xMARS

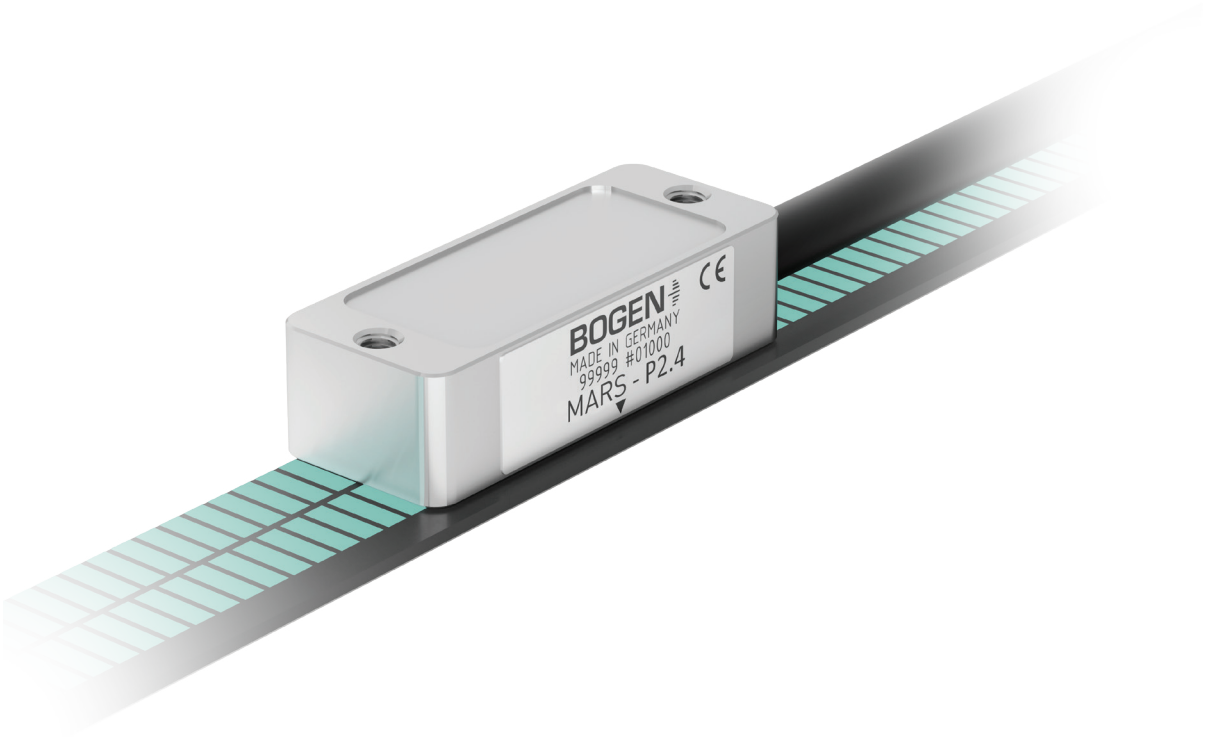
Multi Adaptive Range Sensor for Linear Applications

linear applications

absolute measurement

ALWAYS ABSOLUTE

xMARS is an absolute magnetic sensor for linear measurement applications. The fast and reliable sensing circuit allows both position and velocity feedback in motion control systems. xMARS is the most compact sensor of its class.



Features and Benefits

- non-contact and true absolute measurement
- resolution up to 0,29 µm
- measuring length up to 19,3 m
- BiSS-C and SSI interface with additional sin/cos output
- LED for easy installation and alignment
- drag-chain compatible Hiflex cable
- unaffected by dust, debris or liquids with IP67 protection

xMARS rev 1.1 (2022/06/08)

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Environmental Specifications

shock	250 g , 6 ms
vibration	10 g , 5 - 2000 Hz
protection class	IP67
operating temperature	- 40 to + 85 °C
storage temperature	- 40 to + 100 °C

