

The *magnetostrictive* Position Sensors



Temposonics® E-Series

Rod Model **EH**

— *Linear, Absolute Measurement*

— *Contactless Sensing with Highest Durability*

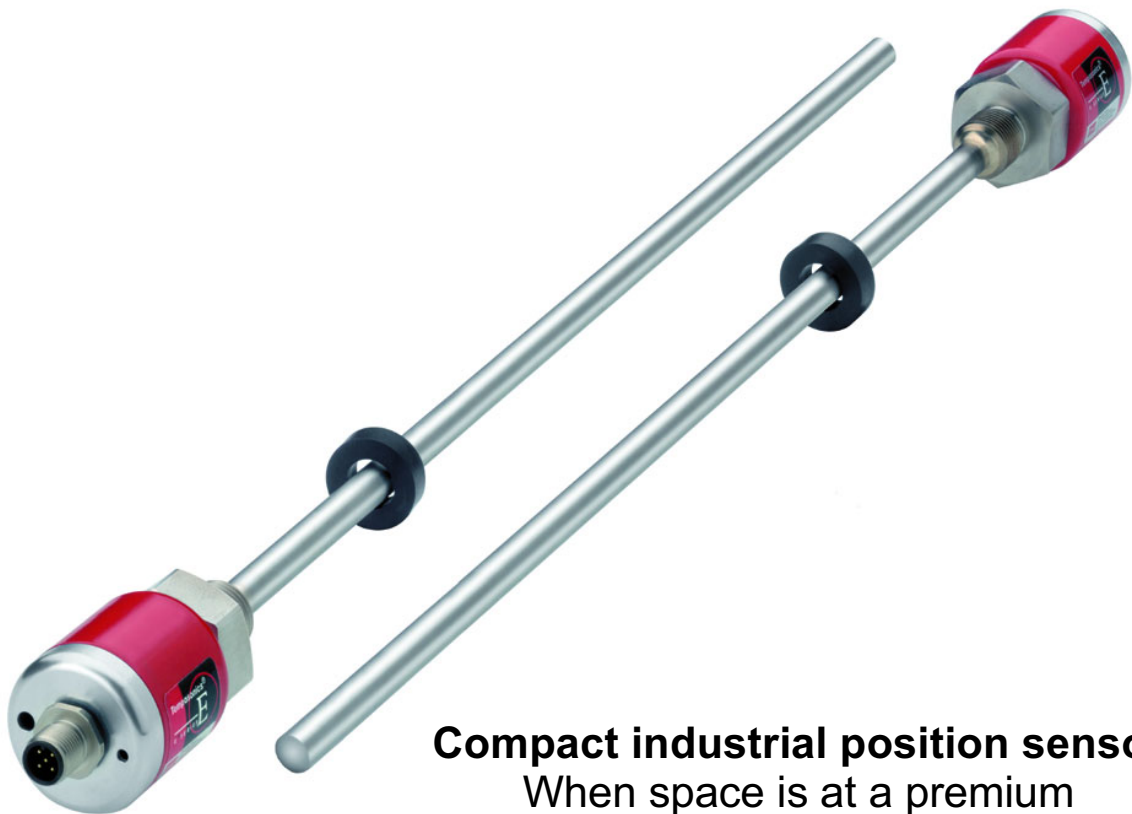
— *Minor Dimensions for Compact Hydrocylinders*

— *Replacement for Potentiometers and Inductive Position Sensors*

— *Superior Accuracy: Linearity better 0,03 %, Repeatability 0,005 %*

— *Direct Position Outputs: Analog (V / mA)*

— *Measuring Range: 50 - 1000 mm*

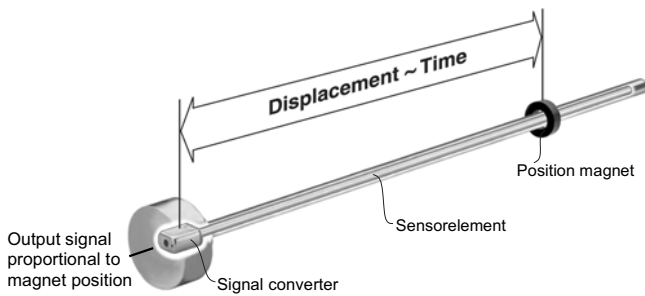


Compact industrial position sensor
When space is at a premium



ANALOG Interface

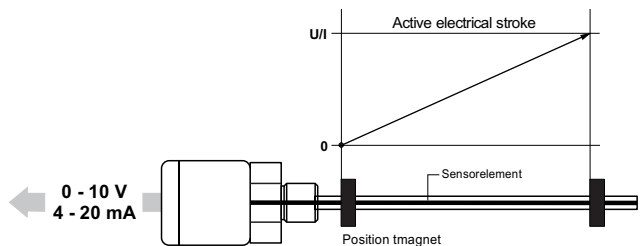
***...for hydraulic cylinders and trendsetting
measuring solutions in automation***



