

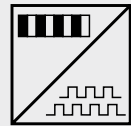
PMIS3 POSIMAG[®] Magnetic Scale Position Sensor



Very compact sensor for industrial applications Sensor head PMIS3

- Non-contact, no wear
- High velocity
- Robust shielded metal enclosure
- Protection class IP67
- Incremental encoder output A/B/Z
- Signal processing as usual with encoders
- Reference pulse and end position signal
- Indicator for velocity/position errors

A POSIMAG measuring system consists of the sensor head PMIS3 and the magnetic scale PMIB3 with the same magnetic period.



Specifications	Output	
		Incremental encoder output A/B with differential push-pull output, TTL/RS422 or HTL compatible
Excitation voltage	10 ... 30 VDC or 5 VDC ±5 %	
Excitation current	50 mA to 300 mA, depending on pulse frequency, cable length and load	
Magnetic period of the sensor	2 mm	5 mm
Guided spacing between sensor and mag. scale (x ₂)	0.1 ... 0.8 mm	0.1 ... 2 mm
Side tracking tolerance of the sensor	±1 mm	±1 mm
Linearity (sensor with mag. scale PMIB3)	15 µm ± 40 µm/m	30 µm ± 40 µm/m
Repeatability	± 1 digit	
Resolution with ext. times 4 counting mode [µm]	5 10 20 50	10 25 50 125
Max. velocity with fp=50 kHz [m/s] (20 kHz: x 0.4; 10 kHz: x 0.2)	0.8 1.6 3.2 8	1.6 4 8 20

Order code PMIS3



Model name

Magnetic period

20 = 2 mm / 50 = 5 mm

Resolution (in µm) with times 4 counting mode

Mag. period 2 mm: 5 / 10 / 20 / 50

Mag. period 5 mm: 10 / 25 / 50 / 125

Max. pulse frequency (in kHz, standard 50 kHz)

50 / 20 / 10

Output

HTL = HTL output with excitation 24 VDC, output 24 V

TTL = TTL output with excitation 5 VDC, output TTL/RS422

TTL24V = TTL output with excitation 24 VDC, output TTL/10 mA

Reference pulse/ end position signal/ status signal

Z0 = A/B w/o reference pulse / Z1 = A/B with reference pulse Z

Z2 = A/B with end position signal / *Z3 = A/B with reference pulse

and status signal

(Option Z3 only for non-differential output, single ended)

Cable length (in m, standard 2 m)

Connection

S = Cable output, open end

P / SD15 = SUB-D connector at the cable end: P = 9 pins; SD15 = 15 pins

Order example: PMIS3 - 50 - 25 - 50KHZ - HTL - Z1 - 2M - S

PMIS3 POSIMAG[®] Magnetic Scale Position Sensor



Specifications (continued)	Max. pulse frequency f_p	50 kHz, 20 kHz, 10 kHz (standard 50 kHz)
	Outputs	A, A', B, B', reference pulse Z, Z', end position signal E, E', status signal ERR
	Material of enclosure	Zinc die casting
	Electrical connection	Cable 8 wire, \varnothing 5 mm, open cable end, 9 pin SUB-D connector at the cable end as option. Max. length of the integrated sensor cable for TTL: 3 m; HTL/TTL24V: 20 m
	Weight (w/o cable and connector)	30 \pm 5 g
	Protection class (EN 60529)	IP67
	Environmental	
	Shock	EN 60068-2-27:1993, 50 g 6 ms, 100 shocks
	Vibration	EN 60068-2-6:1995, 20 g, 10-2000 Hz, 10 cycles
	EMC	DIN EN 61326
Temperature	-40 ... +85°C	



The subsequent counting device must be able to process the specified maximum pulse frequency of the sensor.

