code **ST02** | project **A71** | release **B**

GENERAL CHARACTERISTICS

- Magnetic sensor with direct reading of the absolute position.
- High-speed SSI - BiSS C (unidirectional) serial interface.
- Resolutions up to 0.5 µm and measuring length up to 16000 mm.
- Contactless reading.
- Status indication through LED RGBW.
- Flexible cable that allows the axial or radial output.
- Extremely easy and fast mounting of the sensor and application of the magnetic band, with wide alignment tolerances.
- Small size, to allow installation in narrow spaces.
- Option: 1 Vpp analog signal.
- Magnetic band composed by a magnetized plastoferrite tape, with pole pitch 2+2 mm. The plastoferrite is supported by a stainless steel tape, already provided with the adhesive tape, for an easy application on the machine. To be used with magnetic band MP200AFM.

Cod. MAS

Pole pitch	2+2 mm
Incremental signal	sine wave 1 Vpp (optional)
Resolution 1 Vpp	up to 0.5 µm *
Signal period	2 mm
Serial interface	SSI - BiSS C (unidirectional)
Resolution absolute measure	500 - 100 - 50 - 10 - 5 - 1 - 0.5 µm
Accuracy grade	± 8 µm **
Interpolation error (SDE)	± 1 µm ***
Unidirectional repeatability	± 0.5 µm ***
Hysteresis	1.5 µm ***
Measuring length ML	up to 16000 mm
Max. traversing speed	600 m/min
Vibration resistance (EN 60068-2-6)	200 m/s² [55 ÷ 2000 Hz]
Protection class (EN 60529)	IP 67
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 ± 5%
Current consumption	200 mA_{MAX} (with R = 120 Ω) 5 Vdc 80 mA_{MAX} (with R = 1200 Ω) 24 Vdc
Max. cable length	20 m ****
Electrical connections	see related table
Electrical protections	inversion of polarity and short circuits
Weight	50 g

* Depending on CNC division factor.
** The declared accuracy grade of ± X µm is referred to a measuring length of 1 m.
*** The error declared is subject to the respect of the alignment tolerances.
**** With cable extension, the maximum cable length can be extended to 50 m.

MECHANICAL CHARACTERISTICS

- Magnetic sensor body made of die-cast metallic material.
- Possibility to fix the magnetic sensor with M4 screws or with through M3 screws.
- Wide alignment tolerances.

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).
- High signal stability.
- For applications where the maximum speed exceeds 1 m/s, it is necessary to use a cable suitable for continuous movements.
- CABLE:
  - Flexible cable for axial or radial output.
  - Shielded twisted pair for analog signals (1 Vpp).
  - PUR external sheath with low friction coefficient, resistant to oil and suitable for continuous movements.

SERIAL + ANALOG OUTPUT VERSION
- 10-wire shielded cable ø = 4.8 mm, PUR external sheath.
- Conductors section: power supply 0.14 mm²; signals 0.08 mm².

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

SERIAL OUTPUT VERSION
- 6-wire shielded cable ø = 4.8 mm, PUR external sheath.
- Conductors section: power supply 0.25 mm²; signals 0.14 mm².

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

SIGNALS	CONDUCTOR COLOR
+ V	Brown
0 V	White
CK	Green
$\overline{CK}$	Yellow
D	Pink
$\overline{D}$	Grey
SCH	Shield

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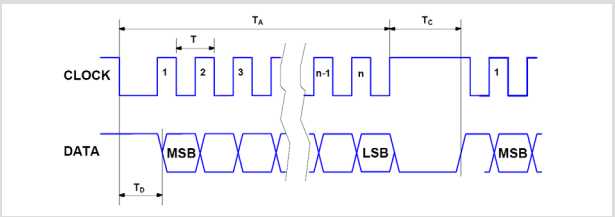
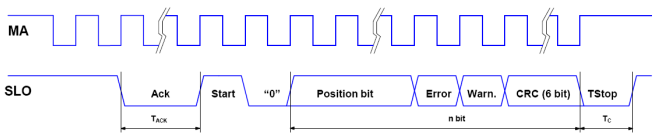
OUTPUT SIGNALS

