

CiDRA's SONARtrac Volumetric Flow and Entrained Gas Monitoring System is a breakthrough in process measurement technology. By installing non-intrusively on existing process lines, the SONARtrac clamp-on system allows on-line real-time measurement of the volumetric flow and amount of entrained air/gas present in any liquid-continuous-phase process fluid. The system also provides a measurement of only the liquid portion of the flow by compensating for the amount of entrained gas/air in the process line.

SONARtrac Monitoring Systems do not utilize ultrasonics; they employ patented sonar array processing techniques to listen to, and interpret, flow turbulence and sound fields generated by the machinery, piping and process flow. This passive listening approach results in measurement of the flow rate and amount of entrained air/gas with a high degree of accuracy and repeatability.

Sonar Technology

CiDRA's SONARtrac technology represents an innovative new class of industrial measurement instrumentation. This sonar technology utilizes array processing techniques similar to those used in the field of sonar processing. CiDRA's proprietary sonar technology was initially developed for flow and compositional measurement in one of the world's most demanding environments: downhole, offshore oil and gas production. CiDRA has taken the proven reliability of its SONARtrac technology to provide new measurement capabilities and provide insight into the monitoring and optimization of industrial processes.

The SONARtrac Volumetric Flow and Entrained Gas Monitoring System utilizes an array of sensors that are clamped onto the pipe. The flow rate and amount of entrained air/gas is determined using CiDRA's array processing techniques and are available as meter outputs. Liquid flow rate is measured by analyzing the flow turbulence in the process stream, while the sound field is used to determine the sound speed, or speed at which sound propagates, through the process medium. The entrained air/gas percentage is then calculated directly from the measured sound speed.

The advantages and features of CiDRA's clamp-on SONARtrac VF/GVF-100 system enable users to realize the following measurable benefits:

- Increased measurement accuracy and certainty
- Low installation and life cycle costs
- Increased process efficiency and uptime
- Lower operating costs
- Increased product quality

Volumetric Flow and Entrained Gas/Air Measurement in a Single Package

Applications:

- Oil & Gas
- Oil Sands Processing
- Minerals Processing
- Chemical
- Pulp and Paper
- Consumer Products
- Water and Wastewater Treatment
- Power Generation
- Pharmaceutical
- Food and Beverage



Features:

- Entirely non-intrusive, full bore clamp-on design enables:
 - Installation without shutting down the process
 - No pressure drop
 - No potential for leaks
 - No wetted parts to corrode or erode
 - No flow obstruction, no clogging
 - No moving parts
- Volumetric flow measurement of liquid continuous phase process flows.
- Entrained air/gas measurement resulting in ability to monitor and/or assess effect of process changes on process efficiency and quality.
- Measurement of gas volume fraction in combination with volumetric flow enables a measurement of true liquid flow.
- Detects changes in process operation due to air/gas leaks caused by pump, pump/valve packing or flange/pipe problems.
- Accurate and reliable operation over a wide range of process flows, including high consistency and abrasive slurries.
- Compatible with most pipe materials and schedules.
- Simple, quick installation, minimal surface preparation, no gel required, lightweight.



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SONARtrac™ Volumetric Flow and Entrained Gas Monitoring System Specs

Parameter	Specifications	Comments
Flow Velocity Range	Liquid: 3 to 30 ft/s (1 to 10m/s) ^(a)	Bi-directional
Flow Rate Accuracy	±1% of reading, typical	
Repeatability	±0.3% of reading	
Entrained air/gas range	0 to 20 %	By volume
Entrained air/gas accuracy	±5% of reading, 0.01% to 20%	Assumes on-line process pressure available
Entrained air/gas repeatability	±1% of reading, 0.01% to 20%	
Pipe diameters	2" to 36"	Metric and Custom Sizes Available) ^(b)
Sensor head	Clamp-mounted onto the existing pipe section; designed for single, permanent installation	Sensor head length 35" (89 cm) Height within flange diameter of pipe Lightweight (22 lbs/10 kg for 8" meter)
Transmitter with integrated flow processor	Programmable by keypad or PC interface Self-diagnostics capability	
Operating Temperature Range:		
Transmitter	-4°F to +140°F (-20°C to +60°C)	Inquire with CiDRA for temperatures outside these specific ranges
Sensor head process temp.	-40°F to +212°F (-40°C to +100°C)	
Sensor Head Ambient Temp.	-40°F to +140°F (-40°C to +60°C)	
Storage Temperature Range:		
Transmitter	-22°F to +176°F (-30°C to +80°C)	
Sensor head	-40°F to +185°F (-40°C to +85°C)	
Cable Between Transmitter And Sensor Head	PLTC or armored cable with one End connectorized	Cable lengths up to 300ft (90m)
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
Digital outputs	Pulse/Frequency Output Alarm Serial Output: RS232 or RS485	
Transmitter Local display	LCD with backlight	Provides flow rate, entrained air/gas, system status, system diagnostics
Data logging capability	Yes	
Transmitter Enclosure	NEMA 4X	
Power Requirements	AC Version: 100 to 240 VAC, 50/60 Hz, 25 Watts DC Version: 18 to 36 VDC, 25 Watts	
Area Classification	Standard: General Purpose Optional: Class I Division 2, Groups A,B, B, C, and D	

- a) Minimum flow can be application dependent
- b) Inquire with CiDRA for availability on sizes greater than 36"

Contact CiDRA

To speak with a CiDRA applications engineer about the *SONARtrac Volumetric Flow and Entrained Air/Gas Monitoring Systems*, or for information on this or other CiDRA industrial process measurement solutions, call (877) cidra77 or visit our web site at www.cidra.com. *SONARtrac* is a trademark of CiDRA Corporation.

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