

Temposonics®

Magnetostrictive Linear Position Sensors

Sensor Component EC SSI Data Sheet

- Completely embeddable in application
- Easy and flexible integration into machinery
- Small mechanical size



MEASURING TECHNOLOGY

For position measurement, the absolute, linear Temposonics® position sensors make use of the properties offered by the specially designed magnetostrictive waveguide. Inside the sensor a torsional strain pulse is induced in the waveguide by momentary interaction of two magnetic fields. The interaction between these two magnetic fields produces a strain pulse, which is detected by the electronics at the head of the sensor. One field is produced by a moving position magnet, which travels along the sensor rod with the waveguide inside. The other field is generated by a current pulse applied to the waveguide. The position of the moving magnet is determined precisely by measuring the time elapsed between the application of the current pulse and the arrival of the strain pulse at the sensor electronics housing. The result is a reliable position measurement with high accuracy and repeatability.

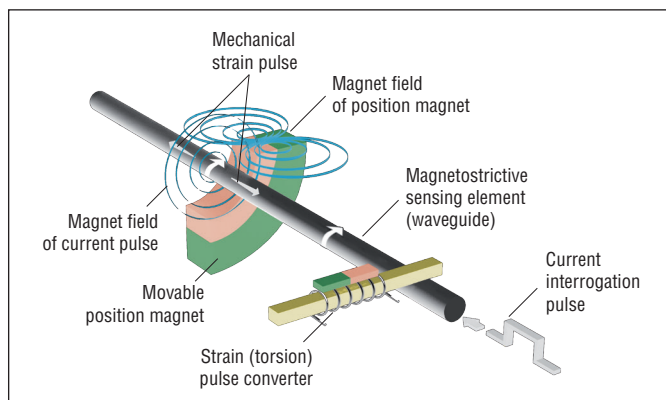


Fig. 1: Time-based magnetostrictive position sensing principle

EC SENSOR COMPONENT

NOTICE

Intended use:

The sensor component is exclusively designed for being fitted into a protective housing as part of equipment by the equipment manufacturer.

The complete electronic interface with active signal conditioning is accommodated in the sensor component's housing.

The sensor component is ideal for integrated level measurement in industrial machinery. Typical market segments and applications are:

- Food (filling machines, milk tanks)
- Industrial (hydraulic oil tanks, lubrications systems, waste water tanks)
- Medical (level measurement of liquids in medical devices)



