HEIDENHAIN

Product Information

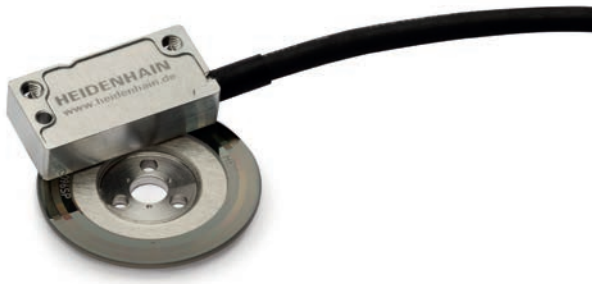
ERO 2000 Series

Angle Encoders
without Integral Bearing

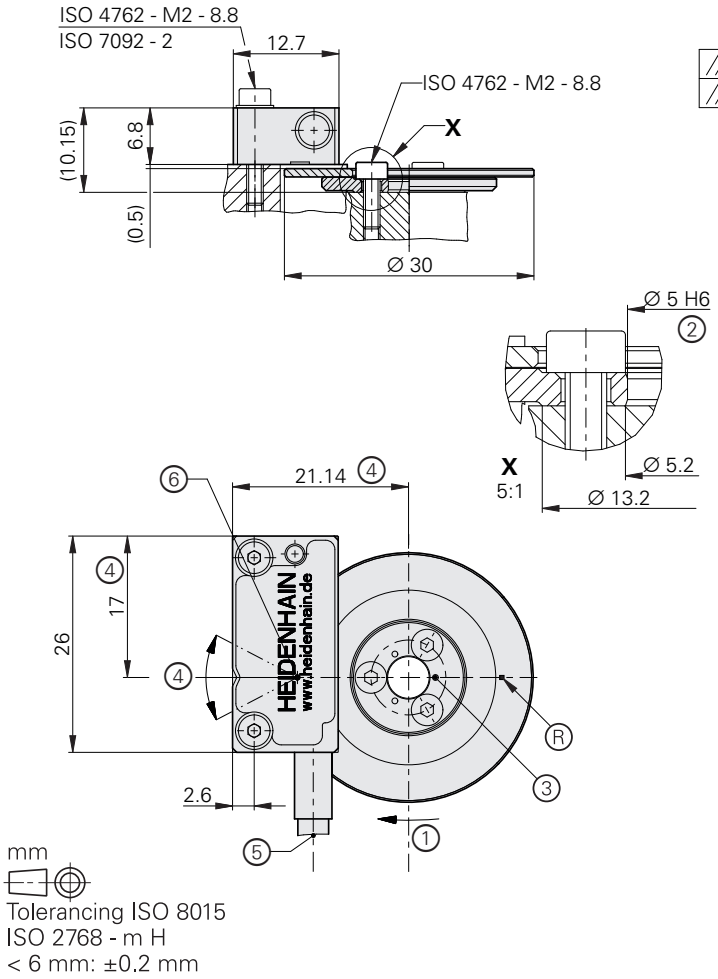
03/2020

ERO 2000 series

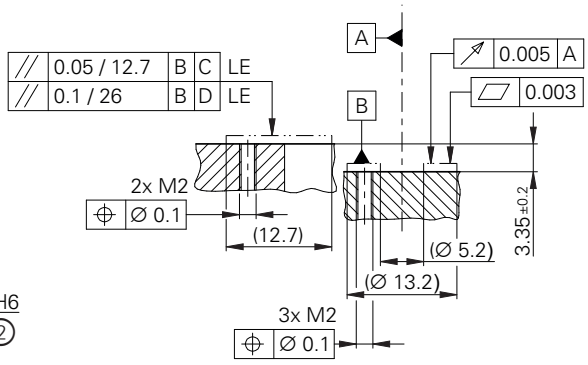
- **High resolution and accuracy**
- **Low mass and low mass moment of inertia**
- **Consisting of AK scanning head and TKN circular scale**

