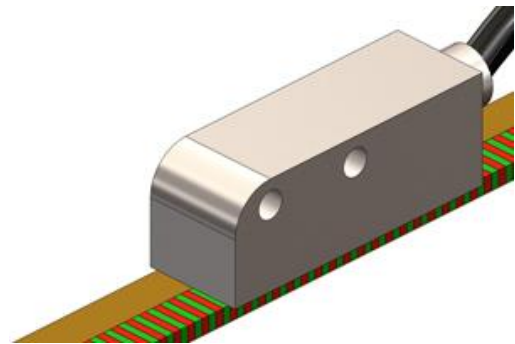# Datasheet

- small design: 12 x 13 x 35 mm
- stainless steel case
- resolution up to 0,5 µm; hysteresis ± 1µm
- pole pitch:1; 2 mm
- output signal: Digital (TTL-RS422) or analog (1 Vpp)
- direct connection to control / display
- issue of reference and index signals
- easy installation in longitudinal or transverse position (through hole or thread M4)
- Distance Sensor - Magnetic Scale < 0,8 mm
- Movement Speed up to 20 m/s
- IP-Rating: IP67

Mechanical Data

Dimension	12 x 13 x 35 mm	
Material		
Housing	Stainless Steel	
Cable	PUR	
Weight		
Sensor	~14 g	
System Accuracy	max. ±5 µm	
	EHP1 and EHP1/90	**EHP2 and EHP2/90**
Resolution (TTL-Variant)	10 µm / 5 µm / 2 µm / 1 µm / 0,5 µm	10 µm / 5 µm/ 2 µm / 1 µm on request
Interpolation Accuracy	typ. ± 1,5 µm < ± 2 µm	typ. ± 3,5 µm < ± 4 µm
Fitting Tape	PM1	PM2
Wavelength	λ= 1 mm	λ= 2 mm
Distance Sensor - Magnetic Scale without Cover Tape with Cover Tape	0,01 up to 0,35 mm max. 0,2 mm	0,01 up to 1,2 mm max. 1,1 mm
Movement Speed digital analog	the max. Travel speed is related to the resolution and edge separation. (see table) max. 10 m/s	
Operating Temperature	-20 °C up to +80 °C	
Humidity	<90% not condensing	
Cable	8-wire cable; twisted pair and shielded	
Connector	open standard Sub-D; 9-polig optional M12; 8-polig optional further connectors on request	
Shock rating EN60068-2-27	100 g/ 6 ms	
Continuous shock EN 60068-2-29	100 g/ 2 ms	
Vibration load EN 60068-2-6	12 g, 10 … 2.000 Hz	
IP-Rating	IP67	

* The subsequent electronics (control; display) has the edge distance of at least 120 ns (= 0,12µm) can safely count on optimal performance. (Note counting frequency of the controller!)
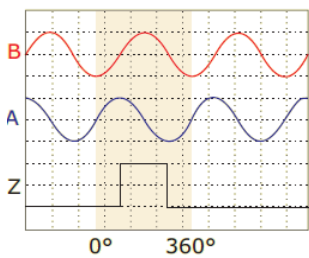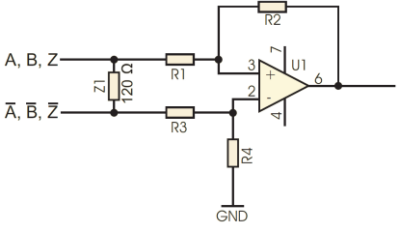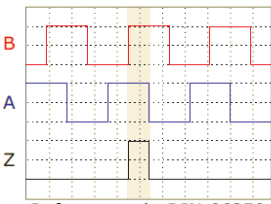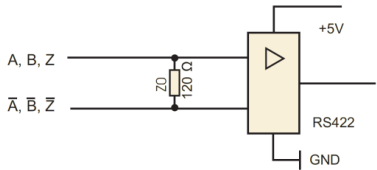
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Datasheet

