CLARK
FSI-T00-000 Impeller Type Flow Sensor
1", 1 1/2" & 2" Pipe Size, Pulse Output

DESCRIPTION

FSI-T00 flow sensors are designed specifically for flow monitoring and control applications in fluidic systems where the materials of construction and performance specifications are suitable.

The sensor features a square wave digital signal proportional to flow. The characteristics of the output signal duplicate existing impeller flow sensor signals making the FSI series sensor compatible with all manufacturer's control products.

The pulse signal will travel up to 2,000 feet without amplification.

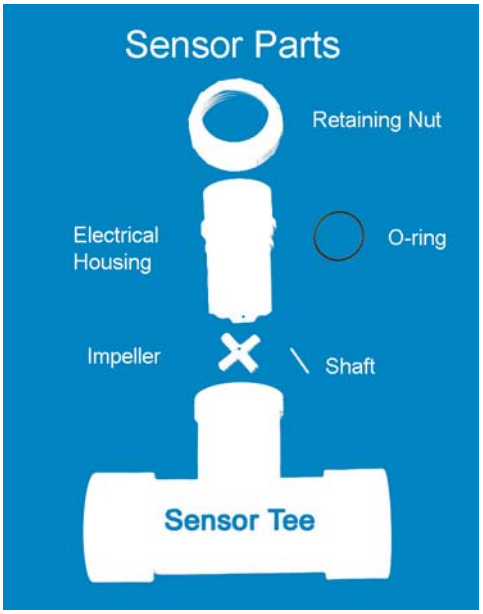
The key elements of this new technology are a proprietary mounting tee, ultra-lightweight impeller and improved processor based electronics giving the FSI series sensor improved performance.

SPECIFICATIONS

Pipe Sizes
1", 1 1/2", 2"
Wetted Materials
Impeller: HDPE (High Density Polyethylene)
Shaft: Tungsten Carbide
O-ring: BUNA N
Tee, Sensor Housing, Retaining Nut: Type 1 PVC
Pressure Rating
Sensor designed to Schedule 40 specifications
Samples tested to working pressure of 240 PSI
Temperature Range
32°F to 140° F (0° to 60° C)
Output Signal
Frequency Range: 0.3 Hz to 200 Hz
Output Pulse: 5 msec +/-25%
Transducer Excitation
Quiescent current 600 uA@8 VDC to 35 VDC max.
Quiescent voltage (VHigh)= Supply Voltage - (600uA X Supply Impedance)
On State (VLow)= Max. 1.2 VDC@50mA current limit, (10 Ohm + 0.7VDC)
Velocity Range (See Table 2)
0.25 to 15 FPS
Electrical Cable
2 single conductor solid copper U.L. listed #18 AWG leads with direct burial insulation
Lead length: 48 inches
Wiring may be extended up to 2,000 feet with direct burial, twisted pair shielded cable

FEATURES

- **Molded Mounting Tee:** Improved control of dimensions for more consistent measurement and improved performance at low flow.
- **Threaded Retaining Nut Instead of Retaining Pin:** Easier to service in a valve box, more moisture resistance for electronics resulting in longer life.
- **Unique 4 Bladed Lightweight Impeller:** Measures lower flow rates. Detects flow as low as 20% of published minimum rate of other impeller sensors
- **Smart Electronics Detection System:** Sensor electronics contain a micro-processor for better signal filtering and conditioning. Detection circuit also contains superior over-voltage andover-current protection.



