



# HEIDENHAIN



Product Information

## **ERA 4480**

Mechanically compatible  
with ERA 180

January 2008

## ERA 4480 – Mechanically Compatible with ERA 180

- Mechanically compatible with ERA 180
- Steel circumferential-scale drum with centering collar
- Optional protective cover



ERA 4480 – Mechanically compatible with ERA 180



ERA 4480 with protective cover –  
Mechanically compatible with ERA 180

ERA 4480 – Mechanically compatible with ERA 180 <sup>1)</sup>								
<b>Incremental signals</b>	~ 1 V <sub>PP</sub>							
Reference mark	One							
Cutoff frequency –3 dB	≥ 350 kHz							
<b>Power supply</b> without load	5 V ± 10%/max. 100 mA							
<b>Electrical connection</b>	Cable, 1 m, with M23 coupling (12-pin)							
<b>Cable length</b>	≤ 150 m (with HEIDENHAIN cable)							
<b>Drum inside diameter*</b>	40 mm	80 mm	120 mm	180 mm	270 mm	425 mm	512 mm	
<b>Drum outside diameter*</b>	76.75 mm	127.64 mm	178.55 mm	254.93 mm	331.31 mm	484.07 mm	560.46 mm	
<b>Line count</b>	6000	10000	14000	20000	26000	38000	44000	
<b>System accuracy<sup>2)</sup></b>	± 7,2"	± 4.3"	± 3.5"	± 3.2"	± 3.0"	± 2.4"	± 2.3"	
<b>Accuracy of the graduation<sup>3)</sup></b>	± 5"	± 3"	± 2.5"			± 2"		
<b>Mech. perm. speed</b>	10000 min <sup>-1</sup>	6250 min <sup>-1</sup>	4500 min <sup>-1</sup>	3250 min <sup>-1</sup>	2500 min <sup>-1</sup>	1800 min <sup>-1</sup>	1500 min <sup>-1</sup>	
<b>Moment of inertia</b> of rotor	0.27 · 10 <sup>-3</sup> kgm <sup>2</sup>	1.9 · 10 <sup>-3</sup> kgm <sup>2</sup>	7.1 · 10 <sup>-3</sup> kgm <sup>2</sup>	28 · 10 <sup>-3</sup> kgm <sup>2</sup>	59 · 10 <sup>-3</sup> kgm <sup>2</sup>	195 · 10 <sup>-3</sup> kgm <sup>2</sup>	258 · 10 <sup>-3</sup> kgm <sup>2</sup>	
<b>Perm. axial movement</b>	≤ ± 0.5 mm (scale drum relative to scanning head)							
<b>Vibration</b> 55 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>	–10 °C to 80 °C (coefficient of expansion of the scale drum approx. 10.5 · 10 <sup>-6</sup> K <sup>-1</sup> )							
<b>Protection*</b> EN 60529								
Without protective cover	IP 00							
With protective cover <sup>4)</sup> and compressed air	IP 40				–			
<b>Weight (approx.)</b>	Scale drum	0.28 kg	0.68 kg	1.2 kg	2.3 kg	2.6 kg	3.8 kg	3.6 kg
	Protective cover	0.15 kg	0.22 kg	0.31 kg	0.33 kg	–		
Scanning head without cable	Approx. 0.080 kg; <i>Scanning head for protective cover</i> : Approx. 0.090 kg							

