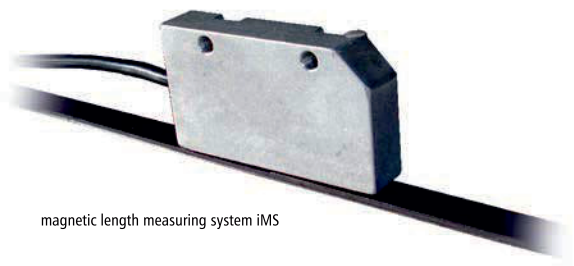
Magnetic length measuring system iMS

English

General

The iMS contactless magnetic measuring system relies on scanning a magnetically coded measuring tape by means of a magnetically sensitive sensor and is suitable for detection of both linear and radial positions. A decisive advantage compared with significantly more expensive optical systems is provided by its insensitivity to contamination caused by liquids, greases and dust. Our length measuring system is therefore a cost-effective alternative to other systems on the market.



magnetic length measuring system iMS

Available sensor interfaces for further processing in the peripherals are, optionally, a pulse sensor with incremental RS422 AB output
(Z optional)

As a measurement standard is a magnetic tape with a pole length of 2mm, that is
North-pole = 2mm,
+ South-pole = 2mm → a magnetic period = 4mm.

Ordering options

Sensor interface

- Standard **RS422** compatible, incremental interface → interface **D**
  The information on the sensor resolution relate to a magnetically internal evaluation 4x edge evaluation on a periodic evaluation of 2mm magnetic.

Sensor power supply

- Standard 5V sensor power supply ±5% → **V5**

Cable outlet

- Standard cable drag chains suitable, 9-pin, 4mm diameter, open wires, stripped - length 0,5m → **K**
  Kx → x = 1 … up to 9 meters in length
- Option: cable drag chains suitable, 9-pin, 4mm diameter, SubD15 plug – Cable length option → **KSx** → x = 1 … up to 9 meters in length

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Technical specifications subject to change.

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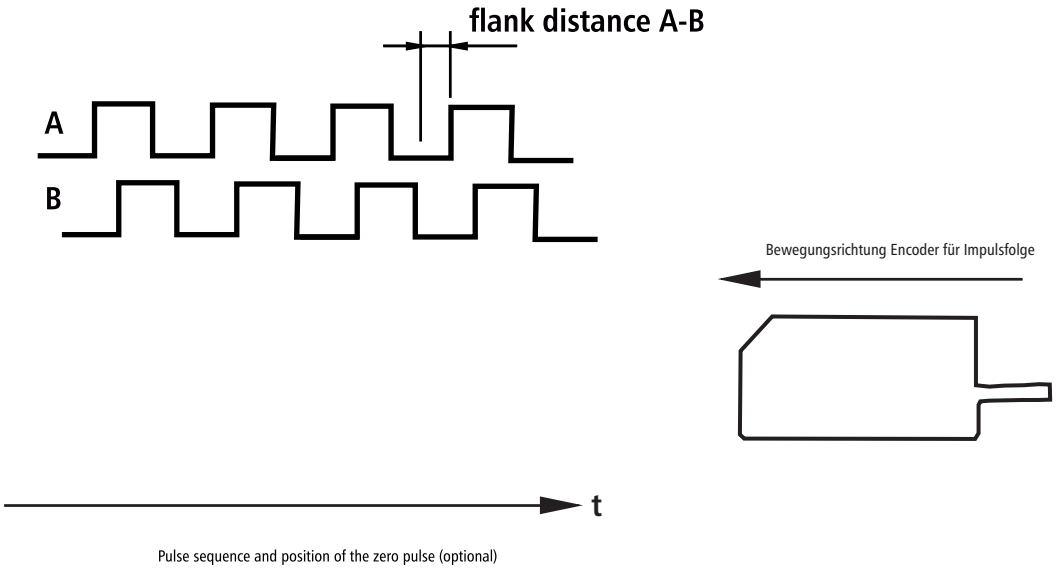
Table: Ordering options Sensor resolution (Standard= highlighted in bold)

