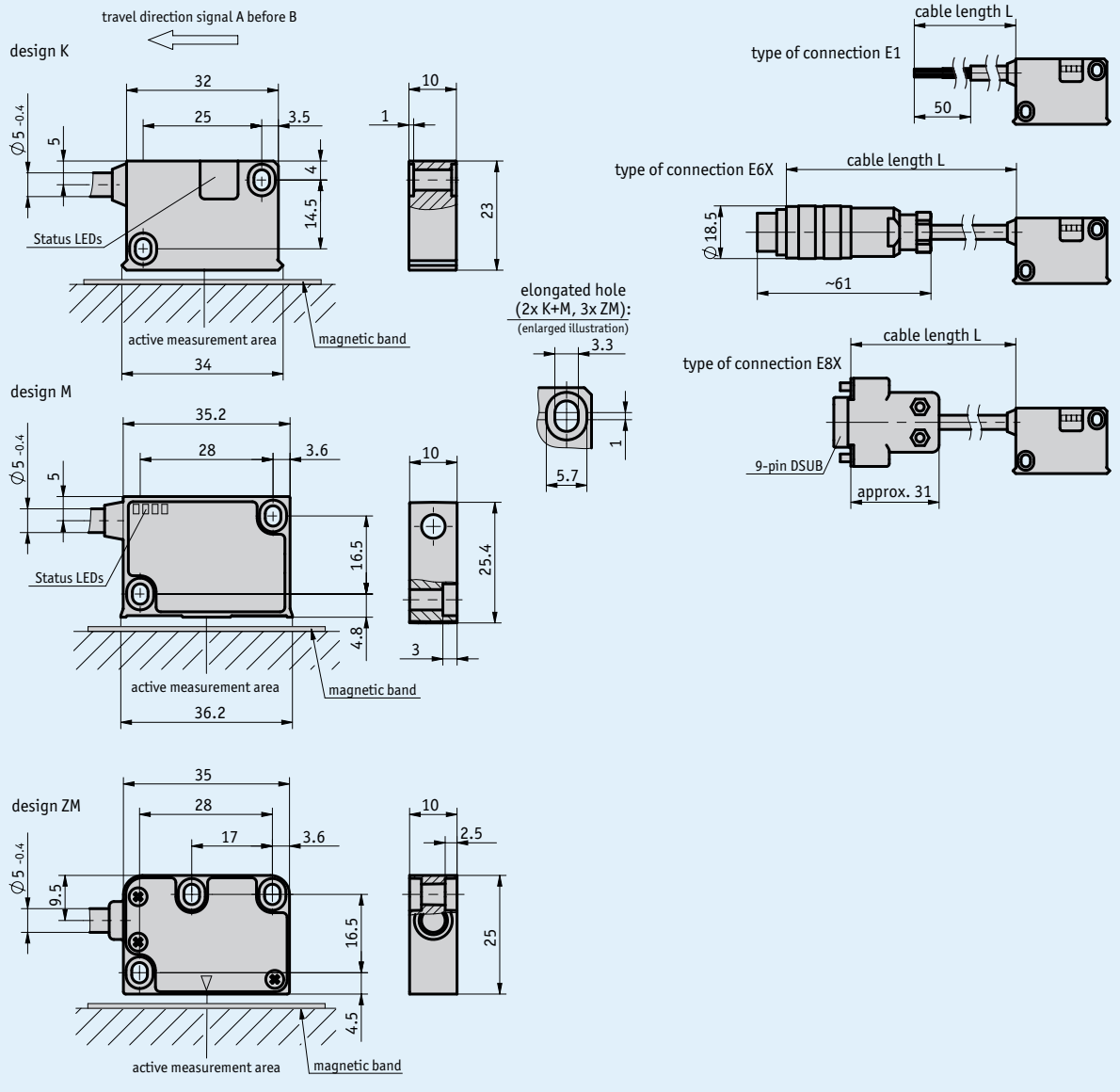
Magnetic sensor MSK5000

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

Profile

- Max. resolution 1 µm
- Repeat accuracy ±0.01 mm
- Repeat accuracy of ±1 increment
- Status LED display
- Works with MB500/1 magnetic tape, MR500 magnetic ring, MBR500 magnetic tape ring
- Reading distance ≤2 mm
- Max. 200000 pulses/revolution in combination with MR500 or MBR500 (160 poles)
- Optionally with reference point R or flexible reference marks FR





Mechanical data

Feature	Technical data	Additional information
Housing	synthetic material ABS black	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-wire ø$5_{-0.4}$ 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 range 4.5 m travel speed 3 m/s acceleration 5 m/s^2 ambient temperature 20 °C ±5 °C

