

Product Specifications

550747 C



Temposonics SH
with Ring Magnet



Temposonics SP
with Captive Sliding Magnet

Features

- Self-contained servo controller in sensor head
- High speed loop closure down to 1 millisecond
- Proven reliability and ruggedness
- Two wire RS-485 network compatible
- Windows based graphical user interface
- CE Certified
- Visual indications of power and status
- Four selectable modes of operation
- User selectable baud rates
- Communication with up to 26 units per link

PARAMETER	SPECIFICATION
Measured Variable:	Displacement
Resolution:	0.025 mm (0.001 in. for strokes ≤ 65 in.) 0.051 mm (0.002 in. for strokes > 65 in.)
Non-Linearity*:	< ± 0.02% of full stroke or ± 0.05 mm (0.002 in.), whichever is greater
Repeatability*:	< ± 0.001% of full scale or ± 0.0025 mm (0.0001 in.), whichever is greater
Hysteresis (Magnetic**):	< 0.004 mm (0.00016 in.)
Outputs:	Up to +/- 10 Vdc or +/- 50 mA to Servovalve
Baud Rates:	Up to 115 k Bd
Measuring Range:	25 to 3350 mm (1 to 132 in.)
Operating Voltage:	+24 Vdc (+ 20%, - 15%)
Power Consumption:	100 mA maximum ***
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 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
Loop Time:	1 msec

PROFILE STYLE (SP MODEL)

Electronic Head:	Aluminum die-cast housing
Sensor Stroke:	Aluminum profile
Sealing:	IP 65
Mounting:	Adjustable mounting feet or T-slot M5 nut in base channel
Magnet Type:	Captive sliding magnet or floating magnet

ROD STYLE (SH MODEL)

Electronic Head:	Aluminum die-cast housing
Sensor Rod with Flange:	304L stainless steel
Operating Pressure:	350 bar static, 690 bar spike (5000 psi static; 10,000 psi spike)
Maximum Hex Torque:	45 N-m (33 ft.-lbs.)
Sealing:	IP 67
Mounting:	M18 x 1.5 or 3/4-16 UNF-3A
Magnet Type:	Ring or floating magnet



All specifications are subject to change. Please contact MTS for specifications critical to your needs.
* Measurement function
** Does not include mechanical backlash on SP model style V and S magnets.
*** Does not include servovalve current draw
For additional information, (www.mtssensors.com).

SERVOSENSOR POSITION CONTROLLER

Temposonics S Series ServoSensor position controller is a complete servo controller installed and interfaced inside a standard MTS Temposonics sensor envelope. This eliminates the need for costly servoamplifiers and complex Programmable Logic Controller (PLC) setups utilized for set-point control.

The Temposonics S Series ServoSensor position controller capitalizes on smaller, more powerful microprocessors and advances in surface-mount technology to eliminate the need for an external controller. The design shaves control cabinet panel space, reduces mounting hardware and operates both sensor and servovalve drive signal with a single 24 Vdc power supply. The improvements allow Temposonics S Series ServoSensors position controller to close the position loop in 1 millisecond at resolutions of 0.001 inches. As a result, ServoSensor position controllers are well suited for many applications that require high accuracy and fast response.

The Temposonics S Series ServoSensor position controller handles position and error information efficiently by integrating MTS Temposonics sensing algorithms directly into the sensor. This makes for noise free position and speed signals, critical for high performance servoloops. The ServoSensor position controller typically mounts inside an actuator with a short drive cable running from the sensor to servovalve, eliminating the need for additional driver interfaces and associated cabling.

ServoSensor position controllers store closed-loop gains and operational parameters. They can be programmed with PLC's or PC's via RS-485 communication and easy to use Windows based graphical user interface setup software. The user defines servo-loop dynamics, including gains and zero adjustments, as well as operating parameters such as velocity, acceleration, dwell time, travel limits, sensor resolution and emergency stops.

