The **SONOCHECK ABD05** air bubble detector is used to detect air or gas bubbles in plastic tubes filled with liquid and is intended to prevent air infusions. However, it can also be used as a wet/dry sensor.

The sensor has no contact with the liquid and is suitable for applications in medical technology. The sensor is designed as a component for fixed installation in machines.

Besides the standard sensors we offer customized versions for different applications.

Technical Data

SONOCHECK ABD05 Air Bubble Detector	
Measuring method	Ultrasound
Bubble sensitivity	Bubbles larger than 0.3 µl are detected (depending on tube properties, application and process characteristics)
Measuring cycle	200 µs
Response time; Holding time	Minimum < 0.2 ms, maximum 2 ms, typical 1 ms; On request: Delays or holding times for bubble events
Operating temperature	+5 °C to + 45 °C
Storage temperature	-20 °C to +70 °C
Humidity during operation, storage and transport	10 ... 90 % relative humidity (not condensing)
Materials	Housing: Plastic / POM black; Measuring cell: PMMA; Potting: PUR Accessible materials feature good chemical resistance. The manufacturer of MDEV is responsible for chemical resistance testing as required by application of use.
Versions / Designs	The sensor version depends on the tube diameter, the hardness of the tube and its wall thickness. If possible, provide us with a sample of the tube so that we can select an optimum design.

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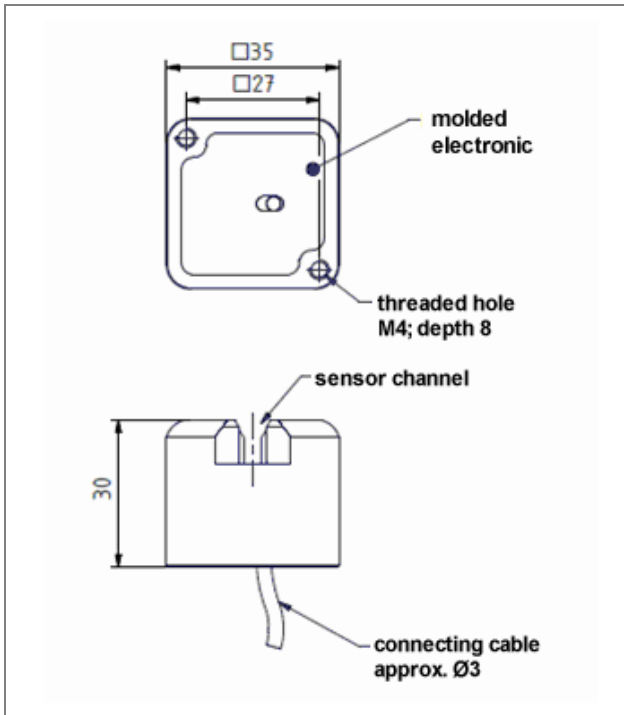| Requirements for tube	Parameter	Property
	Wall thickness	Optimal 10 to 20 % of outer diameter
	Material	Plastic, e.g. PVC, PE, silicone, PUR Other materials on request or after test only
	Special features	Tube must be smooth on outside, no fabric tube
	Elasticity	Tube must be able to adjust flexibly
	Tube is inserted into sensor dry, no coupling medium required	
Requirements for liquid	Sensors can be applied to typical liquids in medicine, e.g. human blood, blood plasma, saline and water, with or without drugs The intensity of ultrasound, which is transmitted into the liquid is below the limitation acc. appropriate standard EN 61157, Ispta < 100 mW/cm². Intensity is so small, that no biological damage occurs. **NOTE!** Any solution which consists of foam will be detected as air.	
Mounting	Rectangular design	2 x recessed M4 threaded holes on rear of sensor
	Circular design	Appropriate clamping fixture
Protection	IP67	
Operating voltage	+5 ± 0.2 VDC, maximum ripple 100 mV	
Current consumption	Max. 60 mA	
Connecting cable	1 m, fixed connection to sensor, shielded line, 4 poles, stranded wires (Electrical specification of input and output see below)	
Outputs	TTL-Logic, Serial interface or PWM	
Directives / Standards	The sensors were developed to be tested with respect to the following standards: • Safety Requirements: IEC 60601-1 • EMC: EN 60601-1-2 • Acoustic Output (Ultrasonic): IEC 61157 • Software developed acc. DIN EN 62304, classified "C" (Module Main) • SONOTEC is certified according to ISO 9001 and EN ISO 13485	
Flammability classification	The sensor has a power consumption of < 300 mW. Devices with power consumption less than 15 W do not need flammability classification according to UL94.	

