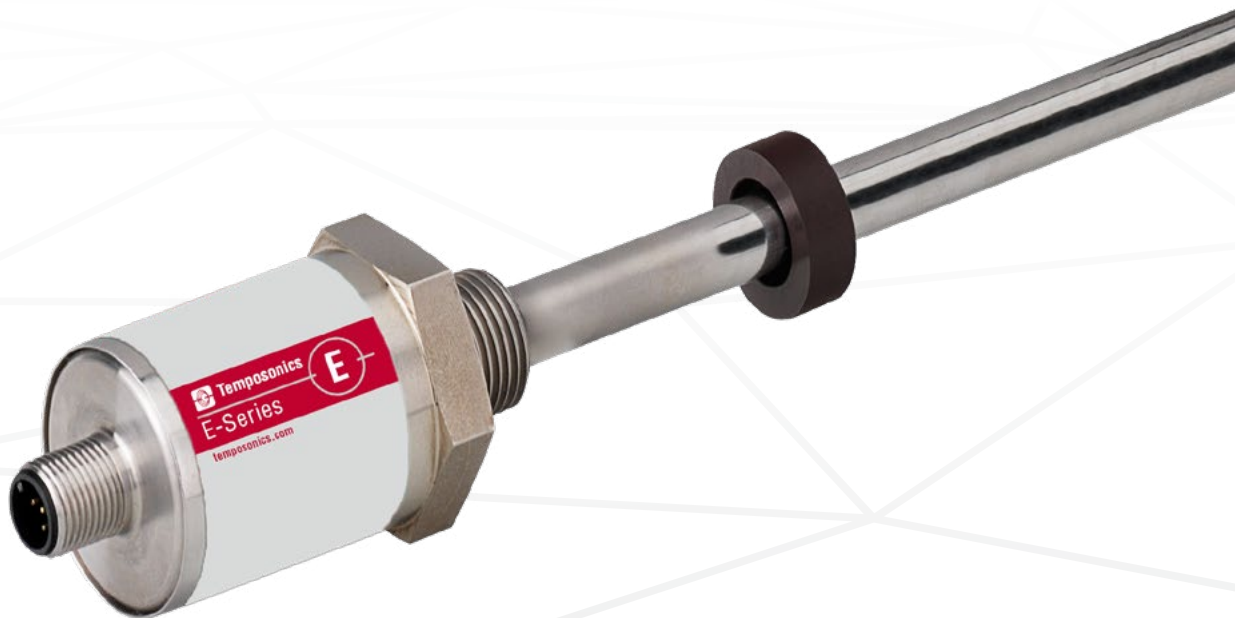


Data Sheet

EH CANopen

Magnetostrictive Linear Position Sensors

- High pressure resistant sensor rod
- Position measurement with more than one magnet
- Small & compact – Ideal for standard hydraulic cylinders



MEASURING TECHNOLOGY

The absolute, linear position sensors provided by Temposonics rely on the company's proprietary magnetostrictive technology, which can determine position with a high level of precision and robustness. Each Temposonics position sensor consists of a ferromagnetic waveguide, a position magnet, a strain pulse converter and supporting electronics. The magnet, connected to the object in motion in the application, generates a magnetic field at its location on the waveguide. A short current pulse is applied to the waveguide. This creates a momentary radial magnetic field and torsional strain on the waveguide. The momentary interaction of the magnetic fields releases a torsional strain pulse that propagates the length of the waveguide. When the ultrasonic wave reaches the beginning of the waveguide it is converted into an electrical signal. Since the speed of the ultrasonic wave in the waveguide is precisely known, the time required to receive the return signal can be converted into a linear position measurement with both high accuracy and repeatability.

