

### SONARtrac® HD Series Process Flow and Entrained Air Monitoring Systems

SONARtrac Models HD VF-100 and HD VF/GVF-100 Process Flow and Entrained Air Monitoring Systems utilize patented hardware and software features specifically designed, engineered and manufactured to provide accurate and reliable process flow measurements for difficult to characterize solid/liquid mixtures and challenging sand/rock slurry flows with varying velocities and densities.

#### Sonar Technology

CiDRA has taken the proven reliability of its patented sonar flow technology used in its SONARtrac VF-100 Flow Monitoring system to address some of the most challenging flow measurement needs in the world. Using similar sonar technology, the Model HD VF-100 and HD VF/GVF-100 systems are ideal solutions for flow applications in industries such as Oil Sands, which provide challenges from both an application as well as environmental perspective.

Sonar-based flow monitoring systems determine volumetric flow rate by measuring the speed at which self-generated, coherent flow structures convect past the sensor array. Sonar-based systems can also determine entrained air (or any other gas) levels by measuring the speed at which sound propagates within the process flow lines. By using a SONARtrac flow monitoring system to measure the speed of sound in the process flow lines, it provides an accurate and robust, clamp-on method for determining entrained air levels in aerated liquids and slurries.

The HD Series systems enable users to realize the following measurable benefits:

- Improved material balance accuracy and reliability
- Low installation and life cycle costs
- Increased process efficiency and uptime
- Lower operating costs
- Increased reliability

SONARtrac HD Series systems offer a compelling economic value and a superior technical solution to measuring and monitoring flow and entrained air content in aggressive, dynamically complex flow applications. HD Series systems, like the VF and VF/GVF-100 systems, clamp onto existing pipe, including lined pipes, do not "pinch" the flow and have no wetted parts, thereby maintaining the full integrity of the piping system and ensuring measurement certainty. SONARtrac flow systems have delivered improved accuracy over existing in-line flowmeters, thereby enabling more accurate and reliable mass balance measurements.

SONARtrac HD Series systems are ideally suited to address the flow measurement needs of applications such as:

- Hydrotransport Slurries
- Coarse Tailings
- Tailings Underflow
- Middlings Froth



In addition, the SONARtrac HD Series hardware and software platform clamp-on system is engineered so that the HD VF-100 can be purchased, or upgraded to the HD VF/GVF-100, which will provide an accurate measurement of the entrained air/gas in any liquid/continuous-phase process fluid, thus delivering *two* critical measurements relating to your process flow: volumetric flow and gas volume fraction (GVF). The ability to have an on-line, real-time measurement of *both* volumetric flow and entrained air provides value in many application areas where more accurate and reliable information is key to optimizing the process.

## SONARtrac<sup>®</sup> HD Series HD VF-100 and VF/GVF-100 Flow Monitoring and Entrained Air System Specifications

Parameter	Specifications	Comments
Flow velocity range	Liquid: 3 to 30 ft/s (.91 to 9.1m/s) <sup>(b)</sup>	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 60"	Metric and custom sizes available <sup>(a)</sup>
Sensor head	Clamp-mounted onto the existing pipe section; designed for single 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) <sup>(e)</sup>	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 option process parameters
Analog output	Two (2) isolated 4-20 mA current outputs	One (1) with HART <sup>®</sup> protocol <sup>(d)</sup>
Digital outputs	Pulse/Frequency Output Alarm Serial Output: RS232 or RS485	
Digital interfaces	10Base-T Ethernet USB/Memory Stick RS232 serial	
Communication interfaces	Standard: RS232/485 Optional: MODBUS <sup>®</sup> RTU/ASCII Optional: PROFIBUS PA Optional: FOUNDATION Fieldbus <sup>™</sup>	
Transmitter local display	LCD with backlight <sup>(f)</sup>	Provides flow rate, entrained air/gas, system status, system diagnostics
Data logging capability	Yes	
Transmitter enclosure	NEMA 4X , IP55	
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 IIC ATEX	

<sup>(a)</sup>Inquire with CiDRA for availability and specifications on sizes greater than 36".

<sup>(b)</sup>Minimum flow can be application dependent.

<sup>(c)</sup>For Gas, overall accuracy may be application dependent.

<sup>(d)</sup>Certain restrictions apply for Zone 2 applications.

<sup>(e)</sup>For Zone 2: -4°F to +134°F ( -20°C to +57°C).

<sup>(f)</sup>For Zone 2: No transmitter window for display.

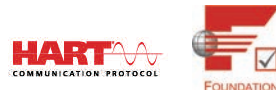
### Contact CiDRA

To speak with a CiDRA applications engineer about the SONARtrac HD Series Process Flow and Entrained Air Monitoring Systems, or for information on this or other CiDRA industrial process measurement solutions, call +1.203.265.0035 or visit our web site at [www.cidra.com](http://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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