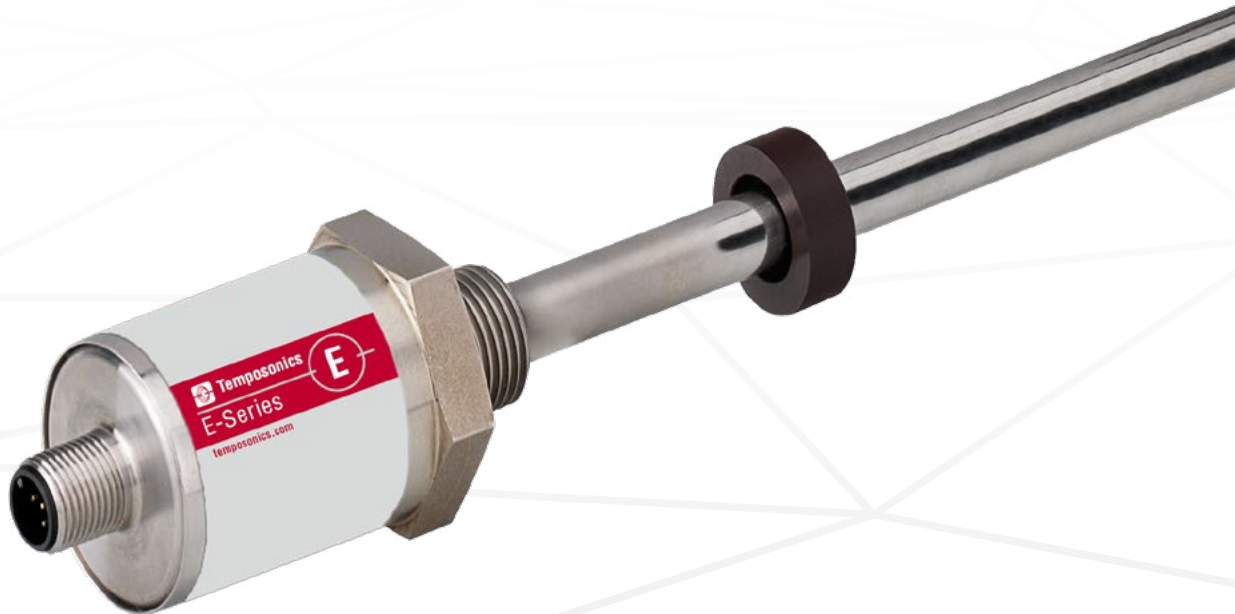


## Data Sheet

### EH SSI

#### Magnetostrictive Linear Position Sensors

- High pressure resistant sensor rod
- Operating temperature up to +75 °C (+167 °F)
- 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.

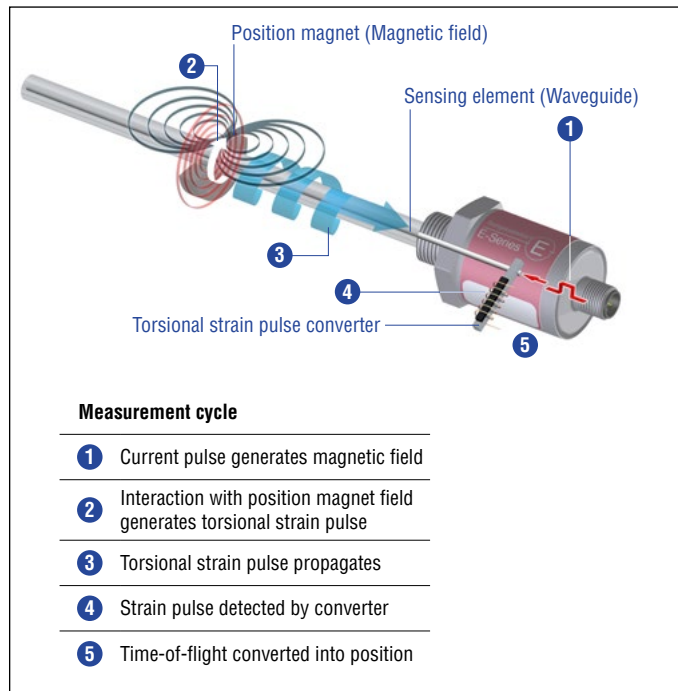


Fig. 1: Time-of-flight based magnetostrictive position sensing principle

## 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	SSI (Synchronous Serial Interface)				
Data format	Binary or gray				
Data length	24 bit, 25 bit				
Data transmission rate	70 kBaud* ... 1 MBaud, dependent on cable length:				
	Cable length < 3 m	< 50 m	< 100 m	< 200 m	< 400 m
	Baud rate 1.0 MBd	< 400 kBd	< 300 kBd	< 200 kBd	< 100 kBd
Measured value	Position				
Measurement parameters					
Resolution	20 µm, 50 µm or 100 µm				
Cycle time	Stroke length	300 mm	750 mm	1000 mm	2000 mm
	Measurement rate	3.7 kHz	3.0 kHz	2.3 kHz	1.2 kHz
Linearity <sup>1</sup>	≤ ±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 <sup>2</sup>	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 <b>CE</b>				
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: <a href="#">551684</a> )				
Electrical connection					
Connection type	M12 male connector (8 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 <sub>pp</sub>				
Current consumption	Typical 90 mA				
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

