



Blood Leak Detector BLD03

Non-Invasive Blood Leak Detection

The Blood Leak Detector BLD03 is a non-invasive optical sensor detecting smallest amounts of blood in clear fluids on transparent flexible plastic tubing. Designed as a built-in component integrated into a medical device, the sensor can be used in various environments such as hospitals, emergency rooms, intensive care units, home care applications, e.g., home dialysis.

The sensor reliably detects 0.35 ml/min of blood at a hematocrit level of 32% at a dialysis fluid flow rate of 800 ml/min according to the medical safety standard IEC 60601-2-16:2018. A proven hardware design and advanced algorithms guarantee excellent protection against ambient light.

Key Features



- Non-invasive optical measurement
- Highly resistant to ambient light
- Designed to detect smallest traces of human blood
- Digital electronics for highest capability
- Advanced algorithms ensuring maximum patient safety

Technical Safety Features

- Internal self-test routines ensuring reliable performance of all essential components
- Calibration at customer site to achieve best working point
- Special algorithms evaluating measurement data plausibility



Regulatory Safety Standards

- **Medical Safety**
IEC 60601-2-16:2018
- **Electromagnetic Compatibility**
IEC 60601-1-2:2014 (4th edition), AMD1:2020
- **Software Classification**
IEC 62304:2006, AMD1:2015



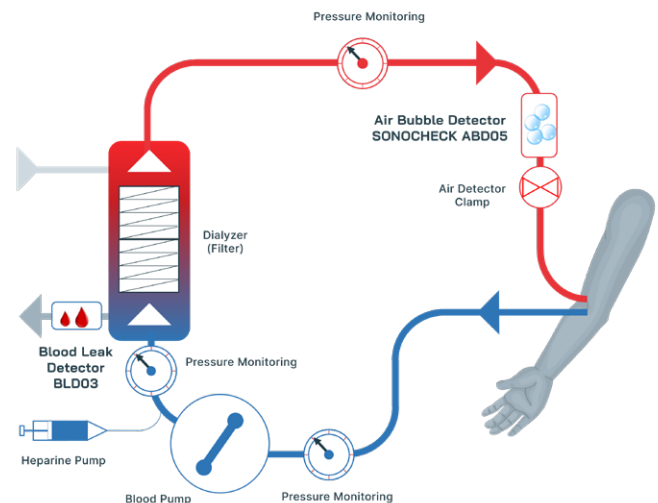
Technical Data

Measuring Method	Optical transmission measurement
Response Time	280 ms ± 10 ms
Measurement Channel	Width: 5.0 mm; height: 5.8 mm
Tubing	Transparent flexible plastic tubing
Outer Diameter – Tubing	5.5 ... 7.0 mm
Mounting	Two mounting holes (Ø = 3.2 mm)

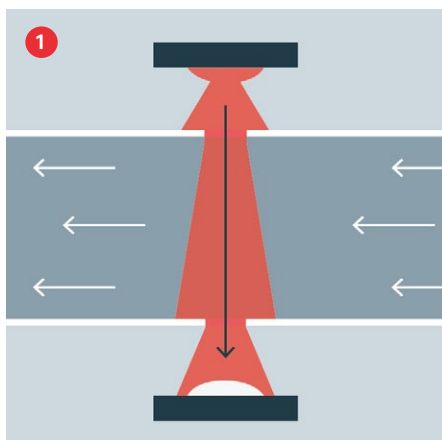
Interfaces	BLD03/I: Serial, logical BLD03/M: Logical
Software Standard	BLD03/I: Class A BLD03/M: Class C
Operating Voltage	+3.1 ... +5.5 VDC
Operating Temperature	+5 ... +50 °C
Protection Class	Sensor head: IP65

Application: 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 panchromatic optical 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 result in life-threatening air embolisms, the blood circulation is continuously observed by the non-invasive air bubble detector SONOCHECK ABD05.



Measurement Principle



Optical Transmission Measurement

The BLD03 sensor measures the quantity of transmitted light in liquid-filled tubes. The measuring cell consists of a light source and a photodiode. The emitted light of the LED (light emitting diode) passes the tube before it reaches the LDC (light to digital converter). The LDC measures the light intensity, which is evaluated by the firmware. With increasing contamination, the intensity of light decreases as a consequence of absorption and reflection. The measured quantity of the transmitted light is compared to a calibrated reference value. An alert is raised by the sensor if the attenuation of the light intensity related to the calibrated reference value is larger than a given threshold.

1 Optical light intensity measurement

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