

Series 200 Insertion Flow Sensor

# DESCRIPTION

The Data Industrial® Series 200 flow sensors by Badger Meter feature a six bladed impeller design with a proprietary non-magnetic sensing mechanism. The forward swept impeller shape provides higher, more consistent torque and is less prone to be fouled by water borne debris. The forward curved shape coupled with the absence of magnetic drag provides improved operation and repeatability at lower flow rates. This is especially true where the impeller is exposed to metallic or rust particles found in steel or iron pipes. As the liquid flow turns the impeller, a low impedance square wave signal is transmitted with a frequency proportional to the flow rate. The signal can travel up to 2000 feet between the flow sensor and the display unit without the need for amplification. All sensors except irrigation versions are supplied with 20 feet of Belden type 9320 two-conductor shielded cable.

# MODEL 220BR (BRASS) AND 220SS (STAINLESS STEEL) SENSORS

The 220BR and 220SS sensors are used in most general flow measuring applications in metallic or non-metallic pipes. The sensor mounts in a 2-inch NPT pipe saddle or Threadolet<sup>\*</sup> for installation in pipe sizes from 3 inches to over 40 inches. Positioning nuts on the three threaded retaining rods allow the sensor to be accurately positioned to a standard insertion depth of 1-1/2 inches into the pipe. When this insertion depth is maintained, and there is at least 10 upstream and 5 downstream diameters of straight uninterrupted flow, an accuracy of +/-1 percent of full scale can be obtained from flow velocities of 0.5 to 30 feet/second (± 4.0 percent of reading within calibration range).



Figure 1: Dimensions for models 220BR and 220SS







# **MODEL 220PVS SENSOR**

The Badger Meter 220PVS flow sensor is an insertion style flow sensor will all wetted parts constructed of non-metallic materials. These sensors are designed for service in corrosive liquids. The metallic trim, in non-wetted areas, is 316 stainless steel. The sensor mounts in a 2-inch NPT thread and may be attached to the pipe with a saddle or other types of mounting hardware.



Figure 2: Dimensions for model 220PVS

# **Technical Brief**

# SPECIFICATIONS

# Wetted Materials for all Sensors

(See ordering matrix)

#### Sensor Sleeve and Hex Adapter for 220BR

Sleeve: Admiralty Brass, UNS C44300 Hex Adapter: Valve Bronze, UNS C83600

#### Sensor Sleeve and Hex Adapter for 220SS

316 Series Stainless Steel

#### **Temperature Ratings**

- Standard Version: 221° F (105° C) continuous service
- Irrigation Version: 150° F (66° C) continuous service
- PVC Version: 140° F (60° C) continuous service

## **Pressure Ratings**

- Metallic Sensor at 100° F 220BR: 400 psi 220SS: 400 psi
- Plastic Sensor at 100° F 220PVS: 100 psi

#### **Recommended Design Flow Range**

- 0.5...30 ft/sec
- Initial detection below 0.3 ft/sec

#### Accuracy

- ± 1.0% of full scale over recommended design flow range
- $\pm$  4.0% of reading within calibration range

## Repeatability

 $\pm$  0.3% of full scale over recommended design flow range

## Linearity

 $\pm$  0.2% of full scale over recommended design flow range

## **Transducer Excitation**

- Quiescent current 600 uA @ 8V DC to 35V DC max.
- Quiescent voltage (V<sub>high</sub>) Supply Voltage - (600 uA \* Supply impedance)
- ON State (V<sub>Low</sub>) Max. 1.2V DC @ 40 mA current limit (15W + 0.7VDC)

## **Output Frequency**

3.2...200 Hz

# **Output Pulse Width**

5 msec ± 25%

# **Electrical Cable for Standard Sensor Electronics**

20 feet of two-conductor AWG 20 with AWG 22 drain wire shielded UL type PTLC wire provided for connection to display or transmitter unit. Rated to 105° C. May be extended to a maximum of 2000 feet with similar cable and insulation appropriate for application.

#### **Electrical Cable for IR Sensor Electronics**

48 inches of UL Style 116666 copper solid AWG 18 wire with direct burial insulation. Rated to 105° C.

	Example: 2 3		00	1		1	1 1	1 2	1	1
STYLE	Example: 2 2	DR	00	0	2			2 <sup>2</sup>		
Standard Flow	7	0								
MATERIAL										
Brass		BR								
Stainless Steel		SS								
PVC Sleeve w/Stainless Steel Trim		PVS								
SIZE			-							
Insert Style for pipe sizes 3" and up			00							
ELECTRONINCS HOUSING				•						
PPS				0						
ELECTRONICS										
CSA Approved					4					
Standard Flow (STANDARD)					5					
IR-Irrigation					6					
O-RING										
Viton							0			
EPDM (STANDARD)							1			
Buna N							8			
SHAFT										
Zirconia Ceramic								0		
Tungsten Carbide (STANDARD)								2		
316 Stainless Steel								6		
IMPELLER										
Nylon (STANDARD)									1	
Tetzel									2	
BEAKING (CTANDADD)										1
UNIVINE (STANDARD)										1
Tefzel										2
Teflon										3
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Figure 3: Series 220 sensors ordering matrix

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