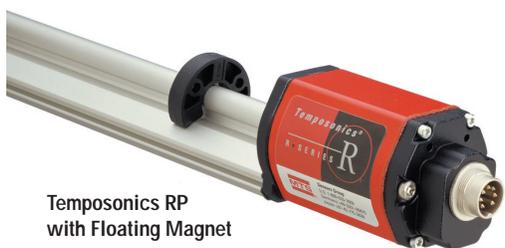


Product Specifications



Temposonics RP
with Captive Sliding Magnet



Temposonics RP
with Floating Magnet



Temposonics RH
with Standard Ring Magnet

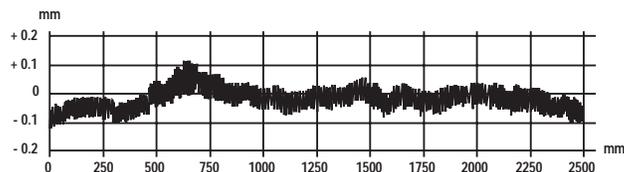
Features

- Industrial standard communication protocol
- High-speed, high-resolution data transmission
Up to 2 micron resolution
- Digital communication architecture
24-/25-bit Gray code or Binary data format
- CE certified
- Modular, non-contacting design
- Field replaceable sensor cartridge (Model RH only)
- 2-year warranty



PARAMETER	SPECIFICATION
-----------	---------------

Measured Variable:	Displacement
Resolution:	Up to 0.002 mm (0.00008 in.)
Non-Linearity:	< ± 0.01% of full stroke or ± 0.04 mm (0.0016 in.), whichever is greater*



Example: Sensor Type: Temposonics RP
Measuring Range: 2500 mm
Non-linearity (measured): ± 0.116 mm

Repeatability:	< ± 0.001% of full scale or ± 0.0025 mm (0.0001 in.), whichever is greater
Hysteresis (Magnetic**):	< 0.004 mm (0.00016 in.)
Output Format:	24- or 25-bit Binary or Gray code
Measuring Range:	Profile Style Sensors (RP): 25 to 5000 mm (1 to 196 in.) Rod Style Sensors (RH): 25 to 7620 mm (1 to 300 in.)
Operating Voltage:	+24 Vdc (+ 20%, - 15%)
Power Consumption:	100 mA typical
Operating Temperature:	Head Electronics: - 40 to 75°C (- 40 to 167°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

PROFILE STYLE (RP 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 (RH MODEL)

Electronic Head:	Aluminum die-cast housing
Sensor Rod with Flange:	304L stainless steel
Operating Pressure:	350 bar static, 690 bar spike (5000 psi spike; 10,000 psi static)
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 Magnet

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

* Varies with sensor model

** Does not include mechanical backlash

Refer to Installation Guide, Part No. 550574, for additional information (www.temposonics.com).

TEMPOSONICS R SERIES SENSORS WITH SSI OUTPUT

Temposonics R Series position sensors are available with a widely accepted controller interface: Synchronous Serial Interface (SSI). Position data from the sensor is encoded in a 24- or 25-bit Binary or Gray code format and transmitted at very high speed via a serial type interface.

SSI output provides effective synchronization in a closed-loop control system. A clock pulse train from a controller is used to gate out sensor

data.

Temposonics R Series Sensors offer modular construction and non-contacting magnetostrictive technology. Two application housings are available: rod style (Model RH) and profile style (Model RP). With the RH sensors, the sensor cartridge (for sensor lengths up to 72 inches) can be quickly replaced in the field without removing the application housing (see page 4).

