



The air bubble detector **SONOCHECK ABD06** is used to detect air and gas bubbles in tubes made of synthetic material. However, it can also be used as a wet/dry sensor in tubes.

The sensor has no contact with the liquid and is suitable for applications in medical and food technology. But the sensor is also suitable for industrial applications such as the bubble detection at tubes filled with glue or paint.

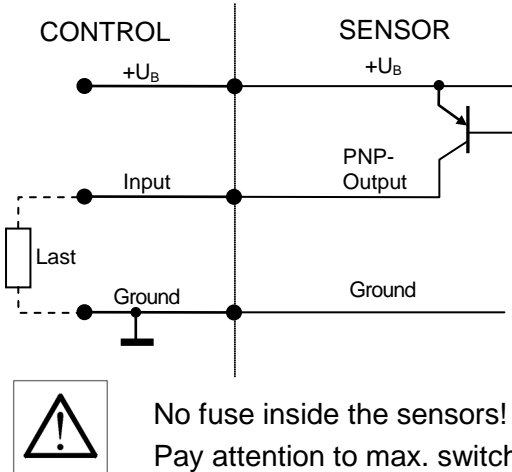
The air bubble detector is designed as a component for fixed installation in machines.

Technical Data

| SONOCHECK, Type ABD06.xx | | |
|--------------------------|--|--|
| Air Bubble Detector | | |
| Measuring method | Ultrasound | |
| Bubble sensitivity | Bubbles larger than 1/3 of internal tube diameter are detected | |
| Measuring cycle | 200 µs | |
| Response time | Can be adjusted, minimum < 0.5 ms | |
| Holding time | Can be set in order to increase the duration of the output signal. | |
| Operating temperature | +5 °C to +60 °C | |
| Storage temperature | -20 °C to +70 °C | |
| Materials | Housing and Cover: Plastics / POM; Measuring cell: Plastics / PMMA; Potting: PUR; (other materials on request) | |
| Dimensions of tube | Model | Outer diameter |
| | The selection of the right sensor depends on the tube properties. If possible, provide us with a tube sample! | |
| | S | 3.0 ... approx. 8.5 mm |
| | L | 8.0 ... approx. 17.0 mm |
| Requirements for tube | Parameter | Property |
| | Material | Plastics, 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 |

* For industrial applications with high-viscosity liquids (e.g. fats/special paints) screening tests must be made.

3 Technical Data

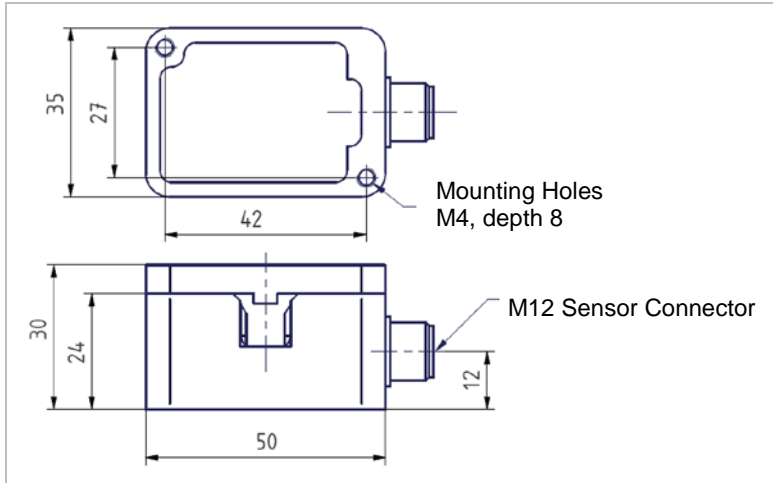
| SONOCHECK, Type ABD06.xx Sensor for air bubble detection at liquid filled tubes | | |
|--|--|-------------------------------|
| Measuring Principle | Ultrasonic principle Tube is put dry in sensor, no coupling gel is required. | |
| Type of Models | Model | Outer Diameter of Tube |
| | S | 3.0 ... ca. 8.5 mm |
| | L | 8.0 ... ca. 17.0 mm |
| | Dimensions of sensor and hinged cover depending on diameter, wall thickness and flexibility of tube. If possible, provide a short piece of tube for an optimal selection! | |
| Materials | <ul style="list-style-type: none"> ▪ Housing: plastics / POM / black ▪ Hinged cover: plastics / POM / black, mounting claw made of steel ▪ Measuring cell: plastics / PMMA / black ▪ Potting: PUR <i>Note: Other materials are available on request.</i> | |
| Mounting | 2 x holes M4 on the rear side of the sensor | |
| Operating Temperature | +5 °C ... +60 °C | |
| Storage Temperature | -20 °C ... +70 °C | |
| Degree of Protection | IP67 (potted) | |
| Operating Voltage | +12 ... 30 VDC, ripple max. 10 %, protection against reverse polarity | |
| Power Requirement | Max. 50 mA (without switching current) | |
| Switching Output | PNP, max. switching current 150 mA  <p>No fuse inside the sensors! Pay attention to max. switching current!</p> | |
| Output Specification (Default) | State | Level of PNP-Output |
| | Air / Bubble | +24 V |
| | Liquid | Ground |
| | Internal error (self-test) | +24 V |
| <i>The state of output can be configured according to the application by means of the ABD Monitor.</i> | | |