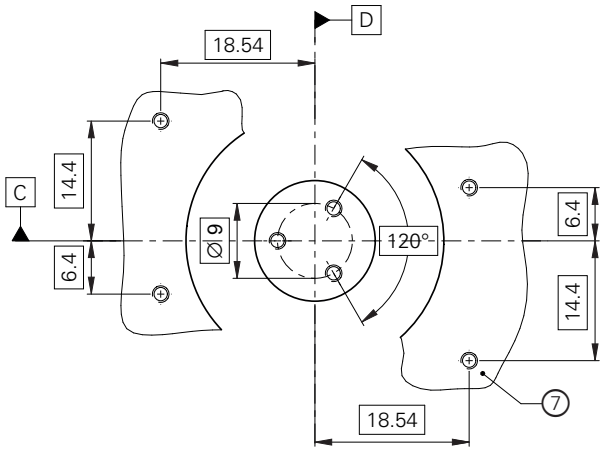


Graduation carrier Ø 30 mm



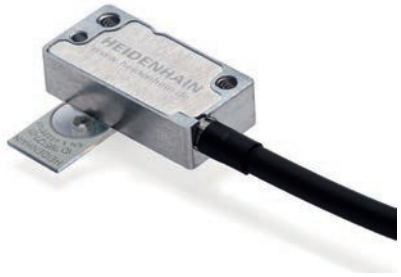
Required mating dimensions





⍓ = Bearing
Ⓡ = Reference mark
1 = Positive direction of rotation
2 = Centering collar
3 = Marks for circular scale centering (3x 120°)
4 = Fine adjustment of the scanning head for obtaining optimal incremental signals
5 = Alternative cable outlet and connector are available
6 = Optical center point
7 = For centering of circular scale with two scanning heads

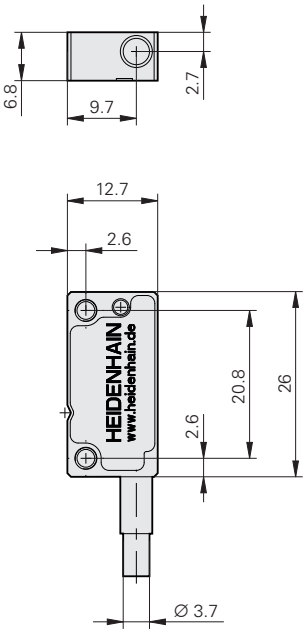
LE = Line element (ISO 1101: 2008)



