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**HEIDENHAIN**



Product Information

## **ERN 1185**

Incremental Rotary  
Encoder with Z1 Track

November 2007

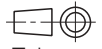
# ERN 1185

Rotary encoders with integral bearing for integration in motors

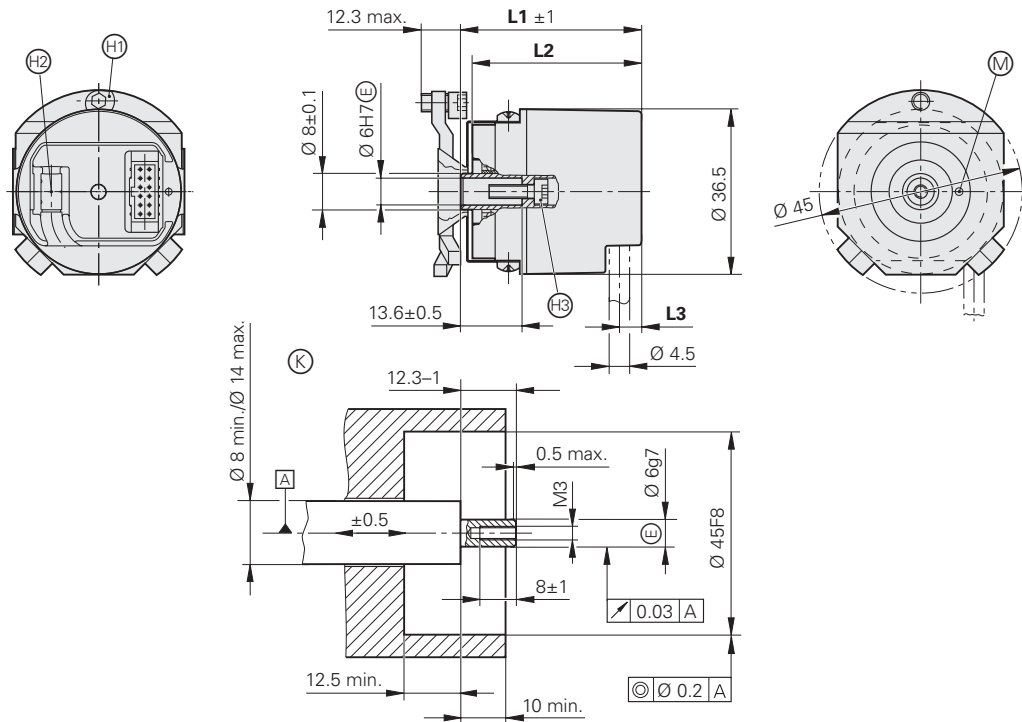
- Mounted stator coupling  $\varnothing 45$  mm
- Compact design
- Blind hollow shaft



Dimensions in mm





Tolerancing ISO 8015  
ISO 2768 - m H  
< 6 mm:  $\pm 0.2$  mm



	L1	L2	L3
<b>ERN</b>	39.9	(37.3)	4.8
<b>ECN/EQN</b>	42.45	(37.55)	3.9

- ▣ = Bearing
- ⊙ = Required mating dimensions
- Ⓜ = Measuring point for operating temperature
- Ⓜ = To fasten the ring coupling, turn the eccentric screw (M4) to the right by approx. 90°. Tightening torque  $2 \pm 0.1$  Nm
- Ⓜ = Cable outlet for cables with crimp sleeve 4.3 ± 0.3 - 7 long
- Ⓜ = Screw ISO 4762 SW2.5 M3 x 10
- ↻ Direction of shaft rotation for output signals as per the interface description

	<b>Incremental</b>
	<b>ERN 1185</b>
<b>Incremental signals</b>	 V <sub>PP</sub> <sup>1)</sup>
Line count*/ System accuracy	512/± 60" 2048/± 40"
Reference mark	One
Cutoff frequency -3dB	512 lines: ≥ 100 kHz 2048 lines: ≥ 400 kHz
<b>Absolute position values</b>	 V <sub>PP</sub> <sup>1)</sup>
Position values per rev	Z1 track <sup>2)</sup>
<b>Power supply</b>	5V ± 5 %
<b>Current consumption</b> without load	≤ 150 mA
<b>Electrical connection</b>	Via 14-pin PCB connector
<b>Shaft</b>	Blind hollow shaft Ø 6 mm
<b>Stator coupling*</b>	Ø 45 mm
<b>Mechanically permissible speed <i>n</i></b>	12000 min <sup>-1</sup>
<b>Starting torque</b>	≤ 0.001 Nm (at 20 °C)
<b>Moment of inertia</b> of rotor	Approx. 0.3 · 10 <sup>-6</sup> kgm <sup>2</sup>
<b>Natural frequency of the stator coupling</b>	≥ 1500 Hz
<b>Permissible axial motion of measured shaft</b>	± 0.5 mm
<b>Vibration</b> 55 to 2000 Hz <b>Shock</b> 6 ms	≤ 100 m/s <sup>2</sup> (EN 60068-2-6) ≤ 1000 m/s <sup>2</sup> (EN 60068-2-27)
<b>Max. operating temperature</b>	115 °C
<b>Min. operating temperature</b>	-30 °C
<b>Protection</b> EN 60529	IP 40 when mounted
<b>Weight (approx.)</b>	0.1 kg

\* Please indicate when ordering

<sup>1)</sup> Restricted tolerances

Signal amplitude:	0.75 to 1.2 V <sub>PP</sub>
Asymmetry:	0.05
Amplitude ratio:	0.9 to 1.1
Phase angle:	90° ± 5° elec.
Signal-to-noise ratio E, F:	100 mV

<sup>2)</sup> For sine commutation: One sine and one cosine signal per revolution

# Electrical Connection

## Pin layout

17-pin HEIDENHAIN coupling or flange socket M23						14-pin PCB connector					
	Power 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 <sub>P</sub>	Sensor U <sub>P</sub>	0V	Sensor 0V	Inside 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+ <sup>1)</sup>	T- <sup>1)</sup>
	Gray	Pink	Yellow	Violet	Green	Brown

**Cable shield** connected to housing;  
**U<sub>P</sub>** = power supply; **T** = temperature  
**Sensor:** The sensor line is connected internally with the corresponding power line.  
 Vacant pins or wires must not be used!

<sup>1)</sup> Only for motor-internal adapter cables

## Encoder cable inside the motor housing

Cable diameter 4.5 mm  
 16xAWG30/7 for

	PCB connector	Crimp sleeve	Complete With PCB connector and right-angle socket M23, 17-pin	With one connector With PCB connector
<b>ERN 1185</b>	14-pin	Ø 4.5 mm	316594-xx	317900-xx

## PUR connecting cables

	17-pin: [(4 × 0.14 mm <sup>2</sup> ) + 4(2 × 0.14 mm <sup>2</sup> ) + (4 × 0.5 mm <sup>2</sup> )] Ø 8 mm
<b>Complete</b> with connector (female) and coupling (male)	323 897-xx
<b>Complete</b> with connector (female) and D-sub connector (female) for IK 220	332 115-xx
<b>Complete</b> with connector (female) and D-sub connector (male) for IK 215	324 544-xx
<b>With one</b> connector (female)	309 778-xx

# HEIDENHAIN

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### For more information

- Catalog *Position Encoders for Servo Drives*