SSI Version



Interface	SSI Binary – Gray
Signals level	EIA RS 422
Clock frequency	0.1 ÷ 1.2 MHz* Duty cycle 50% ± 10%
n	position bit
T_C	max. 25 µs
T_D	max. 7 µs

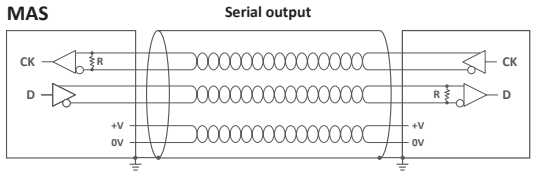
BiSS C (unidirectional) Version



Interface	BiSS C unidirectional
Signals level	EIA RS 485 / RS 422
Clock frequency	0.1 ÷ 8 MHz* Duty cycle 50% ± 10%
n	26 + 2 + 6 bit
T_C	max. 25 µs
T_{ACK}	3 clock

* The maximum frequency is guaranteed with a cable length up to 4 m.

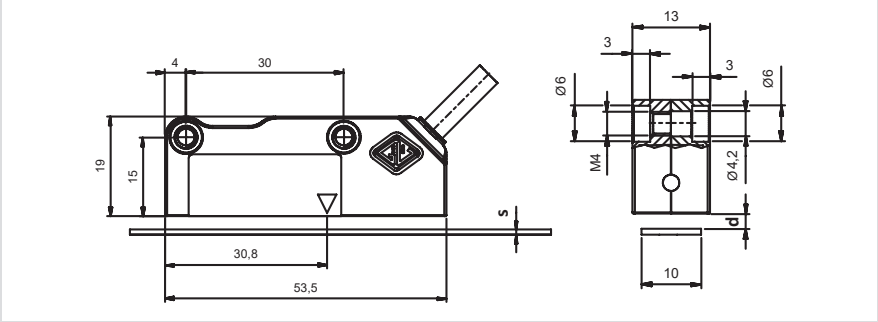
CABLE



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.

DIMENSIONS

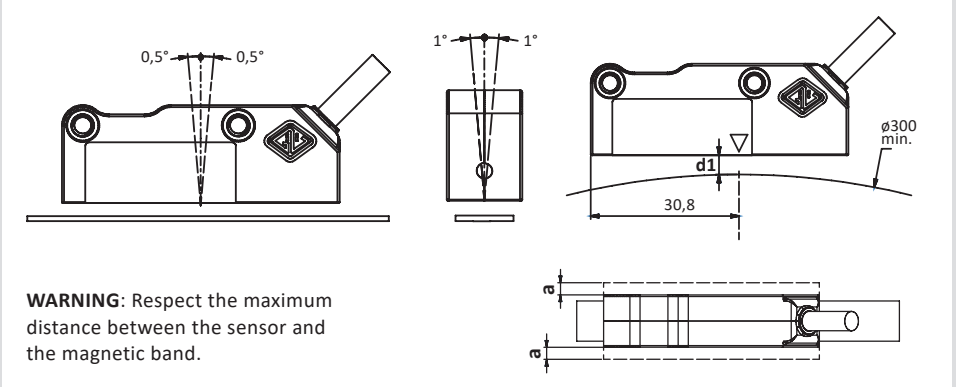


	MP200AFM	MP200AFM + CV103
s (mm)	1.3	1.6
d (mm)	0.1 ÷ 0.8	0.5_{MAX}

s = thickness without double-sided tape. Thickness with double-sided tape + 0.1 mm.

d = distance to be maintained between sensor and surface of the magnetic band (or eventual cover).

ALIGNMENT TOLERANCES



WARNING: Respect the maximum distance between the sensor and the magnetic band.