TEMPOSONICS S SERIES SERVOSENSOR POSITION CONTROLLER OFFERS FOUR MODES OF OPERATION:

PC or Serial Mode - Machine control programs are located in a host PC controller or PLC. These programs access the ServoSensor position controller motion profile tables and other performance tables. Communications between the ServoSensor position controller and host is accomplished via an RS-485 interface. For applications utilizing multiple ServoSensor position controllers, the nominal communication update time is 3 milliseconds per sensor at the 115.2 kBaud rate. Three discrete inputs and one output provide external control and status.

Cycle Mode - A motion table is stored within the ServoSensor position controller. The motion table has 60 possible sets, velocity and dwell times used to define an axis motion profile. Discrete inputs called Motion/Set Enable and Trigger Enable (Input 2) control the start and continuance of the motion profile. A discrete output from the ServoSensor position controller is used to monitor the status of the motion profile. Once the axis starts its sequenced motion events, the motion can be reset to a home position by toggling Input 2. The Motion/Set Enable can also stop or start the motion events anytime.

Pulse Mode - PLC's would predominately use this mode for motion control. Again the motion table would be accessed via an RS-485 interface to a host computer. The motion table has 60 possible sets, velocity and dwell times available. Set points in the table are accessed by pulsing Input 2 with a pulse count that is equal to the set point table number where the actual position is programmed. The Motion/Set Enable is toggled low for the period of the pulse train and must be returned to the high state to make the move.

Incremental Mode - User enters values in the set point (target) table within the ServoSensor position controller. Each time Input 2 is enabled, the ServoSensor position controller will position incrementally to the next target related to the set table. This is accomplished through the set cable. The Motion/Set Enable control input must be on before movement can begin.

FEATURES:

COMMUNICATION

- RS-485 Two Wire (Half Duplex)
- ASCII or Proprietary Serial Protocol
- Baud Rates: 19.2 kBd, 38.4 kBd, 57.6 kBd, and 115.2 kBd (default value)

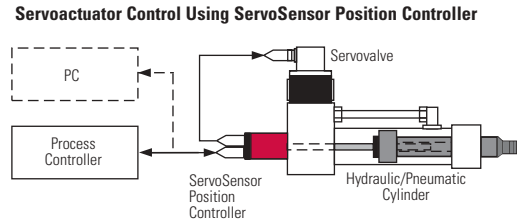
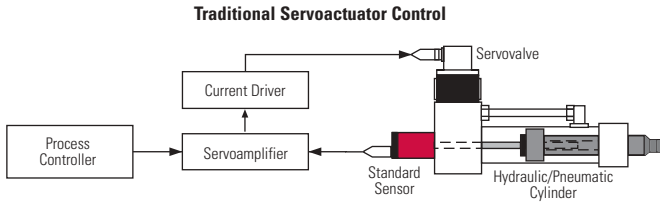
DISCRETE CONTROL

- Motion/Set Enable Input
- Relay Enable Input
- In Position/Cycle Complete Output

VISUAL INDICATORS

- Red LED Indicates Power Applied
- Green LED Indicates Status

TYPICAL CYLINDER POSITION CONTROL APPLICATION



PROVEN PLATFORM APPLICATIONS

All platforms below rely on use of the ServoSensor position controller operating in Serial Mode unless indicated otherwise.

Allen Bradley

- ControlLogix™ utilizing Multi-Vendor Interface (MVI)
- MicroLogix™ (Pulse, Cycle and Incremental Modes)

Automation Direct

- 205 utilizing Coprocessor
- 250 utilizing Coprocessor

Standard PC with RS-485 Interface

Eason Industrial PC

Z-World Industrial PC

USER INTERFACE SOFTWARE

Windows Based Setup Program includes the following interface screens (example screen shots shown at right):

Monitor

Displays set point information. Sensor select, jog controls, servo position and status

System

Allows for adjustment of the configuration parameters, servo number, baud rate, cylinder type and operational mode

