

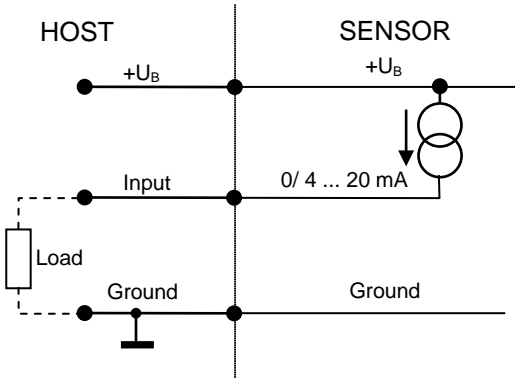
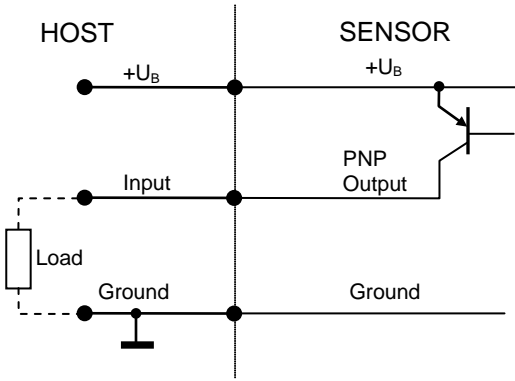


The air bubble detector **SONOCHECK ABD06** is used to detect air and gas bubbles in tubes made of synthetic material. However, it can also be used as a wet/dry sensor in tubes. The sensor has no contact with the liquid and is suitable for applications in medical and food technology. But the sensor is 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. In comparison to standard sensors of ABD06.xxx the sensors described in the following have a **configurable analogue output** for the distinction of bubble size. The sensors are suitable especially for the use on hard plastic tubing and under harsh process conditions (pressure, flow rate, vibration).

Technical data

| SONOCHECK ABD06.xxx with Analogue Output with Analogue Output | |
|---|---|
| Air Bubble Detector | |
| Measuring method | Ultrasound |
| Bubble sensitivity | Bubbles larger than approx. 1/3 of the inner tube diameter 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 Furthermore, the 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: Plastic PET black; Cover: Plastic POM black; Potting: PUR |
| Mounting | 2 x recessed M4 threaded holes on rear of sensor |

| | | | | |
|---|--|---|--|--|
| Requirements for tube (list of sensors and tubing properties behind) | Parameter | Property | | |
| | Material | Plastics, e.g. PVC, PE, Silicone, PUR, PTFE, FEP, PFA (Other materials on request or after test only) | | |
| | Special features | Tube must be smooth on outside, no fabric tube, | | |
| | Tube is inserted into sensor dry, no coupling medium required | | | |
| Requirements for liquid | Water, blood, solutions or other low-viscosity liquids containing no or few solids. | | | |
| | i NOTE! For industrial applications with high-viscosity liquids (e.g. fats/special paints) screening tests must be made. Any solution which consists of foam will be detected as air. | | | |
| 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, 5 pins | | | |
| Pin assignment | <i>Male connector at the sensor</i> | | <i>Female connector at the cable</i> | |
| | Pin | Colour | Connection | |
| | 1 | Brown | Power supply voltage +12 ... 30 VDC | |
| | 2 | White | RS485 – A | |
| | 3 | Blue | Ground | |
| | 4 | Black | Output | |
| | 5 | Grey | RS485 – B | |
| | Shielding | If available: should be grounded on the side of host. | | |
| Outputs (specification can be adopted with the Monitor software) | Configurable as: | | | |
| | <ul style="list-style-type: none"> • Current output 0/4 ... 20 mA (default factory setting) • Switching output PNP / PWM output (max. 25 mA): period 1 kHz, modulation 0 ... 100 % • Voltage output 0/2 ... 10 V • RS485 service interface (default factory setting) | | | |

