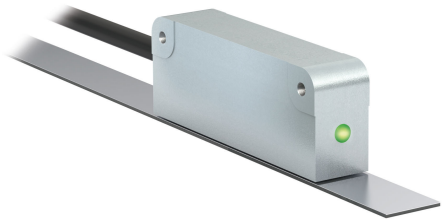
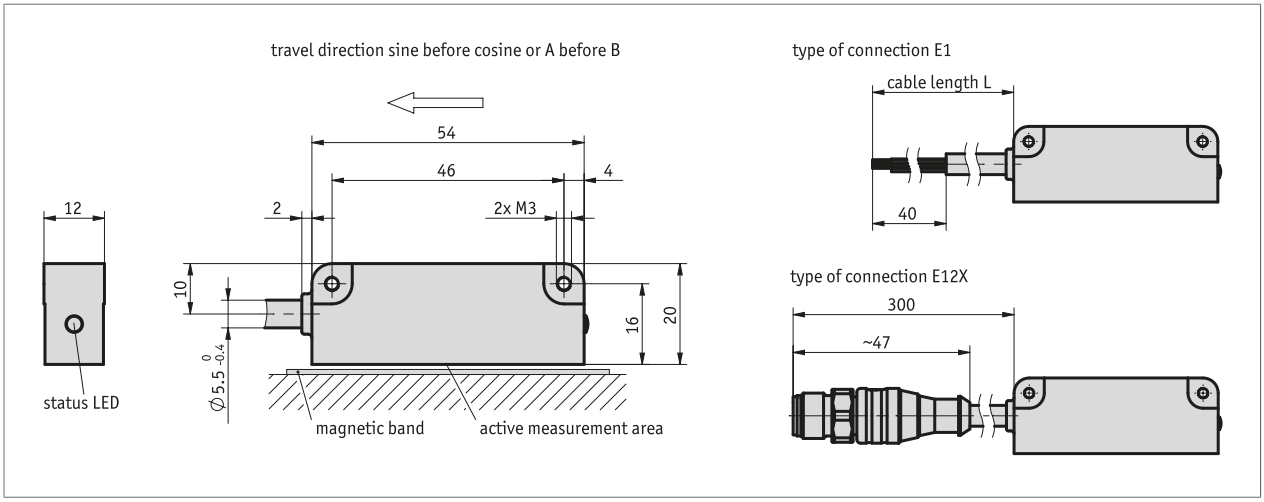
Magnetic sensor MSA213C

Absolute high-resolution, numerous interfaces, very small design

Profile

- High absolute resolution 1 µm
- Repeat accuracy max. ±1 µm
- Reading distance ≤0.8 mm
- Measuring range 0 ... 16 m
- Function and status display LED
- Interface BiSS C, SSI, IO-Link
- Optionally analog Sin/Cos 1 Vss or digital line driver
- Industry 4.0 ready





Mechanical data

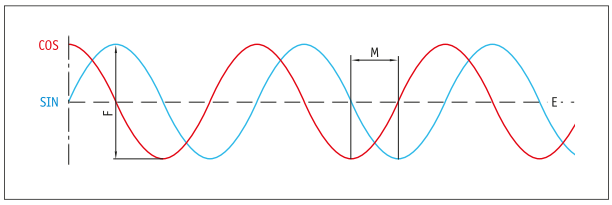
Feature	Technical data	Additional information
Housing	zinc die-cast	
Sensor/band reading distance	≤0.8 mm	
Cable length	1 ... 20 m	(E1 type of connection)
Cable sheath	PUR, suitable for drag-chain use	,10 core ø5.5 $_{-0.4}$ mm (twisted in pairs)
Cable bending radius	28 mm	static
	42 mm	dynamic
Service 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.
Weight	~0.05 kg	without cable

Electrical data

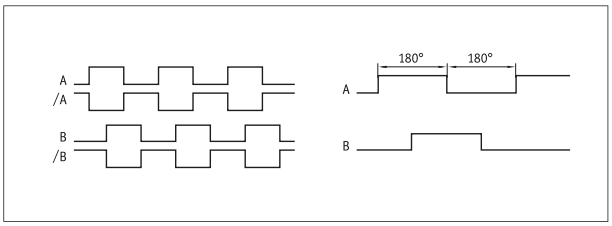
Feature	Technical data	Additional information
Operating voltage	4.5 ... 30 V DC	reverse polarity protected (SSI + BISS/C)
	7.5 ... 30 V DC	reverse polarity protected (IOL)
Current consumption	200 mA	
Status display	RGB-LED	Plausibility error, distance warning, device status
Output circuit	without, LD, 1Vss	
Interface	SSI, BiSS C, IO-Link	
Real-time requirement	speed-proportional signal output	sin/cos output
Type of connection	open cable end	(SSI + BISS/C)
	M12 plug connector (A-coded)	4-pole, 1x pin (IOL)