\* Please indicate when ordering

<sup>1)</sup> 20-µm and 80-µm grating periods on request

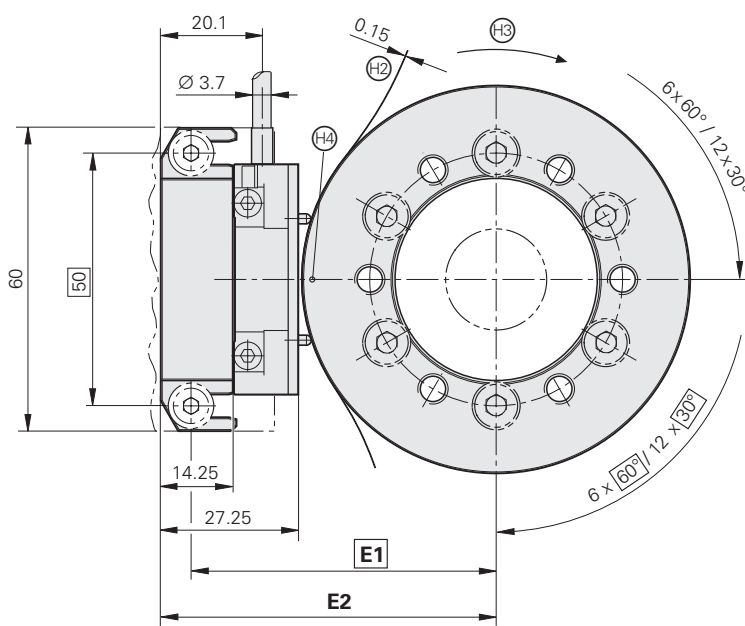
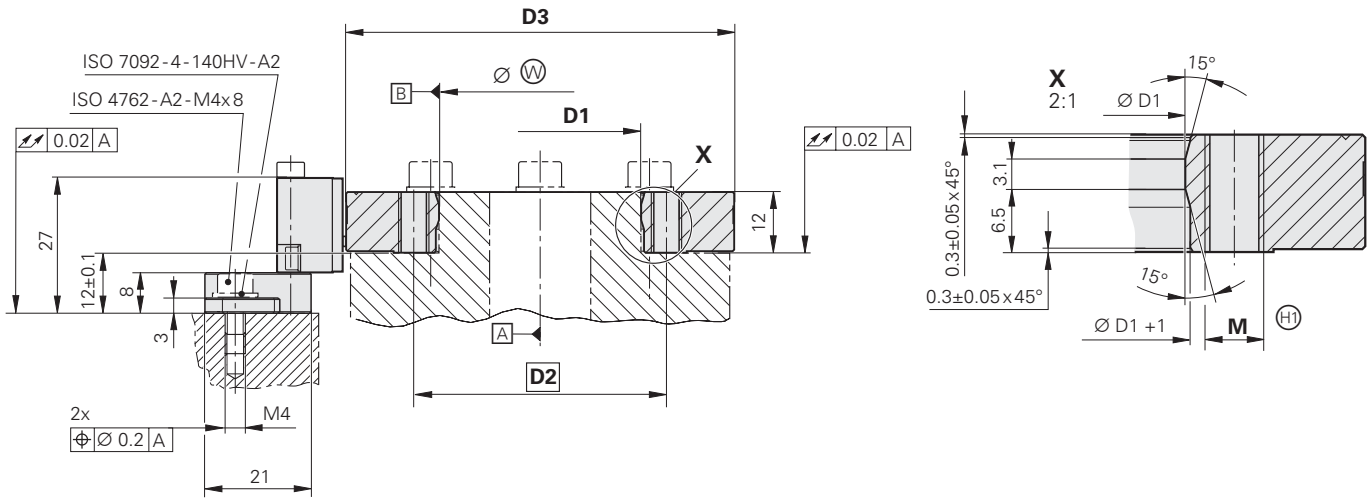
<sup>2)</sup> Without installation. Additional errors caused by mounting inaccuracy and inaccuracy from the bearing of the measured shaft are not included.

<sup>3)</sup> For other errors, see *Angle Encoders without Integral Bearing* brochure

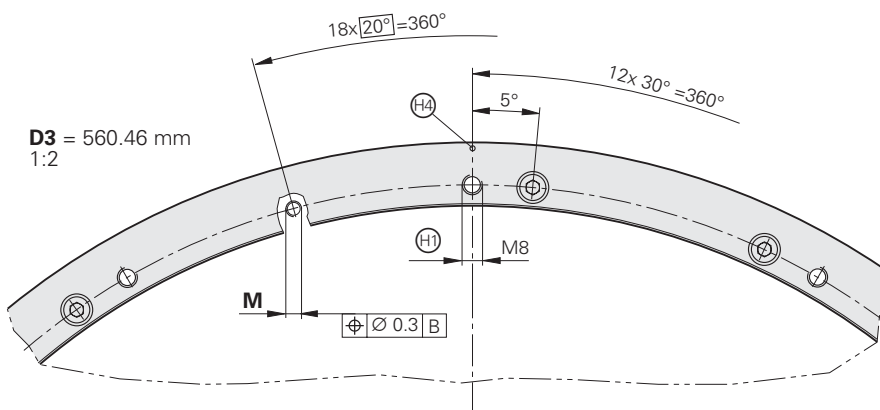
<sup>4)</sup> Please order protective cover separately

