

# Signet 2552 Metal Magmeter Flow Sensor



## Features

- Patented\* Magmeter technology
- Hot-tap version for installation and service without system shutdown
- Diagnostic features using colored LED lights
- NPT or ISO threads
- Optional detachable waterproof cable
- Three output choices: frequency, digital (S<sup>3</sup>L), or 4 to 20 mA
- Bi-directional flow and empty pipe detection
- No moving sensor parts
- Adjustable insertion for large pipe sizes up to DN 1200 (48 in.)
- Flow rate range 0.05 to 10 m/s (0.15 to 33 ft/s)

## Description

The Signet 2552 Magmeter Flow Sensor is a heavy duty, high performance sensor in an adjustable-insertion configuration that can be used with a ball valve for hot-tap installations. This insertion style flow sensor has no moving parts and is constructed of corrosion-resistant materials to provide long-term reliability with minimal maintenance costs.

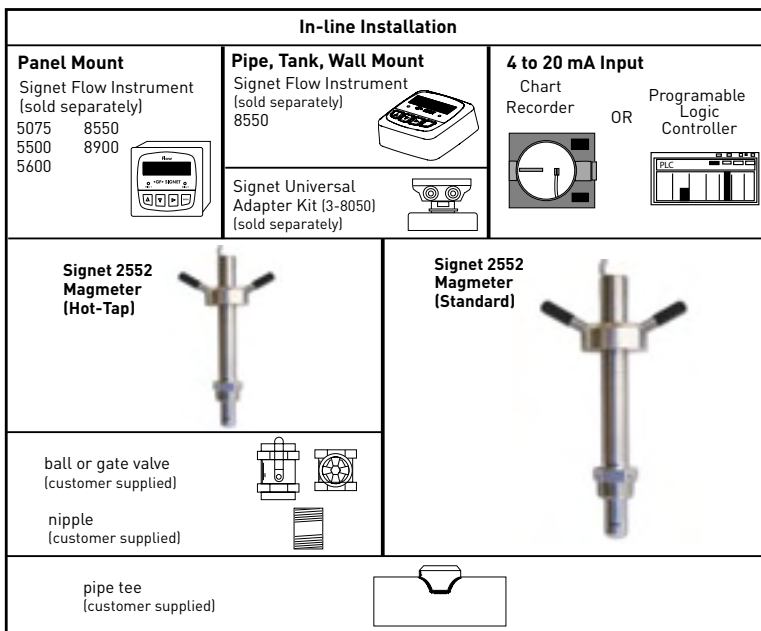
The 2552 is versatile and simple-to-install, delivering reliable flow measurement over a wide dynamic range in pipe sizes ranging from DN50 to DN1200 (2 to 48 inches). Signet 2552 Magmeters offer a variety of output options compatible with Signet flow instru-

mentation that feature a frequency or digital (S<sup>3</sup>L) input. The blind transmitter (4 to 20 mA output) or digital sensor interface is available for long distance signal transmission.

The empty pipe detection features a zero flow output when the electrodes are not completely wetted. The frequency output is bi-directional while the 4 to 20 mA output can be set for uni- or bi-directional flow. The 4 to 20mA output is factory spanned and can be changed using the PC compatible accessory set-up tool.