| | |
|----------------------------|--|
| Measuring Cycle | 200 μ s |
| Response Time Hold Time | Minimal < 0,5 ms <i>The Response Time can be adjusted in a wide range. Furthermore, the Hold Time can be set in order to increase the duration of the output signal.</i> |
| CE Compliance | <p>Compliance with DIN EN 61326-1: 2006</p> <p>EN 61000-4-3 EMC, Radiated radio-frequency - Electromagnetic field immunity, Test Result A, Test with 10 V/m (0.15 ... 1000 MHz)</p> <p>EN 61000-4-4 EMC, Electrical fast transient/burst immunity test, Test Result A (see restrictions below)</p> <p>EN 61000-4-6 EMC, Immunity to conducted disturbances, induced by radio-frequency fields, Test Result A, Test with 10 V/m</p> <p>EN 55011 Electromagnetic disturbance characteristics, Limit 30 dBμV/m</p> <p><i>For testing typical settings for bubble detection have been applied. The interference immunity depends on a reasonable configuration. Operating with very high bubble sensitivity combined with a very short response time can cause disturbances of the system, induced by electromagnetic disturbing, pressure changing, mechanical vibration, etc.</i></p> |
| Scope of Delivery | <p>Bubble detector type ABD06, model and dimensions adjusted to tube of customer</p> <p>Hinged cover with mounting claw: dimensions adjusted to sensor and tube.</p> <p>Technical data sheet</p> |
| Accessories/Options | <p>M12 sensor cable, 3 poles, length 2 m / 5 m / 10 m</p> <p>ABD Monitor, consisting of :</p> <ul style="list-style-type: none"> ▪ USB data converter ▪ M12 sensor cable, 5 poles, length 2 m ▪ USB cable type A-B, length 1.5 m ▪ CD with software ABD Monitor |

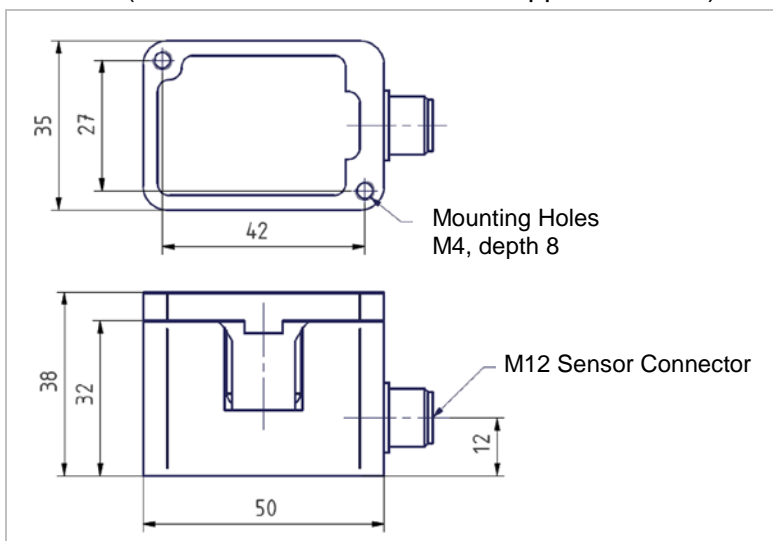
Table 3: Technical data sensor SONOCHECK – type ABD06.xx