# ERA 4480 – Mechanically Compatible with ERA 180

## Scanning Head without Compressed Air Inlet



ISO 7092-5-140HV-A2  
**D3:** Ø 484.07/Ø 560.46 = ISO 7092-6-140HV-A2  
 ISO 4762-A2-M5x20  
**D3:** Ø 484.07/Ø 560.46 = ISO 4762-A2-M6x22



Dimensions in mm

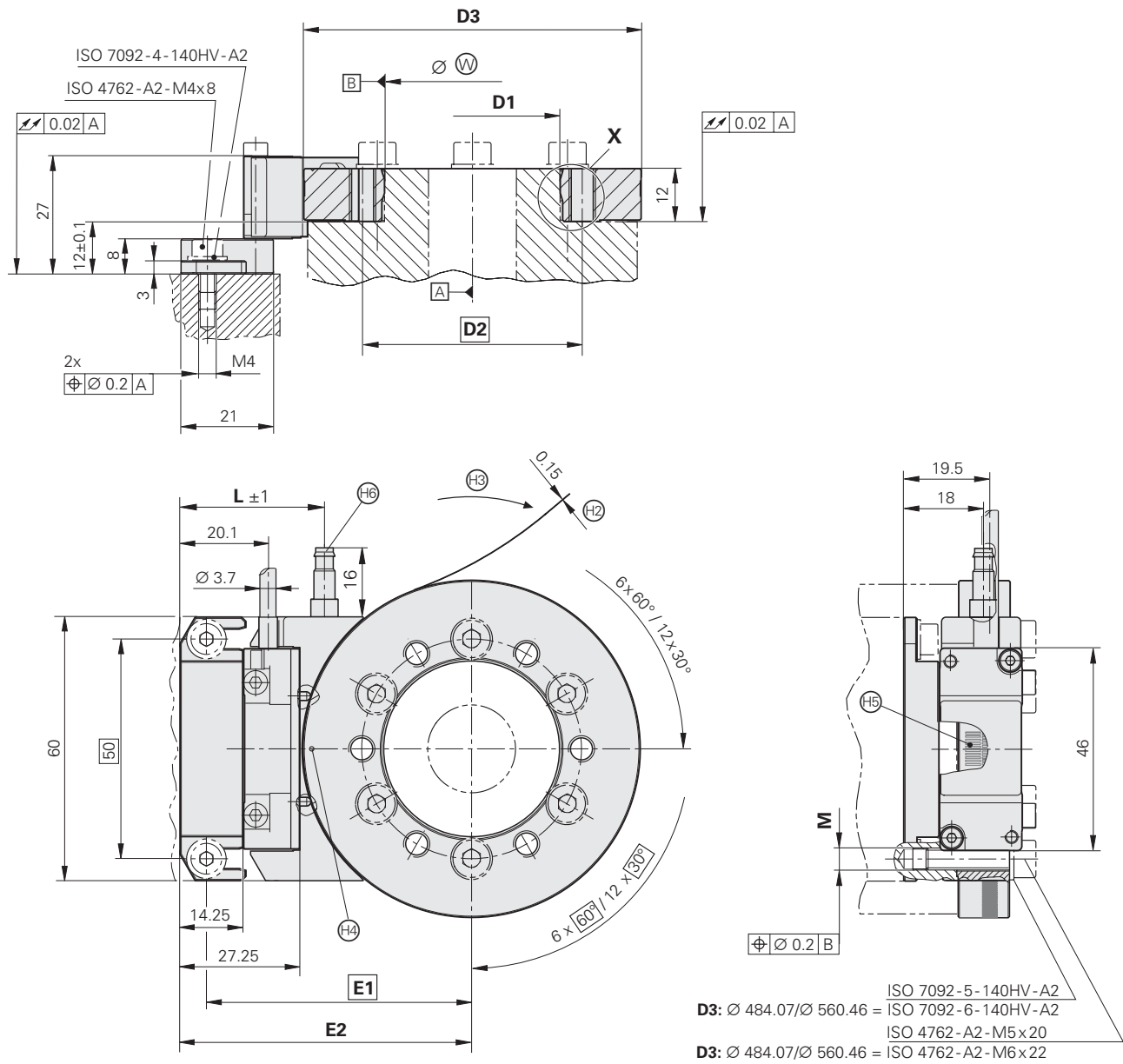


Tolerancing ISO 8015  
 ISO 2768 - m H  
 < 6 mm: ±0.2 mm

- Ⓐ = Bearing
- Ⓢ = Back-off thread
- Ⓜ = Mounting clearance (spacer foil)
- Ⓢ = Positive direction of rotation
- Ⓜ = Marker for reference mark, position tolerance with respect to reference mark ±1.0 mm

