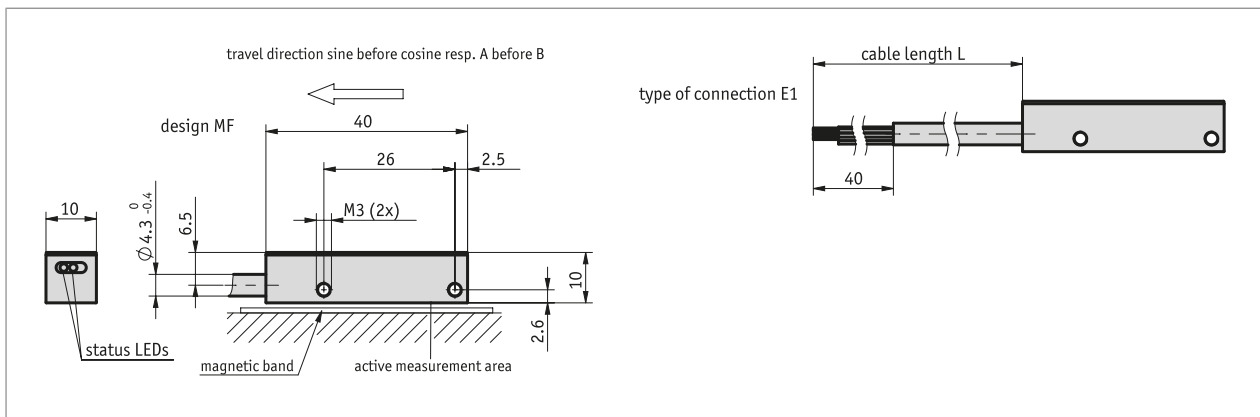


### Profile

- Repeat accuracy max.  $\pm 2 \mu\text{m}$
- Max. resolution  $0.2 \mu\text{m}$  (LD output circuit)
- Reading distance  $0.1 \dots 1 \text{ mm}$
- Works with magnetic tape MB200/1
- Signal period  $2000 \mu\text{m}$
- Output circuit sin/cos or LD
- Function and status display LEDs



### Mechanical data

Feature	Technical data	Additional information
Housing	zinc die-cast	
Sensor/band reading distance	0.4 ... 0.5 mm 0.1 ... 1 mm	FR, RD reference signal without reference signal FR, RD
Cable sheath	PUR, suitable for drag-chain use	8-core $\varnothing 4.3_{-0.4}$ mm
Cable bending radius	5x cable diameter 10x cable diameter	static dynamic
Weight	<0.03 kg	(without cable), cable 0.028 kg/m

### Electrical data

#### ■ Sin/cos output

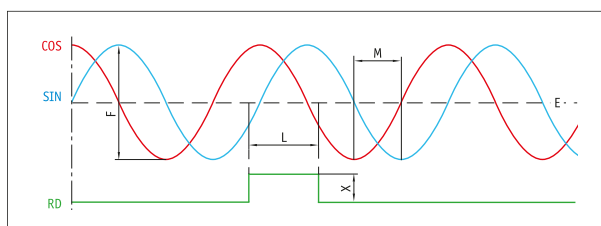
Feature	Technical data	Additional information
Operating voltage	5 V DC $\pm 5 \%$	reverse polarity protection
Current consumption	<50 mA <100 mA	unloaded loaded
Status display	2 LEDs, (yellow, green)	
Output signals	sin, /sin, cos, /cos, index, /index	
Output voltage	$1 V_{PP} \pm 10 \%$ at $0 \dots 70 \text{ }^\circ\text{C}$	120 $\Omega$ terminal resistance
Signal period	2000 $\mu\text{m}$	
Offset voltage	$UB/2 \pm 100 \text{ mV}$	sine/cosine mean to GND (5 V DC)
Phasing	$90^\circ \pm 1^\circ$ , $\pm 3^\circ$ (20 kHz) $45^\circ$ $135^\circ$	sin/cos sin (reference signal) cos (reference signal)
Pulse width of reference signal	$180^\circ \pm 40^\circ$	
Real-time requirement	speed-proportional signal output	
Type of connection	open cable end	

### LD output circuit

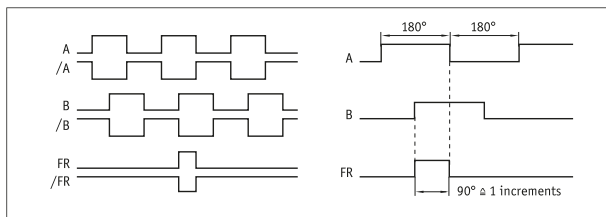
Feature	Technical data	Additional information
Operating voltage	5 V DC $\pm 5\%$	reverse polarity protection
Current consumption	<50 mA	unloaded
	<120 mA	loaded
Status display	2 LEDs, (yellow, green)	
Output circuit	LD (RS422)	
Output signals	A, /A, B, /B, FR, /FR	
Output signal level high	>2.5 V	
Output signal level low	<0.5 V	
Latency	1.5 $\mu$ s	
Pulse width of reference signal	1, 2, 4 Increment(s)	
Real-time requirement	speed-proportional signal output	
Type of connection	open cable end	

### Signal pattern, Sin/Cos output

E: reference voltage 2.5 V  
 F:  $1 V_{SS} \pm 10\%$   
 L:  $180^\circ \pm 40\%$   
 M:  $90^\circ \pm 1.0^\circ / \pm 3^\circ$  (25 kHz)  
 X:  $1 V_{SS}$



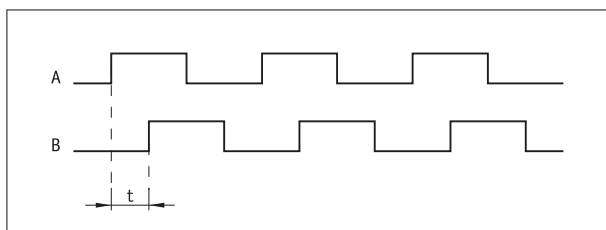
### Signal pattern, LD output circuit



**!** The logic status of signals A and B is not defined regarding the reference signal FRD or FR. It may deviate from the signal pattern.

