

P r o d u c t S p e c i f i c a t i o n s



Temposonics LH

F E A T U R E S

- 2-year warranty
- Modular, non-contacting design
- Excellent resolution and repeatability
- Selection of application housings
- Voltage, Current, Start/Stop, and PWM outputs
- Field adjustable zero and span settings (analog only)
- Easy to install
- Field replaceable sensor cartridge
- 24-hour emergency technical support
- CE Certified

Temposonics® L Series position sensors are available with analog outputs (voltage or current) or digital outputs (Start/Stop or pulse-width-modulated) and provide maximum reliability and ruggedness in a flexible, modular design. Like all Temposonics sensors, the L Series sensors use non-contacting magnetostrictive technology. The LH sensor cartridge (for sensor lengths up to 72 inches) can be quickly replaced in the field.

Temposonics L Series sensors are backward compatible with most existing Temposonics installations. Change-over is quick and easy since many of the connector and output options offered are the same as with our previous models.

Typical industry applications for the L Series position sensors include primary woodworking, plastics processing, hydraulics, and pneumatics.

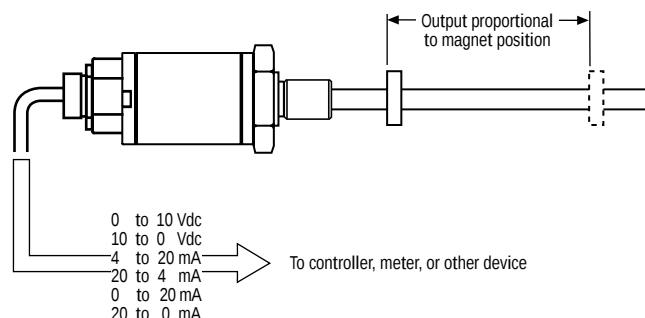
PARAMETER	SPECIFICATION
Measured Variable:	Displacement
Resolution:	<i>Analog:</i> Infinite <i>Digital:</i> $1 \div [\text{gradient} \times \text{crystal freq. (mHz)} \times \text{circulation}]$
Non-Linearity*:	$\pm 0.02\%$ or $\pm 0.05 \text{ mm}$ ($\pm 0.002 \text{ in.}$), whichever is greater 0.002 in. is the minimum absolute linearity and varies with sensor model
Repeatability:	Equal to resolution
Hysteresis:	$< 0.02 \text{ mm}$ (0.0008 in.)
Outputs:	<i>Analog:</i> Voltage or Current <i>Digital:</i> Start/Stop or PWM
Measuring Range:	<i>Analog:</i> 25 to 2540 mm (up to 100 in.) <i>Digital:</i> 25 to 7600 mm (up to 300 in.)
Operating Voltage:	+ 13.5 to 26.4 Vdc ($\pm 0\%$); Strokes $\leq 1525 \text{ mm}$ (60 in.) + 24 Vdc ($\pm 10\%$); Strokes $> 1525 \text{ mm}$ (60 in.)
Power Consumption:	100 mA maximum
Operating Temperature:	<i>Head Electronics:</i> - 40 to 85°C (- 40 to 185°F) <i>Sensing Element:</i> - 40 to 105°C (- 40 to 221°F)
EMC Test:	DIN IEC 801-4, Type 4, CE Qualified; DIN EN 50081-1 (Emissions), DIN EN 50082-2 (Immunity)
Shock Rating:	100 g (single hit)/IEC standard 68-2-27 (survivability)
Vibration Rating:	5 g/10-150 Hz/IEC standard 68-2-6
Adjustability: (for Analog sensors only)	Field adjustable zero and span to 5% of active stroke
Update Time:	<i>Analog:</i> $\leq 1 \text{ ms}$ <i>Digital:</i> Minimum = [Stroke (specified in inches) + 3] x 9.1 μs
Operating Pressure:	5000 psi static; 10,000 psi spike
Housing Style/Enclosure:	Aluminum die-cast head, IP 67 stainless steel rod & flange (LH flange: M18 x 1.5 or 3/4-16 UNF-3A)
Magnet Type:	Ring magnet

* Non-linearity increases with multiple circulations.

The above specifications for analog sensors are assuming that output ripple is averaged by the measuring device as with any typical analog device. Specifications are subject to change without notice. Contact MTS to confirm specifications that are critical to your needs.

