Temposonics®

Magnetostrictive Linear-Position Sensors

E-Series
EP2, Digital Pulse Output (Start/Stop)

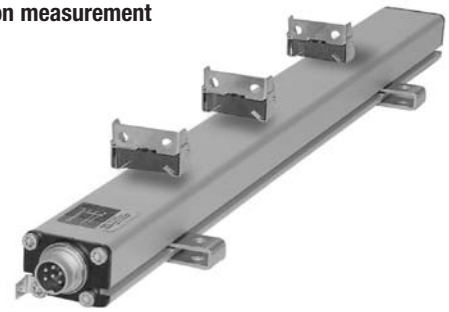
MTS SENSORS

551064 B

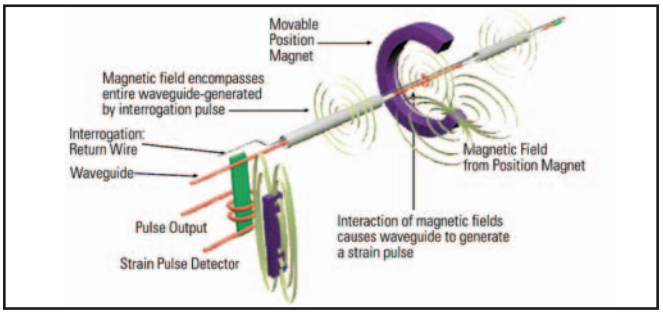
Product Specification

Model EP2 Profile-Style Sensor
single-position measurement

Model EP2 Profile-Style Sensor
multi-position measurement



- **Linear, absolute measurement**
- **Non-contact sensing technology**
- **Non-linearity less than 0.02%**
- **Repeatability within 0.001%**
- **Digital position output: Start/Stop pulse**
- **Simple sensor parameter upload**
- **Simultaneous multi-position measurement**
- **EMI shielded and CE certified**
- **Measuring range from 4 to 60 inches**
- **One year warranty**



E-Series position sensor

There is a new standard of excellence in position sensing. The Temposonics EP2 sensor establishes new performance standards for low-cost, fully-industrial, durable position sensors using the widely preferred 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. Industrial applications include harsh environmental conditions such as presses, injection molding, tire presses, rolling plants, tunnel driving machines and hydraulic units.

CE ISO 9001 CERTIFIED

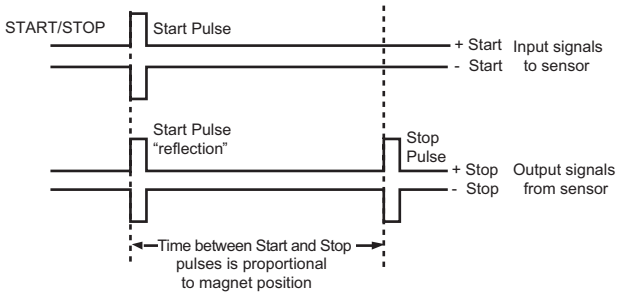
The benefits of magnetostrictive sensing

Temposonics linear-position sensors use the time-based magnetostrictive position sensing principle developed by MTS. Within the sensing element, a sonic strain pulse is induced in a specially designed magnetostrictive waveguide by the momentary interaction of two magnetic fields. One field comes from a movable permanent magnet that passes along the outside of the sensor. The other field comes from an “interrogation” current pulse applied along the waveguide. The resulting strain pulse travels at ultrasonic speed along the waveguide and is detected at the head of the sensing element. The position of the magnet is determined with high precision and speed by accurately measuring the elapsed time between the application of the interrogation pulse and the arrival of the resulting strain pulse with a high speed counter. Using the elapsed time to determine position of the permanent magnet provides an absolute position reading that never needs recalibration or re-homing after a power loss. Non-contact sensing eliminates wear, and guarantees the best durability and output repeatability.

Temposonics Model EP2 linear-position sensor parameters

Output

Digital-pulse output for the EP2 sensor is Start/Stop. Here the sensor requires a start signal from a controller or interface card to initiate the measurement cycle. The sensor generates a stop signal at the end of the measurement cycle that is used to stop the controller's counter clock. The elapsed time between the Start and Stop signals is directly proportional to the magnet's position along the active stroke length. The controller can calculate the absolute position of the magnet from the time value and the sensor's unique gradient value, (inverse of the speed for the ultrasonic pulse traveling in the sensor's waveguide).