The **absolute**, linear TEMPOSONICS sensors are based on the **MTS**-developed **magnetostrictive measurement** principle. That combines various magnetomechanical effects and uses the constant speed of an ultrasonic wave (torsional pulse) in its sensor element for position measurement. The sensor precisely detects the position of an external magnet through the housing wall to measure displacements with a high degree of resolution. This time-based method with up to 10'000 measurements per second provides sensors with standard analog or digital outputs of highest accuracy. The non-contact sensing eliminates the wear, noise and erroneous signal problems and guarantees the best durability without any recalibration.

Analog Output

TEMPOSONICS-EH sensors provide analog output of Voltage and Current. The analog output signal is proportional to the magnet position along the active measuring stroke of the sensor. The measuring range is factory set and does not need recalibration. Since the outputs are **direct**, no signal-conditioning electronics are needed when interfacing with controllers or meters.



INPUT	Measured variable: Measuring range:	Displacement 50 - 1000 mm
OUTPUT	Voltage: Current:	0 - 10 VDC (Controller input R_i : >5 kOhms, short circuit-proof) 4 - 20 mA (Burden 0...500 kOhms)
ACCURACY	Resolution: Linearity, uncorrected: Repeatability: Update frequency: Ripple:	Infinite, restricted by output ripple < $\pm 0,03$ % F.S. (Minimum $\pm 0,09$ mm) < $\pm 0,005$ % F.S. > 1,5 kHz < 0,02 % F.S.
OPERATING CONDITIONS	Sensor mounting: Magnet speed: Operating temperature: Dew point, humidity: EMC Test*: Shock rating: Vibration rating:	Any orientation Any -40° C ... +75° C 90% rel. humidity, no condensation Electromagnetic emission EN 61000-6-3 Electromagnetic immunity EN 61000-6-2 (EN 61326/A1) EN 61000-4, Criteria A, CE qualified 100 g (Single hit) / IEC-Standard 68-2-27 10 g / 10 - 2000 Hz, IEC-Standard 68-2-6
FORM FACTOR, MATERIAL	Sensor head: Rod with flange: Magnet type:	Aluminum, powder coated Stainless steel 1.4301 / AISI 304 Pressure rating (7 mm rod): 300 bar, 450 bar spike Pressure rating (10 mm rod): 350 bar, 530 bar spike Ingress protection: IP 65 if mating connector is correctly fitted Ring magnet (see page 3)
INSTALLATION	Threaded flange:	M18 x 1,5
ELECTRICAL CONNECTION	Sensor connectors: Input voltage: Current drain: Ripple: Electric strength: Polarity protection:	5 pin connector M12 x 1 24 VDC (+20 % / -15 %) 50 - 140 mA, stroke length dependent < 1 % peak to peak 500 V (DC ground to machine ground) Up to 30 VDC

*Sensor mounted in metal housing

The new high pressure compact sensor.

TEMPOSONICS-EH with modern analog interfaces are precise and cost effective alternatives to linear potentiometers. The non contact sensing eliminates the wear, noise and erroneous signal problems and guarantees the best durability without any recalibration.

The new compact EH type position sensors with a pressure resistant stainless steel flange and sensing rod are suitable for use in hydraulic cylinders and in all applications where space is a problem.

