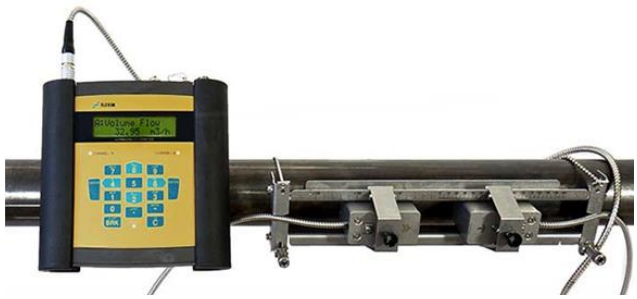
Ultrasonic Liquid Flow Meter

Portable ultrasonic flow measurement of liquids in hazardous areas.

System Overview

Portable instrument for non-invasive, quick ultrasonic flow measurement with clamp-on technology for all types of piping



Features

- Precise bidirectional and highly dynamic flow measurement with the non-invasive clamp-on technology
- High precision at fast and slow flow rates, high temperature and zero-point stability
- Portable, easy-to-use flow transmitter with 2 flow channels, multiple inputs/outputs, an integrated data logger with a serial interface
- Extremely resistant carbon fiber housing
- Covered by ATEX/IECEx zone 2 certification
- Compact and very lightweight, allowing the measuring system to be easily carried as personal luggage, e.g. for offshore visits
- Watertight; resistant against oil, many liquids and dirt
- Li-Ion battery provides up to 25 hours of measurement operation
- Automatic loading of calibration data and transducer detection for a fast and easy set-up (less than 5 min), providing precise and long-term stable results
- User-friendly design
- Transducers available for a wide range of inner pipe diameters and fluid temperatures
- Rugged transducers (ATEX/IECEx zone 1 and 2, resistant to rough environments, dust and humidity)
- Robust, watertight (IP67) transport case with comprehensive accessories
- HybridTrek automatically switches between transit time and NoiseTrek mode of measurement when high particulate flows are encountered
- QuickFix for fast mounting of the flow transmitter in difficult conditions

  Measurement is unaffected by fluid density, viscosity and solid content (max. 10 % of volume)

Applications

Designed for the following industries:

- Upstream (on- and offshore)
- Midstream and downstream (pipelines and refineries)
- Chemical industry
- Energy sector (e.g., HVAC, geothermal, power plants)

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Specification

Design		Portable, Zone 2
Measurement		
Measurement principle		Transit time difference correlation principle, automatic NoiseTrek selection for measurements with high gaseous or solid content
Flow velocity	m/s	0.01...25
Repeatability		0.15 % of reading ±0.005 m/s
Fluid		All acoustically conductive liquids with < 10 % gaseous or solid content in volume (transit time difference principle)
Temperature compensation		Corresponding to the recommendations in ANSI/ASME MFC-5.1-2011
Measurement Uncertainty (Volumetric Flow Rate)		
Measurement uncertainty of measuring system[1]		±0.3 % of reading ±0.005 m/s
Measurement uncertainty at the measuring point[2]		±1 % of reading ±0.005 m/s
Transmitter		
Power supply		• 100...230 V/50...60 Hz (power supply unit, outside of explosive atmosphere) • 10.5...15 V DC (socket at transmitter, with power adapter PA608A2 (optional) and power connection adapter PA608NN (optional)) • Integrated battery
Integrated battery • Operating time	h	Li-Ion, 7.2 V/6.2 Ah • > 14 h (without outputs, inputs and backlight) • > 25 h (1 measuring channel, ambient temperature > 10 °C, without outputs, inputs and backlight)
Power consumption	W	< 6 (with outputs, inputs and backlight), charging: 18
Number of measuring channels		2
Damping	s	0...100 (adjustable)
Measuring cycle	Hz	100...1000 (1 channel)
Response time	s	1 (1 channel), option: 0.07
Housing material		PA, TPS, PC, Polyester, Stainless steel
Degree of protection		IP65
Weight	kg	2.2
Fixation		QuickFix pipe mounting fixture
Ambient temperature	°C	-10...+60
Display		2 x 16 characters, dot matrix, backlight
Menu language		English, German, French, Dutch, Spanish
Explosion Protection		
• **ATEX/IECEx**		
Marking		CE 0637 Ex II3G II2D Ex nA nC ic [ic] IIC (T6) T4 Gc Ta -10...+(50)60 °C Ex tb IIIC T100 °C Db
Certification ATEX		IBExU10ATEX1067
Certification IECEx		IECEx IBE 12.0006
Intrinsic safety parameters		U_m = 16 V DC Intrinsically safe inputs: U_o = 22 V, I_o = 6 mA, P_o = 33 mW, C_o = 450 nF, L_o = 10 mHC_i = 1.8 nF, L_i = 10 µH
Measuring Functions		
Physical quantities		Volumetric flow rate, mass flow rate, flow velocity, heat flow (if temperature inputs are installed)
Totalizer		Volume, mass, optional: heat quantity
Calculation functions		Average, difference, sum
Diagnostic functions		Sound speed, signal amplitude, SNR, SCNR, standard deviation of amplitudes and transit times
Communication Interfaces		
Service interfaces		• RS232 • USB (with adapter)

1 With aperture calibration of the transducers

2 For transit time difference principle and reference conditions

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Accessories		
Serial data kit • Cable • Adapter		 RS232 RS232 - USB
Software		• FluxDiagReader: Download of measured values and parameters, graphical presentation • FluxDiag (optional): Download of measurement data, graphical presentation, report generation • FluxSubstanceLoader: Upload of fluid data sets
Adapter		• Output adapter (necessary, option) • Input adapter (if number of inputs > 2)
Transport case		Dimensions: 500 x 400 x 190 mm
Data Logger		
Loggable values		All physical quantities, totalized values and diagnostic values
Capacity		> 100 000 measured values
Outputs		
		The outputs are galvanically isolated from the transmitter.
Number		Analog outputs: max. 4 • 0, 2 or 4 active current outputs or passive current outputs or frequency outputs or • 2 active current outputs and 2 passive current outputs or • 2 active current outputs and 2 frequency outputs or • 2 passive current outputs and 2 frequency outputs Binary outputs: max. 4
Current Output		
Range	mA	0/4...20
Accuracy		0.1 % of reading ±15 µA
Active output		R_{ext} < 200 Ω
Passive output		U_{ext} = 4...9 V, depending on R_{ext} (R_{ext} < 200 Ω at 9 V)
Frequency output		
Range	kHz	0...5
Open collector		24 V/4 mA
Binary output		
Optorelay		26 V/100 mA
Binary output as alarm output		
• Functions		Limit, change of flow direction or error
Binary output as pulse output		
• Functions • Pulse value • Pulse width	 units ms	Mainly for totalizing 0.01...1000 1...1000
Inputs		
		The inputs are galvanically isolated from the transmitter.
Number		Max. 4
Temperature input		
		Intrinsic safety
Type		Pt100/Pt1000
Connection		4-wire
Range	°C	-150...+560
Resolution	K	0.01
Accuracy		±0.01 % of reading ±0.03 K

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