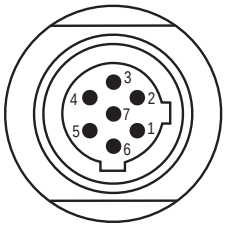
550571 B

WIRING - DIGITAL OUTPUTS

CONNECTORS

RG Connector:

Pin No.	Wire Color	Function
1	Gray	(-) Gate
2	Pink	(+) Gate
3	Yellow	(+) Interrogation (see notes 2 & 3)
4	Green	(-) Interrogation (see notes 2 & 3)
5	Red or Brown	Customer Supplied Power (+ Vdc)*
6	White	DC Ground
7	-	No Connection



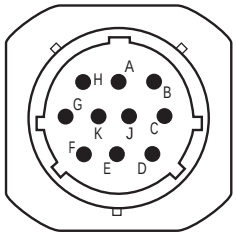
RG Connector
(Molded Mating Extension Cable Required)

MS Connector:

Pin No.	Wire Color	Function
A	White	DC Ground
B	-	No Connection
C	Gray	(-) Gate
D	Pink	(+) Gate
E	Red	Customer Supplied Power (+ Vdc)*
F	-	No Connection
G	-	No Connection
H	-	No Connection
J	Yellow	(+) Interrogation (see notes 2 & 3)
K	Green	(-) Interrogation (see notes 2 & 3)

R3 Integral Cable with MS Connector:

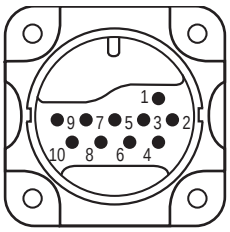
Pin No.	Integral Cable Wire Color	Function
A	White	DC Ground
B	-	No Connection
C	-	No Connection
D	Green	(-) Interrogation
E	Yellow	(+) Interrogation
F	-	No Connection
G	Pink	(+) Gate
H	Red	Customer Supplied Power (+ Vdc)*
J	-	Shield
K	Gray	(-) Gate



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

RB Connector: (LH sensors only)

Pin No.	Wire Color	Function
1	White	DC Ground
2	-	No Connection
3	Gray	(-) Gate
4	Pink	(+) Gate
5	Red	Customer Supplied Power (+ Vdc)*
6	-	No Connection
7	-	No Connection
8	-	No Connection
9	Yellow	(+) Interrogation (see notes 2 & 3)
10	Green	(-) Interrogation (see notes 2 & 3)



RB Connector
(Mating Connector: P/N 400755-3) or Extension Cable)

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

INTEGRAL CABLES:

R0 Cable:

Wire Color	Function
Gray	(-) Gate
Pink	(+) Gate
Yellow	(+) Interrogation (see notes 2 & 3)
Green	(-) Interrogation (see notes 2 & 3)
Red or Brown	Customer Supplied Power (+ Vdc)*
White	DC Ground

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

CAUTION!

1. *When wiring Temposonics L Series sensors equipped with an RG, MS, or R0 connector, **do not connect DC ground to the cable shield or drain wire**.*

   *When wiring Temposonics L Series sensors equipped with an RB connector, **we recommend that you do connect the cable shield to DC ground**.*

2. *For single-ended interrogation, the unused interrogation lead must be connected to DC ground.*

3. *When using PWM with internal interrogation, both interrogation leads must be connected to DC ground.*

Temposonics L Series sensors with PWM output are restricted in maximum active stroke length by the circulation count selected. Refer to the chart below for these restrictions.

