

WIRING

INTEGRAL CABLES:

**R Cable w/Pigtail Termination:
(Voltage or Current Output)**

Wire Color	Function
Gray (Note 1)	0 to 10 Vdc, 4 to 20 mA, or 0 to 20 mA*
Pink (Note 1)	Displacement Output Return for Gray Wire
Yellow	10 to 0 Vdc, 20 to 4 mA, or 20 to 0 mA*
Green	Displacement Output Return for Yellow Wire
Red or Brown	Customer Supplied Power (+ 24 Vdc)
White	DC Ground

**R Cable w/Pigtail Termination:
(Start/Stop or PWM)**

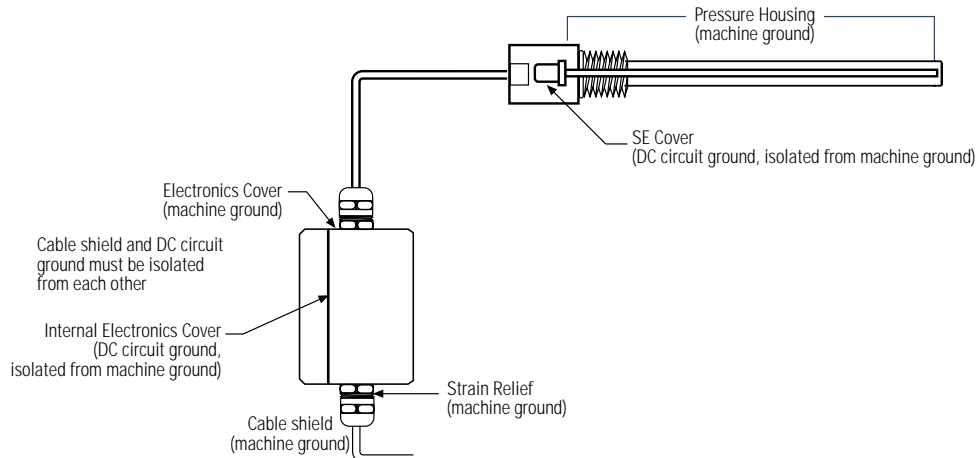
Wire Color	Function
Gray	(-) Gate for PWM, (-) Stop for Start/Stop
Pink	(+) Gate for PWM, (+) Stop for Start/Stop
Yellow	(+) Interrogation for PWM, (+) Start for Start/Stop
Green	(-) Interrogation for PWM, (-) Start for Start/Stop
Red or Brown	Customer Supplied Power (+ 24 Vdc)
White	DC Ground

* 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.

CAUTION!

- 1) When wiring Temposonics L Series sensors, **do not connect DC ground to the cable shield or drain wire.**
- 2) For single-ended interrogation, the unused interrogation lead must be connected to DC ground (single-ended interrogation is not recommended).
- 3) When using PWM with internal interrogation, both interrogation leads must be connected to DC ground.
- 4) Minimum load impedance for voltage outputs is 5K Ω.

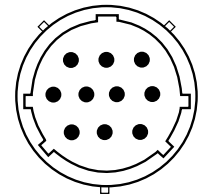
TYPICAL GROUNDING



INTEGRAL CABLES WITH HANGING MS CONNECTOR:

**MS Connector:
(Voltage or Current Output)**

Pin No.	Extension Cable Wire Color	Function
A	White	DC Ground
B	-	No Connection
C	Gray	Return for Pin D
D	Pink	0 to 10 Vdc, 4 to 20 mA, or 0 to 20 mA
E	Red or Brown	Customer Supplied Power (+24 Vdc)
F	-	No Connection
G	Yellow	10 to 0 Vdc, 20 to 4 mA, or 20 to 0 mA
H	Green	Return for Pin G
J	-	No Connection
K	-	No Connection