Mechanical Specifications

dimensions	see drawing
installation tolerances	see drawing
linear speed (mechanical)	> 20 m/s
measuring length	19,3 m
electrical connection	• M12 inline connector 8 pin (BiSS/SSI only) • M12 inline connector 12 pin (BiSS/SSI + sin/cos only) • cable output: see „Order Code - Sensor"

Electrical Specifications

resolution	absolute: min. 0,293 µm incremental: 2400 µm
repeat accuracy	± 1 increment
output circuits	• absolute: BiSS-C, SSI • incremental: sin/cos 1 Vpp
position refresh (absolute)	15 µs
counting frequency (incremental)	sin/cos: max. 200 kHz
maximum speed rates	see table
power supply	5 V ± 5%
electrical protection	short circuit protection through a reverse input polarity protected connector
EMC	CEI EN-61000-4-2, CEI EN-61000-4

Electrical Connections

signal	cable	M12 inline connector 12 pin	M12 inline connector 8 pin
+5V	red	1	1
GND	blue	2	2
MA-	white	3	3
MA+	pink	4	4
SLO+	black	5	5
SLO-	transparent	6	6
RX	purple	7	7
TX	orange	8	8
SIN+	grey	9	
SIN-	yellow	10	
COS-	green	11	
COS+	brown	12	

Materials

housing	aluminum
cable	Hiflex PUR

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Diagnostics

LED	indicating
green on	in operation
green brightness	signal quality while in configuration mode
red on	error/warning
red blinking	error type
blue on	configuration mode

Sensing heads and magnetic scales can be damaged by magnetic fields!
Apply only demagnetized tools for assembly and maintenance.

Follow standard ESD precautions! Turn power off before connecting the sensor.
Do not touch the electrical pins without staticprotection such as a grounded wrist strap.

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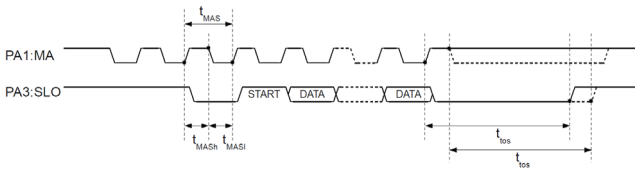
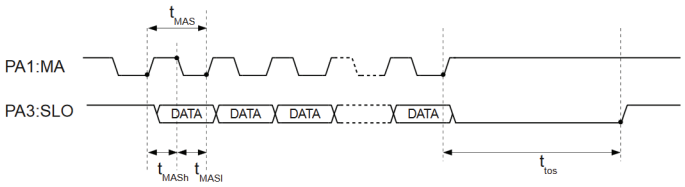
BiSS-C Interface

signals	clock (MA+, MA-) data (SLO+, SLO-)
signal amplitude (without load)	RS422 (± 5 V)
protocol	BISS-C BP3 encoder profile
timeout t_tos	150 - 380 ns
permissible clock period t_MAS	100 ns up to 2 * timeout
clock signal high level duration t_MASh	50 ns up to timeout
clock signal low level duration t_MASl	50 ns



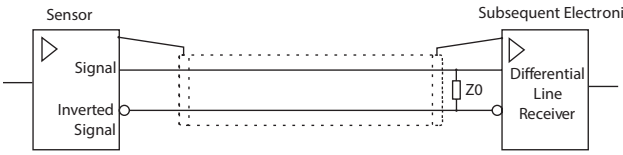
SSI Interface

signals	clock (MA+, MA-)
	data (SLO+, SLO-)
signal amplitude (without load)	RS422 (± 5 V)
timeout t_tos	375-605 ns
permissible clock period t_MAS	250 ns up to 2 * timeout
clock signal high level duration t_MASh	125 ns up to timeout
clock signal low level duration t_MASl	125 ns

