



Product Information

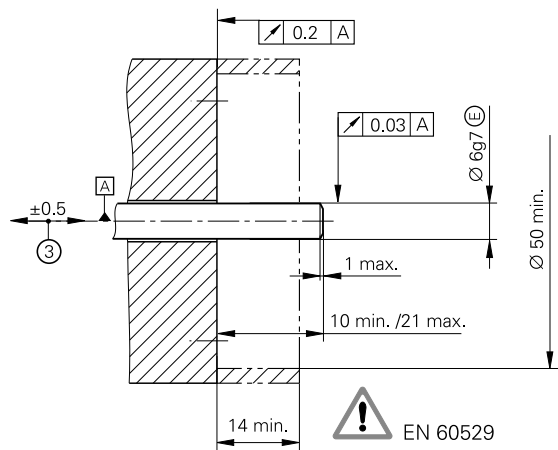
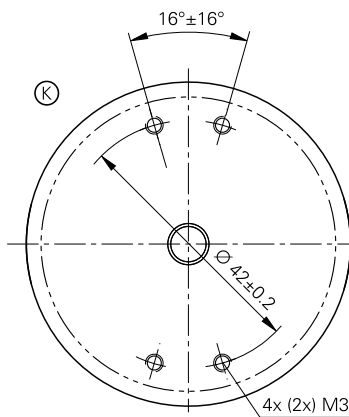
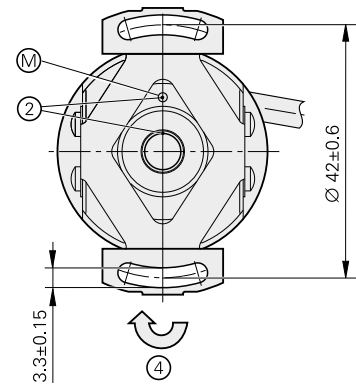
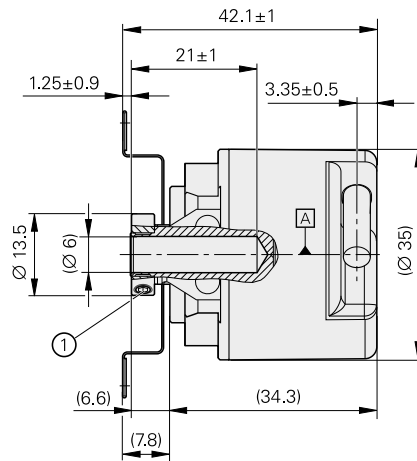
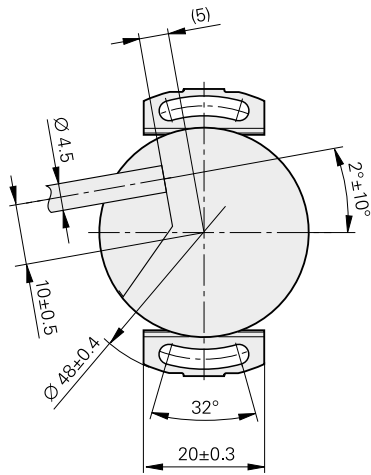
## **ERN 1085**

Incremental Rotary  
Encoder with Z1 Track

**Special Product**  
— only on request —

# 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 = Two screws in clamping ring. Tightening torque:  $0.6 \text{ Nm} \pm 0.1 \text{ Nm}$ ; width A/F: 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 ascending position values

<b>ERN 1085</b>	
<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 per revolution	Z1 track for sine commutation: one sine and one cosine signal per revolution
<b>Electrical connection</b>	Cable (1 m) without connecting element
Cable length	≤ 150 m
Supply voltage	DC 5 V ±0.5 V
Current consumption (typical)	120 mA (without load)
<b>Shaft</b>	Blind hollow shaft Ø 6 mm
Shaft speed	≤ 12000 rpm
Starting torque (typical)	0.001 Nm (at 20 °C)
Moment of inertia of rotor	$0.5 \cdot 10^{-6} \text{ kgm}^2$
Axial motion of measured shaft	≤ ±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>Operating temperature</b>	<i>Fixed cable:</i> –30 °C to 100 °C <i>Moving cable:</i> –10 °C to 100 °C
<b>Protection</b> EN 60529	IP64
<b>Mass</b>	≈ 0.1 kg

