SonoPro S36

Технические характеристики

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

SonoPro® Professional Series Transit Time Clamp-On Ultrasonic Flowmeter (Model S36)

VorTek Instruments SonoPro® Professional Series clamp-on ultrasonic flowmeter offers high-accuracy transit-time ultrasonic technology to deliver accurate and reliable flow metering. The innovative design incorporates 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, this flowmeter can provide a reliable energy (BTU) or mass flow measurement.

SonoPro Professional Series flowmeter offers an industry-leading variety of communication options. In addition to providing traditional communication methods such as analog output signals, this flowmeter also provides the latest and most advanced digital fieldbus protocol options such as BACnet®/IP and Modbus® TCP/IP.

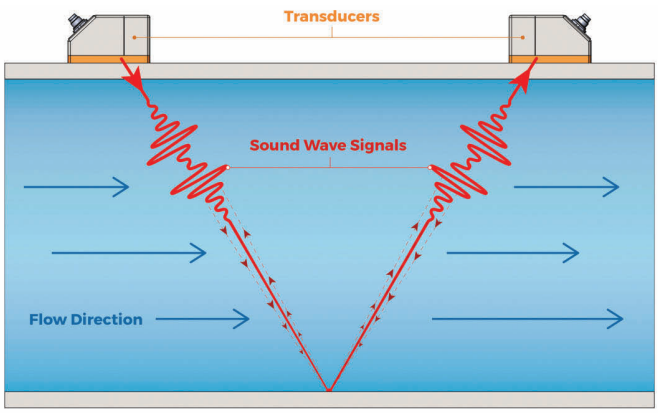
SonoConfig™ Instrument Interface Software works with SonoPro Professional Series to provide valuable setup, diagnostic, and data logging tools. Communicate through Bluetooth® wireless or USB connection. SonoConfig is available for free download and works on most Android® phones and tablets. It can also be provided preloaded on a tablet from VorTek Instruments.

SonoPro Advantage:

- Fixed mount 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 up to +/-0.75% of rate
- 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 - Standard
  Bluetooth® Communication - Optional
  Modbus® and BACnet® Communication - Optional
- 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 Professional Series Principle of Operation

The SonoPro Professional Series flowmeter operates on the transit time ultrasonic measurement principle. Transit-time flowmeters use a pair of transducers. Both transducers act as transmitters and receivers of these ultrasonic sound wave signals. Sound waves moving in a fluid carry faster when traveling in the fluid flow direction (downstream) and slower when traveling against the fluid flow (upstream). If there were no fluid flow, the times would be identical. This time difference is measured, and from that, a fluid velocity is calculated. With the area of the pipe and fluid velocity known, the flowmeter calculates a volumetric flow rate. If the fluid density is known, a mass flow rate can be calculated. If the fluid enthalpy is known, an energy (BTU) measurement can be calculated.



Accuracy

Velocity: English Units: +/- 0.25 ft/s of reading to +/- 30 ft/s
SI Units: +/- 0.08 m/s of reading to +/- 9.1 m/s

Volumetric Flow Rate: ≤1-inch Line Size: +/- 1.5% of rate
>1-inch Line Size: +/- 0.75% 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

Transducer Temperature Range

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

Power Requirements

16 to 36 VDC, 333 mA, 8 W max.
100 to 240 VAC, 50-60 Hz, 8 W max.

Electronics Specifications

Electronics Temperature
Ambient Operating: -4 to 158°F (-20 to 70°C)
Ambient Storage: -22 to 176°F (-30 to 80°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

Standard Outputs - 2 analog (4-20mA), 1 pulse, 2 alarms, 1 scaled frequency
Optional Outputs (Digital Fieldbus Protocols) - Modbus RTU (RS-485), BACnet MS/TP (RS-485), Modbus TCP/IP (RJ45), BACnet/IP (RJ45)

Input Signals

VER – 2 RTD Inputs
VERER-EM – 2 RTD Inputs

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

S36 V (Volumetric Flow Metering)

The model S36-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.

S36 VER (Volumetric & Mass Flow Metering)

The model S36-VER integrates an external RTD to calculate and output a compensated mass flow reading.

S36 VERER-EM (Volumetric, Mass, & Energy Flow Metering)

The model S36 VERER-EM 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 S36 VERER-EM can be installed in either the sent or the return leg of the system and with two external RTD 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.

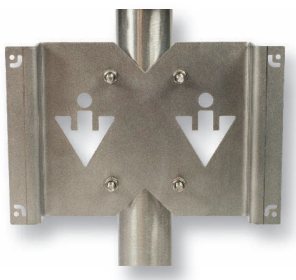
Mounting

Large Transducer (0.5/1.0 MHz) Mounting Clamps

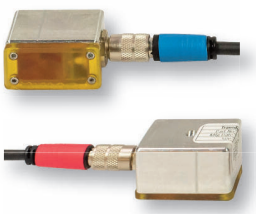
Included with the purchase of either the 0.5 MHz or 1.0 MHz transducer option.
– Adapter kit available to fit the smaller, 2 MHz transducers, on larger pipe sizes.Contact factory if needed.
– For use on pipes ≥ 2 inch (50mm)

Small Transducer (2 MHz) Mounting Fixture

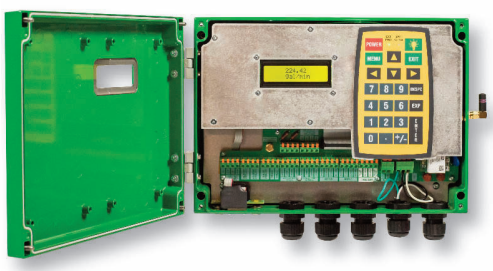
Included with the purchase of the 2 MHz transducers.
– For use on pipes ranging from 1/2 inch (15mm) to 4 inch (100mm) This includes 1/2 inch (50mm) copper tubing



