40 °C to 120 °C	
Protection EN 60 529	IP 40 when mounted			
Weight	Approx. 0.25 kg			

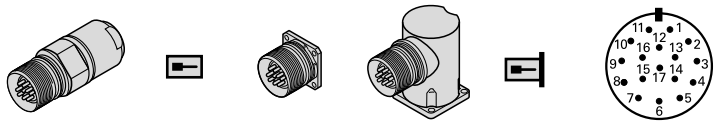
***** Please select when ordering
[1] See catalog: *Interfaces of HEIDENHAIN Encoders*
[2] Speed-dependent deviations between the absolute value and incremental signal
[3] One sine and one cosine signal per revolution
[4] Evaluation optimized for KTY 84-130
[5] Compensation of mounting tolerances and thermal expansion, no dynamic motion
[6] As per standard for room temperature; the following applies for operating temperature
Up to 100 °C: ≤ 300 m/s^2
Up to 115 °C or 120 °C: ≤ 150 m/s^2

Electrical connection

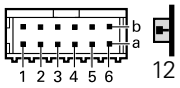
Pin layouts

ECN 1313 pin layout

17-pin coupling or flange socket M23



12-pin PCB connector



	Voltage supply					Incremental signals[1]				Absolute position values			
	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

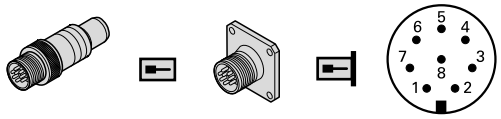
	Other signals	
	5	**6**
	/	**/**
12	**/**	**/**
	Brown[2]	White[2]

Cable shield connected to housing; U_P = power supply voltage; **T** = Temperature
Sensor: The sensor line is connected in the encoder with the corresponding power line.
Vacant pins or wires must not be used!

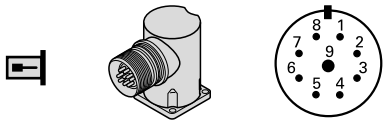
[1] Only with ordering designations EnDat 01 and EnDat 02
[2] Only with output cables inside the motor
[3] Connections for external temperature sensor; connection in the M23 flange socket
[4] **ECI 1118 EnDat 22:** Vacant
[5] Only EnDat 22, except ECI 1118
[6] White with M23 flange socket / Green with M12 flange socket

ECN 1325 pin layout

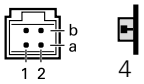
8-pin coupling or flange socket M12



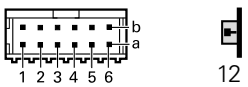
9-pin flange socket M23



4-pin PCB connector



12-pin PCB connector

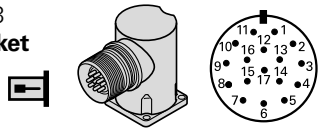


	Voltage supply				Absolute position values				Other signals[3]			
M12	**8**	**2**	**5**	**1**	**3**	**4**	**7**	**6**	**/**	**/**	**/**	**/**
M23	**3**	**7**	**4**	**8**	**5**	**6**	**1**	**2**	**/**	**/**	**/**	**/**
4	**/**	**/**	**/**	**/**	**/**	**/**	**/**	**/**	**1a**	**1b**	**/**	**/**
12	**1b**	**6a**	**4b**	**3a**	**6b**	**1a**	**2b**	**5a**	**/**	**/**	**/**	**/**
	U_P	**Sensor** U_P[4]	**0 V**	**Sensor** 0 V[4]	**DATA**	**$\overline{\text{DATA}}$**	**CLOCK**	**$\overline{\text{CLOCK}}$**	**T+**[5]	**T–**[5]	**T+**[3] [5]	**T–**[3] [5]
	Brown/ Green	Blue	White/ Green	White	Gray	Pink	Violet	Yellow	Brown	Green	Brown	[6]

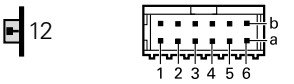
ERN 1321 pin layout

Output cable for ERN 1321 in the motor
ID 667343-01

17-pin M23 **flange socket**



12-pin PCB connector



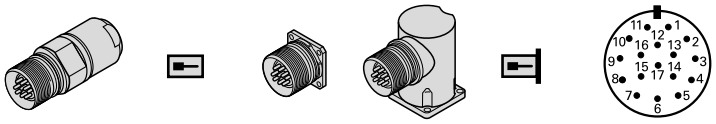
	Voltage supply				Incremental signals						Other signals		
	7	**1**	**10**	**4**	**15**	**16**	**12**	**13**	**3**	**2**	**5**	**6**	**8/9/11/ 14/17**
12	**2a**	**2b**	**1a**	**1b**	**6b**	**6a**	**5b**	**5a**	**4b**	**4a**	**/**	**/**	**3a/3b**
	U_P	**Sensor** U_P	**0 V**	**Sensor** 0 V	**U_{a1}**	**$\overline{U_{a1}}$**	**U_{a2}**	**$\overline{U_{a2}}$**	**U_{a0}**	**$\overline{U_{a0}}$**	**T+**[1]	**T–**[1]	**Vacant**
	Brown/ Green	Blue	White/ Green	White	Brown	Green	Gray	Pink	Red	Black	Brown[1]	White[1]	/

Cable shield connected to housing; **U_P** = power supply voltage
Sensor: The sensor line is connected in the encoder with the corresponding power line
Vacant pins or wires must not be used!

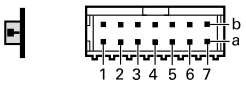
[1] Only for encoder cable inside the motor housing

ERN 1387 pin layout

17-pin coupling or flange socket
M23



14-pin PCB connector



	Voltage supply					Incremental signals					
	7	**1**	**10**	**4**	**11**	**15**	**16**	**12**	**13**	**3**	**2**
	1b	**7a**	**5b**	**3a**	**/**	**6b**	**2a**	**3b**	**5a**	**4b**	**4a**
	U_P	**Sensor** U_P	**0 V**	**Sensor** 0 V	**Internal shield**	**A+**	**A–**	**B+**	**B–**	**R+**	**R–**
	Brown/ Green	Blue	White/ Green	White	/	Green/ Black	Yellow/ Black	Blue/ Black	Red/ Black	Red	Black

	Other signals					
	14	**17**	**9**	**8**	**5**	**6**
	7b	**1a**	**2b**	**6a**	**/**	**/**
	C+	**C–**	**D+**	**D–**	**T+**[1]	**T–**[1]
	Gray	Pink	Yellow	Violet	Green	Brown

Cable shield connected to housing;
U_P = Power supply; **T** = Temperature
Sensor: The sensor line is connected internally with the corresponding power line.
Vacant pins or wires must not be used!

[1] Only with adapter cables inside the motor

HEIDENHAIN

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This Product Information supersedes all previous editions, which thereby become invalid. The basis for ordering from HEIDENHAIN is always the Product Information valid when the contract is made.

More information
- Catalog: *Position Encoders for Servo Drives*
- Catalog: *Rotary Encoders*
- Catalog: *Interfaces of HEIDENHAIN Encoders*

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