



# HEIDENHAIN



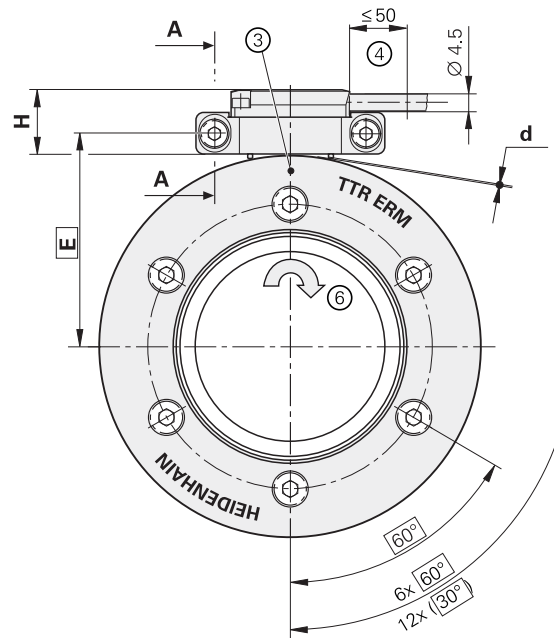
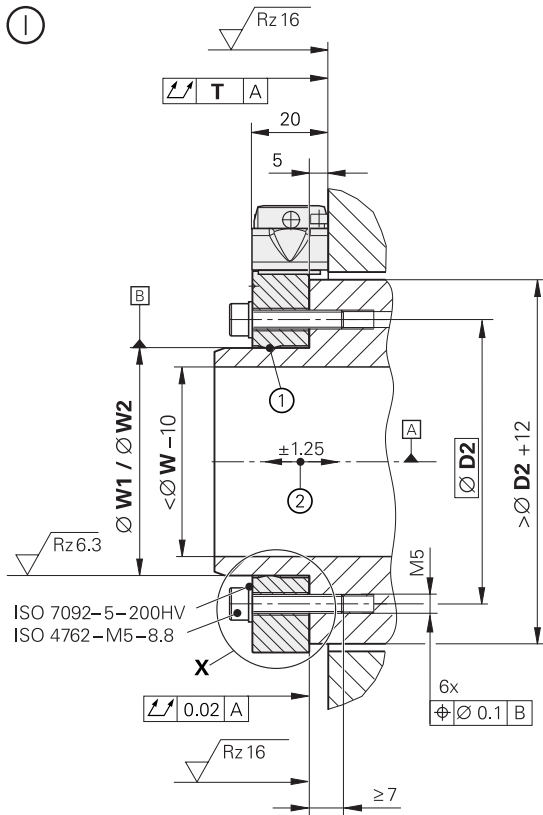
Product Information

## **ERM 2203**

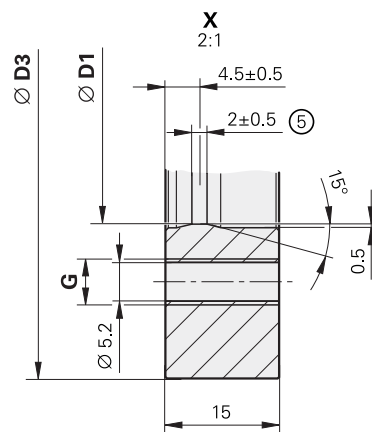
Incremental Angle Encoder  
with Magnetic Scanning  
and High Accuracy

