

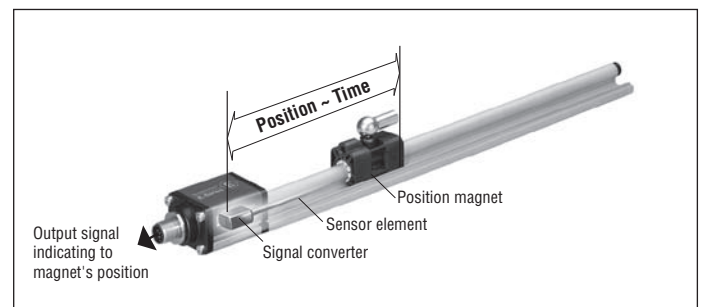
E-Series SSI

Temposonics® EP and EL
Stroke length 50...2500 mm

Document Part Number
551306 Revision C



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



Magnetostriction

The Temposonics® 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 materials crystal lattice. This affect 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 hysteric affect 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.

Design

Inherently robust, non-contact and wear free, the Temposonics® linear positions 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 position 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 position magnet. It is attached to the moving part of the machinery while the transducer itself can be stationary.

Temposonics® EP and EL

Robust aluminum 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 Temposonics® 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	SSI (Synchronous Serial Interface) - Differential signal in SSI standard					
Data format	Binary or Gray					
Data length	24; 25 bit					
Update time	up to 3.7 kHz, depending on stroke lengths					
	70 kBaud...1 MBaud, depending on cable length					
Data speed	Cable length	<3	<50	<100	<200	<400 m
	Baud rate	1.0 MBd	<400 kBd	<300 kBd	<200 kBd	<100 kBd

Accuracy

Resolution	20 µm, 50 µm or 100 µm
Linearity ¹	≤ ± 0.02 % F.S. (minimum ± 60 µm)
Repeatability	≤ ± 0.005 % F.S. (minimum ± 20 µm)

Operating conditions

Mounting position	any
Magnet speed	any
Operating temperature	-40 °C...+75 °C
Dew point, humidity	90 % rel. humidity, no condensation
Electronic ingress protection ²	IP67 with proper mating connector
Shock rating	100 g (single hit) / IEC-Standard 60068-2-27
Vibration test	10 g / 10...2000 Hz IEC-Standard 60068-2-6 (resonance frequencies excluded)
EMC test	Electromagnetic emission EN 61000-6-3
	Electromagnetic immunity EN 61000-6-2
	The sensor meets the requirements of the EC directives and is marked with CE

Design / Material

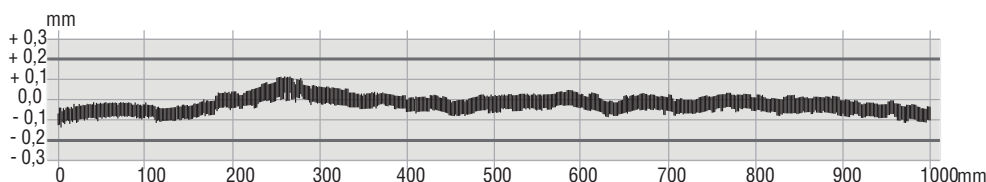
Sensor enclosure	aluminum
Sensor housing	aluminum
Position magnet type	magnet slider or removable U-Magnet

Installation

Mounting type	adjustable mounting clamps
---------------	----------------------------

Electrical connection

Connection type	8 pin M12
Supply voltage	24 VDC (+20 % / -15 %); 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.
Current consumption	typically 90 mA
Ripple	≤ 0.28 Vpp
Electric strength	500 VDC (DC ground to machine ground)
Polarity protection	up to -30 VDC
Overvoltage protection	up to 36 VDC