- Ⓜ = Scale reference mark
- Ⓜ = Connecting piece for plastic pressure tubing 6 x 1 mm

# Scanning Head with Compressed Air Inlet



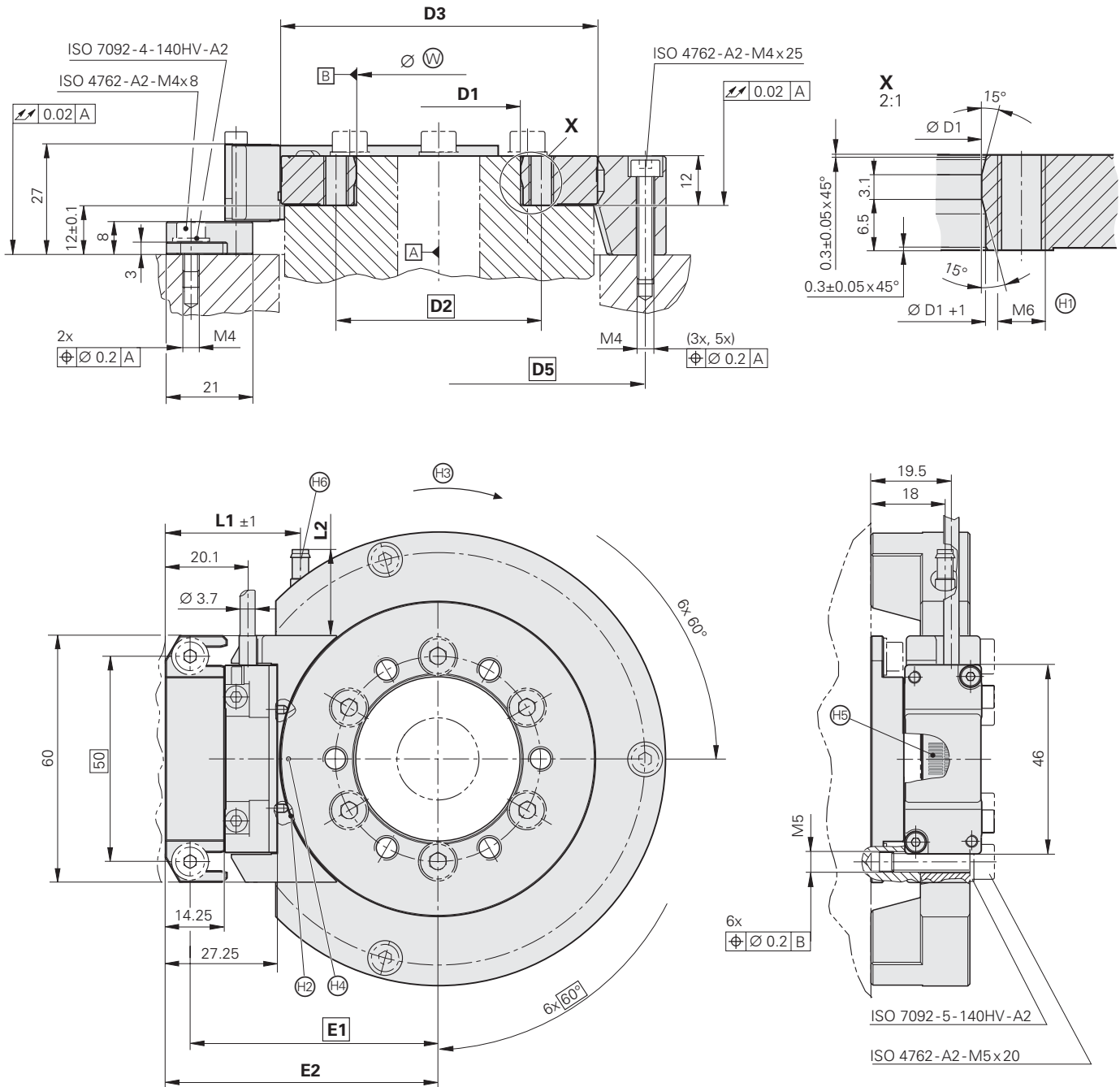
D1	$\varnothing W^{1)}$	$\varnothing W^{2)}$	*)	D2	D3	E1	E2	M	L
$\varnothing 40$ -0.001 -0.005	$\varnothing 40$ +0.004	$\varnothing 40$ +0.009 +0.002	0.001	$\varnothing 50$	$\varnothing 76.75$	60.0	66.5±0.5	6x M5	33.0
$\varnothing 80$ -0.001 -0.005	$\varnothing 80$ +0.006	$\varnothing 80$ +0.013 +0.003	0.0015	$\varnothing 95$	$\varnothing 127.64$	85.0	92.0±0.5	6x M5	29.5
$\varnothing 120$ -0.001 -0.008	$\varnothing 120$ +0.008	$\varnothing 120$ +0.015 +0.003	0.002	$\varnothing 140$	$\varnothing 178.55$	110.0	117.5±0.5	6x M5	28.0
$\varnothing 180$ -0.001 -0.008	$\varnothing 180$ +0.010	$\varnothing 180$ +0.018 +0.004	0.003	$\varnothing 200$	$\varnothing 254.93$	145.0	155.0±0.5	6x M5	27.0
$\varnothing 270$ -0 -0.01	$\varnothing 270$ +0.012	$\varnothing 270$ +0.020 +0.004	0.003	$\varnothing 290$	$\varnothing 331.31$	185.0	194.0±0.5	12x M5	26.0
$\varnothing 425$ -0 -0.01	$\varnothing 425$ +0.015	$\varnothing 425$ +0.020 +0.004	0.006	$\varnothing 445$	$\varnothing 484.07$	262.5	270.0±0.5	12x M6	26.0
$\varnothing 512$ -0 -0.015	$\varnothing 512$ +0.016	$\varnothing 512$ +0.025 +0.005	0.007	$\varnothing 528$	$\varnothing 560.46$	301.0	308.5±0.5	18x M6	26.0