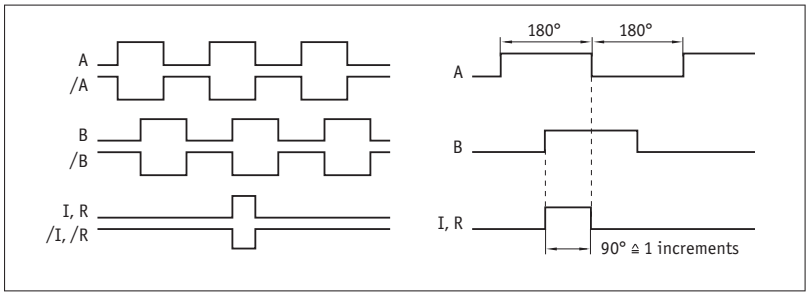
Travel/circumferential speed

		Travel/circumferential speed Vmax [m/s]									
Resolution/ Scaling factor	**0.001/1250**	4.00	3.20	1.60	0.80	0.32	0.20	0.10	0.05	0.03	0.01
	0.005/250	20.00	16.00	8.00	4.00	1.60	1.00	0.50	0.25	0.13	0.06
	0.01/125	25.00	25.00	16.00	8.00	3.20	2.00	1.00	0.50	0.25	0.12
	0.025/50	25.00	25.00	25.00	20.00	8.00	5.00	2.50	1.25	0.63	0.30
	0.05/25	25.00	25.00	25.00	25.00	16.00	10.00	5.00	2.50	1.25	0.61
	0.1/12.5	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 protected
	4.75 ... 6 V DC	without 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

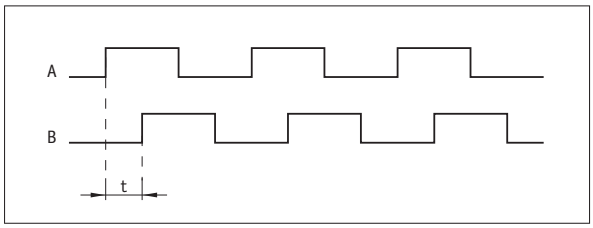
Signal pattern



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



Example: Pulse interval t = 1 µs
(i. e., the downstream unit must be able to process 250 kHz)

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

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	±20 µm	at TU = 20° C, reading distance 1 mm
Repeat accuracy	±10 µm	
Measuring range	∞	
Circumferential speed	depending on scaling factor and pulse interval	see table
Travel speed	depending on resolution and pulse interval	see table

Ambient conditions

Feature	Technical data	Additional information
Ambient temperature	-10 ... 70 °C	
Storage temperature	-30 ... 80 °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 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

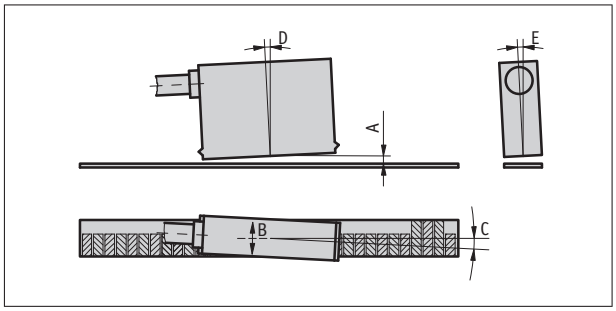
Inverted with reference signal

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

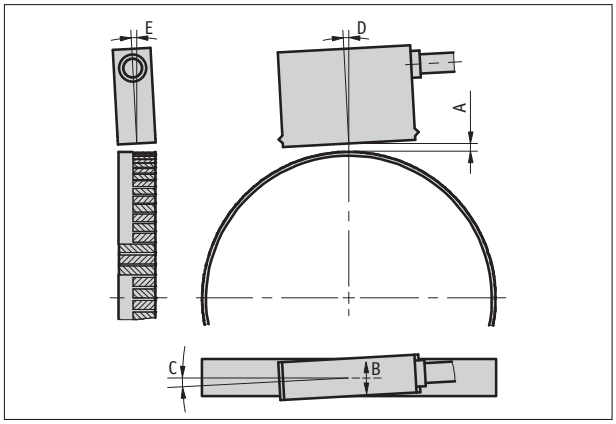
Hint for mounting

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 sensor representation

Order

Ordering information

One or more system components are required:

Magnetic band MB500/1	www.siko-global.com
Magnetic ring MR500	www.siko-global.com
Magnetic band ring MBR500	www.siko-global.com

Ordering table

Feature	Ordering data		Specification	Additional information
Operating voltage	10	A	6.5 ... 30 V DC	
	11		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	K	B	plastic housing	
	M		metal housing with status LEDs	
	ZM		metal housing without status LEDs	not for operating voltage 4 and output circuit LD
Type of connection	E1	C	open cable end	
	E6X		bullet connector without mating connector	
	E8X		D-SUB 9-pin without mating connector	
			extension cables on request	
Cable length	...	D	01.0 ... 20 m, in steps of 1 m	
			others on request	
Output circuit	PP	E	push-pull	
	LD		Line Driver	
Reference signal	0	F	without	
	I		periodic index	index signal every 5 mm
	R		fixed reference	
	FR		flexible reference	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	
			others on request	
Pulse interval	...	H	0.2, 0.25, 0.5, 1, 2.5, 4, 8, 16, 32, 64	

Order key

MSK5000 - [A] - [B] - [C] - [D] - [E] - [F] - [G] - [H]

subject to technical alteration • 2020/08/10 • 11:55