

Datasheet

General features

- Linear magnetic sensor, with direct reading of the absolute position.
- High-speed SSI - BiSS C (unidirectional) serial interface.
- Resolutions up to 1 μm .
- Measuring length up to 30.000 mm.
- Contactless reading.
- Status indication through LED RGBW.
- Extremely easy and fast mounting of the sensor and application of the magnetic scale, with wide alignment tolerances.
- Small size, to allow installation in narrow spaces.
- Axial or radial robust sealed cable output.
- Cable suitable for continuous movements.
- To be used with magnetic scale MBA2.



Technical characteristics

Pole pitch	2+2 mm
Incremental signal	Sinus/Cosinus 1 Vpp (optional)
Resolution 1 Vpp	up to 1 μm ¹⁾
Signal period	2 mm
Serial interface	SSI - BiSS C (unidirectional)
Resolution absolute position	500 - 100 - 50 - 10 - 5 - 1 μm
Accuracy grade	$\pm 10 \mu\text{m}$ ²⁾
Interpolation error (SDE)	$\pm 1.5 \mu\text{m}$ ³⁾
Unidirectional repeatability	$\pm 0.5 \mu\text{m}$ ³⁾
Hysteresis	$\pm 2 \mu\text{m}$ ³⁾
Measuring length ML	up to 30.000 mm
Max. traversing speed	600 m/min
Vibration resistance (EN 60068-2-6)	200 m/s ² [55 ... 2.000 Hz]
Protection class (EN 60529)	IP67
Operating temperature	-20 °C ... 75 °C (serial), 0 °C ... 60 °C (serial + 1 Vpp)
Storage temperature	-40 °C ... 80 °C
Relative humidity	100%
Power supply	5 ... 28 VDC $\pm 5\%$
Current consumption with 24 VDC	200 mA _{MAX} (with R = 120 Ω) 5 VDC 80 mA _{MAX} (with R = 1200 Ω) 24 VDC
Max. cable length	20 m ⁴⁾
Electrical connections	see related table
Electrical protections	inversion of polarity and short circuits
Weight	80 g

¹⁾ Depending on CNC division factor.

²⁾ The declared accuracy grade of $\pm X \mu\text{m}$ is referred to a measuring length of 1 m.

³⁾ The error declared is subject to the respect of the alignment tolerances.

⁴⁾ Ensuring a minimum power supply of 5 V to the sensor, the maximum cable length can be extended to 50 m.

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Mechanical characteristics

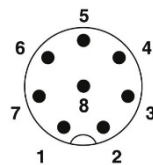
- Magnetic sensor with untreated die-cast zinc housing (standard).
- Possibility to fix the magnetic sensor with M4 screws or with through M3 screws.
- Wide alignment tolerances.
- Robust sealed cable output.

Electrical characteristics

- Reading through positioning sensor based on magneto resistance, with AMR effect (Magnetic Anisotropy).
- Electrical protection against inversion of power supply polarity and short circuits on output ports.
- Option: 1 Vpp A and B output signals, with phase displacement of 90° (electrical).
- Serial protocol SSI - BiSS C (unidirectional).

Connector M12 plug straight, 8-pin, type CI9

PIN	Signal	Colour
1	CK/	yellow
2	CK	green
3	+V	brown
4	--	--
5	Data/	grey
6	Data	pink
7	--	--
8	0V	white
9	--	--
10	--	--
11	--	--
12	Shield	



Connector type **CI9**:
M12 plug straight, 8-pin,
view on plug side.

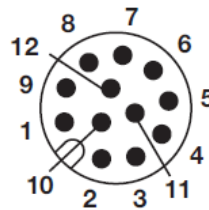
Shield = connected to plug housing

Wiring and Pin Assignment: M12 plug straight, 8-pin (according to DIN 47100)

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Connector M23 plug straight, 8-pin type CG4

PIN	Signal	Colour
1	Data	pink
2	Data/	grey
3	--	--
4	--	--
5	--	--
6	--	--
7	CK	green
8	CK/	yellow
9	--	--
10	GND	white
11	+V	brown
12	Shield	



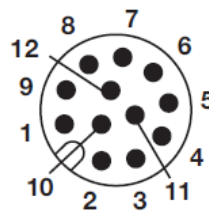
Connector type **CG4**:
M23 plug straight, 8-pin,
view on plug side.

