

**Special Product**  
— only on request —

**SALES & SERVICE:**

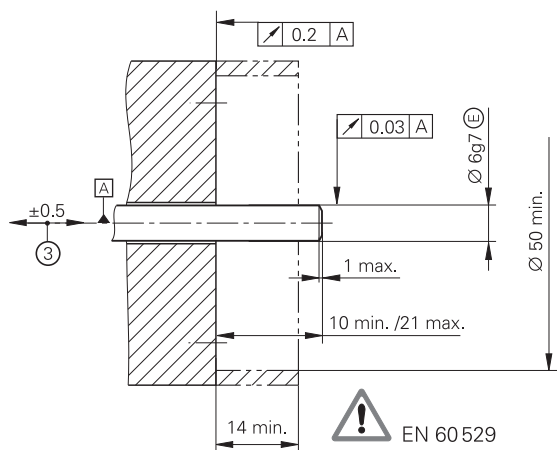
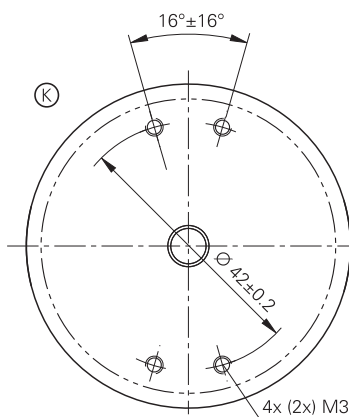
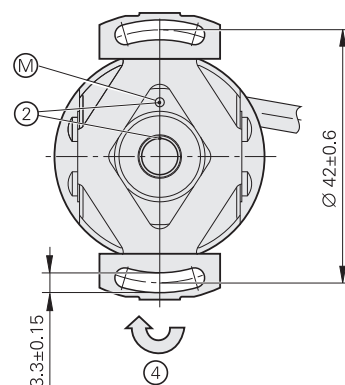
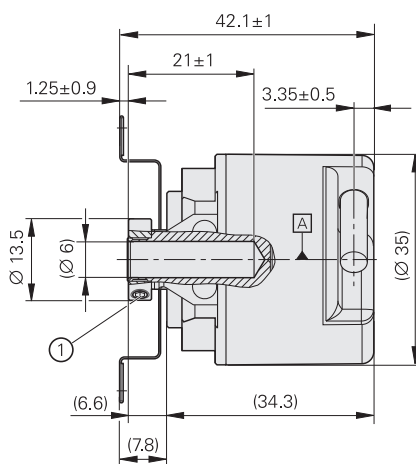
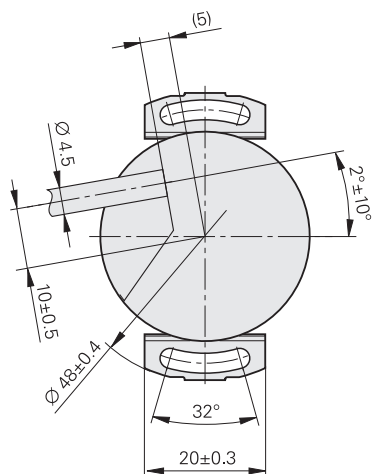
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Product Information

**ERN 1085**  
Incremental Rotary  
Encoder with Z1 Track

# ERN 1085

- Rotary encoder with mounted stator coupling
- Compact dimensions
- Blind hollow shaft  $\varnothing 6$  mm
- Z1 track for sine commutation



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

- ▣ = Bearing of mating shaft
- ⊗ = Required mating dimensions
- Ⓜ = Measuring point for operating temperature
- ① = 2 screws in clamping ring. Tightening torque  $0.6 \pm 0.1$  Nm, width across flats 1.5
- ② = Reference mark position  $\pm 20^\circ$
- ③ = Compensation of mounting tolerances and thermal expansion, no dynamic motion permitted
- ④ = Direction of shaft rotation for output signals as per the interface description