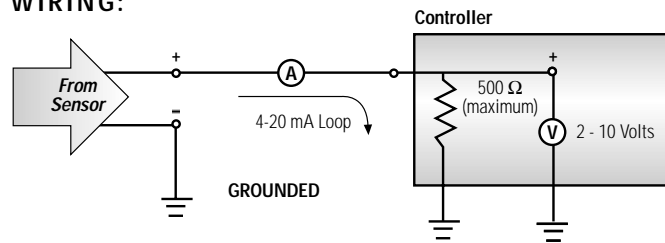


MS Connector, R_ _ MS
(Mating Connector: P/N 370013; MS3116F-12-10S or Extension Cable)

**MS Connector:
(Start/Stop or PWM)**

Pin No.	Extension Cable Wire Color	Function
A	White	DC Ground
B	-	No Connection
C	Gray	(-) Gate for PWM, (-) Stop for Start/Stop
D	Pink	(+) Gate for PWM, (+) Stop for Start/Stop
E	Red or Brown	Customer Supplied Power (+24 Vdc)
F	-	No Connection
G	-	No Connection
H	-	No Connection
J	Yellow	(+) Interrogation for PWM, (+) Start for Start/Stop
K	Green	(-) Interrogation for PWM, (-) Start for Start/Stop

WIRING:



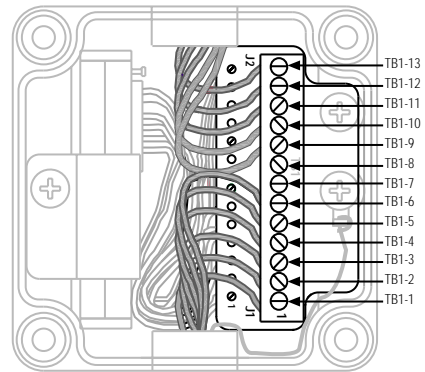
TYPICAL 4-20 mA

INTERNAL ELECTRONICS HEAD TERMINAL WIRING FOR SENSING ELEMENT:

Pin No.	Status	Function
TB1-1	Factory Wired	(See Note 1)
TB1-2	Factory Wired	(See Note 1)
TB1-3	Factory Wired	(See Note 1)
TB1-4	Factory Wired	(See Note 1)
TB1-5	Factory Wired	(See Note 1)
TB1-6	Factory Wired	(See Note 1)
TB1-7	-	No Connection
TB1-8	-	No Connection
TB1-9	Customer Connection (Red)	+5 V (See Note 2)
TB1-10	Customer Connection (Yellow)	SE Out (See Note 2)
TB1-11	Customer Connection (Black)	Ground (See Note 2)
TB1-12	Customer Connection (Green)	WG - (See Note 2)
TB1-13	Customer Connection (Blue)	WG + (See Note 2)

Integral cable wiring to cable termination 'PT' or 'MS'

Sensing element wiring to terminal board



TB1 locations in a Temposonics LD Electronics Housing (view shown with cover removed)

NOTES:

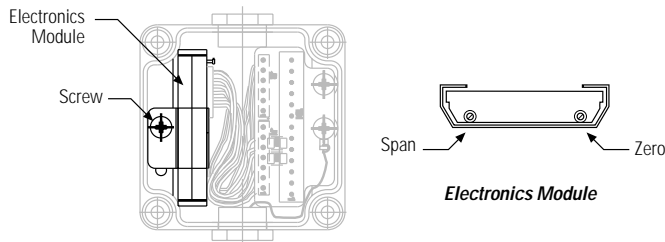
- 1) TB1-1 through TB1-6 is connected to the integral cable by the factory. Integral cable wiring is provided in a variety of outputs and options. For customer required inputs and outputs, see the applicable integral cable wiring diagrams.
- 2) Sensors may not be returned for credit if interconnect cable length has been modified.

CAUTION!

Electronics enclosure and sensing element located in the pressure pipe are a matched set calibrated by the factory. It is important to keep these as matched sets or performance may be affected.

Z E R O & S P A N (For Analog output)

All Temposonics L Series sensors are factory calibrated and should not require calibration. However, if your application requires that the zero and span settings be fine-tuned, use the following procedure.