Shield = connected to plug housing

Wiring and Pin Assignment: M23 plug straight, 8-pin (according to DIN 47100)

Connector M23 plug straight, 12-pin type CG4

PIN	Signal	Colour
1	Data	pink
2	Data/	grey
3	A	green
4	A/	orange
5	B	white
6	B/	bright blue
7	CK	brown
8	CK/	yellow
9	--	--
10	GND	blue
11	+V	red
12	Shield	



Connector type **CG4**:
M23 plug straight, 12-pin,
view on plug side.

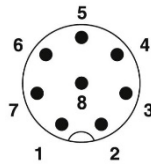
Shield = connected to plug housing

Wiring and Pin Assignment: M23 plug straight, 8-pin (according to DIN 47100)

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Connector M12 plug straight, 8-pin, type C08

PIN	Signal	Colour
1	--	--
2	--	--
3	CK	green
4	CK/	yellow
5	Data/	grey
6	Data	pink
7	0V	white
8	+V	brown

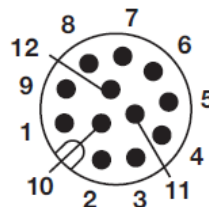


Connector type **C08**:
 M12 plug straight, 8-pin,
 view on plug side.

Wiring and Pin Assignment: M12 plug straight, 8-pin (according to DIN 47100)

Connector M12 plug straight, 12-pin, type C12

PIN	Signal	Colour
1	B	white
2	B/	bright blue
3	CK	brown
4	CK/	yellow
5	Data/	grey
6	Data	rosa
7	0V	blue
8	+V	red
9	A/	orange
10	A	green
11	--	--
12	--	--



Connector type **C12**:
 M12 plug straight, 12-pin,
 view on plug side.

Wiring and Pin Assignment: M12 plug straight, 12-pin (according to DIN 47100)

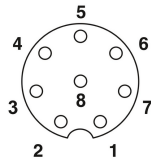
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Extension cables

Extension cable type **VLK-8** with M12 **socket**, 8-pin, straight, opposite open cable end.

- Conductors section: 8 x 0.25 mm² for power supply and signals, PUR/PVC external sheath

PIN	Signal	Colour
1	--	white
2	--	brown
3	CK	green
4	CK/	yellow
5	Data/	grey
6	Data	pink
7	0V	blue
8	+V	red



Connector type **C08**:
M12 socket straight, 8-pin,
view on socket side.

Wiring and Pin Assignment: M12 socket straight, 8-pin (according to DIN 47100)

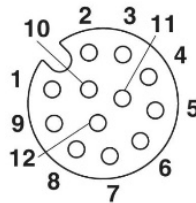


Connection extension cable type VLK-8 only in combination with M12 plug, 8-pin type C08 (standard).

Extension cable type **VLK-12** with M12 **socket**, 12-pin, straight, opposite open cable end.

- Conductors section: 12 x 0.14 mm² for power supply and signals, PUR/PVC external sheath

PIN	Signal	Colour
1	B	brown
2	B/	blue
3	CK	white
4	CK/	green
5	Data/	pink
6	Data	yellow
7	0V	black
8	+V	grey
9	A/	red
10	A	violet
11	--	grey/pink
12	--	red/blue



Connector type **C12**:
M12 socket straight, 12-pin,
view on socket side.

Wiring and Pin Assignment: M12 socket straight, 12-pin (according to DIN 47100)



Connection extension cable type VLK-12 only in combination with M12 plug, 12-pin type C12 (standard).

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Cable types

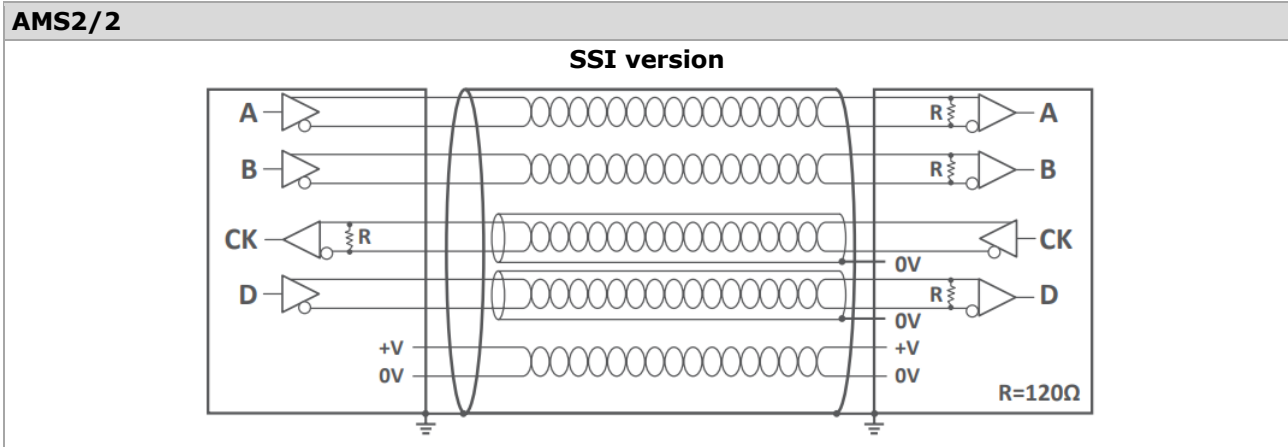
- Shielded twisted pair for digital signals (SSI - BiSS).
- PUR external sheath with low friction coefficient, resistant to oil and suitable for continuous movements.