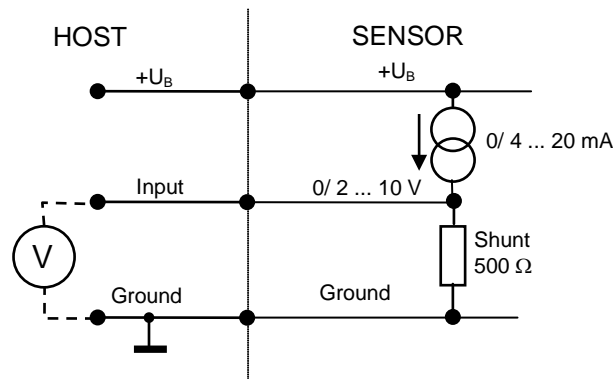
| <p>Configuration as:</p> <p>Current output (factory setting)</p> | <p>The current output can be configured in the range of 0 ... max. 25 mA</p>  <p>Example: Measuring range 4 ... 20 mA / error output 0 mA or 22 mA</p> <p>⚠ CAUTION! Pay attention to the max. load depending on the operating voltage: 12 V: 0 ... 400 Ω 24 V: 0 ... 200 Ω 30 V: 0 ... 100 Ω</p> | | | | | | | | |
|--|--|-------|---------------------|--------------|-------|-------|--------|----------------------------|-------|
| <p>Output specification (default configuration)</p> | <table border="1"> <thead> <tr> <th>State</th> <th>Current output</th> </tr> </thead> <tbody> <tr> <td>Air / Bubble</td> <td>20 mA</td> </tr> <tr> <td>Fluid</td> <td>4 mA</td> </tr> <tr> <td>Internal error (self-test)</td> <td>0 mA</td> </tr> </tbody> </table> | State | Current output | Air / Bubble | 20 mA | Fluid | 4 mA | Internal error (self-test) | 0 mA |
| State | Current output | | | | | | | | |
| Air / Bubble | 20 mA | | | | | | | | |
| Fluid | 4 mA | | | | | | | | |
| Internal error (self-test) | 0 mA | | | | | | | | |
| <p>Configuration as:</p> <p>Switching output / PWM output</p> | <p>PNP und PWM, switching current max. 25 mA</p>  <p>i NOTE! In the event of a short circuit the current is limited internally to approx. 33 mA</p> | | | | | | | | |
| <p>Output specification (default configuration)</p> | <table border="1"> <thead> <tr> <th>State</th> <th>Level of PNP-Output</th> </tr> </thead> <tbody> <tr> <td>Air / Bubble</td> <td>+24 V</td> </tr> <tr> <td>Fluid</td> <td>Ground</td> </tr> <tr> <td>Internal error (self-test)</td> <td>+24 V</td> </tr> </tbody> </table> | State | Level of PNP-Output | Air / Bubble | +24 V | Fluid | Ground | Internal error (self-test) | +24 V |
| State | Level of PNP-Output | | | | | | | | |
| Air / Bubble | +24 V | | | | | | | | |
| Fluid | Ground | | | | | | | | |
| Internal error (self-test) | +24 V | | | | | | | | |

Configuration as:**Voltage output**

The current output is used as voltage output. Internally a shunt ($500\ \Omega$) is connected to output.

The voltage output can be configured in the range of 0 ... max. 12.5 V.

