



# HEIDENHAIN



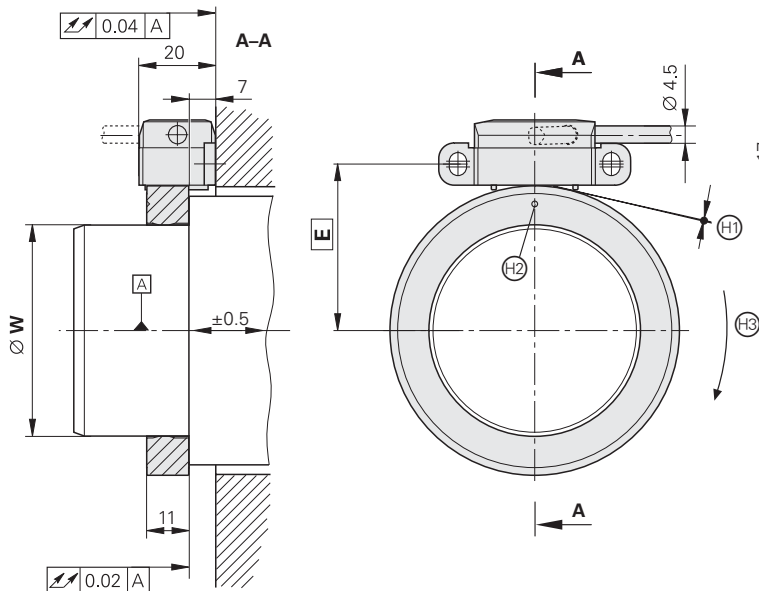
Product Information

## **ERM 2400 Series** **ERM 2900 Series** Modular Magnetic Encoders

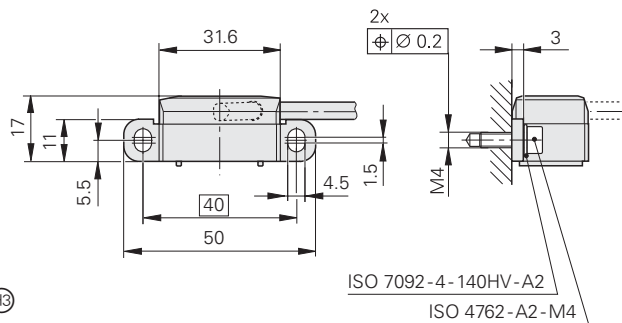
October 2009

# ERM 2400/ERM 2900 Series

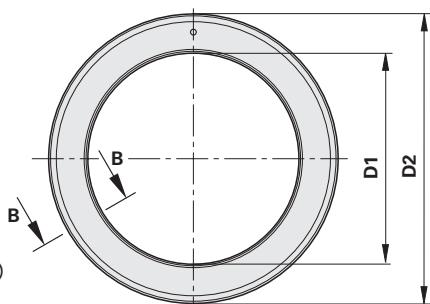
- Modular encoders
- Magnetic scanning principle
- Compact dimensions
- Two signal periods



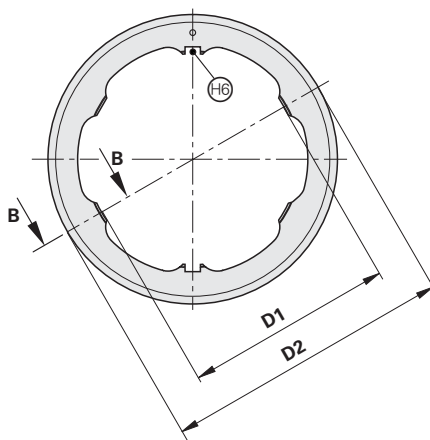
ERM 2x80 scanning head



ERM 2x04 scale drum



ERM 2405 scale drum



Dimensions in mm

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

- ⊠ = Bearing
- ⊕ = Mounting clearance set with spacer foil  
ERM 2400: 0.15 mm  
ERM 2900: 0.30 mm
- ⊙ = Reference mark
- ⊕ = Positive direction of rotation for output signals
- ⊕ = Centering collar
- ⊕ = Clamping area (applies to both sides)
- ⊕ = Slot for feather key 4x4x10 (as per DIN 6885 shape A)

	D1	W	D2	E
ERM 2400	$\varnothing 40 +0.010/+0.002$	$\varnothing 40 0/-0.006$	$\varnothing 64.37$	37.9
	$\varnothing 55 +0.010/+0.002$	$\varnothing 55 0/-0.006$	$\varnothing 75.44$	43.4
ERM 2900	$\varnothing 55 +0.010/+0.002$	$\varnothing 55 0/-0.006$	$\varnothing 77.41$	44.6