Dynamics

Provides access to servo loop gains including extend and retract, accel and decel, drive limit and dead band windows

Limits

Includes feedback and travel limits as well as zero off-set adjustment

Set Point

Used for cycle, pulse and increment modes. Table includes up to 60 target position velocity and dwell settings

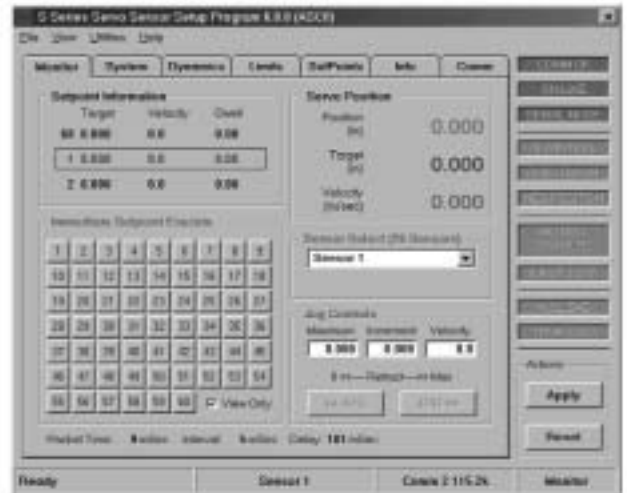
Information

This tab exhibits ServoSensor position controller program data, status and control information

Communication

Allows for selection of COM port, baud rate and packet interval time. Also displays sensor, control and RS-485 communication status

Monitor Tab



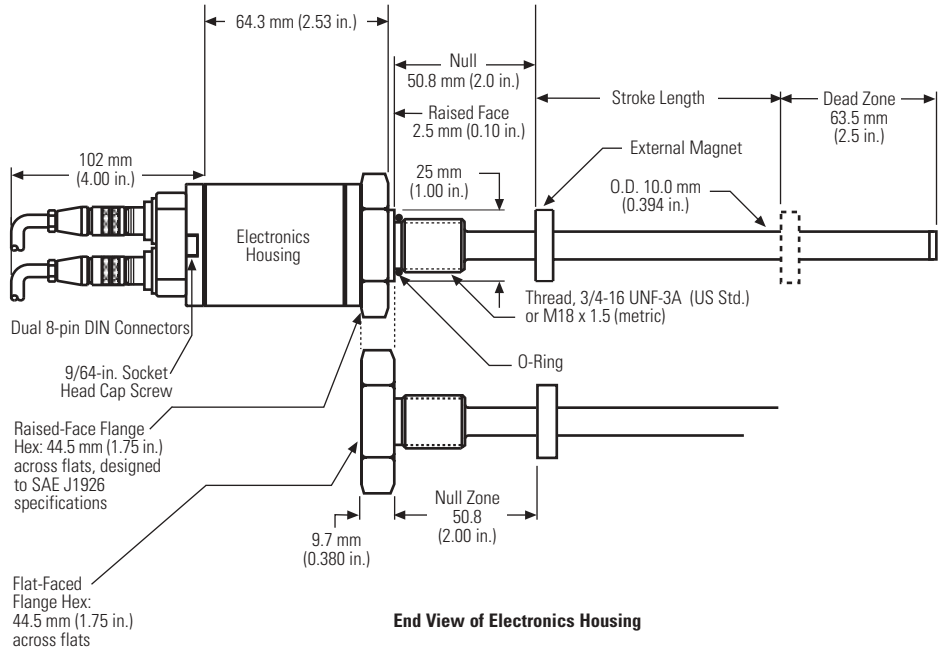
Dynamics Tab



ROD-STYLE (Model SH)

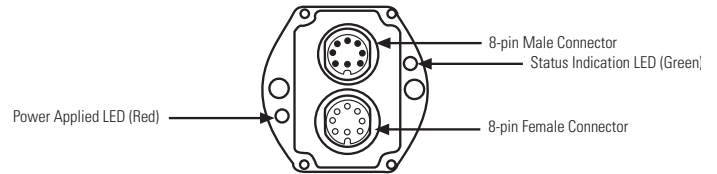
The S Series SH rod-style application housing offers modular construction, flexible mounting configurations, and easy installation. It is designed for internal mounting in applications where high-pressure conditions exist (5000 psi continuous, 10,000 psi spike) such as hydraulic cylinders. Temposonics SH may also be mounted externally in many applications.