Example: Measuring range 2 ... 10 V / error output 0 V or 11 V

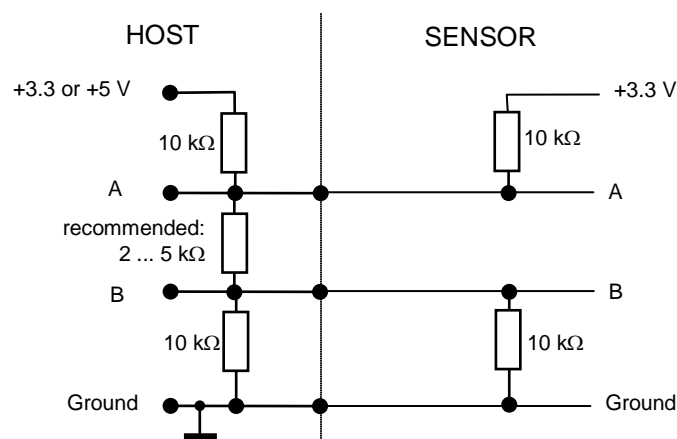


CAUTION! Pay attention to the internal resistance (shunt) at the connection of voltage output.
Adhere to the maximum output voltage depending on the operating voltage: 12 V: 0 ... 9 V | 14 V: 0 ... 10 V | 18 V: 0 ... 12.5 V

RS485 Service interface

Half-duplex operation / 115.200 baud / no parity / 1 stop bit / no handshaking / Bus operation not possible

Recommended electrical connection of the RS485 interface



NOTE! For details of the protocol please contact our service.
If the interface is not used, the two pins A and B shall remain open.

| | |
|--------------------------------------|--|
| <p>Directives / Standards</p> | <p>Electromagnetic compatibility, tests in compliance with DIN EN 61326-1: 2013</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 NOTE! 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.</p> |
| <p>Scope of delivery</p> | <ul style="list-style-type: none"> • Bubble detector type ABD06.xxx with analogue output, • Cover with screws / hinged cover, dimensions adjusted to sensor and tube • Data sheet |
| <p>Accessories / Options</p> | <p>M12 sensor cable, 5 pins, length 2 m / 5 m / 10 m</p> <p>ABD Monitor, consisting of:</p> <ul style="list-style-type: none"> • USB Data Converter Type 011 (for RS 485) • Power supply unit (24 VDC) • USB cable, type A-B, length 1.5 m • Software ABD Monitor <p>With the help of software ABD Monitor (optional) for configuration of the sensors and assistance in diagnostics:</p> <ul style="list-style-type: none"> • Bubble sensitivity (threshold air / liquid) • Response time / holding time for output conditions • Output specifications, e.g. of serial output, switching output or PWM value <p>Furthermore measurement values can be recorded for diagnosis.</p> |
| <p>Customization</p> | <p>Customized modifications for special applications upon request (e.g. adapted channel width, individual output specifications or settings)</p> |

Overview of sensor and tubing dimensions

The sensors series ABD06 are suitable for a variety of tubes.

The sensor version depends on the tube diameter, the hardness of the tube and its wall thickness. Please note, that because of diverse tubing dimensions and materials an aptitude test has to be made. Please provide us with a tube sample (minimum length 30 cm) and contact our service to find the appropriate sensor and cover.

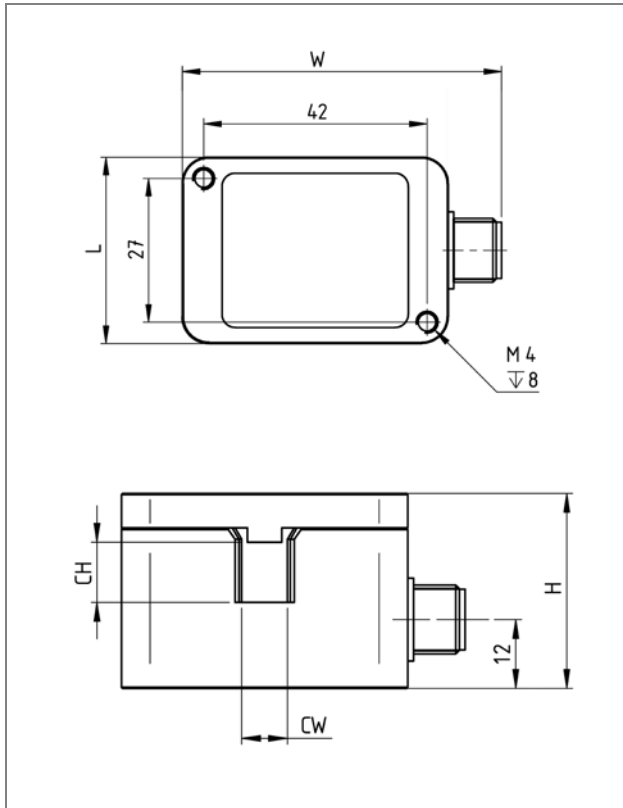
Note, that the cover is necessary to fix the tubing in the measuring channel to ensure correct coupling. The cover as well depends on the tubing properties and the application.

