Model HD VF/GVF-200

- **For Highly Dispersive Slurries in Mineable Oilsands**

CiDRA®

Data Sheet

SONARtrac® digital HD Process Flow and Entrained Air Measurement System

SONARtrac digital HD VF/GVF-200 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 digital 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 digital* VF/GVF-200 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-200 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 S*ONARtrac digital* 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 digital 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 digital 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. The HD Series, like the VF/GVF-200 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
  - 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®

SONARtrac® Technology

CiDRA
50 Barnes Park North
Wallingford, CT 06492
Tel. +1.203.265.0035
www.cidra.com

SONARtrac® digital HD VF/GVF-200 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]	
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-200 only 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 [c]
Sensor head Sensor head cover Sensor head electronics	Clamp-mounted onto the existing pipe section; designed for single installation Designed to IP55 Certified to IP66	 2"-30" Sensor Length–34.7" (91.4cm) Height within flange diameter of pipe Lightweight (30 lbs./13.6 kg for 8" meter)
Transmitter with integrated flow processor	Programmable by keypad or via USB Self-diagnostics capability	
Operating Temperature Range: Transmitter Sensor head process temp. Sensor head ambient temp.	 -40°F to +140°F (-40°C to +60°C) [c] -40°F to +212°F (-40°C to +100°C) -40°F to +140°F (-40°C to +60°C)	 Inquire with CiDRA for temperatures outside these specific ranges
Storage Temperature Range: Transmitter Sensor head	 -40°F to +176°F (-40°C to +80°C) -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 [d]
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 [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	
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 web site at www.cidra.com.

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* *Approval in process*