Impeller
Data Industrial®

Flow Sensors
SDI Series Insert Style Flow Sensor, Brass

DESCRIPTION

The Data Industrial SDI Series brass insert flow sensors from Badger Meter offer accurate liquid flow measurement in closed pipe systems in an easy to install economical package. Impeller sensors offer a quick response to changes in flow rate and are well suited to flow control and batch type applications in addition to flow monitoring. The four-bladed impeller design is rugged, non-fouling and does not require custom calibration. Coupled with the proprietary patented digital detection circuit, the sensor measures flows from under 0.5 ft/sec (0.15 m/sec) to more than 20 ft/sec (6.1 m/sec) regardless of the conductivity or turbidity of the liquid. The standard frequency output produces a low impedance square wave signal proportional to flow rate that may be transmitted up to 2000 ft (610 m) without amplification. The SDI Series includes:

- Single direction powered insert with raw, scaled pulse and analog output
- Battery powered insert with a local or remote display and scaled pulse output

APPLICATIONS

SDI insert style flow sensors are intended for general clean liquid flow measurement applications.

FUNCTIONALITY

These insert style sensors are intended for direct installation into pipelines through a 1 in. (25 mm) tap. The pipeline must be out of service and not under pressure at the time of installation. For any pipeline that is in service at the time of installation or cannot be de-pressurized and drained for service, the SDI hot tap model equipped with isolation valves is recommended.

Three different stem lengths in both the direct insert and hot tap versions accommodate pipe diameters 1-1/2…36 in. (38…914 mm) depending on the pipe material and tapping methods. Larger sizes usually require the use of hot tap models.

In pipe sections with at least 10 diameters of straight pipe upstream of the sensor and 5 diameters of straight pipe downstream, accuracies of ±1% of rate may be achieved when the flow sensor is installed at the correct insertion depth and properly aligned.

BATTERY POWERED SENSORS (OPTIONAL)

Battery powered versions are complete flow measuring systems providing a local or remote programmable display of rate, total or both, powered by a C size lithium battery that has a five year life span.

Badger Meter

Product Data Sheet

OUTPUT CONFIGURATIONS

Standard Frequency

Sensor output is a pulse proportional to flow. The signal is similar to all 200 Series flow sensors and will interface with all existing Data Industrial transmitters and monitors. The power supply to the sensor and the output signal from the sensor is carried on the same two wires. Wire connections are made at screw terminals on removable headers inside the NEMA 4X housing.

Analog Output

The sensor is also available with a two-wire loop powered 4…20 mA output. The analog output is produced by an onboard micro-controller for precise, drift-free signals. Sensors may be preprogrammed at the factory or field programmed using the a computer with the programming kit and Windows® based software program. All information is stored in the flow sensor nonvolatile memory.

Scaled Pulse Output

The scaled pulse is produced by an onboard micro-controller for precise, accurate outputs. This option may be programmed to produce an isolated solid state contact closure scaled to any number of engineering units of measure. Sensors may be preprogrammed at the factory or field programmed using the a computer with the programming kit and Windows® based software program. All information is stored in nonvolatile memory in the flow sensor. This is a four-wire option.

Display Options

All models except the standard frequency output version may also be equipped with a display. Integrated into the NEMA 4X housing, the eight digit LCD may be programmed to show rate of flow, flow total or toggle between the two.

The eight character 3/8 in. LCD is mounted on the sensor visible through a lens at the top of the electronics housing.

For battery powered versions only, an optional remote display is available where the LCD is located in a wall mount NEMA 4 enclosure. The remote may be connected to the flow sensor up to a maximum of 50 ft (15 m) away using extension cables.

