

Signet 2517 Brass Paddlewheel Flow Sensor

English



3-2517.090 Rev. F 11/06 English



SAFETY INSTRUCTIONS

1. Do not remove from pressurized lines.
2. Do not exceed maximum temperature/pressure specifications.
3. Wear safety goggles or faceshield during installation/service.
4. Do not alter product construction.
5. Apply sealant or PTFE tape to sensor threads, inspecting threads to ensure integrity. Do not install a sensor with damaged threads.



Pipe fittings **MUST** be installed by a certified welder only. Signet will not assume liability of any kind for improper fitting installations.



2517 Hot-Tap sensor specifications and limitations depend on the lowest maximum rating of the components associated with the system. a ball valve, a component of the system, is rated at a maximum 100 psi @ 175°F, limiting the entire system's maximum pressure/temperature rating to 100 psi @ 175°F. All higher maximum specifications **MUST** yield to the component with the lowest maximum specification.

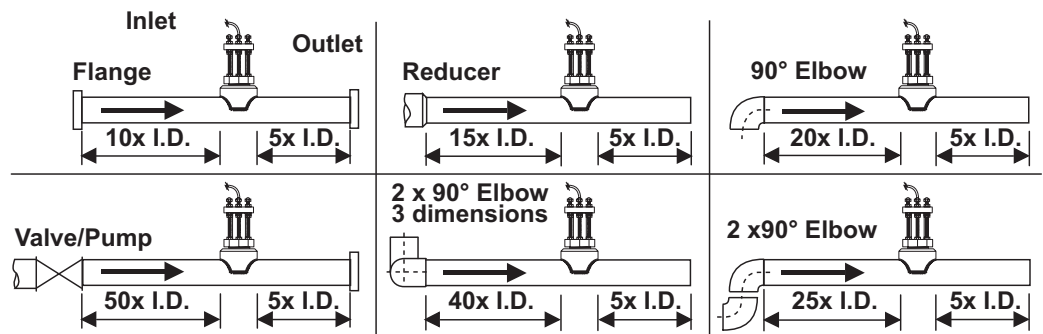


Maximum Operating Pressure/Temperature:

- 17 bar (250 psi) @ 82°C (180°F) with standard FPM sensor fitting O-rings.
- 17 bar (250 psi) @ 100°C (212°F) with optional EPR sensor fitting O-rings.

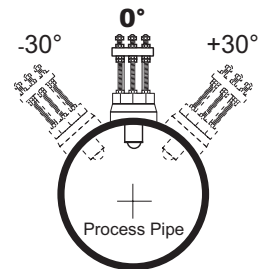
1. Location of Fitting

Recommended sensor upstream/downstream mounting requirements.



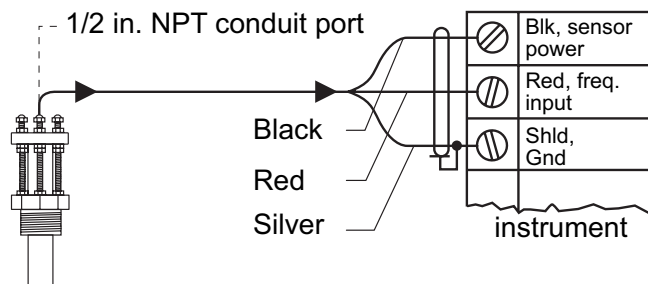
2. Sensor Mounting Position

Vertical mounting is recommended for best overall performance. Mount at a maximum of 30° when air bubbles are present. **DO NOT** mount on the bottom of the pipe when sediments are present.



3. Sensor Wiring

Signet Instruments



- Use 2-conductor shielded cable for cable extensions up to 300m (1000 ft.)
- Maintain cable shield through splice.

5. Installation

The following items are required to properly install Signet 2217 Sensors.

5.1 Hardware, Standard Sensor

- Female pipe fitting (weld-on or saddle) with 1.5 in. NPT or ISO 7/1-Rc 1.5 threads
- 32 mm (1.25 in.) diameter drill
- Pipe thread sealant
- Tape measure

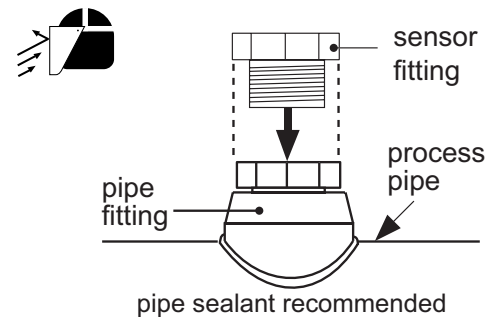
5.2 Hardware, Hot-Tap Sensor

The Hot-Tap sensor requires all the standard sensor items plus:

- Hot-Tap drilling machine (e.g., Mueller drilling machine or equivalent)
- Female ball or gate valve (full port only) with 1.5 in. NPT or ISO 7/1-Rc 1.5 threads
- Male pipe nipple, 32 x 50 mm (1.5 x 2 in.) with 1.5 in. NPT or ISO 7/1-R 1.5 threads
- Hot-Tap installation tool (purchased separately)

5.3 Standard Fitting Installation

- Depressurize and drain pipe.
- Wearing safety face protection, drill a 32 mm (1.25 in.) diameter hole in the pipe.
- Install the pipe fitting of the outside of the pipe according to the manufacturer's instructions. Failure to follow these instructions may result in serious bodily injury and/or product failure.
- Remove sensor fitting from sensor assembly.
- Thread sensor fitting into pipe fitting. (Fig. 1)