## System Overview

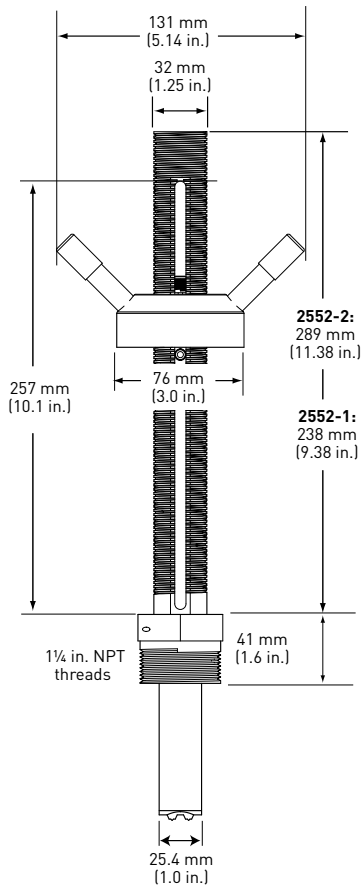


\*U.S. Patent No.:  
7,055,396 B1

## Applications

- Municipal/Industrial Water Distribution
- Water Inlets to Process Plants
- Surface, Ground, and Ocean Water
- Chemical Processing
- Water and Wastewater Monitoring
- Food Processing and Waste Lines

## Dimensions



## Specifications

### Wetted Materials:

- 316L Stainless Steel body and electrodes
- PVDF Insulator
- O-rings: FPM (standard)
- Cable: 4-cond + shield, PVC jacket (Fixed cable models) or watertight rubber cable with connector

### Power Requirements

- 4 to 20 mA: 24VDC nominal, 21.6 to 26.4 VDC max., 22.1 mA maximum
- Frequency: 5 to 24 VDC nominal, 5 to 26.4 VDC max., 15 mA maximum
- Digital (S<sup>3</sup>L): 5VDC nominal, 5 to 6.5 VDC max., 15 mA maximum
- Reverse polarity and short circuit protected

### Performance

Pipe size range:  
DN50 to DN1200 (2 in. to 48 in.)

#### Flow Range

- Minimum: 0.05 m/s (0.15 ft/s)
- Maximum: 10 m/s (33 ft/s)

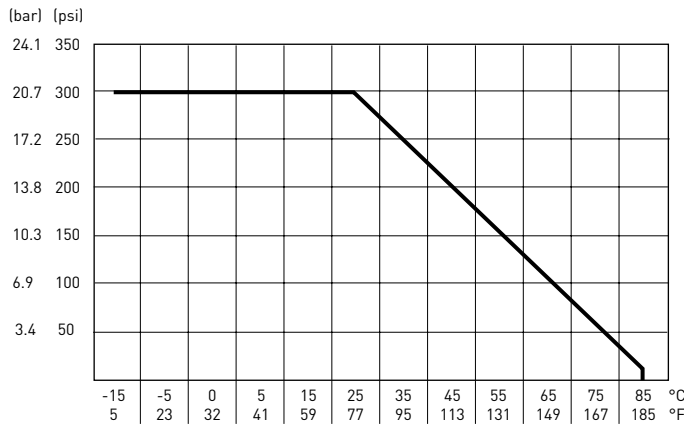
Linearity:  $\pm(1\% \text{ reading} + 0.01 \text{ m/s})$   
 $\pm(1\% \text{ reading} + 0.033 \text{ ft/s})$

Repeatability:  $\pm 0.5\%$  of reading @ 25°C

Minimum Conductivity: 20  $\mu\text{S/cm}$

#### Accuracy:

<  $\pm 2\%$  of measured value in reference conditions where, the fluid is water at ambient temperature, the appropriate upstream and downstream distances are observed, the sensor is inserted at the correct depth, and there is a fully developed flow profile which is in compliance to ISO 7145-1982 (BS 1042 section 2.2).



### Electrical

Current output (4 to 20 mA)

- Programmable and reversible
- Loop Accuracy: 32  $\mu\text{A}$  max. error (@ 25°C @ 24 VDC)
- Temp. drift:  $\pm 1 \mu\text{A}$  per °C max.
- Power supply rejection:  $\pm 1 \mu\text{A}$  per V
- Isolation: Low voltage < 48 VAC/DC from electrodes and auxiliary power
- Maximum cable: 300 m (1000 ft.)
- Max. Loop Resistance: 300  $\Omega$
- Error condition: 22.1 mA

Frequency output:

- Compatible with Signet 5075, 5500, 5600, 8550 and 8900
- Max. Pull-up Voltage: 30 VDC
- Short Circuit Protected:  $\leq 30 \text{ V}$  @ 0 $\Omega$  pull-up for one hour
- Reverse Polarity Protected to -40 V for 1 hour
- Overvoltage Protected to +40 V for 1 hour
- Max. Current Sink: 50 mA, current limited
- Maximum cable: 300 m (1000 ft.)