	MP200AFM	MP200AFM + CV103
d1 (mm)	0.1 ÷ 0.5	0.2_{MAX}

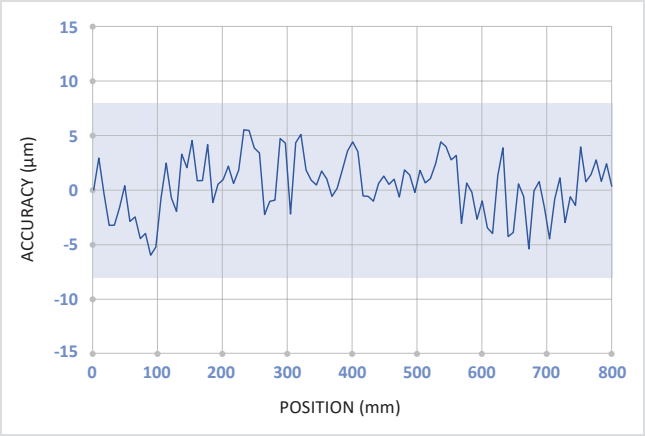
d1 = distance to be maintained between sensor and surface of the magnetic band (or eventual cover).

	MAS
a (mm)	0.5_{MAX}

a = alignment tolerance

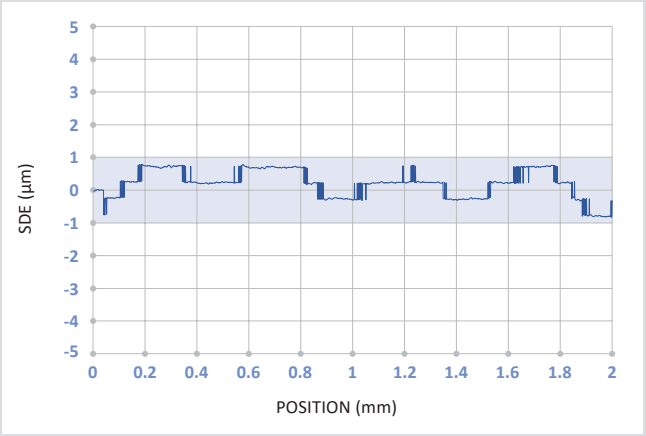
The following graphs show tests carried out in a metrological room under controlled climatic conditions: T= 20 °C ± 0.1 °C and R.H.= 45 ÷ 55%. The reference system for the comparison of position measurements is interferometric with 1 nm resolution and equipped with an environmental compensation device. The sensor is installed according to the recommended mechanical configuration at a distance of 0.5 mm from the magnetic band.

ACCURACY



Accuracy graph: deviation between the value measured by the sensor and the value measured by the reference system.

INTERPOLATION - SDE



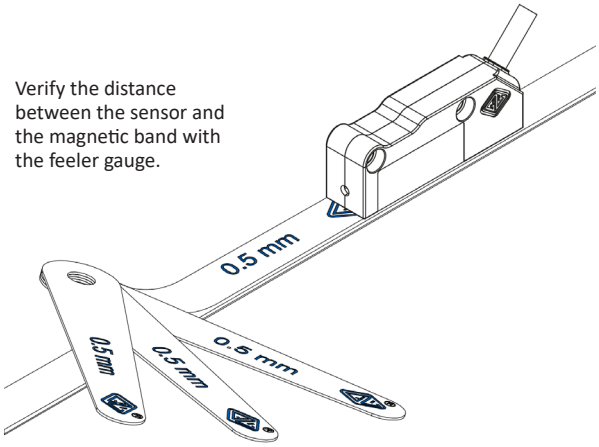
SDE (sub-division error) graph: accuracy of the interpolation device within the single pole pitch.

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.

Verify the distance between the sensor and the magnetic band with the feeler gauge.



WARNING!

Make sure the tools used for assembly are rigorously demagnetized.
DO NOT TOUCH the cable terminals (or connector contacts) to avoid electrostatic discharges (ESD) on the device.