5.4 Hot-Tap Fitting Installation

- Install the pipe fitting on the outside diameter of the pipe according to the manufacturer's instructions. Failure to follow these instructions may result in serious bodily injury and/or product failure.
- Install the pipe nipple and isolation valve (ball or gate valve) onto the external pipe fitting using pipe sealant on the threads. (Fig. 2)
- Wearing safety face protection, install an appropriate hole cutting tool per manufacturer's instructions (e.g., Mueller drilling machine) with a 32 mm (1.25 in.) drill onto the top of the isolation valve, ensuring a tight fit. **Use the recommended drill bit size or damage to the isolation valve may occur.**
- Open the isolation valve and insert the drill through the valve and cut the sensor clearance hole. After the hole is cut, withdraw the drill from the isolation valve and close the valve. Remove the drilling machine per manufacturer's instructions. (Fig. 3)
- Install the sensor fitting/bleed valve into the top of the isolation valve. Make sure the bleed valve clears the handle of the isolation valve during operation.

Fig. 2

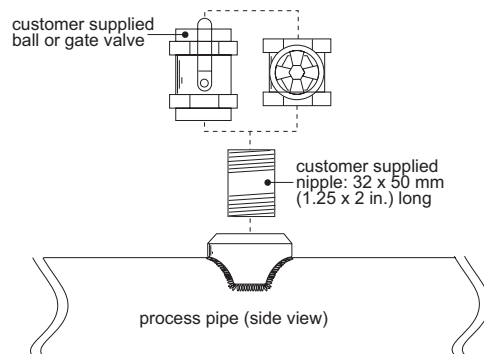
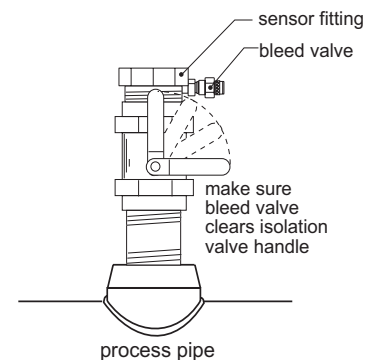


Fig. 3



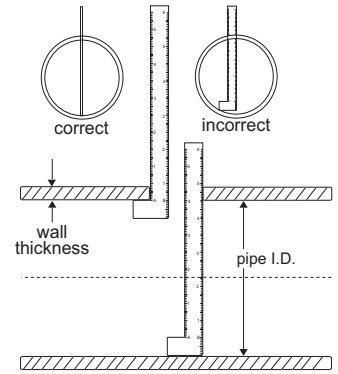
5.5 Calculating the H Dimension

Before installing the sensor some critical dimensions must be established (for Hot-Tap installations, we assume the pipe dimensions are known). The rotor shaft must be located 10% inside the pipe I.D. to ensure accurate calibration capability. To accomplish this, the "H" dimension is measured from the outside surface of the pipe to the bottom of the sensor flange.

Nominal "H" dimensions for standard pipes are listed here. For non-standard pipe dimensions, calculate the "H" dimension using the formula listed below. Your pipe's wall thickness and inside diameter (I.D.) is required for the "H" dimension calculation.

The 6 inch ruler (included) may be used to measure your pipe I.D. and wall thickness up to 5 inches (standard sensors only).

Pipe wall thickness: _____ Pipe I.D.: _____



H Dimensions, Standard Sensors

Wrought Steel Pipe Per ANSI 36.10

Stainless Steel Pipe Per ANSI B36.19

Conversion:
mm = inches (25.4)

NPS	SCH 40	SCH 80	STD	XS
1-1/2 in.	5.644 in.	5.600 in.	5.644 in.	5.600 in.
2 in.	5.589 in.	5.538 in.	5.589 in.	5.538 in.
2-1/2 in.	5.500 in.	5.442 in.	5.500 in.	5.442 in.
3 in.	5.427 in.	5.360 in.	5.427 in.	5.360 in.
3-1/2 in.	5.369 in.	5.296 in.	5.369 in.	5.296 in.
4 in.	5.310 in.	5.230 in.	5.310 in.	5.230 in.
5 in.	5.187 in.	5.094 in.	5.187 in.	5.094 in.
6 in.	5.064 in.	4.942 in.	5.064 in.	4.942 in.
8 in.	4.830 in.	4.688 in.	4.830 in.	4.688 in.
10 in.	4.583 in.	4.400 in.	4.583 in.	4.475 in.
12 in.	4.350 in.	4.125 in.	4.375 in.	4.275 in.
14 in.	4.200 in.	3.950 in.	4.250 in.	4.150 in.
16 in.	3.950 in.	3.675 in.	4.050 in.	3.950 in.
18 in.	3.700 in.	3.400 in.	3.850 in.	3.750 in.
20 in.	3.475 in.	3.125 in.	3.650 in.	3.550 in.
22 in.	*	2.850 in.	3.450 in.	3.350 in.
24 in.	3.000 in.	2.575 in.	3.250 in.	3.150 in.