ADVANTAGES

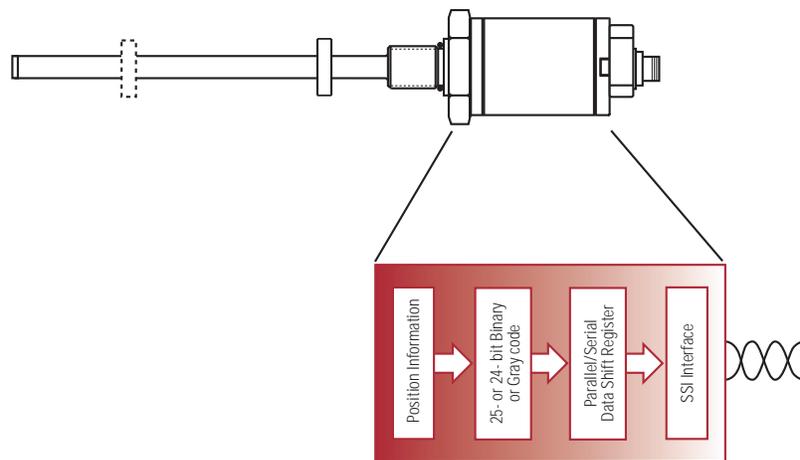
- Noise immunity
- Cost effective data transfer
- Data transmission rate is adjustable and independent of length and resolution
- Effective in closed-loop controls; both synchronous and asynchronous modes
- Transmission over long distances (due to selectable baud rate)

FUNCTION

The diagram, right, illustrates the function of Temposonics R Series position sensors with Serial Synchronous Interface (SSI). The position of a magnet mounted on a machine is precisely determined by a time-based method (i.e., magnetostriction). The displacement value is provided in a 24- or 25-bit Binary or Gray code data stream and transmitted to a controller via SSI. Update frequencies are available up to 7500 measurements per second (length dependent) in asynchronous mode; and 1000 measurements per second (up to 82 inches).

Also, displacement outputs are absolute which means that position information is immediately available upon recovery from power loss.

Sensor w/SSI - Block Diagram



DEFINITIONS:

Synchronous Mode: A synchronous pulse from the control system starts the measuring time of the sensor; the measured result is available before the next synchronizing pulse is generated.

Asynchronous Mode: SSI takes measurements at its fastest internal interrogation rate (length dependent) and provides information upon request.

NOTE:

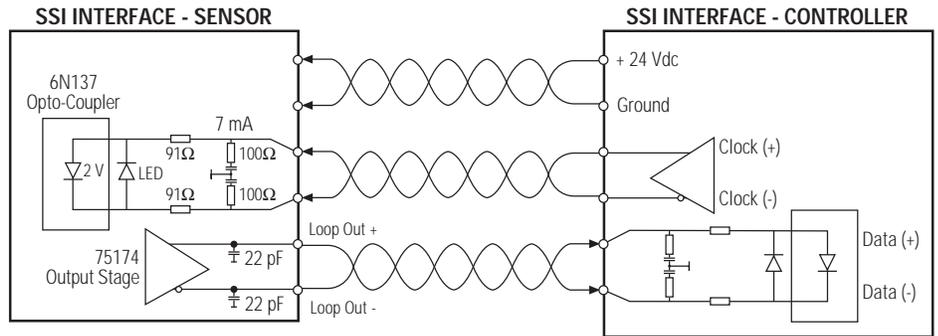
If controller/interface does not specify synchronous mode, use sensor in asynchronous mode.

SSI INTERFACE

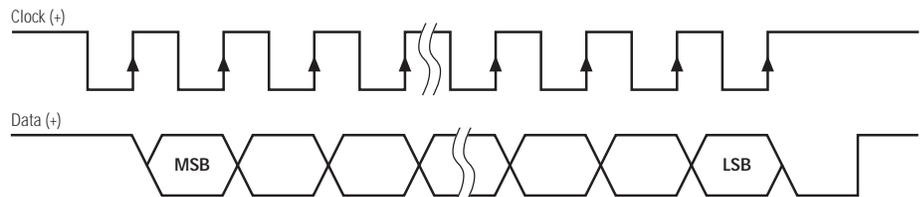
SSI is a widely used serial interface between an absolute position sensor and a controller. SSI uses a clock pulse train from a controller to initiate a gated output from the sensor.

A clock pulse train from a controller is used to gate out sensor data: one bit of position data is transmitted to the controller per one clock pulse received by the sensor. The absolute position data is continually updated by the sensor and converted by the shift register into serial information. Between each clock pulse train there is a minimum dwell of 25 μ s during which data is moved into the register. The data is then shifted out when the sensor receives a pulse train from the controller. When the least significant bit (LSB) goes HIGH and the minimum dwell time has elapsed, new data is available to read. Refer to the diagrams, right.

SSI Block Diagram



SSI Timing Diagram



For Example: For 25-bit output, the timing clock must have 26 pulses.