	ERN 1085
<b>Incremental signals</b>	$\sim 1 V_{PP}^{1)}$
Line count*/ System accuracy	512/± 60" 2048/± 40"
Reference mark	One
Cutoff frequency -3 dB	512 lines: ≥ 100 kHz 2048 lines: ≥ 350 kHz
<b>Absolute position values</b>	$\sim 1 V_{PP}^{1)}$
Position values/revolution	Z1 track for sine commutation: One sine and one cosine signal per revolution
<b>Voltage supply</b>	5 V DC ± 0.5 V
<b>Current consumption</b> without load	≤ 120 mA
<b>Electrical connection</b>	Cable 1 m without connecting element
<b>Cable length</b>	≤ 150 m
<b>Shaft</b>	Blind hollow shaft Ø 6 mm
<b>Mechanically permissible speed</b> <i>n</i>	12 000 rpm
<b>Starting torque</b>	≤ 0.001 Nm (at 20 °C)
<b>Moment of inertia</b> of rotor	≈ 0.5 · 10 <sup>-6</sup> kgm <sup>2</sup>
<b>Permissible axial motion of measured shaft</b>	± 0.5 mm
<b>Vibration</b> 55 Hz to 2000 Hz <b>Shock</b> 6 ms	≤ 200 m/s <sup>2</sup> (EN 60068-2-6) ≤ 1000 m/s <sup>2</sup> (EN 60068-2-27)
<b>Max. operating temperature</b>	100 °C
<b>Min. operating temperature</b>	Fixed cable: -30 °C For frequent flexing: -10 °C
<b>Protection</b> EN 60529	IP 64
<b>Mass</b>	≈ 0.1 kg

\* Please select when ordering

<sup>1</sup> Limited tolerances

Signal amplitude: 0.80 V<sub>PP</sub> to 1.2 V<sub>PP</sub>

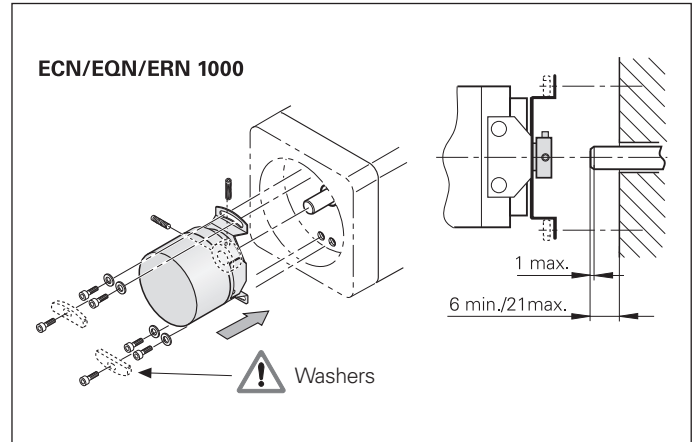
# Assembly

The **ERN 1085** rotary encoder features an integral bearing and mounted stator coupling. The stator coupling compensates radial runout and alignment errors without significantly reducing the accuracy. The encoder shaft is directly connected with the shaft to be measured. During angular acceleration of the shaft, the stator coupling must absorb only that torque resulting from friction in the bearing.

## Mounting

The rotary encoder is slid by its hollow shaft onto the measured shaft and fastened by two screws.

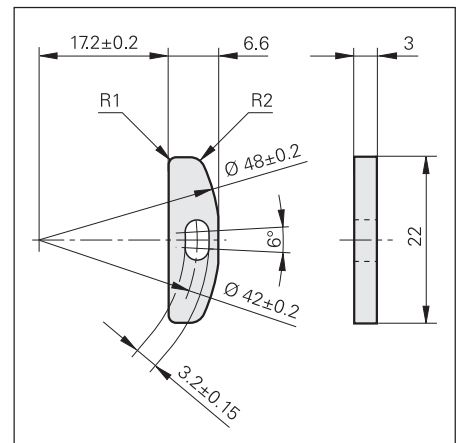
Dynamic applications require the highest possible natural frequencies  $f_N$  of the system. These are achieved through a stator coupling by four screws or with special washers (see *Mounting accessories*).