	flank distance channel A - channel B, pole length 2mm					
	0,25µs	0,55µs	1µs	2µs	4µs	8µs
resolution / code	**Travel speed in meters per second / order option: Resolution**					
20µm	20,00 / A1	10,00 / A2	5,50 / A3	3,00 / A4	1,50 / A5	0,75 / A6
10µm	20,00 / B1	10,00 / B2	5,50 / B3	3,00 / B4	1,50 / B5	0,75 / B6
5µm	10,00 / C1	***5,25 / C2***	2,70 /C3	1,50 / C4	0,75 / C5	0,35 / C6
2,5µm	5,40 / D1	2,70 / D2	1,40 / D3	0,75 / D4	0,35 / D5	0,15 / D6
1µm	2,00 / E1	1,00 / E2	0,50 / E3	0,30 / E4	0,15 / E5	0,075 / E6
	Travel speed in meters per second					
Analog 1VSS	20,00	20,00	20,00	20,00	20,00	20,00

Note the maximum counting frequency of your subsequent electronics. (see figure below)



Pulse sequence and position of the zero pulse (optional)

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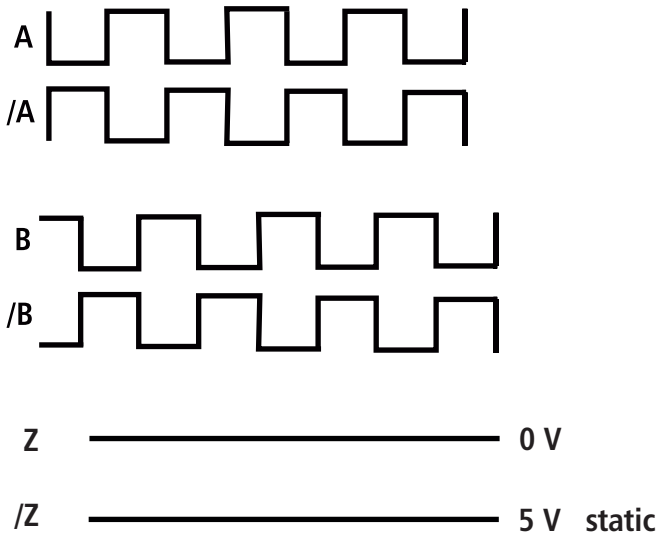
RS422-output signals



Ordering example

iMS - interface - **resolution** – sensor power supply - cable outlet

Example: iMS - D – C2 – V5 – KS1
→ iMS Sensor, RS422, 5μm resolution and minimal flank distance of 550ns, 5V supply, encapsulated SUBD9, cable length 1 meter, SUBD15 plug

Installation instructions

Assembly of the magnetic tape:

- The mounting surface must be free of grease and dust
- The magnetic tape must be mounted to the measuring system without offset and ripples in flight. The magnetic tape is to be mounted centrally to the sensor.
  (Requires: no reference track on the magnetic tape coded)
- After degreasing the pad with alcohol / acetone and drying, the magnetic tape is to be aligned provisionally in the measuring direction, remove the protective tape on the adhesive side about 10cm, glue the tape on and now in constant change: glue the tape on / remove the protective tape until the tape is completely bonded is.
  Please note that the tape is not to resolve again. A repeated subtraction can lead to damage of the magnetic tape. Please check your application.
- Application temperature of the magnetic tape: 20 ° C to 30 °