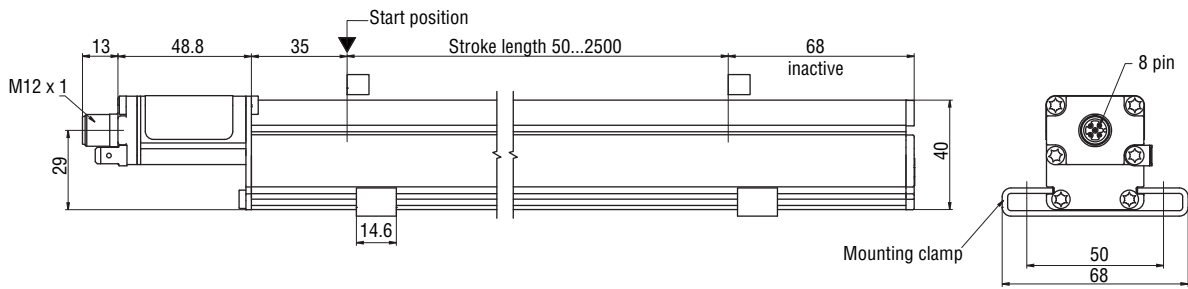
Linearity protocol

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

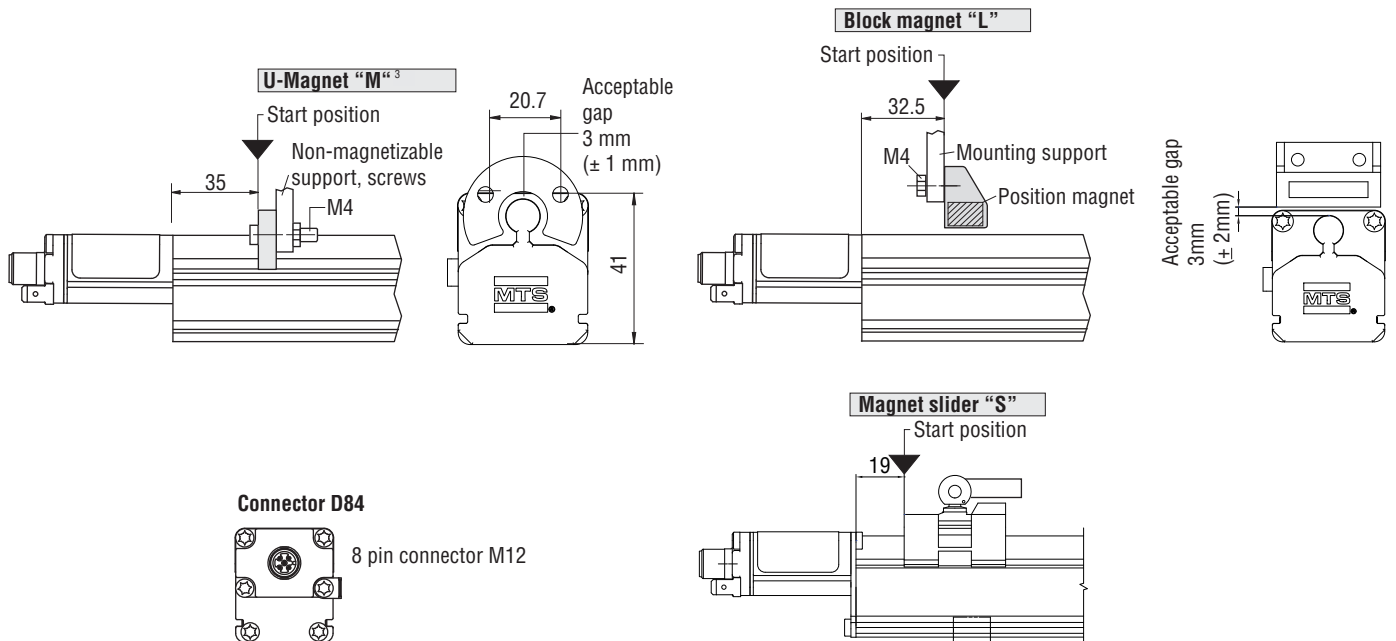
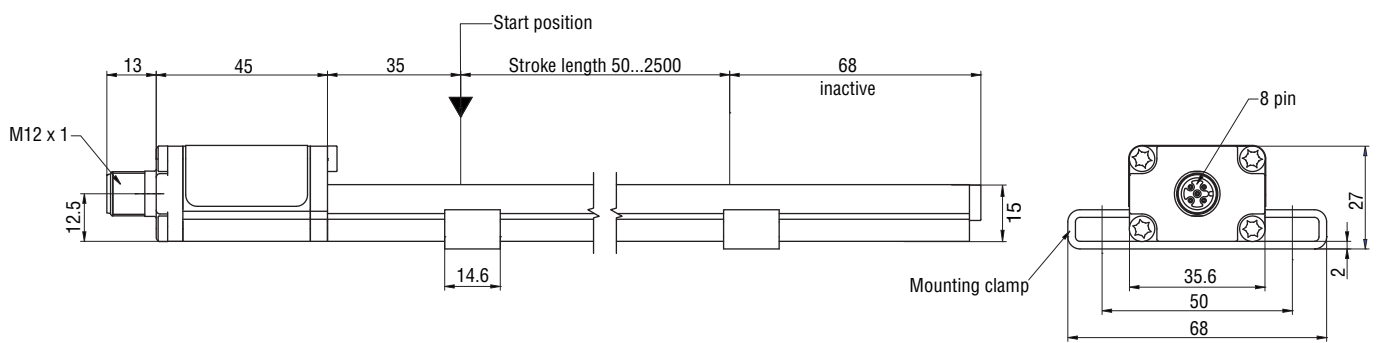
¹ with position magnet # 252 182.