Serial + Analog output version

- 10-wire shielded cable $\varnothing = 6.2$ mm, PUR external sheath.
- Conductors section:
 - power supply 0.30 mm²
 - signals 0.10 mm²



The cable's bending radius should not be lower than 80 mm.

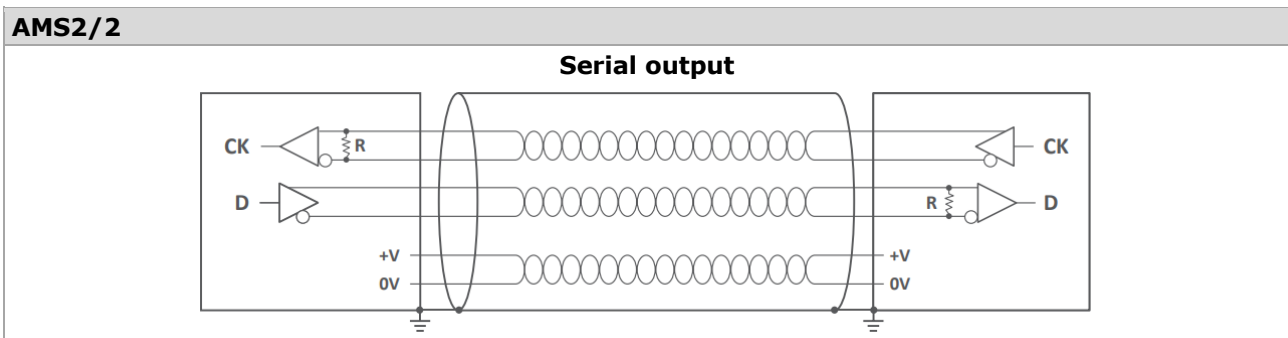


Serial output version

- 6-wire shielded cable $\varnothing = 6.2$ mm, PUR external sheath.
- Conductors section:
 - power supply 0.35 mm²
 - signals 0.25 mm²



The cable's bending radius should not be lower than 70 mm.



In case of cable extension, it is necessary to guarantee:

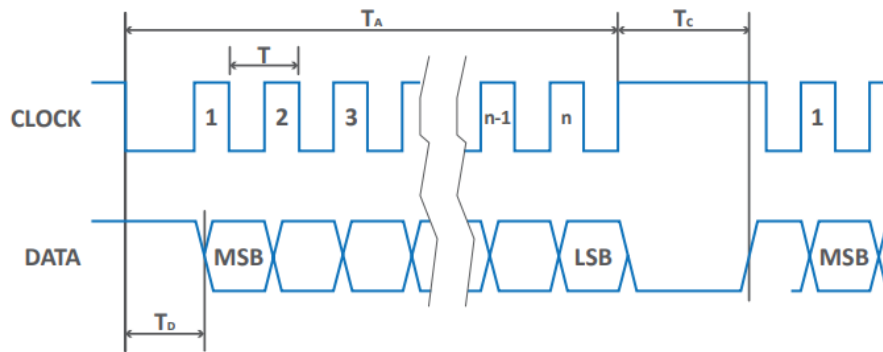
- the electrical connection between the body of the connectors and the cables shield
- a minimum power supply voltage of 5 V to the sensor

