SonoPro S34

Технические характеристики

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vfr@nt-rt.ru || https://vortek.nt-rt.ru/

SonoPro® Portable Transit Time Clamp-On Ultrasonic Flowmeter

VorTek Instruments SonoPro® Portable clamp-on flowmeter incorporates high accuracy transit-time ultrasonic technology to deliver accurate and reliable flow metering. The innovative design includes matched precision transducers and signal processing circuitry to accurately measure the flow of most liquids over a wide range of velocities. Clamp-on transducers create no wear, zero pressure loss, and do not require process interruptions to install them since they are attached to the outside of the pipe. With the addition of external temperature inputs, SonoPro Portable can provide a reliable (BTU) energy or mass flow measurement.

SonoConfig™ Instrument Interface Software works in conjunction with SonoPro Portable to provide valuable setup, diagnostic, and data logging tools.

SonoPro Advantage:

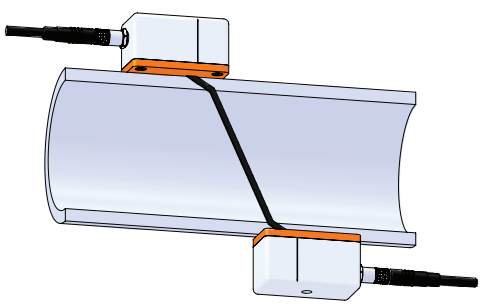
- Portable non-invasive flow metering for most liquids
- Multivariable meter provides volume flow, mass flow, density, temperature, and energy readings
- Energy Monitoring – ability to compute and output energy use
- Zero pressure loss
- Easy to install and commission – clamp on the outside of the pipe – non-invasive
- Reliable – no moving parts, no wear
- High accuracy with rangeability up to 400:1
- Temperatures up to 248°F (120°C)
- Clamp On pipe sizes from 1/2" (15mm) to 200" (5000mm)
- Transducer mounting configurations include Z, V, and W
- Field configurable ranges, outputs and display
- USB communication - Standard Bluetooth® Wireless Communication - Optional
- Rechargeable lithium-ion battery Battery life up to 11 hours
- Internal data logging with file save and playback functionality
- SonoConfig Instrument Interface Software available for setup, diagnostic, and data logging tools
- Bidirectional flow metering capabilities

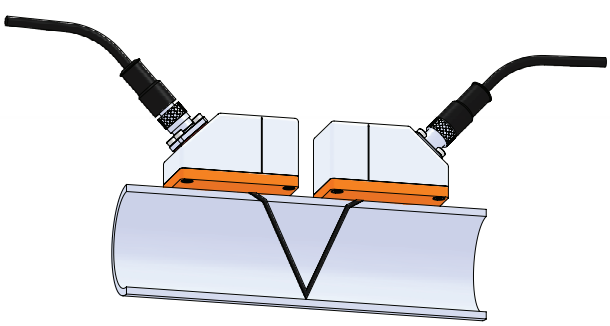
SonoPro Portable Principle of Operation

The SonoPro Portable flowmeter operates on the transit time ultrasonic measurement method. This type of measurement uses the basic fact that the fluid's velocity influences the transmission speed of the ultrasonic signal. This is analogous to a person paddling a canoe with the current versus paddling against the current. The canoe can travel downstream with the current faster than it can be paddled back upstream against the current. The same is true for the sound waves as they travel with and against the direction of fluid flow.

For the measurement, two ultrasonic transducers are mounted onto the outside of the pipe. With one being downstream at a designated distance from the other. The electronics send two pulses through the pipe and into the fluid inside the pipe. One signal is sent with the direction of the flow, and the second is sent against the flow. The transducers act as both transmitters and receivers. The transit time of the ultrasonic signal moving in the direction of the flow is faster than that sent against the flow. The meter's electronics read these two times and calculate the time difference, ΔT, which can then be used to determine the average flow velocity.

The SonoPro Portable electronics take into account the fluid flow profile and apply a correction to the velocity reading to determine the average flow through the pipe.





Performance Specifications

Accuracy

Velocity: English Units: +/- 0.1 ft/s of reading to +/- 30 ft/s
SI Units: +/- 0.03 m/s of reading to +/- 10.7 m/s

Volumetric Flow Rate: ≤1-inch Line Size: +/- 2% of rate
>1-inch Line Size: +/- 1% of rate

Accuracy is dependent on several variables including pipe characteristics and transducer mounting configuration. Special calibration can improve accuracy. Contact factory if needed.