Maximum Stroke per Circulation Count for PWM Output w/Internal Interrogation

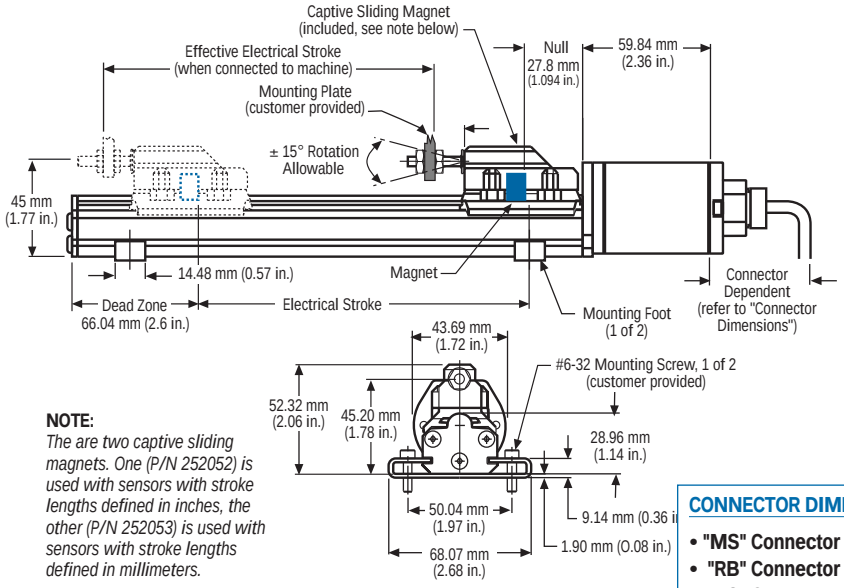
Maximum Stroke	Circulation Count
84 inches	15
96 inches	4
108 inches	2
120 inches	1

Refer to the back page of this document for grounding information.

MTS®

DIMENSIONS

MODEL
LA
w/Captive Sliding

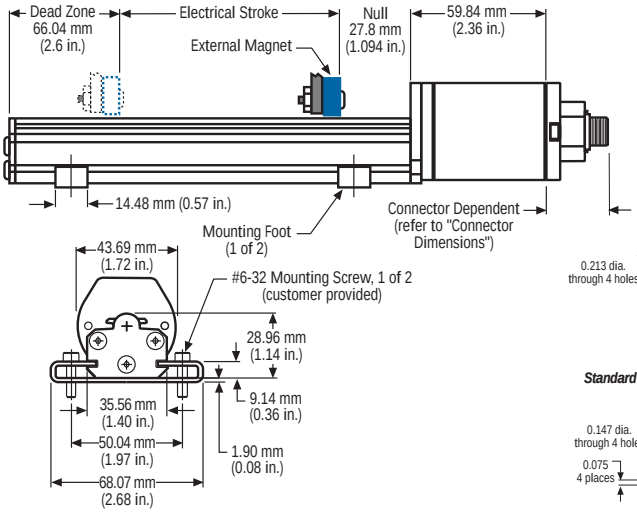


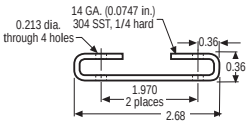
NOTE:
The are two captive sliding magnets. One (P/N 252052) is used with sensors with stroke lengths defined in inches, the other (P/N 252053) is used with sensors with stroke lengths defined in millimeters.

CONNECTOR DIMENSIONS (includes cable bend)

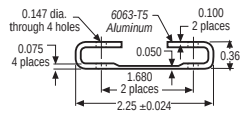
- **"MS" Connector w/"MS" Mating Connector:** 95.25 mm (3.75 in.)
- **"RB" Connector w/"MT" or "FT" Mating Connector:** 109.22 mm (4.30 in.)
- **"RG" Connector w/straight exit "RG" Mating Connector:** 85.85 mm (3.38 in.)
- **"RG" Connector w/90° "RA" Mating Connector:** 54.61 mm (2.15 in.)
- **"R" Integral Cable:** 69.85 mm (2.75 in.)

