

Volumetric flow monitoring system

Expro's PassiveSONAR technology represents an innovative new class of single and multiphase process monitoring systems.

The PassiveSONAR Volumetric Flow Monitoring System utilizes an array of sensors clamped around the pipe. Flow rate is determined using Expro's sonar processing techniques to measure the speed at which naturally occurring turbulent structures flow past the sensor array. The volumetric flow rate is determined based on the speed of the turbulent structures.

Expro's PassiveSONAR systems provide the following features and advantages:

- Clamp-on Installation
- Robust operation in single and multiphase flows
- Maintenance-free operation

Applications:

Process monitoring and de-bottlenecking
Separator measurements
Gas and water injection lines
Underground storage wells
2" to 60" pipelines

Benefits:

Reliable, clamp-on multiphase process surveillance
Provides mixture flow rate for a wide range of single and multiphase flows

- Ideally suited for gases, liquids, bubbly flows and wet gas flows
- Optional gas void fraction measurement for bubbly flows available

Quick, simple installation with no alignment

- Installs while process is running

Full bore flow measurement; no pressure drop or potential for leaks
No recalibration required

- No inherent drift mechanism

Robust performance over wide range of pipe sizes, schedules and materials



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Technical Specifications:

Parameter	Specifications	Comments
Pipe diameters	2" to 36" (standard)	Metric and Other Sizes (up to 60 inches) Available
Flow velocity range	Liquid: 1 to 10 m/s (3 to 30 ft/s) Gas: 6 to 50 m/s (20 to 150 ft/s) ^(a)	
Flow rate accuracy	±2.0% of reading ^(b)	
Repeatability	±0.3% of reading	
Sensor head	Clamp-mounted onto the existing pipe section; designed for permanent installation	Sensor head requires ~1m (~3 feet) of straight pipe Lightweight
Transmitter with integrated flow processor	Programmable by keypad or PC interface Self-diagnostic capability	
Operating Temperature Range:		
Transmitter	-20°C to +60°C (-4°F to +140°F) ^(c)	
Sensor head process temperature	-40°C to +100°C (-40°F to +212°F) ^(d)	Inquire with Expro for temperatures outside these specified ranges.
Sensor head ambient temperature	-40°C to +60°C (-40°F to +140°F)	
Storage Temperature Range:		
Transmitter	-30°C to +80°C (-22°F to +176°F)	
Sensor Head	-40°C to +85°C (-40°F to +185°F)	
Transmitter to Sensor Head Cable	PLTC or armored cable with one end connectorized	Cable lengths up to 90m (300ft)
Analog input	Two (2) 4-20 mA	Enables internal logging of optional process parameters
Analog output	Two (2) isolated 4-20 mA current outputs	One (1) with HART protocol ^(e)
Digital outputs	Pulse/Frequency output Alarm	
Diagnostic interfaces	10Base-T Ethernet USB/Memory Stick RS232 serial	
Communication protocols	Standard: MODBUS RS232/485 RTU/ASCII Optional: FOUNDATION Fieldbus™	
Transmitter local display	LCD with backlight ^(f)	Provides flow rate, system status, system diagnostics
Data logging capability	Yes	
Transmitter enclosure	NEMA 4X , IP55	
Power requirements	AC version: 100 to 240 VAC, 50/60 Hz, 25 watts DC version: 18 to 36 VDC, 25 watts	
Area classification	Standard: Ordinary Location Optional: Class I Division 2, Groups A-D Optional: ATEX Zone 2, Group IIC	

^(a) Minimum flow can be application dependent.

^(b) Accuracy can be function of installation

^(c) For Zone 2: -20°C to +57°C (-4°F to +134°F)

^(d) For Zone 2: -40°C to +90°C (-40°F to +194°F)

^(e) Certain restrictions apply for Zone 2 applications

^(f) For Zone 2: No transmitter window for display.