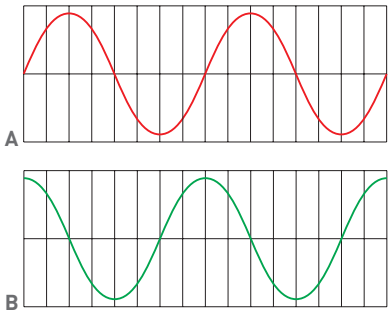


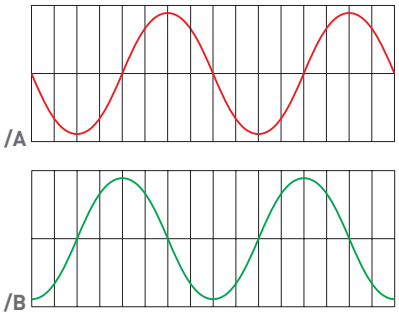
Analogue Interface

signals	cosinus (A, /A), sinus (B, /B)
signals level	1 V_{PP}



load resistor 1 V_{PP} Z0 = 100 Ω





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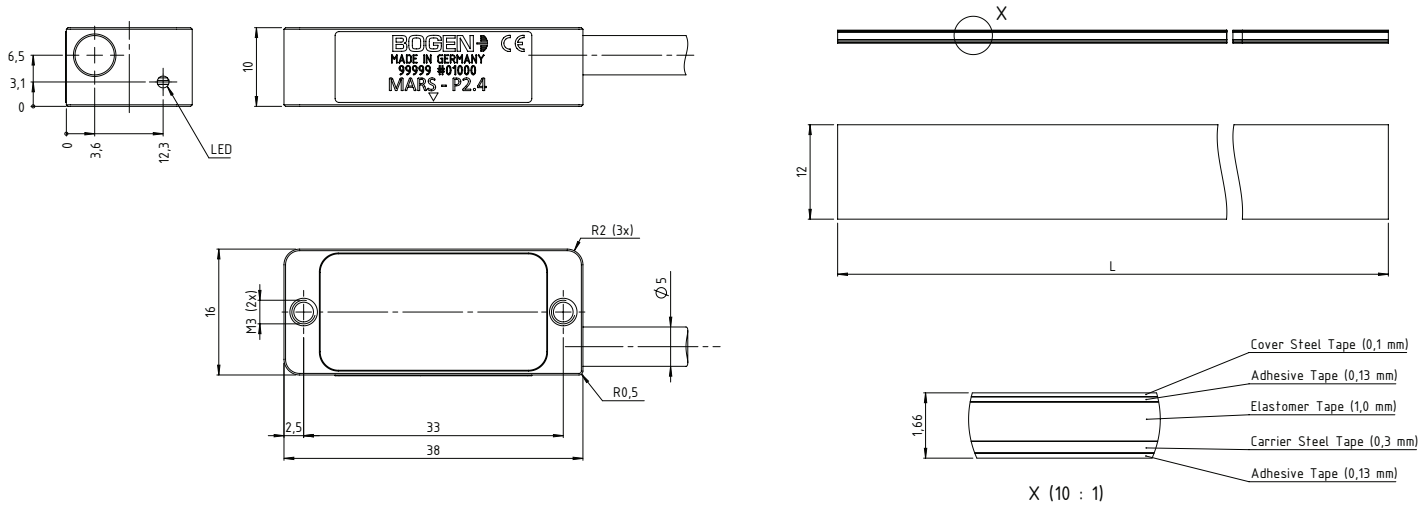
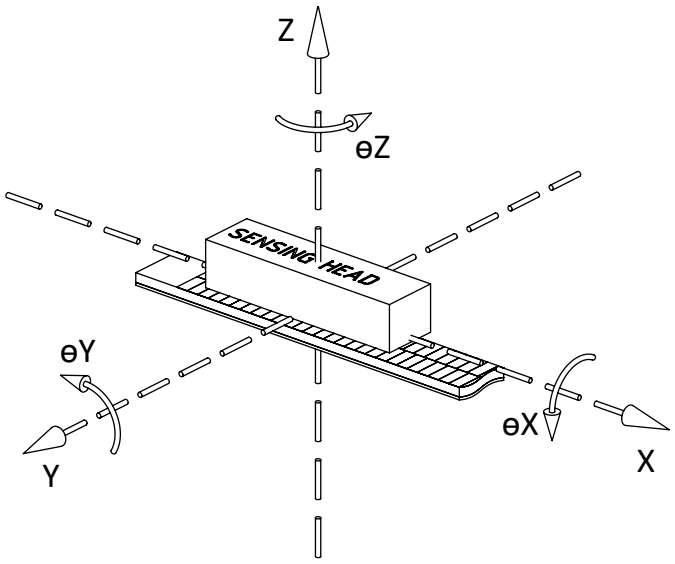
Dimensions