MODEL
LA
w/Floating Magnet



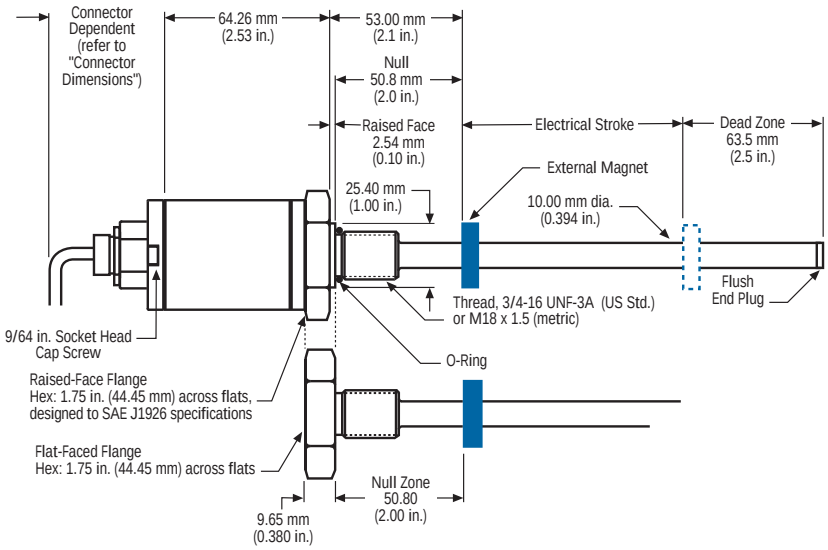


Standard Mounting Feet (P/N 400802)



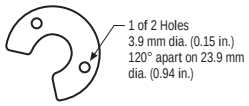
Low-profile Mounting Feet (P/N 400867)

MODEL
LH



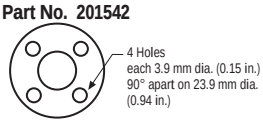
MAGNETS

Part No. 251416



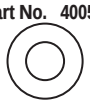
ID: 13.5 mm (0.53 in.)
OD: 32.8 mm (1.29 in.)
Thickness: 7.9 mm (0.312 in.)

Part No. 201542



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

Part No. 400533

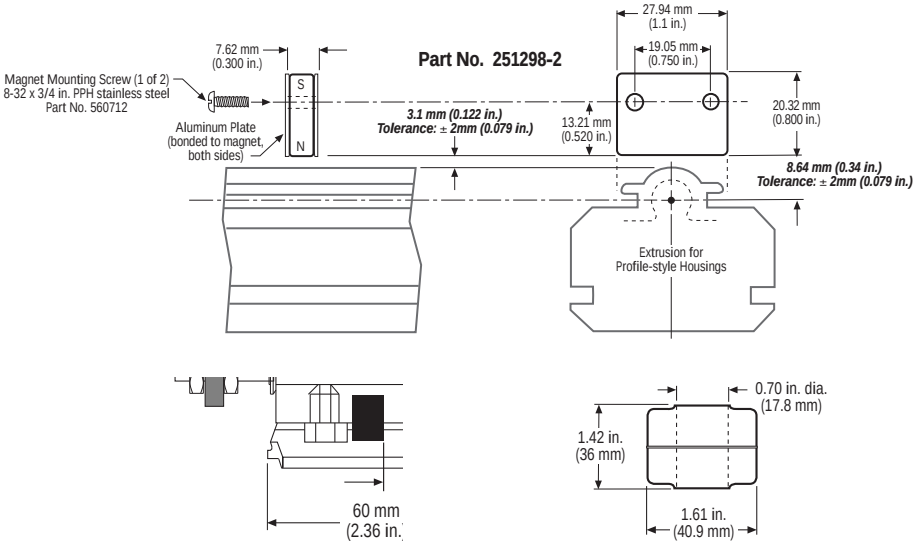


ID: 13.5 mm (0.53 in.)
OD: 25.4 mm (1.0 in.)
Thickness: 7.9 mm (0.312 in.)
(For use with strokes ≤ 3050 mm or 120 in.)

