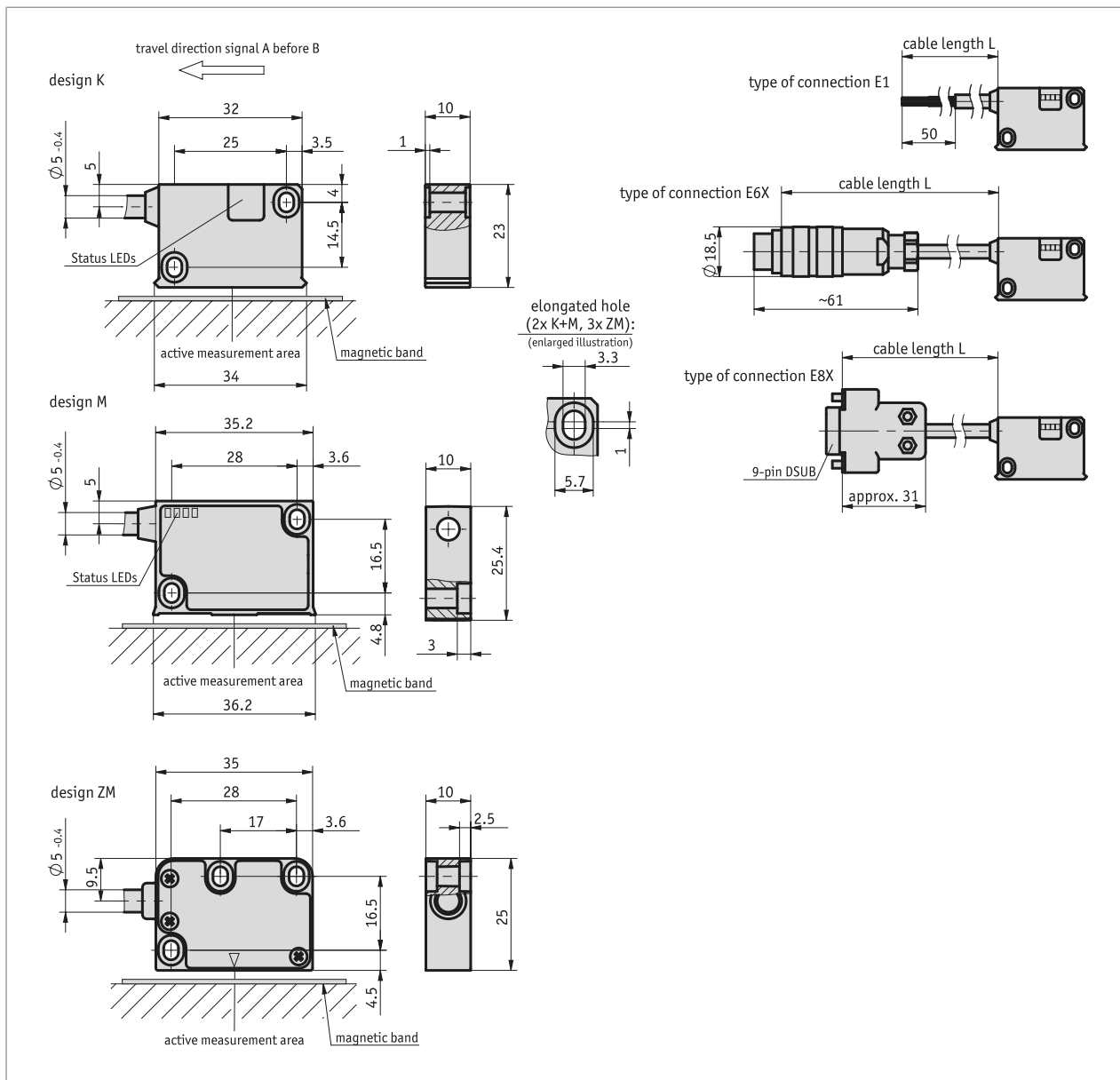
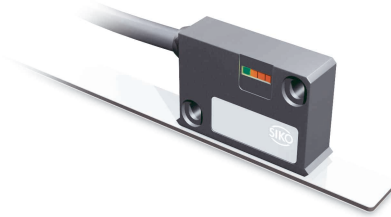


Profile

- max. resolution 1 μm
- Repeat accuracy $\pm 0.01\text{ mm}$
- Repeat accuracy ± 1 increment
- LED status display
- Works with magnetic tape MB500/1, magnetic ring MR500, magnetic band ring MBR500
- Reading distance $\leq 2\text{ mm}$
- max. 200000 pulses/revolution in conjunction with MR500 or MBR500 (160 poles)
- optionally with reference point R or flexible reference marks FR