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Output signals

AMS2/2

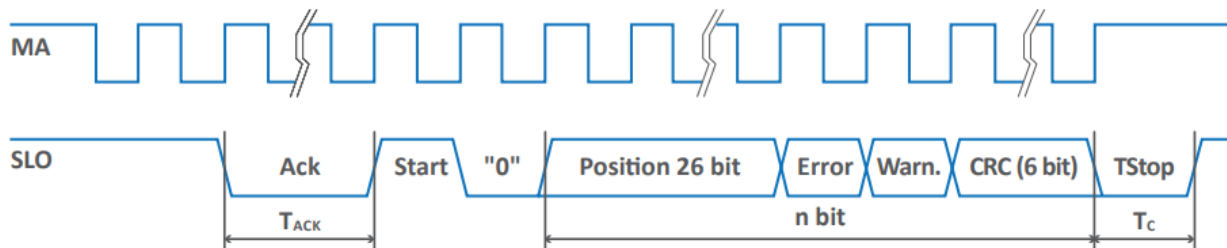
SSI version



Interface	SSI binary - Gray
Signal level	EIA RS422
Clock frequency [MHz]	0.2 ... 1.2 MHz ¹⁾ Duty cycle 50% ± 10%
n	position bit
T_C	max. 25 µs
T_D	max. 7 µs

AMS2/2

BiSS C (unidirectional) version

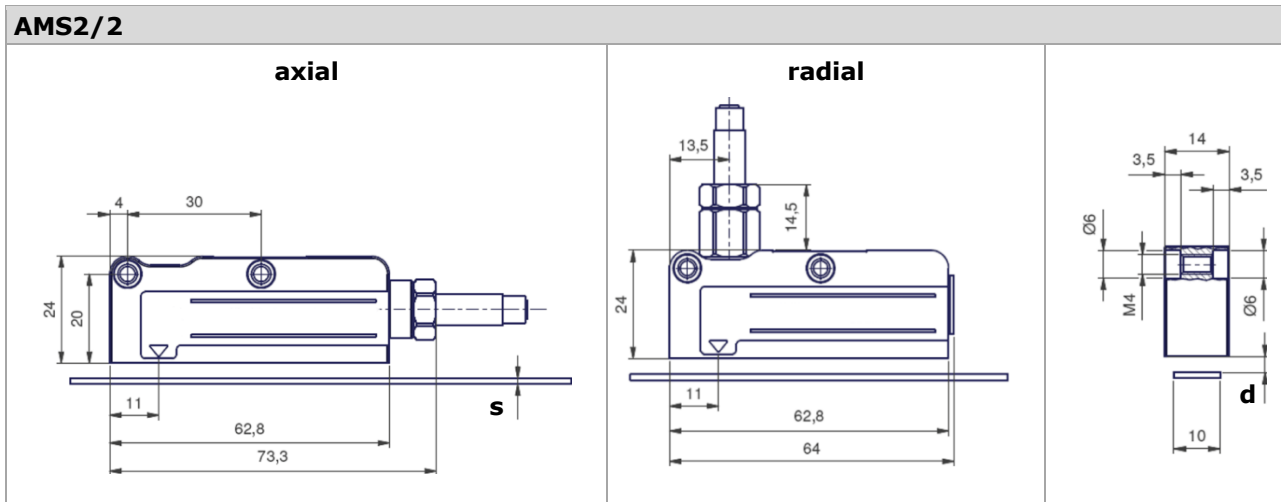


Interface	BiSS C unidirectional
Signal level	EIA RS485 / RS422
Clock frequency [MHz]	0.4 ... 8 MHz ¹⁾ Duty cycle 50% ± 10%
n	26 + 2 + 6 Bit
T_C	max. 25 µs
T_{ACK}	3 clock

¹⁾ The maximum frequency is guaranteed with a cable length up to 2 m.

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Dimensions



All dimensions in mm

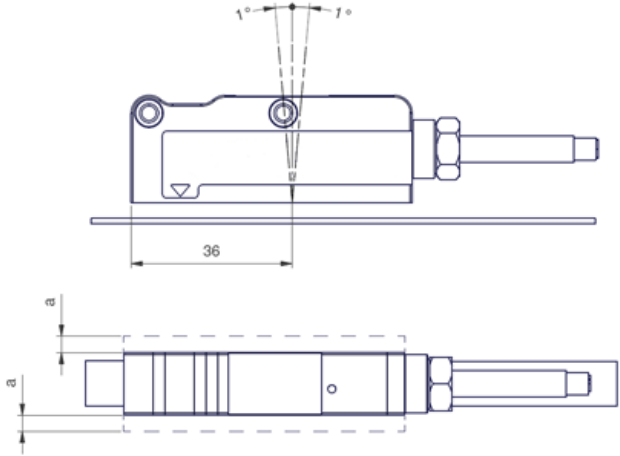
s (mm) = thickness magnetic scale		
MBA2¹⁾	thickness without double-sided adhesive tape	1.3
	thickness with double-sided adhesive tape	1.5
MBA2 + DB01²⁾	thickness with double-sided adhesive tape and cover tape DB01	1.7