NPS	SCH 5S	SCH 10S	SCH 40S	SCH 80S
1-1/2 in.	5.708 in.	5.673 in.	5.644 in.	5.600 in.
2 in.	5.660 in.	5.625 in.	5.589 in.	5.538 in.
2-1/2 in.	5.596 in.	5.567 in.	5.500 in.	5.442 in.
3 in.	5.534 in.	5.504 in.	5.427 in.	5.360 in.
3-1/2 in.	5.484 in.	5.454 in.	5.369 in.	5.296 in.
4 in.	5.434 in.	5.404 in.	5.310 in.	5.230 in.
5 in.	5.306 in.	5.287 in.	5.187 in.	5.094 in.
6 in.	5.200 in.	5.180 in.	5.064 in.	4.942 in.
8 in.	5.000 in.	4.969 in.	4.830 in.	4.688 in.
10 in.	4.768 in.	4.743 in.	4.583 in.	4.475 in.
12 in.	4.550 in.	4.531 in.	4.375 in.	4.275 in.
14 in.	4.425 in.	4.400 in.	*	*
16 in.	4.218 in.	4.200 in.	*	*
18 in.	4.018 in.	4.000 in.	*	*
20 in.	3.800 in.	3.776 in.	*	*
22 in.	3.600 in.	3.576 in.	*	*
24 in.	3.376 in.	3.350 in.	*	*

(*) represents values currently unavailable

H Dimensions for Hot-Tap Sensors

Wrought Steel Pipe Per ANSI 36.10

Stainless Steel Pipe Per ANSI B36.19

Conversion:
mm = inches (25.4)

NPS	SCH 40	SCH 80	STD	XS
1-1/2 in.	14.694 in.	14.650 in.	14.694 in.	14.650 in.
2 in.	14.639 in.	14.588 in.	14.639 in.	14.588 in.
2-1/2 in.	14.550 in.	14.492 in.	14.550 in.	14.492 in.
3 in.	14.477 in.	14.410 in.	14.477 in.	14.410 in.
3-1/2 in.	14.419 in.	14.346 in.	14.419 in.	14.346 in.
4 in.	14.360 in.	14.280 in.	14.360 in.	14.280 in.
5 in.	14.237 in.	14.144 in.	14.237 in.	14.144 in.
6 in.	14.144 in.	13.992 in.	14.144 in.	13.992 in.
8 in.	13.880 in.	13.738 in.	13.880 in.	13.738 in.
10 in.	13.633 in.	13.450 in.	13.633 in.	13.525 in.
12 in.	13.400 in.	13.175 in.	13.425 in.	13.325 in.
14 in.	13.250 in.	13.000 in.	13.300 in.	13.200 in.
16 in.	13.000 in.	12.725 in.	13.100 in.	13.000 in.
18 in.	12.750 in.	12.450 in.	12.900 in.	12.800 in.
20 in.	12.525 in.	12.175 in.	12.700 in.	12.600 in.
22 in.	*	11.900 in.	12.500 in.	12.400 in.
24 in.	12.050 in.	11.625 in.	12.300 in.	12.200 in.

NPS	SCH 5S	SCH 10S	SCH 40S	SCH 80S
1-1/2 in.	14.758 in.	14.723 in.	14.694 in.	14.650 in.
2 in.	14.711 in.	14.675 in.	14.639 in.	14.588 in.
2-1/2 in.	14.646 in.	14.617 in.	14.550 in.	14.492 in.
3 in.	14.584 in.	14.554 in.	14.477 in.	14.410 in.
3-1/2 in.	14.534 in.	14.504 in.	14.419 in.	14.346 in.
4 in.	14.484 in.	14.454 in.	14.360 in.	14.280 in.
5 in.	14.357 in.	14.337 in.	14.237 in.	14.144 in.
6 in.	14.250 in.	14.230 in.	14.144 in.	13.992 in.
8 in.	14.050 in.	14.019 in.	13.880 in.	13.738 in.
10 in.	13.818 in.	13.793 in.	13.633 in.	13.525 in.
12 in.	13.600 in.	13.581 in.	13.425 in.	13.325 in.
14 in.	13.475 in.	13.450 in.	*	*
16 in.	13.268 in.	13.250 in.	*	*
18 in.	13.068 in.	13.050 in.	*	*
20 in.	12.850 in.	12.826 in.	*	*
22 in.	12.650 in.	12.626 in.	*	*
24 in.	12.426 in.	12.400 in.	*	*

(*) represents values currently unavailable

Standard Sensors

$H = 5.23 - \text{pipe wall thickness} - (0.10 \times \text{I.D.})$

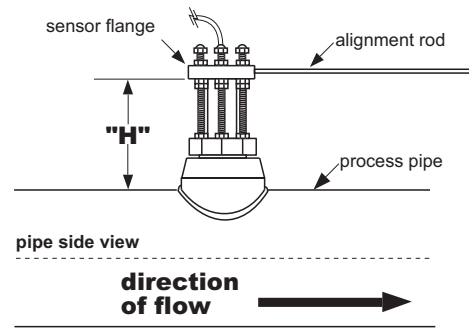
Example:

3.0 inch schedule 80 wrought steel;
Wall thickness = 0.3 in. / Inside diameter = 2.9 in.

$H = 5.23 - 0.3 - (0.10 \times 2.9) / H = 117.86 \text{ mm (4.64 in.)}$

Record your sensor's "H" dimension for future reference:

H= _____



Hot-Tap Sensors

$H = 15.39 \text{ in.} - \text{pipe wall thickness} - (0.10 \times \text{I.D.})$

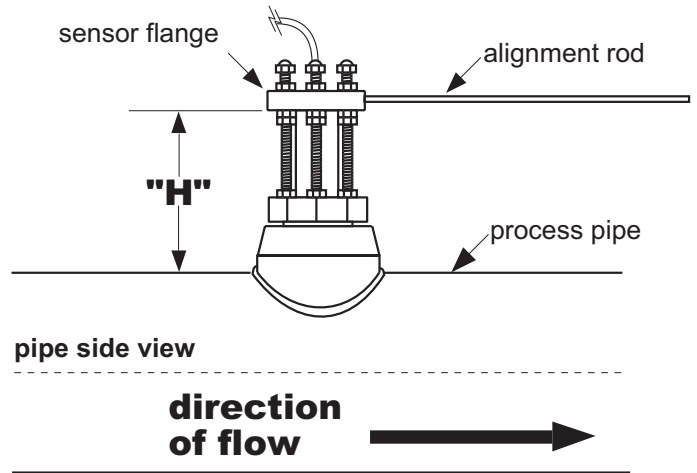
Example:

10 inch schedule 40 wrought steel;
Wall thickness = 0.365 in. / Inside diameter = 10.02 in.