Dimensions, listed in the following, are guiding values:

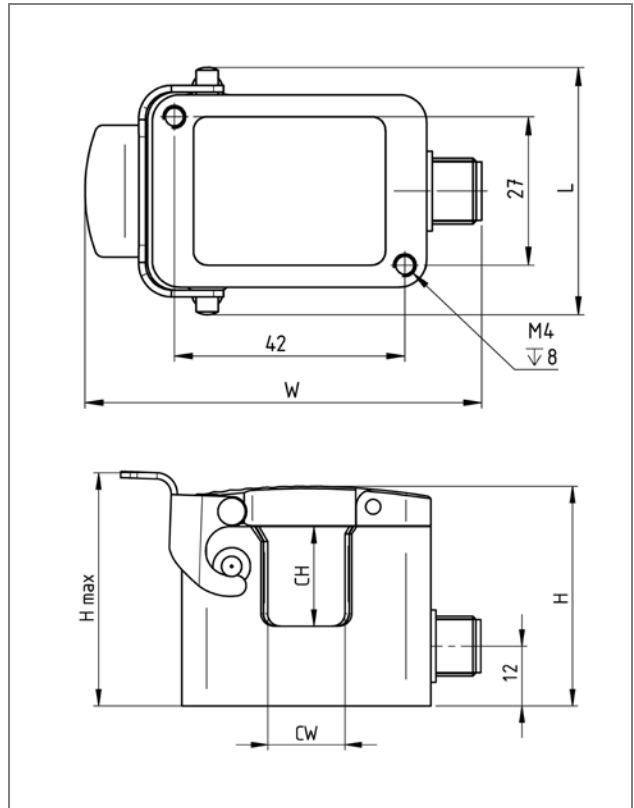
| Specification SONOCHECK | Sensor | | | Tube | |
|----------------------------|---------------------------|---------|---------|------------------|------------------|
| | Dimensions (L x W x H) | CW | CH | OD | ID |
| Cover with screws | | | | | |
| ABD06.115 | 50 x 35 x 32 mm | 5.6 mm | 11.0 mm | 6.0 ... 8.0 mm | 2.5 ... 7.0 mm |
| ABD06.114 | 50 x 35 x 34 mm | 8.0 mm | 13.0 mm | 9.0 ... 11.5 mm | 4.0 ... 10.0 mm |
| ABD06.119 | 50 x 35 x 38 mm | 11.0 mm | 17.0 mm | 12.0 ... 15.5 mm | 6.0 ... 13.5 mm |
| Hinged cover | | | | | |
| ABD06.120 | 73 x 45 x 34 mm | 7.2 mm | 11.5 mm | 8.0 ... 10.0 mm | 3.5 ... 8.0 mm |
| ABD06.117 | 73 x 45 x 39 mm | 12.0 mm | 15.5 mm | 13.0 ... 17.0 mm | 6.5 ... 15.0 mm |
| ABD06.121 | 73 x 45 x 44 mm | 15.5 mm | 20.0 mm | 17.0 ... 22.0 mm | 10.0 ... 20.0 mm |

Abbreviations: L = sensor length; W = sensor width; H = sensor height; CW = channel width at the narrowest part of the channel; CH = channel height (without cover); OD = outer tube diameter; ID = inner tube diameter

Technical drawings



Design version: Cover with screws
(The drawings are not to scale)



Design version: Hinged cover

Drawings are not to scale. Information is subject to change without notice!

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