SONOTEC



Medical Technology

ULTRASONIC SENSORS

FOR A SAFER WORLD

Non-Invasive Fluid Monitoring

SONOFLOW® | AVA
Portable Flow Meter*

Portable Flow Meter with Integrated Touch Display for Supportive Flow Measurement on Medical Tubing



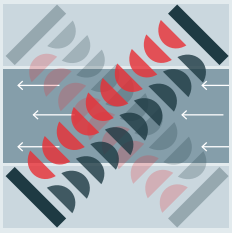
SONOFLOW | AVA flow meters are designed to provide additional monitoring of flow rates in medical tubing, in conjunction with the ECMO and heart-lung machines in use. The sensor uses ultrasound adjusted to the viscosity of the blood to show immediate flow data via its touch display.

The sensor requires only a power source to reliably display the flow data. Easy to use and configure, the sensor is an efficient tool for monitoring pump-controlled flow rates in medical devices and other applications also outside the medical field.

The touch display can easily be adjusted and customized to the specific operation. The following options can be selected, e.g.:

- → Display orientation
- → Min and max flow rate
- → Measuring unit (ml/min or l/min)
- → Flow direction
- → Status information of the sensor

Measurement Principle

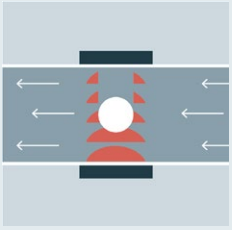


Flow Measurement | Ultrasonic Transit-Time

SONOFLOW flow sensors use ultrasound transit-time technology to accurately determine flow rates. The non-invasive clamp-on 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 flow volume is calculated from the fluid velocity and the cross-sectional area of the tubing.

Bubble Detection | Ultrasonic Transmission

SONOCHECK ABD bubble sensors detect air bubbles and obstructions 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 bubble size.



SONOFLOW® CO.56 Pro V2.0 Flow-Bubble Sensor

Lightweight Hybrid Sensor for Free-Hanging Installation on the Tubing

SONOFLOW CO.56 Pro V2.0 combines accurate flow measurement and reliable air bubble detection in standard medical tubing. The implemented fail-safe architecture and cyclical self-tests prevent the sensor from any malfunction in order to ensure patient safety and life support. The lightweight ultrasonic sensor is designed to hang on the tube with no need for additional mounting.

Unique Product Benefits

- → Combined accurate flow measurement and bubble detection
- → Free-hanging on medical tubing, e.g., extracorporeal life support systems (ECLS)
- → Integrated electronics



SONOFLOW® CO.56 Flow-Bubble Sensor

Compact Hybrid Sensor for Fixed Mounting onto Medical Devices

The clamp-on sensor SONOFLOW CO.56 measures flow rates and detects air bubbles in liquid filled plastic tubing. The ultrasonic sensor is available in different sizes to cover a wide range of typical tubing diameters and materials. Designed for system integration, the compact sensor can be mounted, e.g., onto perfusion systems, organ transport or robot-assisted surgery devices.

Unique Product Benefits

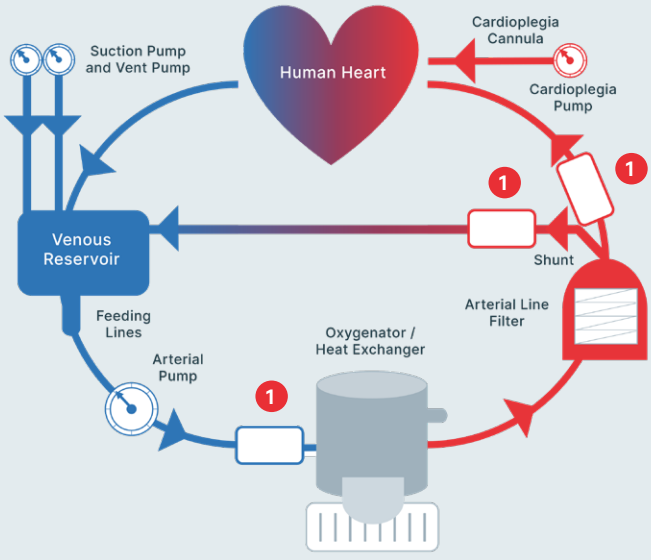
- → Manifold sensor sizes for a wide range of tubing
- → Sensor design allows for fixed mounting onto medical devices
- → Integrated electronics



Heart-Lung Machine

During cardiopulmonary bypass, the heart-lung machine takes over the function of the heart and lungs. A reliable operation of all equipment used must be guaranteed at all times. For that reason, combining flow measurement and air bubble detection by implementing the non-invasive ultrasonic flow-bubble sensor SONOFLOW CO.56 Pro V2.0 constitutes a significant safety and comfort feature.

