

# Meters

## Expro PassiveSONAR™ GVF Flow Meter

**Expro PassiveSONAR™ flow meter is a member of the sonar class of clamp-on flow meters, for gas void fraction (GVF) measurement of bubbly liquids.**

Sonar flow meters combine sophisticated submarine sonar array processing techniques with state-of-the-art digital signal processors and transducers.

The PassiveSONAR flow meter employs an array of passive strain-based sensors to track the velocity of turbulent eddies in the fluid flow. The PassiveSONAR meter has the unique ability to also measure the gas void fraction (GVF) of well-mixed bubbly liquid flows.

To measure GVF, the PassiveSONAR meter detects sound waves in the fluid as they pass through the sensor array. The speed of sound of the mixture is then computed and the GVF is derived.

### Applications

- Gas carry-under from separator liquid outlets
- Net oil measurement for GLCCs
- Measurement correction from existing flow meters - turbine, Coriolis, positive displacement meters
- Measurement correction from existing watercut devices - Coriolis, microwave
- Measurement correction from existing density devices
- Gas breakout detection

### Features and Benefits

- Applicable to well-mixed bubbly liquid flows
- Applicable to a wide range of flow rates
- Excellent performance on large diameter pipes
- Completely non-intrusive, clamp-on design
- No pressure drop or leak risk
- Unaffected by corrosive or erosive fluids



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<b>Technical specifications</b>			
<b>Parameter</b>	<b>Specifications</b>	<b>Comments</b>	
Pipe diameter range	2" to 30" NPS	Enquire about other sizes	
Gas void fraction	0 to 20% +/-5% of reading. 0.01-20% GVF	By volume of bubbly flow	
Repeatability	+/-0.01%		
Sensor head	Clamp-mounted onto the existing pipe section designed for permanent installation	Sensor head requires 1m (3ft) of straight pipe free of fittings	
Transmitter	Programmable by keypad or PC interface, self-diagnostic, and data logging capability	LCD display with backlight. Provides flow rate, status, and diagnostics 1.	
Transmitter to sensor cable	Unarmoured cable, connected at one end	Cable lengths up to 90m (300ft) Optional armoured cable	
Cable Entries	4 x 1/2" NPT		
<b>Operating temperature range</b>			
Ambient temp - sensor head	-40°C to +60°C (-40°F to 140°F)		
Ambient temp - transmitter	-20°C to +60°C (-4°F to 140°F)	Can be remote from sensor 2.	
Process temperature	-40°C to +100°C (-40°F to 212°F)		
Digital outputs	Serial communications ports Pulse/frequency and alarm	RS-232/RS-485, half-duplex Isolated solid-state switches	
Serial communication protocol	Modbus (slave) RTU/ASCII	Enquire about other protocols	
Analog output	Two (2) isolated 4-20mA outputs	One (1) with HART protocol Enquire about other protocols	
Analog input	Two (2) 4-20mA inputs	For use with 2-wire transmitters	
<b>Ingress protection (IP) rating</b>			
	Transmitter	IP-55	Models are Type 4X After installation on pipe
	Sensor head	IP-55	
Diagnostic interfaces	USB port		For data history, configuration and diagnostic data via USB memory stick only
		10Base-T Ethernet	For setup/diags using a laptop
Power requirements		AC version: 100-240Vac, 25W DC version: 18 to 36Vdc, 25W	
Mounting		Pole or pipe mount	
Methods of protection		Non-sparking (nA) Intrinsic safety (ic)	Intrinsic safety applies to the sensor Head cable and 4-20mA inputs
<b>Hazardous area classification</b>			
ATEX model	ATEX Zone 2, Group IIB	Suitable for Groups IIA and IIB	
US/Canada model	Class I, Div 2, Groups A-D	Also suitable for Class I, Zone 2	

Note: Other sizes and configurations are available to meet most applications, for more information contact your local Expro representative or email [meters@exprogroup.com](mailto:meters@exprogroup.com)

1. For Zone 2: no transmitter window for display  
2. For Zone 2: -20° to +57°C (-4° to +135°F)