

Model HD VF/GVF-100

- For Highly Dispersive Slurries in Mineable Oilsands

CiDRA®

Data Sheet

SONARtrac® HD Process Flow and Entrained Air Measurement System

SONARtrac HD VF/GVF-100 Process Flow and Entrained Air Measurement System utilizes 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.

SONARtrac measurement 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 with a high degree of accuracy and repeatability.

Passive Sonar Technology

CiDRA has taken the proven reliability of its patented sonar flow technology used in its SONARtrac VF/GVF100 Flow Measurement system to address some of the most challenging flow measurement needs in the world. Using similar sonar technology, the Model HD VF/GVF-100 systems are ideal solutions for highly dispersive flow applications in industries such as mineable oil sands which provide challenges from both an application as well as environmental perspective.

Sonar-based flow measurement 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 levels by measuring the speed at which sound propagates within the process flow lines. By using a SONARtrac flow measurement 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 VF/GVF systems are ideally suited to address the flow measurement needs of applications such as:

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

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



In addition, the SONARtrac HD VF/GVF hardware and software platform system is engineered to provide an accurate measurement of the entrained air 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.

Features:

- ◆ Entirely non-contact, "wrap-around" flow sensor design
- ◆ Transmitter with integrated flow processor
 - Programmable by keypad or PC interface
 - Self-diagnostics capability
- ◆ USB Port and memory stick
 - Remote data logging retrieval
 - Diagnostic reporting to CiDRA technical support
- ◆ Analog /Digital Outputs
 - Two (2) 4-20 mA current outputs
 - Pulse output
 - Alarm output
 - HART® protocol
- ◆ Options:
 - FOUNDATION Fieldbus™
 - PROFIBUS® PA
 - MODBUS®

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SONARtrac® Technology

SONARtrac[®] HD VF/GVF-100 for Highly Dispersive Slurries in Mineable Oilsands HD Process 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)	Bi-directional
Flow rate accuracy	±1% of reading ^(b)	HD VF-100 only
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%	HD VF/GVF-100 only 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)
Sensor head	Clamp-mounted onto the existing pipe section; designed for single installation Certified to IP55	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
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)	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 [®] 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) Minimum flow can be application dependent.

^(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.

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.

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