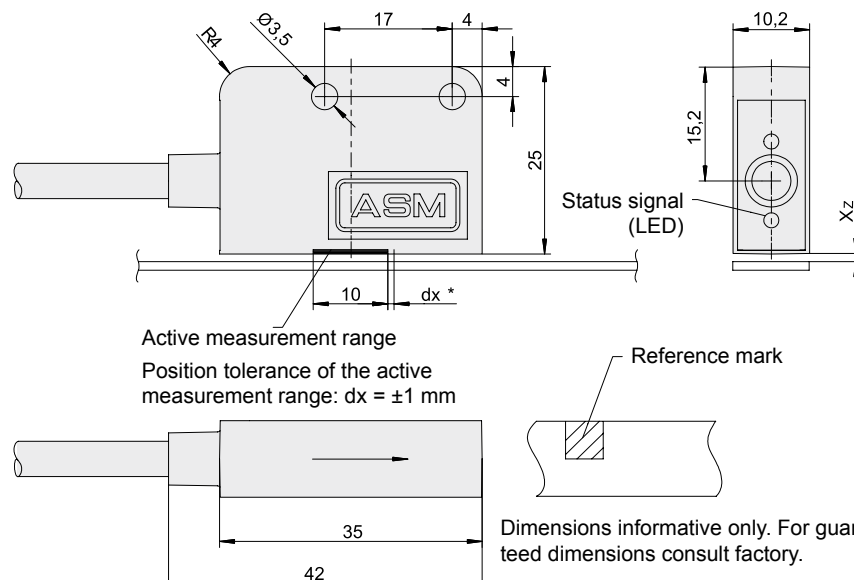
Output signals	Saturation voltage	UH, UL = 0,2 V UH, UL = 0,4 V $C_{last} < 10$ nF	$I_{out} = \pm 10$ mA (UH = UB - U _{out}) $I_{out} = \pm 30$ mA
	Short circuit current	ISL, ISH < 800 mA ISL, ISH < 90 mA	(UH, UL = 0 V) (UH, UL = 1,5 V)
	Rise time	$t_r, t_f < 200$ ns	with cable length 1 m, 10 % ... 90 %

Pulse frequency in dependence on the cable length	Load/cable length	Load/pulse frequency f_p		
		HTL single ended UB = 24 V	TTL/RS422 differential UB = 5 V *	TTL/24 V UB = 24 V
	Max. output current	50 mA	50 mA	10 mA
	R_{last} min.	500 Ω	100 Ω	500 Ω
	C_{last} max.	10 nF	10 nF	1 nF
	200 m	15 kHz	—	—
	100 m	25 kHz	100 kHz	—
	50 m	50 kHz	200 kHz	50 kHz
	10 m	100 kHz	300 kHz	100 kHz

* = consider the voltage loss of the cable; the excitation voltage 5 V \pm 5% of the sensor must be guaranteed.

Note: For longer distances (see specification above) you must use min. 0,5 mm² wire for „Excitation+“ and „Excitation GND“ (see signal wiring next page), all signal wires must be min. 0,14 mm²!

Outline drawing

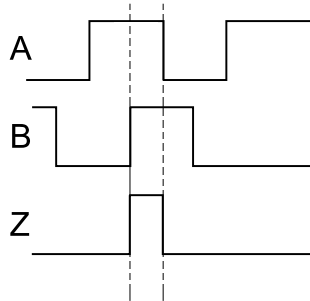


PMIS3 POSIMAG[®] Magnetic Scale Position Sensor

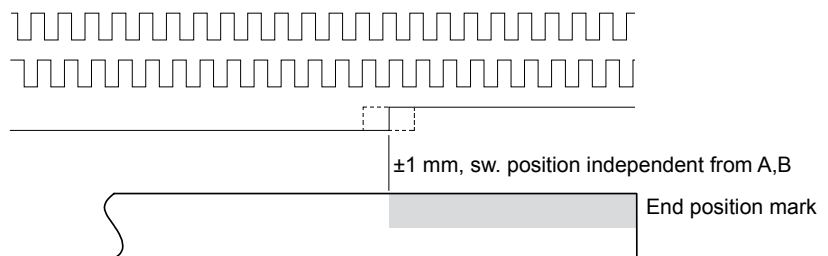


Output signals

Option Z1 (Reference pulse)