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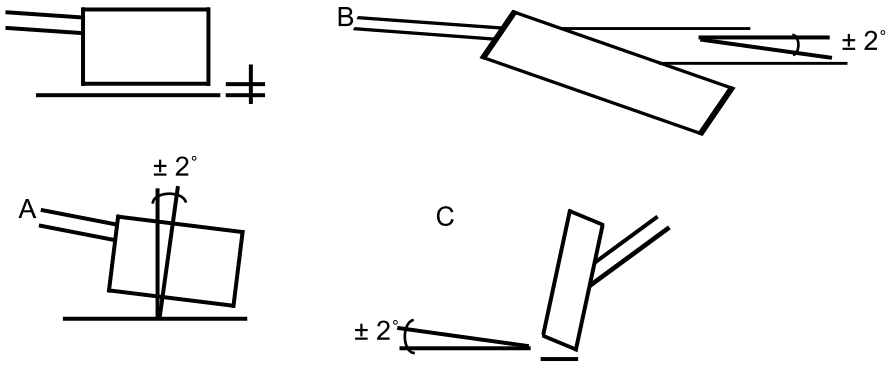
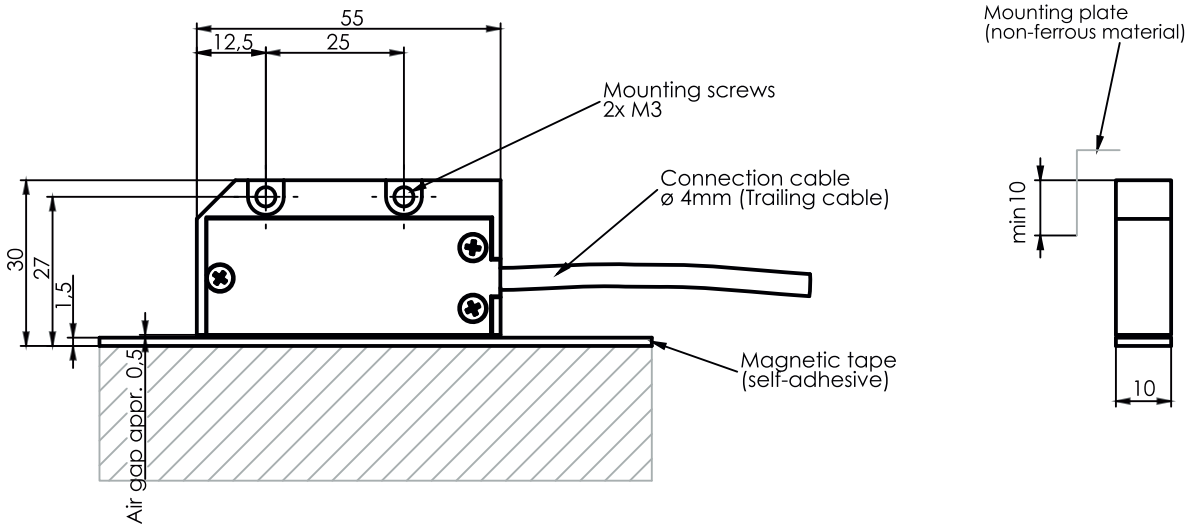
Mounting of the path sensor:

- The mounting surface must be flat and in XYZ rond to the magnetic tape, may be provided within the following tolerances
  - * Misalignment A direction < ± 2 °
  - * B direction < ± 2 °
  - * C direction < ± 2 °
  - (see image sensor installation)





- The path sensor is to be mounted at a sufficient distance to strong external magnetic fields.
- Excessive shock or vibration should be avoided. On a vibration-free mounting of the path sensor is essential to ensure.
- A direct mounting of the measuring head to a metal stopper must be avoided in order to prevent magnetic interference of the sensor. For this individual case, a pad of 10mm non-ferrous material between the sensor and the stop must be provided.
- To adjust the sensor distance sensor - magnetic tape, slide the supplied spacer between the magnetic tape and the sensor. Tighten the fixing screws. Note that the spacer can be pulled out easily after tightening the sensor mounting.