Mechanical data

Feature	Technical data	Additional information
Housing	black plastic	K design
	zinc die-cast/aluminum	M design: aluminum front cover
	zinc die-cast	ZM design
Sensor/band reading distance	0.1 ... 2 mm	O, I reference signals
	0.1 ... 1.5 mm	R reference signal
	0.4 ... 1 mm	FR reference signal
Sensor/ring reading distance	0.1 ... 2 mm	O, I reference signals
	0.1 ... 1.5 mm	R reference signal
Cable sheath	PUR, suitable for drag-chain use	6, 8-core ø5 _{-0.4} mm
Cable bending radius	5x cable diameter	static
	7.5x cable diameter	dynamic
Service life of cable	>5 Million cycles	Under the following test conditions: travel 4.5 m travel speed 3 m/s acceleration 5 m/s ² ambient temperature 20 °C ±5 °C.

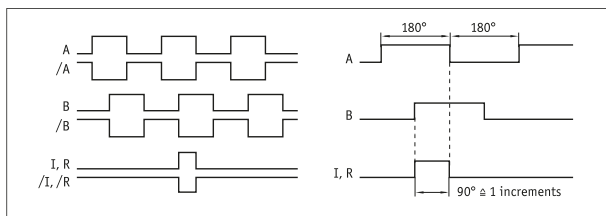
Travel/circumferential speed

Resolution/ Scaling factor	Travel/circumferential speed Vmax [m/s]										
	0.001/1	4.00	3.20	1.60	0.80	0.32	0.20	0.10	0.05	0.03	0.01
0.005/1	20.00	16.00	8.00	4.00	1.60	1.00	0.50	0.25	0.13	0.06	
0.01/1	25.00	25.00	16.00	8.00	3.20	2.00	1.00	0.50	0.25	0.12	
0.025/1	25.00	25.00	25.00	20.00	8.00	5.00	2.50	1.25	0.63	0.30	
0.05/2	25.00	25.00	25.00	25.00	16.00	10.00	5.00	2.50	1.25	0.61	
0.1/12	25.00	25.00	25.00	25.00	25.00	20.00	10.00	5.00	2.50	1.21	
Pulse interval [μs]	0.20	0.25	0.50	1.00	2.50	4.00	8.00	16.00	32.00	66.00	
Counting frequency [kHz]	1250.00	1000.00	500.00	250.00	100.00	62.50	31.25	15.63	7.81	3.79	

Electrical data

Feature	Technical data	Additional information
Operating voltage	6.5 ... 30 V DC	reverse polarity protection
	4.75 ... 6 V DC	no reverse polarity protection
	5 ... 30 V DC	no reverse polarity protection
Current consumption	<25 mA at 24 V DC	unloaded
	<75 mA	loaded
Output circuit	PP, LD (RS422)	
Output signals	A, /A, B, /B, I, /I, R, /R, FR, /FR	
Output signal level high	>UB -2.5 V	PP
	>2.5 V	LD
Output signal level low	<0.8 V	
Latency	1.5 μs	
Pulse width of reference signal	1 or 4 increment(s)	
Real-time requirement	speed-proportional signal output	
Type of connection	open cable end	
	plug connector	7/8-pole
	D-SUB	9-pole

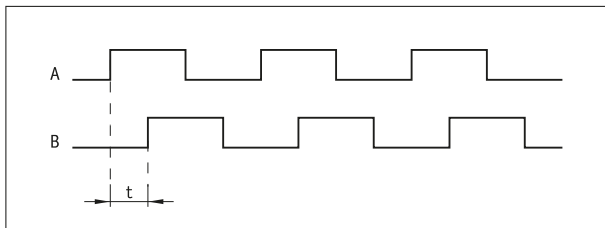
Signal image



! The logical condition of signals A and B is not defined in reference to the index signal I or the reference signal R. It can deviate from the signal form.

! Reference or index signal with 4 increments (360°) signal length is only valid from the 5th counting step onwards. A corresponding delay should be taken into consideration after switching on the operating voltage.

■ Pulse interval, LD output circuit



Example: Pulse interval $t = 1 \mu\text{s}$

(i. e., the downstream unit must be able to process 250 kHz)

$$\text{Formula for counting frequency} = \frac{1}{1 \mu\text{s} \times 4} = 250 \text{ kHz}$$

System data

Feature	Technical data	Additional information
Resolution	0.001, 0.005, 0.01, 0.025, 0.05, 0.1 mm	
Scaling factor	12.5, 25, 50, 125, 250, 1250	
Linearity deviation	$\pm 20 \mu\text{m}$ at $T_U = 20^\circ \text{C}$	1 mm sensor/strip reading distance
Repeat accuracy	$\pm 10 \mu\text{m}$	
Measuring range	∞	
Circumferential speed	Dependent on resolution and pulse interval	see table
Travel speed	Dependent on resolution and pulse interval	see table