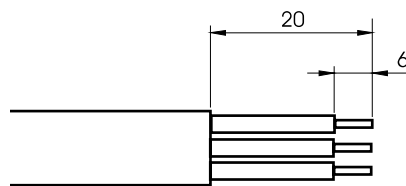


Option Z2 (End position signal)

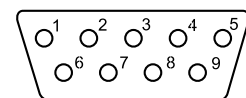


Signal wiring / connection	Signal name					Open cable end Cable colour	Conn. SUB-D, 9 pin pin no.
	Option	Z0	Z1	Z2	Z3*		
Excitation +						white	1
Excitation GND (0V)						brown	5
		B	B	B	B	green	2
		A	A	A	A	yellow	3
		\overline{B}	\overline{B}	\overline{B}	ERR	grey	7
		\overline{A}	\overline{A}	\overline{A}	-	pink	6
		-	Z	\overline{E}	Z	blue	4
		-	\overline{Z}	E	-	red	8
Shield						black	9

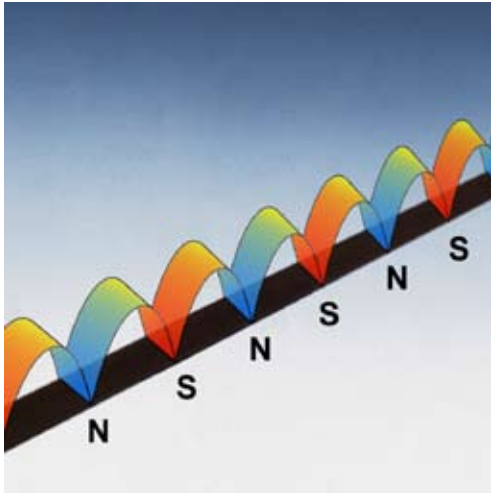
- Z = reference pulse
- E = end position signal
- ERR = status signal, periodical approx. 16 Hz, for side tracking and velocity errors
- * = status signal \overline{ERR} available only with HTL (single ended) output



Cable output dimensions



Connector SUB-D (Pin)
View to connector pins



Magnetic scale PMIB3 for Position Sensor PMIS3

- Easy splicing
- Resistant to moisture and many fluids
- Extensive ruggedness against dust etc.
- High temperature durability
- Magnetic scale with stainless steel base

The magnetic material is magnetised in defined and even distances and works as a solid measure. Reference marks can be user defined in 4 mm resp. 10 mm steps. The magnetic scale retains its firmness by means of a spring steel base (stainless steel strip CrNi 17 7).

Specifications		Solid measure	
		Plastic bonded flexible permanent magnet	
Base material		Stainless steel CrNi 17 7 / elastomer	
Masking tape		Stainless steel (non magnetic)	
Measurement ranges		e.g. 100 ... 2500 mm (up to 50 m on request)	
Width		10 mm +0.1 mm / -0.2 mm	
Thickness (with masking tape)		1.7 mm ±0.1 mm	
Magnetic period		2 mm	5 mm
Linearity at 25°C	up to 30 m	±40 µm/m	±40 µm/m
	up to 50 m	±80 µm/m	±80 µm/m
Reference mark (reference pulse)		max. every 4 mm	max. every 10 mm
Measurement range		must be divisible by 4	must be divisible by 10
Linear thermal expansion coefficient		17 x 10 ⁻⁶ / K	
Operating temperature		-40 ... +100°C	

An unmagnetic masking tape made of stainless steel is available (accessories). The magnetic scale is flexible and can be glued to the surface of a cylinder with a minimum radius of 100 mm and used for angular measurements.