ANALOG OUTPUT

The Temposonics L Series position sensors provide direct analog outputs, including voltage (0 to 10 Vdc, forward or reverse acting) and current (4 to 20 mA or 0 to 20 mA, forward or reverse acting). Both voltage and current outputs allow 5% adjustments of zero and span setpoints. Since the outputs are direct, no signal-conditioning electronics are needed when interfacing with controllers or meters. Other output options are also available with L Series sensors: digital pulse for Start/Stop or pulse-width modulation (PWM).

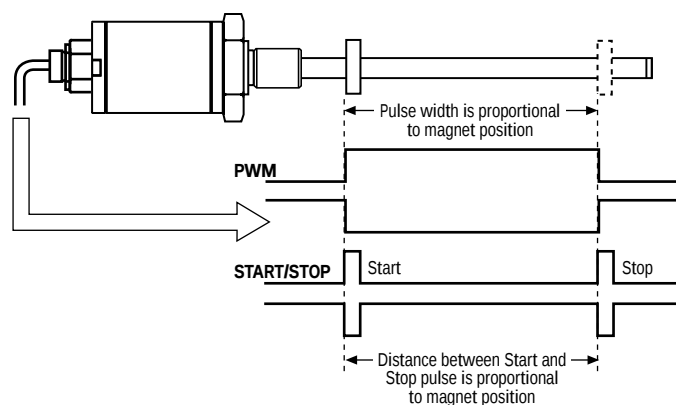


FEATURES

- Voltage & Current Outputs
- 5% Adjustment on Zero and Span
- Direct Outputs—No Signal-conditioning Required
- High Resolution

DIGITAL OUTPUT

The Temposonics L Series position sensors provide direct Start/Stop and pulse-width modulated (PWM) outputs. Standard resolution is 0.004 inches (when using a 28MHz counter). Higher resolutions are possible with increased circulations. Since the outputs are direct, no signal-conditioning electronics are needed when interfacing with controllers or meters. Other output options are also available with L Series sensors: voltage (0 to 10 Vdc, forward or reverse acting) and current (4 to 20 mA or 0 to 20 mA, forward or reverse acting).



FEATURES

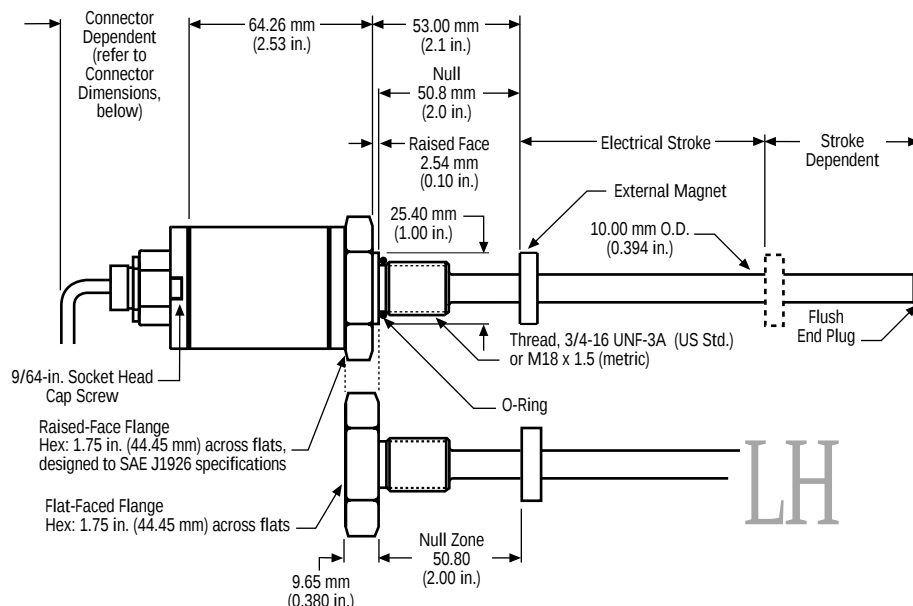
- Start/Stop or PWM outputs
- High Resolution
- Direct Outputs—No Signal-conditioning Required

DIMENSIONS

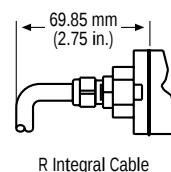
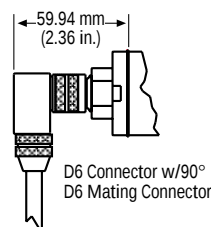
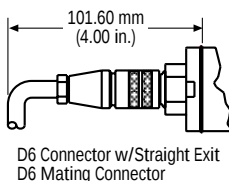
ROD-STYLE (Model LH):

The L Series rod-style application housing (Model LH) offers modular construction, flexible mounting configurations, and easy installation. LH housings are designed for internal mounting in applications where high-pressure conditions exist (i.e., 5000 psi static, 10,000 psi spike) such as hydraulic cylinders; it can also be mounted externally in many applications.

