

# Linear encoders without bearings incremental

## System for linear motion feedback

### Sensing head with magnetic tape

#### MIL10



MIL10

#### Features

- Sensing head with magnetic tape
- Robust magnetic sensing method
- Output signals A 90° B with index signal
- Output circuits: HTL/push-pull and TTL/RS422
- Resolution up to 5 µm (4-times evaluation)
- Non-contact, wear-free sensing system
- High resistant to dirt, vibrations

#### Technical data - electrical ratings

Sensing method	Magnetic
Resolution	5 µm (4-times evaluation) 10 µm (4-times evaluation) 25 µm (4-times evaluation)
Interpolation	20-fold, 50-fold, 100-fold
Output stages	HTL/push-pull TTL/RS422
Output signals	A+, B+, R+, A-, B-, R-
Reference signal	Index signal, width 90°
Output frequency	≤350 kHz
Short-circuit proof	Yes
System accuracy	±(0.02 mm + 0.04 mm x magnetic tape length (m))
Initializing time	≤50 ms after power on (see general informations)
Scan ratio	40...60 %
Interference immunity	DIN EN 61000-6-2
Emitted interference	DIN EN 61000-6-4
Approvals	CE, UL

#### Technical data - electrical ratings (HTL)

Voltage supply	10...30 VDC
Reverse polarity protection	Yes
Consumption typ.	20 mA (w/o load)

#### Technical data - electrical ratings (TTL)

Voltage supply	5 VDC ±5 %
Consumption typ.	30 mA (w/o load)
Recommended cable termination	On control side each channel pair 120 Ohm

#### Technical data - mechanical design

Dimensions (sensor head)	10 x 15 x 45.5 mm
Protection DIN EN 60529	IP 66, IP 67
Movement speed	<5 m/s (resolution 5 µm) <10 m/s (resolution 10 µm) <25 m/s (resolution 25 µm)
Operating temperature	-40...+85 °C
Working distance	0.1...0.6 mm
Resistance	DIN EN 60068-2-6 Vibration 30 g, 10-2000 Hz DIN EN 60068-2-27 Shock 500 g, 6 ms
Material	Housing: zinc diecast, plated
Relative humidity	EN 60068-2-78:2010 EN 60068-2-30:2005 93 % condensation permitted
Connection	Cable 2 m Cable 0.3 m with connector M12
Weight approx.	130 g

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## Part number

MIL10-S2.   .  **P.A**

### Resolution

0005	5 $\mu$ m (4-times evaluation)
0010	10 $\mu$ m (4-times evaluation)
0025	25 $\mu$ m (4-times evaluation)

### Voltage supply / output stages

E	4.75...5.25 VDC / TTL/RS422, 6 channel
N	10...30 VDC / HTL/push-pull, 6 channel

### Connection

- L Cable 2 m
- C Cable 0.3 m with connector M12, 8-pin, pin terminals, ccw

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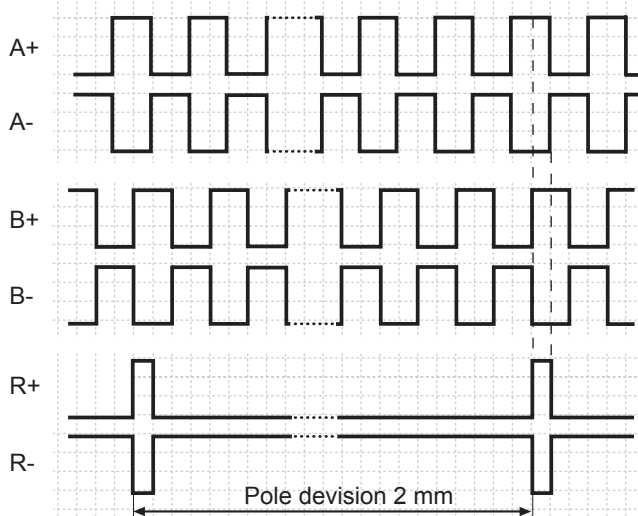
##### Accessories

##### Connectors and cables

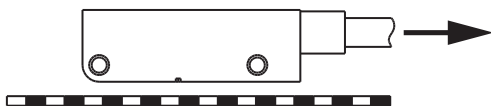
10146775 Female connector M12, 8-pin, straight

##### Output signals

Signal A leads to signal B by 90° in the moving direction shown below.



##### Rotational or linear direction



##### Trigger level

Outputs	HTL/push-pull
Output level High	>+Vs -2 V
Output level Low	<0.5 V
Load	≤20 mA

Outputs	TTL/RS422
Output level High	>2.4 V
Output level Low	<0.5 V
Load	≤20 mA

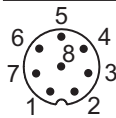
##### General informations

The initializing time of the sensor is 50 ms. Output signals may not be processed during this time.

##### Terminal assignment

##### Cable or cable 0.3 m with connector M12

Connector	Core colour	Signals
Pin 1	white	0 V
Pin 2	brown	+Vs
Pin 3	green	A+
Pin 4	yellow	A-
Pin 5	grey	B+
Pin 6	pink	B-
Pin 7	blue	R+ (zero pulse)
Pin 8	red	R- (zero pulse inv.)



