

Product Specifications



Temposonics LH

Features

- Modular, non-contacting design
- Excellent resolution and repeatability
- Absolute Linear Position Measurement
- Voltage, Current, Start/Stop, and PWM outputs
- Field adjustable zero and span settings (analog only)
- Easy to install
- Field replaceable sensor cartridge
- CE Certified
- 2-year warranty

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 without removing the hydraulic pressure housing thereby eliminating the need to break the hydraulic seal.

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 ÷ [gradient x crystal freq. (mHz) x circulations]
Non-Linearity*:	± 0.02% or ± 0.05 mm (± 0.002 in.), whichever is greater 0.002 in. is the minimum absolute linearity and varies with sensor model
Repeatability:	Equal to resolution
Hysteresis:	< 0.02 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 (1 to 100 in.) <i>Digital:</i> 25 to 7620 mm (1 to 300 in.)
Operating Voltage:	+ 13.5 to 26.4 Vdc (± 0%); Strokes ≤ 1525 mm (60 in.) + 24 Vdc (± 10%); Strokes > 1525 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:	Field adjustable zero and span up to 5% of (for Analog sensors only) active stroke
Update Time:	<i>Analog:</i> < 1 ms (typical) <i>Digital:</i> Minimum = [Stroke (specified in inches) + 3] x 9.1 µs
Housing Style/Enclosure:	<i>Sensor Rod with Flange:</i> Stainless steel <i>Electronic Head:</i> Aluminum die-cast, IP 67
Operating Pressure:	350 bar static, 690 bar spike (5,000 psi static, 10,000 psi spike)
Maximum Hex Torque:	45 N-m (33 ft.-lbs.)
Mounting:	M18 x 1.5 or 3/4-16 UNF-3A
Magnet Type:	Ring magnet or floating magnet



All specifications are subject to change. Please contact MTS for specifications critical to your needs.

* Non-linearity increases with multiple circulations.

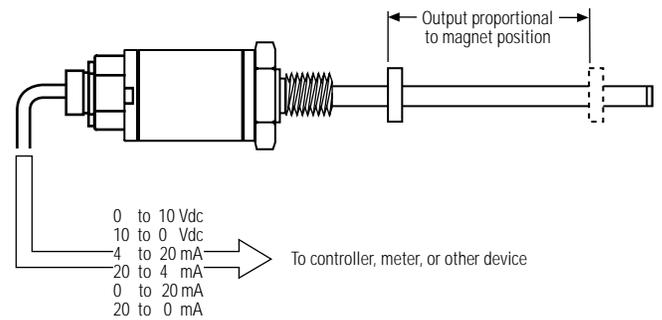
** Power supply dependent.

The above specifications for analog sensors are assuming that output ripple is averaged by the measuring device as with any typical analog device.

Refer to **Installation Guide, Part No. 550570**, for additional information, (www.mtssensors.com).

ANALOG OUTPUTS

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. Resolution is limited only by the output ripple. Since the outputs are direct, no signal-conditioning electronics are needed when interfacing with controllers or meters.

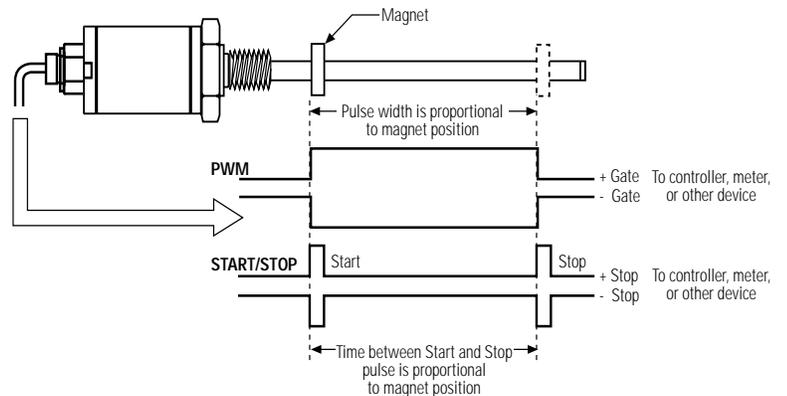


FEATURES

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

DIGITAL OUTPUTS

The Temposonics L Series position sensors provide direct Start/Stop and PWM outputs. Standard resolution is 0.004 inches (when using a 28 MHz counter). Higher resolutions are possible with increased circulations or with the use of higher resolution counters. Since the outputs are direct, no signal-conditioning electronics are needed when interfacing with controllers or meters.