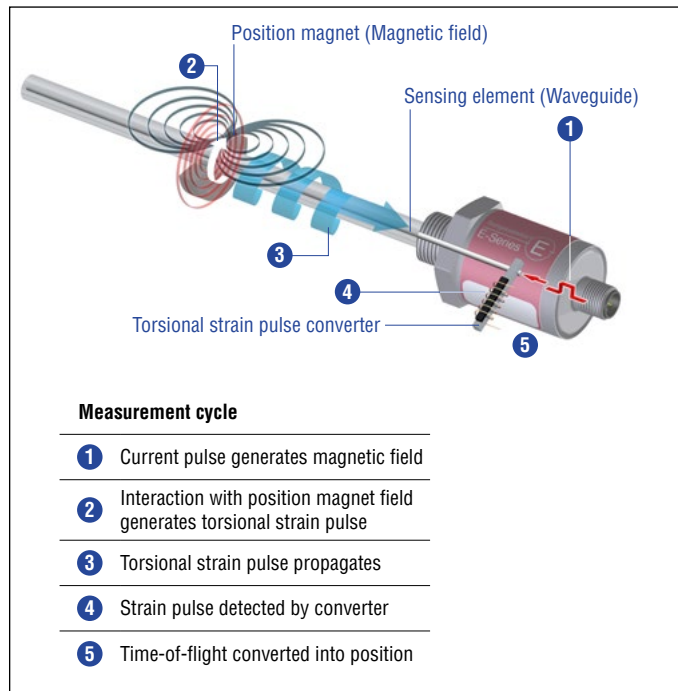


Fig. 1: Time-of-flight based magnetostrictive position sensing principle

EH SENSOR

Robust, non-contact and wear free, the Temposonics® linear position sensor provide the best durability and precise position measurement feedback in harsh industrial environments. Measurement accuracy is tightly controlled by the quality of the waveguide manufactured exclusively by in-house production.

Temposonics® EH is a compact rod-style sensor and the ideal solution for direct stroke measurement in small hydraulic cylinders. The position magnet mounted on the piston head of the hydraulic cylinder travels over the sensor rod with the built-in waveguide to provide a precise, non-contact position measurement. The EH is ideal for a variety of applications including: Fluid power, food industry, plastic industry, glass and ceramics, energy sector, machine tools and testing machines.



Fig. 2: Typical application: Plastics processing

TECHNICAL DATA

Output	
Interface	CAN System ISO 11898
Data protocol	CANopen: CIA standard DS 301 V3.0/encoder profile DS 406 V3.1
Baud rate, kBit/s	1000 800 500 250 125
Cable length, m	< 25 < 50 < 100 < 250 < 500
Measured value	The sensor will be supplied with ordered baud rate, changeable by customer via LSS Position, Multi-position measurement with maximum 2 magnets
Measurement parameters	
Resolution	10 µm, 20 µm
Velocity	1 mm/s
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	-40...+75 °C (-40...+167 °F)
Humidity	90 % relative humidity, no condensation
Ingress protection ²	IP67/IP69K (correctly fitted)
Shock test	100 g (single shock) IEC standard 60068-2-27
Vibration test	15 g/10...2000 Hz IEC standard 60068-2-6 (resonance frequencies excluded)
EMC test	Electromagnetic emission according to EN 61000-6-3 Electromagnetic immunity according to EN 61000-6-2 The sensor meets the requirements of the EU directives and is marked with CE
Magnet movement velocity	Any
Design/Material	
Sensor electronics housing	Stainless steel 1.4305 (AISI 303); option: Stainless steel 1.4404 (AISI 316L)
Flange	Stainless steel 1.4305 (AISI 303); option: Stainless steel 1.4404 (AISI 316L)
Sensor rod	7 mm (0.28 in.) rod Ø: Stainless steel 1.4301 (AISI 304) 10 mm (0.39 in.) rod Ø: Stainless steel 1.4306 (AISI 304L); option: Stainless steel 1.4404 (AISI 316L)
Stroke length	50...2540 mm (2...100 in.)
Operating pressure	7 mm (0.28 in.) rod Ø: 300 bar (4351 psi), 450 bar (6527 psi) peak 10 mm (0.39 in.) rod Ø: 350 bar (5076 psi), 530 bar (7687 psi) peak
Mechanical mounting	
Mounting position	Any
Mounting instruction	Please consult the technical drawings and the brief instructions (document number: 551684)
Electrical connection	
Connection type	M12 male connector (5 pin)
Operating voltage	+24 VDC (-15/+20 %); UL recognition requires an approved power supply with energy limitation (UL 61010-1), or Class 2 rating according to the National Electrical Code (USA)/Canadian Electrical Code
Ripple	≤ 0.28 V _{pp}
Current consumption	40...60 mA (depending on stroke length)
Dielectric strength	500 VDC (DC ground to machine ground)
Polarity protection	Up to -30 VDC
Overvoltage protection	Up to 36 VDC