SPECIFICATIONS

Wetted Materials	Sensor stem, mounting adapter and nipple:	Brass, B16, UNS C36000
Sensor Tip	Polyphenylene sulfide (PPS)	
	Polyetheretherketone (PEEK)	
O-rings, Bearings, Shaft	See ordering matrix	
Operating Temperature	Electronics	14…150° F (−10…65° C)
	LCD	−4…150° F (−20…65°C)
Maximum Pressure Rating (Non Shock)	600 psi (41.3 bar) up to 140° F (60° C)	
	225 psi (15.5 bar) up to 180° F (82° C)	
Optimum Design Flow Range	1…20 ft/sec. (0.30…6 m/sec.)	
	Extended flow range < 0.5…20 fps	
Pressure Drop	0.5 psi or less at 10 ft/sec (3 m/sec.) for all pipe sizes 1.5 in. (38 mm) diameter and up	
Accuracy	Standard: to ±1% of rate over optimum flow range	
Straight Pipe Requirement	Install sensor in straight pipe section with a minimum distance of 10 diameters upstream and 5 diameters downstream to any bend, transition, or obstruction.	
Repeatability	±0.5%	
Enclosure	Sensor- battery	Polypropylene with Viton® sealed acrylic cover. Meets NEMA 6P specifications.
	Sensor	Polypropylene with Viton® sealed acrylic cover. Meets NEMA 4X specifications.
	Remote	Polycarbonate w/ Neoprene® sealed cover. Meets NEMA 4X specifications.
Programming	Battery powered version	A-303 connector cable and SDI Series software
	Pulse and analog versions	USB to DIC converter programming kit (840134-0002)
Display (Optional)	8 character, 3/8 in. (10 mm) LCD	
	STN (Super Twisted Nematic) display	
	Annunciators for rate, total, totalizer multipliers, low battery, flow direction	
Accessories	USB to DIC converter programming kit (840134-0002)	
	ASDIB-20 programming kit- battery powered A-301 connector cable or USB	
	Battery powered version	807101 5 ft (1.5 m) extension cable
		807108 10 ft (3 m) extension cable
		807102 20 ft (6 m) extension cable
		807109 50 ft (15 m) extension cable

Power Specifications

		Unidirectional			Battery Operated
		Raw Pulse Option 0	**Analog Loop Option 1**	**Scaled Pulse Option 2**	**Scaled Pulse Option 2**
Number of Wire Connections		2	2	4	2
Pulse Units	Operating Voltage	8…35V DC	n/a	12…30V AC 12…35V DC	n/a
	Overvoltage Protection	30V AC ± 40V DC	± 40V DC	30V AC ± 40V DC	n/a
	Quiescent Current Draw @ 12V DC or 24V AC	330 µA typical	Software-controlled current of 3.5…20.5 mA	< 2.0 mA	n/a
	Short Circuit Current	50 mA typical	n/a	> 100 mA	> 100 mA
	Output Frequency	800 Hz max	n/a	Scaled by customer	Scaled by customer
	Output Pulse Width	5 mS below 100 Hz	n/a	Adjustable 50 mS to 5.0 seconds in 50 mS increments	Selectable 50 mS 100 mS 250 mS
	Output Isolation	n/a	n/a	Opto-isolated	Opto-isolated
Analog Units	Operating Voltage	n/a	8…25V DC	n/a	n/a
	Output Response Time	n/a	Varies with programmable filter	n/a	n/a

The battery operated version is powered by a C size lithium battery with a five year life span

ORDERING MATRIX

SDI Series Brass Single Direction Insert Powered Version Ordering Matrix

	SDI	0	D1	N	0	0	-	0	2	0	0

MATERIAL

Brass / PPS Tip **(not available with hot tap)** — 1

TYPE

Direct Insert for Pipe 1½" - 10" * — D1
Direct Insert for Pipe 12" - 36" * — D2
Direct Insert 36" and UP* — D3

ELECTRONIC HOUSING

NEMA 4X — N

OUTPUT

Standard Frequency Pulse — 0
Analog 4-20mA — 1
Scaled Pulse — 2

DISPLAY

No Display — 0
LCD Option **(requires output option 1 or 2)** — 1

O-RING

Viton® — 0
EPDM — 1
AFLAS — 2

SHAFT

Tungsten Carbide [Standard] — 2

IMPELLER

Stainless Steel — 0

BEARING

Torlon® — 0
Ketron — 2

* Pipe size is for reference only. Depending on pipe size, tapping saddle or existing hardware, longer sensor length may be required. Consult the factory. For material details, consult the factory.

SDI Series Battery Powered Ordering Matrix

	SDI	1	D1	B	N	1	-	0	2	0	0
MATERIAL											
Brass / PPS Tip **(not available with hot tap)**		1									
TYPE											
Direct Insert for Pipe 1-1/2" thru 10" *			D1								
Direct Insert for Pipe 12" thru 36" *			D2								
Direct Insert 36" and UP*			D3								
ELECTRONIC HOUSING											
Battery Powered/NEMA 6				B							
OUTPUT											
No Output					N						
Scaled Pulse					2						
2 Pulse Output					9						
DISPLAY											
LCD Option						1					
Remote Display/NEMA 4X						2					
O-RING											
Viton®								0			
EPDM								1			
AFLAS								2			
SHAFT											
Tungsten Carbide [Standard]									2		
IMPELLER											
Stainless Steel										0	
BEARING											
Torlon®											0

* Pipe size is for reference only. Depending on pipe size, tapping saddle or existing hardware, longer sensor length may be required. Consult the factory. For material details, consult the factory.

INTENTIONAL BLANK PAGE