Optional Pipe Mounting Kit (PMK) for Transmitter



Multiple transducer options to accommodate a variety of pipe sizes



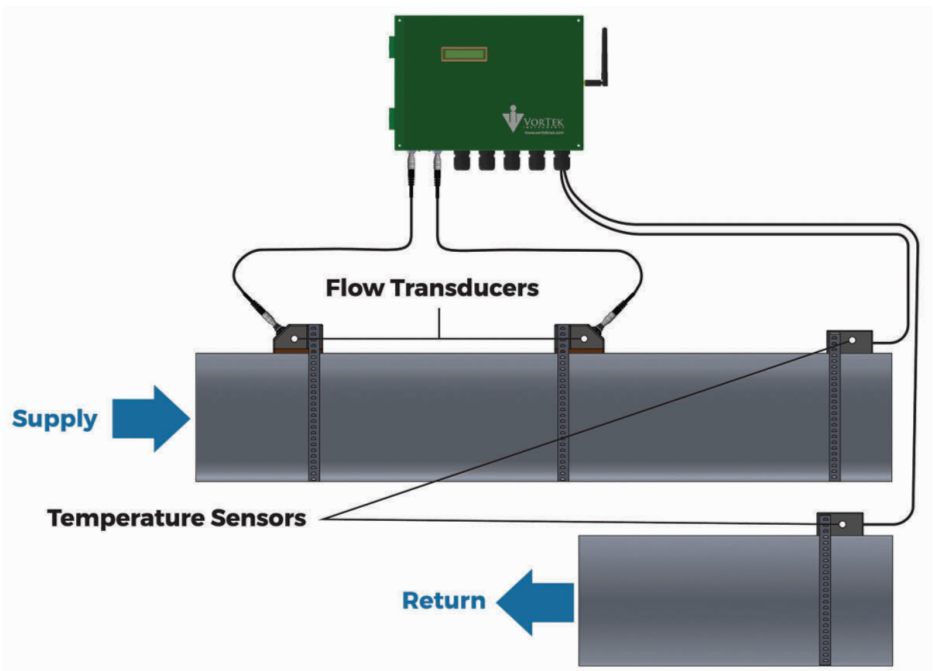
Programming setup is simple and easy with a backlit display, intuitive programming menu, and tactile keypad

Thermal energy meters, or BTU meters, measure the energy of hydronic or steam-based heating and cooling systems. Thermal energy meters consist of a volumetric flow sensor, temperature sensors and a flow computer. Volumetric flow rate and temperature measurements feed into the flow computer, where the necessary calculations are performed to produce a thermal energy measurement.

Metering thermal energy in this fashion continues to grow in importance, with environmental regulations and financial incentives being the primary drivers. District energy systems and commercial facilities such as universities, hospitals and airports are adopting thermal energy metering to optimize the performance of their HVAC systems. These modern systems are complex, consisting of chilled and hot water systems, boilers, cooling towers, pumps and metering equipment. Optimizing these systems is well worth the investment. Increasing energy efficiencies of the heating and cooling infrastructure leads to more environmentally friendly facilities and significant cost savings.

Older facilities typically do not have thermal energy metering capabilities. These requirements have come about more recently through increased environmental regulations and initiatives. Clamp-on ultrasonic thermal energy meters are ideal for retrofitting these older systems, as costly and time-consuming piping modifications are not required.

SonoPro ultrasonic flowmeters are available with clamp-on RTD temperature sensors. Using these temperature measurements, SonoPro flowmeters perform the necessary calculations to provide a reliable energy (BTU) measurement. With all flow transducers and temperature sensors connected to a single unit, SonoPro flowmeters are a fully integrated energy measurement solution. This fully integrated solution eliminates the error potential associated with using multiple devices toperform energy calculations.



SonoConfig Instrument Interface Software

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

Bluetooth®

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

Parent Model Code

S36	SonoPro Professional Series Transit Time Clamp-On Ultrasonic Flowmeter

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

V	Volumetric Flow Metering
VER	Velocity and External RTD (Volumetric & Mass Flow Metering)
VERER-EM	Velocity, Two External RTDs and Energy Output Options (Volumetric, Mass, & Energy Flow Metering)

Feature 2: Transducer

S1	(0.5 MHz) 12-Inch (300mm) to 200-Inch (5000mm) Line Size
S2	(1 MHz) 2-Inch (50mm) to 20-Inch (500mm) Line Size
S4	(2 MHz) 1/2-Inch (15mm) to 6-Inch (150mm) Line Size

Feature 3: Transducer Cable Length

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

Feature 4: Communications

1	Analog Outputs (Two)
2	Analog Outputs (Two), Modbus RTU (RS-485)
3	Analog Outputs (Two), BACnet MS/TP (RS-485)
4	Analog Outputs (Two), Modbus TCP/IP (RJ45)
5	Analog Outputs (Two), BACnet/IP (RJ45)

Feature 5: Options & Accessories

BLU	Bluetooth® Wireless Communication (Communicate with SonoConfig™ Instrument Interface Software)
CG	Additional Container of Acoustic Coupling Grease, List as a separate line item (with quantity) on your P.O.
CRTD	Clamp On RTDs (2)
PMK	Pipe Mounting Kit for Transmitter
SPCA	Special Calibration

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