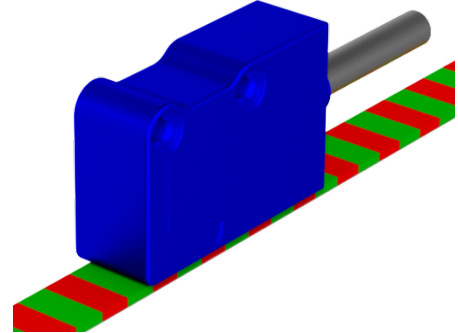# Magnetic Sensor - Incremental
IMS5

Datasheet

General characteristics

- Magnetic sensor for contactless linear and angular reading.
- Small overall dimensions allow installation in narrow spaces.
- Resolutions up to 1 µm programmable through serial interface.
- Easy and fast mounting with wide alignment tolerances.
- 8-wire shielded cable as standard with low friction coefficient and oil-resistant.
- Electrical protection against inversion of power supply polarity and short circuits.
- Protection class IP67.

Technical characteristics

Pole pitch	5+5 mm						
Reference indexes	**C** = constant step (every 5 mm) [1] **E** = external **Z** = positioned on magnetic scale						
Resolution (µm)	250	100	50	25	10	5	1
Accuracy (µm) [2]	±50 µm				±30 µm		
Max. traversing speed [3]	1.2 m/s (resolution 1 µm) 30 m/s (resolution 25 µm)						
Max. frequency	300 kHz (up to 500 kHz on request)						
Repeatability	±1 increment						
A, B and I_0 output signals	Line Driver / Push-Pull						
Vibration resistance (EN 60068-2-6)	300 m/s^2 [55 … 2,000 Hz]						
Shock resistance (EN 60068-2-27)	1.000 m/s^2 (11 ms)						
Protection class (EN 60529)	IP67						
Operating temperature	0 °C … 50 °C						
Storage temperature	-20 °C … 80 °C						
Relative humidity	100%						
Power supply	5 … 28 VDC ±5%						
Current consumption without load	60 mA$_{MAX}$						
Current consumption with load	140 mA$_{MAX}$ (with 5 V and R = 120 Ω) 90 mA$_{MAX}$ (with 28 V and R = 1.2 kΩ)						
Electrical connections	see related table						
Electrical protections	inversion of polarity and short circuits						
Weight	40 g						

[1] With 100 µm resolution, the constant step is 10 mm.

[2] To obtain the declared accuracy values, it is necessary to respect the alignment tolerances prescribed by the Manufacturer. Better accuracy can be obtained by reducing the gap between the sensor and the magnetic scale.

[3] The indicated speeds are referred to a maximum frequency of 300 kHz.

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Mechanical characteristics

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

Electrical characteristics

- Very flexible power cable.
- Reading through positioning sensor based on magneto resistance, with AMR effect (Magnetic Anisotropy).
- High signal stability.
- Electrical protection against inversion of power supply polarity and short circuits on output port.
- For applications where the maximum speed exceeds 1 m/s, it is necessary to use a PUR cable suitable for continuous movements.

Wiring and pin assignment (assignment according to DIN 47100)

8-wire connecting cable

Incremental magnetic sensor IMS5 is supplied with an 8-wire shielded cable, $\varnothing$ = 6.1 mm, PVC external sheath, with low friction coefficient and oil-resistant.
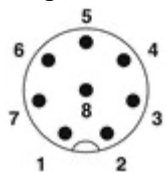Conductors section:
- power supply: 0.35 mm^2
- signals: 0.14 mm^2

PUR cable or cable with reduced section are available on request.

> **PUR cable is suitable for continuous movements.**
> **The cable's bending radius should not be lower than 60 mm.**

Pin diagram **connector M12 plug**, 8-pin, A-coded, view plug side, connected to the connecting cable of the magnetic sensor.
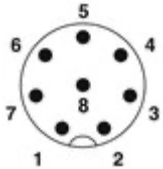

Line Driver	Push-Pull	PIN	Conductor colour
I$_0$	I$_0$	1	brown
$\overline{I0}$	NC	2	yellow
B	B	3	white
$\overline{B}$	NC	4	light-blue
$\overline{A}$	NC	5	orange
A	A	6	green
0V	0V	7	blue
+V	+V	8	red
SCH	SCH		Shield

NC = not connected

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8-wire extension cable

Pin diagram connector M12 plug, 8-pin, A-coded, view plug side, connected to an extension cable (e.g. 0,3 m, 5 m, or 30 m).