	ERM 2484		ERM 2485		ERM 2984
<b>Incremental signals</b>	$\sim 1 V_{PP}$				
Reference mark	One				
Cutoff frequency -3dB	$\geq 300 \text{ kHz}$				
<b>Power supply</b>	$5 V \pm 10 \%$				
<b>Current consumption</b>	$\leq 150 \text{ mA}$ (without load)				
<b>Electrical connection*</b>	Cable 1 m, with or without coupling; cable outlet axial or radial				
<b>Cable length</b>	$\leq 150 \text{ m}$ with HEIDENHAIN cable				
<b>Drum inside diameter*</b>	40 mm	55 mm	40 mm	55 mm	55 mm
<b>Drum outside diameter*</b>	64.37 mm	75.44 mm	64.37 mm	75.44 mm	77.41 mm
<b>Line count</b>	512	600	512	600	256
<b>System accuracy<sup>1)</sup></b>	$\pm 43''$	$\pm 36''$	$\pm 43''$	$\pm 36''$	$\pm 70''$
<b>Accuracy of graduation</b>	$\pm 17''$	$\pm 14''$	$\pm 17''$	$\pm 14''$	$\pm 15''$
<b>Mech. perm. speed</b>	$\leq 42000 \text{ min}^{-1}$	$\leq 36000 \text{ min}^{-1}$	$\leq 33000 \text{ min}^{-1}$	$\leq 27000 \text{ min}^{-1}$	$\leq 35000 \text{ min}^{-1}$
<b>Moment of inertia of the rotor</b>	$0.12 \cdot 10^{-3} \text{ kgm}^2$	$0.19 \cdot 10^{-3} \text{ kgm}^2$	$0.11 \cdot 10^{-3} \text{ kgm}^2$	$0.17 \cdot 10^{-3} \text{ kgm}^2$	$0.22 \cdot 10^{-3} \text{ kgm}^2$
<b>Perm. axial movement</b>	$\pm 0.5 \text{ mm}$				
<b>Vibration</b> 55 to 2000 Hz <b>Shock</b> 6 ms	$\leq 400 \text{ m/s}^2$ (EN 60068-2-6) $\leq 1000 \text{ m/s}^2$ (EN 60068-2-27)				
<b>Max. operating temp.</b>	100 °C				
<b>Min. operating temp.</b>	-10 °C				
<b>Protection</b> EN 60529	IP 67				
<b>Weight</b> (approx.)					
Scale drum	0.17 kg	0.17 kg	0.15 kg	0.15 kg	0.19 kg
Scanning head (without cable)	Approx. 0.02 kg				

Other line counts/dimensions upon request

\* Please select when ordering

<sup>1)</sup> Before installation. Additional error caused by mounting inaccuracy and inaccuracy from the bearing of the drive shaft are not included.

# Mechanical Design Types and Mounting

There are two different signal periods available for the ERM modular magnetic encoders (ERM 2400: approx. 400 µm; ERM 2900: approx. 1 mm). This results in differing line counts for nearly identical outside diameters, making it possible to use these encoders for different types of spindle applications.

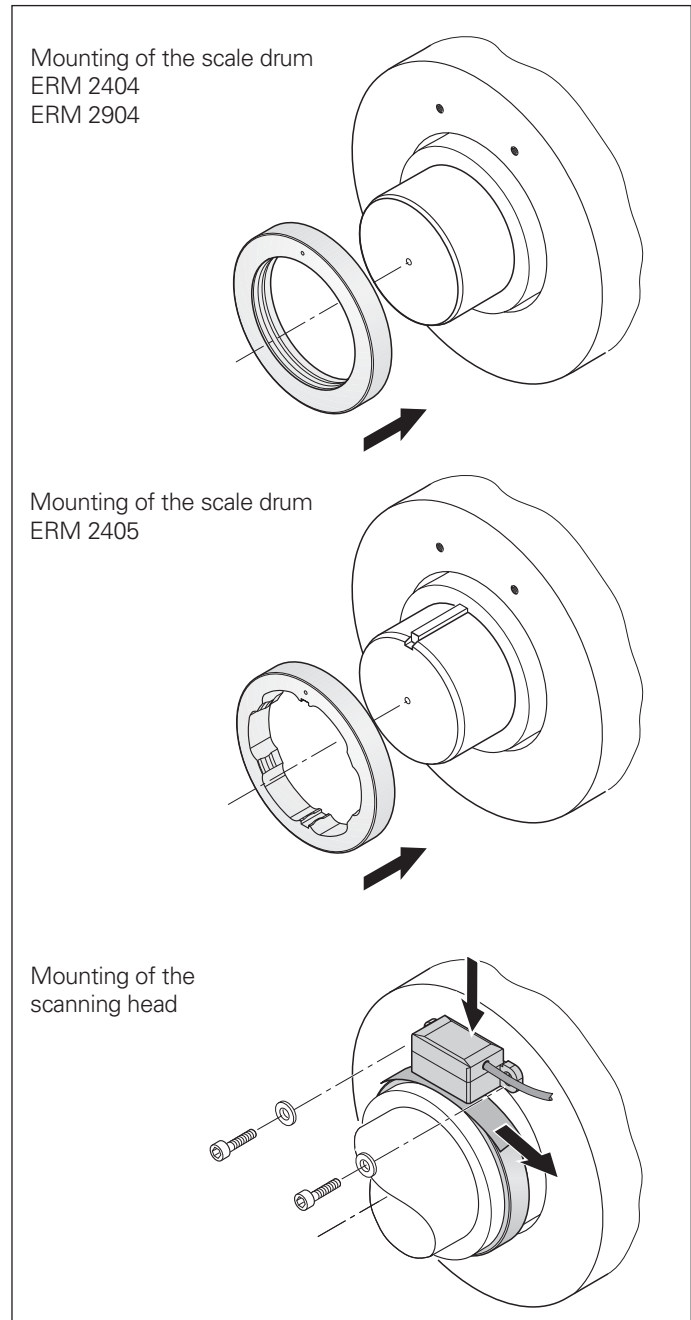
Each ERM modular encoder consists of a circumferential-scale drum and the corresponding scanning head.