The clamp-on sensors measure flow rates on different tubes and shunts leading to the body or back into the venous circuit of the heart-lung machine. Simultaneously, they detect air bubbles and give feedback on the real flow compared to the theoretical flow of the heart-lung machine.



1 Flow-Bubble Sensor SONOFLOW CO.56 Pro V2.0

SONOCHECK® ABD Compact Air Bubble Detector

Designed for Medical Applications With High Safety Requirements

The non-invasive SONOCHECK ABD05 and SONOCHECK ABD07 air bubble sensors are applied to detect air and gas bubbles in blood, plasma, water, or saline solution-filled flexible plastic tubing. The compact sensor series combines intelligent ultrasonic transmission technology and innovative safety concepts in order to guarantee maximum sensor reliability.

Unique Product Benefits

- → Sensor designed for dry coupling on flexible tubing
- → Advanced fail-safe architecture
- → Dynamic adjustment for the optimal operating point at all times



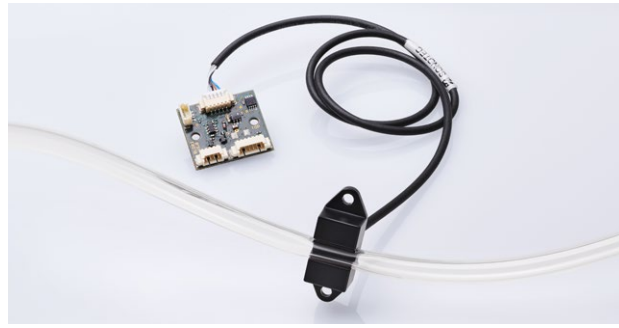
BLD03 | Non-Invasive Blood Leak Detector

Contactless Detection of Smallest Traces of Human Blood

The optical sensor BLD03 detects smallest amounts of blood in clear fluids on transparent flexible plastic tubing. Acc. to safety requirements for dialysis equipment specified in the IEC 60601-2-16:2018 standard, the sensor recognizes 0.35 ml/min of blood at a flow rate of 800 ml/min and a hemato-crit level of 32 %. Advanced algorithms guarantee excellent protection against ambient light.

Unique Product Benefits

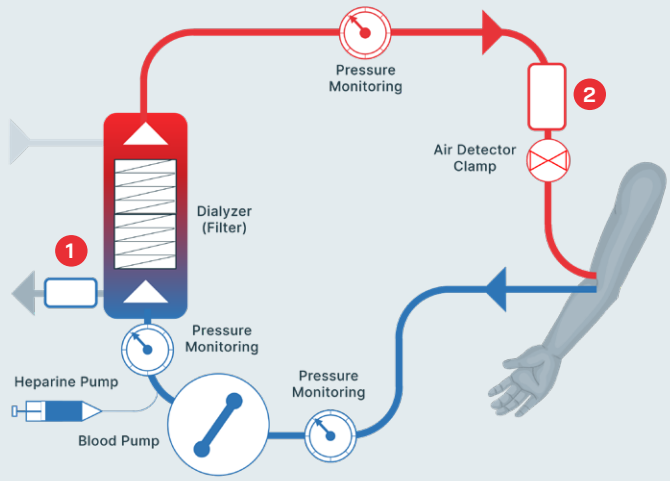
- → Highly resistant to ambient light
- → Built-in component integrated into a medical device, e.g., dialysis machines
- → Advanced electronics for a wide working range



Hemodialysis

As an extracorporeal circuit, the dialysis machine substitutes a kidney's function during treatment. An undetected membrane rupture in the dialyzer can lead to unwanted blood loss of the patient during dialysis treatment. For this reason, the discharged dialysate is continuously examined for blood traces. This task is performed by the optical sensor Blood Leak Detector BLD03.

The non-invasive sensor detects smallest amounts of blood in the dialysate. With regards to the presence of air bubbles, as they may re-sult in life-threatening air embolisms, the blood circulation is continuously observed by the non-invasive air bubble detector SONOCHECK ABD05.