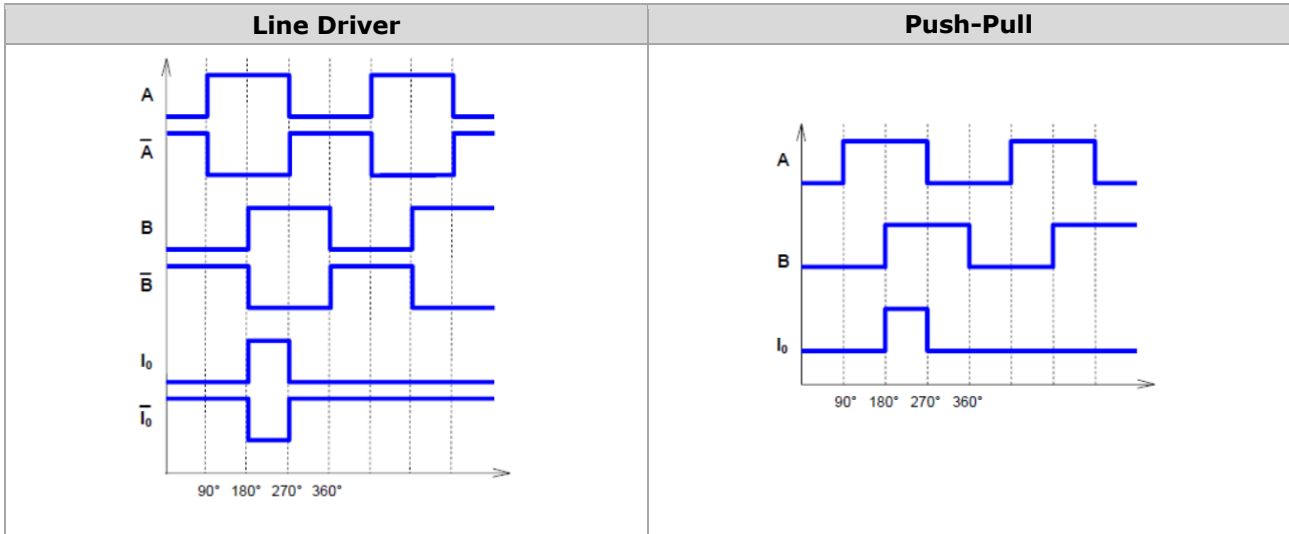| Signal	PIN	Conductor colour
I_0	1	white
$\overline{I0}$	2	brown
B	3	green
$\overline{B}$	4	yellow
$\overline{A}$	5	pink
A	6	grey
0V	7	blue
+V	8	red
SCH		Shield

Pin diagram connector M12 socket, 8-pin, A-coded, view socket side, connected to an extension cable (e.g. 0,3 m, 5 m, or 30 m).
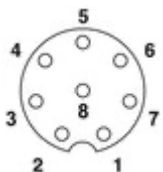
Signal	PIN	Conductor colour
I_0	1	white
$\overline{I0}$	2	brown
B	3	green
$\overline{B}$	4	yellow
$\overline{A}$	5	pink
A	6	grey
0V	7	blue
+V	8	red
SCH		Shield