FEATURES

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

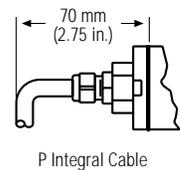
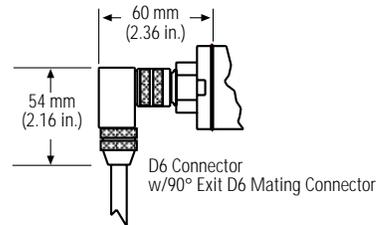
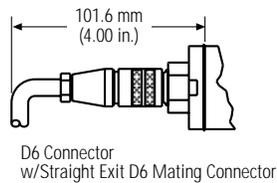
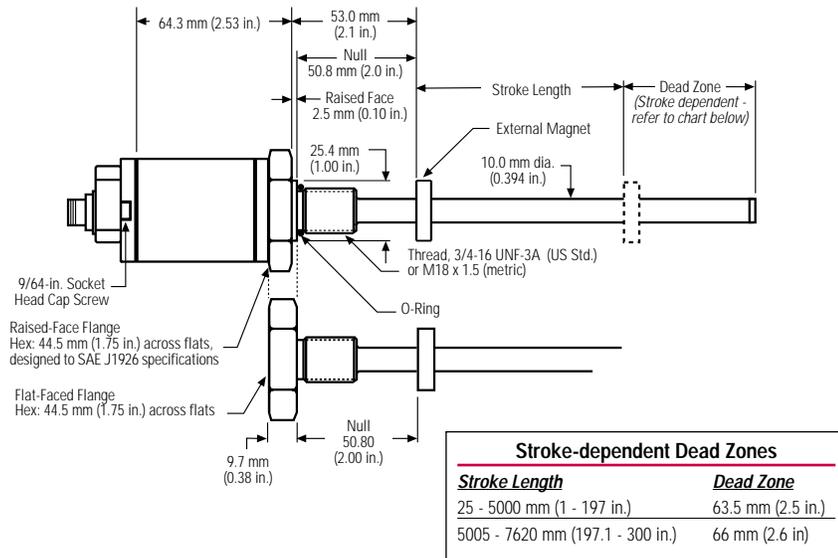
DIMENSIONS

ROD-STYLE (Model LH):

The Temposonics L Series rod-style application housing (Model LH) offers modular construction, flexible mounting configurations, and easy installation. It is designed for internal mounting in applications where high-pressure conditions exist (5000 psi continuous, 10,000 psi spike) such as hydraulic cylinders.

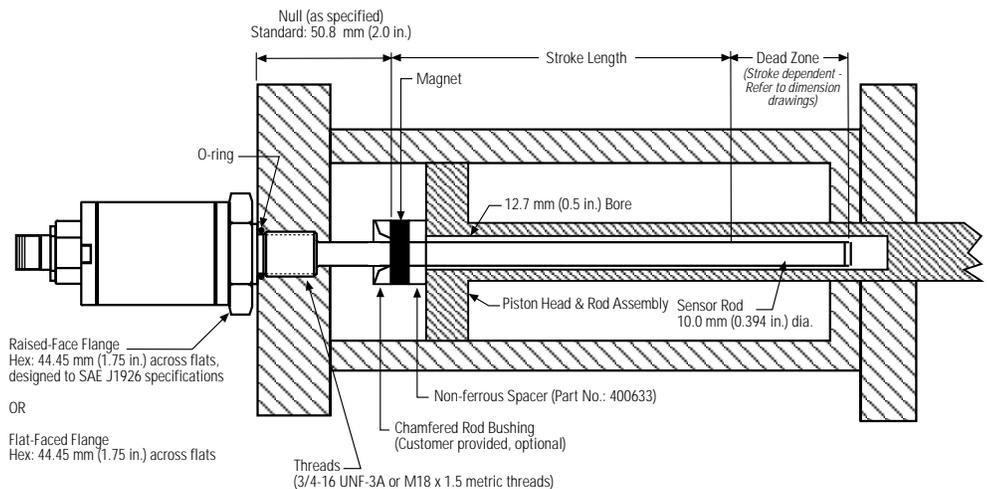
Temposonics LH may also be mounted externally in many applications.