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



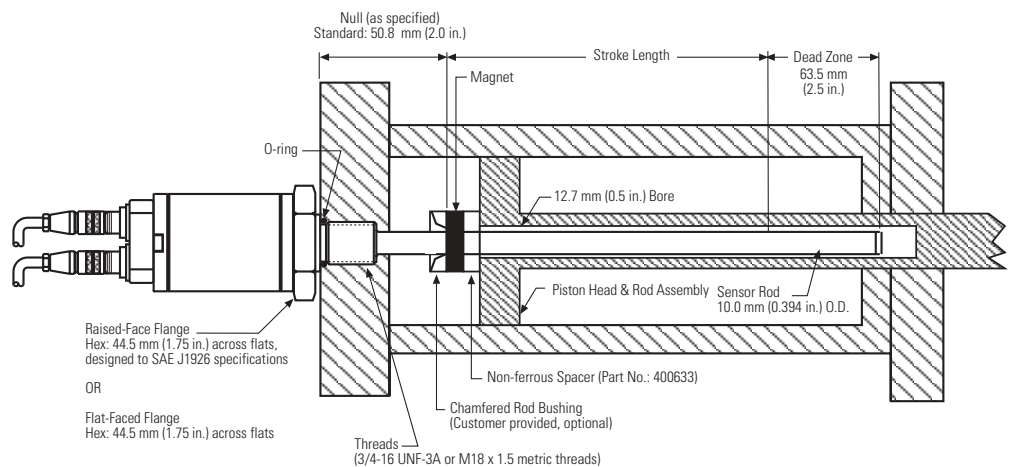
MAGNETS FOR TEMPOSONICS SH

Magnets must be ordered separately with Temposonics SH sensors. The standard ring magnet (Part No. 201542) is suitable for most applications.



TYPICAL CYLINDER INSTALLATION

The rod-style SH position sensors 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.

PROFILE-STYLE (Model SP)

Temposonics SP profile-style position sensors offer modular construction, flexible mounting configurations, and easy installation. A choice of two magnet mounting configurations are available with the profile housing: captive sliding magnet or floating magnet.

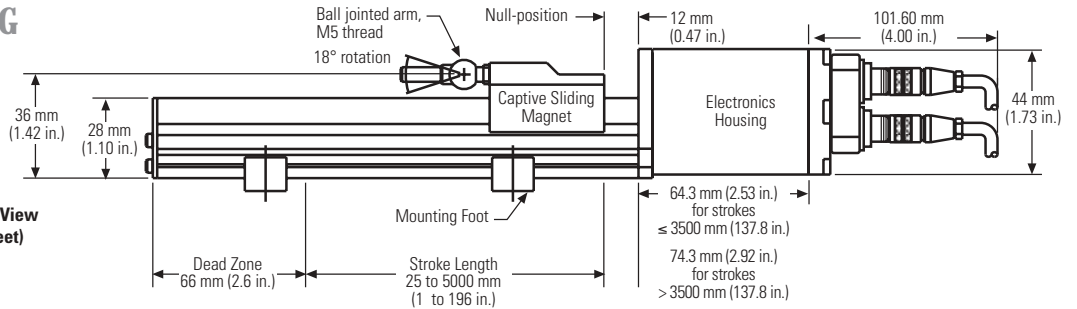
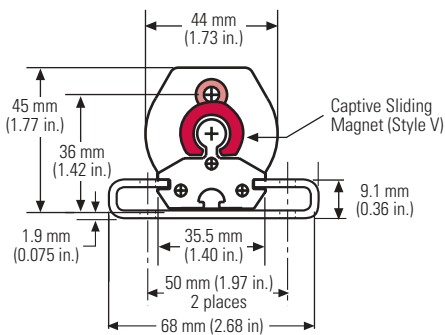
Temposonics SP sensors are effective in applications where space is an issue and in environments where there are high levels of dust and contamination. In addition, profile Temposonics SP sensors are designed for external mounting on machines and can be configured with a variety of connector options.