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Output signals

Line Driver	Push-Pull

Dimensions

IMS5 + PM5
All dimensions in mm
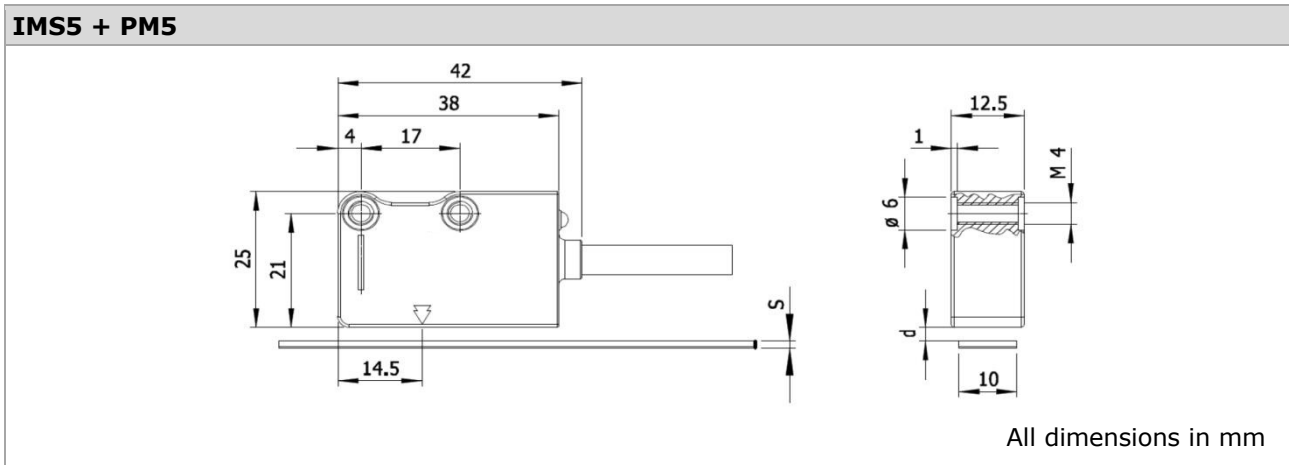
Value in mm	PM5	PM5 + DB01	PM5 + PS1
s	1.3	1.6	2.1
d IMS5	0.3 … 3.7	< 3.7	< 3.2
d IMS5/Z	0.35 … 2.0	< 1.7	< 1.2

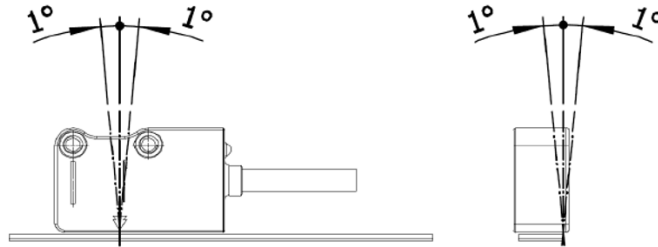s = thickness magnetic scale
d = distance to be observed between the sensor and the surface of the magnetic scale
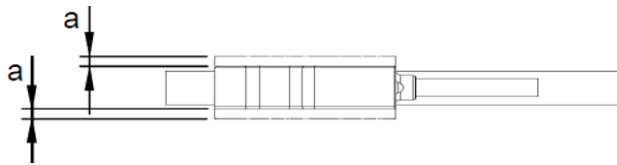(or eventual cover tape/ support)

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Alignment tolerances

IMS5 + PM5

IMS5 + PM5	a (mm) = alignment tolerance
	$a = 3_{MAX}$ [1] IMS5-_-C / IMS5-_-E $a = 1_{MAX}$ [2] IMS5-_-Z Reference indexes: [1] **C** = constant step (every 5 mm) [3] **E** = external [2] **Z** = positioned on magnetic scale

[3]   With 100 µm resolution, the constant step is 10 mm.