1) Tolerances apply to all newly produced mating shafts

2) Tolerances apply exclusively to replacement of existing ERA 180

\*) Circularity of mating diameter (shaft)

# ERA 4480 – Mechanically Compatible with ERA 180 with Protective Cover



Dimensions in mm

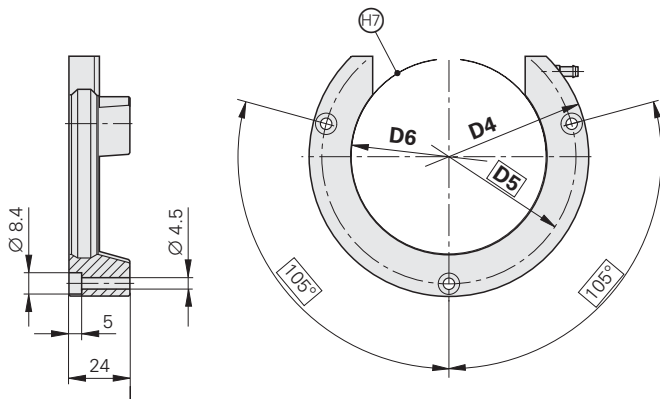


Tolerancing ISO 8015  
ISO 2768 - m H  
< 6 mm: ±0.2 mm

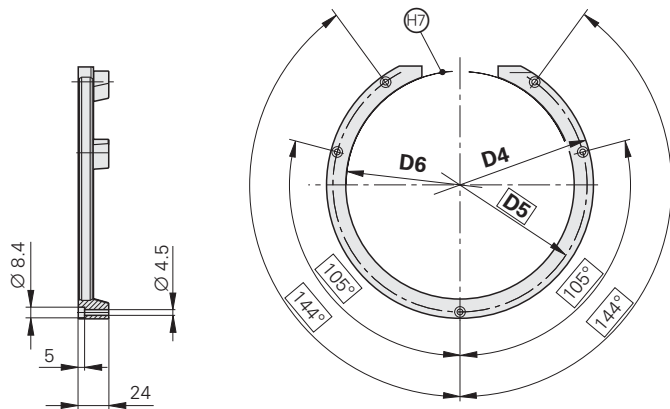
- Ⓐ = Bearing
- Ⓕ = Back-off thread
- Ⓜ = Mounting clearance (spacer foil)
- Ⓝ = Positive direction of rotation
- Ⓢ = Marker for reference mark, position tolerance with respect to reference mark ±1.0 mm

- Ⓣ = Scale reference mark
- Ⓟ = Connecting piece for plastic pressure tubing 6 x 1 mm
- Ⓠ = Mounting clearance of protective cover 0.15 mm

