

E-Series CANopen

Tempsonics® EP and EL
Stroke length 50 - 2500 mm

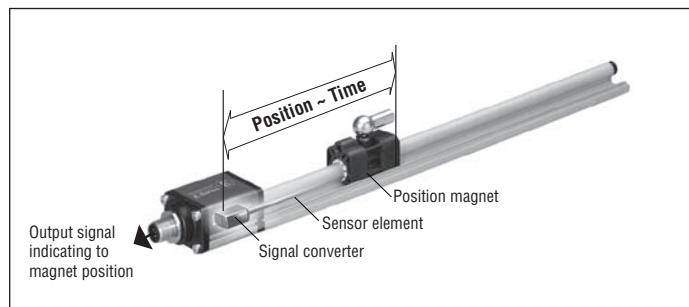
Document Part Number
551307 Revision A



EP

EL

- Linear, absolute measurement
- Contactless sensing with highest durability
- Rugged industrial sensor
- EMC tested and CE marked
- Linearity deviation less than 0.02 % F.S.
- Repeatability 0.005 % F.S.
- Direct signal output for position
-CANopen
- Stroke length 50 - 2500 mm



Magnetostriction

Design

The Tempsonics® linear position transducers are based on magnetostriction technology. Magnetostriction is a ferromagnetic material phenomenon which relates a dimensional change of the material to its magnetization properties. It is the product of a general coupling between the magnetic and elastic transport properties of the material's crystal lattice. This effect is typically on the scale of a few parts per million. It is quasi linear with the material's magnetization, may be positive or negative, and reaches a maximum at magnetic saturation. It is reversible, but exhibits a hysteretic effect if the magnetization does so. Magnetostriction was characterized in the late 19th century, the longitudinal version is called the „Joule“ effect, the torsional version is called the „Wiedemann“ effect, and the reciprocal effect where mechanical stress changes the magnetic properties is referred to as the „Villari“ effect.

Inherently robust, non-contact and wear free, the Tempsonics® linear position transducers provide the best durability and accurate position measurement solutions in harsh industrial environments. The position measurement technique is similar to the radar principle but using magnetostrictive effects. The position measurement accuracy is tightly controlled by the quality of our waveguide which is manufactured by MTS. The sensors are completely modular in electrical and mechanical design. They provide flexibility of use in many different applications. In EP and EL sensors, an aluminium profile housing protects the sensor element and provides guidance for the magnet. The environmentally sealed sensor head houses the modular electronics which provides the measurement and the choice of various different signal output interfaces. The external position measurement target is a permanent magnet. It is attached to the moving part of the machinery while the transducer itself can be stationary.

Tempsonics®-EP and EL

Robust aluminium profile-style housing - Stroke length 50-2500 mm

MTS Sensors continues to establish new performance standards for low-cost, fully-industrial, durable position sensors based on the magnetostrictive technology. This principle for accurate and non-contact measurement of linear-position sensing was developed 30 years ago by MTS and is used with outstanding success in a large variety of industrial applications.

The Tempsonics® EP and EL Sensors consist of robust aluminum profile-style housings that offer flexible mounting configurations and easy installation. Sensors EP and EL are ideal for demanding industrial applications where simple, reliable non-contact feedback is essential.

Technical Data

Input

Measured variable	Position
Stroke length	50 - 2500 mm

Output

Interface	CAN System ISO-DIS 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
The sensor will be supplied with ordered baud rate, which is changeable by customer					

Accuracy

Resolution	10 µm, 20 µm
Velocity	1 mm / s
Linearity, deviation	< ± 0.02 % F.S. (Minimum ± 60 µm)
Repeatability	< ± 0.005 % F.S. (Minimum ± 10 µm)
Temperature coefficient	≤ 15 ppm/°C
Update frequency	1 ms

Operating Conditions

Magnet speed	Any
Operating temperature	-40° C ... +75° C
Dew point, humidity	90 % rel. humidity, no condensation
Ingress protection	IP67 with proper mating connector
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 EN 61000-6-4 (for use in industrial environment) Electromagnetic immunity EN 61000-6-2
	The sensor meets the requirements of the EC directives and is marked with CE

Design / Material

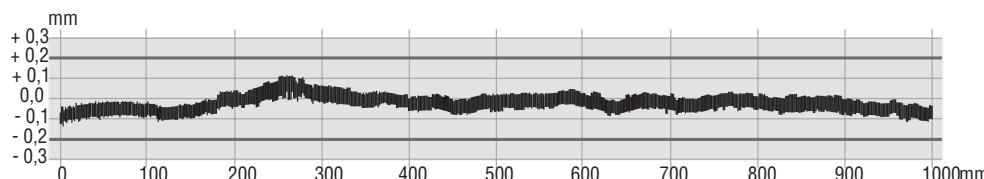
Sensor enclosure	Aluminum
Sensor housing	Aluminum
Position magnet type	Magnet slider hard ferrite, block magnet plastic