$H = 15.39 - 0.365 - (0.10 \times 10.02) / H = 356.18 \text{ mm (14.023 in.)}$

Record your sensor's "H" dimension for future reference:

H= _____

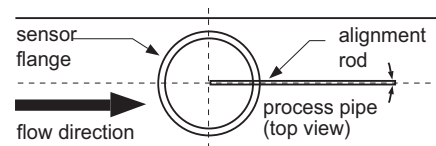
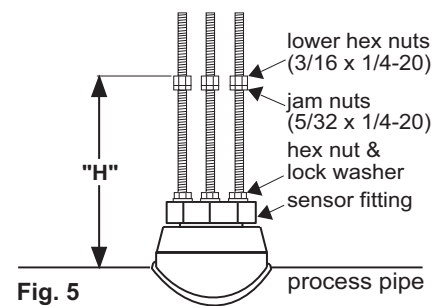
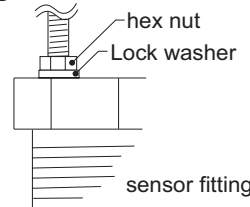


After correct dimensions are calculated and recorded, the sensor can be installed in the fitting. The Standard and Hot-Tap versions require substantially different procedures.

5.6 Standard Sensor Installation

- A. Thread one hex nut onto each of the three threaded rods included in package. Install threaded rod with a lock washer onto the sensor fitting. Secure rods in place by tightening each hex nut against the sensor fitting. (Fig. 4)
- B. Thread one jam nut and lower hex nut onto each threaded rod so that the top surface of each nut is at the proper "H" dimension for your pipe. Secure each hex nut with a jam nut. (Fig. 5)
- C. Insert the flow sensor into the sensor fitting, making sure the alignment hole on the sensor flange is pointing downstream.
- D. Place the alignment rod in the alignment hole on the sensor flange. Align the flange so rod is parallel to the process pipe. (Fig. 6)
- E. Thread upper hex nuts with lock washers until they contact the sensor flange and tighten. Check for proper "H" dimension and readjust if necessary. (Fig. 7)

Fig. 4



The flow sensor alignment rod **MUST** be parallel to the process pipe as shown.

Fig. 6

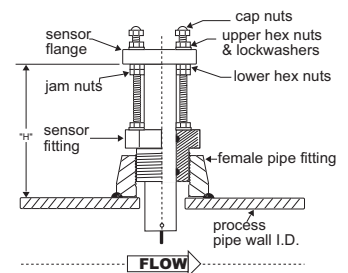


Fig. 7

5.7 Hot-Tap Sensor Installation

- A. Thread one hex nut onto each of the three threaded rods included in package. Install threaded rod with a lock washer onto the sensor fitting. Secure rods in place by tightening each hex nut against the sensor fitting. (Fig. 8)
- B. Thread one jam nut and lower hex nut onto each threaded rod so that the top surface of each nut is 359 mm (14.14 in.) from the top surface of the sensor fitting. Secure each hex nut with a jam nut. (Fig. 9)



CAUTION: This setting is critical to ensure an adequate sensor seal and to prevent the rotor from hitting the isolation valve orifice during installation.

- C. Wipe the sensor body with a dry, clean cloth. Orient the alignment hole on the sensor flange to point **downstream**. Place the slotted flange over the threaded rods. Lower the sensor into the fitting until the sensor flange rests on the lower hex and jam nuts.
- D. Secure the sensor with lock washers and upper hex nuts on the top of the flange. Before tightening, align the sensor flange so that the alignment rod is parallel and level with the process pipe. (Fig. 10 & Fig. 11)
- E. Make sure the bleed valve is closed (full clockwise position).
- F. Thread protector plate hex nuts onto each of the three threaded rods. Adjust each hex nut to a height of approximately 25 mm (1 in.) from the top of each rod. Remove the black plastic cable grommet in top of sensor with a screwdriver. Slide the grommet up the cable away from sensor. (Fig. 12)