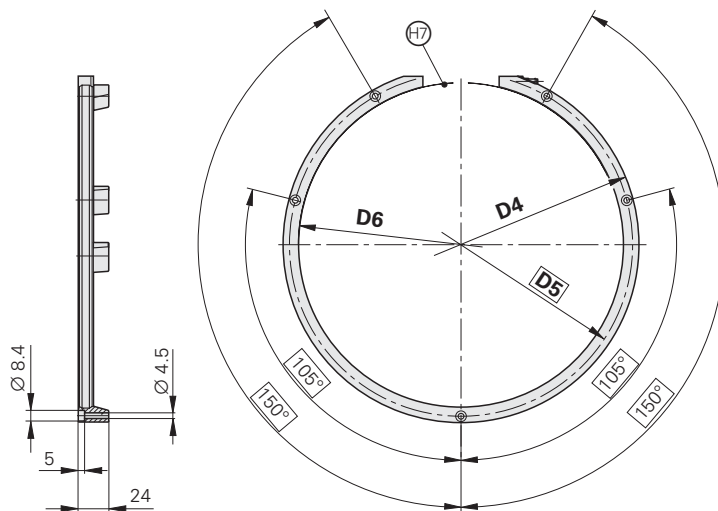
Ⓐ, Ⓑ  
1:2



Ⓒ  
1:4



Ⓓ  
1:4



D1	Ⓜ <sup>1)</sup>	Ⓜ <sup>2)</sup>	*)	D2	D3	E1	E2	L1	L2
Ø 40 -0.001 -0.005	Ø 40 +0.004	Ø 40 +0.009 +0.002	0.001	Ø 50	Ø 76.75	60	66.5±0.5	33.0	20.3
Ø 80 -0.001 -0.005	Ø 80 +0.006	Ø 80 +0.013 +0.003	0.0015	Ø 95	Ø 127.64	85	92.0±0.5	29.5	20.2
Ø 120 -0.001 -0.008	Ø 120 +0.008	Ø 120 +0.015 +0.003	0.002	Ø 140	Ø 178.55	110	117.5±0.5	28.0	20.3
Ø 180 -0.001 -0.008	Ø 180 +0.010	Ø 180 +0.018 +0.004	0.003	Ø 200	Ø 254.93	145	155.5±0.5	27.0	30.7

	D3	D4	D5	D6
Ⓐ	Ø 76.75	Ø 110	Ø 100	Ø 77.2
Ⓑ	Ø 127.64	Ø 160	Ø 150	Ø 128.2
Ⓒ	Ø 178.55	Ø 210	Ø 200	Ø 179.1
Ⓓ	Ø 254.93	Ø 280	Ø 270	Ø 255.6


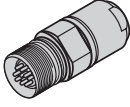
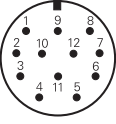

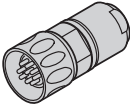
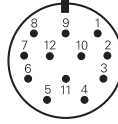


<sup>1)</sup> Tolerances apply to all newly produced mating shafts

<sup>2)</sup> Tolerances apply exclusively to replacement of existing ERA 180

\*) Circularity of mating diameter (shaft)

# Electrical Connection

## Pin layout







12-pin M23 coupling					12-pin M23 connector								
													
	Power supply				Incremental signals						Other signals		
	<b>12</b>	<b>2</b>	<b>10</b>	<b>11</b>	<b>5</b>	<b>6</b>	<b>8</b>	<b>1</b>	<b>3</b>	<b>4</b>	<b>9</b>	<b>7</b>	<b>/</b>
	<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** is on housing; **U<sub>P</sub>** = power supply

**Sensor:** The sensor line is connected internally to the respective power supply

Vacant pins or wires must not be used!

## Connecting cable

		12-pin M23
<b>PUR connecting cables</b>	<b>12-pin:</b> [4(2 × 0.14 mm <sup>2</sup> ) + (4 × 0.5 mm <sup>2</sup> )]	<b>Ø 8 mm</b>
<b>Complete</b> with connector (female) and coupling (male)		298401-xx
<b>Complete</b> with connector (female) and connector (male)		298399-xx
<b>Complete</b> with connector (female) and D-sub connector (female) for IK 220		310199-xx
<b>Complete</b> with connector (female) and D-sub connector (male) for IK 115/IK 215		310196-xx
<b>With one connector</b> (female)		309777-xx
<b>Cable without connectors</b> , Ø 8 mm		244957-01

# HEIDENHAIN

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### For more information

- Brochure: *Angle Encoders without Integral Bearing*