In addition, the LH housing offers the ability to quickly and easily replace the sensor cartridge in the field (up to 72 inches.)



Connector Dimensions



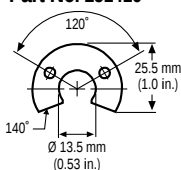
Stroke-dependent Dead Zones

Stroke Length	Dead Zone
50 - 5000 mm (2 - 197 in.)	63.5 mm (2.5 in.)
5001 - 7625 mm (197.1 - 300 in.)	66 mm (2.6 in.)

MAGNETS/FLOAT:

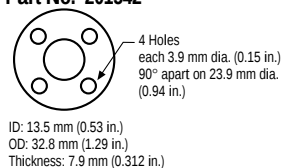
Magnets and floats must be ordered separately with Temposonics LH sensors. A variety of magnet styles (right) are available to meet your particular application demands. The standard ring magnet (P/N 201542) is suitable for most applications.

Part No. 251416

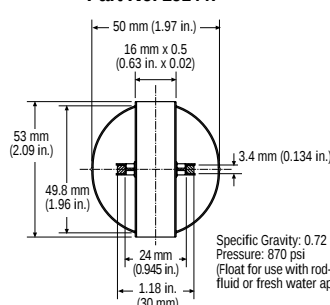


ID: 13.5 mm (0.53 in.)
OD: 32.8 mm (1.29 in.)
Thickness: 7.9 mm (0.312 in.)

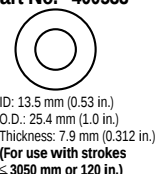
Part No. 201542



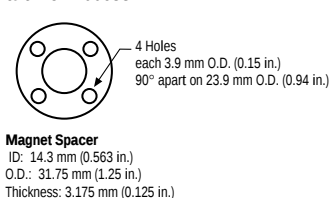
Part No. 251447



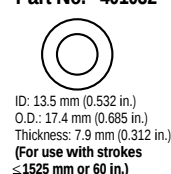
Part No. 400533



Part No. 400633



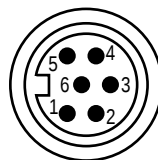
Part No. 401032



CONNECTORS

D6 Connector: (Voltage or Current Output)

Pin No.	Wire Color	Function	Notes
1	Gray	0 to 10 Vdc, 4 to 20 mA, 0 to 20 mA	(Note 1)
2	Pink	Return for Pin 1	
3	Yellow	10 to 0 Vdc, 20 to 4 mA, or 20 to 0 mA	(Note 1)
4	Green	Return for Pin 3	
5	Red or Brown	Customer Supplied Power (+ Vdc)	(Note 3)
6	White	DC Ground	



(As viewed from end of sensor)

Pin out

D6 Connector: (PWM or Start/Stop)

Pin No.	Wire Color	Function	Notes
1	Gray	(-) Gate for PWM, (-) Stop for Start/Stop	
2	Pink	(+) Gate for PWM, (+) Stop for Start/Stop	
3	Yellow	(+) Interrogation for PWM, (+) Start for Start/Stop	(Note 2)
4	Green	(-) Interrogation for PWM, (-) Start for Start/Stop	(Note 2)
5	Red or Brown	Customer Supplied Power (+ Vdc)	(Note 3)
6	White	DC Ground	

INTEGRAL CABLE:

R0 Cable: (Voltage or Current Output)

Wire Color	Function	Notes
Gray	0 to 10 Vdc 4 to 20 mA or 0 to 20 mA	(Note 1)
Pink	Displacement Output Return for Gray Wire	
Yellow	10 to 0 Vdc 20 to 4 mA or 20 to 0 mA	(Note 1)
Green	Displacement Output Return for Yellow Wire	
Red or Brown	Customer Supplied Power (+ Vdc)	(Note 3)
White	DC Ground	

INTEGRAL CABLE:

R0 Cable: (Start/Stop or PWM)