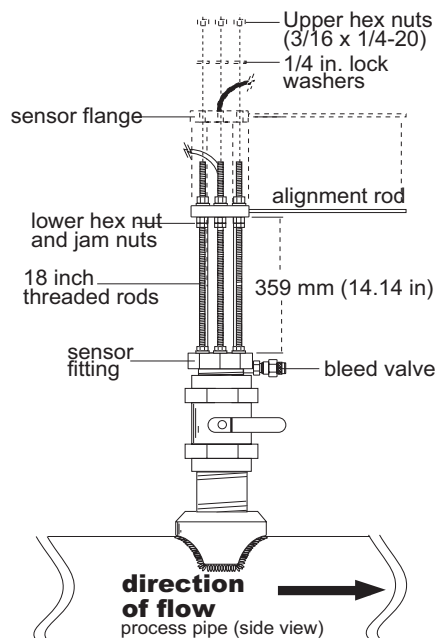


Fig. 11

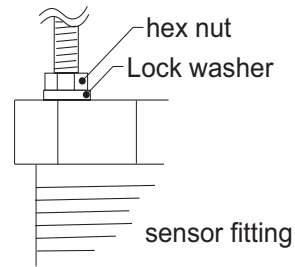


Fig. 8

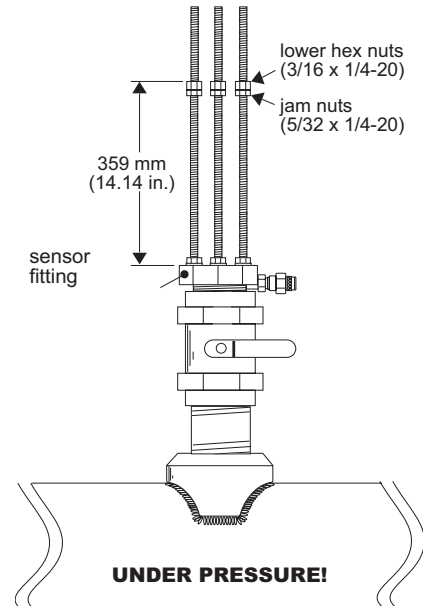
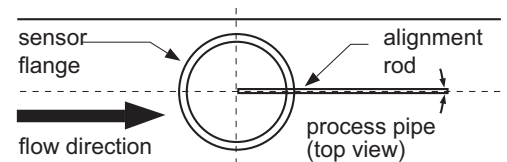


Fig. 9



The flow alignment rod **MUST** be parallel to the process pipe as shown.

Fig. 10

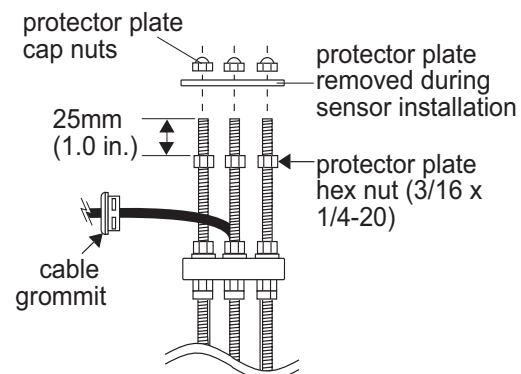


Fig. 12

Hot-Tap Sensor Installation - Continued

- G. Position the installation tool bearing plate by rotating it so that it is approximately 40 mm (1.6 in.) from the swivel mount. Mount the installation tool by placing the threaded rods through the holes in the tool's bearing plate, resting the bearing plate on top of the protector plate hex nuts. Make sure the swivel mount's ears are mounted **between** the threaded rods (not over the rods). Install the bearing plate cap nuts. Tighten the bearing plate cap nuts to secure the installation tool in place. (Fig. 13)
- H. Align the sensor cable with the swivel mount cable port to prevent cable pinching. Use a 3/8 inch wrench or socket to turn the installation tool shaft clockwise until it is seated in the hole at the top of the sensor flange.
- I. Wearing safety face protection, **slowly open the isolation valve to the full open position**. Loosen the lower hex and jam nuts and move them to the proper "H" dimension. Turn the installation tool shaft **clockwise** until the sensor flange contacts the lower hex and jam nuts. Thread the upper hex nuts down until they contact the sensor flange. Tighten the upper hex nuts to secure the sensor. (Fig. 14)
- J. Remove cap nuts and withdraw the installation tool. Be careful to not damage cable. Snap cable grommet into top of sensor and replace protector plate and cap nuts. (Fig. 15)



Fig. 13

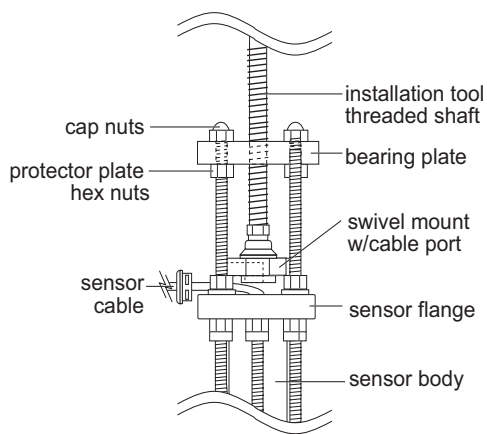


Fig. 14

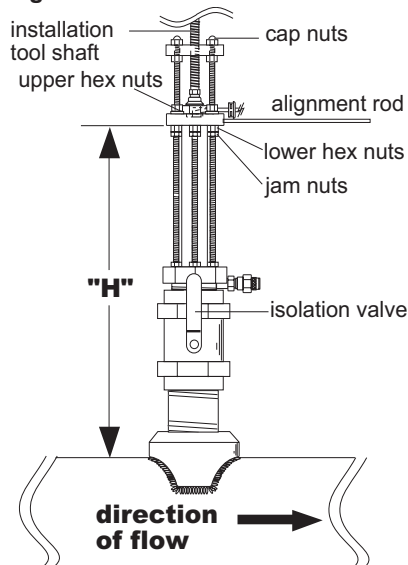
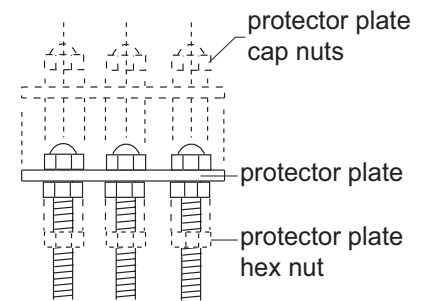


Fig. 15



6. Standard Sensor Removal

To remove the sensor from a **depressurized empty pipe**, simply remove the cap nuts and upper hex nuts located above the sensor flange. Pull up on sensor flange with twisting motion.

7. Hot-Tap Sensor Removal

To remove the Hot-Tap sensor safely from a pressurized active pipe, the entire installation process must be reversed.