Sequential Measurements of SSI Timing



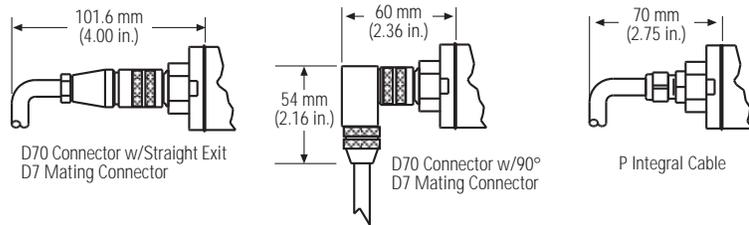
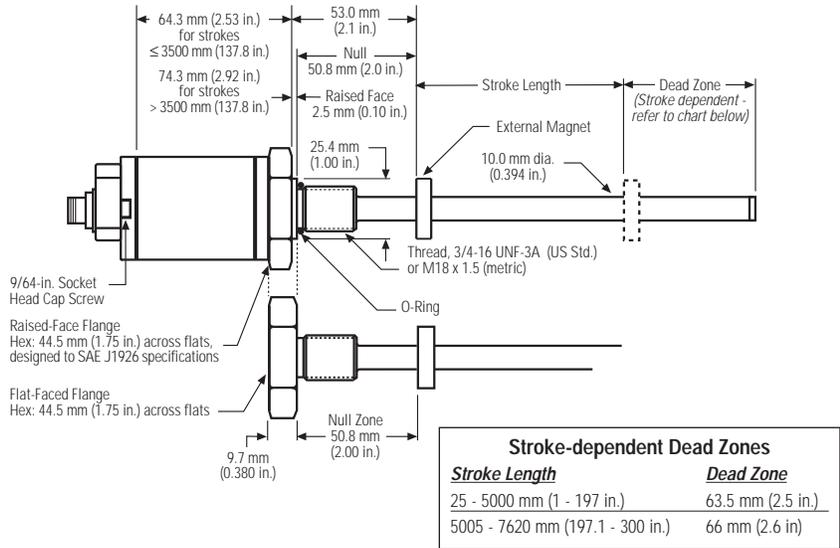
Baud Rates for Data Transmission

Baud Rate	1.5 MBd	< 400 kBd	< 300 kBd	< 200 kBd	< 100 kBd
Cable Length (ft.)	< 10	< 160	< 320	< 650	< 1300

ROD-STYLE (Model RH)

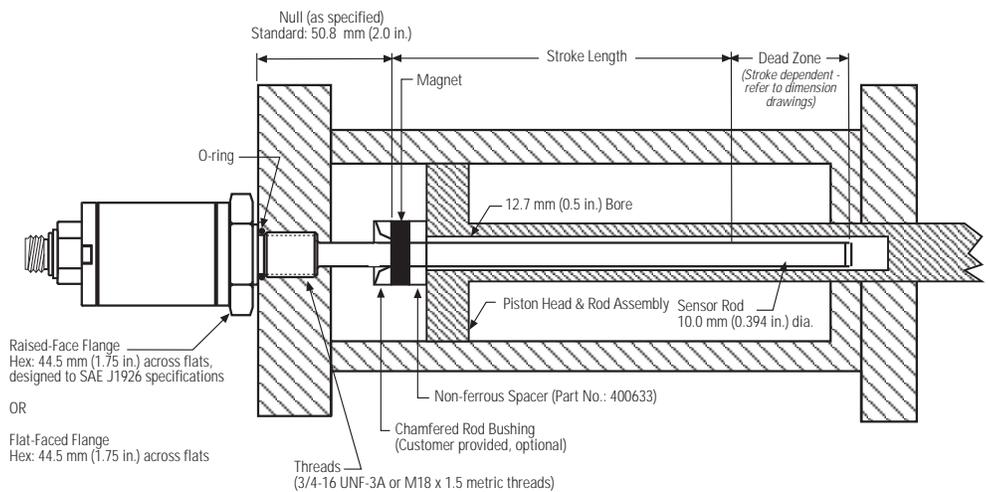
The Temposonics R Series rod-style application housing (Model RH) offers modular construction, flexible mounting configurations, and easy installation. It is designed for internal mounting in applications where high-pressure conditions exist (5000 psi continuous, 10,000 psi spike) such as hydraulic cylinders.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

In addition, the RH 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 R Series position sensors (Model RH) 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 RP)

Temposonics RP 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.

