



PendoTECH® Low-Flow Ultrasonic Flowmeter

The PendoTECH Low-flow Ultrasonic Flowmeter is an in-line flow sensor that can measure flows down to 2mL/minute and has an unobstructed fluid path to minimize any back-pressure. The flow sensor is a straight-through PFA tube that uses ultrasonic sensing technology to measure the flow rate. There are no moving parts or mechanical seals. The PFA tube can be cleaned with standard cleaning solutions so it can be re-used. The monitor has an LCD to display the flow and connectors on the back for the outputs and power. The monitor receives the raw flow rate signal from the sensor and provides the LCD display indication and has output signals in terms of 4-20milliamp analog output and also a pulse/frequency output.



Console version
FM-US-LF-C

Features

- Ultrasonic flow sensing technology - robust proven technology
- Capable of measuring flows from 2 - 200ml/min
- Compact design
- Sensors/Transducers sit outside tube - hence completely non-invasive
- Minimal pressure drop - since there is no obstruction in flow path
- Minimal bubble entrapment compared to other designs due to in-line flow path
- Ideal for precise measurements in low flow applications
- No moving parts: hence no particle generation
- Flow measurements possible in both flow directions
- Transducers resistant to harsh chemical environments
- Flow cell has NEMA 4X compliance



Operating Principal

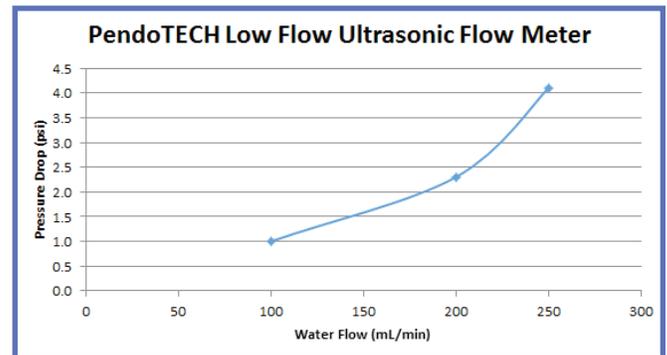
This transit-time ultrasonic flow meter measures the difference in travel time between upstream and downstream signals. It consists of two ring shape piezo-transducers that surround the tube with a fixed longitudinal spacing. The flow meter's electronic circuitry directs signals from one transducer to another and back through an upstream and a downstream measurement cycle; sound pulses of a few cycles in length are usually transmitted each way. If the liquid inside of the flow tube is moving, the sound pulse will travel faster when it is sent in the direction of liquid flow than it will when it is sent against the liquid flow. Thus the difference in the transit times in upstream Vs downstream directions, (TU - TD) measured over the same acoustic signal path can be used to calculate the flow through the conduit. Because the cross-sectional area of the conduit is known, the product of that area and the measured velocity will provide a measure of volumetric flow. Such calculations are performed by the Digital Signal Processing (DSP) based controller.

Performance Specification

Flow Range	2 to 200mL/min
Accuracy	± 2% of the reading for flow rates over 100 mL/min ± 2% ± 0.2mL/min for flow rates under 100mL/min

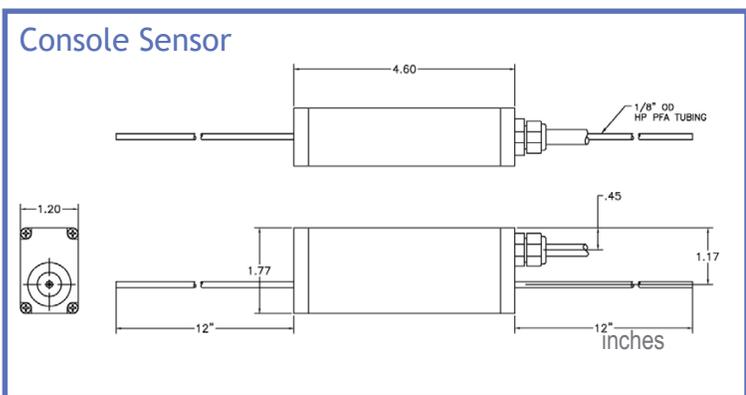
Sensor Materials Specification

Flow Cell Materials	Non-wetted Parts FEP, Peek, PP, PTFE, PVDF, Viton A Wetted Parts High Purity PFA
Cable for Console Unit	6feet / 2meters (standard) to connect monitor to flow cell. PTFE jacketed cabling.



Functional Specification

Analog Output	Current Isolated 4 - 20mA current output spanned: 0-600mL/min on Console (Maximum load resistance of 500 Ω) (Under and over range capability 0 to 24mA)
Pulse/Frequency Output	Isolated Open Collector (30VDC, 10mA) Frequency of 10KHz maximum with K factor = 1,000,000 pulses/L on Console Power Supply 12 - 36VDC Power Consumption 3.5 W continuous (600mA max on start-up) Ambient Temperature 32 - 115°F (0 - 46°C) Fluid Temperature 50 - 140°F (10 - 60°C)



Ordering Information

FM-US-LF-C	Low Flow Ultrasonic Benchtop Flow Meter (1/16in ID), flow range 2-200mL/min (with 24VDC power supply & output signal connector)
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