ORDERING CODE

Example MAGNETIC SENSOR **MAS M1 528V S0 V M02/S SC**

Model	Pole pitch	Resolution	Power supply	Output signals	Incremental signal	Cable length, cable type	Connector, wiring
MAS	M = 2+2 mm	500 = 500 µm 100 = 100 µm 50 = 50 µm 10 = 10 µm 5 = 5 µm 1 = 1 µm 05 = 0.5 µm	528V = 5 ÷ 28 V	S0 = SSI programmable 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	V = + 1 Vpp No cod. = no increm. signal	Mnn = length in m M02 = 2 m M20 = 20 m S = PUR cable	SC = without connector Cnn = progressive

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

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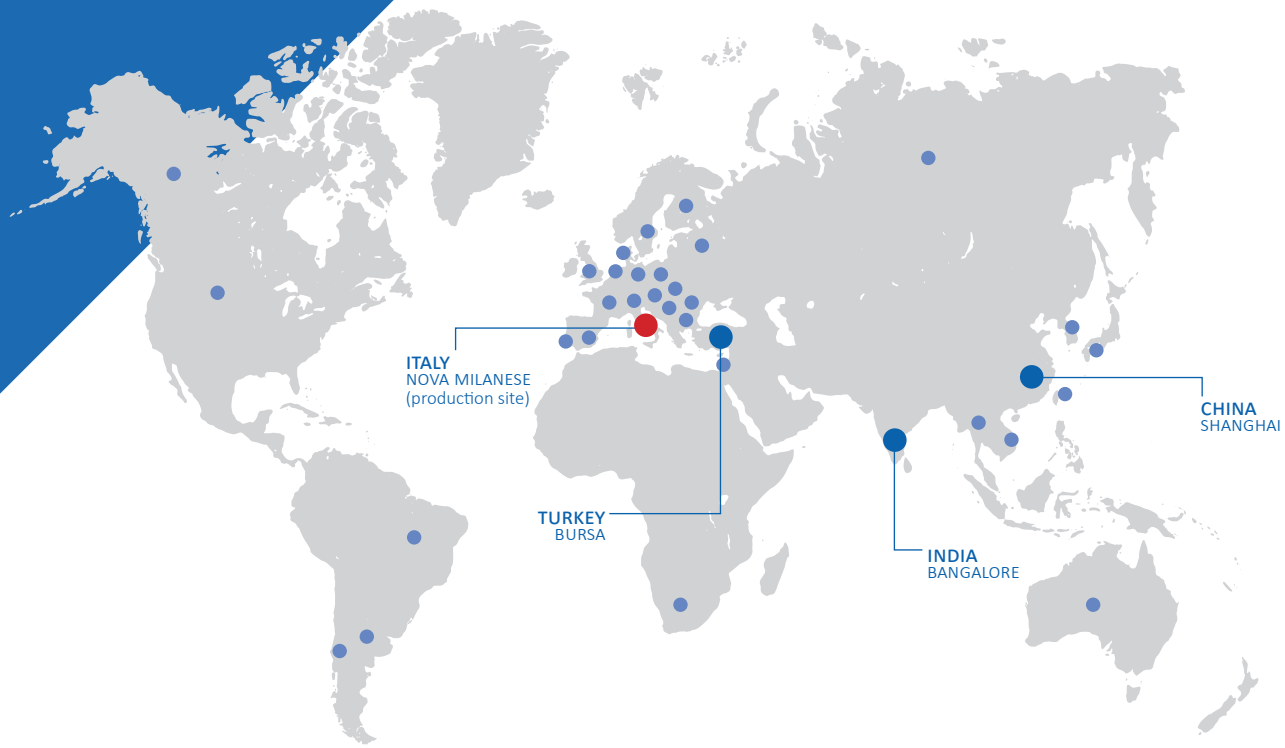

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