1/ With position magnet # 251 416-2

2/ The IP rating is not part of the UL recognition

TECHNICAL DRAWING

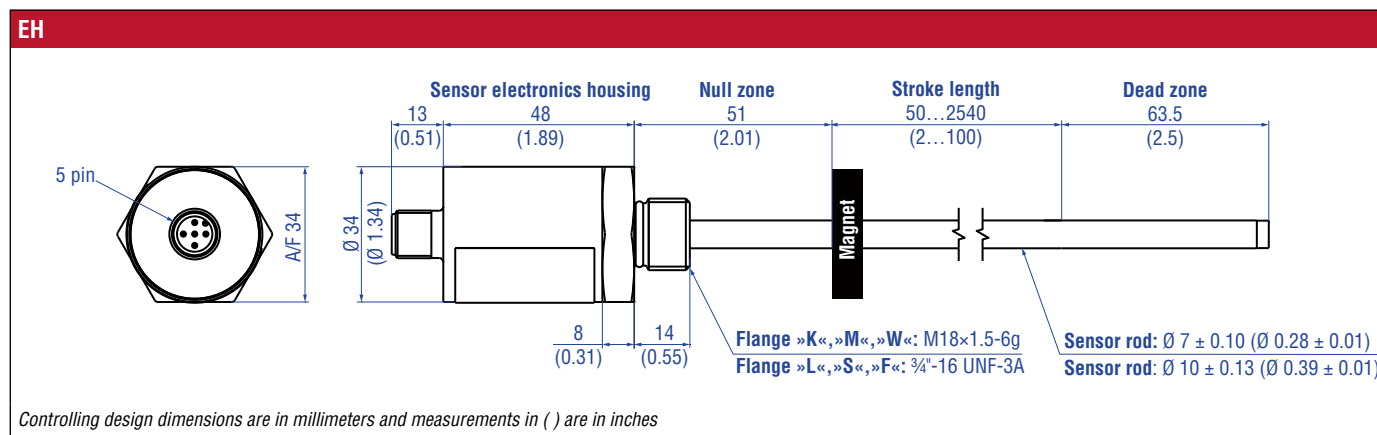


Fig. 3: Temposonics® EH with ring magnet

CONNECTOR WIRING

D34

Signal + power supply

M12 male connector (A-coded)	Pin	Function
<p>View on sensor</p>	1	Shield
	2	+24 VDC (-15/+20 %)
	3	DC Ground (0 V)
	4	CAN_H
	5	CAN_L

Fig. 4: Connector wiring D34

FREQUENTLY ORDERED ACCESSORIES – Additional options available in our [Accessories Guide](#) 551444

Position magnets

<p>U-magnet OD33 Part no. 251416-2</p> <p>Material: PA ferrite GF20 Weight: Approx. 11 g Surface pressure: Max. 40 N/mm² Fastening torque for M4 screws: 1 Nm Operating temperature: -40...+105 °C (-40...+221 °F)</p>	<p>Ring magnet OD33 Part no. 201542-2</p> <p>Material: PA ferrite GF20 Weight: Approx. 14 g Surface pressure: Max. 40 N/mm² Fastening torque for M4 screws: 1 Nm Operating temperature: -40...+105 °C (-40...+221 °F)</p>	<p>Ring magnet OD25.4 Part no. 400533</p> <p>Material: PA ferrite Weight: Approx. 10 g Surface pressure: Max. 40 N/mm² Operating temperature: -40...+105 °C (-40...+221 °F)</p>	<p>Ring magnet OD17.4 Part no. 401032</p> <p>Material: PA neobond Weight: Approx. 5 g Surface pressure: Max. 20 N/mm² Operating temperature: -40...+105 °C (-40...+221 °F)</p>