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



CYLINDER INSTALLATION

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

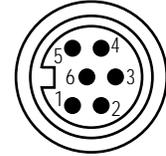


The illustration above represents a **typical** installation. Some installation requirements may be application specific.

CONNECTION TYPES:

Integral Connector D6 Integral Cable with Pigtail Termination

Integral Connector
(D6 Male)
(As Viewed from End of Sensor)



Analog Output: (Voltage or Current)

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

Digital Output: (PWM or Start/Stop)

Pin No.	Wire Color	Function
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
4	Green	(-) Interrogation for PWM, (-) Start for Start/Stop
5	Red or Brown	Customer Supplied Power (+ Vdc)*
6	White	DC Ground

NOTES:

1) Appropriate grounding of cable shield is required at the controller end.

For Analog Output:

- 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.
- Minimum load impedance for voltage outputs is 5K Ω .
- Maximum load impedance for current output is 500 Ω . (Reference to Ground Only, see page 5).

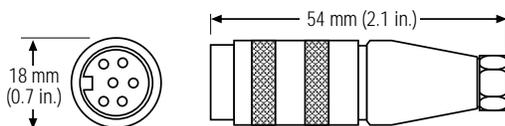
For Digital Output:

- For single-ended interrogation, the unused interrogation lead must be connected to DC ground at the controller.
- When using PWM with internal interrogation, both interrogation leads must be connected to DC ground.

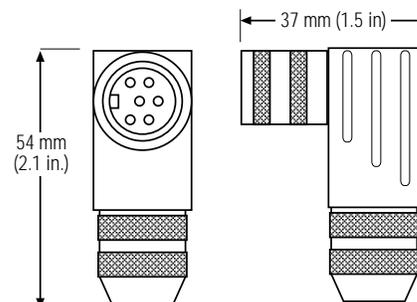
* Power requirements are stroke length dependent.
+ 13.5 to 26.4 Vdc (\pm 0%): Stroke lengths \leq 1525 mm (60 in.)
+ 24 Vdc (\pm 10%): Stroke lengths > 1525 mm (60 in.)

CABLE CONNECTORS (Field-installable D6 Female): Mates with Sensor's Integral Connector

D6 Straight-exit Connector
Part No. 560700



D6 90° Connector
Part No. 560778



EXTENSION CABLE WITH CONNECTOR(S) FOR THE D6 CONNECTION TYPE

SENSOR CONNECTION TYPE _____

D6 = Female connector (straight-exit) for sensors with D6 connector
DA = Female connector (90° exit) for sensors with D6 connector

CABLE LENGTHS _____

For standard length cables up to 100 ft.

