



SONOFLOW® CO.56 Pro V2.0

Non-Invasive Clamp-On Flow-Bubble Sensors

The hybrid flow-bubble sensor SONOFLOW CO.56 Pro V2.0 combines accurate flow measurement and reliable air bubble detection in liquid filled medical tubing. The robust design with cyclical self-tests and fail-safe architecture prevents the sensor from any malfunction in order to ensure patient safety and life support. The lightweight compact ultrasonic sensor can easily be clamped on the tubing or mounted onto medical devices. By meeting high medical standards SONOFLOW CO.56 Pro V2.0 is suitable for life safety-critical applications.



- Combined flow measurement and bubble detection
- Meets high medical standards ensuring patient safety and life support
- Safe operation in electromagnetically sensitive environments
- Free-hanging on medical tubing, e.g., extracorporeal life support systems (ECLS) or fixed mounting onto medical devices
- Available for medical grade IV tubing sets

Key Features

- Highly accurate non-invasive flow measurement of liquids
- Reliable detection of air bubbles in liquid filled tubing
- Lightweight sensor with integrated electronics, no external transmitter required
- RS-485 interface for operating up to 12 sensors



Technical Safety Features

- Fail-safe architecture
- Cyclical self-tests ensuring functionality of all essential components
- Watchdog securing output in case of major errors
- Initial test procedure after power on or software reset



Regulatory Safety Standards

- **Medical Safety**
IEC 60601-1 (3rd edition)
- **Electromagnetic Compatibility**
IEC 60601-1-2 (4th edition)
- **Further Standards**
Acoustic emission: IEC 61157
RoHS compliance: 2011/65/EU



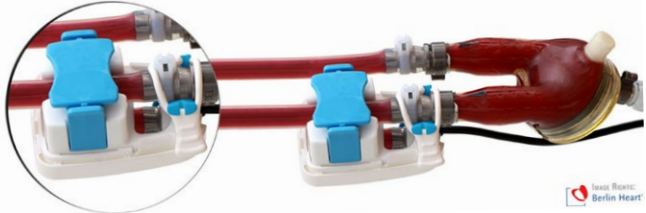
Technical Data

Measuring Method	Ultrasound for combined flow & bubble detection
Measuring Cycle	20 ms
Mounting	Clamped on the tubing (freely hanging) or mounted onto a medical device
Tubing (ID x WT)	1/4" x 1/16" 1/4" x 3/32" 3/8" x 3/32"

Interfaces	RS-485
Operating Voltage	5 VDC +0.5/-0.1VDC
Current Consumption	≤ 150 mA
Ambient / Media Temperature	15 ... +43°C
Protection Class	IP67

Customization

- High degree of customization
- Customer-specific solutions regarding sensor design, parameter setting, interfaces, etc.
- Calibration according to OEM requirements



Measurement Principles

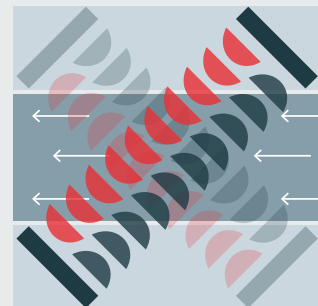
SONOFLOW CO.56 Pro V2.0 flow-bubble sensors combine the ultrasonic transit-time principle for flow measurement with intelligent ultrasonic transmission technology for bubble detection. Thus, the sensors are based on innovative safety concepts to guarantee maximum sensor reliability.

Flow Measurement | Ultrasonic Transit-Time

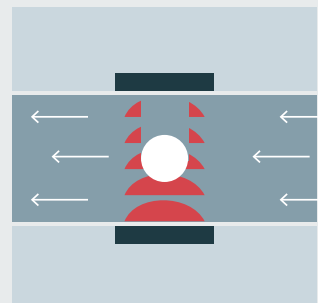
SONOFLOW sensors use ultrasound transit-time technology to accurately determine flow rates. The sensors measure the time of flight of the ultrasonic wave with and against the flow direction of the liquid. The time difference between both signals is a size for the velocity of the flowing liquid. The velocity together with the value of the cross-sectional area allow determining the specific flow volume. The volume results from the product of the flow velocity and the cross-sectional area of the tubing.

Bubble Detection | Ultrasonic Transmission Technology

The non-contact flow-bubble sensor incorporates intelligent ultrasonic transmission technology. The presence of air bubbles and obstructions is detected by means of dynamic amplitude monitoring. Depending on the sound impedance of the adjacent media, reflection and transmission take place at the interface. When an air bubble passes the sensor channel, the signal level of the transmitted sound wave drops. The higher the drop of the signal level, the larger the size of the air bubble.



Transit-time principle for clamp-on flow measurement



Amplitude monitoring for bubble detection

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