

Model: VF/GVF-200

CiDRA®

Data Sheet

SONARtrac® digital Flow and Entrained Air Measurement System

CiDRA's *SONARtrac digital* Flow and Entrained Air Measurement System is an industry standard in process measurement technology. The *SONARtrac digital* clamp-on, non-contact system allows for on-line, real-time measurement of the volumetric flow in difficult to measure slurries and fluids; and the amount of entrained air present in any liquid, continuous-phase process flow. The system also provides a measurement of only the liquid portion of the flow by compensating for the amount of entrained air in the process line.

SONARtrac digital measurement systems 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 with a high degree of accuracy and repeatability without contacting the process fluid.

Passive Sonar Technology

CiDRA's *SONARtrac digital* technology represents the next generation of CiDRA's reliable measurement technology. This sonar technology utilizes array processing techniques similar to those used in the field of sonar processing. CiDRA's patented 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 and upgraded the electronics to enhance the signal processing capabilities. This will provide superior monitoring and optimization of homogeneous slurries in harsh environments such as those typically found in mining applications.

The *SONARtrac digital* Flow and Entrained Air Measurement System utilizes an array of sensors that are wrapped around the pipe. The flow rate and percent of entrained air by volume 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 velocity at which sound propagates through the process medium. The entrained air percentage is then calculated directly from the measured sound speed.

CiDRA's clamp-on, non-contact *SONARtrac digital* enables users to realize the following measurable benefits:

- Increase measurement accuracy and certainty
- Correct for volumetric or mass flows
- Low installation and life cycle costs
- Increase process efficiency and uptime
- Lower maintenance and operating costs

SONARtrac® Technology



Features:

- ◆ Entirely non-contact "wrap-around" flow sensor design
- ◆ Transmitter with integrated flow processor
 - Programmable by keypad or PC interface
 - Self-diagnostics capability
 - High resolution color graphic display
- ◆ USB A & C Ports and memory stick
 - Remote data logging retrieval
 - Diagnostic reporting to CiDRA technical support
- ◆ Analog/Digital Outputs
 - 4-20 mA current outputs
 - Pulse output
 - HART® protocol
- ◆ Options:
 - FOUNDATION Fieldbus™
 - PROFIBUS® PA
 - PROFIBUS® DP
 - MODBUS®

Benefits:

- Accurate and reliable operation over a wide range of process flows, including; homogeneous, dispersive, corrosive and abrasive slurries in lined or unlined metal or plastic pipe
- Non-wetted sensing; not damaged by corrosive or abrasive slurries
- Provides true liquid flow measurement; corrected for entrained air
- Entrained air measurement can be a diagnostic tool for performance monitoring
- No moving parts, no inherent drift mechanism
 - Does not require calibration
 - Maintenance free operation
- Quick and simple installation
 - Installs while process is running
 - No alignment tools needed
 - No coupling gels required

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PROFIBUS PROCESS FIELD BUS is a registered trademark of PROFIBUS NUTZERORGANISATION e.V.
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SONARtrac[®] digital VF/GVF-200 Flow and Entrained Air Measurement System Specifications

Parameter	Specifications	Comments
Flow velocity range	Liquid: 3 to 30 ft/s (0.91 to 9.1m/s) ^(a,b)	Liquid-only flow conditions may permit flow measurements below 3 ft/sec ^(a)
Flow rate accuracy	±1% of reading ^(c)	
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 30" (50.8mm to 762mm)	Metric and custom sizes available
Sensor Head	Clamp-mounted onto the existing pipe section; designed for single installation	2"-30" Sensor Length–34.7" (91.4cm) Height within flange diameter of pipe Lightweight (30 lbs./13.6 kg for 8" meter)
Sensor head cover	Designed to IP55	
Sensor head electronics	Certified to IP66	
Transmitter with integrated flow processor	Programmable by keypad or via USB Self-diagnostics capability	
Operating Temperature Range:		
Transmitter	-40°F to +140°F (-40°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	-40°F to +176°F (-40°C to +80°C)	
Sensor head	-40°F to +185°F (-40°C to +85°C)	
Cable between transmitter and sensor head	Armored or unarmored cable with one end connectorized	Cable lengths up to 500ft (152m)
Analog input	One (1) 4-20 mA	Enables optional inclusion of dynamic process parameters
Analog output	Two (2) isolated 4-20 mA current outputs	One (1) with HART® protocol
Digital outputs	Pulse output	
Digital interfaces	10Base-T Ethernet USB A & C/Memory Stick HART	Only without optional communications
Optional communication interfaces	MODBUS ® RTU PROFIBUS® PA PROFIBUS® DP FOUNDATION Fieldbus™	
Transmitter local display	LCD with backlight	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	
Altitude	5000 meters	Certified for high altitude regions
(a) Inquire with CiDRA for qualifying your application. (b) Minimum flow velocity may be affected by pipe type and/or fluid characteristic. (c) Inquire with CiDRA for availability and specifications on sizes greater than 30".		

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 website at www.cidra.com.

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* Approval in process