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

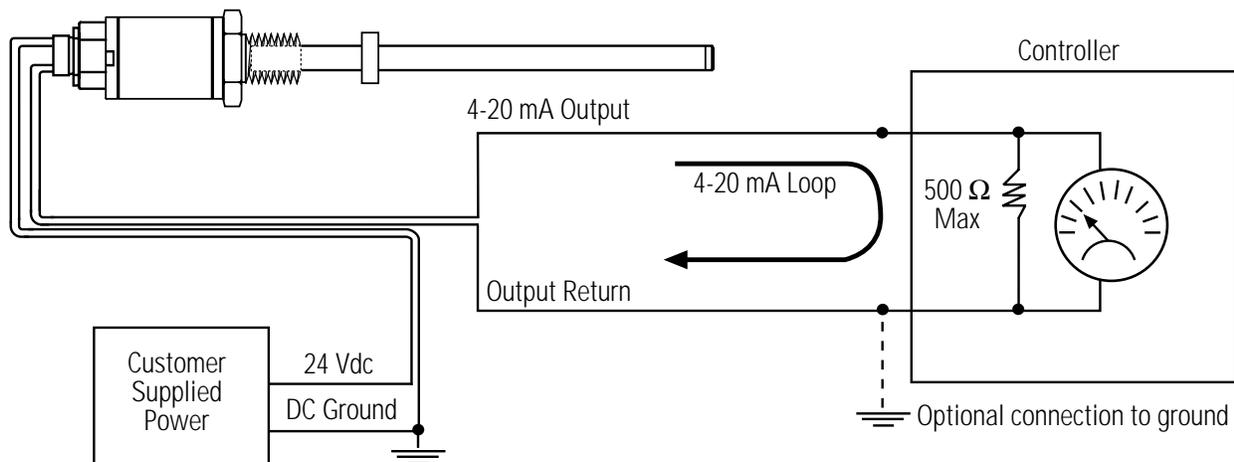
For custom length cables over 100 ft.

_____ = Cable Length (maximum cable length is dependent on the output selected; consult MTS Applications Engineering.)

CABLE TERMINATION _____

PO = Pigtail connection
D6M = 6-pin D6 Male connector (straight exit)

TYPICAL WIRING FOR CURRENT OUTPUT (4-20 mA Loop)



NOTES:

- 1) Sensor requires connection to customer supplied power and can not be loop-powered from controller.
- 2) The 4-20 mA current loop is powered only by the sensor.
- 3) The sensor's Output Return connection is referenced to DC Ground, (connected internally). To avoid output errors the optional connection to ground at the controller must be at the same potential as DC Ground.

POSITION SENSORS

When placing an order, build the desired model number using the model number guide (right). A wide range of L Series sensor configurations are available to meet the demands of your particular application.

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

Output code is 2 or 4 digits in length depending on output selected



- 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, integral connector
 - R0 = Integral cable with pigtail termination
- 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 customary 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 stroke length, in meters if using metric stroke length)

CABLE LENGTH NOTES:
 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.

- STROKE LENGTH** _____
- U** _ . _ _ = Inches and tenths (Encode in 0.1 in. increments)
 or
M _ _ _ _ = Millimeters (Encode in 5 mm increments)
- INPUT VOLTAGE** _____
- 1 = +13.5 to 26.4 Vdc, (For stroke lengths ≤ 60 inches)
 - 2 = +24 Vdc, ±10% (For stroke lengths > 60 inches)

STROKE LENGTH NOTES:
 LH sensors with Analog outputs have a stroke range = 1-100 in. (25-2540 mm).
 LH sensors with Start/Stop or PWM outputs have a stroke range = 1-300 in. (25-7620 mm).

- OUTPUT** _____
- V0 = Voltage (0 to +10 Vdc or +10 to 0 Vdc)
 - A0 = 4 to 20 mA
 - A1 = 20 to 4 mA
 - A2 = 0 to 20 mA
 - A3 = 20 to 0 mA
 - R0 = Start/Stop
 - D _a _b _c = Pulse-Width Modulated (PWM) (Fill in the three blanks with the following codes.)

NOTE:
 Mating connectors, extension cables, and magnets sold separately.

- a) Interrogation** **b, c) Circulations**
- E = External
 - I = Internal
 - _ _ = Desired number of circulations (Range = 1 to 15; encode as 01 to 15. Refer to Tables A and B.)