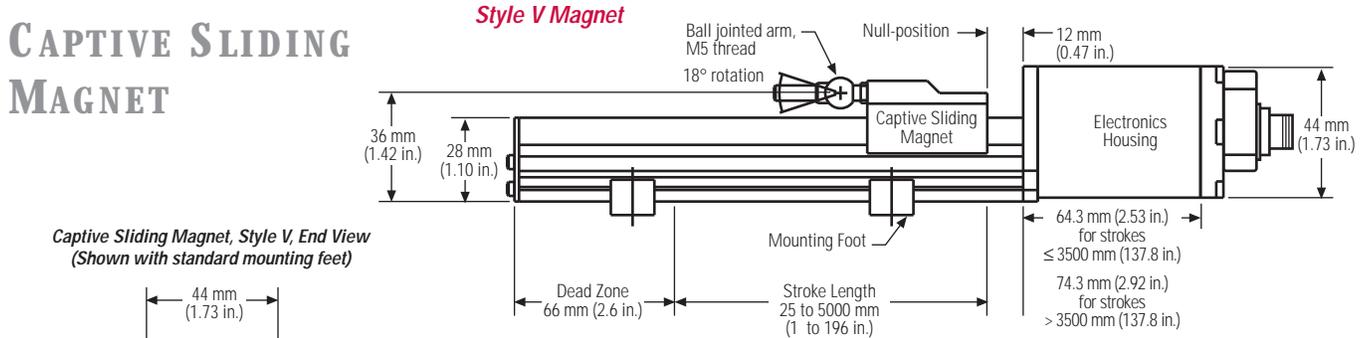
Temposonics RP sensors are effective in applications where space is an issue and in environments where there are high levels of dust and conta-

mination. In addition, Temposonics RP sensors are designed for external mounting on machines and can be configured with a variety of connector options.

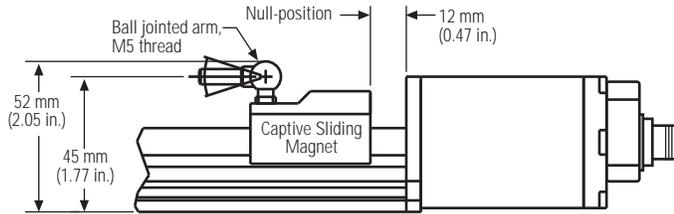
NOTE:
 Temposonics RP Sensors include two mounting feet (Part No. 400802) for sensors up to 1250 mm (50 in.). One additional mounting foot is included for every additional 500 mm (20 in.).