Repeatability

+/- 0.2% of rate

Pipe Sizes

Clamp-On-Transducers:
2MHz – 1/2" (15mm) to 4" (100mm)
1MHz – 2" (50mm) to 20" (500mm)
.5MHz – 12" (300mm) to 200" (5000mm)
Installation conditions can affect transducer selection

Measurement Parameters

Volume Flow, Mass Flow, Density, Temperature, Energy Units

Temperature Range

Standard Temperature – 4°F to 248°F (-20°C to 120°C)

Electronics Specifications

Battery Charger Power – 100-240 VAC, 50 to 60 Hz
Electronics Temperature
Battery – 20°C to 60°C
Charging – 0°C to 45°C

Display

Display – 2x16 character LCD digital display
Also works in conjunction with SonoConfig™ Instrument Interface Software. SonoConfig™ works on most Android phones and tablets

Output Signals

Output Standard – 2 analog 4-20mA, 1 pulse output, 2 alarm, 1 scaled frequency
Optional Output – Output Standard plus Energy Monitoring Options*
*Optional Output is only available with models VERER-EM

Input Signals

VER/VET – 1 RTD/Temperature Transmitter Input
VERER-EM – 2 RTD Inputs

Physical Specifications

Protection Rating

Ultrasonic Sensor – IP67 Standard

Fluid Types

Acoustically conductive fluids, including most clean fluids and many liquids with some entrained solids or gas bubbles. Some examples are: Refined Hydrocarbons, Petroleum products, Crude oil, Hydraulic fluids, Diesel and fuel oils, water, wastewater, Hot and chilled water, Glycol water solutions, Other liquids.

Models

SonoPro S34-VERER-EM

The model S34-VERER-EM Energy Monitoring option permits real time calculation of energy consumption for a facility or process. The meter can be programmed for hot water, chilled water, heat transfer oils, or water-glycol solutions. The model S34-VERER-EM can be installed in either the sent or the return leg of the system and with two external RTD or temperature transmitter inputs can calculate the change in energy. Selectable units include BTU, MBTU, MMBTU, Joules, Calories, Watt-hours, Megawatt-hours, Kilojoules, and Horsepower-hours. The electronics indicate two temperatures, Delta T, mass flow, total and energy total.

SonoPro S34-VER/VET

The model S34-VER/VET integrates an external RTD or temperature transmitter to calculate and output a compensated mass flow reading.

SonoPro S34-V

The model S34-V delivers a direct reading of the volumetric flow rate in applications ranging from water flow rates to hydrocarbon flow rates or for any other acoustically conductive fluids.

Mounting

Large Transducer (0.5/1.0 MHz) Mounting Fixture

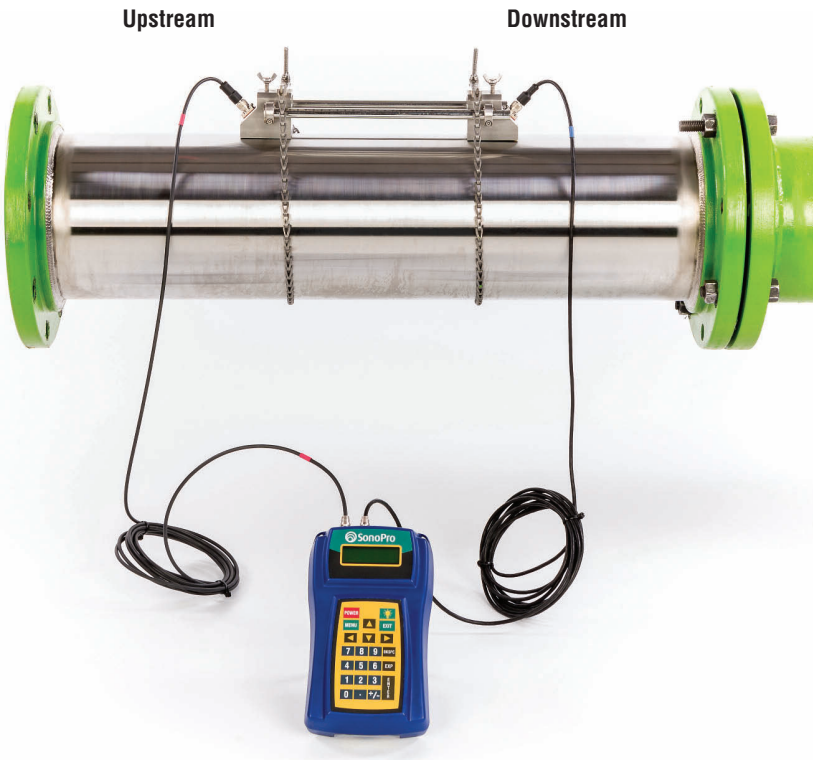
Included with the purchase of either the 0.5 MHz or 1.0 MHz transducer option.