Order code PMIB3



Model name

Magnetic period

20 = 2 mm / 50 = 5 mm

Mounting of the magnetic scale

N = adhesive taping

Measurement range (total length = range + X mm, refer to the table on page 12)

e.g. 100, 500, 1000 ... 2500 mm (up to 50 m on request)

Measurement ranges must be divisible by 4 (resp. by 10)

Reference marks/end position marks (optional)

R1 = reference mark on the left / R2 = on the right

E1 = end position mark on the left / E2 = on the right

Additional reference marks every 4 mm (period 2 mm) resp. 10 mm (period 5 mm) from the left

Options

FP = magnetic scale in flat profile

HP = magnetic scale in high profile

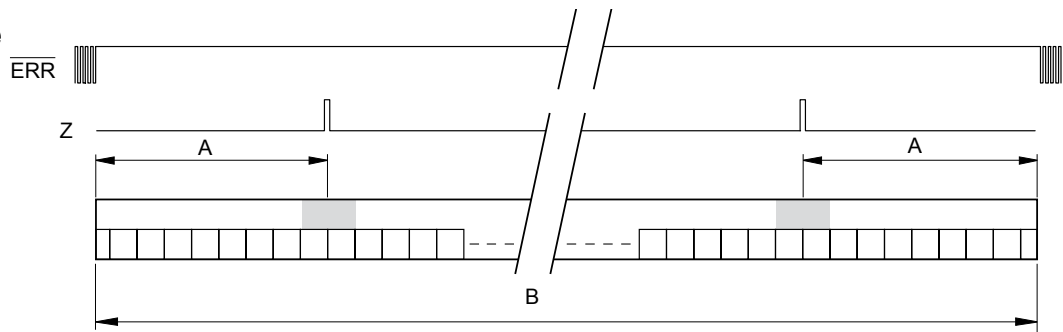
AB = masking tape (only with FP + HP)

Order example: PMIB3 - 50 - N - 1500 - R1

PMIS3/PMIB3 POSIMAG® Magnetic Scale



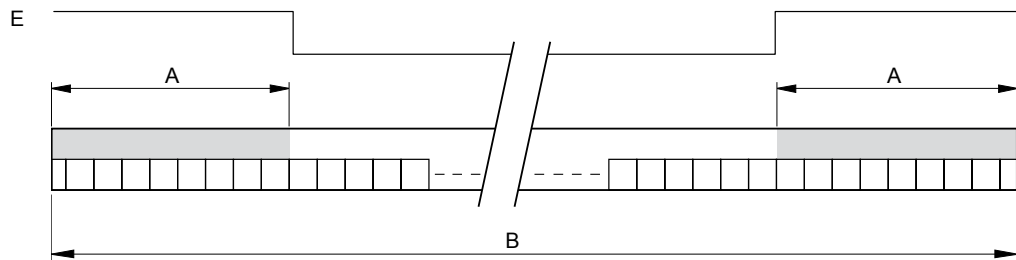
Position of the standard reference marks



Dimensions reference	Magnetic period	Switching position A	Total length B
	2 mm	20.0 ±1 mm	measurement range + 40 mm
	5 mm		
	2 mm with high profile	60.0 ±1 mm	measurement range + 120 mm
	5 mm with high profile		

Additional reference marks every 4 mm (period 2 mm) resp. 10 mm (period 5 mm) from the left h. s.

Position of the end position marks



Dimensions end positions	Magnetic period	Switching position A	Total length B
	2 mm	21.0 ±1 mm	measurement range + 50 mm
	5 mm	22.5 ±1 mm	measurement range + 50 mm
	2 mm with high profile	61.0 ±1 mm	measurement range + 130 mm
	5 mm with high profile	62.5 ±1 mm	measurement range + 130 mm