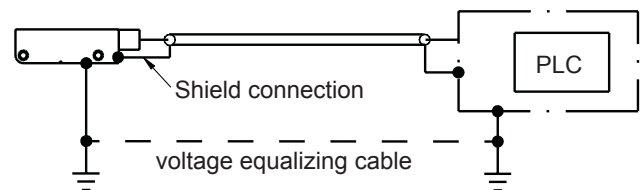
Cable screen: connected to sensor housing or connector M12 and sensor housing.

Cable data: PUR 4 x 2 x 0.14 mm<sup>2</sup>, shielded

Bending radius: >50 mm (fix) / >100 mm (cable chain)

Outer diameter: 6.3 mm

##### Recommended grounding concept



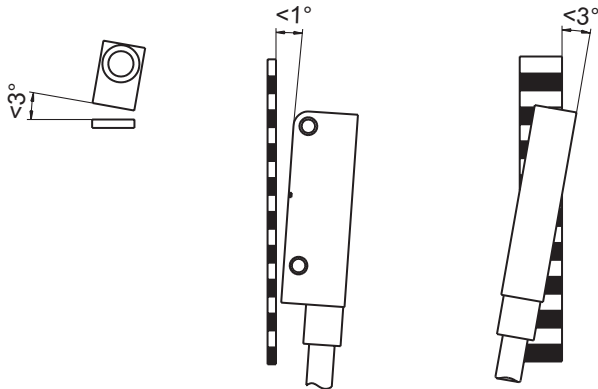
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System for linear motion feedback

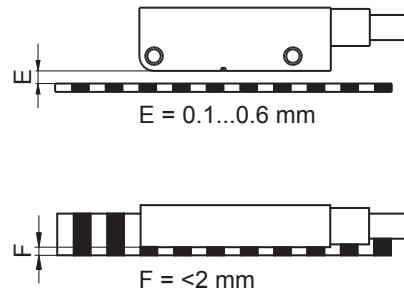
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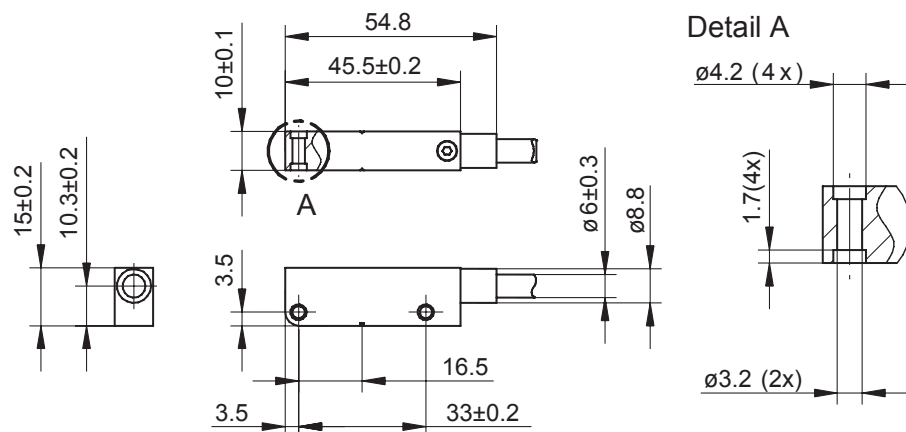
## Angular misalignment



## Working distance



## Dimensions



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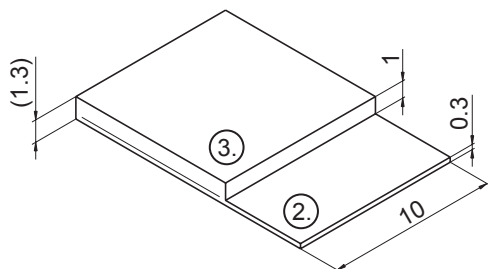
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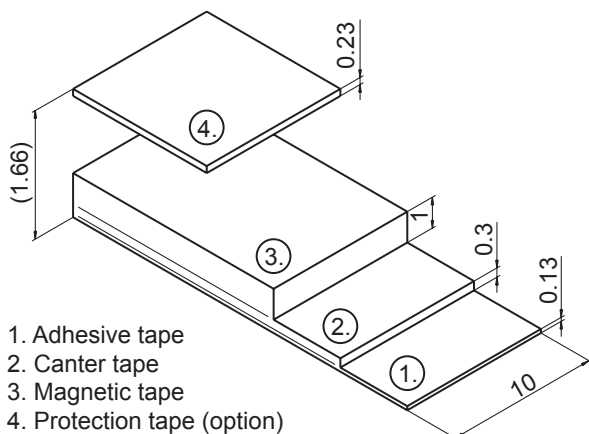
## MIL10

### Magnetic tapes

#### Layers – magnetic tape



#### Layers – magnetic tape self-adhesive



- 1. Adhesive tape
- 2. Canter tape
- 3. Magnetic tape
- 4. Protection tape (option)

#### Technical data - magnetic tape

Measuring range	<50 m
Pole length	2 mm
Precision class	$\pm 40 \mu$ (further upon request)
Tape width	10 mm
Material	Elastomer bounded tape on an stainless steel support
Mounting	Self-adhesive or self-mounting
Bending radius	Min. 75 mm

#### Part number

10128606	MIL10-M402.xxxxx.P10NN Magnetic tape individual length in meter
10157184	MIL10-M402.xxxxx.P10TN Magnetic tape self-adhesive, individual length in meter
10157164	Protection tape self-adhesive, stainless steel, 0.3 mm thick, individual length in meter