Part No. 401032

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

Part No. 251298-2



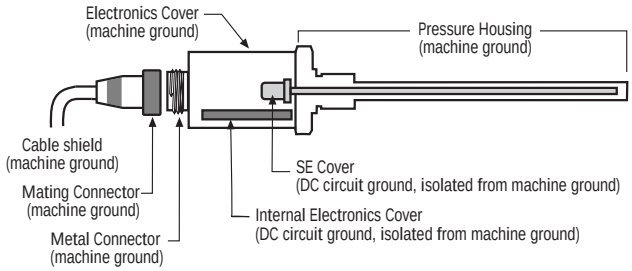
Captive Sliding Magnet (P/N 252052 & 252053)

Part No. 200938-1
Specific Gravity: > 0.74
Pressure: 125 psi
(Float for use with rod-style sensors in hydraulic fluid or fresh water applications only)

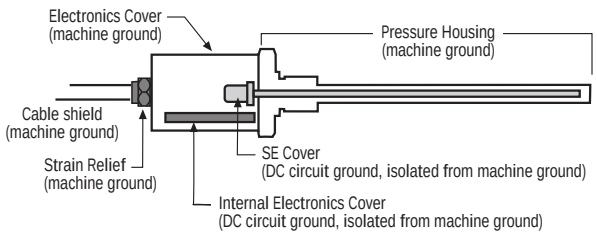
NOTE:
When optimum sensor performance is required, use of a ring magnet or captive sliding magnet is recommended since they provide the best magnetic coupling to the sensor's waveguide. Use of a bar magnet (P/N 251298-2) requires strict adherence to tolerances to achieve specified sensor performance. Variations to tolerances will result in reduced performance.

G R O U N D I N G

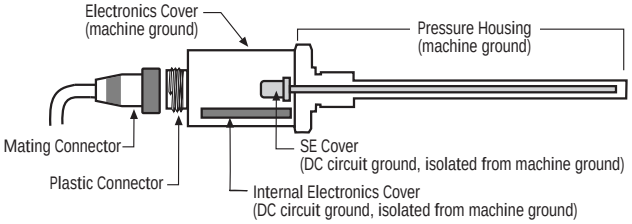
L Series (SE-based) Sensors with Metal Connectors



L Series (SE-based) Sensors with Integral Cables



L Series (SE-based) Sensors with Plastic Connectors



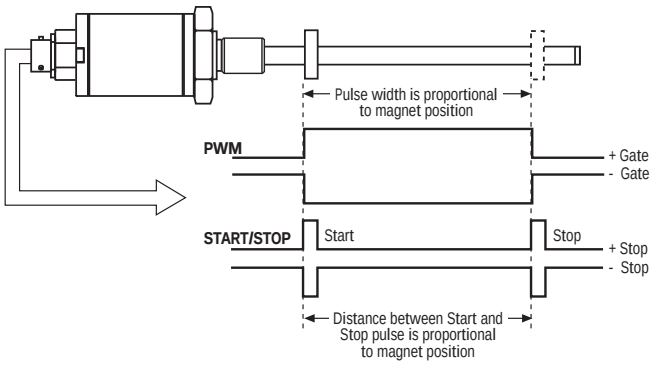
Retrofitting Note:
When retrofitting original Temposonics II or LH sensors with L Series sensors, with 'R0' type integral cables, verify that the cable shield and the DC circuit ground are isolated from each other. Connecting the cable shield to DC ground will typically cause a ground loop when using sensors with metal connectors or integral cables.

SPECIFICATIONS

PARAMETER	SPECIFICATION
Measured Variable:	Displacement
Resolution:	1 ÷ [gradient x crystal freq. (mHz) x circulation]; maximum resolution: 0.006 mm or 0.00025 in.
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:	Start/Stop (RS422 compatible) Pulse-width modulated (up to 15 circulations)
Measuring Range:	25 to 3050 mm (1 to 120 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 typical
Operating Temperature:	Head Electronics: - 40 to 70°C (- 40 to 158°F) Sensing Element: - 40 to 105°C (- 40 to 221°F)
EMC Test*:	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
Update Time:	Resolution and Stroke dependent Minimum = [Stroke (specified in inches) + 3] x 9.1 µs
Operating Pressure: *(applies to Model LH only)*	5000 psi static 10,000 psi spike
Housing Style/Enclosure:	*Profile Style Sensors (LA):* aluminum profile, IP 67 enclosure, adjustable mounting feet *Rod Style Sensors (LH):* aluminum die-cast head, IP 67 stainless steel rod & flange (LH flange: M18 x 1.5 or 3/4-16 UNF-3A)
Magnet Type:	*Profile Style Sensors (LA):* captive sliding magnet and floating magnet *Rod Style Sensors (LH):* ring magnet