Technical Drawings

Model S (outer tube diameter of 3.0 ... approx. 8.5 mm)



Model L (outer tube diameter of 8.0 ... approx. 17 mm)



Information is subject to change without notice!

4 Drawings

4.1 Model S: Outer diameter 3.0 ... ca. 8.5 mm

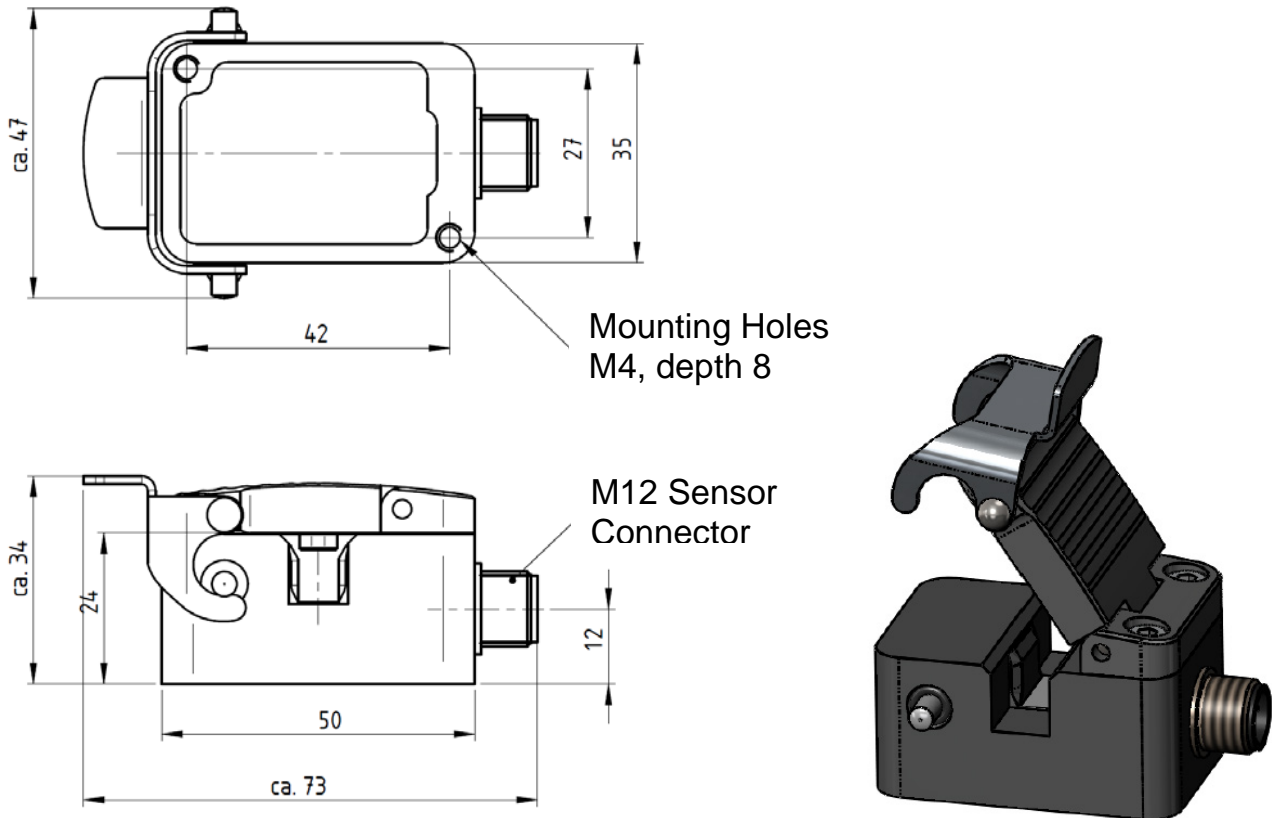


Figure 5: Drawing of sensor model S.