Digital (S<sup>3</sup>L) Output:

- Compatible with Signet 8900
- Serial ASCII, TTL level 9600 bps
- Maximum cable: Application dependent (See 8900 manual)

### Max. Temperature/Pressure Rating

Storage Temperature:

-15°C to 70°C (5°F to 158°F)  
in non-icing conditions

Operating Temperature

- Ambient: -15°C to 70°C (5°F to 158°F) in non-icing conditions
- Media: -15°C to 85°C (5°F to 185°F)

Maximum Operating Pressure

20.7 bar @ 25°C (300 psi @ 77°F)

### Hot-Tap Installation Requirements

- Maximum Installation Pressure 20.7 bar (300 psi)
- Maximum Installation Temp. 40°C (104°F)

Hot-tap installation at temperatures that are greater than 40°C (104°F) or with hazardous liquids are not permitted with this product.

### Standards and Approvals

- CE
- U.S. Patent No.: 7,055,396 B1
- Fixed cable: NEMA 6 (IP67)
- Watertight connector: NEMA 6P (IP68)
- EN 61326: Immunity and Emissions for Control Equipment

# Sensor Selection Guide

The 2552 Magmeter can be installed into a variety of pipe sizes ranging from DN50 to DN1200 (2 in. to 48 in.). Follow the steps below to ensure that you choose the right sensor for your application.

## Step 1: Determine how the sensor will be installed

### A. For standard (no Hot-Tap) installations:

The height of the weldolet (threadolet) and pipe adapter(s) should be determined before the sensor is purchased.

- For retrofit installations, the stack height, or "A" dimension (see Fig. 1), is the overall height from the top of the pipe to the highest point of the stack before the sensor is connected.
- For new installations, Signet recommends a weldolet (threadolet) and an adapter to accommodate the 1.25 in. sensor process threads. The stack height, or "A" dimension (see Fig. 1), is the overall height from the top of the pipe to the highest point of the stack.

### B. For Hot-Tap installations:

The stack height of the ball valve, nipple weldolet (threadolet) and pipe adapters should be determined before the sensor is purchased.

- For retrofit installations, the ball valve must be at least a 1.25 in. full port valve. The stack height, or "A" dimension (see Fig. 2), is the overall height from the top of the pipe to the top of the ball valve, or the top of the highest point of the stack before the sensor is connected.
- For new installations, Signet recommends a 1.25 in. full port ball valve, a short nipple and a weldolet (threadolet). The stack height or "A" dimension (see Fig. 2) is the overall height from the top of the pipe to the top of the ball valve.

## Step 2: Determine how the sensor will be installed

Once the "A" dimension is determined, go to the sensor selection table and find your "A" dimension on the left column. Then, find the appropriate pipe size at the top of the chart. These two factors will determine which sensor is best suited for your installation.