CAPTIVE SLIDING MAGNET

Style V Magnet

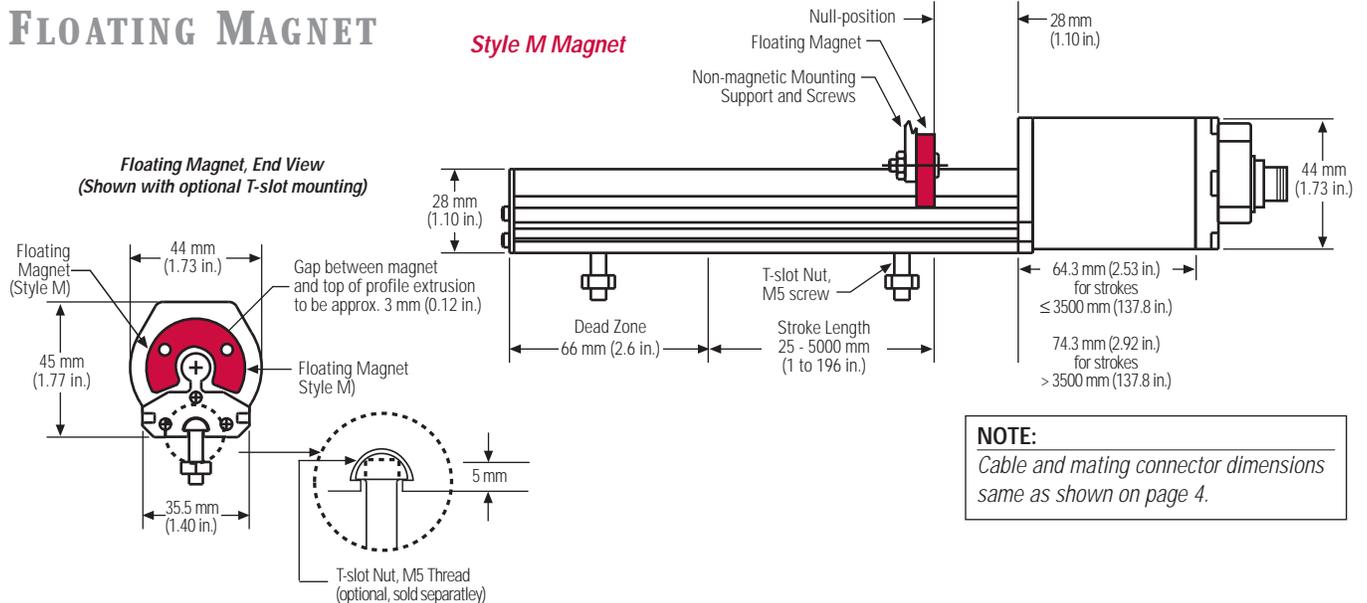


Style S Magnet



FLOATING MAGNET

Style M Magnet



NOTE:
 Cable and mating connector dimensions same as shown on page 4.

SENSOR INTEGRAL CONNECTOR (D7 Male):

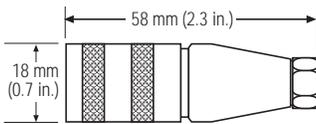
(As Viewed from End of Sensor)



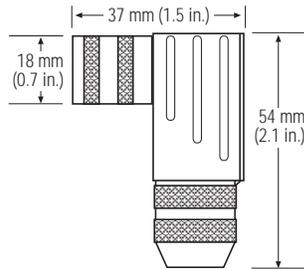
CABLE CONNECTORS (Field-installable D7 Female):

Mates with Sensor Integral Connector

D7 Straight-exit Connector
Part No. 560701



D7 90° Connector
Part No. 560779



PINOUT / WIRE COLOR CODE (Integral or Extension Cable)

Pin No.	Wire Color	Function
1	Gray	(-) Data
2	Pink	(+) Data
3	Yellow	(+) Clock
4	Green	(-) Clock
5	Brown or Red	+ 24 Vdc, Customer Supplied
6	White	DC Ground
7	Blue	No Connection*

* Extension cables using the standard cable (Styles DS and DT) do not have a 7th wire.

NOTE:

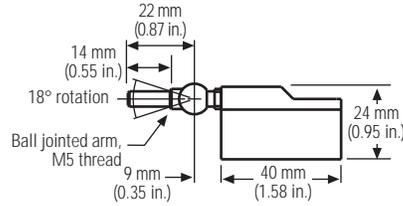
Appropriate grounding of cable shield is required at the controller end.

MAGNETS

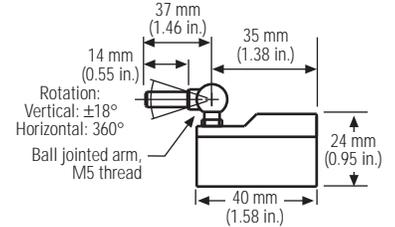
Magnets must be ordered separately with Temposonics RH sensors. The standard ring magnet (Part No. 201542) is suitable for most applications.

Magnets are included with the order of Temposonics RP sensors. Temposonics RP can be configured with one of two magnet configurations: captive sliding magnet or floating magnet. There are two styles of captive sliding magnet, and one style of floating magnet.

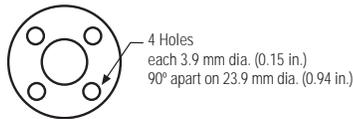
Captive Sliding Magnet, Style V
Part No. 252111-1



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

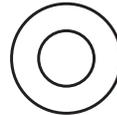


Standard Ring Magnet
Part No. 201542



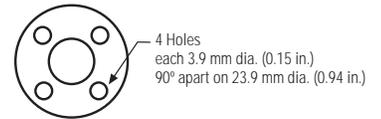
ID: 13.5 mm (0.53 in.)
OD: 32.8 mm (1.29 in.)
Thickness: 7.9 mm (0.312 in.)

