

Gas void fraction monitoring system

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

The PassiveSONAR Gas Void Fraction Monitoring System utilizes an array of sensors clamped around the pipe. Gas Void Fraction is determined using Expro's sonar processing techniques to measure the sound speed, or rate at which sound propagates, through the process medium. The entrained gas percentage is then determined from the measured sound speed.

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

- Clamp-on Installation
- Accurate determination of entrained gas levels in liquid-continuous flows
- Maintenance-free operation



Applications:

Quantify Gas-carry under on liquid outlets of two and three phase separators

Production and Test Separator Optimization

Augment volumetric flow rate devices to provide accurate liquid rate in the presence entrained gases

- Turbine / Coriolis / PD meters

Augment watercut devices to provide accurate watercut determination in the presence of entrained gas

- Coriolis / Microwave devices

Gas break-out detection

Benefits:

Reliable, clamp-on multiphase process surveillance

Provides gas void fraction for liquid-continuous flows

Optional volumetric flow capability available

May be used to compensate process instrumentation affected by entrained gas:

- Flow measurement
- Watercut measurement
- Density measurement

Monitor and Optimize Separator Performance

- Increase throughput
- Enhance Measurement Accuracy
- Optimize chemical additive usage

Detect changes in process operation due to gas break out

Accurate and reliable operation over a wide range of process flows, including highly viscous fluids and liquids with high levels of entrained solids

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
Gas Void Fraction range	0 to 20 %	By volume for bubbly flow regimes
Gas Void Fraction accuracy	±5% of reading, 0.01% to 20%	Assumes on-line process pressure available
Gas Void Fraction repeatability	±1% of reading, 0.01% to 20%	
Sensor head	Clamp-mounted onto the existing pipe section; designed for single, 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) ^(a)	
Sensor head process temperature	-40°C to +100°C (-40°F to +212°F) ^(b)	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)	
Cable between transmitter and sensor head	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 ^(c)
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 ^(d)	Provides gas void fraction, process sound speed, system status, system diagnostics
Data logging capability	Yes	
Transmitter enclosure	NEMA 4X , IP55	
Power requirement	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) For Zone 2: -20°C to +57°C (-4°F to +134°F).

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

^(c) Certain restrictions apply for Zone 2 applications.

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