PMIS3/PMIB3 POSIMAG®

Magnetostrictive Position Sensor

Accessories



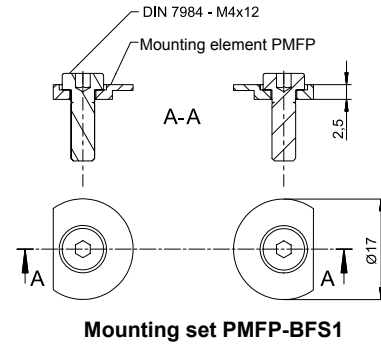
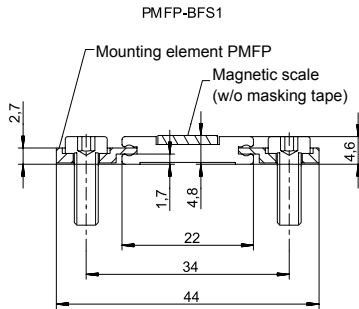
Masking tape PMAB:

Masking tape made of stainless steel for POSIMAG magnetic scale PMIB3, width 10 mm, thickness 0.2 mm

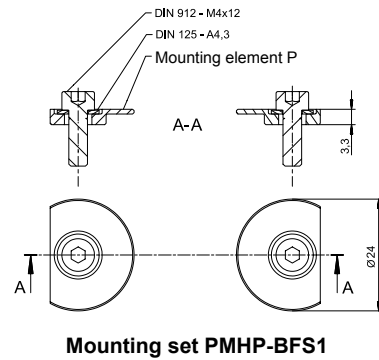
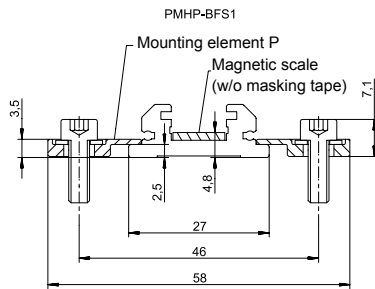
Order code: PMAB — 10MM —

Length in mm

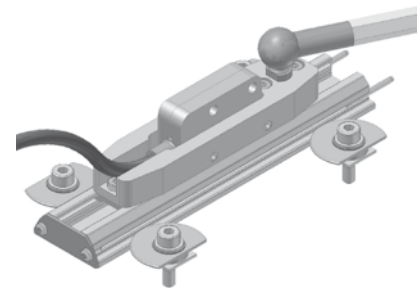
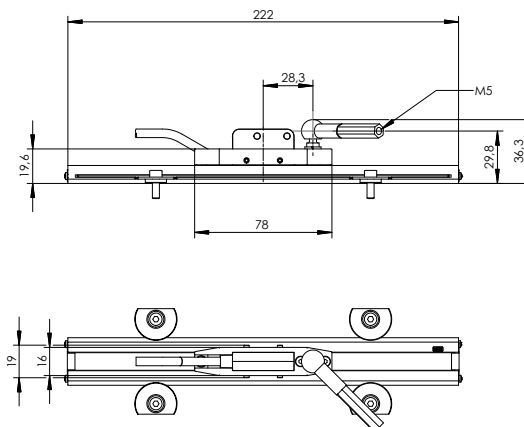
Outline drawing flat profile PMFP



Outline drawing high profile PMHP



Slider for high profile PMGW3



Dimensions informative only. For guaranteed dimensions consult factory.

Magnetic Scales – Technical Information

Types of magnetic scales / Application recommendation

Type	Stainless steel elastomer scale PMIB3
base strip	CrNi 17 7 stainless steel
magnetic scale	Elastomer magnetic scale
environmental conditions	very difficult
corrosion resistance	high
temperature resistance	high
media resistance	high

Chemical durability – Elastomer magnetic scales (PMIB3)

no / little influence	weak / middle influence	strong influence
motor oils gear oils ATF (automatic transmission fluid) hydraulic fluid kerosene antifreeze agent purifying agent turpentine water sea water/salt water	JP-4 fuel (Jet fuel) gasoline/petrol heptane alcohol	aromatic hydrocarbon (benzene, toluene, xylene) ketone anorganic acids (HCl, H ₂ SO ₄)