

Tempsonics®

Magnetostrictive Linear Position Sensors

Sensor Component EC Analog 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.

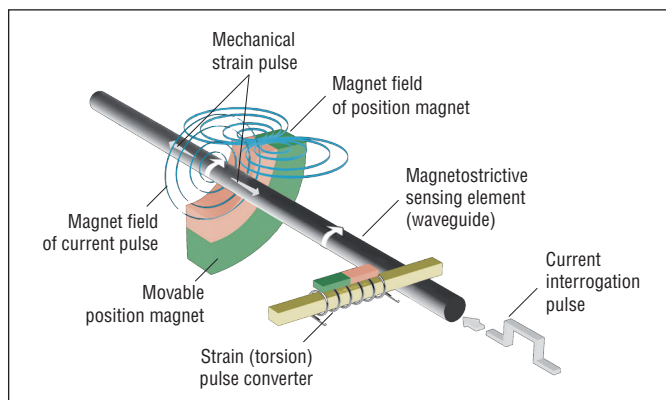


Fig. 1: Time-based magnetostrictive position sensing principle

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

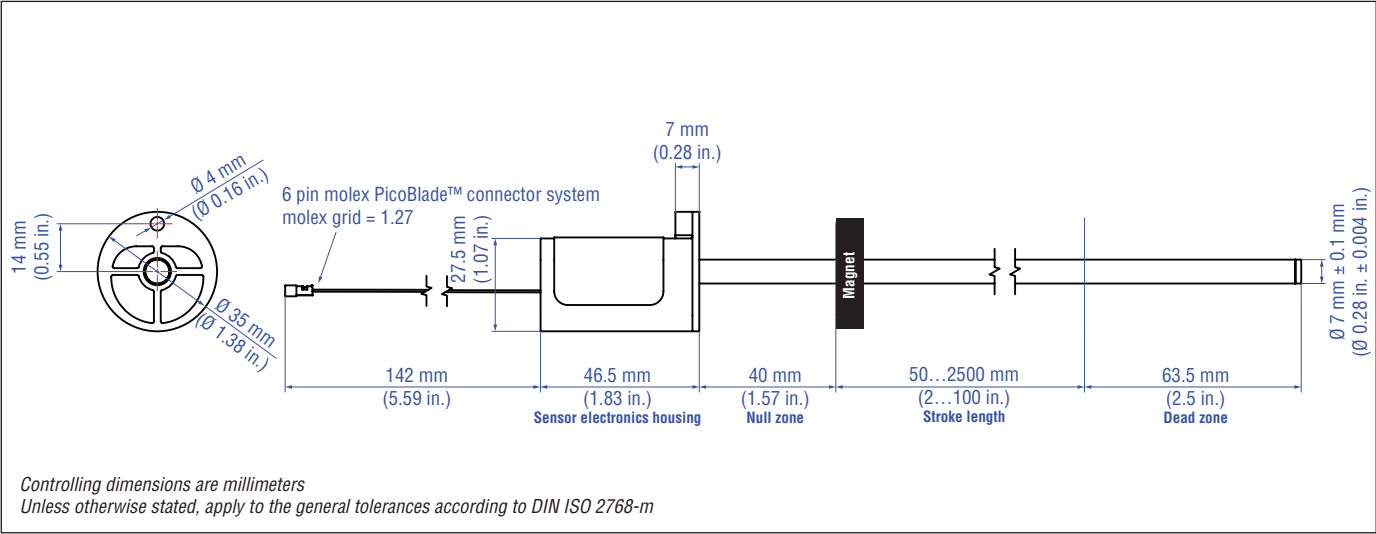
Output	
Voltage	0...10 VDC or 10...0 VDC (min. load controller > 5 kΩ)
Current	4...20 mA or 20...4 mA (min./max. load 0/500 Ω)
Measured value	Position
Measurement parameters	
Resolution	Infinite
Cycle time	< 0.3 ms
Linearity ¹	≤ ±0.02 % F.S. (minimum ±60 μm)
Repeatability	≤ ±0.005 % F.S. (minimum ±20 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 and the operation manual (document no.: 551414)
Electrical connection	
Connection type	6 pin molex PicoBlade™ connector system
Operating voltage	+24 VDC (–15 / +20 %)
Ripple	≤ 0.28 Vpp
Current consumption	50...140 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

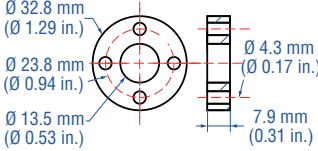
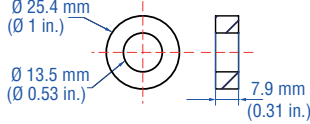
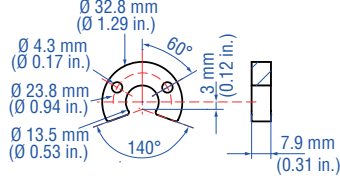
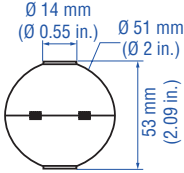
5 pin connector	M12	Signal
	Pin 1	+24 VDC (–15 / +20 %)
	Pin 2	Output 1
	Pin 3	DC Ground (0 V)
	Pin 4	n.c.
	Pin 5	DC Ground

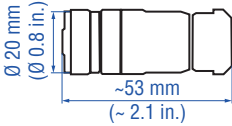
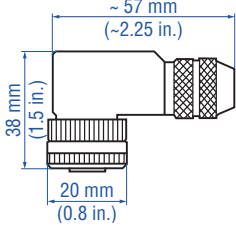
NOTICE
 Cable shield should be soldered on connector housing and must be grounded in the control unit.