Installation Tolerances



Note:

• for tolerance purposes, the bracket for mounting xMARS should have adjustment options

Assembly Values and Tolerances

X [mm]	±0.5
Y [mm]	±0.5
Z [mm]	0.1 - 1.2
ϑX [°]	±1
ϑY [°]	±1
ϑZ [°]	±1

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Order Code - Sensor

xMARS - P - V - A - R - Z - C - /Sxxx

		code	explanation
P	pole pitch	P2.4	2.4 mm
V	supply voltage	V5	5 V
A	interface absolute	A1	BiSS-C
		A2	SSI
		A3	BiSS-C + 1 V_{PP}
		A4	SSI + 1 V_{PP}
R	resolution	R0.29	0.29 µm
Z	code pattern	Z10	xMARS code pattern
C	connection	C10	M12 inline connector 12 pin, 0.5 m cable length
		C11	M12 inline connector 12 pin, 2 m cable length
		C12	M12 inline connector 8 pin, 0.5 m cable length
		C13	M12 inline connector 8 pin, 2 m cable length
		L1	1 m
		L3	3 m
		L5	5 m
		L10	10 m
/Sxxx	custom version	S	

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Order Code - Magnetic Tape

LMSX3 - L - W - H - A - C - K - T - EB

		code	explanation
L	length	L	piece, length in mm
W	width	W12	12 mm
H	scale height		**1 mm magnetic tape, 0.3 mm carrier tape**
		H1-0.1	1 mm magnetic tape; 0.1 mm carrier tape
		H0.5-0.3	0.5 mm magnetic tape; 0.3 mm carrier tape
		H0.5-0.1	0.5 mm magnetic tape; 0.1 mm carrier tape
A	accuracy class	A10	± 10 µm/m (only delivered up to piece length of 2300 mm)
		A20	± 20 µm/m
C	cover tape		**without cover tape**
		C	equipped with cover tape (only delivered upt to piece length of 1500 mm)
K	adhesive tape		without adhesive tape
		K	equipped with adhesive tape
T	text imprint		including BOGEN text imprint
		T2	including customer specific text imprint (on request)
EB	mounting holes	EB1	please see next page for available standard mounting hole options
		EB2	
		EB3	
		EB4	
		EB5	

Ordering Example Linear Magnetic Scale X3

LMSX3 - L1400-W12-A10-K-T2	total length: 1400 mm (usable measuring length: 1376 mm)
	total width: 12 mm
	total height: 1.03 mm
	accuracy class: ± 10 µm/m
	without cover tape
	with adhesive tape
	with customer specific imprint