- A. Remove the cap nuts, protector plate, protector plate hex nuts, and sensor cable grommet. (Fig. 16)
- B. Thread installation tool in place and secure bearing plate in place of sensor protector plate. (Fig. 17)
- C. Turn shaft of installation tool **clockwise** to lower tool into opening in sensor flange. Guide cable into the port to prevent damage.

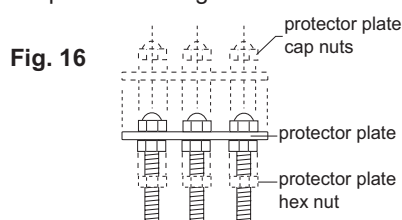
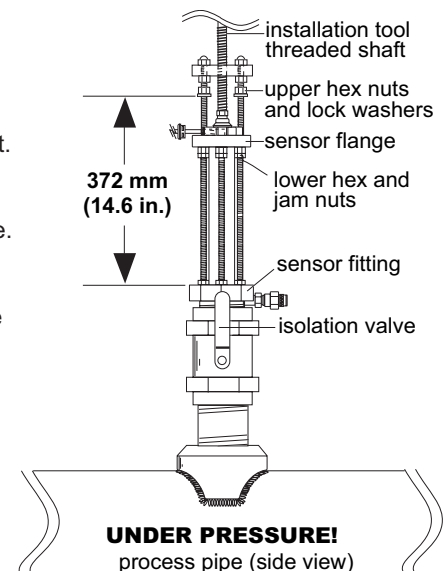
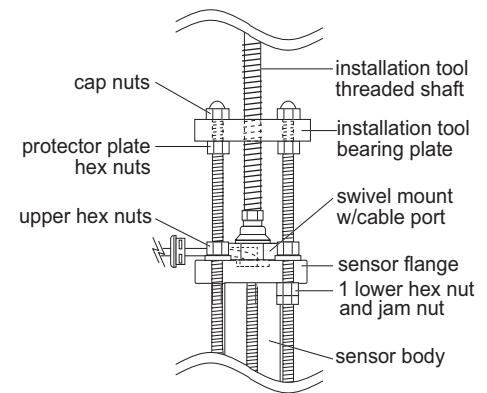


Fig. 17



Hot-Tap Sensor Removal - Continued

- D. Wearing safety face protection, loosen the upper hex nuts and raise to 372 mm (14.6 in.) from top of sensor fitting to bottom of upper hex nuts/lock washers. **CAUTION! This measurement is critical to maintain watertight seal in sensor while allowing clearance to close the isolation valve.**
- E. Wearing safety face protection, turn the installation tool shaft **counterclockwise** to withdraw sensor until the sensor flange contacts the upper hex nuts. (Fig. 18)
- F. Raise **one** lower hex and jam nut to bottom of sensor flange.
- G. Close isolation valve, remove bearing plate and tool.
- H. Wearing safety face protection, cover the bleed valve with suitable protection (rag, towel, etc.) and open the bleed valve (ccw rotation) to relieve internal pressure. Pull sensor up until bleed valve purges some fluid (indicating sensor is past 1st o-ring seal inside sensor fitting).



CAUTION: In case of a leaky isolation valve, the sensor will be under a slight amount of pressure. Care should be taken when removing the sensor. Use the bleed valve to relieve this pressure taking care not to spray fluid on yourself or others.

Fig. 18

Sensor can now be safely removed. When reinstalling the sensor: leave one lower hex nut in position to guide sensor to proper isolation valve clearance height before opening isolation valve. Return to "H" dimension height after valve is opened.

8. Maintenance

Your sensor requires little or no maintenance of any kind, with the exception of an occasional sensor/paddlewheel cleaning.

9. Sensor Parts

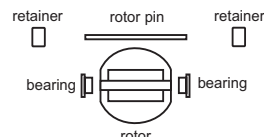
2517 Sensor Assemblies

Order no.	Sensor type	Fitting type	Code
3-2517.100	Standard	1.5 in. NPT	159 840 003
3-2517.101	Standard	ISO 7/1-R 1.5	159 840 007
3-2517.102	Hot-Tap	1.5 in. NPT	159 000 267
3-2540.103	Hot-Tap	ISO 7/1-R 1.5	159 000 268

Accessories

Order no.	Description	Code
3-1500.663	Hot-Tap installation tool	198 820 008
P52509-3	Rotor kit w/Tungsten Carbide pin Fluoroloy-B bearings, 316 ss retainers	159 001 068
P52509-1	Rotor kit w/316 ss pin, Fluoroloy-B bearings, 316 ss retainers	159 000 479
1220-0121*	Standard FPM O-ring for sensor fitting	159 000 852
1224-0021*	Optional EPDM O-ring for sensor fitting	198 820 006
P52504-2	Replacement rotor pin, tungsten carbide	198 820 023
P52504-1	Replacement rotor pin, 316 ss	198 801 500
3-2517.567	Cable, per ft.	159 000 269

*One O-ring required for standard sensor
Two O-rings required for Hot-Tap sensor



10. K-Factors (Stainless Steel, Wrought Steel & Plastic Pipe)

SCH 40 WROUGHT STEEL PIPE PER ANSI B36.10

PIPE SIZE	K-FACTOR	K-FACTOR
	PULSES/ U.S. GAL	PULSES/ LITER
1 ½	122.000	32.232
2	78.690	20.790
2 ½	55.630	14.697
3	35.530	9.3871
3 ½	26.070	6.8877
4	19.840	5.2417
5	12.090	3.1942
6	8.0410	2.1244
8	4.3500	1.1493
10	2.6080	0.6890
12	1.7610	0.4653
14	1.4250	0.3765
16	1.0590	0.2798
18	0.8180	0.2161
20	0.6460	0.1707
22	*	*
24	0.4350	0.1149