\*/ With standard one shot of 16 µs

## TECHNICAL DRAWING

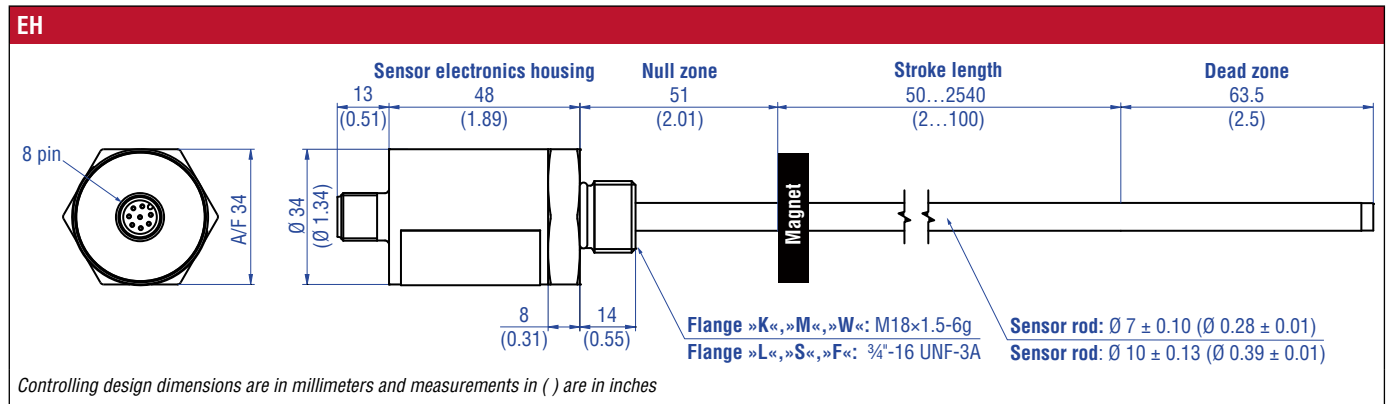


Fig. 3: Temposonics® EH with ring magnet

## CONNECTOR WIRING

**D84**

Signal + power supply

M12 male connector (A-coded)

Pin	Function
1	Clock (+)
2	Clock (-)
3	Data (+)
4	Data (-)
5	Not connected
6	Not connected
7	+24 VDC (-15/+20 %)
8	DC Ground (0 V)

View on sensor

Fig. 4: Connector wiring D84

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

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

Cable connectors*		Cord sets	
<p><b>M12 A-coded female connector (8 pin), straight</b> Part no. 370694</p>	<p><b>M12 A-coded female connector (8 pin), angled</b> Part no. 370699</p>	<p><b>Cable with M12 A-coded female connector (8 pin), straight – pigtail</b> Part no. 370674</p>	<p><b>Cable with M12 A-coded female connector (8 pin), angled – pigtail</b> Part no. 370676</p>
<p>Housing: GD-ZnAL Termination: Screw Contact insert: CuZn Cable Ø: 4...9 mm (0.16...0.35 in.) Wire: 0.75 mm<sup>2</sup> Operating temperature: -25...+90 °C (-13...+194 °F) Ingress protection: IP67 (correctly fitted) Fastening torque: 0.6 Nm</p>	<p>Housing: GD-ZnAL Termination: Screw Contact insert: CuZn Cable Ø: 6...8 mm (0.24...0.31 in.) Wire: 0.5 mm<sup>2</sup> Operating temperature: -25...+85 °C (-13...+185 °F) Ingress protection: IP67 (correctly fitted) Fastening torque: 0.6 Nm</p>	<p>Material: PUR jacket; black Features: Shielded Cable length: 5 m (16.4 ft) Ingress protection: IP67/IP69K (correctly fitted) Operating temperature: -25...+80 °C (-13...+176 °F)</p>	<p>Material: PUR jacket; black Features: Shielded Cable length: 5 m (16.4 ft) Ingress protection: IP67/IP69K (correctly fitted) Operating temperature: -25...+80 °C (-13...+176 °F)</p>

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

**NOTICE**  
The wiring of the optional adapter cables is available in the accessories brochure (document no. 551444)

## ORDER CODE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
E	H							D	8	4	1	S					0	0
a		b	c					d			e	f						

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 8 4	M12 male connector (8 pin)

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

f	Output
S (14) (15) (16) (17) (18) (19) = Synchronous Serial Interface	
Output (box no. 13)	
S	SSI
Data length (box no. 14)	
1	25 bit
2	24 bit
Output format (box no. 15)	
B	Binary
G	Gray
Resolution (box no. 16)	
3	0.05 mm (50 µm)
4	0.1 mm (100 µm)
5	0.02 mm (20 µm)
Performance (box no. 17)	
1	Standard
Mode (box no. 18 & 19)	
0 0	Measuring direction forward

## DELIVERY



- Sensor
- O-ring

Accessories have to be ordered separately.

Manuals, Software & 3D Models available at:  
[www.temposonics.com](http://www.temposonics.com)

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