# ERM 2203

## Dimensions



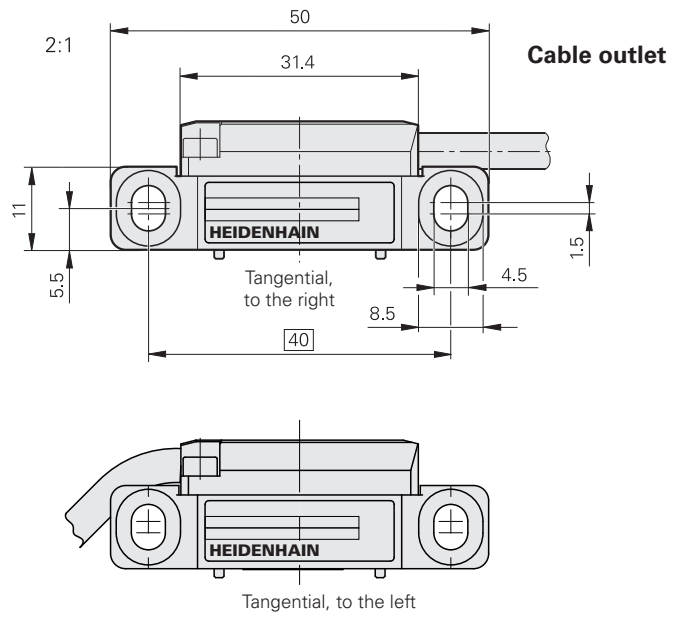
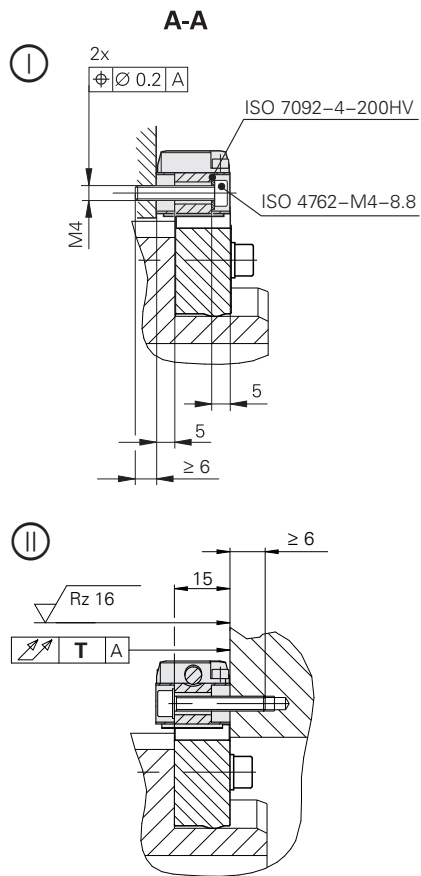
mm  
  
 Tolerancing ISO 8015  
 ISO 2768 - m H  
 < 6 mm:  $\pm 0.2\ \text{mm}$



W1 = Without mechanical fault exclusion  
 W2 = With mechanical fault exclusion  
 $\textcircled{1}$ ,  $\textcircled{2}$  = Mounting option for scanning head

$\textcircled{A}$  = Bearing of mating shaft  
 1 = Shaft fit; ensure full-surface contact  
 2 = Axial tolerance of mating shaft  
 3 = Reference mark position  
 4 = Cable support  
 5 = Centering collar  
 6 = Direction of shaft rotation for ascending position values

Scanning head	H	T	Mounting clearance <b>d</b> (with spacer shim)
AK ERM 2283	17 mm	0.02 mm	0.05 mm



Scale drum	D1	W1	W2	D2	D3	E	G
TTR ERM 2203	∅ 40 +0/-0.007	∅ 40 +0.009/+0.002	∅ 40 +0.010/+0.003	∅ 50	∅ 75.44	43.4	6x M6
	∅ 55 +0/-0.008	∅ 55 +0.010/+0.002	∅ 55 +0.015/+0.007	∅ 70	∅ 90.53	51.0	6x M6
	∅ 70 +0/-0.008	∅ 70 +0.010/+0.002	∅ 70 +0.019/+0.011	∅ 85	∅ 113.16	62.3	6x M6
	∅ 80 +0/-0.008	∅ 80 +0.010/+0.002	∅ 80 +0.022/+0.014	∅ 95	∅ 128.00	70.1	6x M6
	∅ 105 +0/-0.010	∅ 105 +0.013/+0.003	∅ 105 +0.031/+0.021	∅ 120	∅ 150.88	81.2	6x M6
	∅ 130 +0/-0.012	∅ 120 +0.015/+0.003	∅ 130 +0.041/+0.029	∅ 145	∅ 176.03	93.7	6x M6
	∅ 160 +0/-0.012	∅ 160 +0.015/+0.003	∅ 160 +0.049/+0.037	∅ 175	∅ 213.24	112.3	6x M6
	∅ 180 +0/-0.012	∅ 180 +0.015/+0.003	∅ 180 +0.055/+0.043	∅ 195	∅ 257.50	134.5	6x M6
	∅ 260 +0/-0.016	∅ 260 +0.020/+0.004	∅ 260 +0.082/+0.066	∅ 275	∅ 326.90	169.2	6x M6

# ERM 2203

- Consists of a scanning head and scale drum
- High graduation accuracy
- Small interpolation error
- No reversal error