Graduation carrier Ø 18.6 mm

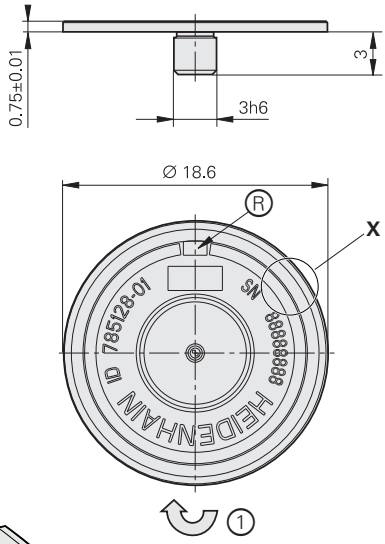
Graduation carrier 18.6 mm x 9 mm

AK ERO 20x0



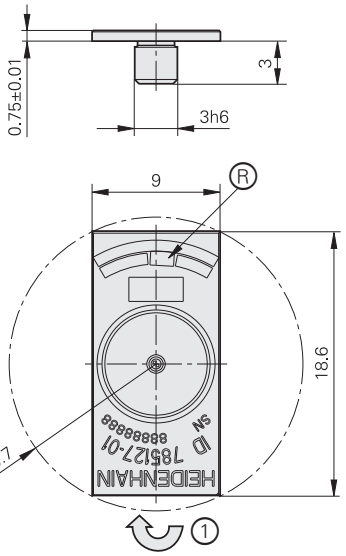
TKN ERO 2000

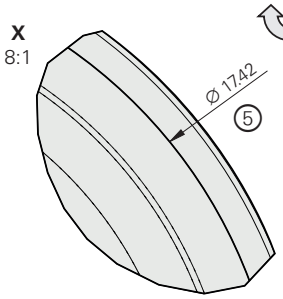
2:1

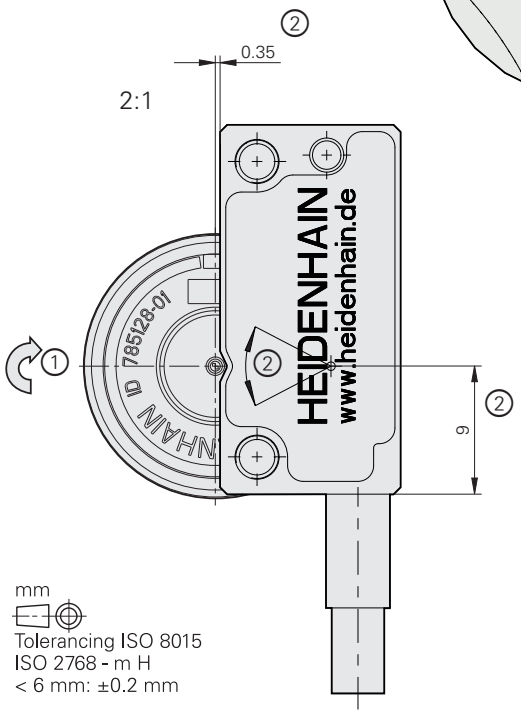


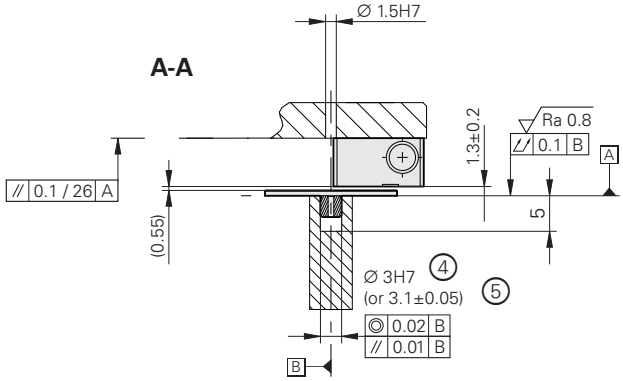
TKN ERO 2002

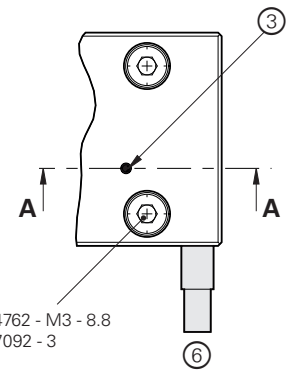
2:1











mm

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

B = Bearing
R = Position of the reference mark
1 = Direction of shaft rotation for ascending position values
2 = Fine adjustment of the scanning head for optimal incremental signals
3 = Cylindrical pin for positioning and Moiré adjustment (must be removed after positioning)
4 = Dimension for alignment of the circular scale by means of the centering pin of the graduated disk
5 = Dimension for mounting the graduated disk by means of optical alignment;
do not use the outer glass edge of the graduated disk
6 = Alternative cable outlet and connector are available

Specifications

Scanning head		**AK ERO 2080**
Interface		∿ 1 V_{PP}
Reference mark signal		Square-wave pulse
Cutoff frequency –3 dB[1)]		≥ 1 MHz
Electrical connection*		15-pin D-sub connector (male) with 0.5 m/1 m/1.5 m/3 m cable 12-pin SHR-12V-S connector (female) with 0.5 m/1 m/1.5 m/3 m cable Cable outlet on the left or right and straight or angled
Cable length		With HEIDENHAIN cable: ≤ 20 m; during signal adjustment with the PWM 21: ≤ 3 m
Supply voltage		DC 5 V ±0.5 V
Current consumption		≤ 150 mA (without load)
Vibration 55 Hz to 2000 Hz **Shock** 6 ms		≤ 500 m/s^2 (EN 60068-2-6) ≤ 1000 m/s^2 (EN 60068-2-27)
Operating temperature		–10 °C to 70 °C
Protection		IP50
Mass	Scanning head Connector Cable	≈ 5 g (without cable) ≈ 71 g ≈ 22 g/m