NOTE:
 Temposonics SP Sensors include two mounting feet (Part No. 400802) for sensors up to 1250 mm (50 in.). One additional mounting foot is included for every additional 500 mm (20 in.).

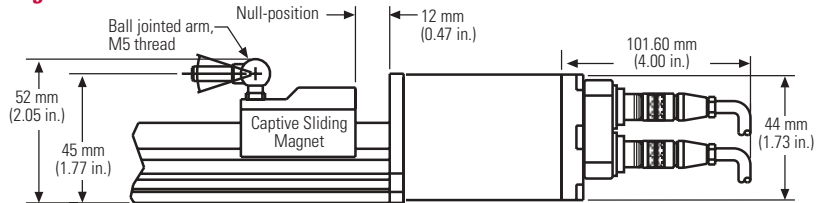
Style V Magnet

CAPTIVE SLIDING MAGNET

Captive Sliding Magnet, Style V, End View (Shown with Standard Mounting Feet)

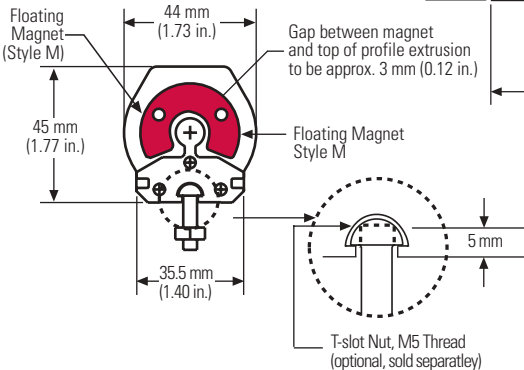


Style S Magnet

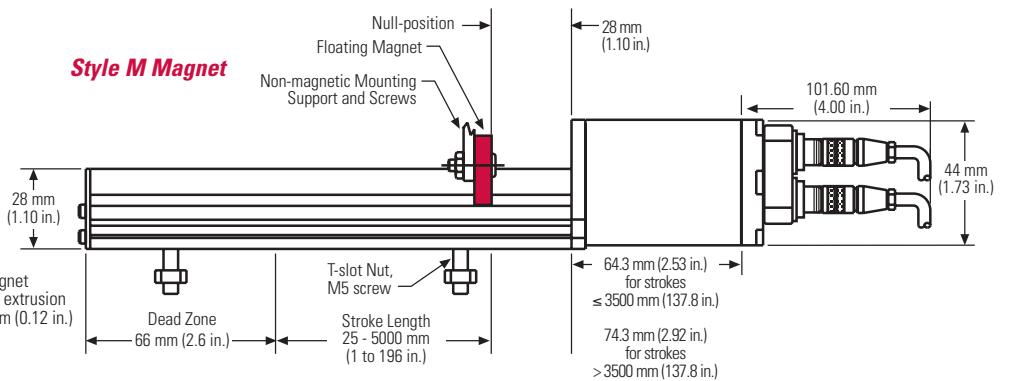


FLOATING MAGNET

Floating Magnet, End View (Shown with Optional T-slot Mounting)



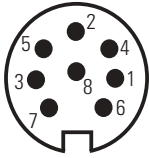
Style M Magnet



SENSOR INTEGRAL CONNECTORS

Power and RS-485 Communication

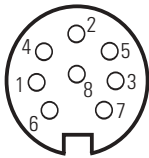
D8 Male Sensor Integral Connector
(As Viewed from End of Sensor)