Max. "A" Dimension		Pipe Size																					
		Inch	2	2.5	3 - 3.5	4	5	6 - 8	10	12 - 14	16	18	20	22	24	26 - 28	30 - 32	34	36 - 38	40 - 42	48	48 +	
mm	inch	DN	50	65	80 to 90	100	125	150 - 200	250	300 - 350	400	450	500	550	600	650 - 700	750 - 800	850	900 - 950	1000 - 1100	1200	1220+	
50.8	2		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	
63.5	2.5		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	4
76.2	3		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	4
88.9	3.5		1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	2	2	2	2	2	4
101.6	4		1	1	1	1	1	1	1	1	1	1	1	2	2	1	2	2	2	2	2	2	4
114.3	4.5		1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	3	4
127	5		1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	3	3	3	4
139.7	5.5		1	1	1	1	1	1	1	2	2	2	2	2	3	2	2	3	3	3	3	3	4
152.4	6		1	1	1	1	1	2	2	2	2	2	3	3	2	3	3	3	3	3	3	3	4
165.1	6.5		1	1	1	1	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	4
177.8	7		1	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	4
190.5	7.5		2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4
228.6	9		2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4
241.3	9.5		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4
254	10		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4
266.7	10.5		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4
279.4	11		3	3	3	3	3	3	3	3	3	3	3	3	4	3	3	3	4	4	4	4	4
292.1	11.5		3	3	3	3	3	3	3	3	3	3	3	4	4	3	4	4	4	4	4	4	4
304.8	12		3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4
317.5	12.5		3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4
330.2	13		3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4
342.9	13.5		3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
355.6	14		3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
368.3	14.5		3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
381	15		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4

- Legend:
- Use 3-2552-1, max. protrusion = 185 mm (7.3 in.)
  - Use 3-2552-2, max. protrusion = 236 mm (9.3 in.)
  - Available mid-year 2007
  - Contact you local GF sales office for more information.

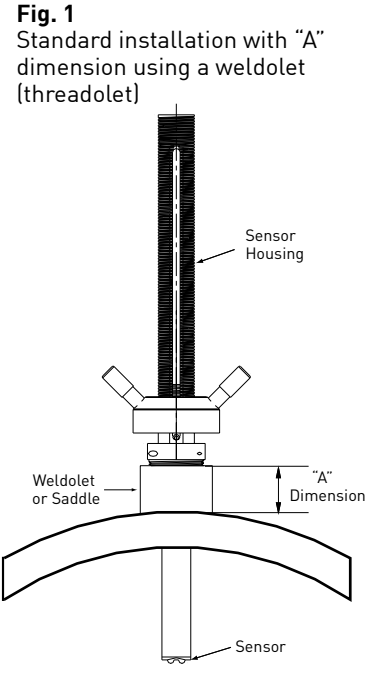


Fig. 1 Standard installation with "A" dimension using a weldolet (threadolet)

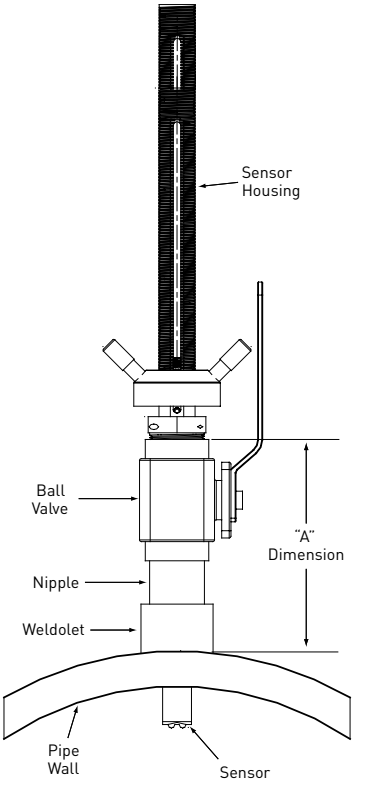


Fig. 2 Hot-Tap installation with "A" dimension using a ball valve, short nipple and weldolet (threadolet)

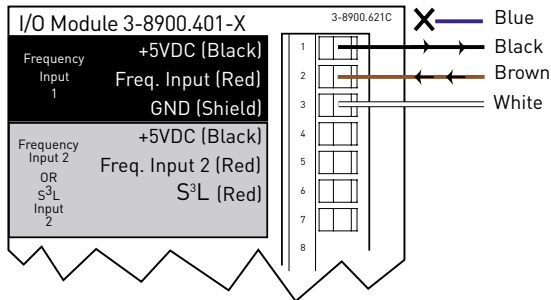
## Step 3: Refer to Ordering Information to select corresponding part numbers