Sensor parameter upload

For applications using smart sensor interfaces, the Model EP2 digital-pulse output sensor can provide a sensor parameter upload ability. This feature can replace the manual task of entering sensor data for system start-up, or for system maintenance work, saving time and preventing possible entry errors.

The following sensor parameters are available for upload:

- **Measuring range**
- **Offset**
- **Gradient** (Inverse speed of sensing pulse)
- **Status**

These sensor specific parameters can be retrieved by the controller/interface card at any time, via the sensor's Start/Stop signal lines.

The sensor parameter upload feature requires a RS-485 / 422 interface, The data format is serial, 4800 Baud, 8-bit data length. (Please consult factory for further details on parameter upload protocol.)

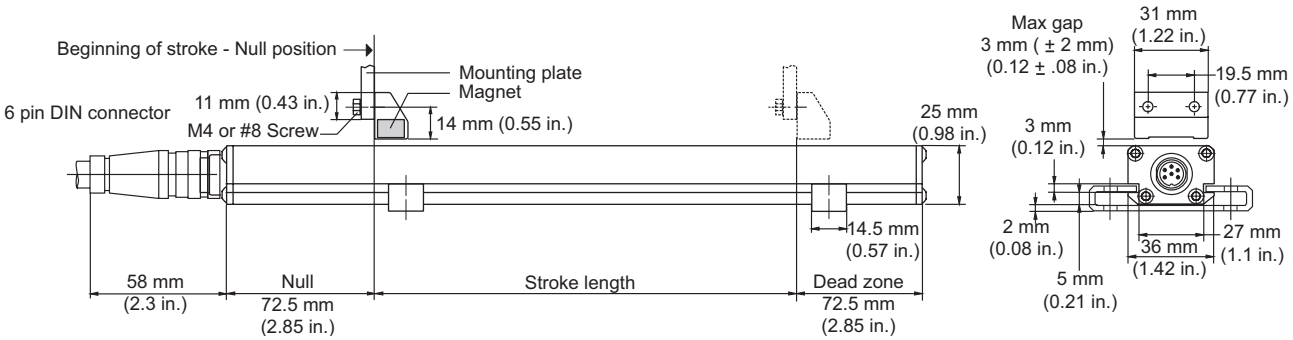
Multi-position measurements

The Model EP2 digital-pulse output sensor can provide multi-position measurements when used with more than one position magnet, and an appropriate controller/interface card. The minimum allowed distance between magnets is 3.0 in. (76 mm) to maintain proper sensor output. The total number of magnets is limited by the EP2 stroke length, and the particular interface card/controller that is used.

Parameters	Specification
Measured variable:	Displacement, single-position measurement or multi-position measurement
Resolution:	0.1, 0.01, 0.005 mm (controller dependent)
Non-linearity:	< ± 0.02% full scale , minimum ± 60 µm
Repeatability:	< ± 0.001% full scale
Outputs:	Start/Stop: RS-422 differential signal (serial parameter upload available for: measuring range, offset, gradient and status)
Update frequency:	Controller dependent
Measuring ranges:	4, 6, 9, 12, 15, 18, 21, 24, 30, 36, 42, 48, 54, 60 in.
Operating conditions:	Temperature: - 40 to 75 °C (- 40 to +167 °F) Relative humidity: 90% no condensation Ingress protection: IP67 if mating cable connector is correctly fitted. Shock test: 50 g (single hit) IEC-Standard 68-2-27 Vibration rating: 5 g/10 - 2000 Hz IEC-Standard 68-2-6
EMC test:	Electromagnetic emission: EN 50081-1 Electromagnetic immunity: EN 50082-2 EN 61000-4-2/3/4/6 Criteria A, CE qualified
Operating voltage:	+ 24 Vdc nominal (-15% or +20%) Polarity protection: up to -30 Vdc Overvoltage protection: up to 36 Vdc Current drain: Start/Stop, 50 - 100 mA (stroke length dependent) Dielectric withstand voltage: 500 Vdc (DC ground to machine ground)
Connection type:	6-pin male D60 connector
Sensor extrusion:	Aluminum
Mounting:	Adjustable mounting feet
Magnet type:	Block magnet with stamped metal carrier

Temposonics Model EP2 linear-position sensor

Dimensions



Measurement stroke lengths: 4, 6, 9, 12, 15, 18, 21, 24, 30, 36, 42, 48, 54, 60 in. (only)

Wiring and connectors

Sensor integral connector (D60 Male)

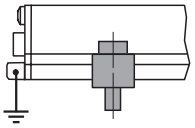
Pinout/wire color code (for extension cable)

Pin no.	Wire color	Function
		Digital-pulse outputs
1	Gray	(-) Stop
2	Pink	(+) Stop
3	Yellow	(+) Start
4	Green	(-) Start
5	Red or Brown	+24 Vdc (+20%, -15%)
6	White	DC Ground (for supply)

Integral D6 connector (male) as viewed from end of sensor

Note:
Appropriate grounding of cable shield is required at the controller end.