Fig. 2: Typical application: e.g. filling machines

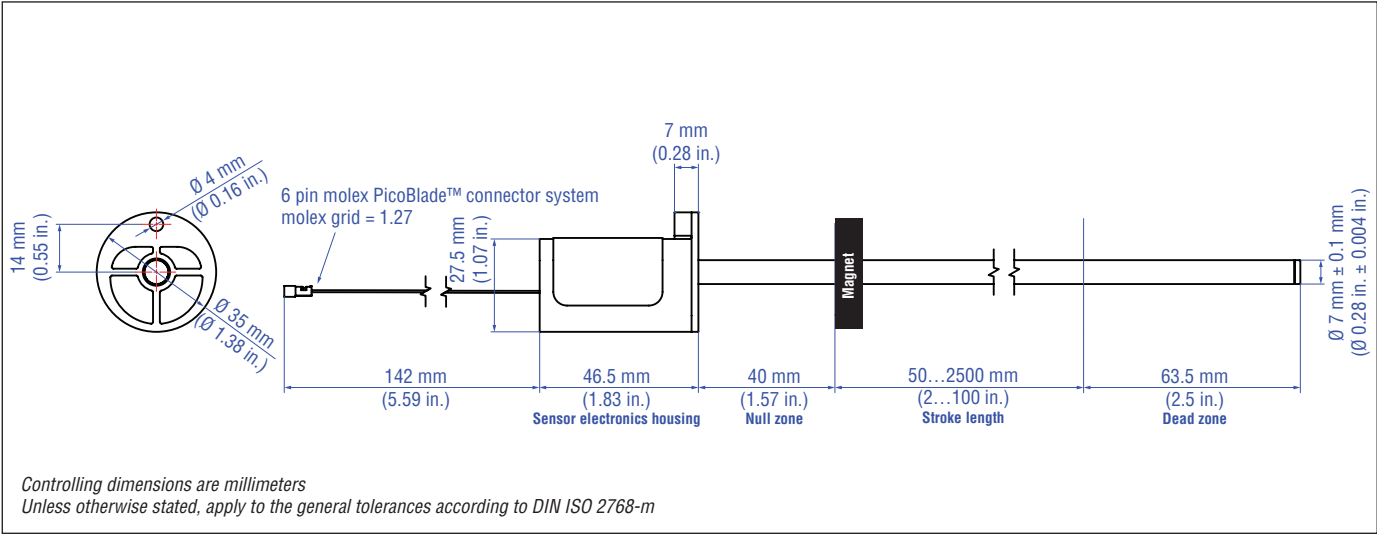
TECHNICAL DATA

Output	
Interface	SSI (Synchronous Serial Interface) – Differential signal in SSI standard
Data format	Binary or gray
Data length	24 bit, 25 bit
Data transmission rate	70...400 kBaud, depending on cable length
Measured value	Position
Measurement parameters	
Resolution	20 µm, 50 µm or 100 µm
Cycle time	$0.3 < t_c < 10$ ms depending on stroke length
Linearity ¹	$\leq \pm 0.02$ % F.S. (minimum ± 60 µm)
Repeatability	$\leq \pm 0.005$ % F.S. (minimum ± 20 µm)
Operating conditions	
Operating temperature	–20...+70 °C (–4...+158 °F) (see “mounting”)
Humidity	90 % rel. humidity, no condensation
Ingress protection	IP30
Shock test	According to installation conditions (see “mounting”)
Vibration test	According to installation conditions (see “mounting”)
EMC test	According to installation conditions (see “mounting”)
Magnet movement velocity	Any
Design/Material	
Sensor electronics housing	PA66 GF30
Sensor rod	PVC
Stroke length	50...2500 mm (2...100 in.)
Mechanical mounting	
Mounting position	Any
Mounting instruction	Please consult the technical drawings
Electrical connection	
Connection type	6 pin molex PicoBlade™ connector system
Operating voltage	+24 VDC (–15 / +20 %)
Ripple	≤ 0.28 Vpp
Current consumption	Typ. 90 mA
Polarity protection	Up to –30 VDC
Overvoltage protection	Up to 36 VDC

Mounting
The design allows easy fitting into an external protective housing provided by the machine builder. Electromagnetic compatibility (EMC), shock, vibration and ingress protection can meet the performance of industrial applications depending on external protective housing. The external housing ensures that the sensor rod is contained inside a guiding structure such as a metallic tube or profile ensuring mechanical stability. The component must be protected against EMC during handling.

¹/ With position magnet # 251 416-2

TECHNICAL DRAWING



CONNECTOR WIRING

With mating connector cable 254 385

8 pin connector	M12	SSI
	Pin 1	Clock (+)
	Pin 2	Clock (-)
	Pin 3	Data (+)
	Pin 4	Data (-)
	Pin 5	n.c.
	Pin 6	n.c.
	Pin 7	+24 VDC (-15 / +20 %)
	Pin 8	DC Ground (0 V)

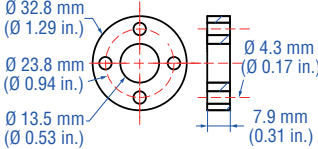
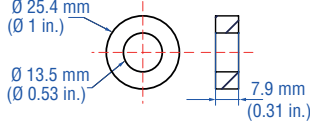
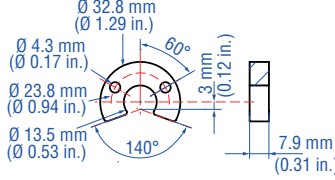
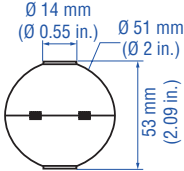
With mating connector cable 254 386

