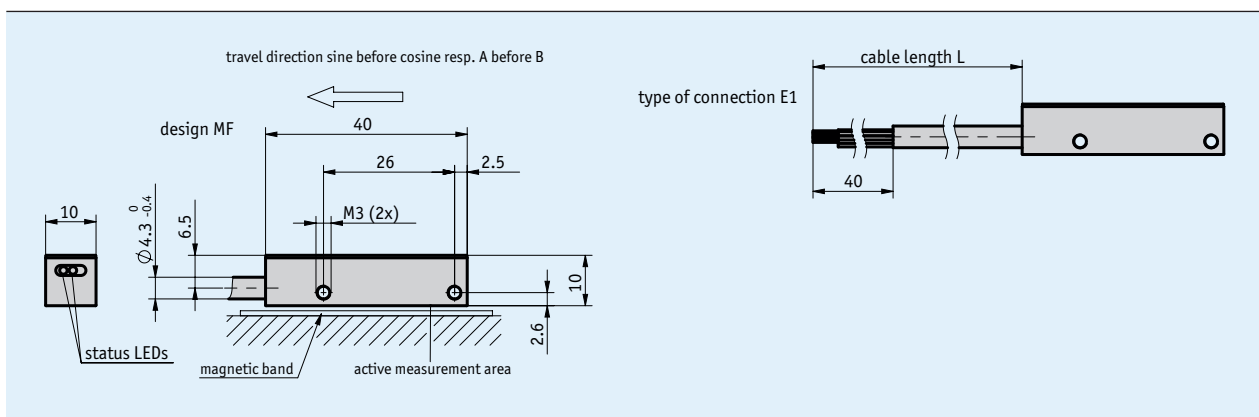
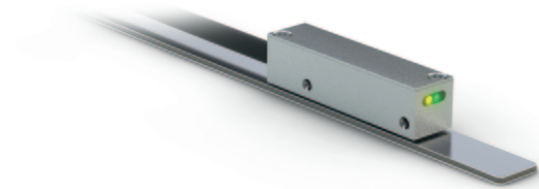


Profile

- Repeat accuracy max. $\pm 1 \mu\text{m}$
- Max. resolution $0.1 \mu\text{m}$ (LD output circuit)
- Reading distance $0.1 \dots 0.8 \text{ mm}$
- Works with MB160 magnetic tape
- Signal period $1600 \mu\text{s}$
- 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	0.1 ... 0.8 mm	0, I reference signal
	0.1 ... 0.5 mm	R reference signal
	0.4 ... 0.6 mm	FR reference signal
Cable sheath	PUR, suitable for drag-chain use	8-core $\varnothing 4.3_{-0.4}^0 \text{ mm}$
Cable bending radius	5x cable diameter	static
	10x cable diameter	dynamic
Weight	<math><0.03 \text{ kg}</math>	(without cable); cable 0.028 kg/m

Electrical data

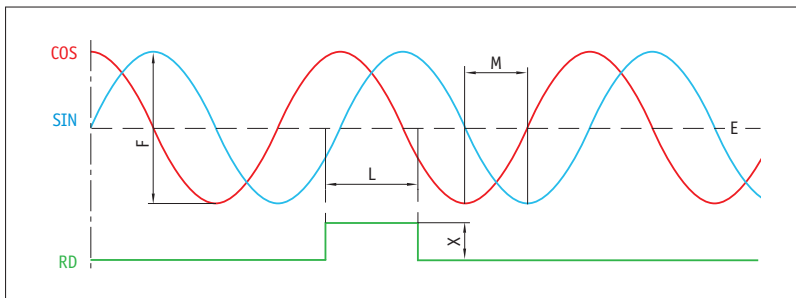
Sin/cos output

Feature	Technical data	Additional information
Operating voltage	5 V DC $\pm 5 \%$	
Current consumption	<math><35 \text{ mA}</math>	off-load
	<math><50 \text{ mA}</math>	loaded
Status display	2 LEDs (yellow, green)	
Output signals	sin, /sin, cos, /cos, index, /index	
Output voltage	1 V _{pp} $\pm 10 \%$	at $0 \dots 70^\circ \text{ C}$, 120Ω terminal resistance
Signal period	1600 μs	
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)	sin/cos
	45°	sin (reference signal)
	135°	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