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Technical Data

Sensor

Mechanical specifications	
Casing	Aluminium
Sensor lead	PUR
Cable bending radius	>10mm, first bend > 10mm from sensor casing
Electronic data	
Supply voltage	Standard 4,75V to 5,25V / optional 7V to 15V
Current train	< 100mA
Output signals	Standard RS422 A, /A, B, /B optional reference Z, /Z Option: SIN/ COS 1Vss +20%, -40%, Z und /Z right sign
Termination	Terminating resistor = 120 Ohm between corresponding output signals, e.g. A - /A, at receiver
Distance Sensor - Magnetic tape	0,4mm to 0,7mm
Resolution Sensor incremental	1 µm, 2.5 µm, 5 µm, 10 µm, 20 µm
Pulse interval	0.25 µs, 0.55 ns, 1 µs, 2 µs, 4 µs, 8 µs
Maximum speed	see table 1
Repeat accuracy	Incremental resolution ± 1 increment, plus errors due to angular tilting in the 3 sensor axes
Accuracy	Measurement error 20 µm, plus errors due to angular tilting in the 3 sensor axes
Reference sequence	optional: NSN (special order)
Ambient conditions	
Operating temperature	-5°C to 80°C
Storage temperature	-20°C to 100°C
Air humidity (only sensor)	100%, dewing allowed

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Normal measuring - magnetic tape

operating temperature	-5°C to 80°C
Material	High quality stainless steel, coding bearer elastomer, self-adhesive
Thickness	1.3 mm ± 0.15 mm + bonding layer 0.13 mm, optional: 0.1 mm stainless steel tape + 0.2 mm bonding layer
Width	10 mm
Length	up to 50m on roll
Pole pitch/PITCH	2 mm, i.e. north pole = 2 mm, south pole = 2 mm magnetic period = 4 mm
Number of tracks	Single track, 10 mm wide Option: signal track 5 mm, reference track periodically 5 mm
Accuracy	± 0.04mm/m, at 20°C
expansion coefficient	17x10 exp-6m / Kelvin
Ambient conditions	
with no or minimum effect on the measurement norm	Chemical resistance to contamination with motor oil, gearbox oil, ATF, hydraulic oil, kerosene, antifreeze, Clorox disinfectant, turpentine, water, brine. The materials listed have no or little effect on the long term stability of the measurement standard; this depends, among other things, on the concentration, the temperature and the time of the contamination. Please check your own case.
little/average effect on the measurement standard	Jet petrol, carburettor fuels, heptanes, alcohols
strong effect on the measurement standard	Aromatic hydrocarbons, ketones, inorganic acids

On request, the following pole lengths are optional:
1mm, 2.5mm, 5mm

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General informationen:

- Place of installation according to the installation instructions.
- Avoid sensor protection against shock and vibration!
- Keep a sufficient distance from the sensor to disturbing magnetic fields.
- Observe minimum and maximum working air gap between the magnetic tape and the sensor.
- Comply with Permitted angle tipping of the sensor to the magnetic tape.

Color mapping sensor for ordering option cable outlet open cable ends:

Coulour	RS 422	Option 1Vss
white	A	SIN
violett	/A	/SIN
grey	B	COS
orange	/B	/COS
brown	Z	Z
blue	/Z	/Z
yellow	Do not use, do not connect	TEST
red	+supply, look at the technical data sensor	
black	GND - Sensor supply	

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SubD15 15 connector occupancy sensor:

Pin	Signal name	Signal direction	Meaning
1	N.C.		
2	+5V, optional 7V .. 12V	IN	Power supply sensor
3	/Z	OUT	Track signal /Z when not in use static HIGH
4	/B	OUT	Track signal /B
5	/A	OUT	Track signal /A
6	N.C.	-	-
7	N.C.	-	-
8	N.C.	-	-
9	N.C.	-	-
10	GND-Encoder	IN	GND Power supply sensor
11	Z		Track signal Z when not in use static LOW
12	B		Track signal B
13	A		Track signal A
14	N.C.	-	-
15	N.C. Casing	-	- shield connection

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