– Adapter kit available to fit the smaller, 2 MHz transducers, on larger pipe sizes
– For use on pipes ≥ 2 inch (50mm)

Small Transducer (2 MHz) Mounting Fixture

Included with the purchase of the 2 MHz transducers.

– For use on pipes ranging from 1/2 inch (15mm) to 4 inch (100mm) This includes 1/2 inch (50mm) copper tubing



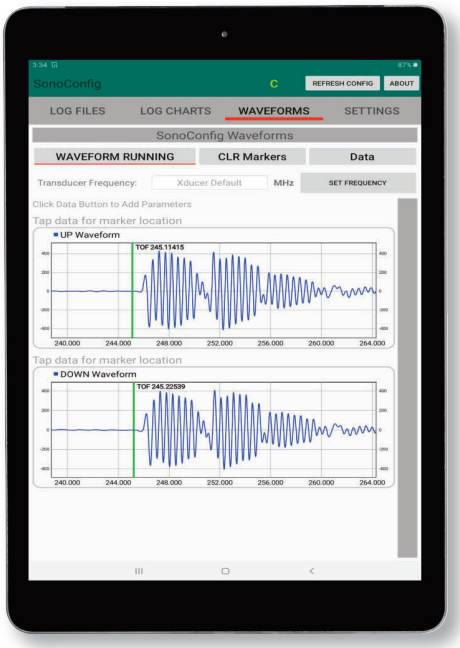
SonoConfig Instrument Interface Software

SonoConfig Instrument Interface Software

SonoConfig Instrument Interface Software works in conjunction with SonoPro Portable to provide valuable setup, diagnostic, and data logging tools. Communicate with SonoPro Portable through Bluetooth wireless or direct wire communication.

SonoConfig can also be provided preloaded on a tablet from VorTek Instruments.

Bluetooth®



Ultrasonic Thickness Gauge

MT160 Ultrasonic Thickness Gauge

Portable ultrasonic flow metering requires knowing the thickness of the pipe for which the transducers are mounted. The user does not always know this information. This is where a portable thickness gauge proves to be exceptionally useful. VorTek Instruments' MT160 ultrasonic thickness gauge is a compact handheld device that can measure the thickness of various materials with a high degree of accuracy. The MT160 gauge has no moving parts and does not require process interruptions as the measurement is taken on the outside of the pipe. With data logging capabilities and a wide range of transducers, the MT160 will accommodate your specific application requirements.

Individual Components and Carrying case options

Optional hard sided carrying case

Standard soft sided carrying case

Model Number Information – SonoPro Portable Transit Time Clamp-On Ultrasonic Flowmeter

Parent Model Code

S34	SonoPro Portable Transit Time Clamp-On Ultrasonic Flowmeter

Feature 1: Multivariable Options (See "Models" on page 3 for a more detailed description)

V	Volumetric Flowmeter for Liquids	**VET**	Velocity and External Temperature Transmitter[1]
VER	Velocity and External RTD[1]	**VERER-EM**	Velocity, Two External RTDs and Energy Output Options[1]

Feature 2: Transducer*

S1	(0.5 MHz) 12-Inch (300mm) to 200-Inch (5000mm) Line Size	**S4**	(2 MHz) 1/2-Inch (15mm) to 4-Inch (100mm) Line Size
S2	(1 MHz) 2-Inch (50mm) to 20-Inch (500mm) Line Size	**S5**	Combination of S1 and S4 (0.5 & 2 MHz)
S3	Combination of S1 and S2 (0.5 & 1 MHz)	**S6**	Combination of S2 and S4 (1 & 2 MHz)
		S7	Combination of S1, S2 and S4 (0.5, 1, & 2 MHz)

Feature 3: Cable Length

1	15-Foot (4 m) Length
2	30-Foot (9 m) Length
3	45-Foot (13 m) Length

Feature 4: Process Temperature

ST	Standard Temperature	Process Temperature -4°F to 248°F (-20°C to 120°C)

Feature 5: Options and Accessories

BLU	Bluetooth Communication	**CG**	Additional Container of Acoustic Coupling Grease, List as a separate line item (with quantity) on your P.O.
SC	SonoConnect™ Breakout Box		
PCC	Protective Carrying Case, Telescoping Handle, Wheels, Custom Foam Cut-Out	**CRTD**	Clamp On Temperature Sensors (RTDs) (2)
		SPCA	Special Calibration

[1] SonoConnect™ Breakout Box is Required for these Models

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