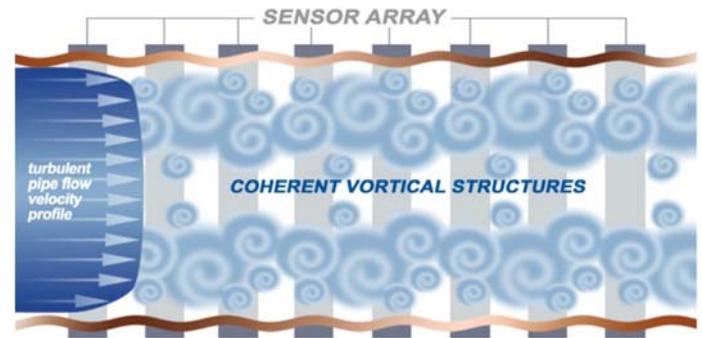


SONARtrac[®] Measurement Technology— How It Works

CiDRA's patented sonar technology utilizes array processing techniques to measure volumetric flow and entrained air.

The SONARtrac system measures volumetric flow rate by combining phase and frequency components of the turbulent eddies as they convect past the array of sensors.

In order to determine the amount of entrained air present, the SONARtrac system measures the speed at which acoustic waves pass through the sensor array. The measured sound speed is then correlated to the phase fraction of the two component mixture.



SONARtrac[®] VF/GVF-100



Volumetric Flow and Entrained Air Measurement System

The SONARtrac VF/GVF-100 is CiDRA's combination flow meter that has the capability to calculate both volumetric flow and gas volume fraction to provide the customer with a true flow measurement. The VF/GVF-100 utilizes passive sonar technology with the added ability to calculate the entrained air/gas measurement in any slurry or liquid. As a result, these dual measurements enable the customer to monitor and assess the effects of process changes on efficiency and quality.

SONARtrac[®] Volumetric Flow and Entrained Air Measurement System Product with Phase Fraction Management

CiDRA's patented passive sonar, non-contact technology provides dual measurement capability of the volumetric flow *and* air content (gas void fraction (GVF) in slurries and liquids. This unique combination finally enables true **phase fraction management** leading to unprecedented improvement in process efficiencies and operations.

Whether used to correct total volumetric flow in bubbly flows, correcting the measurement error in density meters for a more accurate mass balance or for detecting the cause of process flow upsets, SONARtrac **PFM** delivers both top and bottom line value for thousands of customers around the world.

SONARtrac® Volumetric Flow and Entrained Air Measurement System Specifications — VF/GVF-100

Parameter	Specifications	Comments
Flow velocity range	Liquid: 3 to 30 ft/s (0.91 to 9.1m/s)	Liquid-Only flow conditions may permit flow measurements below 3 ft/sec ^(a)
Flow rate accuracy	±1% of reading ^(a)	
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 60" (50.8mm to 1524.0mm)	Metric and custom sizes available ^(b) 2"-36" Sensor Length—34.7" (91.4cm) Over 36" Sensor— 51.2" (130.0cm) Height within flange diameter of pipe Lightweight (22 lbs./10 kg for 8" meter) Stainless Steel designed to IP55
Sensor head	Clamp-mounted onto the existing pipe section; designed for single installation Certified to IP55	
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) ^(c)	
Sensor head process temp.	-40°F to +212°F (-40°C to +100°C)	Inquire with CiDRA for temperatures outside these specific ranges
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 ^(d)
Digital outputs	Pulse output Alarm output	
Digital interfaces	10Base-T Ethernet USB/Memory Stick RS232 serial	
Communication interfaces	Standard: RS232/485 Optional: MODBUS® RTU/ASCII Optional: PROFIBUS® PA Optional: FOUNDATION Fieldbus™	
Transmitter local display	LCD with backlight ^(e)	Provides flow rate, entrained air/gas, system status, system diagnostics
Data logging capability	Yes	
Transmitter enclosure	NEMA 4X, IP66	
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: Class I Zone 2, Group IIB ATEX	
Altitude	5000 meters	Certified for high altitude regions

^(a) Inquire with CiDRA for qualifying your application under 3 ft/sec

^(b) Inquire with CiDRA for availability and specifications on sizes greater than 36".

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

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

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

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Contact CiDRA

To speak with an applications engineer about CiDRA's SONARtrac systems or other CiDRA industrial process measurement solutions, call +1.203.265.0035 or visit our web site at www.cidra.com.

All information contained herein is believed to be accurate and is subject to change without notice. No responsibility is assumed for its use. Specifications are preliminary and CiDRA reserves the right to make changes, without notice to product designs, specifications, functions, components and manufacturing methods.



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