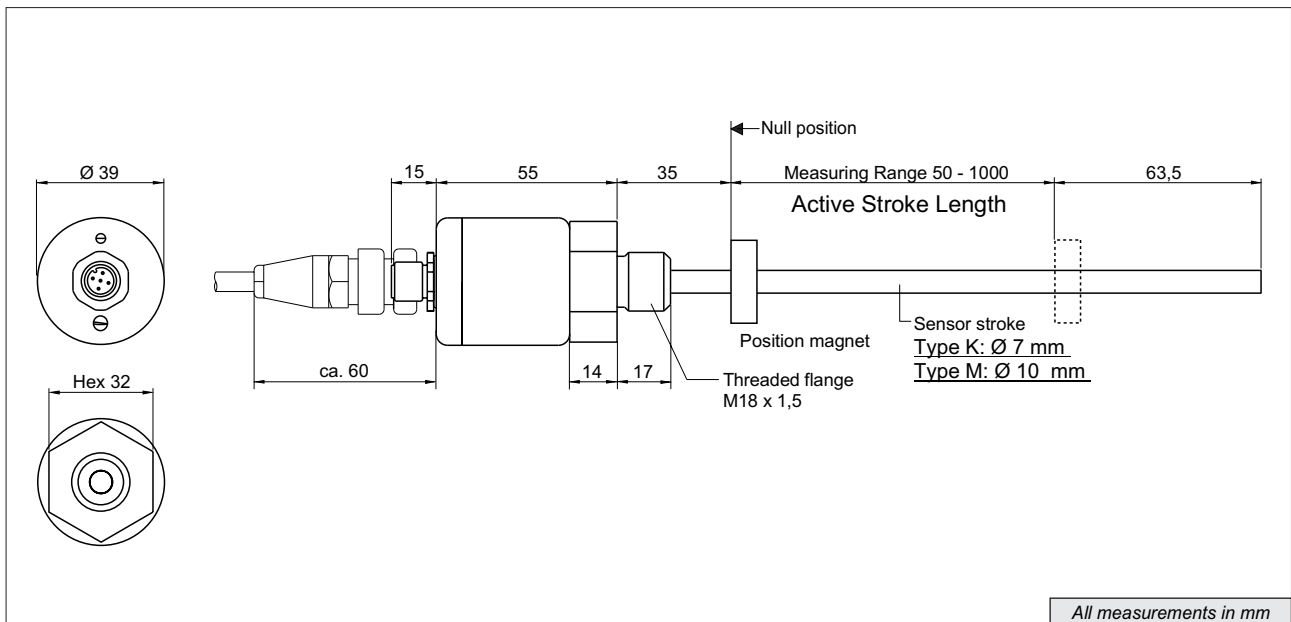
The robust TEMPOSONICS-EH are ideal choices for a wide range of standard hydraulic cylinders, specifically for use in clevis head cylinders or any applications with small cylinders.

It can also be mounted externally in many other industrial automation devices which have limited space.

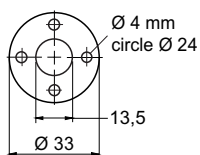
The extremely rugged sensor consists of 3 main parts:

1. The **sensor head**, a robust housing with built-in electronics.
2. The pressure-proof **sensor pipe** (up to 450 bar spike) with threaded flange protects the internal sensing element, the waveguide system. It can fit into the bored piston rod.
3. The **position magnet**, the only moving part is mounted on the piston bottom. This permanent magnet travels wearfree and contactless along the stationary sensor tube. Its magnetic field starts the measurement signal through sensor's rod wall. Electrical sensor connection is by means of 5 pin connector.

Customer benefit: The combination of smart magnetostrictive, MTS displacement sensors, high quality cylinders and precise control valves form ideal driving systems for technically demanding machine industries and other applications.



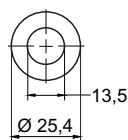
Position magnets (Pls. order separately)



Ring magnet Ø33 mm, Standard
Height = 8 mm

Part No. 201 542

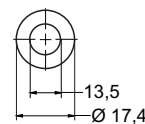
Material: PA 66-GF 30,
magnets compound-filled,
weight ca. 10 g, operating
temperature -40...+75° C



Ring magnet Ø 25,4 mm
Height = 8 mm

Part No. 400 533

Material: Composite PA-Ferrite,
weight ca. 10 g, operating
temperatur -40...+100° C



Ring magnet Ø 17,4 mm
Height = 8 mm

Part No. 401 032

Material: Surface PA coated,
weight ca. 10 g, operating
temperatur -40...+100° C

Other magnets upon request

Attention

Ensure the sensor mounting is kept away from strong magnetic and electrical noise-fields.

The sensor may be operated in any position. Normally, the sensor is firmly installed, whilst the magnet head is mounted at the mobile machine part and taken over the tube contactlessly.

Note: To avoid damaging of magnet and sensor housing be aware of a careful parallel mounting of the transducer.

Rod

Temposonics-EH is designed for installation into standard hydraulic cylinders or parallel to moved machine parts. The sensor can be mounted in any position.

The sensor's high-pressure, stainless steel tube will be fixed via the threaded flange M18 x 1,5.

Hydraulic sealing recommendation:

By use of an O-Ring (e.g. 21,89 x 2,62) in a channel of cylinder cover or O-Ring 15,3 x 2,2 sealing in sensor thread undercut.

Attention

For screwing in the sensor, pls. use only the hexnut on sensor's head bottom. Maximum tightening torque is 50 Nm.