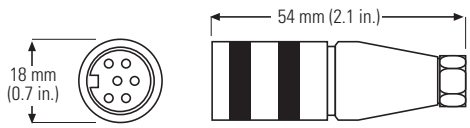
Attention:
A grounding lug is provided near the connector end of the sensor for a convenient connection to earth ground. Since the EP2 sensor's aluminum housing has an anodic coating the sensor mounting feet, (part no. 400802), do not provide proper grounding. A ground wire connection to the grounding lug is required.



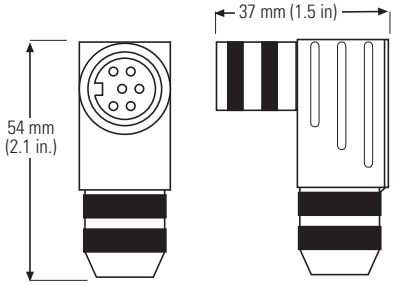
Cable connectors (field-installed D6 female)

Mates with sensor's integral connector

D6 Straight-exit connector
part no. 560700



D6 90º connector
part no. 560778



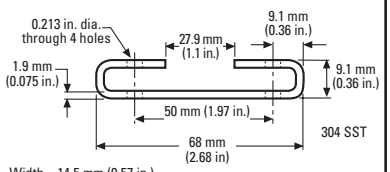
Temposonics Model EP2 linear-position sensor

Sensor mounting

The sensor is fixed onto a flat straight surface of the machine with moveable mounting feet. A pair (2) mounting feet are provided with each sensor. Additional mounting feet are provided for measurement stroke ranges greater than 48 inches. These mounting feet slide onto the sensor via channels in the extrusion and should be evenly distributed along its length. Refer to the drawing on page 3.

When fastening the mounting feet, 10-32 cap screws are recommended at a maximum torque of (44 in. lbs.).

Mounting foot
Standard mounting foot
part no. 400802

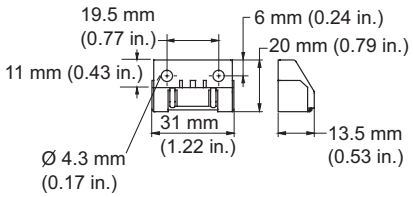


Position magnet

The floating magnet (block style L) mounts on the moving machine part and travels just above the sensor's extrusion. It can be mounted using ferrous metal screws and support bracket. However, the support bracket can not extend beyond 11 mm (0.43 in.)from the top of the magnet, unless it is made of non-ferrous material.

The magnet should be installed with a perpendicular orientation relative to the top surface of the sensor extrusion as shown on page 3. Optimal performance is achieved when this orientation remains consistent throughout the full measurement stroke range.

Block magnet, style L
part no. 252887



How to order

The EP2 sensor model
With an integral 6-pin connector, digital pulse output (Start/Stop)

EP2D - _ _ _
Measuring stroke length (inches)
004 / 006 / 009 / 012 / 015 / 018 / 021 / 024 / 030 / 036 / 042 / 048 / 054 / 060

Notes:

Temposonics Model EP2 sensors include one magnet (part no. 252887), and two mounting feet (part number 400802) for sensors up to 48 inches of stroke length. Additional mounting feet are included for stroke lengths over 48 inches.

Accessories

Description	Function/Notes	Part no.
Mounting feet, standard (spares)	Model EP2 sensors come with mounting feet	400802
Block style magnet (spare)	Style L "floating" magnet (included with EP2 sensors)	252887
6-Pin DIN connector, straight	Female, straight exit, mates to D60 connection type (see page 3).	560700
6-Pin DIN connector, 90°	Female, 90° exit, mates to D60 connection type (see page 3).	560778

Part Number: 05-06 551064 Revision B

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