TABLE A:
 Circulation Count vs. Resolution for PWM Output (Based on 28 MHz counter)

Resolution	Circulation Count*
0.00026 in. (0.0066 mm)	15
0.0005 in. (0.0127 mm)	8
0.001 in. (0.025 mm)	4
0.002 in. (0.051 mm)	2
0.004 in. (0.102 mm)	1

TABLE B:
 Maximum Circulation Count vs. Stroke for PWM Output w/Internal Interrogation

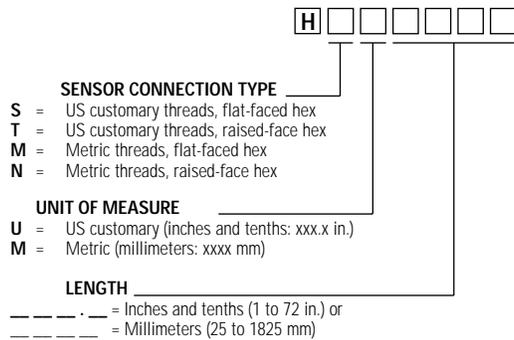
Stroke	Maximum Circulation Count
≤ 84 in. (2134 mm)	15
> 84 in. (2136 mm)	1

* Limited by stroke length for sensors configured for **internal** interrogation. (Refer to Table B)

ACCESSORIES

Description	Part No.	Notes
Magnet Spacer	400633	For use with standard ring magnet 201542
Magnet Mounting Screws	560357	Used to mount standard ring magnet Part No. 201542 (4 screws required)
Power Supply (24/28 Vdc, 0.5 A)	380009	Open frame style
LH O-ring (spare)	560315	For sealing LH pressure tube in the cylinder
Hex Jam-nut (w/ 3/4-16 UNF threads)	500015	For US customary stroke lengths
Hex Jam-nut (w/ M18 x 1.5 threads)	500018	For metric stroke lengths
Collar	560777	For Temposonics LH sensors with float magnet
Cable	530026	Specify length in feet at time of order
D6 Straight-exit Connector	560700	See drawing on page 4
D6 90° Connector	560778	See drawing on page 4

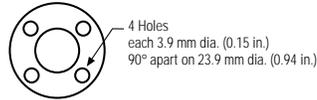
PRESSURE HOUSING



MAGNETS/FLOAT:

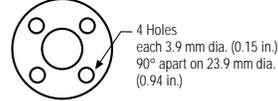
Magnets and floats must be ordered separately with Temposonics LH sensors. A variety of magnet styles (right) are available to meet your particular application demands. The standard ring magnet (Part No. 201542) is suitable for most applications.

Magnet Spacer
Part No. 400633



ID: 14.3 mm (0.56 in.)
O.D.: 31.8 mm (1.25 in.)
Thickness: 3.2 mm (0.125 in.)

Standard Ring Magnet
Part No. 201542



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

Ring Magnet
Part No. 400533



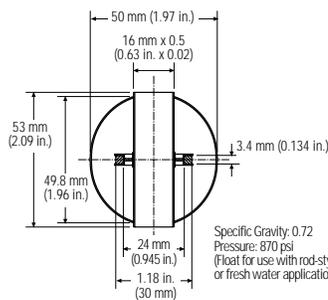
ID: 13.5 mm (0.53 in.)
O.D.: 25.4 mm (1.0 in.)
Thickness: 7.9 mm (0.312 in.)
(For use with strokes ≤ 3050 mm or 120 in.)

Ring Magnet
Part No. 401032



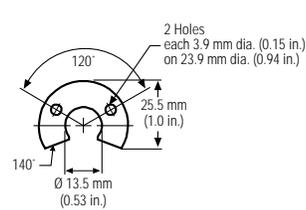
ID: 13.5 mm (0.532 in.)
O.D.: 17.4 mm (0.685 in.)
Thickness: 7.9 mm (0.312 in.)
(For use with strokes ≤ 1525 mm or 60 in.)

Float Magnet
Part No. 251447



Specific Gravity: 0.72
Pressure: 870 psi
(Float for use with rod-style sensors in hydraulic fluid or fresh water applications only)

Floating Magnet
Part No. 251416



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



SENSORS
GROUP

Pioneers,
Innovators,
Leaders in
Magnetostrictive
Sensing

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