Pin No.	Function
1	Ground (24 V Return)
2	(+) COMM (RS-485)
3	Relay Enable
4	Trigger Enable
5	(-) COMM (RS-485)
6	+ 24 V (Supply Voltage)
7	Set Enable
8	Cycle/Target Complete (+ 24 V)

Servocontrol Output

D8 Female Sensor Integral Connector
(As Viewed from End of Sensor)



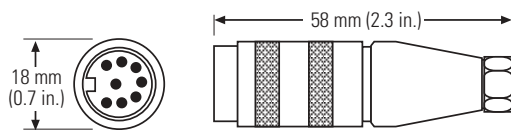
Pin No.	Function
1	Not Used
2	+24 V Relay Enabled Valve Supply*
3	Control Output Return
4	+24 V (Connected to Pin 2 via Internal Relay)
5	Not Used
6	+24 V (Internally Connected to Pin 4)
7	Control Output
8	Ground (24 V Return)

* Not required for self powered valves

FIELD INSTALLABLE CONNECTORS

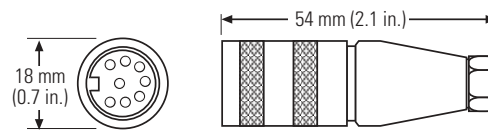
Servocontrol Output

D8 Male Straight-exit Connector
Part No. 370449



Power and RS-485 Communication

D8 Female Straight Connector
Part No. 370448



SERVOVALVE CONNECTORS

Consult servovalve manufacturer for mating servovalve connector.

Temposonics ServoSensor Position Controller

When placing an order, build the desired model number using the model number guide (right). See the following page for how to order extension cables and accessories.

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

S **D** **8** **2** **1** **2**

SENSOR MODEL _____

- SH** = Hydraulic Rod-style
- SP** = Profile-style

HOUSING STYLE _____

Temposonics SH only (magnet must be ordered separately):

- T** = US customary threads, raised-face hex, and pressure tube
- N** = Metric threads, raised-faced hex, and pressure tube
- B** = Sensor cartridge only (No application housing, stroke length ≤ 72 in.)

Temposonics SP only (magnet included):

- M** = Floating magnet (Open ring 140°) (Part No. 251416)
- S** = Captive sliding magnet with joint *at top* (Part No. 252110-1)
- V** = Captive sliding magnet with joint *at front* (Part No. 2512111-1)

STROKE LENGTH _____

_____. ____ **U** = Inches and tenths (Encode in 0.1 in. increments)

SH and SP: Stroke Range = 1 - 132 in.

_____. ____ **M** = Millimeters (Encode in 5 mm increments)

SH and SP: Stroke Range = 25 - 3350 mm.

CONNECTION TYPE _____

Connector

D82 = 8-pin DIN connectors, integral, standard

INPUT VOLTAGE _____

1 = +24 Vdc (+20%, -15%)

OUTPUT _____

V ____ Voltage Output; +/- 10 Vdc Output (Range to be specified - see example below)

A ____ Current Output; +/- 50 mA (Range to be specified - see example below)

Example

V 1 0 = +/- 10 Vdc Output

A 2 0 = +/- 20 mA Output

PROGRAM _____

2 = Standard ASCII serial protocol

NOTES:

- 1) ServoSensor position controllers are manufactured with an 8-pin female and an 8-pin male DIN connector.
- 2) For applications requiring baud rates other than the default value (115.2 kBd), the ServoSensor position controllers must be reprogrammed. If no programming capability exists (see pages 2 and 3), customers must consult factory at time of order to specify desired baud rate.

EXTENSION CABLES:

Two separate cables are needed. One communications cable (D8 female termination) and one servo cable (D8 male termination). Please specify cable assembly types when ordering the ServoSensor.