\* Please select when ordering

<sup>1)</sup> Constrained tolerances

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

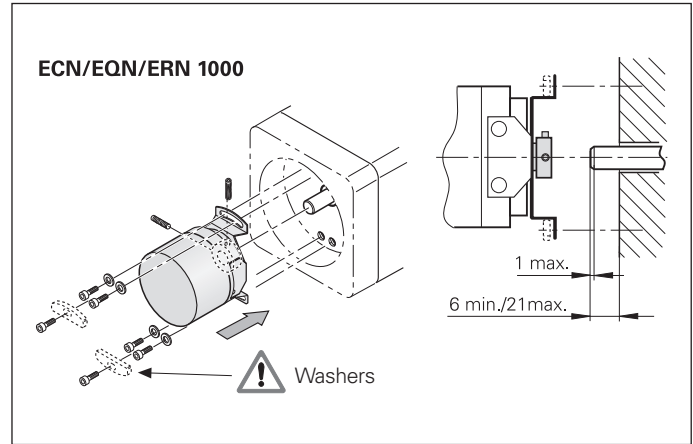
# Mounting

The **ERN 1085** rotary encoder features an integral bearing and mounted stator coupling. The stator coupling compensates for radial runout and misalignment without a significant reduction in accuracy. The rotary encoder shaft is directly connected to the measured shaft. During angular acceleration of the shaft, the stator coupling must absorb only the torque arising from bearing friction.

## Mounting

The hollow shaft of the rotary encoder is slid onto the measured shaft and fastened with two screws.

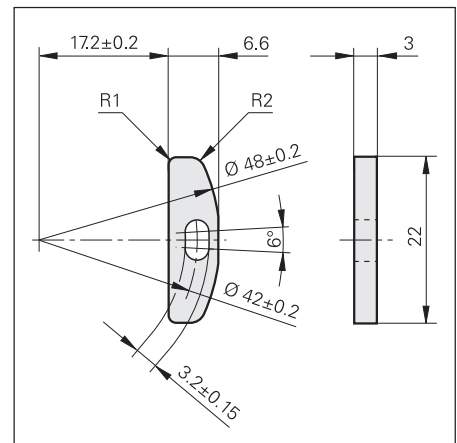
Dynamic applications require the highest possible natural frequencies  $f_N$  of the system. These natural frequencies are achieved through a stator coupling with four screws or with special washers (see *Mounting accessory*).