**!** Reference or index signal with 4 increments ( $360^\circ$ ) 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  $t = 1 \mu$ 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
Pole length	2 mm	
Resolution	0.2, 0.4, 1, 2, 4, 10, 20 $\mu$ m	LD output circuit
System accuracy	$\pm(0.015 + 0.01 \times L)$ mm, L in m	$T_U = 20^\circ\text{C}$
Repeat accuracy	$\pm 2 \mu$ m	unidirectional
Measuring range	$\infty$	
Travel speed	$\leq 25$ m/s	sin/cos output, referencing speed $\leq 5$ m/s
	$\leq 25$ m/s	LD output circuit, see table, referencing speed $\leq 5$ m/s

### Travel speed

	Travel speed Vmax [m/s]							
Resolution [μm]	0.2	0.80	0.64	0.32	0.16	0.08	0.04	0.02
	0.4	1.60	1.28	0.64	0.32	0.16	0.08	0.04
	1	4.00	3.20	1.60	0.80	0.40	0.20	0.10
	2	8.00	6.40	3.20	1.60	0.80	0.40	0.20
	4	16.00	12.80	6.40	3.20	1.60	0.80	0.40
	10	25.00	25.00	16.00	8.00	4.00	2.00	1.00
	20	25.00	25.00	25.00	16.00	8.00	4.00	2.00
Pulse interval [μs]		0.20	0.25	0.50	1.00	2.00	4.00	8.00
Counting frequency [kHz]		1250.00	1000.00	500.00	250.00	125.00	62.50	31.25

### Ambient conditions

Feature	Technical data	Additional information
Ambient temperature	-40 ... 85 °C	
Storage temperature	-40 ... 85 °C	
Relative humidity	100 %	condensation admissible
EMC	EN 61326-1 EN 61000-6-2	immunity requirement of industry class B emission limit
Protection category	IP60	EN 60529
Shock resistance	≤500 m/s <sup>2</sup> , 11 ms	EN 60068-2-27, half-sine, 3 axes (+/-), each 3 shocks
Vibration resistance	≤100 m/s <sup>2</sup> , 10 Hz ... 2000 Hz	EN 60068-2-6, 3 axes, each 10 cycles

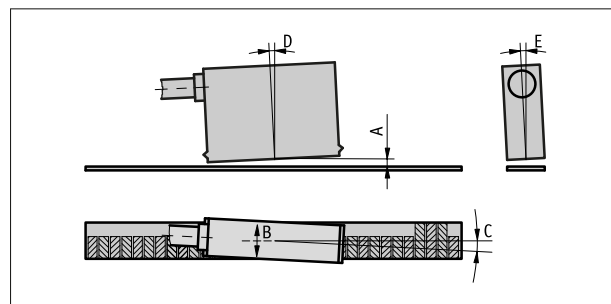
### pin assignment

Signal Sin/Cos	"Signal LD"	Cable color
sin	A	red
cos	/A	yellow
FRD	FR	blue
+UB	+UB	brown
GND	GND	black
/sin	B	orange
/cos	/B	green
/FRD	/FR	violet

### 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	with FR, RD	without FR, RD
A, Sensor/tape reading distance	0.4 ... 0.5 mm	0.1 ... 1 mm
B, Lateral offset	±0.5 mm	±0.5 mm
C, Alignment error	±3°	±3°
D, Longitudinal inclination	±1°	±1°
E, Lateral inclination	±3°	±3°



Symbolic representation

### Order

#### Ordering information

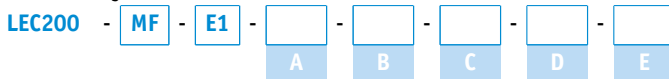
One or more system components are required:  
Magnetic tape MB200/1

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#### Ordering table

Feature	Ordering data	Spezifikation	Additional information
Cable length	A ...	01.0, 02.0, 03.0 in m	
Output circuit	B 1V <sub>SS</sub> LD	Sin/Cos, 1 V <sub>SS</sub> Line Driver	
reference signal	C RD FR	flexible reference (digital) flexible reference	only with output circuit 1V <sub>SS</sub> only with LD output circuit
Resolution	D ...	no information required 0.2, 0.4, 1, 2, 4, 10, 20 in $\mu$ m	only with 1V <sub>SS</sub> output circuit
Pulse interval	E ...	no information required 0.2, 0.25, 0.5, 1.0, 2.0, 4.0, 8.0 in $\mu$ s	only with 1V <sub>SS</sub> output circuit

### Order key



 **Scope of delivery:**  
LEC200, Quick Start Guide

 **Accessories you can find:**  
Flexible reference mark [www.siko-global.com](http://www.siko-global.com)