NOTICE

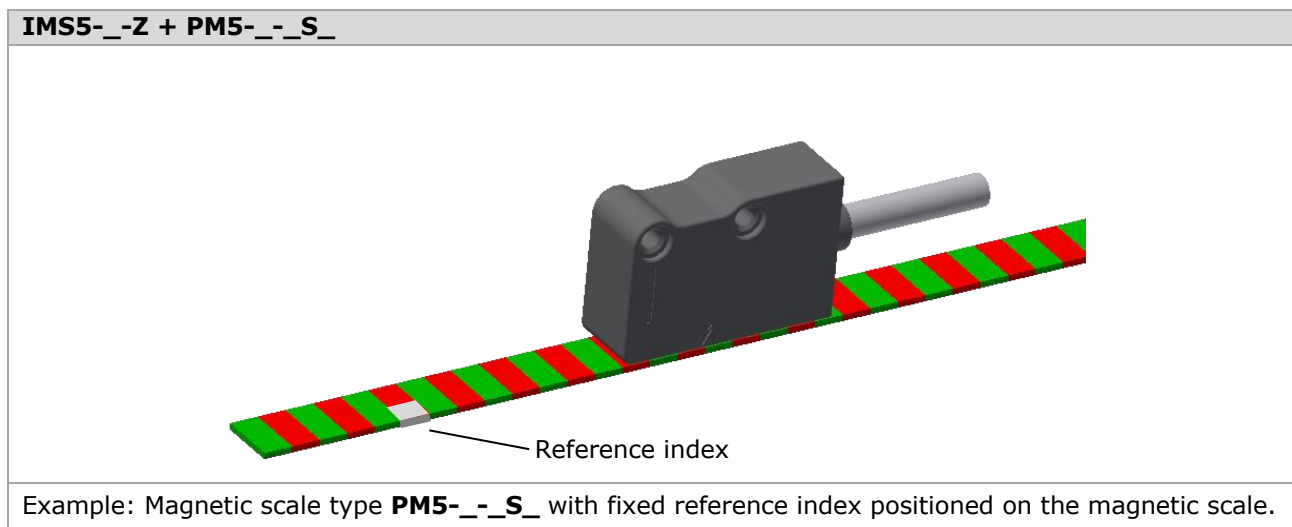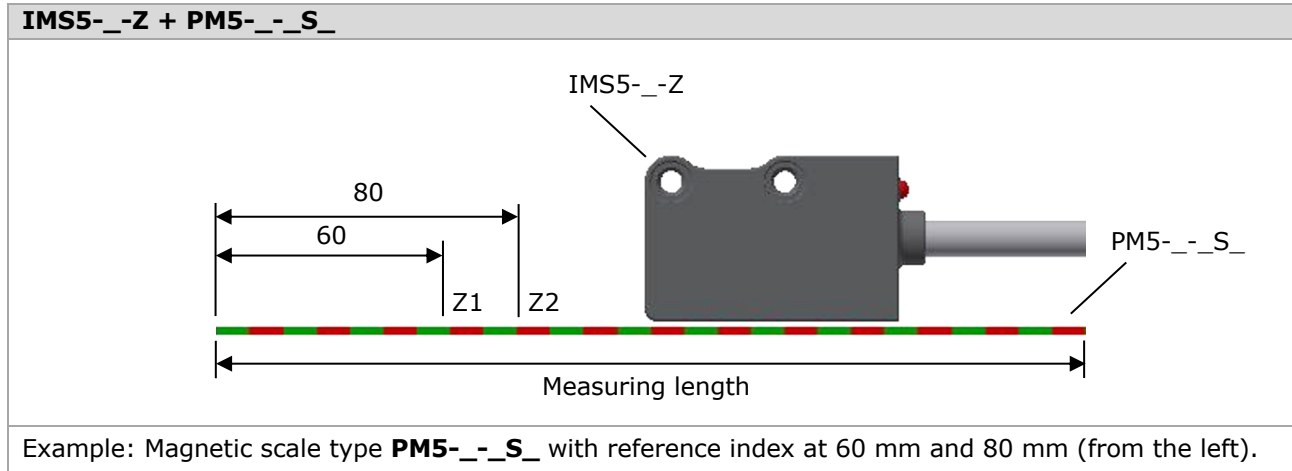- Avoid the direct contact with magnetized objects or tools that could damage the surface.
- **Do not touch** the contacts of the cable's connector to avoid electrostatic discharges (ESD) on the device.