d (mm) = distance to be maintained between sensor and surface		
MBA2¹⁾	distance to be maintained between sensor and surface of the magnetic scale (without cover tape)	0.4 ... 1.0
MBA2+ DB01²⁾	distance to be maintained between sensor and surface of the cover tape	max. 0.7

- 1) Absolute magnetic scale MBA2, composed by a magnetized plastoferrite tape, with pole pitch 2+2 mm. The plastoferrite is supported by a stainless steel tape, already provided with an adhesive tape.
- 2) Non-magnetic stainless steel cover tape DB01 on which a double-sided adhesive tape is pre-mounted for a quick sticking and an easy fixing on the magnetic scale.

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Alignment tolerances

AMS2/2 + MBA2	a (mm) = alignment tolerance
	<p>a = 0.5_{MAX}</p>

NOTICE

- Respect the maximum distance between the sensor and the magnetic band.

NOTICE

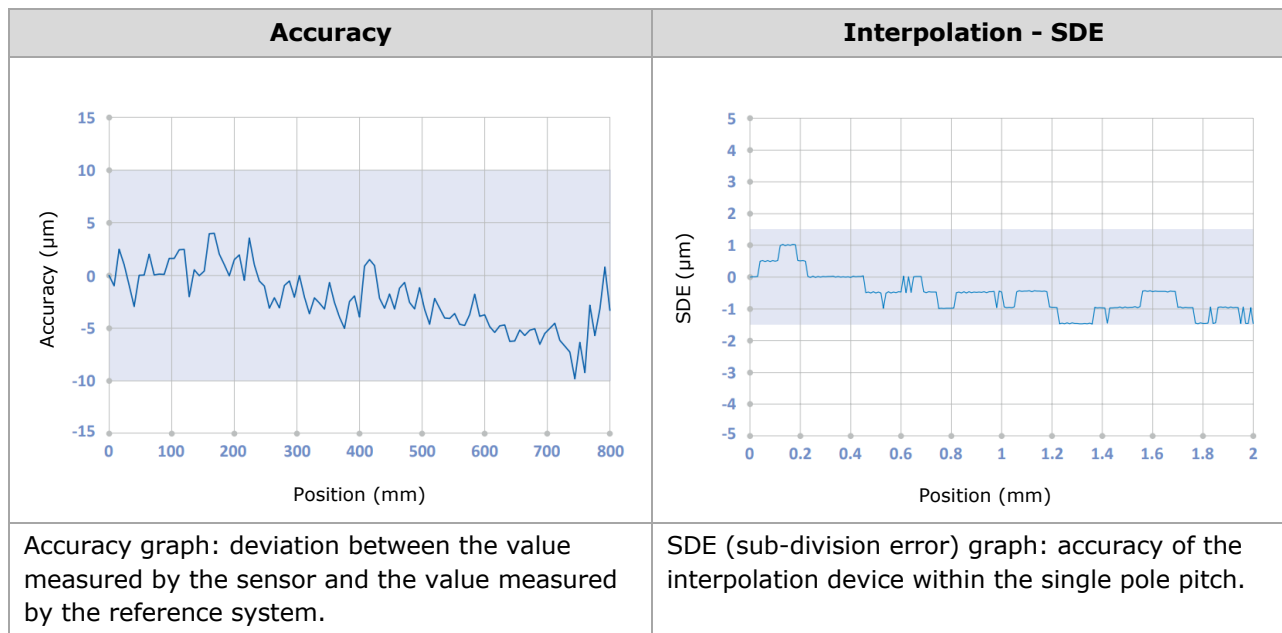
- Avoid the direct contact with magnetized objects or tools that could damage the surface.
- **Do not touch** the contacts of the cable's connector to avoid electrostatic discharges (ESD) on the device.

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The following graphs show tests carried out in a metrological room under controlled climatic conditions:
T= 20 °C ± 0.1 °C and R.H.= 45% ... 55%.

The reference system for the comparison of position measurements is interferometric with 1 nm resolution and equipped with an environmental compensation device. The sensor is installed according to the recommended mechanical configuration at a distance of 0.5 mm from the magnetic scale.