The scale drum is available in two versions. The insides of the **ERM 2404** and **ERM 2904** scale drums are smooth. Only a force-fit connection (clamping of the drum) may be used to prevent it from rotating unintentionally. The **ERM 2405** scale drum features a keyway. The feather key is only intended for the prevention of unintentional rotation. The transmission of torque via the feather key is not permissible. A force-fit connection is to be used here, as with the ERM 2404 scale drum. The special shape of the drum's inside is designed to ensure stability even at the maximum permissible speeds.

## Mounting


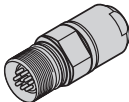
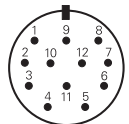

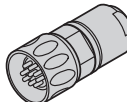
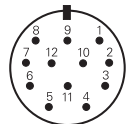

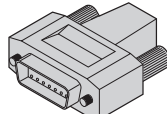
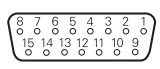



The **circumferential-scale drum** is slid onto the drive shaft and clamped. The scale drum is centered via the centering collar on its inner circumference. In order to keep the eccentricity of the graduation to the bearing resulting from mounting to a minimum, and the resulting deviations in accuracy as well, the gap between the shaft and centering collar should be as small as possible. The clamping of the scale drum depends on the mounting situation. The clamping force must be applied evenly over the plane surface of the drum. The necessary mounting elements depend on the design of the customer's equipment, and are therefore the responsibility of the customer. The frictional connection must be strong enough to prevent unintentional rotation or skewing in axial and radial directions, even at high speeds and accelerations. The scale drum may not be modified for this purpose, such as by drilling holes or countersinks in it.

In order to mount the scanning head, the spacer foil is applied to the surface of the circumferential scale drum. The **scanning head** is pressed against the foil, fastened, and the foil is removed.



# Electrical Connection

## Pin layout






12-pin M23 coupling				12-pin M23 connector				15-pin D-sub connector, female for HEIDENHAIN controls and IK 220					
													
	Power supply				Incremental signals						Other signals		
	12	2	10	11	5	6	8	1	3	4	7/9	/	/
	1	9	2	11	3	4	6	7	10	12	5/8/13/14/15	/	/
	<b>U<sub>P</sub></b>	<b>Sensor</b> U <sub>P</sub>	<b>0V</b>	<b>Sensor</b> 0V	<b>A+</b>	<b>A-</b>	<b>B+</b>	<b>B-</b>	<b>R+</b>	<b>R-</b>	<b>Vacant</b>	<b>Vacant</b>	<b>Vacant</b>
	Brown/ Green	Blue	White/ Green	White	Brown	Green	Gray	Pink	Red	Black	/	Violet	Yellow

**Shield** on housing; **U<sub>P</sub>** = Power supply voltage

**Sensor:** The sensor line is connected internally with the corresponding power line

Vacant pins or wires must not be used!

## Connecting cables

PUR connecting cables	12-pin: [4(2 × 0.14 mm <sup>2</sup> ) + (4 × 0.5 mm <sup>2</sup> )]	Ø 8 mm
<b>Complete</b> with M23 connector (female) and M23 coupling (male)		298401-xx
<b>Complete</b> with M23 connector (female) and M23 connector (male)		298399-xx
<b>Complete</b> with M23 connector (female) and D-sub connector (female) for IK 220		310199-xx
<b>With one M23 connector</b> (female)		309777-xx
<b>Cable without connectors</b> , Ø 8 mm		244957-01

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[www.heidenhain.de/docu](http://www.heidenhain.de/docu)

**For more information**

See the *ERM 200*

Product Information sheet