

Temposonics®

Magnetostrictive Linear Position Sensors

Sensor Component EC CANopen 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.

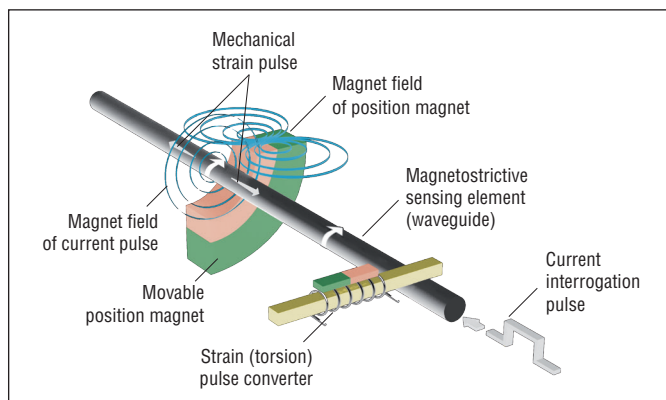


Fig. 1: Time-based magnetostrictive position sensing principle

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

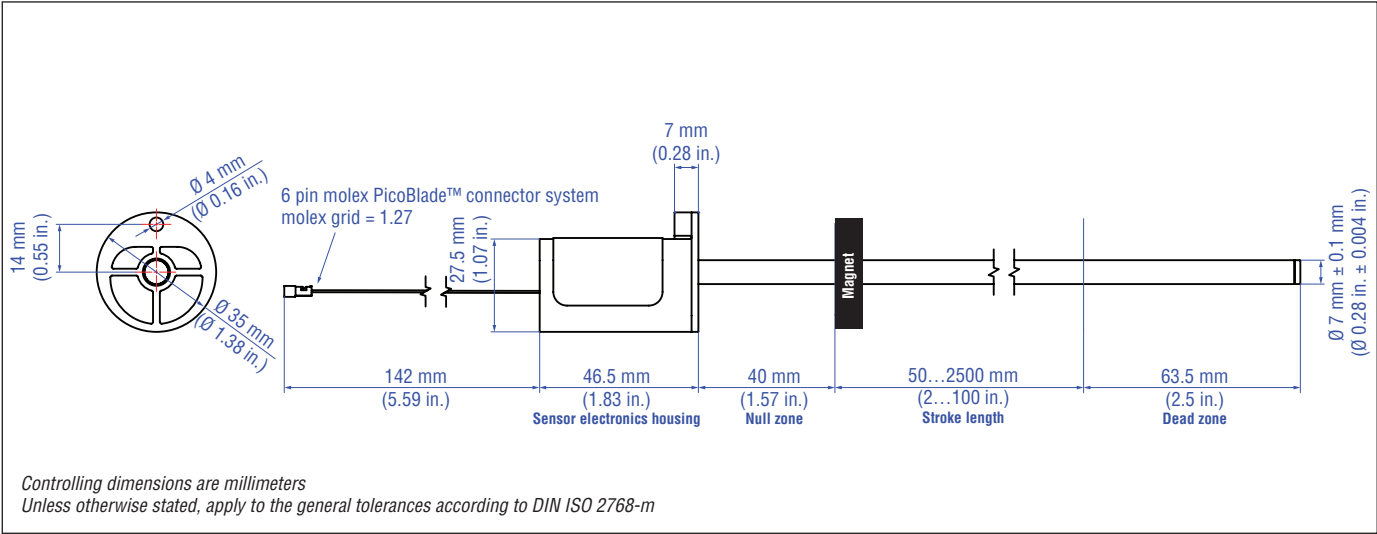
TECHNICAL DATA

Output					
Interface	CAN system ISO-DIS 11898				
Data protocol	CANopen: CIA standard DS 301 V3.0 / encoder profile DS 406 V3.1				
Baud rate	1000	800	500	250	125 kBit/s
Cable length	< 25	< 50	< 100	< 250	< 500 m
Measured value	Position				
Measurement parameters					
Resolution	10 µm, 20 µm				
Cycle time	1 ms				
Linearity ¹	≤ ±0.02 % F.S. (minimum ±60 µm)				
Repeatability	≤ ±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 instructions	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. < 50 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 254 256