***** Please select when ordering
1) Maximum frequency during referencing: 500 kHz

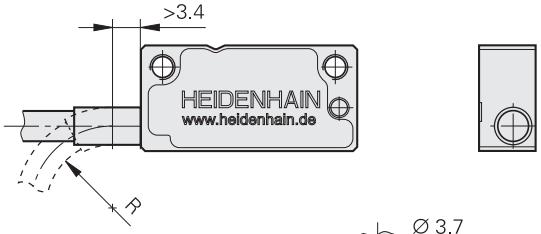
Circular scale	TKN ERO 2000 (full circle)		TKN ERO 2002[3] (segment)	
Measuring standard	SUPRADUR graduation on glass			
Measuring range	360°		45°	
Signal periods	4096	2500[3]	2500 over 360°	
Accuracy of graduation[1]	±8″	±10″	–	
Interpolation error[2]	±0.3″	±0.5″	±0.5″	
Position noise RMS (1 MHz)	0.03″	0.04″	0.04″	
Reference marks	One		One	One on every side
Hub inside diameter	5 mm	–	–	
Dimensions of graduation carrier	∅ 30 mm	∅ 18.6 mm	18.6 mm x 9 mm	
Centering pin	–	3 mm	3 mm	
Mech. permissible shaft speed	≤ 14 000 rpm			
Moment of inertia	$4.1 \cdot 10^{-7}$ kgm^2	$2.2 \cdot 10^{-8}$ kgm^2	$1.1 \cdot 10^{-8}$ kgm^2	
Protection EN 60529	Complete, mounted encoder: IP00			
Mass	≈ 5.2 g	≈ 0.56 g	≈ 0.36 g	

1) When centered with two scanning heads
2) The position error within one signal period and the graduation accuracy together yield the encoder-specific error; for additional mounting and bearing errors of the measured shaft, see *Measuring accuracy* in the *Modular Angle Encoders With Optical Scanning* brochure
3) Available as a prototype; orderable only after consultation

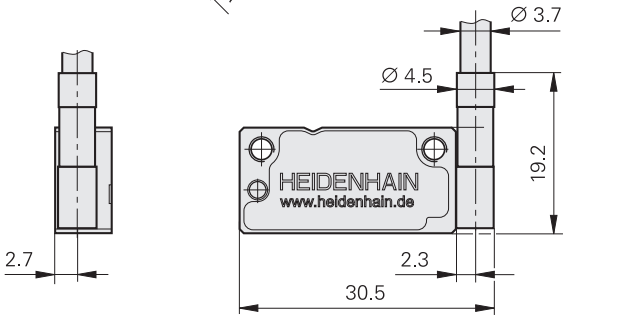
Cable outlets

Cable outlet on the right

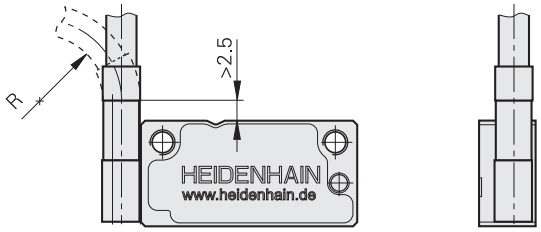
Cable outlet on the left



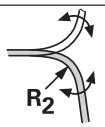
Cable outlet on the right at angle of 0°