## Mounting accessories

### Washer

For increasing the natural frequency  $f_N$  when fastening with only two screws  
ID 334653-01



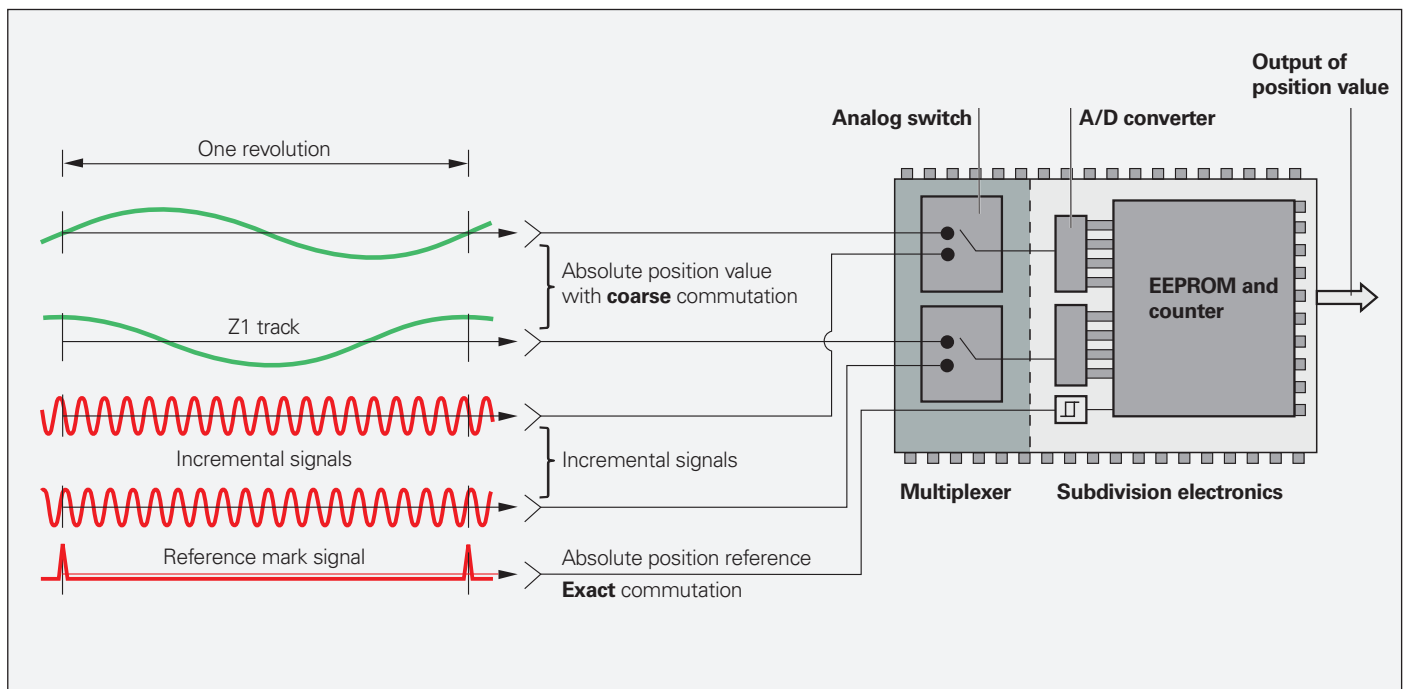
# Interfaces

## Commutation signals for sine commutation

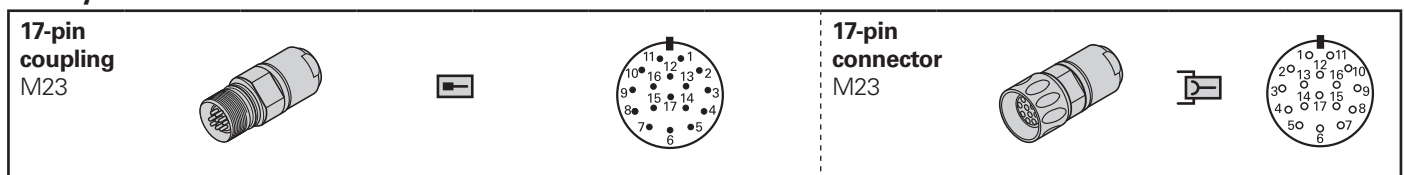
The **commutation signals C and D** are taken from the Z1 track, and are equal to one sine or cosine period per revolution. They have a signal amplitude of typically  $1 V_{PP}$  against  $1 k\Omega$ . The input circuit of the subsequent electronics corresponds to the  $\sim 1 V_{PP}$  interface. However, the required terminating resistance  $Z_0$  is  $1 k\Omega$  instead of  $120 \Omega$ .