SCH 5S STAINLESS STEEL PIPE PER ANSI B36.19

PIPE SIZE	K-FACTOR	K-FACTOR
	PULSES/ U.S. GAL	PULSES/ LITER
1 ½	104.200	27.5297
2	67.160	17.7437
2 ½	46.060	12.1691
3	29.790	7.8705
3 ½	22.060	5.8283
4	16.890	4.4624
5	10.6500	2.8137
6	7.1160	1.8801
8	3.8700	1.0225
10	2.3570	0.6227
12	1.6060	0.4243
14	1.2980	0.3429
16	0.9620	0.2542
18	0.7400	0.1955
20	0.5900	0.1559
22	0.4790	0.1266
24	0.3990	0.1054

SCH 80 WROUGHT STEEL PIPE PER ANSI B36.10

PIPE SIZE	K-FACTOR	K-FACTOR
	PULSES/ U.S. GAL	PULSES/ LITER
1 ½	136.100	35.9577
2	88.590	23.4055
2 ½	62.810	16.5945
3	39.990	10.5654
3 ½	29.220	7.7199
4	22.160	5.8547
5	13.420	3.5456
6	9.0160	2.3820
8	4.8190	1.2732
10	2.8970	0.7654
12	1.9620	0.5184
14	1.5890	0.4198
16	1.1750	0.3104
18	0.9040	0.2388
20	0.7160	0.1892
22	0.5820	0.1538
24	0.4820	0.1273

SCH 10S STAINLESS STEEL PIPE PER ANSI B36.19

PIPE SIZE	K-FACTOR	K-FACTOR
	PULSES/ U.S. GAL	PULSES/ LITER
1 ½	113.600	30.0132
2	72.560	19.1704
2 ½	48.750	12.8798
3	31.250	8.2563
3 ½	23.010	6.0793
4	17.540	4.6341
5	10.8700	2.8719
6	7.2410	1.9131
8	3.9520	1.0441
10	2.3880	0.6309
12	1.6200	0.4280
14	1.3110	0.3464
16	0.9680	0.2557
18	0.7440	0.1966
20	0.5930	0.1567
22	0.4820	0.1273
24	0.4020	0.1062

K-factors are listed in U.S. gallons and in liters. Conversion formulas for other engineering units are listed below.

- **K = 60/A**

The K-factor is the number of pulses generated by the 2517 paddlewheel per unit of liquid in a specific pipe size.

To convert	to:	multiply
K from:		K by:
U.S. gallons	cubic feet	7.479
U.S. gallons	cubic inches	0.00433
U.S. gallons	cubic meters	263.85
U.S. gallons	pounds of water	0.120
U.S. gallons	acre feet	325853
U.S. gallons	Imperial gallons	1.201

10. K-Factors (Stainless Steel, Wrought Steel & Plastic Pipe) continued

STD WROUGHT STEEL PIPE PER ANSI B36.10

PIPE SIZE	K-FACTOR	K-FACTOR
	PULSES/ U.S. GAL	PULSES/ LITER
1 ½	122.000	32.2325
2	78.690	20.7900
2 ½	55.630	14.6975
3	35.530	9.3871
3 ½	26.070	6.8877
4	19.840	5.2417
5	12.090	3.1942
6	8.0410	2.1244
8	4.3500	1.1493
10	2.6080	0.6890
12	1.7400	0.4597
14	1.3950	0.3686
16	1.0220	0.2700
18	0.7800	0.2061
20	0.6150	0.1625
22	0.4970	0.1313
24	0.4110	0.1086

SCH 40S STAINLESS STEEL PIPE PER ANSI B36.19

PIPE SIZE	K-FACTOR	K-FACTOR
	PULSES/ U.S. GAL	PULSES/ LITER
1 ½	122.000	32.2325
2	78.690	20.7900
2 ½	55.630	14.6975
3	35.530	9.3871
3 ½	26.070	6.8877
4	19.840	5.2417
5	12.090	3.1942
6	8.0410	2.1244
8	4.3500	1.1493
10	2.6080	0.6890
12	1.7400	0.4597
14	*	*
16	*	*
18	*	*
20	*	*
22	*	*
24	*	*

XS WROUGHT STEEL PIPE PER ANSI B36.10

PIPE SIZE	K-FACTOR	K-FACTOR
	PULSES/ U.S. GAL	PULSES/ LITER
1 ½	136.100	35.9577
2	88.590	23.4055
2 ½	62.810	16.5945
3	39.990	10.5654
3 ½	29.220	7.7199
4	22.160	5.8547
5	13.420	3.5456
6	9.0160	2.3820
8	4.8190	1.2732
10	2.7730	0.7326
12	1.8240	0.4819
14	1.4550	0.3844
16	1.0590	0.2798
18	0.8050	0.2127
20	0.6320	0.1670
22	0.5100	0.1347
24	0.4200	0.1110

SCH 80S STAINLESS STEEL PIPE PER ANSI B36.19

PIPE SIZE	K-FACTOR	K-FACTOR
	PULSES/ U.S. GAL	PULSES/ LITER
1 ½	136.100	35.9577
2	88.590	23.4055
2 ½	62.810	16.5945
3	39.990	10.5654
3 ½	29.220	7.7199
4	22.160	5.8547
5	13.420	3.5456
6	9.0160	2.3820
8	4.8190	1.2732
10	2.7730	0.7326
12	1.8240	0.4819
14	*	*
16	*	*
18	*	*
20	*	*
22	*	*
24	*	*