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Adaptable parameters	With the help of software ABD Monitor (optional) for configuration of the sensors and assistance in diagnostics • Bubble sensitivity (threshold air / liquid) • Response time / holding time for output conditions • Output specifications, e.g. of serial output, switching output, LED state or PWM value
Safety in medical devices	• TÜV approved safety concept • Fail safe architecture • Cyclical self-test • Self adjusting to surrounding conditions for constant sensitivity • Microbubble detection • Software developed according to standards (see Directives / Standards)
Label	Laser labelling on housing or label glued on housing on socket for a definite identification on the sensor. Contains type and serial number (SN). The SN is coded in bar code or 2D matrix code.
Packaging	Sensors are packed in plastic bags for each one. All sensors of each lot are put together in cushioned cartons. ESD packaging is not needed.
Scope of delivery	Air bubble detector type SONOCHECK ABD05,channel width and design adapted to tube diameter; user documentation
Accessories / Options	ABD Monitor for configuration and diagnostics, consisting of: • USB data converter (type 007_V001) • USB cable, type A-B, length 1.5 m • CD with ABD Monitor software
Customization	In addition to our standard sensors, we also manufacture customer-specific solutions with: • special materials • individual colours • adapted mechanical dimensions • other cable specifications • different interfaces • customized output specifications • default parameters adapted to application

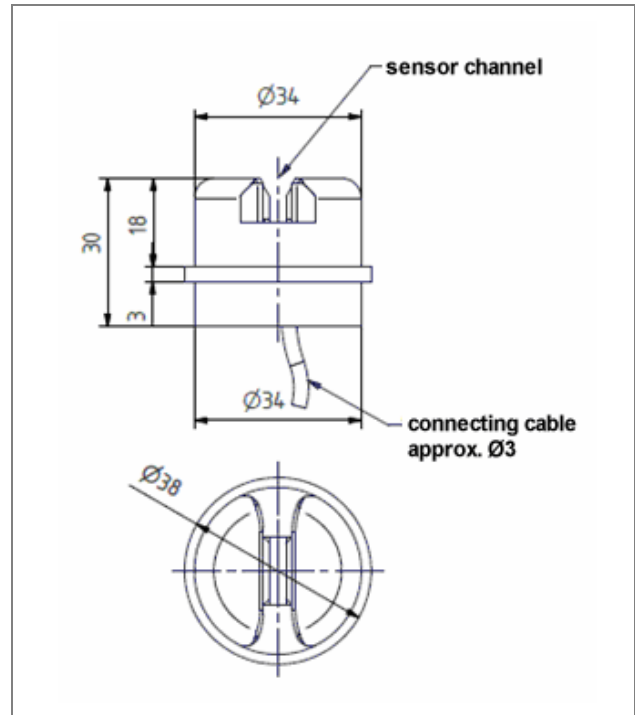## Electrical specification of input and output

Connection	Colour	Specification	Function
+5 VDC	Red	+5 ± 0.2 VDC	Operating voltage, provided by machine
GND	Blue		
ABD-IN	Yellow	5 V logic, TTL *Internal pull up* *10 kΩ to +5 V* *Ratings:* *L = -0.2 ... 1.0 V* *H = 3.0 … 5.5 V*	Control input for test or service Configurable as • Digital input • Serial input of UART
ABD-OUT	White	5 V logic, TTL, push-pull *Ratings:* *L = max. -5 mA* *H = max. +5 mA*	Output of sensor Configurable as • Switching output • Serial output of UART • PWM output
Shield	The shield is not connected in sensor. It shall be connected to GND (blue) on the side of MDEV.		
⚠ **NOTE!**	There is no protection against reverse polarity implemented. Respect the safety notes in the operating manual.		

Output specification (default)	Condition	Signal at output (H/L: TTL output)	LED
	Air / Bubble	H	Red
	Liquid	L	Green
	Internal error (self-test)	H	Blue

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Technical drawings

Version with rectangular design

Version with circular design

Information for ordering

Specification	Design version	Channel width	Outer Ø tube (typical)	Order number
ABD05.50	Circular	3.4 mm	4.2 mm	200 02 0050
ABD05.51	Rectangular	3.4 mm	4.2 mm	200 02 0051
ABD05.52	Circular	5.2 mm	6.8 mm	200 02 0052
ABD05.53	Rectangular	5.2 mm	6.8 mm	200 02 0053
ABD05.54	Rectangular	2.2 mm	3.0 mm	200 02 0054
ABD05.55	Circular	2.2 mm	3.0 mm	200 02 0056
ABD05.56	Rectangular	1.8 mm	1.8 mm	200 02 0057
ABD05.57	Circular	4.4 mm	5.5 mm	200 02 0107

Information is subject to change without notice!

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