SONOPRO® Portable Transit Time Clamp-On Ultrasonic Flowmeter

VorTek Instruments SONOPRO® portable transit time clamp-on ultrasonic flowmeters incorporate the latest digital signal processing to deliver accurate and stable volumetric flow readings. Every SONOPRO® clamp-on transducer pair is matched and can be joined with an external temperature input to ensure an accurate temperature compensation of the flow signal. Clamp-on meters have no wear, create zero pressure loss and do not require the process to be stopped to install them since they are attached to the outside of the pipe. SONOPRO® transit time meters are inherently bidirectional as well.

Combine these features with the energy monitoring option and the SONOPRO® transit time clamp-on ultrasonic flowmeters will accommodate your specific application requirements.

SONOPRO® Advantage:

- Non-invasive Volumetric Flow monitoring for most liquids
- Multivariable meter delivers mass flow, temperature, pressure 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
- Temperature up to 248°F (120°C)
- Clamp On pipe sizes from 1/2" (15mm) to 200" (5000mm)
- Transducer mounting configurations include Z, V, N, and W
- Field configurable ranges, outputs and display
  USB communication - Standard
  Bluetooth communication - Optional
- Rechargeable lithium-ion battery
  Battery life up to 11 hours
- Datalogging with file save and playback functionality
- Custom software interface for troubleshooting

available at

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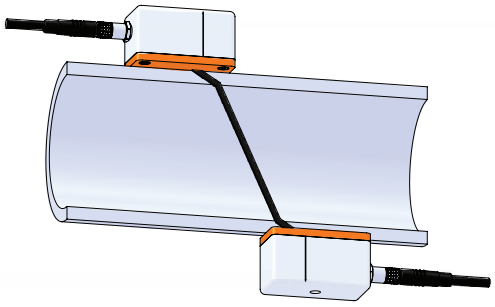
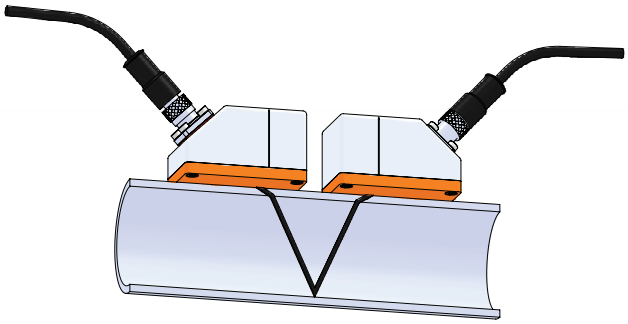
SONOPRO® Principle of Operation

The SONOPRO® portable clamp-on ultrasonic flowmeter operates on the transit time ultrasonic measurement method. This type of measurement uses that basic fact that the transmission speed of the ultrasonic signal is influenced by the flow velocity of the fluid to be measured. This is analogous to a person paddling a canoe with the current vs. paddling against the current. The canoe is able to travel downstream with the current faster than it can be paddled back up stream against the current. The same is true for the sound waves as they travel with and against the direction of flow.

For the measurement, there are two ultrasonic transducers 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 meters electronics read these two times and calculate the time difference, ΔT, which can then be used to determine the average flow velocity.

The SONOPRO® 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: +/- 0.01 ft/s of reading to +/- 40 ft/s
SI Units: +/- 0.003 m/s of reading to +/- 12.2 m/s

Volumetric Flow Rate: +/- 1% to 2% of rate typical
+/- 0.5% of rate is achievable with the optional special calibration

Accuracy is dependent on several variables including pipe characteristics and transducer mounting configuration

Repeatability

+/- 0.2% of rate

Pipe Sizes

Clamp-On-Transducers:

2MHz – 1/2" (15mm) to 6" (150mm)
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 - 85 to 240 VAC, 50 to 60 Hz, 2 watts
Electronics Temperature - 0°C to 70°C

Display

Display – 2x16 character LCD digital display

Output Signals

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

Input Signals

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

Physical Specifications

Wetted Materials

Transducer - Stainless Steel

Protection Rating

Ultrasonic Sensor – IP67 Standard

Pending Approvals

2006/95/EC Low Voltage Directive
IEC 61010-1

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/VETET-EM

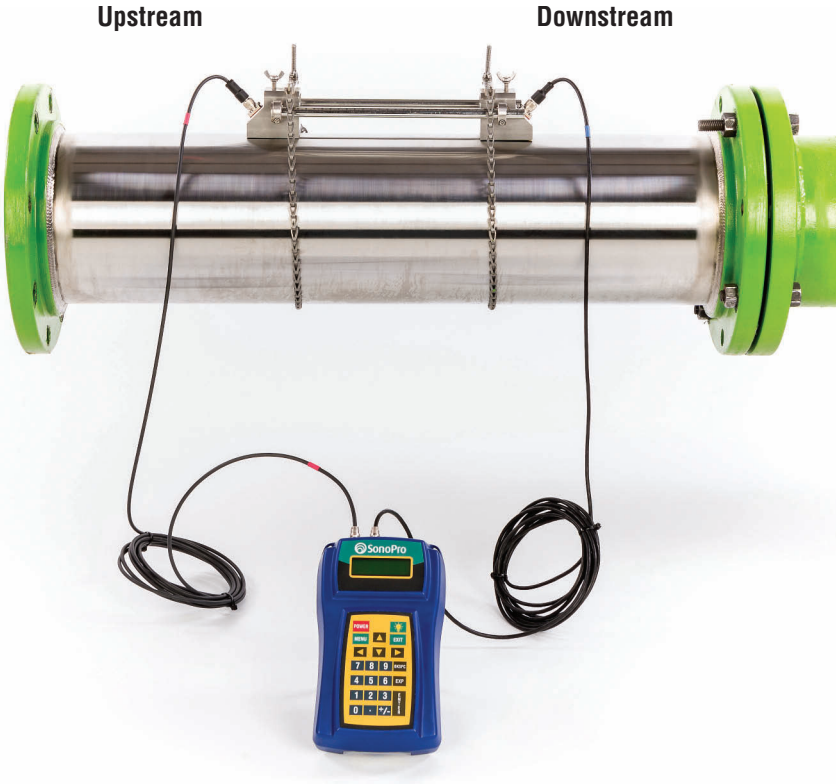
The model S34-VERER-EM/VETET-EM Energy Monitoring option permits real time calculation of energy consumption for a facility or process. The meter can be programmed for hot water, chilled water, heat transfer oils, or water-glycol solutions. The model S34-VERER-EM/VETET-EM can be installed in either the 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.



Individual Components and Packaging

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

S34- [ ] [ ] [ ] [ ] [ ]

Parent Model Code

S34	SonoPro® Portable Transit Time Clamp-On Ultrasonic Flowmeter

Feature 1: Multivariable Options

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

Feature 2: Transducer

S1	(2MHz) 1/2-inch (15 mm) to 6-inch (150 mm) Line Size
S2	(1MHz) 2-inch (50 mm) to 20-inch (500 mm) Line Size
S3	(.5MHz) 12-inch (300 mm) to 200-inch (5000 mm) Line Size

Feature 3: Cable Length

1	15-Foot Length
2(xx)	Custom Length in 15-Foot Segments up to 45-Feet

Feature 4: Process Temperature

ST	Standard Temperature

Feature 5: Options and Accessories

BLU	Bluetooth
CRTD	Clamped On Matched RTD's
SC	SonoConnect™ Breakout Box
SPCA	Special Calibration

[1] SonoConnect™ Breakout Box is Required for these Models, External Temperature Sensors to be Supplied by Others