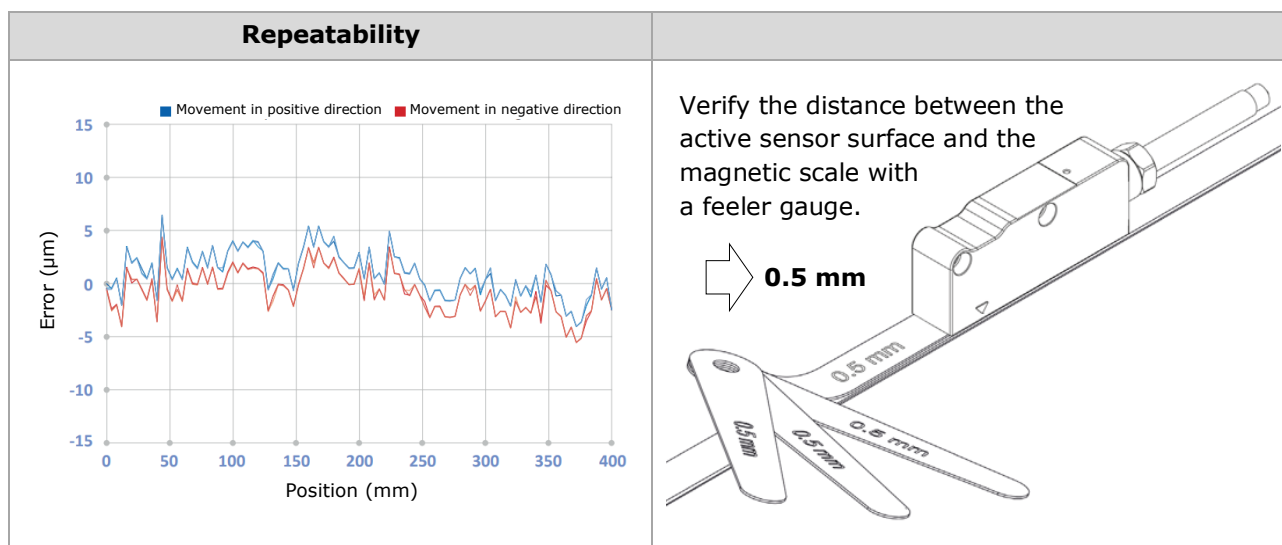
Accuracy and Interpolation



Repeatability

Repeatability graph obtained by carrying out the measurements several times in both directions of advancement.

- Unidirectional repeatability: measurement error detected without inverting the movement direction of the sensor.
- Hysteresis: difference in the measure due to the inversion of the sensor movement direction.



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Ordering example Magnetic sensor

Type AMS2/2 - 1 - A - 528V - S0 - V - M02/S - SC

Pole pitch

2 = 2+2 mm

Resolution [μm]

500; 100; 50; 10; 5; **1**

Cable output

A = axial

R = radial

Power supply

528V = 5 ... 28 VDC

Output signals

S0 = SSI programmable ¹⁾

S1 = SSI binary

S2 = SSI binary+even parity

S3 = SSI binary+odd parity

S4 = SSI binary+error

S5 = SSI binary+even parity+error

S6 = SSI binary+odd parity+error

S7 = SSI Gray

B1 = BiSS binary

Incremental signal

V = +1 Vpp (10-wire cable)

= without incremental signal (6-wire cable)

Cable length/type

M0.3 = 0,3 m (only in combination with connector M12 plug)

M02 = 2 m (standard)

M20 = 20 m

S = 10-wire cable (serial + analog) or 6-wire cable (only serial)

Connector/wiring

SC = without connector, open cable end

CI9 = connector M12 plug straight, 8-pin

CG4 = connector M23 plug straight, 8-pin or 12-pin

CO8 = connector M12 plug straight, 8-pin (only in combination with extension cable type VLK-8)

C12 = connector M12 plug straight, 12-pin (only in combination with extension cable type VLK-12)

¹⁾ Programming device available separately.



Accessories

Please order the magnetic scale, and extension cable for connectors type CO8 and type C12 separately. For ordering information, please refer to the corresponding data sheet.

You can configure the enclosure according to your requirements from the technical information and enter it into the ordering code.

Variants that cannot be configured from the ordering code are available on request as a special version.

Without prior notice, the products may be subject to modifications that the Manufacturer reserves to introduce as deemed necessary for their improvement.