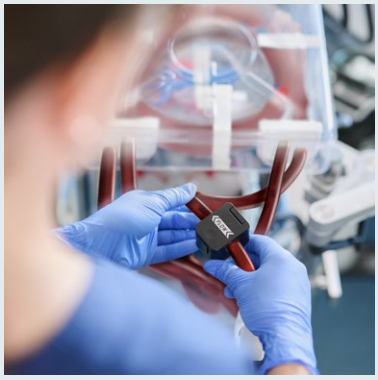
1 Blood Leak Detector BLD03

2 Air Bubble Detector SONOCHECK ABD

Non-Invasive Sensor Solutions for Medical Technology

Medical sensors need to be highly accurate, reliable at any time and resistant to external influences. High demands on sensors set high demands on sensor manufacturers. As a component manufacturer, SONOTEC gives clear guidance from a early stage in the product development process, supports during verification, prototyping and the expertise in certification processes, SONOTEC has built up a proven track record among medical device manufacturers. Customers all over the world implemented SONOTEC sensors in dialysis and transfusion machines, heart and lung support devices, organ transportation systems, blood separators, medical pumps and diagnostic systems.

Fields of Application





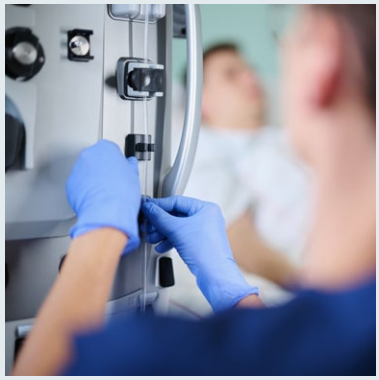
Heart and lung support

- → Cardiopulmonary bypass / heart-lung machines
- → ECMO machines
- → Cardiac support systems



Medical devices

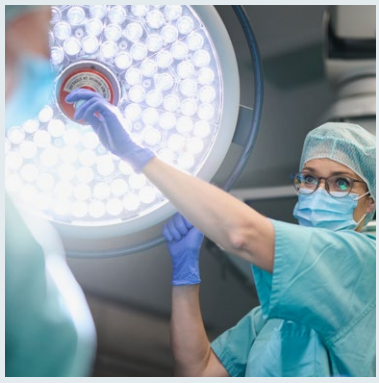
- → Hemodialysis and transfusion
- → Organ transport
- → Apheresis machines
- → Diagnostic systems



Medical pumps

- → Infusion pumps
- → Heart pumps
- → Feeding pumps
- → Contrast media injectors





SONOCHECK® ALD | Non-Invasive Drip Chamber Sensor

The non-invasive air level detector SONOCHECK ALD monitors the liquid level in drip chambers during infusion therapy, dialysis or, parenteral nutrition. The sensor is dry coupled, free of wear and tear, and highly reliable. Small foamy bubbles are ignored by the clamp-on sensor. The SONOCHECK ALD can be installed at the drip chamber, either freely hanging or built into the device as a fixed component.

Unique Product Benefits

- High safety level with cyclical self-tests
- One and two level detection available
- Application-specific configuration
- High level of customization
- Integrated electronics



Maximum Patient Safety with Sophisticated Technology

The patient's life always comes first. For this reason, the sensors are designed and produced with utmost care and according to highest international electrotechnical standards. The accurate and reliable sensors for flow measurement, bubble, level as well as blood leak detection are applied, among others, in cardiopulmonary machines, infusion pumps and dialysis devices.

The non-invasive sensors with proven hardware design and advanced technology features ensure maximum patient safety and life support. SONOTEC produces its sensors in compliance with strict quality standards. With our long-term experience, qualified manufacturing staff and state-of-the-art production lines, we guarantee highest quality and a long product life time.

SONOTEC
Ultrasound Is Our Strength

SONOTEC is specialized in ultrasonic sensor technology in the field of non-contact and non-invasive liquid flow measurement and air bubble detection in flexible tubes and hard plastic pipes.

As a global technology leader, we offer first-class measurement performance, excellent product quality and outstanding service to our customers in medical technology, biotechnology, and the semiconductor industry.

We are certified according to ISO 9001 as well as EN ISO 13485 and fulfill the directives for the manufacturing of products to be applied in potentially explosive atmospheres according to ATEX/IECEx.

In addition to our off-the-shelf products, we offer customized sensor solutions responding to application-specific requirements.

*__Important Note:__ SONOFLOW|AVA flow sensors do not replace the judgement or experience of medical professionals. The sensor is intended to additionally monitor the already monitored flow rate controlled by the ECLS system. SONOFLOW|AVA sensors are sold exclusively to companies / institutions with a registered office in the European Union. Sales outside the European Union are excluded.

Sales & Support

SONOTEC GmbH
Thüringer Str. 33
06112 Halle (Saale)
Germany

+49 345 13317-0
sonotec@sonotec.de
www.sonotec.eu

Certified according to
ISO 9001 and EN ISO 13485

SONOTEC® is a registered trademark

Rev. 4