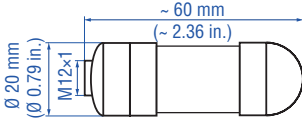
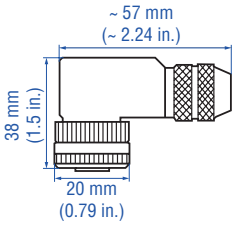
6 pin molex connector	Molex	Color	SSI
	Pin 1	WH	DC Ground (0 V)
	Pin 2	BN	+24 VDC (-15 / +20 %)
	Pin 3	GN	Clock (-)
	Pin 4	YE	Clock (+)
	Pin 5	VT	Data (+)
	Pin 6	GY	Data (-)

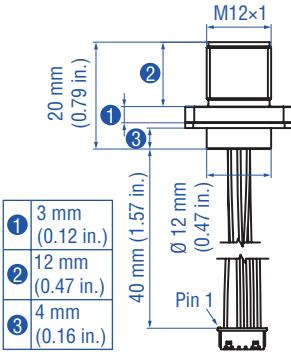
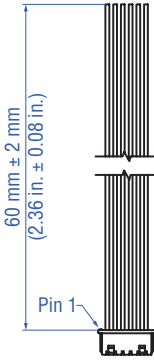
NOTICE

Cable shield should be soldered on connector housing and must be grounded in the control unit.

ACCESSORIES (More accessories see [551444](#))

Position magnets		Magnet float	
			
Standard ring magnet Part no. 201 542-2	Ring magnet OD25.4 Part no. 400 533	U-magnet OD33 Part no. 251 416-2	Magnet float Part no. 251 447
Material: PA ferrite GF20 Weight: ca. 14 g Operating temperature: -40...+105 °C (-40...+221 °F) Surface pressure: max. 40 N/mm ² Fastening torque for M4 screws: max. 1 Nm	Material: PA ferrite Weight: ca. 10 g Operating temperature: -40...+105 °C (-40...+221 °F) Surface pressure: max. 40 N/mm ²	Material: PA ferrite GF20 Weight: ca. 11 g Operating temperature: -40...+105 °C (-40...+221 °F) Surface pressure: max. 40 N/mm ² Fastening torque for M4 screws: max. 1 Nm	Material: stainless steel Weight: ca. 42 ± 3 g Density: 720 kg/m ³ Pressure: max. 60 bar (870 psi)

Cable connectors	
	
Female, straight, 8 pin M12 Part no. 370 694	Female, angled, 8 pin M12 Part no. 370 699
Housing: GD-ZnAL / IP67 Termination: screw; 0.75 mm ² Contact insert: CuZn Cable Ø: 4...9 mm (0.16...0.35 in.)	Housing: GD-ZnAL / IP67 Termination: screw; max. 0.5 mm ² Contact insert: CuZn Cable Ø: 6...8 mm (0.24...0.31 in.)

Mating connector cables		
		
Mating connector cable M12 8 pin Part no. 254 385	Mating connector cable pigtail Part no. 254 386	Extension cable molex to molex Part no. 254 243

Controlling dimensions are millimeters

ORDER CODE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
E	C	C						M	0	0	1	S				1	0	0
a		b	c					d			e	f		g	h	i	j	

a	Sensor model
E	C Sensor component

i	Type
1	Standard

b	Design
C	Rod Ø 7 mm

j	Option
0	0 Measuring direction forward

c	Stroke length				
X	X	X	X	M	0050...2500 mm
X	X	X	X	U	002.0...100.0 in.

Standard stroke length (mm)	
Stroke length	Ordering steps
50 ... 500 mm	5 mm
500 ... 750 mm	10 mm
750...1000 mm	25 mm
1000...2500 mm	50 mm

Standard stroke length (in.)	
Stroke length	Ordering steps
2 ... 20 in.	0.2 in.
20 ... 30 in.	0.5 in.
30 ... 40 in.	1.0 in.
40...100 in.	2.0 in.

d	Connection type
M	0 0 6 pin molex PicoBlade™ connector system

e	Operating voltage
1	+24 VDC (–15 / +20 %)

f	Output
1	25 Bit
2	24 Bit

g	Data protocol
B	Binary
G	Gray

h	Resolution
3	0.05 mm
4	0.10 mm
5	0.02 mm

DELIVERY

 Sensor component

Accessories have to be ordered separately.

Operation manuals & software are available at:
www.mtssensors.com

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