Position magnet

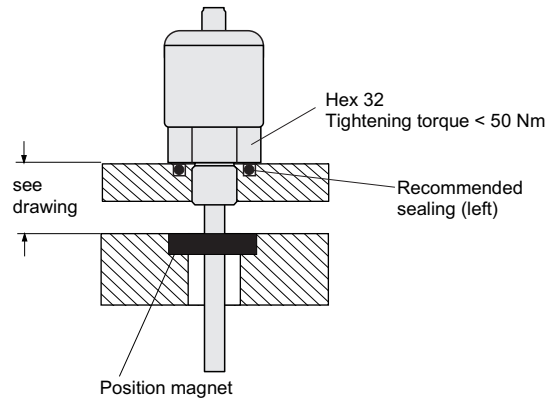
For accurate position measurements mount the magnet with non-magnetizable fastening material (screws, supports etc.). Using ferromagnetic supports, note that the magnet must be mounted with non-magnetizable spacer and screws (see right).

Cylinder mounting

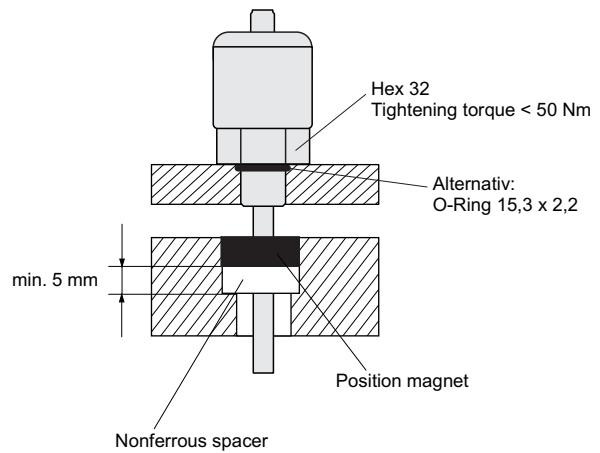
Use a rod bush (e.g. teflon) to prevent wear on the magnet and the sensor pipe. The bore in the piston rod is dependent on hydraulic pressure and piston velocity etc.

The minimum drilling must be 10 mm for Ø7 mm sensor rod and 13 mm for Ø10 mm sensor rod. Do not exceed the 450 (530) bar peak pressure.

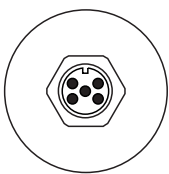
1. Non-magnetizable material



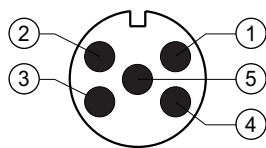
2. Magnetizable material



Connector outlet D51



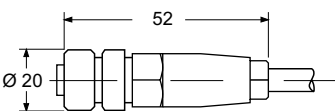
5 pin male receptacle M12 x 1



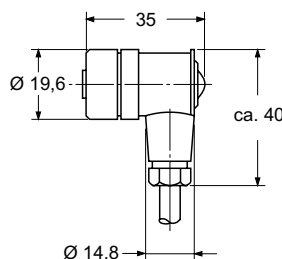
Front face of sensor plug or rear of cable connector

Pin	Function
1	+24 VDC (+20%/-15%)
2	0 - 10 V / 4 - 20 mA
3	DC Ground (0 V)
4	DC Ground (return)
5	Not connected

Cable connectors (Pls. order separately)



5 pin female cable connector M12 x 1
Part No. ST 933 171-100



5 pin 90° female cable connector
M12 x 1, insert adjustable in 90° positions
Part No. ST 933 176-100

Housing: Zinc diecasting, nickel plated
Termination: Solder
Contact insert: Silver plated
Cable clamp: Pg 9
Cable-Ø: 8 mm

Position Sensor Temposonics

EH - x - xxxxM - xxx - 1 - xx

SENSOR MODEL

EH - Hydraulic rod

STYLE

K - Threaded flange M18x1,5 / Rod 7 mm-Ø
M - Threaded flange M18x1,5 / Rod 10 mm-Ø

MEASURING RANGE

0050 - 1000 mm in 5 mm steps

CONNECTION TYPE

D51 - 5 pin male receptacle M12

INPUT VOLTAGE

1 - +24 VDC

SIGNAL OUTPUT

V0 - 0 - 10 V
A0 - 4 - 20 mA

On Delivery

Sensor only.
Position magnets are not included.
Pls. order separately.

Pls. order accessories (below)
separately.

Accessories	Part No.
Ring magnet Ø 33 mm	201 542
Ring magnet Ø 25,4 mm	400 533
Ring magnet Ø 17,4 mm	401 032
O-Ring 15,3 x 2,2 Viton FPM 75	401 133
5 pin female cable connector M12	ST 933 171-100
5 pin 90° female cable connector M12	ST 933 176-100