Signal pattern, Sin/Cos output

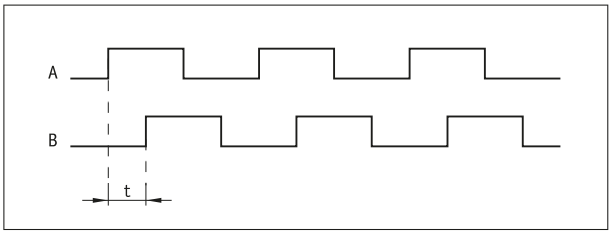
E: reference voltage 2.5 V
F: 1 V_{SS} ±10 %
M: 90° ±1.0° / ±3° (25 kHz)



Signal pattern, LD output circuit



Pulse interval, LD output circuit



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
Pole length	2 mm	incremental
Resolution	1 µm	absolute
	1, 5, 10 µm	LD, incremental
	2 mm	period length, 1 Vpp
Linearity deviation	±10 µm	
Repeat accuracy	±1 µm	
Measuring range	≤16000 mm	
Travel speed	≤5 m/s	absolute
	≤25 m/s	incremental

Travel speed, LD output circuit

		Travel speed Vmax [m/s]					
Resolution [µm]	1	10.00	5.00	2.00	1.00	0.50	0.20
	5	25.00	25.00	10.00	5.00	2.50	1.00
	10	25.00	25.00	20.00	10.00	5.00	2.00
Pulse interval [µs]		0.10	0.20	0.50	1.00	2.00	5.00
Counting frequency [kHz]		2500.00	1250.00	500.00	250.00	125.00	50.00

Ambient conditions

Feature	Technical data	Additional information
Ambient temperature	-40 ... 80 °C	
Storage temperature	-40 ... 80 °C	
Relative humidity	100 %	condensation admissible
EMC	EN 61326-1	immunity requirement of industrial applications, emission limit class B
Protection category	IP67	EN 60529
Shock resistance	≤500 m/s², 11 ms	EN 60068-2-27, half-sine, 3 axes (+/-), each 3 shocks
Vibration resistance	≤100 m/s², 10 Hz ... 2000 Hz	EN 60068-2-6, 3 axes, each 10 cycles

pin assignment

SSI, BiSS C interface without LD, 1 Vss

SSI	BiSS C	Cable color
GND	GND	black
+UB	+UB	brown
nc	nc	red
nc	nc	yellow
nc	nc	orange
nc	nc	green
T+	MA	blue
T-	NMA	violet
D+	SLO	gray
D-	NSLO	white

SSI, BiSS C interface with LD, 1 Vss

SSI	BiSS C	Cable color
GND	GND	black
+UB	+UB	brown
A, Sin+	A, Sin+	red
/A, Sin-	/A, Sin-	yellow
B, Cos+	B, Cos+	orange
/B, Cos-	/B, Cos-	green
T+	MA	blue
T-	NMA	violet
D+	SLO	gray
D-	NSLO	white

IO-Link interface

Signal	PIN
L+ (+UB)	1
I/Q	2
L- (GND)	3
C/Q	4

Industry 4.0

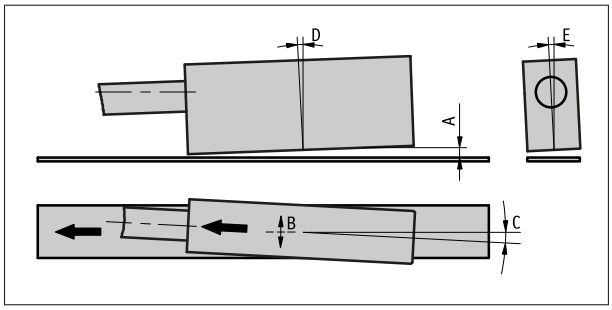
In most cases, data exchange with the magnetic encoders is limited to the exchange of process data. In addition to the process data, intelligent drives provide additional information that can be evaluated for condition monitoring up to predictive maintenance:

Process data	Smart Value	Smart Function
Actual position	--	Plausibility monitoring

Hint for mounting

When mounting sensor and magnetic tape, please be careful to align both system components correctly. The arrow marks on the tape and sensor must point in the same direction when mounting the components.

A, Sensor/tape reading distance	≤0.8 mm
B, Lateral offset	±0.6 mm
C, Alignment error	±1°
D, Longitudinal inclination	max. sensor/tape A reading distance must never be exceeded.
E, Lateral inclination	max. sensor/tape A reading distance must never be exceeded.



Symbolic representation

Order

Ordering information

One or more system components are required:
Magnetic tape MBA213 www.siko-global.com

Ordering table

Feature	Ordering data		Spezifikation	Additional information
Type of connection	A	E1	open cable end	only with SSI, BISS/C
		E12X	plug outlet with cable	only with IO-link
Cable length	B	00.3	0.3 m	only at E12X
		...	01.0 ... 20.0 m, in intervals of 1 m	only at E1
			others on request	
Interface	C	BiSS/C	BiSS C	only at E1
		SSI	RS422	only at E1
Output circuit	D	1Vss	sin/cos	only at E1
		LD	Line Driver (RS422)	only at E1
		0	without	
incremental resolution	E	...	1, 5, 10 in µm	only with LD
			no information required	
Pulse interval	F	...	0.1, 0.2, 0.5, 1, 2, 5 in µs	only with LD
			no information required	

Order key

MSA213C - [A] - [B] - [C] - [D] - [E] - [F] - S

Scope of delivery:
MSA213C, Distance gage, Quick Start Guide