Cable connectors*

<p>M12 A-coded female connector (4 pin/5 pin), straight Part no. 370677</p> <p>Material: GD-Zn, Ni Termination: Screw Contact insert: CuZn Cable Ø: 4...8 mm (0.16...0.31 in.) Wire: 1.5 mm² Operating temperature: -30...+85 °C (-22...+185 °F) Ingress protection: IP67 (correctly fitted) Fastening torque: 0.6 Nm</p>	<p>M12 A-coded female connector (5 pin), angled Part no. 370678</p> <p>Material: GD-Zn, Ni Termination: Screw; max. 0.75 mm² Contact insert: CuZn Cable Ø: 5...8 mm (0.2...0.31 in.) Wire: 0.75 mm² (18 AWG) Operating temperature: -25...+85 °C (-13...+185 °F) Ingress protection: IP67 (correctly fitted) Fastening torque: 0.4 Nm</p>	<p>M12 A-coded male connector (5 pin), straight Part no. 561665</p> <p>Housing: GD-Zn, Ni Termination: Screw Contact insert: CuZn Cable Ø: 4...8 mm (0.16...0.31 in.) Wire: 1.5 mm² Operating temperature: -30...+85 °C (-22...+185 °F) Ingress protection: IP67 (correctly fitted) Fastening torque: 0.6 Nm</p>	<p>M12 A-coded T connector (5 pin) Part no. 370691</p> <p>Selfcuring coupling nut 2 × female connector 1 × male connector Feature: Shielded Ingress protection: IP67 (correctly fitted)</p>

Connection accessory

<p>Passive M12 A-coded male bus terminator (5 pin) Part no. 370700</p> <p>Material: PUR Termination: Screw Contact insert: Au Operating temperature: -25...+85 °C (-13...+121 °F) Ingress protection: IP68 (correctly fitted)</p>

*/ Follow the manufacturer's mounting instructions
Controlling design dimensions are in millimeters and measurements in () are in inches

ORDER CODE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
E	H							D	3	4	1	C						1			
a		b	c					d		e	f								g		
optional																					

a	Sensor model
E H	Rod

b	Design
EH rod-style sensor with housing material 1.4305 (AISI 303) and rod material 1.4301 (AISI 304)	
K	Threaded flange M18×1.5-6g, rod Ø 7 mm
L	Threaded flange ¾"-16 UNF-3A, rod Ø 7 mm
EH rod-style sensor with housing material 1.4305 (AISI 303) and rod material 1.4306 (AISI 304L)	
M	Threaded flange M18×1.5-6g, rod Ø 10 mm
S	Threaded flange ¾"-16 UNF-3A, rod Ø 10 mm
EH rod-style sensor with housing material 1.4404 (AISI 316L) and rod material 1.4404 (AISI 316L)	
F	Threaded flange ¾"-16 UNF-3A, rod Ø 10 mm
W	Threaded flange M18×1.5-6g, rod Ø 10 mm

c	Stroke length
X X X X M	0050...2540 mm
Standard stroke length (mm) Ordering steps	
50... 500 mm	5 mm
500... 750 mm	10 mm
750... 1000 mm	25 mm
1000... 2540 mm	50 mm
X X X X U	001.0...100.0 in.
Standard stroke length (in.) Ordering steps	
1... 20 in.	0.2 in.
20... 30 in.	0.4 in.
30... 40 in.	1.0 in.
40... 100 in.	2.0 in.
Non-standard stroke lengths are available; must be encoded in 5 mm/0.1 in. increments.	

d	Connection type
D 3 4	M12 male connector (5 pin)

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

f	Output
C (14) (15) (16) (17) (18) (19) = CANopen	
Protocol (box no. 14, 15, 16)	
C 3 0 4	CANopen
C 4 0 4	CANopen (bus terminator)
Baud rate (box no. 17)	
1	1000 kBit/s
2	500 kBit/s
3	250 kBit/s
4	125 kBit/s
Resolution (box no. 18)	
4	10 µm
5	20 µm
Performance (box no. 19)	
1	Standard

Optional

g	Magnet number for multi-position measurement
Z 0 2	2 magnets

NOTICE

- Specify magnet numbers for your sensing application and order separately.
- Use magnets of the same type for differential measurement, e.g. 2 × U-magnet (part no. 251 416-2).

DELIVERY



- Sensor
- O-ring

Accessories have to be ordered separately.

Manuals, Software & 3D Models available at:
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