# Wiring

## Frequency Wiring:

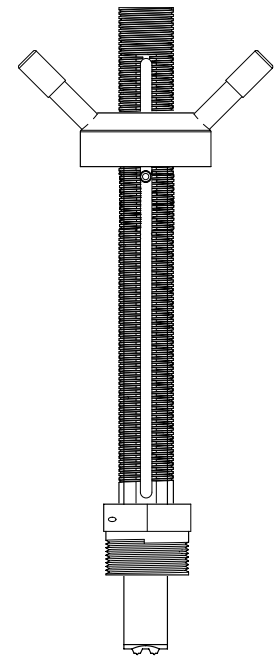
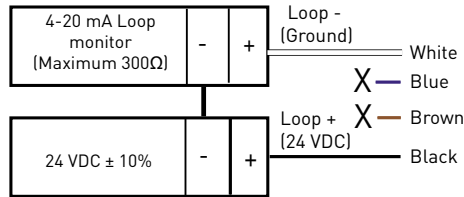
The 2552 offers an open collector frequency signal that can be connected to any powered Signet flow instrument. If connecting to a non-Signet instrument, 5 to 24VDC power must be provided to the 2552.

8900 Multi-Parameter Controller



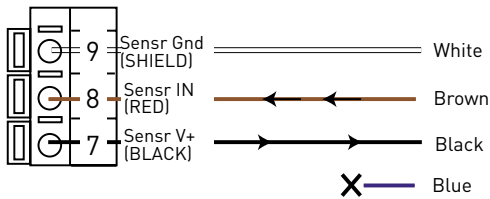
## Loop Wiring:

The 2552 is a traditional 2-wire passive 4 to 20mA loop transmitter. External loop power (24 VDC ± 10%) is required. Please refer to the Model 7300 Power Supplies.

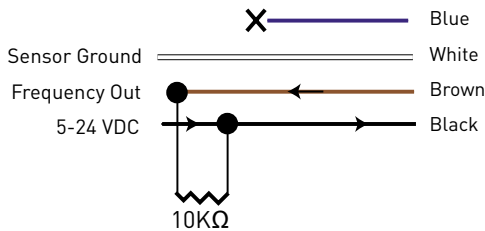


2552 Metal Magmeter

8550-1 Flow Transmitter



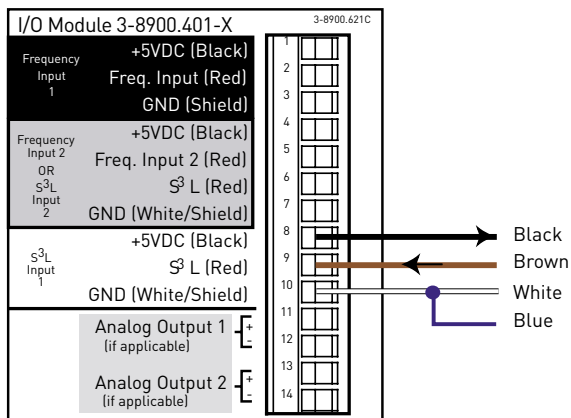
Non-Signet Instrument



Install a pull-up resistor when connecting the 2552 Magmeter to other manufacturers' flowmeters.

## Digital (S³L) Wiring:

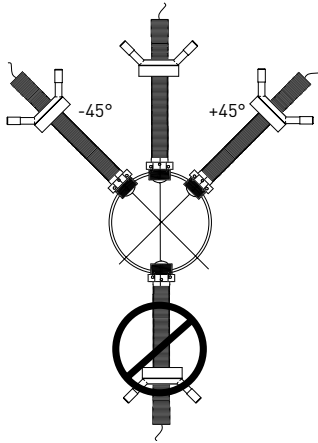
The 2552 receives 5 VDC power from the 8900. No additional power is required.