Installation

Mounting type	Adjustable mounting clamps
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Electrical connection

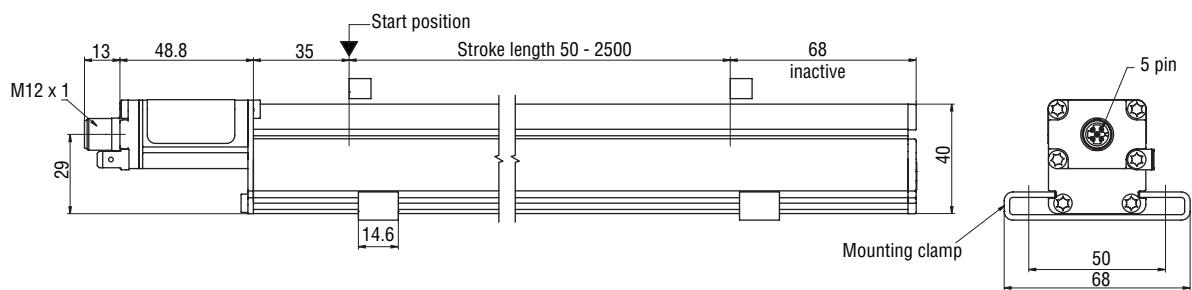
Connection type	5 pin connector M12
Supply voltage	24 VDC (+20 % / -15 %)
Current consumption	max. 90 mA
Ripple	≤ 0.288 Vpp
Dielectric strength	500 VDC (DC ground to machine ground)
Polarity protection	≥ -30 VDC
Oversupply protection	≤ 36 VDC



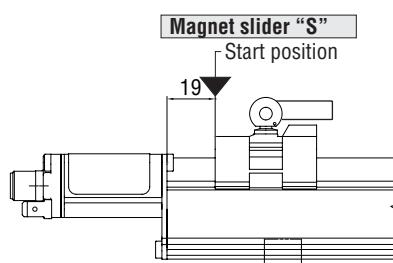
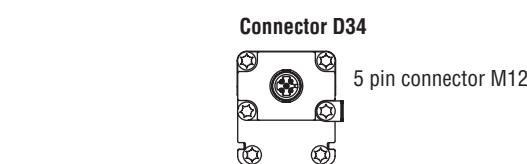
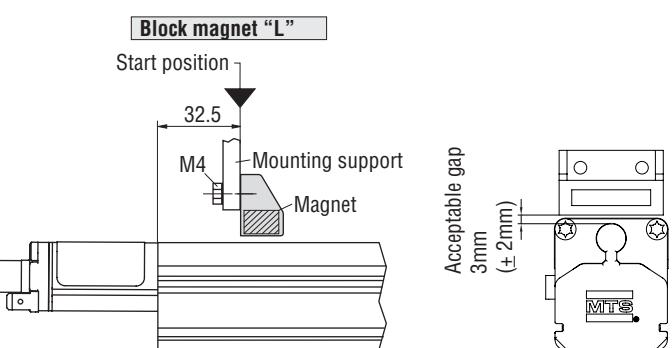
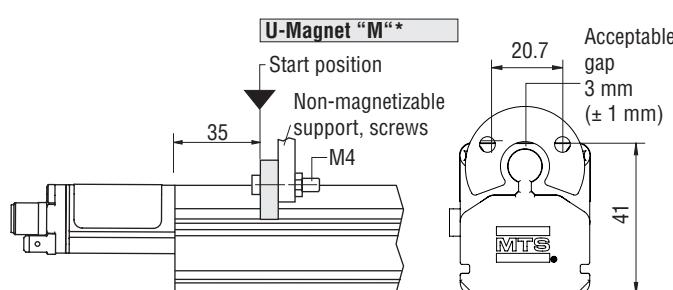
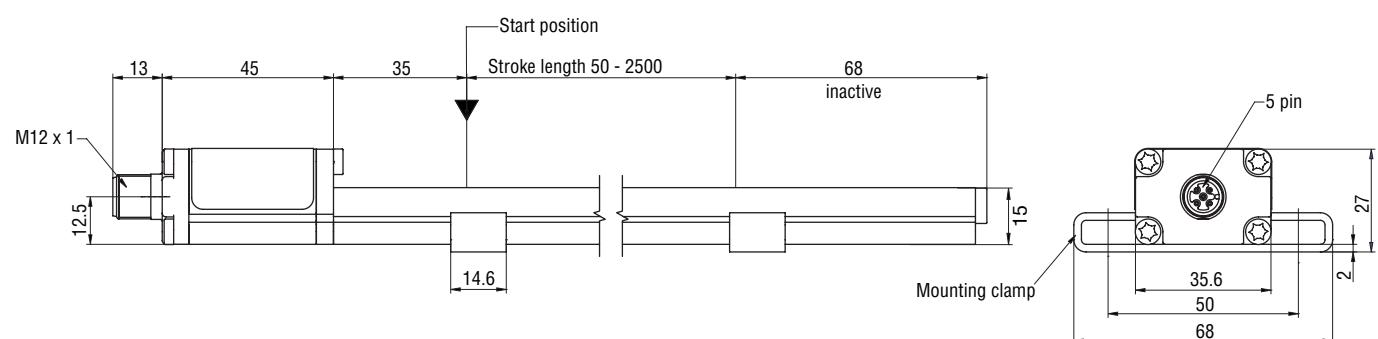
Linearity protocol