Temposonics LD Electronics Housing (view shown with cover removed)

Figure 1

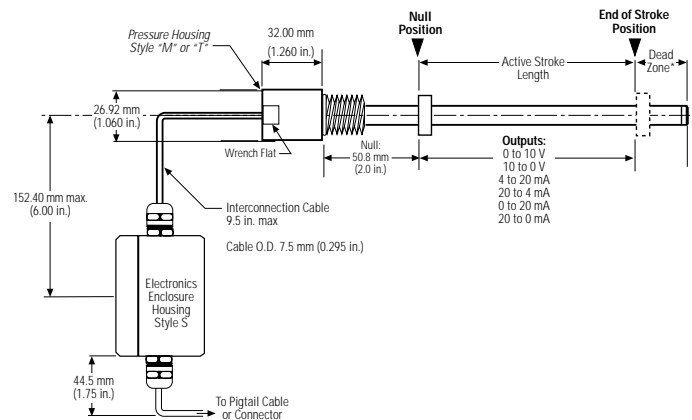


Figure 2

1. Remove the electronics housing cover.
2. Remove the screw that affixes the electronics module to the bottom of the electronics housing (see Fig.1). Slide the electronics module out of the electronics housing.
3. The zero and span potentiometer ports should be visible and accessible on the end of the electronics module (see Fig. 1).
4. With power on, connect the sensor's output leads to a voltmeter/ammeter.
5. Move the magnet to the **null** position (see Fig. 2).
6. Use a small, flat-head screwdriver to adjust the zero potentiometer until the output reads:

For Forward-Acting Outputs:

- - 0.020 V (\pm 0.005 V) for sensor with 0 to 10 V outputs
- + 3.980 mA (\pm 0.005 mA) for sensors with 4 to 20 mA outputs
- + 0.020 mA (\pm 0.005 mA) for sensor with 0 to 20 mA outputs

For Reverse-Acting Outputs:

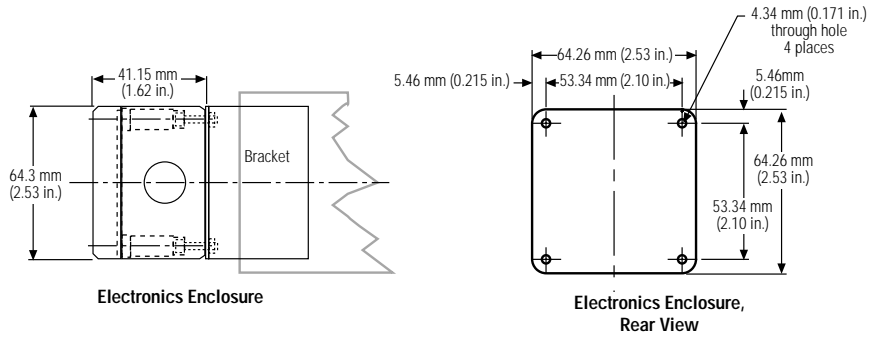
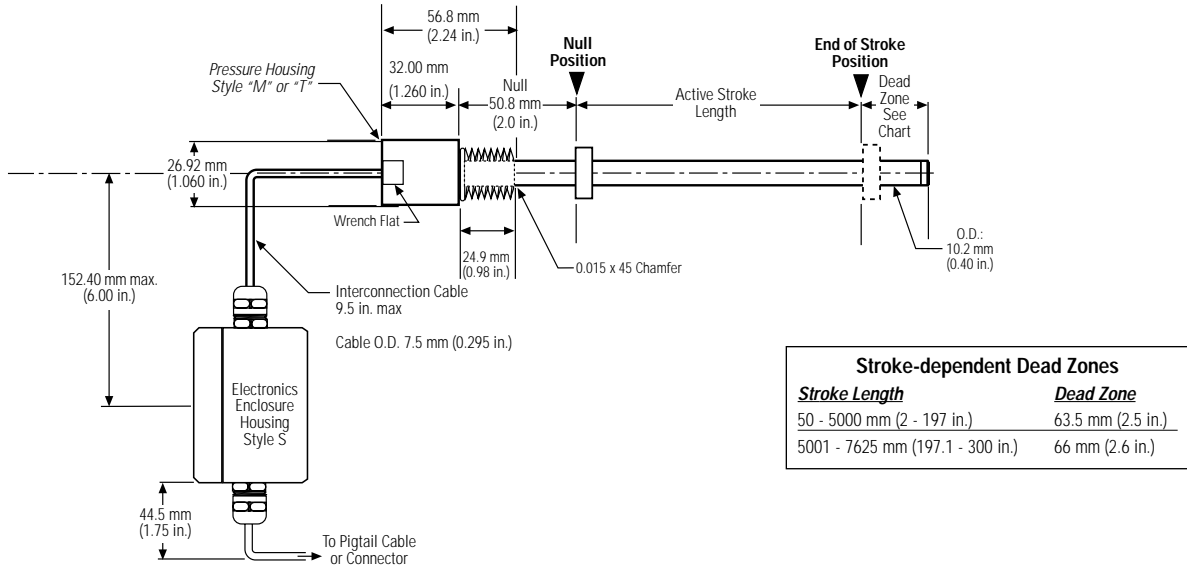
- + 10.02 V (\pm 0.010 V) for sensor with 0 to 10 V outputs
- + 20.02 mA (\pm 0.010 mA) for sensors with current outputs