Note: The drawings do not conform to real dimensions.

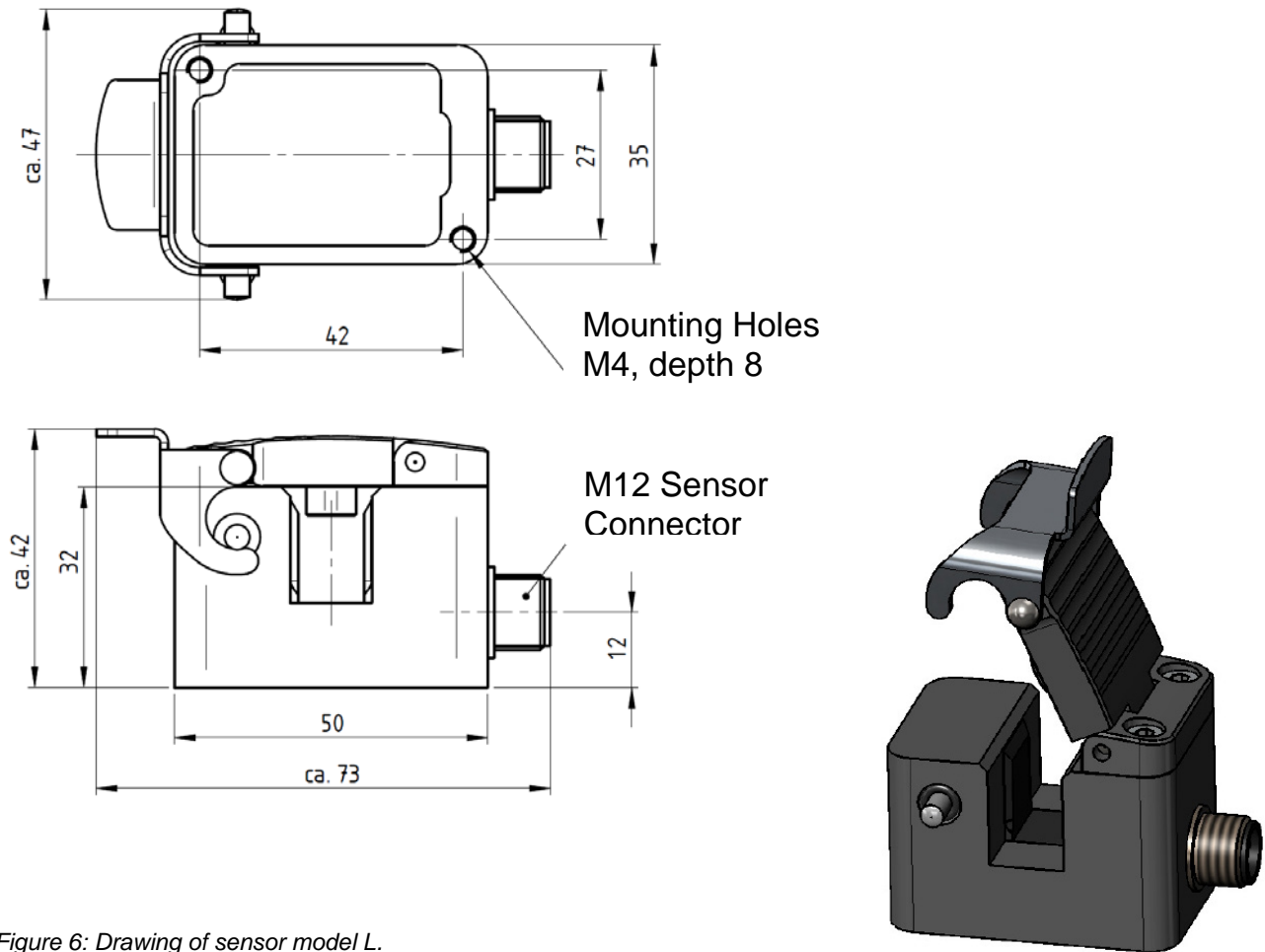
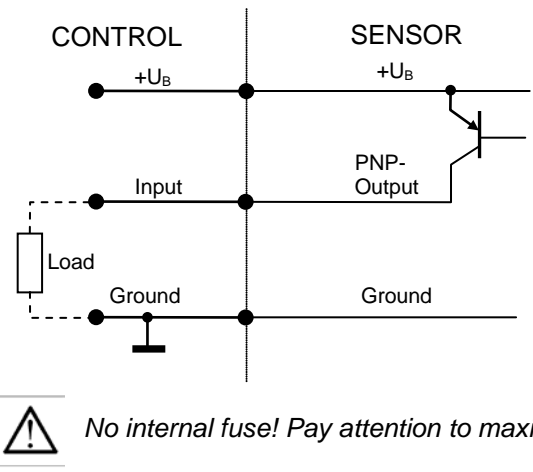