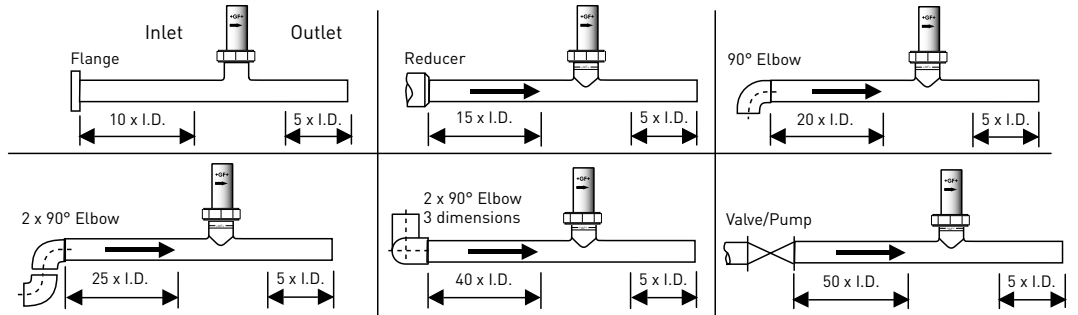
# Installation

## Mounting Angle:

Mount the sensor at a maximum of 45° when air bubbles are present. Do not mount the sensor upside down if sediment is present.



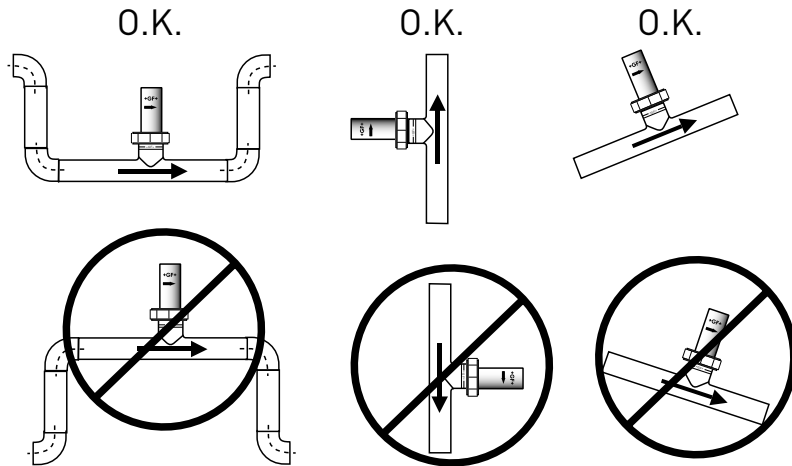
- The 2552 requires a fully developed turbulent flow profile for accurate measurement.
- If the piping system harbors air pockets or bubbles, locate the sensor so the air pockets do not come into contact with the sensor.
- Part numbers 3-2552-XB are rated NEMA 6P (IP68). These units can withstand submersion to depths no greater than 2m (6 ft) for prolonged periods.



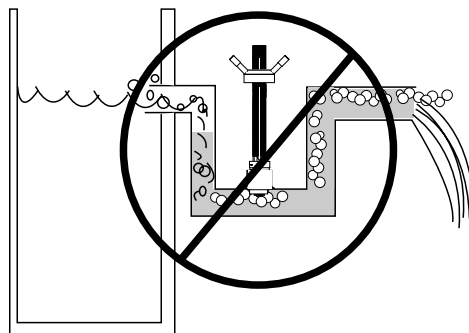
Locating the sensor in a trap or where the flow is upward helps to protect the sensor from exposure to air bubbles when the system is in operation.

**Note:** The system should be designed to keep the sensor wet at all times.

The configurations shown on the right are not recommended because it is difficult to keep the pipe full.



In a gravity-flow system, the tank must be designed so the level does not drop below the outlet. This causes the pipe to draw air in from the tank. If air bubbles pass across the Magmeter electrodes, the output will become erratic.