	C □ □ □ □ □	P O
COMMUNICATION CABLE CONNECTION TYPE		
CS = 8-pin female straight connector		
CR = 8-pin female right angle connector		
CABLE LENGTHS		
005 = 5 ft.		
015 = 15 ft.		
025 = 25 ft.		
050 = 50 ft.		
100 = 100 ft.		
For custom length cables over 100 feet add:		
____ = Cable length (Range 101 ft. - 200 ft.; Encode 101 to 200)		
COMMUNICATIONS CABLE TERMINATION		
PO = Pigtail Termination		

	S □ □ □ □ □	P O
SERVO CABLE CONNECTION TYPE		
SS = 8-pin male straight connector		
SR = 8-pin male right angle connector		
CABLE LENGTHS		
001 to 005 = 1 ft. to 5 ft. (Range 1 ft. - 5 ft.; Encode 001 to 005)		
For custom length cables over 5 feet add:		
____ = Cable length over 5 ft. (Range 6 ft. - 100 ft.; Encode 006 to 100)		
SERVO CABLE TERMINATION		
PO = Pigtail Termination		

PRESSURE HOUSING (SH Spare Only)

	H □ □ □ □ □ □ □
SENSOR CONNECTION TYPE	
T = US customary threads, raised-face hex	
N = Metric threads, raised-face hex	
STROKE LENGTH	
U ____ . ____ = Inches and tenths (Encode in 0.1 in. increments)	
or	
M ____ = Millimeters (Encode in 5 mm increments)	

NOTE:

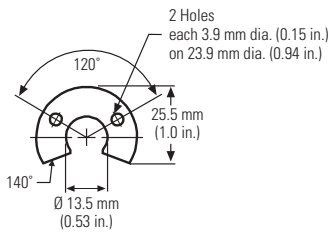
SH spare pressure housing for stroke lengths 1 to 72 in. (25 to 1825 mm) only.

ACCESSORIES

Description	Part No.	Notes
O-Ring (spare)	560315	For use with Temposonics SH sensors
Hex Jam-nut (w/ 3/4-16 UNF threads)	500015	For use with Temposonics SH sensors
Hex Jam-nut (w/ M18x 1.5 threads)	500018	For use with Temposonics SH sensors
Magnet Spacer	400633	For use with Standard Ring Magnet Part No. 201542
Magnet Mounting Screws	560357	Used to Mount Standard Ring Magnet Part No. 201542 (4 screws required) and 90° Cutout Magnet 201552 (2 screws required)
140° Cut-out Floating Magnet	251416	Spare for Temposonics SP sensors
Captive Sliding Magnet, Style V	252111-1	Spare for Temposonics SP sensors, Rod joint at front of magnet
Captive Sliding Magnet, Style S	252110-1	Spare for Temposonics SP sensors, Rod joint at top of magnet
Field Installable Connector	370449	Male 8-pin DIN
Field Installable Connector	370448	Female 8-pin DIN
Joint Rod Sleeve	401603	Optional accessory for Temposonics SP sensors
Ball Jointed Arm	401600-1	Optional accessory for Temposonics SP sensors
Power Supply (24/28 Vdc, 0.5 A)	380009	For use with R Series and L Series
Mounting Feet, Standard	400802	Spare for SP Sensors
Mounting Feet, Low Profile	400867	Spares for SP Sensors
T-slot M5 Nut	401602	Optional accessory for mounting Temposonics SP sensors
CD ROM	550754	Setup Software
Converter	550182	RS-232 to RS-485

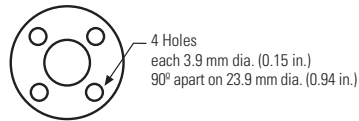
Floating Magnet

(May be used with Temposonics RH and RP)
Part No. 251416



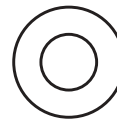
ID: 13.5 mm (0.53 in.)
OD: 32.8 mm (1.29 in.)
Thickness: 7.9 mm (0.312 in.)