Wire Color	Function	Notes
Gray	(-) Gate for PWM, (-) Stop for Start/Stop	
Pink	(+) Gate for PWM, (+) Stop for Start/Stop	
Yellow	(+) Interrogation for PWM, (+) Start for Start/Stop	(Note 2)
Green	(-) Interrogation for PWM, (-) Start for Start/Stop	(Note 2)
Red or Brown	Customer Supplied Power (+ Vdc)	(Note 3)
White	DC Ground	

NOTES:

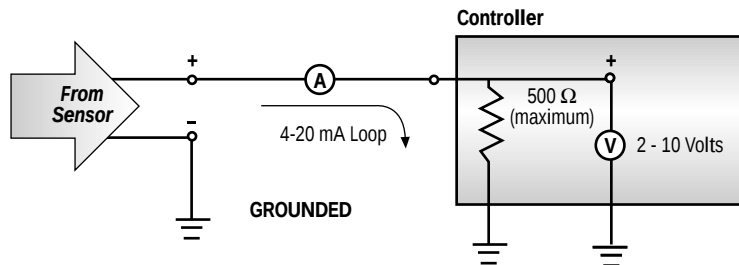
- 1) When using current (mA) outputs, only one output signal is provided (as selected in the ordering guide). With voltage outputs, both 0 to 10 Vdc and 10 to 0 Vdc output signals are provided.
- 2) For single-ended interrogation, the unused interrogation lead must be connected to DC ground. When using PWM with internal interrogation, both interrogation leads must be connected to DC ground.
- 3) +13.5 to 26.4 Vdc ($\pm 0\%$):
Stroke lengths ≤ 1525 mm (60 in.)

+ 24 Vdc ($\pm 10\%$):
Stroke lengths > 1525 mm (60 in.)

CAUTION!

When wiring Tempsonics L Series sensors equipped with an D6 or R0 connection type, **do not connect DC ground to the cable shield or drain wire.**

TYPICAL 4-20 mA WIRING:

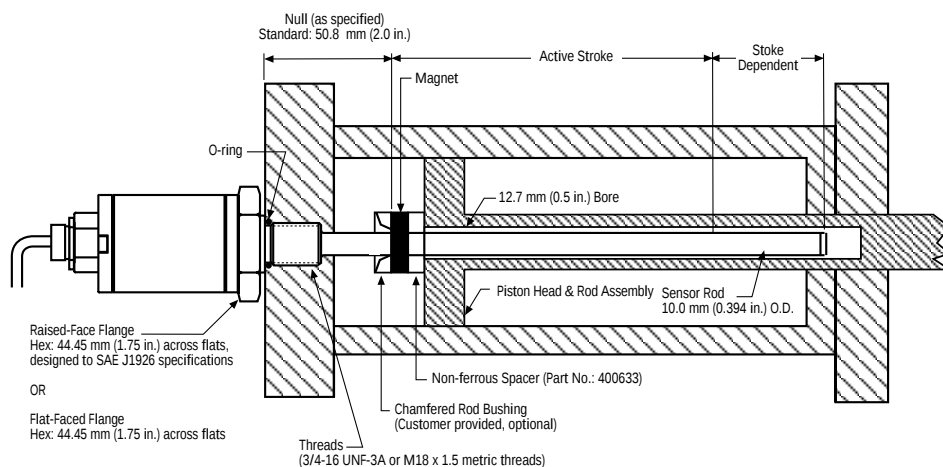


NOTE:

Minimum load impedance for voltage outputs is 5K Ω.

CYLINDER INSTALLATION

The rod-style Temposonics L Series position sensor (Model LH) are designed for installation into hydraulic cylinders. The sensor's high-pressure, stainless steel tube installs into a 1/2 inch gun-drilled piston rod assembly as illustrated (right).



The illustration above represents a **typical** installation. Some installation requirements may be application specific.

If you have any questions about how to apply MTS Temposonics L Series position sensors, please contact one of our Application Engineers or your local distributor—they are available to help you design an effective position sensing system to fit your application.