Sensor Tempsonics®-EP EL, Stroke length 1000 mm
Tolerance allowed: ± 0.2 mm
Tolerance measured: typical ± 0.09 mm

Tempsonics® EP



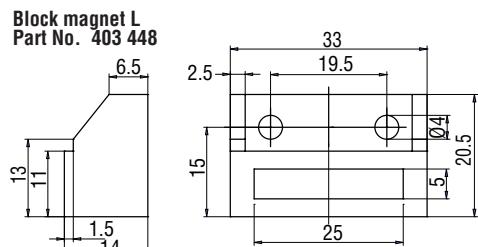
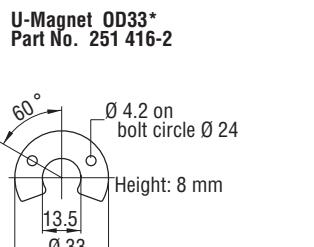
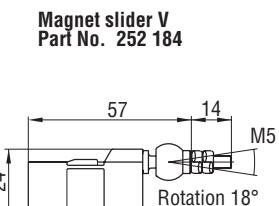
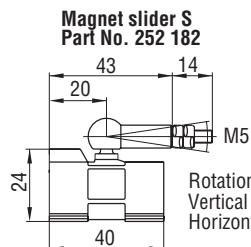
Tempsonics® EL



* only for EP transducers

All dimensions in mm

Position magnet (not included in delivery, please order separately)



GRP, magnet hard ferrite
Joint CuZn39Pb3 nickel-plated
Weight ca. 30 g
Operating temperature: -40 ... +75°C

GRP, magnet hard ferrite
Joint CuZn39Pb3 nickel-plated
Weight ca. 30 g
Operating temperature: -40 ... +75°C

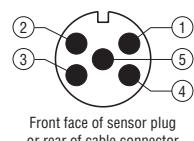
PA-Ferrite-GF20
Weight ca. 11g
Operating temperature: -40 ... +100°C

Magnet support: plastic
Magnet: hard ferrite
Weight: ca. 20 g
Operating temperature: -40 ... +75°C

* only for EP transducers

Other Position magnets upon request

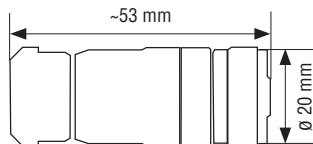
Connector wiring



Connector D34	Function
Pin 1	Shield
Pin 2	+24 VDC
Pin 3	OV (GND)
Pin 4	CAN_H
Pin 5	CAN_L

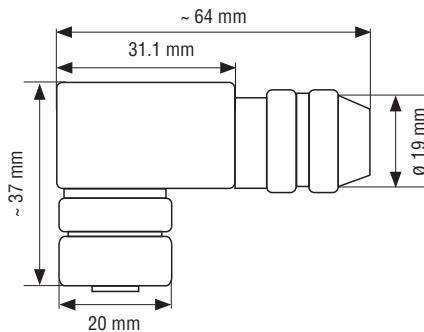
Connectors (not included in delivery, please order separately)

5 pin Female Connector M12 x 1*



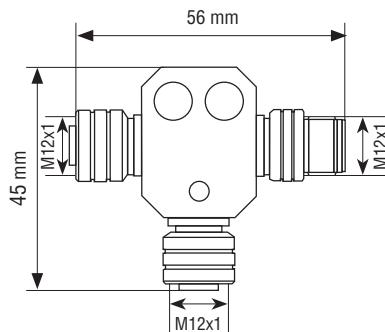
Housing: GD-Zn, Ni / IP67
Termination: screw terminals
Contact Insert: CuZn
Max. cable: Ø 4-8 mm
Part No.: 370 677