Ambient conditions

Feature	Technical data	Additional information
Ambient temperature	$-10 \dots 70^\circ \text{C}$	
Storage temperature	$-30 \dots 80^\circ \text{C}$	
Relative humidity	100 %	condensation admissible
EMC	EN 61000-6-2	interference resistance / immission
	EN 61000-6-4	emitted interference / emission
Protection category	IP67	EN 60529
Shock resistance	500 m/s^2 , 11 ms	EN 60068-2-27
Vibration resistance	$<100 \text{ m/s}^2$, 5 ... 150 Hz	EN 60068-2-6

pin assignment

■ Inverted without reference signal

Signal	E1	E6X	E8X
A	red	1	1
B	orange	2	2
nc		3	3
+UB	brown	4	4
GND	black	5	5
/A	yellow	6	6
/B	green	7	7
nc			8
nc			9

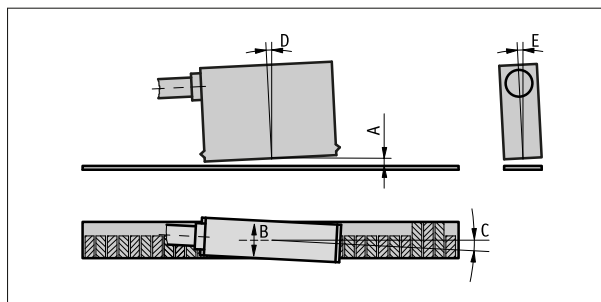
■ Inverted with reference signal

Signal	E1	E6X	E8X
A	red	1	1
B	orange	2	2
I,R	blue	3	3
+UB	brown	4	4
GND	black	5	5
/A	yellow	6	6
/B	green	7	7
/I, /R	violet	8	8
nc			9

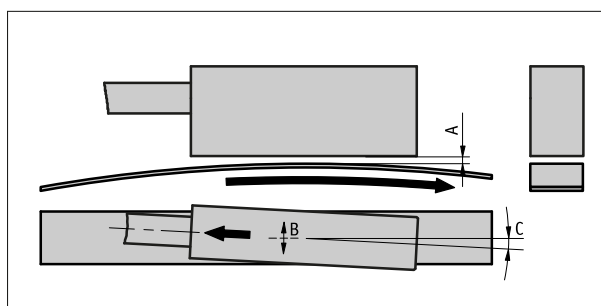
Hint for mounting

For systems with reference points on the magnetic tape please take care that sensor and strip are correctly aligned (see picture).

Reference signal	O, I	R	FR
A, Sensor/tape reading distance	≤2 mm	≤1.5 mm	0.4 ... 1.0 mm
B, Lateral offset	±2 mm	±0.5 mm	±0.5 mm
C, Alignment error	±3°	±3°	±3°
D, Longitudinal inclination	±1°	±1°	±1°
E, Lateral inclination	±3°	±3°	±3°



Symbolic representation



Symbolic representation

Order

■ Ordering information

One or more system components are required:

Magnetic tape MB500/1
Magnetic ring MR500
Magnetic band ring MBR500

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■ Ordering table

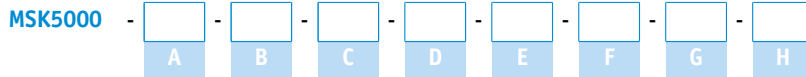
Feature	Ordering data	Spezifikation	Additional information
Operating voltage	A 10 11	6.5 ... 30 V DC 4.75 ... 6 V DC	A voltage drop is to be expected with increasing cable length. This must be taken into account in the electrical design.
design	B K M ZM	plastic housing metal housing with status LEDs metal housing without status LEDs	
Type of connection	C E1 E6X E8X	open cable end bullet connector without mating connector D-SUB 9-pole without mating connector extension cables on request	
Cable length	D ...	01.0 ... 20 m, in intervals of 1 m others on request	
Output circuit	E PP LD	push-pull LineDriver	
reference signal	F O I R FR	without periodic index fixed reference flexible reference	index signal every 5 mm only for ZM design and MB500/1 magnetic tape
linear resolution/ radial scaling factor	G ...	0.001/1250, 0.005/250, 0.010/125, 0.025/50, 0.050/25, 0.1/12.5 in μs others on request	

Magnetic sensor MSK5000

Incremental, digital interface, resolution 1 μm , scaling factor 1250

Feature	Ordering data	Spezifikation	Additional information
Pulse interval	H ...	0.2, 0.25, 0.5, 2.5, 4, 8, 16, 32, 64	

■ Order key



Scope of delivery:

MSK5000, Fastening set, Installation Instructions



Accessories you can find:

Installation tool ZB3054
Flexible reference mark

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Order key 88436