## Ordering Information

Sensor Part Number				
<b>3-2552</b>	Mounting Depth Options - Choose One*			
	<b>-1</b>	Sensor protrusion depth = 7.3 inches*		
	<b>-2</b>	Sensor protrusion depth = 9.3 inches*		
		Process Connection Options - Choose One		
	<b>1</b>	1 1/4 inch NPT Process Connection Threads**		
	<b>2</b>	1 1/4 inch ISO Process Connection Threads**		
		Cable and Connector Options - Choose One		
	<b>-A</b>	Fixed Cable, 7.6m (25 ft); no connector		
	<b>-B</b>	Watertight sensor connector; cable sold separately		
		Output options - Choose One		
	<b>-11</b>	Frequency or Digital (S <sup>3</sup> L); for use with most Signet Flow Instrument or the 8900 Multi-Parameter Controller		
	<b>-12</b>	4 to 20 mA output		
<b>3-2552</b>	<b>-1</b>	<b>1</b>	<b>-A</b>	<b>-12</b>
				<b>Example Part Number</b>

\* Customer must determine stack height (ball valve, nipple, weldolet, etc.). Refer to Sensor Selection on previous page to determine "A" dimension.

\*\* 1.25 inch process connection is the standard thread size: 1.5 or 2 inch adapters are listed under Accessories.

### Model 2552

#### Ordering Notes:

- 1) Sensor protrusion depth is the distance from the bottom of the sensor housing to the tip of the sensor.
- 2) For new Hot-Tap installations, a 1.25 inch ball valve is recommended.
- 3) See Sensor Selection Guide on previous page to determine the sensor length required.

#### Application Tips:

- Minimum process liquid conductivity requirement is 20µS/cm.
- 1.5 inch and 2 inch retrofit adapters are available for replacement installations of Signet 2550 and 2540 sensors.

Mfr. Part No.	Code	Mfr. Part No.	Code
3-2552-11-A-11	<b>159 001 505</b>	3-2552-21-A-11	<b>159 001 513</b>
3-2552-11-A-12	<b>159 001 506</b>	3-2552-21-A-12	<b>159 001 514</b>
3-2552-11-B-11	<b>159 001 507</b>	3-2552-21-B-11	<b>159 001 515</b>
3-2552-11-B-12	<b>159 001 508</b>	3-2552-21-B-12	<b>159 001 516</b>
3-2552-12-A-11	<b>159 001 509</b>	3-2552-22-A-11	<b>159 001 517</b>
3-2552-12-A-12	<b>159 001 510</b>	3-2552-22-A-12	<b>159 001 518</b>
3-2552-12-B-11	<b>159 001 511</b>	3-2552-22-B-11	<b>159 001 519</b>
3-2552-12-B-12	<b>159 001 512</b>	3-2552-22-B-12	<b>159 001 520</b>

## Accessories and Replacement Parts

Mfr. Part No.	Code	Description
2120-1512	<b>159 001 425</b>	1.5 x 1.25 inch NPT adapter for retrofitting 2540 installation to 2552 - 316 stainless steel
2120-2012	<b>159 001 426</b>	2 x 1.25 inch NPT adapter for retrofitting 2550 installation to 2552 - 316 stainless steel
3-2552.392	<b>159 001 530</b>	1.25 in. NPT full port stainless steel ball valve and nipple kit
3-2552.393	<b>159 001 531</b>	1.25 in. NPT full port brass ball valve & nipple kit
3-2552.394	<b>159 001 532</b>	1.5 in. NPT conduit adapter, aluminum
4301-2125	<b>159 001 533</b>	1.25 in. NPT full port ball valve - brass
4301-3125	<b>159 001 387</b>	1.25 in. NPT full port ball valve - stainless steel
3-0232	<b>159 000 865</b>	RS232 set-up tool (PC compatible)
5541-4184	<b>159 001 388</b>	4-conductor, 22 AWG, water-tight connector, 4m (13 ft)
5541-4186	<b>159 001 389</b>	4-conductor, 22 AWG, water-tight connector, 6m (19.5 ft)
special order	<b>special order</b>	4-conductor, 22 AWG, water-tight connector, customer specified length

### George Fischer Signet, Inc.

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