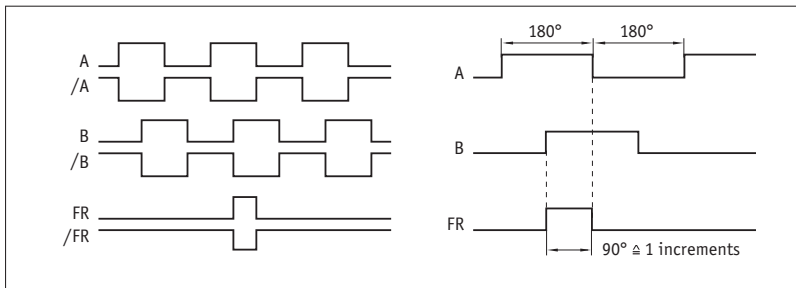
Feature	Technical data	Additional information
Operating voltage	5 V DC $\pm 5\%$	
Current consumption	<50 mA	off-load
	<120 mA	loaded
Status display	2 LEDs (yellow, green)	
Output circuit	LD (RS422)	
Output signals	A, /A, B, /B, I, /I, R, /R, FR, /FR	
Output signal level high	>2.5 V	
Output signal level low	<0.5 V	
Latency	1.5 μ s	
Pulse width of reference signal	1, 2, 4 increment(s)	
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: $1 V_{SS}$

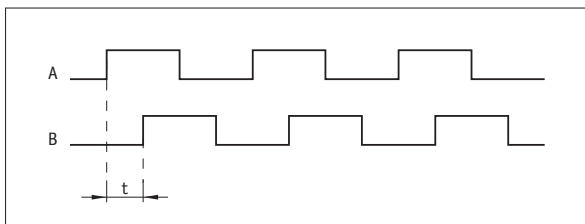
Signal pattern, LD output circuit



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

! 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 $t = 1 \mu$ s
 (i. e., the downstream unit must be able to process 250 kHz)
 Formula for counting frequency = $\frac{1}{1 \mu\text{s} \times 4} = 250 \text{ kHz}$

System data

Feature	Technical data	Additional information
Resolution	0.1, 0.2, 0.5, 1, 2, 5, 10 μ m	LD output circuit LD output circuit
Linearity deviation	$\pm 3 \mu$ m	
Repeat accuracy	$\pm 1 \mu$ m	at 0.3 mm reading distance
Measuring range	∞	
Travel speed	$\leq 25 \text{ m/s}$	Sin/Cos output, referencing speed $\leq 5 \text{ m/s}$
	$\leq 25 \text{ m/s}$	LD output circuit, see table, referencing speed $\leq 5 \text{ m/s}$

Travel speed, LD output circuit

Resolution [μm]	Travel speed Vmax [m/s]						
	0.1	0.2	0.5	1	2	5	10
	0.80	1.60	4.00	8.00	16.00	25.00	25.00
	0.40	0.80	2.00	4.00	8.00	16.00	16.00
	0.32	0.64	1.60	3.20	6.40	16.00	25.00
	0.16	0.32	0.80	1.60	3.20	8.00	16.00
	0.08	0.16	0.40	0.80	1.60	4.00	8.00
	0.04	0.08	0.20	0.40	0.80	1.60	4.00
Pulse interval [μs]	0.10	0.20	0.25	0.50	1.00	2.00	2.00
Counting frequency [kHz]	2500.00	1250.00	1000.00	500.00	250.00	125.00	125.00

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 ² , 11 ms	EN 60068-2-27, half-sine, 3 axes (+/-), each 3 pulses
Vibration resistance	≤100 m/s ² , 10 ... 2000 Hz	EN 60068-2-6, 3 axes, each 10 cycles

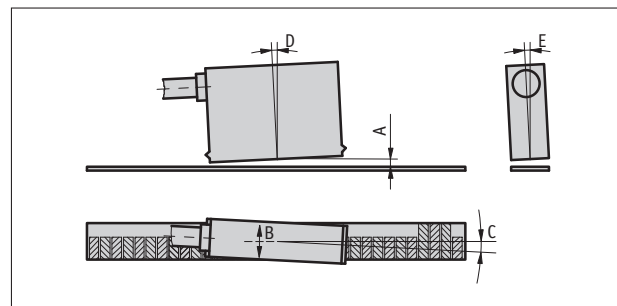
Pin assignment

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

Hint for mounting

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

Reference signal	FR	R	O, I
A, sensor/tape reading distance	0.4 ... 0.6 mm	0.1 ... 0.5 mm	0.1 ... 0.8 mm
B, lateral offset	±0.5 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

Order

Ordering information

One or more system components are required:

Magnetic band MB160

www.siko-global.com

Ordering table

Feature	Ordering data	Specification	Additional information
Cable length	... A	00.5, 01.0, 02.0, 03.0 in m	
Output circuit	1Vss LD B	Sin/Cos, 1 V _{SS} Line Driver	
Reference signal	0 FR C	without flexible reference	
Resolution	... D	no information required 0.1, 0.2, 0.5, 1, 10, 2, 5 in μm	only with 1Vss output circuit
Pulse interval	... E	no information required 0.1, 0.2, 0.5, 1.0, 2.0 in μs	only with 1Vss output circuit

Order key

LEC160 - MF - E1 - - - - -
A B C D E

Scope of delivery: LEC160, Quick Start Guide

Accessories:
Flexible reference mark

Order key 89976