10. K-Factors (Stainless Steel, Wrought Steel & Plastic Pipe) continued

Schedule 40 Plastic pipe per ASTM-D-1785

PIPE SIZE	K-FACTOR	K-FACTOR
	PULSES/ U.S. GAL	PULSES/ LITER
1 1/2	124.400	32.8666
2	80.140	21.1731
2 1/2	56.730	14.9881
3	36.180	9.5588
3 1/2	26.500	7.0013
4	20.140	5.3210
5	12.250	3.2365
6	8.1430	2.1514
8	4.3980	1.1620
10	2.6340	0.6959
12	1.7770	0.4695

Schedule 80 Plastic pipe per ASTM-D-1785

PIPE SIZE	K-FACTOR	K-FACTOR
	PULSES/ U.S. GAL	PULSES/ LITER
1 1/2	139.400	36.8296
2	90.790	23.9868
2 1/2	64.610	17.0700
3	41.050	10.8454
3 1/2	29.940	7.9102
4	22.660	5.9868
5	13.700	3.6196
6	9.1990	2.4304
8	4.9060	1.2962
10	2.9450	0.7781
12	1.9930	0.5266

11. Specifications

General

Flow Rate Range:

0.5 to 6 m/s (1 .6 to 20 ft/s)

Linearity: ±1% of full range

Repeatability: ±0.5% of full range

Min. Reynolds Number Required: 4500

Pipe size range:

- Standard version: DN40 to DN600 (1 .5 to 24 in.)
- Hot-Tap version: DN40 to DN900 (1 .5 to 36 in.)

Sensor fitting options:

- 1 .5in NPT threads
- ISO 7/1-R 1 .5 threads

Wetted materials

Sensor body: C36000 Free cutting brass

Sensor fitting: C36000 Free cutting brass

Sensor fitting O-rings:

Standard Viton®, optional EPR

Rotor: CB7Cu-1 Alloy

Rotor pin: Tungsten Carbide GRP 1

Retainers (2): 316 stainless steel

Rotor bearings (2): Fluoroloy B®

Electrical

Frequency: 20 Hz per ft/s nominal,
5 to 8 mV p-p per Hz

Source Impedance: 11 .6 KΩ

Cable length: 7.6 m (25 ft.), can be extended up to 60m (200 ft.)

Cable type: 2-conductor twisted-pair with shield, 22AWG

Max. Pressure/Temperature Rating

- Sensor with standard FPM sensor fitting O-rings: 17 bar @ 82°C (250 psi @ 180°F)
- Sensor with optional EPDM sensor fitting O-rings: 17 bar @ 100°C (250 psi @ 212°F)

See page 226 for Temperature and Pressure graphs.

Shipping Weight:

- 3-2517.100, .101: 2.04 kg (4.5 lbs.)
- 3-2517.102, .103: 2.63 kg (5.8 lbs.)

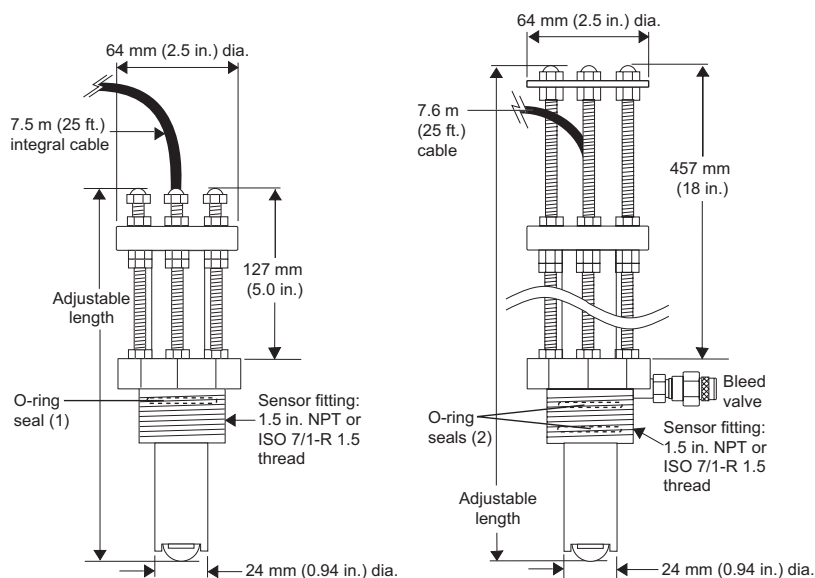
Standards and Approvals

- Manufactured under ISO 9001:2000 for Quality and ISO 14001:1996 for Environmental Management
- FM approved, CE.



Caution: The 2517 Hot-Tap system's overall specifications and limitations depend on the lowest maximum rating of the components associated with the system. In other words, the Hot-Tap system is only as strong as its weakest link. For example, a ball valve, a component of the system, is rated at a maximum 100 psi @ 175 °F, limiting the entire system's maximum pressure/temperature rating to 100 psi @ 175 °F. All higher maximum specifications **MUST** yield to the component with the lowest maximum specification.

Note: Pressure/temperature specifications refer to sensor performance in water. Certain chemical limitations may apply. Chemical compatibility should be verified.



Standard Sensor Dimensions:

- 2540-1 = 1.5 in. NPT fitting
- 2540-2 = ISO 7/1-R 1.5 fitting

Hot-Tap Sensor Dimensions:

- 2540-3 = 1.5 in. NPT fitting
- 2540-4 = ISO 7/1-R 1.5 fitting

Notes:

Notes:



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