# Mounting accessory

## Washer

For fastening with only two screws  
ID 334653-01



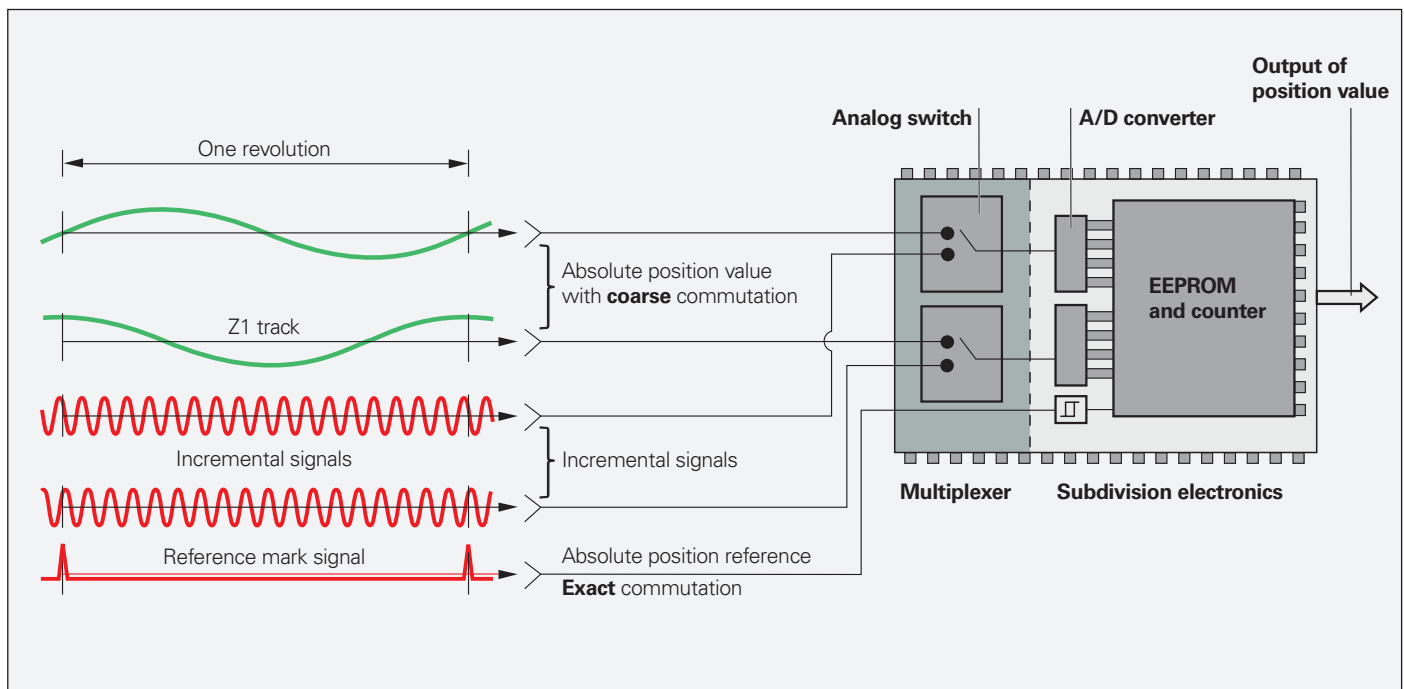
# Interfaces

## Commutation signals for sine commutation

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

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

### Electronic commutation with Z1 track








### Pin layout

17-pin M23 coupling					17-pin M23 connector						
	Power supply					Incremental signals					
	7	1	10	4	11	15	16	12	13	3	2
	$U_P$	Sensor $U_P$	0V	Sensor 0V	Internal shield	A+	A-	B+	B-	R+	R-
	Brown/Green	Blue	White/Green	White	/	Green/Black	Yellow/Black	Blue/Black	Red/Black	Red	Black

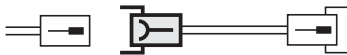
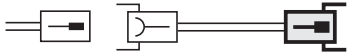
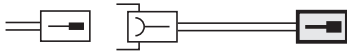
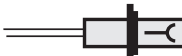
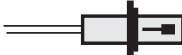
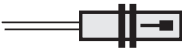
Other signals				
	14	17	9	8
	C+	C-	D+	D-
	Gray	Pink	Yellow	Violet

**Shield** on housing  
 $U_P$  = Power supply  
**Sensor:** The sense line is connected internally to the respective the power line.  
 Vacant pins or wires must not be used!

# Cables and connecting elements

<b>PUR Ø 8 mm adapter cables and connecting cables</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>Adapter cable</b> with 17-pin M23 connector (female) and 15-pin D-sub connector (female) for IK 220		332115-xx
<b>Adapter cable</b> with 17-pin M23 connector (female) and 15-pin D-sub connector (male) for IK 115/IK 215		324544-xx
<b>Connecting cable</b> with 17-pin M23 connector (female) and 17-pin M23 coupling (male)		323897-xx
<b>Connecting cable</b> with 17-pin M23 connector (female) and stripped cable end		309778-xx <sup>1)</sup>
<b>Signal cable</b> with stripped cable ends		816322-xx <sup>1)</sup>

<sup>1)</sup> The electromagnetic compatibility must be ensured in the complete system.

<b>Mating element on connecting cable, fitting to encoder connecting element</b>	<b>M23 connector (female)</b> for cable Ø 8 mm 	291697-26
<b>Connector on connecting cable</b> for connection to 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>M23 mounted coupling</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 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 made.



### Further information:

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

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

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