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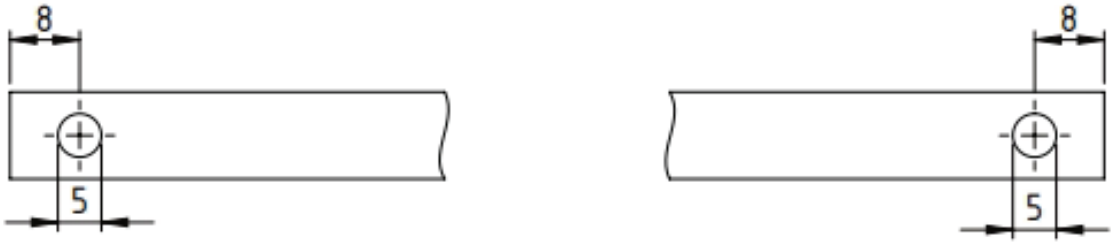
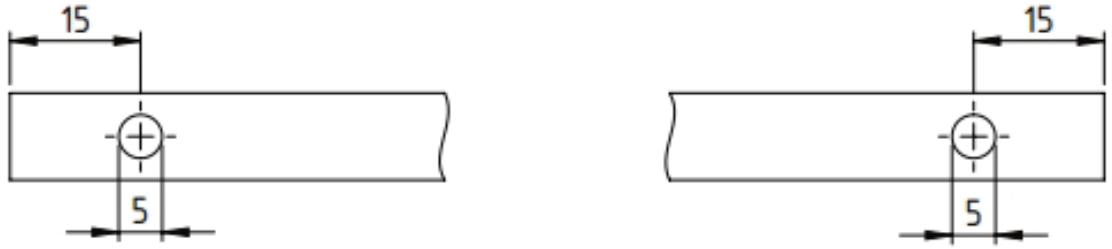
Standard Mounting Holes Options

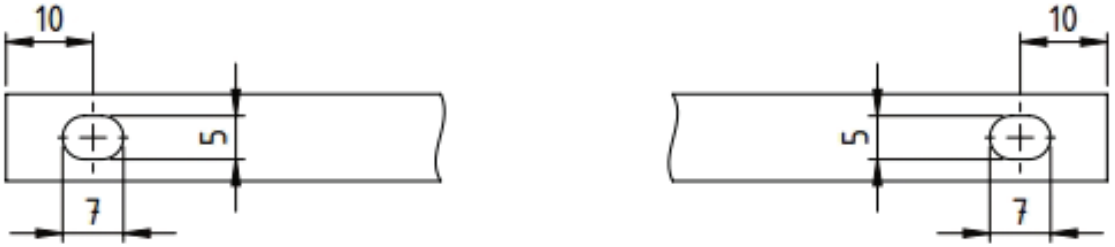
Option 1



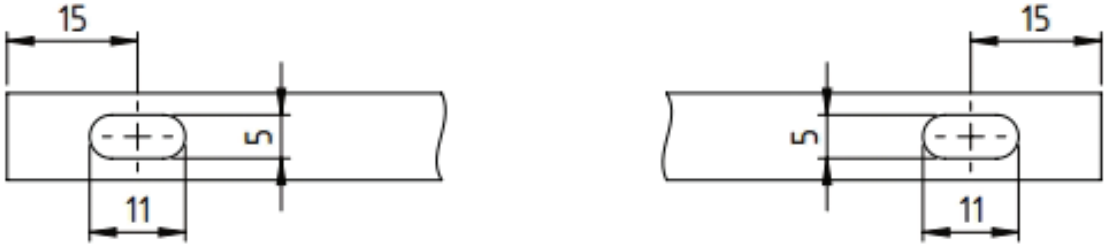
Option 2



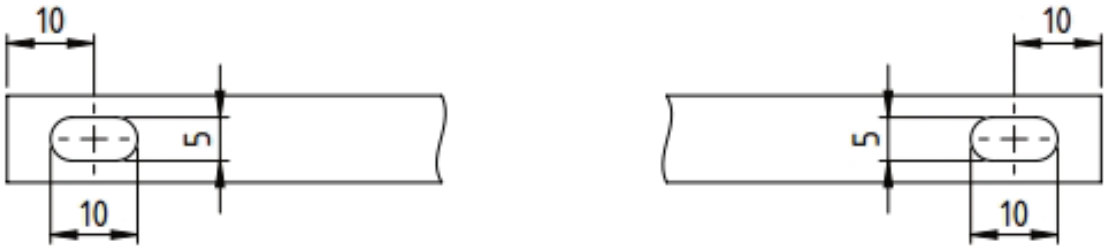
Option 3



Option 4



Option 5



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