Ring Magnet
Part No. 400533



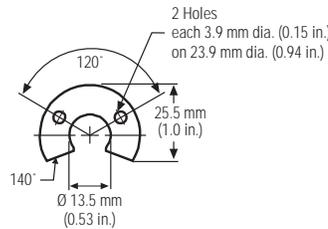
ID: 13.5 mm (0.53 in.)
OD: 25.4 mm (1.0 in.)
Thickness: 7.9 mm (0.312 in.)
**(For use with strokes
≤ 3050 mm or 120 in.)**

Magnet Spacer
Part No. 400633



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

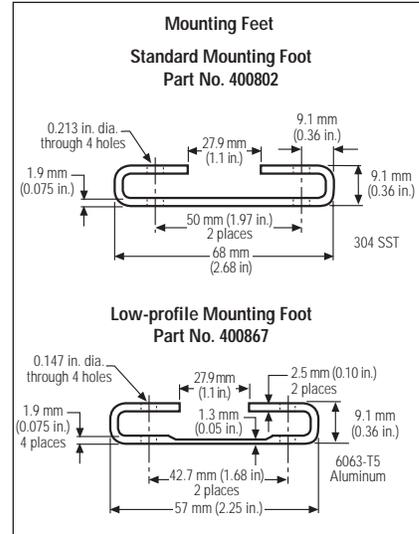
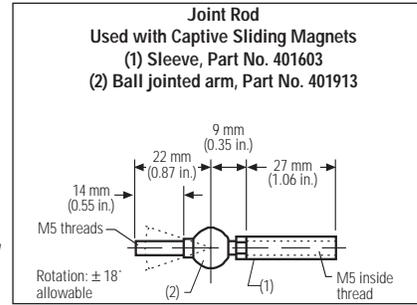
Floating Magnet
(May be used
with Temposonics RH and RP)
Part No. 251416



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

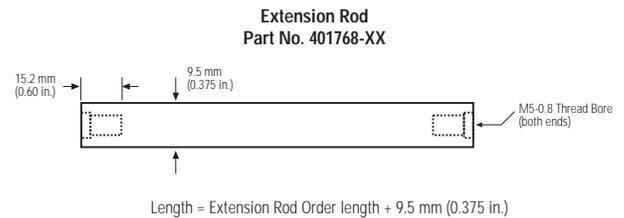
ACCESSORIES

Description	Part No.	Notes
O-Ring (spare)	560315	For use with Temposonics RH sensors
Hex Jam-nut (w/ 3/4-16 UNF threads)	500015	For use with Temposonics RH sensors
Hex Jam-nut (w/ M18x 1.5 threads)	500018	For use with Temposonics RH 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) and 90° Cut-out Magnet Part No. 201552 (2 screws)
140° Cut-out Floating Magnet	251416	Spare for Temposonics RP sensors
Captive Sliding Magnet, Style V	252111-1	Spare for Temposonics RP sensors, Rod joint at front of magnet
Captive Sliding Magnet, Style S	252110-1	Spare for Temposonics RP sensors, Rod joint at top of magnet
Joint Rod Sleeve	401603	Optional accessory for Temposonics RP sensors
Ball jointed arm	401913	Optional accessory for Temposonics RP sensors
Power Supply (24/28 Vdc, 0.5 A)	380009	
Mounting Feet, Standard (spares for RP sensors)	400802	Temposonics RP position sensors are provided with a set of Mounting Feet
Mounting Feet, Low-profile	400867	Optional accessory for Temposonics RP sensors
T-slot M5 Nut	401602	Optional accessory for mounting Temposonics RP sensors
Cable	530026	Specify length in feet at time of order
D7 Field-installable Connector	560701	Female, straight exit, mates to D70 connection type
D7 Field-installable Connector	560779	Female, 90° exit, mates to D70 connection type



OPTIONAL EXTENSION RODS (for use with Captive Sliding Magnet)

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





SENSORS GROUP

Pioneers,
Innovators,
Leaders in
Magnetostrictive
Sensing

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Part Number: 11-01 550542 Revision G