DIMENSIONS

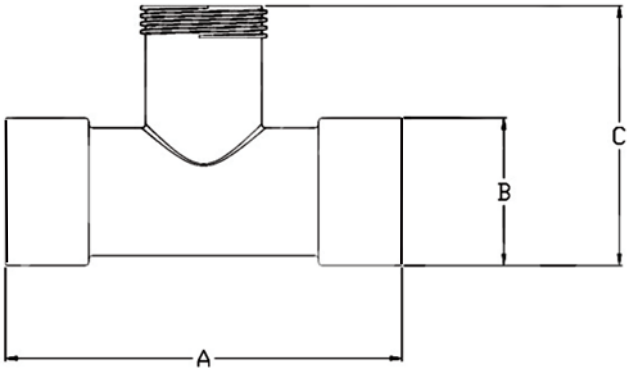


Table 1- Dimensions, K Factors						
Model	Pipe Size	A Length Inches (mm)	B Width Inches (mm)	C Height Inches (mm)	*K Factor (To read flow rate in GPM)	*Offset
FSI-T10-001	1"	5.625 (143)	1.710 (43)	3.487 (88)	0.322	0.20
FSI-T15-001	1 1/2"	6.188 (157)	2.310 (58)	5.097 (130)	0.650	0.750
FSI-T20-001	2"	7.00 (178)	2.875 (73)	4.573 (116)	1.192	0.938
*Frequency = (GPM/K) - Offset or GPM = Frequency x K + Offset						

FLOW SENSOR OPERATING RANGE

FST flow sensors use a rotating impeller to sense the water moving through the closed pipe. The speed of the impeller rotation is proportional to the velocity of the liquid. As the impeller turns, it produces digital pulses. The relationship between velocity and volumetric flow rate is dependent on the size of the pipe and may be calculated using the formula Qgpm = Vfps X D^2 X 2.45 where Q is the flow rate in gpm, V is velocity in fps and D is the inside diameter of the pipe in inches. The pipe must be full for the rotational speed of the impeller to accurately reflect flow.

FSI Series flow sensors measure flow over a range from 0.25 fps to 15 fps. Size the flow sensor for the flow rates that need to be measured, not the pipe size. The most common mistake in selecting a flow sensor is to oversize the unit and not be able to measure low flow . The flow sensor will operate at significantly higher velocities than commonly used for sizing pipe. Note: a 2" flow sensor has an operating range high enough for use with 3 or 4 inch diameter pipelines running at lower velocities. If the system flow rate falls below the minimum shown in these tables, use a smaller diameter flow sensor installed in a "meter run"- a section of pipe containing 10 diameters of straight pipe ahead of the sensor and 5 diameters of straight pipe after the sensor.

Table 2- Flow				
Model		FSI-T10-001 1"	FSI-T15-001 1 1/2"	FSI-T20-001 2"
	Feet Per Second	GPM	GPM	GPM
Minimum Flow	0.25	0.86	1.8	2.8
	1	3.5	7.24	11.3
	2	7	14.5	23
	3	10.4	22	34
	5	17	36	57
	7	24	51	79
	10	35	72	113
	12	42	87	136
Maximum Flow	15	52	108	170

ELECTRICAL

1. Two conductors are required to connect the flow sensor to the monitor or control device.
2. The RED lead from the sensor is the + (Positive) lead and the BLACK lead from the sensor is the - (Negative) lead. Observe polarity when extending these conductors and connect them to the + and - leads or terminals of the FLOW SENSOR INPUT of the monitor or controller. Do not connect flow sensor to Power or Valve circuits!
3. Use a shielded Direct Burial cable with at least one twisted pair of conductors. Multiple pair cable may be used. Use #20 AWG or larger stranded copper wire conductors to extend the distance up to 2,000 feet.
4. Waterproof the splices. The preferred method is the two part epoxy kit, Scotchlok 3570 as manufactured by 3M. Follow all manufacturer's instructions.
5. Make sure that the flow sensor housing is installed in the tee or the retaining nut is on the wire leads before making the splices.
6. Provide a service loop in the cable to allow the flow sensor housing to be removed from the tee and brought above grade for servicing.
7. Avoid making splices in the direct burial cable.

ORDERING INFORMATION

Model	Size
FSI-T10-001	1"
FSI-T15-001	1 1/2"
FSI-T20-001	2"

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