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Reference indexes

To determine the positions of the reference indexes, the magnetic sensor and the magnetic scale must be aligned according to the following figure.
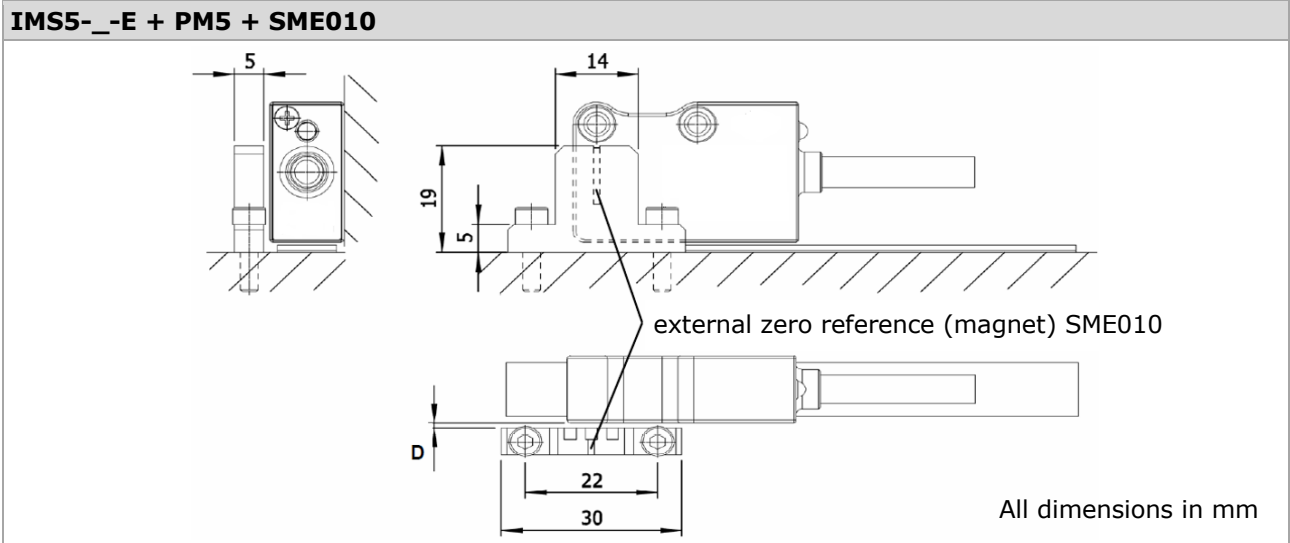
IMS5-_-Z + PM5-_-_S_

Example: Magnetic scale type **PM5-_-_S_** with reference index at 60 mm and 80 mm (from the left).

IMS5-_-Z + PM5-_-_S_

Example: Magnetic scale type **PM5-_-_S_** with fixed reference index positioned on the magnetic scale.

Manual setting of a reference point on the magnetic scale
On customer request, a specific reference index can be integrated at any position on the magnetic scale type **PM5-_-_S_** by selectively demagnetising the magnetic track. Information on this can be found in the data sheet and the operating instructions for the magnetic scale.

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External reference index

IMS5-_-E + PM5 + SME010

external zero reference (magnet) SME010

All dimensions in mm

Value in mm	D	
IMS5-_-E + PM5	1_{TYP}	< 2

D = distance to be observed between magnetic sensor and **external zero reference**.

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Ordering example

Type						IMS5	-	10	-	C	-	528V	-	L	-	M02/N	-	SC

Pole pitch

5 = 5+5 mm

Resolution [µm]

250 / 100 / 50 / 25 / **10** / 5 / 1

Reference index

C = constant step (every 5 mm) [1]
E = external
Z = positioned on magnetic scale

Power supply

528V = 5 VDC … 28 VDC
5285 = 5 VDC … 28 VDC with 5 V output

Output signals

L = Line Driver
Y = Push-Pull

Cable [2] [3]

M01/N = 1 m
M02/N = 2 m
M03/N = 3 m

Connection

SC = without connector, open cable end
Cxx = progressive (e.g. C08 = connector M12 plug, 8-pin)

[1] With 100 µm resolution, the constant step is 10 mm.

ℹ Cable
[2]   Different cable lengths are available. The sensor is provided with a 2 m cable as standard.
Longer lengths are available with the following application limits:
L_{max} = 10 m sensor cable
L_{max} = 100 m sensor cable (2 m) + cable extension
Cable extensions need to have a 0.5 mm^2 section for power supply conductors.
[3]   For applications where the maximum speed exceeds 1 m/s, it is necessary to use a PUR cable suitable for continuous movements.

ℹ Accessories
Please order the magnetic scale, the corresponding cover tape, the external zero reference (magnet) and the extension cable 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 example 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. Mistakes excepted.

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