

## Expro's PassiveSONAR™ clamp-on meter for single and multiphase volumetric flow measurement

The PassiveSONAR flow meter is a member of the sonar class of clamp-on flow meters.

Developed in the 1990s, 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 velocity is then used to determine volumetric flow rate for single phase flows.

The sonar array processing techniques embodied in ActiveSONAR™ and PassiveSONAR flow meters enable flow measurement in single and multiphase flow conditions, which make them ideally suited for oil and gas applications. Refer to the Total Production Surveillance datasheet for a description of the use of sonar meters in multiphase flow conditions.

In addition, the PassiveSONAR meter has a unique ability to measure Gas Void Fraction (GVF) of bubbly liquids as well as volumetric flow rates. See the PassiveSONAR GVF Meter data sheet for details on the GVF measurement capabilities of the PassiveSONAR meter.



### Applications targeted by PassiveSONAR VF meters:

- Oil (including black oil) or gas/condensate production
- Water/gas injection
- Downstream gas & liquid flow
- Tanker oil loading/unloading
- Contact Expro Meters to discuss other applications

### Features and advantages of PassiveSONAR VF meters:

- Well suited to multiphase liquid flows
- Applicable to a wide range of flow rates and pressures
- Excellent performance on large diameter pipes
- No pressure drop or leak risk
- Unaffected by corrosive or erosive fluids
- Designed for permanent installation in harsh environments

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Technical specifications:		
Parameter	Specifications	Comments
Pipe diameter range	2" to 30" NPS Enquire about other sizes	Meter is pipe size specific
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)	See note (a) See note (a)
Flow rate accuracy	+/-2.0% of reading	Repeatability of +/-0.3% See note (b)
Sensor head	Clamp-mounted onto 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 datalogging capability	LCD display w/backlight Provides flow rate, status, and diagnostics See note (c)
Transmitter to sensor cable	Unarmoured cable, connected at one end	Cable lengths up to 90m (300ft) Optional armoured cable
Operating temperature range Ambient temp – sensor head Ambient temp – transmitter Process temperature	-40° to +60°C (-40° to 140°F) -20° to +60°C (-4° to 140°F) -40° to +100°C (-40° to 212°F)	Can be remote from sensor See note (d)
Digital outputs	Serial communications port Pulse/frequency and alarm	RS232/485, half-duplex Isolated solid-state switches
Serial communication protocol	Modbus (slave) RTU/ASCII	Ask about other protocols
Analog outputs	Two (2) isolated 4-20mA outputs	One (1) with HART protocol See note (e)
Analog inputs	Two (2) 4-20mA inputs	For use with 2-wire transmitters
Diagnostic interfaces	USB port  10Base-T ethernet	For data history, config, and diag data via USB memory stick only For setup/diags using laptop
Ingress protection (IP) rating	Transmitter: IP-55 Sensor head: IP-55	US/Canadian model is Type 4X After installation on pipe
Power requirements	AC version: 100-240Vac, 25W DC version: 18 to 36Vdc, 25W	
Methods of protection	Non-sparking (nA) and Intrinsic safety (ic)	Intrinsic safety applies to sensor Head cable and 4-20mA inputs
Hazardous area classification US/Canada model: ATEX model	Class I, Div 2, Groups A-D  ATEX Zone 2, Group IIB	Also suitable for Class I, Zone 2 Suitable for Groups IIA and IIB

- Notes: (a) Actual flow range is application-dependent and may differ from the nominal ranges  
 (b) Specification for single phase flow; accuracy can be a function of installation  
 (c) For Zone 2: no transmitter window for display  
 (d) For Zone 2: -20° to +57°C (-4° to +135°F)  
 (e) Certain restrictions apply for Zone 2 applications