Scale drum	TTR ERM 2203 Grating period $\approx 200 \mu\text{m}$				
Measuring standard Coefficient of expansion	Steel drum $\alpha_{\text{therm}} \approx 10 \cdot 10^{-6} \text{ K}^{-1}$				
Signal periods	1200	1440	1800	2048	2400
Drum inside diameter*	40 mm	55 mm	70 mm	80 mm	105 mm
Drum outside diameter*	75.44 mm	90.53 mm	113.16 mm	128.75 mm	150.88 mm
Accuracy of graduation	$\pm 6.5''$	$\pm 5.5''$	$\pm 4.5''$	$\pm 4''$	$\pm 3.5''$
Interpolation error per signal period	$\pm 4''$	$\pm 3.5''$	$\pm 3''$	$\pm 2.5''$	$\pm 2''$
Reference mark	One or distance-coded				
Mech. permissible speed	$\leq 19000 \text{ rpm}$	$\leq 18500 \text{ rpm}$	$\leq 14500 \text{ rpm}$	$\leq 13000 \text{ rpm}$	$\leq 10500 \text{ rpm}$
Max. angular acceleration	$27000 \text{ rad/s}^2$	$20000 \text{ rad/s}^2$	$9000 \text{ rad/s}^2$	$6000 \text{ rad/s}^2$	$4900 \text{ rad/s}^2$
Moment of inertia	$0.32 \cdot 10^{-3} \text{ kgm}^2$	$0.63 \cdot 10^{-3} \text{ kgm}^2$	$1.5 \cdot 10^{-3} \text{ kgm}^2$	$2.6 \cdot 10^{-3} \text{ kgm}^2$	$4.4 \cdot 10^{-3} \text{ kgm}^2$
Mass	$\approx 0.35 \text{ kg}$	$\approx 0.44 \text{ kg}$	$\approx 0.69 \text{ kg}$	$\approx 0.89 \text{ kg}$	$\approx 1.0 \text{ kg}$

	2800	3392	4096	5200
	130 mm	160 mm	180 mm	260 mm
	176.03 mm	213.24 mm	257.50 mm	326.90 mm
	±3"	±2.5"	±2"	±1.5"
	±2"	±1.5"	±1.5"	±1"
	≤ 9000 rpm	≤ 7000 rpm	≤ 6000 rpm	≤ 4500 rpm
	3300 rad/s <sup>2</sup>	1900 rad/s <sup>2</sup>	820 rad/s <sup>2</sup>	560 rad/s <sup>2</sup>
	7.4 · 10 <sup>-3</sup> kgm <sup>2</sup>	16 · 10 <sup>-3</sup> kgm <sup>2</sup>	37 · 10 <sup>-3</sup> kgm <sup>2</sup>	76 · 10 <sup>-3</sup> kgm <sup>2</sup>
	≈ 1.2 kg	≈ 1.8 kg	≈ 3.0 kg	≈ 3.5 kg

<b>Scanning head</b>	<b>AK ERM 2283</b>
<b>Interface</b>	$\sim 1 V_{PP}$
Cutoff frequency (-3dB)	$\geq 300$ kHz
Grating period	$\approx 200$ $\mu\text{m}$
<b>Electrical connection</b>	Cable, 1 m, with or without 12-pin M23 coupling (male)
Cable outlet	Tangential, to the left or right
Supply voltage	DC 5 V $\pm 0.5$ V
Current consumption (typical)	$\leq 35$ mA (without load)
Cable length <sup>1)</sup>	$\leq 150$ m
<b>Vibration</b> 55 Hz to 2000 Hz <b>Shock</b> 6 ms <b>Shock</b> 6 ms, with fault exclusion for the loosening of the mechanical connection	$\leq 400$ m/s <sup>2</sup> (EN 60068-2-6) $\leq 1000$ m/s <sup>2</sup> (EN 60068-2-27) $\leq 400$ m/s <sup>2</sup> (EN 60068-2-27)
<b>Operating temperature</b>	-10 °C to 60 °C
<b>Protection class</b> EN 60529	IP67
<b>Mass</b> Scanning head Connecting cable Coupling (M23)	$\approx 30$ g (without cable) $\approx 37$ g/m $\approx 50$ g

<sup>1)</sup> With HEIDENHAIN cable

# 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:

- Brochure: *Modular Angle Encoders with Optical Scanning*
- Brochure: *Interfaces of HEIDENHAIN Encoders*
- Brochure: *Cables and Connectors*

ID 745168

ID 1078628

ID 1206109