4.2 Model L: Outer diameter ca. 8.0 ... 17.0 mm

Figure 6: Drawing of sensor model L.
Note: The drawings do not conform to real dimensions.

| | | |
|---------------------------------------|--|----------------------------|
| Liquid requirements | Low-viscosity liquids containing no or few solids* | |
| Mounting | 2 x recessed M4 threaded holes on rear of sensor | |
| | Tube is inserted into sensor dry | |
| Protection | IP67 | |
| Operating voltage | +12 ... 30 VDC; Ripple max. 10 %; Protection against reverse polarity | |
| Current consumption | Max. 50 mA (without switching current) | |
| Connecting cable | M12 sensor cable, 3 poles | |
| Switching output | PNP, max. switching current 150 mA | |
| |  <p>No internal fuse! Pay attention to maximum switching current!</p> | |
| Output specification (Default) | State | Level of PNP-Output |
| | Air / Bubble | +24 V |
| | Liquid | Ground |
| | Internal error (Self-test) | +24 V |
| | <i>The state of output can be configured according to the application by means of the ABD Monitor.</i> | |
| Directives/standards | Compliance with DIN EN 61326-1: 2006 EN 61000-4-3 EMC, Radiated radio-frequency - Electromagnetic field immunity, Test Result A, Test with 10 V/m (0.15 ... 1000 MHz) EN 61000-4-4 EMC, Electrical fast transient/burst immunity test, Test Result A (see restrictions below) EN 61000-4-6 EMC, Immunity to conducted disturbances, induced by radio-frequency fields, Test Result A, Test with 10 V/m EN 55011 Electromagnetic disturbance characteristics, Limit 30 dBµV/m | |
| |  <p><i>For testing typical settings for bubble detection have been applied. The interference immunity depends on a reasonable configuration. Operating with very high bubble sensitivity combined with a very short response time can cause disturbances of the system, induced by electromagnetic disturbing, pressure changing, mechanical vibration, etc.</i></p> | |


| | |
|--------------------------|--|
| Functional safety | <p>Reliability, test according to IEC 61508 by using SN 29500 MTTF (mean time to failure): 239 [years] PFD (probability of failure on demand): $5.212 \cdot 10^{-4}$</p> <p> <i>These specifications depend on the ambient conditions as well as on the operating conditions of the sensor. Note, that a proof test interval of $T_1 = 1$ year is given. The MTTF value corresponds to the MTBF value, because the sensor is a non-repairable device.</i></p> |
| Scope of delivery | <p>Bubble detector type ABD06, Cover with screws, dimensions adjusted to sensor and tube Operating Manual</p> |
| Accessories | <p>M12 sensor cable, 3 poles, length 2 m / 5 m / 10 m</p> <p>ABD Monitor, consisting of:</p> <ul style="list-style-type: none"> • USB Data Converter • M12 cable, 5 poles, length 2 m • USB cable, type A-B, length 1.5 m • CD with software ABD Monitor |
| Options | <p>Snap-in cover, dimensions adjusted to sensor and tube (cannot be retrofitted)</p> |

Table 1: Technical data for SONOCHECK sensor type ABD06.xx