SENSOR MODEL _____ LH = Hydraulic Rod Style	
HOUSING STYLE _____ T = US customary threads, raised-faced hex, and pressure tube S = US customary threads, flat-faced hex, and pressure tube M = Metric threads, flat-faced hex, and pressure tube N = Metric threads, raised-faced hex, and pressure tube B = Sensor cartridge only, no pressure housing, stroke lengths ≤ 72 in.	
CONNECTION TYPE _____ D6 = 6 pin DIN connector R0 = Integral cable, straight out exit, pigtail connection	
INTEGRAL CABLE LENGTH _____ 00 = No integral cable (sensors with connection type D6) 02 = 2 meter integral cable; standard with metric stroke lengths (i.e., millimeters) 05 = 5 ft. integral cable; standard with US stroke lengths (i.e., inches and tenths) 01 - 99 = Custom cable length 1 to 99 ft. (or 1 to 30 meters) (Encode length in feet if using US customary, in meters if using metric) NOTE: MTS recommends the maximum integral cable length to be 10 meters or 33 feet. Cables greater than 10 meters in length are available, however, proper care must be taken during handling and installation.	
UNIT OF MEASURE _____ U = US customary (inches and tenths: xxx.x in.) M = Metric (millimeters: xxxx mm)	
LENGTH _____ ____ ____ . ____ = Inches and tenths (in 0.5 in. increments) or ____ ____ ____ Millimeters (in 5 mm increments)	
INPUT VOLTAGE _____ 1 = +13.5 to 26.4 Vdc, $\pm 0\%$ (For stroke lengths ≤ 60 in.) 2 = +24 Vdc, $\pm 10\%$ (For stroke lengths > 60 in.)	
OUTPUT _____ R0 = Start/Stop D ____ = PWM (Pulse-Width Modulated) IMPORTANT: Refer to Tables A and B before ordering sensors with PWM output. [Fill in the three blanks with "E" (external interrogation) or "I" (internal interrogation) followed by the number of circulations desired (Range: 1 to 15, encode as 01 to 15)]	
V0 = 0 to 10 Vdc and 10 to 0 Vdc (available to 78 in.) A0 = 4 to 20 mA (available to 100 in.) A1 = 20 to 4 mA (available to 100 in.) A2 = 0 to 20 mA (available to 100 in.) A3 = 20 to 0 mA (available to 100 in.)	

Table B

Maximum Stroke per Circulation Count for PWM Output w/Internal Interrogation	
Maximum Stroke	Circulation Count
≤ 84 inches	15
> 84.1 inches	1

6

HOW TO ORDER (cont.)

PRESSURE HOUSING

H

SENSOR CONNECTION TYPE _____

S = US customary threads, flat-faced hex
T = US customary threads, raised-face hex
M = Metric threads, flat-faced hex
N = Metric threads, raised-face hex

UNIT OF MEASURE _____

U = US customary (inches and tenths: xxx.x in.)
M = Metric (millimeters: xxxx mm)

LENGTH _____

_____. ____ = Inches and tenths (1 to 72 in.) or
 _____ = Millimeters (25 to 1825 mm)

EXTENSION CABLES

SENSORS CONNECTION TYPE _____

D6 = Female Mating Connector for D6 Straight-exit style sensor only
DA = Female Mating Connector for D6 90° exit style sensor only

CABLE LENGTHS _____

005 = 5 ft.
015 = 15 ft.
025 = 25 ft.
050 = 50 ft.
100 = 100 ft.

Custom Cable Length
 _____ = Custom cable length (in feet). Maximum cable length is dependent upon output. Consult MTS Applications Engineering.

CABLE TERMINATION _____

P0 = Pigtail connection
D6M = Male D6 connector

ACCESSORIES

<u>Description</u>	<u>Part No.</u>	<u>Notes</u>
O-Ring (spare)	560315	
Hex Jam-nut (w/ 3/4-16 UNF threads)	500015	For US customary stroke lengths
Hex Jam-nut (w/ M18x 1.5 threads)	500018	For metric stroke lengths
Magnet Spacer	400633	For use with standard ring magnet 201542
Magnet Mounting Screw	560357	Used to mount standard ring magnet P/N 201542 (4 screws required) and 90° cutout magnet 201552 (2 screws required)
Magnet Mounting Screw	560712	Used to mount floating magnet P/N 251298-2 (2 screws required)
Power Supply (24/28 Vdc, 0.5 A)	380009	
Cable	530026	Specify length in feet at time of order
Collar	560777	For Tempsonics LH sensors with float
D6 Field Installable Connector	560700	Female Straight Exit
D6 Field Installable Connector	560701	Female 90° exit



SENSORS G R O U P

Pioneers,
Innovators,
Leaders in
Magnetostrictive
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