Electrical Data

Power Supply	5V ±5%
Consumption (without circuitry of subsequent electronics)	typ. 35 mA max. 50 mA
Reference Signal	without fix periodically
Hysteresis	≤ 2 µm (distance-dependent)
Linearity Deviation by the Evaluation	≤ ±2 µm
External magnetic fields	< 30 mT to permanent damage to avoid <1 mT not to influence measurement
Analog (Sinus-Cousins signal)	**Vpp**
Signal Level (A; B;Z)	0,6 Vpp - 1,2 Vpp typ. 1,1 Vpp
Signal Ratio (A/B)	0,8 - 1,25
Phase Angle	90° ±0,1° el.
THD*	max. 0,1% EHP1
Signal Period (A; B)	1000 µm EHP1 2000 µm EHP2
Digital (Square Wave Signal)	**TTL**
Signal Level	RS422
Output	LineDriver
Square Wave Signal	DIN 66259
Phase Angle (A-B)	90°
Terminator	120 Ω
Edge Separation	the edge spacing is related to the resolution and the max. Traversing. (see table)

* In the variant EHP1 is when using the magnetic tape measures the number Permagnet® no hysteresis (backlash) exists. Connected to the extremely small total harmonic distortion (typ. Max. 0.1%) of the signals, this allows a perfect control performance in highly dynamic Positionierprozessen (eg for direct drives).

Output Signal

Analog (Vpp)

**recommended circuitry of subsequent electronics:**

Digital (TTL)

reference point DIN 66259

reference point DIN 66259

recommended circuitry of subsequent electronics:

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Relationship between edge distance and travel speed

On the basis of two possible methods to explain the tables:

- The determination of a suitable EHPx system with an existing control.

  ➔ **edge spacing:** min. 1 µs (=1000 ns)

  ➔ *speed:* max. 2 m/s

  ➔ **pole pitch**: 1 mm (=EHP1)

  ⇒ A glance at the table EHP1 enough and you read out of the line at **1000 ns**, the resolution 5 µm as the best possible resolution for this constellation.

- the determination of the required counter frequency, required for the future control.

  ➔ **resolution**: 1 µm

  ➔ *speed*: max. 5 m/s

  ➔ **pole pich**: 1 mm (=EHP1)

  ⇒ A glance at the table EHP1 enough and you will see that the control of a min. edge separation of 120 ns should (about 8.3 MHz) are safe.
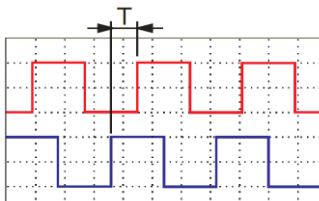
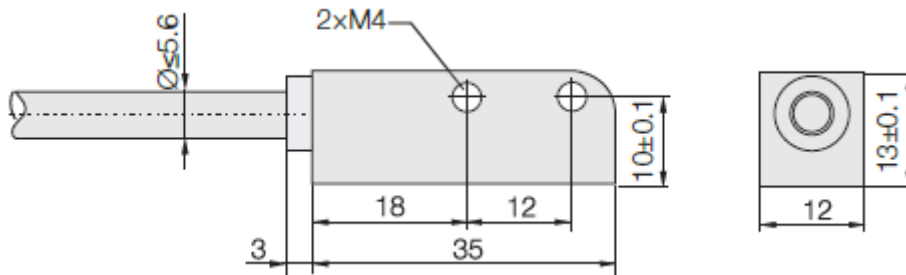T is the time interval between a signal transition to the next.

Min Edge Separation T		accord counter frequency	EHP1 + EHP1/90			
			0,5 µm	1 µm	5 µm	10 µm
0,12 µs	120 ns	~ 8,30 MHz	2,500 m/s	5,00 m/s	10,00 m/s	10,00 m/s
0,29 µs	290 ns	~ 3,40 MHz	1,000 m/s	2,00 m/s	10,00 m/s	10,00 m/s
0,48 µs	480 ns	~ 2,10 MHz	0,600 m/s	1,20 m/s	6,00 m/s	6,00 m/s
0,68 µs	680 ns	~ 1,50 MHz	0,400 m/s	0,90 m/s	4,50 m/s	4,50 m/s
0,80 µs	800 ns	1,25 MHz	0,400 m/s	0,80 m/s	4,00 m/s	4,00 m/s
1,00 µs	1000 ns	1,00 MHz	0,250 m/s	0,55 m/s	2,80 m/s	2,80 m/s
1,50 µs	1500 ns	~ 670,00 KHz	0,200 m/s	0,40 m/s	2,00 m/s	2,00 m/s
2,00 µs	2000 ns	500,00 KHz	0,150 m/s	0,30 m/s	1,50 m/s	1,50 m/s
4,00 µs	4000 ns	250,00 KHz	0,075 m/s	0,15 m/s	0,75 m/s	0,75 m/s
10,00 µs	10000 ns	100,00 KHz	0,030 m/s	0,06 m/s	0,30 m/s	0,30 m/s