Standard Ring Magnet
Part No. 201542



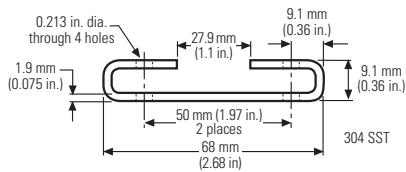
ID: 13.5 mm (0.53 in.)
OD: 32.8 mm (1.29 in.)
Thickness: 7.9 mm (0.312 in.)

Ring Magnet
Part No. 400533

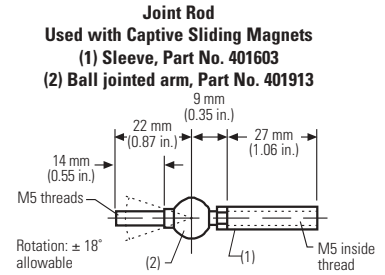
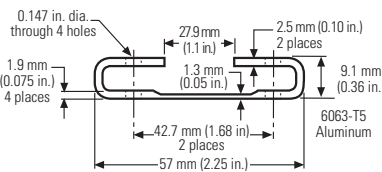


ID: 13.5 mm (0.53 in.)
OD: 25.4 mm (1.0 in.)
Thickness: 7.9 mm (0.312 in.)
(For use with strokes ≤ 3050 mm or 120 in.)

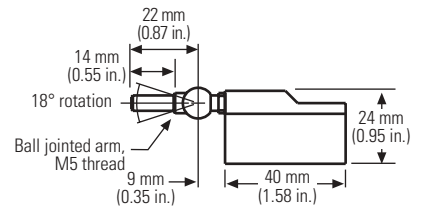
Standard Mounting Foot
Part No. 400802



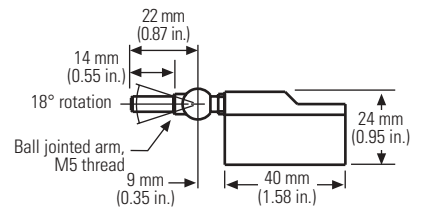
Low-profile Mounting Foot
Part No. 400867



Captive Sliding Magnet, Style V
Part No. 252111-1



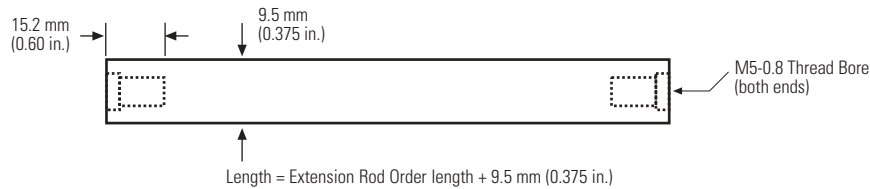
Captive Sliding Magnet, Style S
Part No. 252110-1



OPTIONAL EXTENSION RODS (FOR USE WITH CAPTIVE SLIDING MAGNET ON SP STYLE)

Description	Part No.	Description	Part No.
2 in. Extension Rod	401768-2	15 in. Extension Rod	401768-15
3 in. Extension Rod	401768-3	18 in. Extension Rod	401768-18
4 in. Extension Rod	401768-4	20 in. Extension Rod	401768-20
6 in. Extension Rod	401768-6	21 in. Extension Rod	401768-21
7 in. Extension Rod	401768-7	24 in. Extension Rod	401768-24
8 in. Extension Rod	401768-8	30 in. Extension Rod	401768-30
9 in. Extension Rod	401768-9	36 in. Extension Rod	401768-36
10 in. Extension Rod	401768-10	42 in. Extension Rod	401768-42
12 in. Extension Rod	401768-12	48 in. Extension Rod	401768-48
14 in. Extension Rod	401768-14	60 in. Extension Rod	401768-60

Extension Rod



SENSORS GROUP

Pioneers,
Innovators,
Leaders in
Magnetostrictive
Sensing

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