7. Move the magnet to the **end of stroke** position.
8. Use a small, flat-head screwdriver to adjust the span potentiometer until the output reads:
 - For Forward-Acting Outputs:**
 - + 10.02 V (\pm 0.010 V) for sensor with 0 to 10 V outputs
 - + 20.02 mA (\pm 0.010 mA) for sensors with current outputs
 - For Reverse-Acting Outputs:**
 - - 0.020 V (\pm 0.005 V) for sensor with 0 to 10 V outputs
 - + 3.980 mA (\pm 0.005 mA) for sensors with 4 to 20 mA outputs
 - + 0.020 mA (\pm 0.005 mA) for sensor with 0 to 20 mA outputs
9. Since the null setting can affect the end of stroke setting, return to the null position to verify that the output still reads within the acceptable range. If not, repeat the procedure until the null and end of stroke settings provide a full output range.
10. **IMPORTANT:** Reassemble the sensor.

(Refer to Figure 2 to determine zero and span set point location)

D I M E N S I O N S

Style 'M' or 'T'



Non-Hydraulic Application

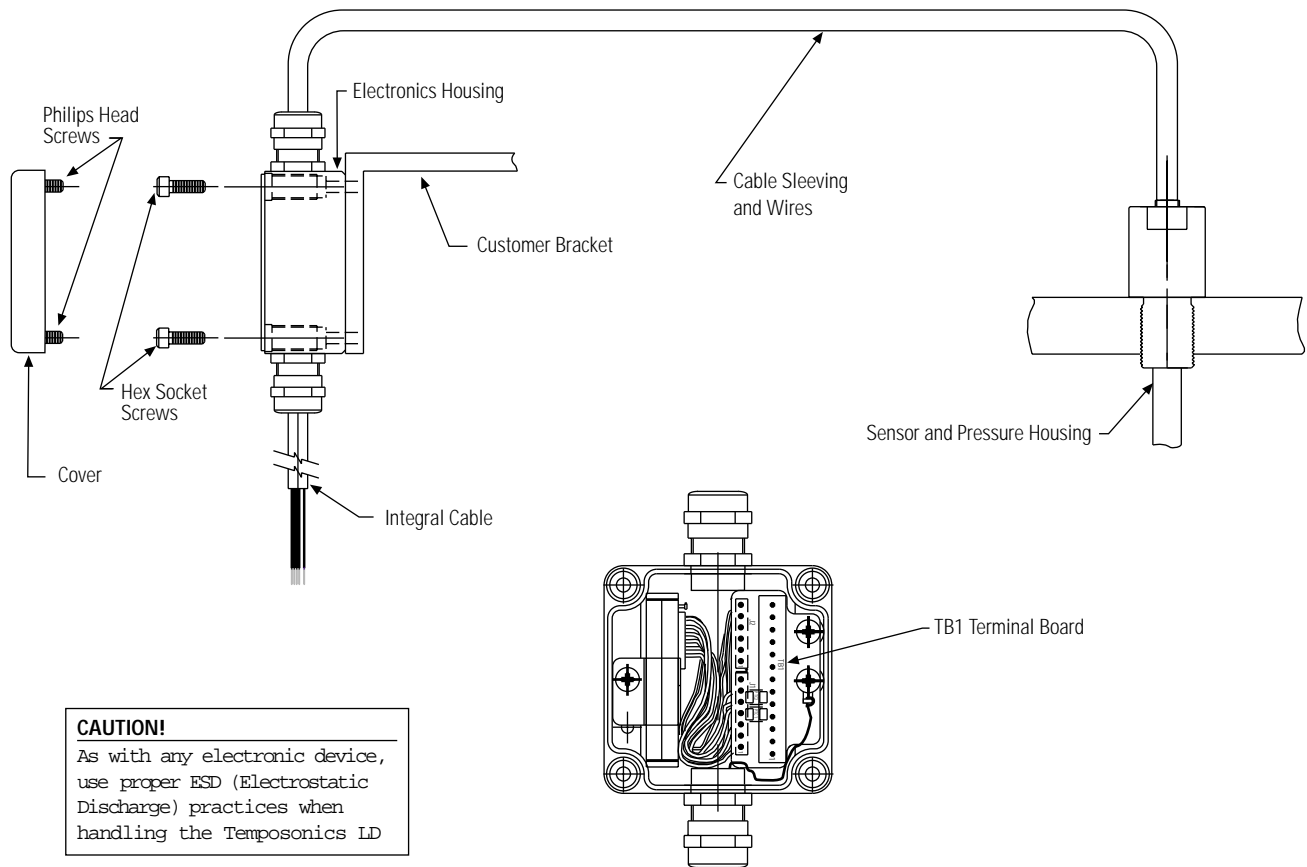
The Temposonics LD units are shipped fully assembled as tested and should be disassembled only when ready to install. The following procedure must be complied to for proper sealing of unit.

Tools Required:

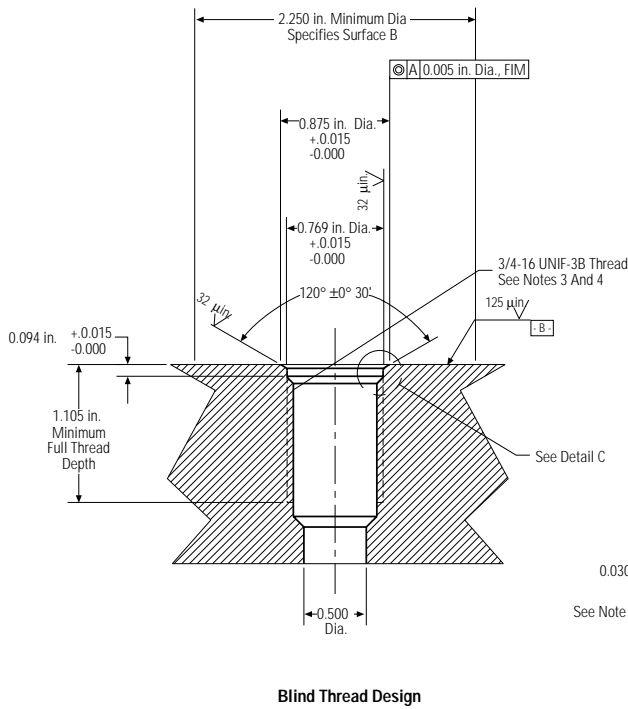
- Adjustable or suitable open end wrench
- Phillips driver capable of 16 inch-pounds torque
- 9/64 inch Hex drive
- Small blade screw driver

Installation:

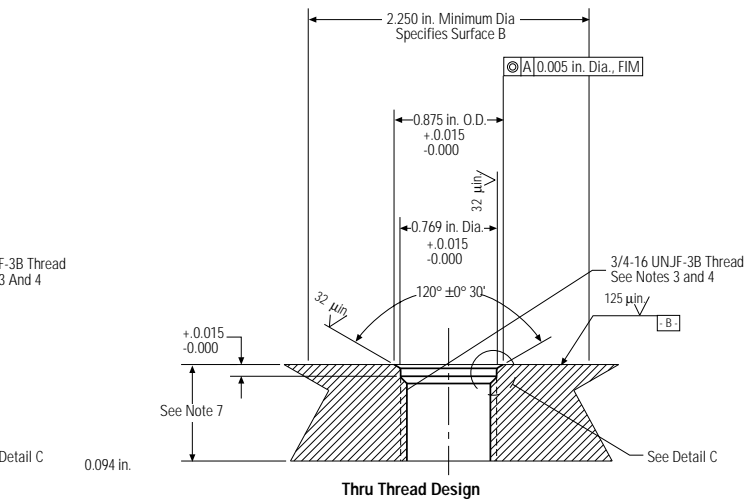
1. Install the pressure pipe and sensor using the wrench flats to tighten unit.
2. Remove the electronics housing cover by loosening (4) Phillips head cover screws. Note that screws are captured and cannot be removed from cover.
3. Secure the electronics housing to the mounting surface using (4) hex socket screws provided (nuts may be required). Note: torque screws to 16 inch-pounds.
4. Place the cover on the enclosure and hand start captured screws. Torque the cover screws to 16 inch-pounds.



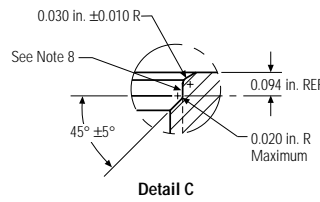
O-RING BOSS DETAIL FOR TEMPOSONICS LD SENSORS (with Pressure Housing Style 'T')



Blind Thread Design



Thru Thread Design

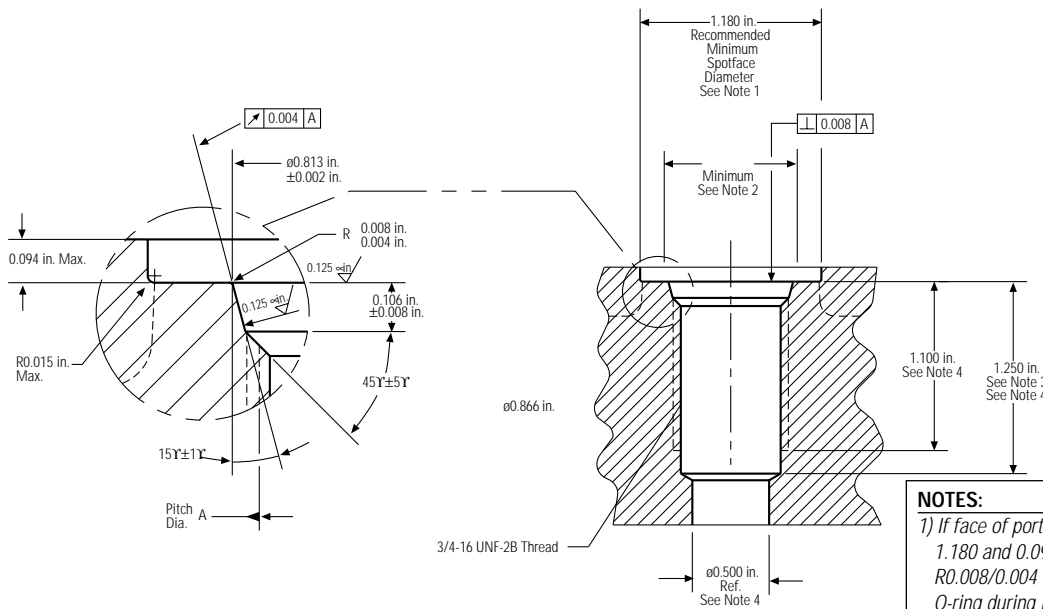


Detail C

NOTES:

- 1) Dimensions and tolerances based on ANSI Y14.5-1982.
- 2) MTS has extracted all pertinent information from MS33649 to Generate this document.
- 3) PD must be square with surface B within 0.005 FIM across 2.250 dia minimum.
- 4) PD must be concentric with 2.250 dia within 0.030 FIM and with 0.769 dia within 0.005 FIM.
- 5) Surface texture ANSI B46.1-1978
- 6) Use o-ring MTS part number 560315 for correct sealing.
- 7) The thread design shall have sufficient threads to meet strength requirements of material used.
- 8) Finish counter-bore shall be free from longitudinal and spiral tool marks. Annular tool marks up to 32 microinches maximum will be permissible.

PORT DETAIL (SAE J1926/1) FOR TEMPOSONICS LD SENSORS (with Pressure Housing Style 'T')



NOTES:

- 1) If face of port is on a machined surface, dimensions 1.180 and 0.094 need not apply as long as R0.008/0.004 is maintained to avoid damage to the O-ring during installation.
- 2) Measure perpendicularity to A at this diameter.
- 3) This dimension applies when tap drill cannot pass through entire boss.
- 4) This dimension does not conform to SAE J1926/1.

SPECIFICATIONS

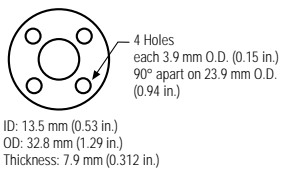
TYPICAL PORT DETAIL FOR TEMPOSONICS LD SENSORS (with Pressure Housing Style 'S')

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 $\pm 0.10 \text{ mm}$ ($\pm 0.004 \text{ in.}$), whichever is greater Minimum absolute linearity varies with sensor model
Repeatability:	Equal to resolution
Hysteresis:	$< 0.02 \text{ mm}$ (0.0008 in.)
Outputs:	<i>Analog:</i> Voltage and Current <i>Digital:</i> Start/Stop and Pulse-width modulated
Measuring Range:	<i>Analog:</i> 25 to 2540 mm (1 to 100 in.) <i>Digital:</i> 25 to 7600 mm (1 to 300 in.)
Operating Voltage:	+ 24 Vdc ($\pm 10\%$)
Power Consumption:	100 mA typical
Operating Temperature:	<i>Head Electronics:</i> - 40 to 70°C (- 40 to 158°F) <i>Sensing Element:</i> - 40 to 105°C (- 40 to 221°F)
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:	<i>For Analog sensors only:</i> Field adjustable zero and span to 5% of active stroke
Update Time:	<i>Analog:</i> $< 1 \text{ ms}$ <i>Digital:</i> Minimum = [Stroke (specified in inches) + 3] x 9.1 μs
Housing Style/Enclosure:	IP-67
Operating Pressure:	5000 psi static, 10,000 psi spike (pressure pipe only)
Interconnecting Cable:	10 in.
Magnet Type:	Ring magnet, see right

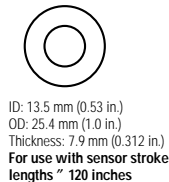
* The above specifications are assuming that output ripple is averaged by the measuring device as with any typical analog device.
Specifications are subject to change without notice. Consult the factory for specifications critical to your needs.

Magnets

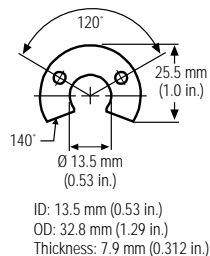
Part No. 201542



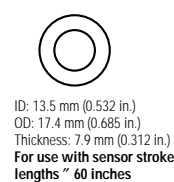
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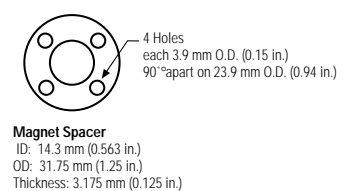
Part No. 251416



Part No. 401032



Part No. 400633





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