Min Edge Separation T		accord counter frequency	EHP2 + EHP02/90			
			1 µm	2 µm	5 µm	10 µm
0,12 µs	120 ns	~ 8,30 MHz	5,00 m/s	10,00 m/s	10,00 m/s	10,0 m/s
0,29 µs	290 ns	~ 3,40 MHz	2,00 m/s	4,00 m/s	10,00 m/s	10,0 m/s
0,48 µs	480 ns	~ 2,10 MHz	1,20 m/s	2,40 m/s	6,00 m/s	10,0 m/s
0,68 µs	680 ns	~ 1,50 MHz	0,80 m/s	1,80 m/s	4,50 m/s	9,0 m/s
0,80 µs	800 ns	1,25 MHz	0,80 m/s	1,60 m/s	4,00 m/s	8,0 m/s
1,00 µs	1000 ns	1,00 MHz	0,50 m/s	1,20 m/s	2,80 m/s	5,8 m/s
1,50 µs	1500 ns	~ 670,00 KHz	0,40 m/s	0,80 m/s	2,00 m/s	4,0 m/s
2,00 µs	2000 ns	500,00 KHz	0,30 m/s	0,60 m/s	1,50 m/s	3,0 m/s
4,00 µs	4000 ns	250,00 KHz	0,15 m/s	0,30 m/s	0,75 m/s	1,5 m/s
10,00 µs	10000 ns	100,00 KHz	0,06 m/s	0,12 m/s	0,30 m/s	0,6 m/s

For digital models more values are available on request
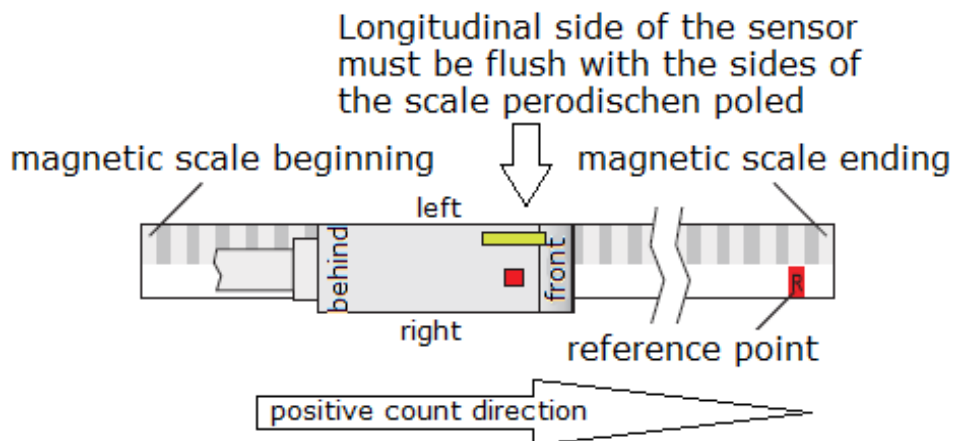
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Messtechnik eK

Dimensions

Mounting Position

EHP

Longitudinal side of the sensor
must be flush with the sides of
the scale perodischen poled

magnetic scale beginning   magnetic scale ending

left

behind

front

right

reference point

positive count direction

EHP/90

End side of the sensor must be
flush with the edge of the scale

magnetic scale beginning   magnetic scale ending

front

left   right   reference point

behind

positive count direction

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Magnetic Sensor - Incremental
EHP

Datasheet

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Ordering Code

| Type | | | | | EHP1 | - | 0 | - | 1 | - | I | - | TTL | - | 1,0/C08 | - | 5 | - | 120 |

pole Pitch
1 / 2

Mounting Position
0   = 0° (along the magnetic scale)
90   =90°(transversely to the magnetic scale)

Resolution [µm]*
0,5 / **1** / 2 / 5 / 10

Reference Signal
S   = reference signal
I   = reference signal periodically
0   = without reference signal

Output Signal
TTL   = digital
Vpp   = analog

Vable Length [m]
0,2 / 0,5 / **1,0** / 2,0 / 5,0 /

/Connector
C08   = M12; 8-pin
SUBD9 = Sub-D; 9-pin
O   = open cable

Power Supply
5   = 5 VDC

Limited Edition Edge Separation [ns]**
 See table

*further on request
**specify when output TTL (digital)

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