<b>Interface</b>	Sinusoidal voltage signals $\sim 1 V_{PP}$
<b>Commutation signals</b>	<b>Two nearly sinusoidal signals C and D</b> For the signal level, see <i>Incremental signals</i> $\sim 1 V_{PP}$
<b>Incremental signals</b>	See <i>Incremental signals</i> $\sim 1 V_{PP}$
<b>Connecting cables</b>	Shielded HEIDENHAIN cable PUR $[4(2 \times 0.14 \text{ mm}^2) + 4(2 \times 0.14 \text{ mm}^2) + (4 \times 0.5 \text{ mm}^2)]$ Max. 150 m Propagation time 6 ns/m

### Electronic commutation with Z1 track



### Pin layout








	Voltage supply					Incremental signals					
	7	1	10	4	11	15	16	12	13	3	2
	<b>U<sub>P</sub></b>	<b>Sensor U<sub>P</sub></b>	<b>0V</b>	<b>Sensor 0V</b>	<b>Internal shield</b>	<b>A+</b>	<b>A-</b>	<b>B+</b>	<b>B-</b>	<b>R+</b>	<b>R-</b>
	Brown/Green	Blue	White/Green	White	/	Green/Black	Yellow/Black	Blue/Black	Red/Black	Red	Black

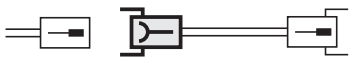
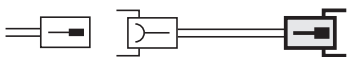
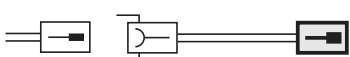
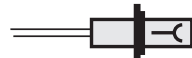
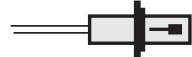
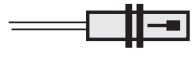
	Other signals			
	14	17	9	8
	<b>C+</b>	<b>C-</b>	<b>D+</b>	<b>D-</b>
	Gray	Pink	Yellow	Violet

**Shield** on housing  
**U<sub>P</sub>** = Power supply  
**Sensor:** The sensor line is connected internally with the corresponding power line.  
 Vacant pins or wires must not be used.

# Cables and connecting elements

17-pin  
M23

<b>PUR connecting cable Ø 8 mm</b> <b>17-pin:</b> [(4 x 0.14 mm <sup>2</sup> ) + 4(2 x 0.14 mm <sup>2</sup> ) + (4 x 0.5 mm <sup>2</sup> )]		
<b>Complete</b> with M23 connector (female) and M23 coupling (male)		323897-xx
<b>Complete</b> with M23 connector (female) and D-sub connector (female) for IK 220		332115-xx
<b>Complete</b> with M23 connector (female) and D-sub connector (male) for IK 115/IK 215		324544-xx
<b>With one</b> M23 connector (female)		309778-xx
<b>Cable only</b> , Ø 8 mm		816317-01

<b>Mating element on connecting cable to connecting element on encoder cable</b>	<b>M23 connector (female)</b> for cable Ø 8 mm 	291697-26
<b>Connector on connecting cable</b> for connecting to the subsequent electronics	<b>M23 connector (male)</b> for cable Ø 8 mm Ø 6 mm 	291697-27
<b>Coupling on connecting cable</b>	<b>M23 coupling (male)</b> for cable Ø 4.5 mm Ø 6 mm Ø 8 mm 	291698-25 291698-26 291698-27
<b>Mounted coupling M23</b>	<b>With flange (female)</b> Ø 6 mm Ø 8 mm 	291698-35
	<b>With flange (male)</b> Ø 6 mm Ø 8 mm 	291698-41 291698-29
	<b>With central fastening (male)</b> Ø 6 mm to 10 mm 	741045-01

## 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 document edition valid when the order is made.



### For more information:

Comply with the requirements described in the following documents to ensure the correct operation of the encoder:

- Brochure: *Encoders for Servo Drives* 208922-xx
- Brochure: *Interfaces of HEIDENHAIN Encoders* 1078628-xx
- Brochure: *Cables and Connectors* 1206103-xx

For brochures and product information documents, visit [www.heidenhain.de](http://www.heidenhain.de).