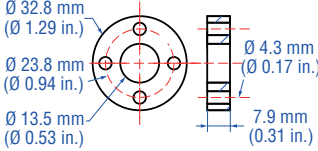
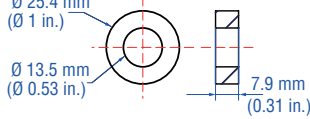
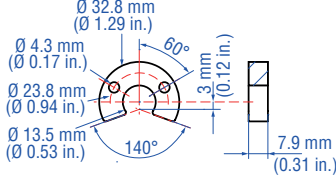
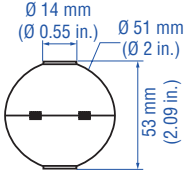
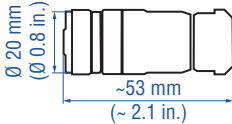
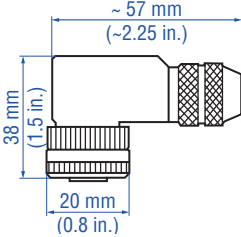
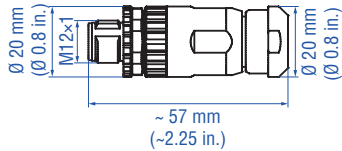
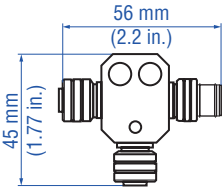
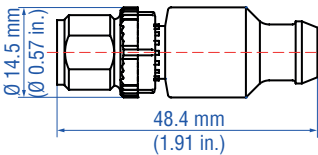
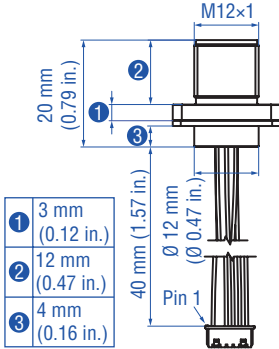
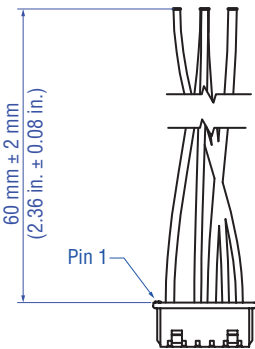

5 pin connector	M12	CANopen
	Pin 1	Shield
	Pin 2	+24 VDC (–15 / +20 %)
	Pin 3	DC Ground (0 V)
	Pin 4	CAN_H
	Pin 5	CAN_L

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

With mating connector cable 254 266

6 pin molex connector	Molex	Color	CANopen
	Pin 1	YE	CAN_H
	Pin 2	—	n.c.
	Pin 3	GY	+24 VDC (–15 / +20 %)
	Pin 4	WH	DC Ground (0 V)
	Pin 5	BK	CAN_L
	Pin 6	BN	Shield

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

Position magnets		Magnet float	
 <p>Standard ring magnet Part no. 201 542-2</p> <p>Material: PA ferrite GF20 Weight: ca. 14 g Operating temperature: -40...+105 °C (-40...+221 °F) Surface pressure: max. 40 N/mm² Fastening torque for M4 screws: max. 1 Nm</p>	 <p>Ring magnet OD25.4 Part no. 400 533</p> <p>Material: PA ferrite Weight: ca. 10 g Operating temperature: -40...+105 °C (-40...+221 °F) Surface pressure: max. 40 N/mm²</p>	 <p>U-magnet OD33 Part no. 251 416-2</p> <p>Material: PA ferrite GF20 Weight: ca. 11 g Operating temperature: -40...+105 °C (-40...+221 °F) Surface pressure: max. 40 N/mm² Fastening torque for M4 screws: max. 1 Nm</p>	 <p>Magnet float Part no. 251 447</p> <p>Material: stainless steel Weight: ca. 42 ± 3 g Density: 720 kg/m³ Pressure: max. 60 bar (870 psi)</p>
Cable connectors		Connection accessories	
 <p>Female, straight, 5 pin M12 Part no. 370 677</p> <p>Housing: GD-Zn, Ni / IP67 Termination: screw; max. 0.75 mm² Contact insert: CuZn Cable Ø: 4...8 mm (0.16...0.31 in.)</p>	 <p>Female, angled, 5 pin M12 Part no. 370 678</p> <p>Housing: GD-Zn, Ni / IP67 Termination: screw; max. 0.75 mm² Contact insert: CuZn Cable Ø: 5...8 mm (0.2...0.31 in.)</p>	 <p>Male, straight, 5 pin M12 Part no. 561 665</p> <p>Housing: GD-Zn, Ni / IP67 Termination: screw; max. 0.75 mm² Contact insert: CuZn Cable Ø: 4...8 mm (0.16...0.31 in.)</p>	 <p>CANopen T-Connector, M12, 5 pin Part no. 370 691</p> <p>Selfcuring coupling nut 2 × cable connector female 1 × cable connector male shielded</p>
Connection accessories		Mating connector cables	
 <p>CANopen bus terminator, male, M12, 5 pin; Part no. 370 700</p> <p>Housing: PUR Contact insert: Au</p>	 <p>Mating connector cable M12 5 pin Part no. 254 256</p>	 <p>Mating connector cable pigtail Part no. 254 266</p>	 <p>Extension cable molex to molex Part no. 254 243</p>

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	C						1
a	b	c	d	e	f	g	h	i										

a	Sensor model																		
E	C	Sensor component																	
b	Design																		
C	Rod Ø 7 mm																		
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																		
3	0	4	CANopen																
4	0	4	CANopen (bus terminator)																
g	Baud rate																		
2	500 kBit/s																		
3	250 kBit/s																		
4	125 kBit/s																		
h	Resolution																		
4	10 µm																		
5	20 µm																		
i	Type																		
1	Standard																		

DELIVERY



Sensor component

Accessories have to be ordered separately.

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

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