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

Temposonics® EP



Temposonics® EL



All dimensions in mm

³ only for EP transducers

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

Magnet slider S
Part no. 252 182

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

Magnet slider V
Part no. 252 184

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

U-Magnet OD33⁴
Part no. 251 416-2

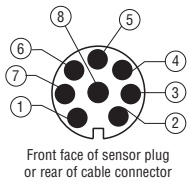
PA-Ferrite-GF20
Weight ca. 11 g
Operating temperature: -40...+100 °C

Block magnet L
Part no. 403 448

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

Other position magnets upon request

Connector wiring



Connector D84	SSI
Pin 1	Clock (+)
Pin 2	Clock (-)
Pin 3	Data (+)
Pin 4	Data (-)
Pin 5	n.c.
Pin 6	n.c.
Pin 7	+24 VDC
Pin 8	0 V (GND)

Connectors (not included in delivery, please order separately)

8 pin female connector M12 x 1 *

Housing: GD-ZnAL / IP67
Termination: screw terminals
Contact insert: CuZn
Max. cable: Ø 4...9 mm
Part no.: 370 694

8 pin 90° female connector M12 x 1 *

Housing: GD-ZnAL / IP67
Termination: screw terminals
Contact insert: CuZn
Max. cable: Ø 6...8 mm
Part no.: 370 699

All dimensions in mm

⁴ only for EP transducers

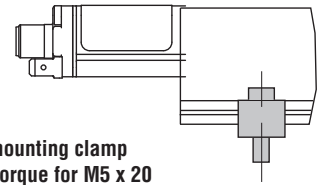
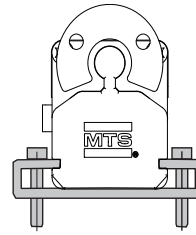
* Maximum recommended torque: 0.6 Nm

Profile

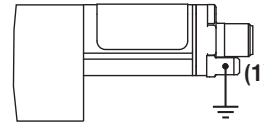
The sensor is fixed on a flat surface of the machine with the mounting clamps. The number of clamps is dependent on the length of the sensor. The clamps should be distributed evenly along the profile. We recommend M5 x 20 (DIN 6912) screws for attachment to be tightened with a torque of max. **5 Nm**.

CAUTION!

In order to use the sensor correctly the sensor housing must be grounded with a flat pin terminal (6.3 x 0.8 mm) on the sensor head (1).