** EMC test specification does not include sensor with the RB connection style. Sensor with the RB connection style meet the following standard: DIN EN 50081-2 (emissions) and DIN EN 50082-1 (immunity).*

DIGITAL OUTPUT SIGNAL



ORDERING GUIDE

SENSOR MODEL
LH = Hydraulic Rod Style
LA = Profile Style

HOUSING STYLE
T = LH Model: US customary threads, raised-faced hex, and pressure tube
S = *(a)* LH Model: US customary threads, flat-faced hex, and pressure tube
(b) LA Model: Captive sliding magnet
M = *(a)* LH Model: Metric threads, flat-faced hex, and pressure tube
(b) LA Model: Floating magnet
N = LH Model: Metric threads, raised-faced hex, and pressure tube
B = For LH Models: Sensor cartridge only, no pressure housing, stroke lengths ≤ 72 in.

CONNECTION TYPE
RG = 7-pin micro connector
RB = 10-pin threaded connector*
MS = 10-pin bayonet style MS connector
R0 = Integral cable, straight out exit, pigtail connection
R3 = Integral cable with 10-pin male connector (P/N 370160)
[Connection Type R3 is for use with L Series sensors with a pulse-width modulated (PWM) output when retrofitting existing Temposonics digital sensor systems.
Contact MTS Applications Engineering before retrofitting existing products.

NOTE: *Integral cable length = 5 ft. or 2 m depending on 'Unit of Measure' selected below.*

INTEGRAL CABLE LENGTH
00 = No integral cable (i.e., sensors with integral connectors)
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) *See note 1*

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

LENGTH
__ __ __ . __ = Inches and tenths or __ __ __ __ millimeters
1 to 120 in. stroke lengths only (25 to 3050 mm)

Stroke Length Increments by Sensor Model:
- *LH Style: 1 to 120 in. in 0.5 in. increments*
- *LA Style: 1 to 120 in. in 1.0 in. increments*

INPUT VOLTAGE
1 = +13.5 to 26.4 Vdc, ±0% (For stroke lengths ≤ 60 inches)
2 = +24 Vdc, ±10% (For stroke lengths > 60 inches)

OUTPUT
R0 = RS422-compatible Start/Stop
D __ __ __ = PWM (Pulse-Width Modulated)
*[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**]*

IMPORTANT: ***Refer to Charts A and B before ordering sensors with PWM output. Information in chart A is based on a 28 MHz counter.***

**** CE certification is pending for sensors with connection type RB***

NOTES

1. *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.*
2. *Mating connectors and extension cables sold separately.*

CAUTION!

Interfacing LA Sensors:
Consult MTS Applications Engineering for compatibility when interfacing Temposonics LA sensors with other Temposonics peripherals.

Retrofitting LH Sensors:
The "S" style housing on the original Temposonics LH sensor had a raised-face flange. The "S" style housing on the new Temposonics L Series LH sensor has a flat-faced flange. If you want to retrofit an original LH sensor with an "S" style housing with a new L Series LH sensor, select the "T" style housing. Contact the factory if you have an questions.

Charts A and B (right) apply to sensors with pulse-width modulated (PWM) outputs. Chart A defines the circulation count required to reach varying levels of resolution. Chart B defines maximum stroke length based on the circulation count (applies only to sensors with internal interrogation).

Chart A

Circulation Count vs. Resolution for PWM Outputs

Resolution	*Circulation Count*
0.00035	15
0.0005	8
0.001	4
0.002	2
0.004	1

Information in Chart A, above, is based on a 28 Mhz counter using the resolution formula in the product specifications.

Chart B

Maximum Stroke per Circulation Count for PWM Output w/Internal Interrogation

Maximum Stroke	*Circulation Count*
≤ 84 inches	15
> 84.1 inches	1

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