5 pin 90° Female Connector M12 x 1*



Housing: GD-Zn, Ni / IP67
Termination: screw terminals
Contact Insert: CuZn
Max. cable: Ø 6-8 mm
Part No.: 370 678

5 pin T-Connector*



Selfcuring coupling nut
2 x cable connector female
1 x cable connector male
Part No.: 370 691

*Maximum recommended torque: 0.6 Nm

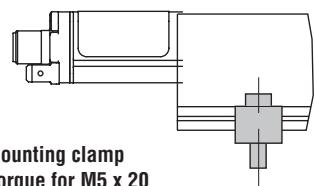
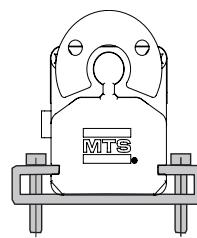
All dimensions in mm

Profile

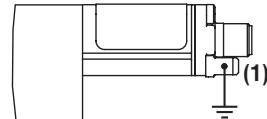
The sensor is fixed on a flat surface of the machine with the mounting clamps. The number of clamps is dependent on the length of the sensor. The clamps should be distributed evenly along the profile. We recommend M5 x 20 (DIN 6912) screws for attachment to be tightened with a torque of max. **5 Nm**.

Caution!

The mounting clamps isolate the sensor housing from the machine ground. In order to use the sensor correctly the sensor housing must therefore be grounded with a flat pin terminal (6.3 x 0.8 mm) on the sensor head (1).



Sliding mounting clamp
Tightening torque for M5 x 20
Machine screws: max. 5 Nm



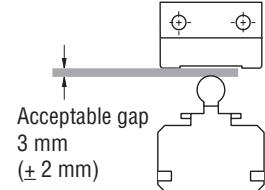
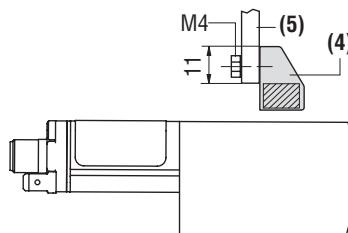
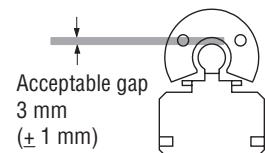
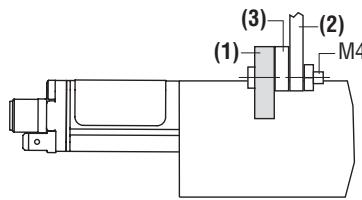
Position transmitter

U-Magnet: For accurate position measurements mount the magnet (1) with non-magnetizable fastening material (2) (screws, supports etc.).

Using magnetizable supports, note that the magnet must be mounted with non-ferrous support (3) of 5 mm minimum and screws.

Block magnet: The magnet (4) can be fixed with standard material and screws (5) Note the clearance, as shown here in the diagram on the right.

Caution!
Do not exceed the maximum permitted gap.



Tempsonics®

E

0

M

D 3 4

1

C

Z

Specification

P = Tempsonics® EP Sensor
L = Tempsonics® EL Sensor

0 - without position magnet

Stroke length

0050 - 2500 mm

Connection type

D34 - 5 pin cable connector M12

Supply voltage

1 - +24 VDC

Output

C [1] [2] [3] [4] [5] [6] = CAN-Bus

[1] [2] [3] Protocol: **404** = CANopen (active Duo Terminator) **304** = CANopen
 [4] Baud rate: **1** = 1000 kBit/s **2** = 500 kBit/s **3** = 250 kBit/s **4** = 125 kBit/s
 [5] Resolution: **5** = 20 µm **4** = 10 µm
 [6] Type: **1** = Standard

Magnet number for Multi-Position measurement*

Z02 = 2 pcs.

*Note: Please specify magnet numbers for your sensing application and order separately

Delivery includes:

- Sensor, mounting clamps

Please order separately: accessories (see below)

Stroke length standard:

Stroke	Ordering steps
≤ 500 mm	25 mm
> 500 - ≤ 2500 mm	50 mm

Accessories

Description	Part No.
U-Magnet OD33	251 416-2
Block magnet L	403 448
Magnet slider V	252 184
Magnet slider S	252 182
5 pin female connector M12	370 677
5 pin 90° female connector M12	370 678
5 pin T-Connector	370 691
Terminator	370 700

Notes

www.mtssensor.com

www.temposonics-shop.de

Temposonics® Hotline: +49 2351-9587-6000

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