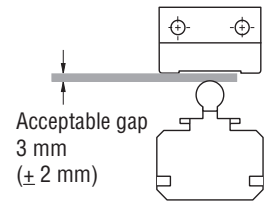
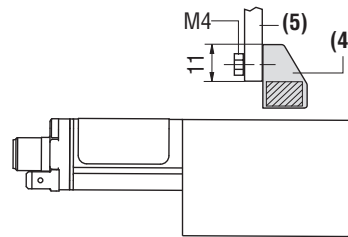
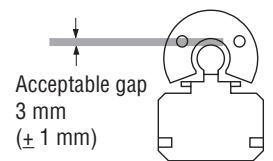
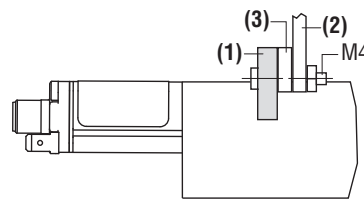
Sliding mounting clamp
Tightening torque for M5 x 20
Machine screws: max. 5 Nm



Position transmitter

U-Magnet: For accurate position measurements mount the position magnet (1) with non-magnetizable fastening material (2) (screws, supports etc.). Using magnetizable supports, note that the position magnet must be mounted with nonferrous support (3) of 5 mm minimum and screws.

Block magnet: The position 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.

Temposonics®



Specification

P = Temposonics® EP sensor
L = Temposonics® EL sensor

0 - without position magnet

Stroke length

0050...2500 mm

Connection type

D84 - 8 pin cable connector M12

Supply voltage

1 - +24 VDC

Output

S [1] [2] [3] [4] [5] [6] = Synchronous Serial Interface

- [1] Data length: 1 - 25 Bit • 2 - 24 Bit
- [2] Output format: B - Binary • G - Gray
- [3] Resolution (mm): 3 - 0.05 • 4 - 0.1 • 5 - 0.02
- [4] Performance: 1 - Standard
- [5] [6] Options: 00 - Measuring direction forward

Stroke length standard:

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

Delivery includes:

- Sensor
- 2 Mounting clamps up to 1250 mm stroke
- + 1 Mounting clamp for 500 mm each

Please order separately: accessories (see below)

Accessories

Description	Part no.
Magnet slider S	252 182
Magnet slider V	252 184
U-Magnet OD33	251 416-2
Block magnet L	403 448
Mounting clamp	403 508
8 pin M12 female connector	370 694
8 pin M12 90° female connector	370 699
8 pin M12 cordset, 5 m PUR shielded cable	370 674
8 pin M12 90° cordset, 5 m PUR shielded cable	370 676
Adapter cable to retrofit old series	on request

Document Part Number: 551306 Revision C (EN) 06/2014

MTS and Temposonics® are registered trademarks of MTS Systems Corporation. All other trademarks are the property of their respective owners. Printed in Germany.
Copyright © 2014 MTS Sensor Technologie GmbH & Co. KG. Alterations reserved. All rights reserved in all media. No license of any intellectual property rights is granted. The information is subject to change without notice and replaces all data sheets previously supplied. The availability of components on the market is subject to considerable fluctuation and to accelerated technical progress. Therefore we reserve the right to alter certain components of our products depending on their availability. In the event that product approbations or other circumstances related to your application do not allow a change in components, a continuous supply with unaltered components must be agreed by specific contract.



**MTS Sensor Technologie GmbH
& Co. KG**
Auf dem Schüffel 9
58513 Lüdenscheid, Germany
Tel. + 49-23 51-95 87 0
Fax + 49-23 51-5 64 91
E-Mail: info.de@mtssensors.com
www.mtssensors.com

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

MTS Sensors Technology Corp.
737 Aihara-cho,
Machida-shi, Japan
Tel. + 81-42-775-3838
Fax + 81-42-775-5516
E-Mail: info.jp@mtssensors.com
www.mtssensors.com