Cable outlet on the left at angle of 0°

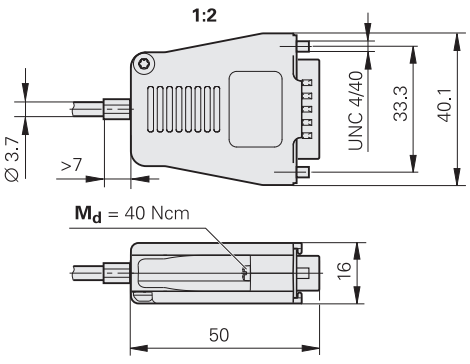


Cable bend radius **R**

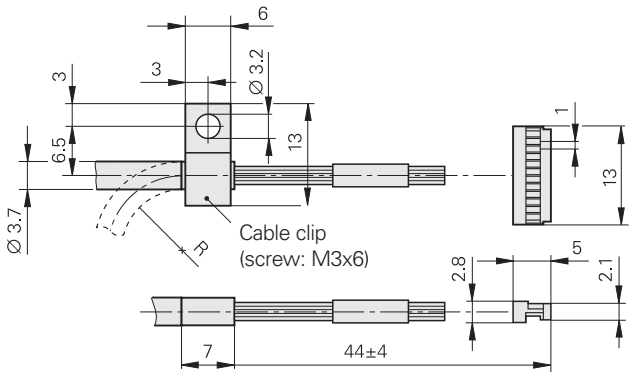
Ø 3.7 mm R_1 ≥ 8 mm R_2 ≥ 40 mm		

Connectors

D-sub ~ 1 V_{PP}



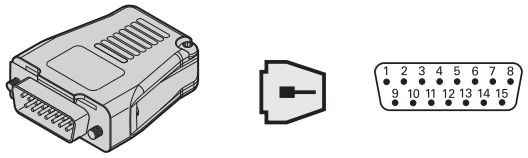
SHR-12V-S ~ 1 V_{PP}



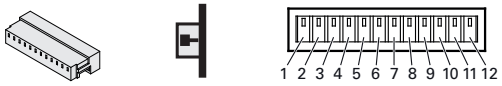
Electrical connection

Pin layout

15-pin D-sub connector (male)



12-pin SHR-12V-S connector (female)



	Power supply				Incremental signals						Other signals		
	4	**12**	**2**	**10**	**1**	**9**	**3**	**11**	**14**	**7**	**13**	**15**	**5/6/8**
	1	**–**	**2**	**–**	**3**	**4**	**6**	**5**	**8**	**7**	**9**	**11**	**12/10**
1 V_{PP}	**U_P**	**Sensor** U_P	**0 V**	**Sensor** 0 V	**A+**	**A–**	**B+**	**B–**	**R+**	**R–**	**Vacant**[1)]	**Vacant**[1)]	**Vacant**
	Brown/ Green	/	White/ Green	/	Brown	Green	Gray	Pink	Red	Black	Violet	Yellow	/

Shield on housing; **U_P** = Power supply voltage
Sensor: The sense line is connected in the connector with the corresponding power line.
Vacant pins or wires must not be used.
[1)] Required for signal adjustment with the PWM 21

Adapter cables and connecting cables

PUR 6 x (2 x 0.19 mm²); A_P = 2 x 0.19 mm²			
PUR 4 x (2 x 0.16 mm²) + (4 x 0.5 mm²); A_P = 2 x 0.5 mm²		Ø 8 mm	Ø 6 mm[1]
Adapter cable with 15-pin D-sub connector (female) and 12-pin M23 connector (male)		331693-xx	355215-xx
Adapter cable with 15-pin D-sub connector (female) and 15-pin D-sub connector (male)		335074-xx	355186-xx
Connecting cable with 15-pin D-sub connector (female) and stripped cable end		332433-xx	355209-xx
Connecting cable with 15-pin D-sub connector (female) and 15-pin D-sub connector (female) with pin layout for the IK 220		335077-xx	349687-xx
Signal cable with stripped cable ends (15-pin)[2]		816317-xx	816323-xx

1) Cable length for Ø 6 mm: max. 9 m
2) Cable design: 4 x (2 x 0.14 mm²) + (4 x 0.5 mm²)

A_P: Cross section of supply lines

Accessory

Adapter connector from SHR-12V-S to D-sub for signal adjustment with the PWM 21
ID 1234385-01

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 and intended operation of the encoder:

- Brochure: *Modular Angle Encoders With Optical Scanning* 1222041-xx
- Brochure: *Interfaces of HEIDENHAIN Encoders* 1078628-xx
- Brochure: *Cables and Connectors* 1206103-xx

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