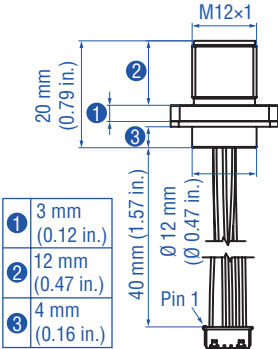
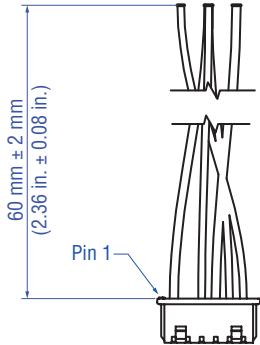
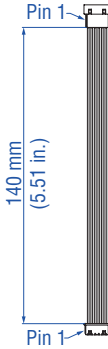
With mating connector cable 254 266

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

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

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

Cable connectors	
	
Female, straight, 5 pin M12 Part no. 370 677 Housing: GD-Zn, Ni / IP67 Termination: screw; max. 0.75 mm ² Contact insert: CuZn Cable Ø: 4...8 mm (0.16...0.31 in.)	Female, angled, 5 pin M12 Part no. 370 678 Housing: GD-Zn, Ni / IP67 Termination: screw; max. 0.75 mm ² Contact insert: CuZn Cable Ø: 5...8 mm (0.2...0.31 in.)

Mating connector cables		
		
Mating connector cable M12 5 pin Part no. 254 256	Mating connector cable pigtail Part no. 254 266	Extension cable molex to molex Part no. 254 243

Controlling dimensions are millimeters

ORDER CODE

1

E

2

C

3

C

4

5

6

7

8

9

M

10

0

11

0

12

1

13

14

15

a

b

c

d

e

f

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

Voltage

V

0

1

0...10 VDC

V

1

1

10...0 VDC

Current

A

0

1

4...20 mA


A

1

1

20...4 mA

DELIVERY



Sensor component

Accessories have to be ordered separately.

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

Document Part Number:
551329 Revision C (EN) 05/2015

LOCATIONS

USA
MTS Systems Corporation
Sensors Division
3001 Sheldon Drive
Cary, N.C. 27513, USA
Tel. +1 919 677-0100
Fax +1 919 677-0200
info.us@mtssensors.com
www.mtssensors.com

JAPAN
MTS Sensors Technology Corp.
737 Aihara-machi,
Machida-shi,
Tokyo 194-0211, Japan
Tel. +81 42 775-3838
Fax +81 42 775-5512
info.jp@mtssensors.com
www.mtssensors.com

FRANCE
MTS Systems SAS
Zone EUROPARC Bâtiment EXA 16
16/18, rue Eugène Dupuis
94046 Creteil, France
Tel. +33 1 58 4390-28
Fax +33 1 58 4390-03
info.fr@mtssensors.com
www.mtssensors.com

GERMANY
MTS Sensor Technologie
GmbH & Co. KG
Auf dem Schüffel 9
58513 Lüdenscheid, Germany
Tel. +49 2351 9587-0
Fax +49 2351 56491
info.de@mtssensors.com
www.mtssensors.com

CHINA
MTS Sensors
Room 504, Huajing Commercial Center,
No. 188, North Qinzhou Road
200233 Shanghai, China
Tel. +86 21 6485 5800
Fax +86 21 6495 6329
info.cn@mtssensors.com
www.mtssensors.com

ITALY
MTS Systems Srl.
Sensor Division
Via Diaz, 4
25050 Provaglio d'Iseo (BS), Italy
Tel. +39 030 988 3819
Fax +39 030 982 3359
info.it@mtssensors.com
www.mtssensors.com

LEGAL NOTICES

MTS, Temposonics and Level Plus are registered trademarks of MTS Systems Corporation in the United States; MTS SENSORS and the MTS SENSORS logo are trademarks of MTS Systems Corporation within the United States. These trademarks may be protected in other countries. All other trademarks are the property of their respective owners.
Copyright © 2015 MTS Systems Corporation. No license of any intellectual property rights is granted. MTS reserves the right to change the information within this document, change product designs, or withdraw products from availability for purchase without notice. Typographic and graphics errors or omissions are unintentional and subject to correction. Visit www.mtssensors.com for the latest product information. Product change notification alerts are available through the MTS Product Change Management System; register at www.mtssensors.com/PCMS.

ISO 9001
CERTIFIED

