



Miniature Air
Bubble Sensor (MABS)



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The Introtek[®] Miniature Air Bubble Sensor incorporates the latest generation of pulse-type ultrasonic circuitry. Highly reliable and non-invasive, Introtek's air detection capabilities ensure a patient's safety as well as the integrity of a process during critical applications. Many of the variables affecting the accuracy of amplitude during continuous wave ultrasound are also greatly reduced, if not eliminated, by Introtek's advanced pulse-type technology.

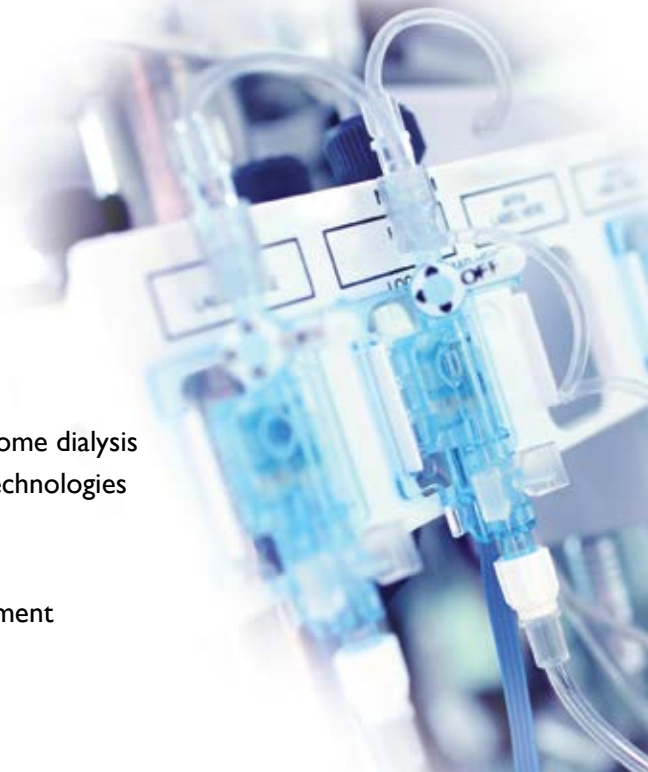
As part of the company's value-added services, Introtek will integrate special components into a sensor for a completely customized package. Every sensor is built to Introtek's unsurpassed quality control and is 100% factory-tested prior to shipment.

PRODUCT FEATURES

- Non-invasive, ultrasonic
- Compact, free-entry design
- Small footprint
- Low cost
- Low power consumption
- High EMI and RFI noise immunity
- Accommodates wide range of tubing sizes
- Integratable electronics
- Air detection threshold/bubble size can be set to customer's requirements
- Dry coupled
- Redundant safety designs
- Optional self-test safety features
- Output options: CMOS Logic, Analog
- Custom prototypes available

APPLICATIONS

- Air bubble, air-in-line, and end-of-sample sensing
- Patient-connected medical devices
 - Apheresis
 - Heart-lung bypass
 - Auto-transfusion
 - Hemodialysis
 - Infusion pumps
 - Wearable kidney and portable/home dialysis
- Chromatography and separation technologies
- Liquid and chemical dispensing
- Blood processing equipment
- Immunoassay and diagnostic equipment



The Introtek Advantage

Introtek provides products of unsurpassed quality, functionality, and dependability. They are manufactured to the highest medical device standards and are backed by a three-year warranty.

FUNCTIONAL SPECIFICATIONS

The miniature air bubble air-in-line sensor is made of injection-molded ABS plastics that will accept softer, more pliable tubing. Consult Introtek for rigid tubing applications.

Supply Voltage:	3.3, 5.0VDC \pm 10% (consult Introtek for other voltages)
Supply Current:	24 mAmp maximum
Self-test Input:	Provides electronic check for false wet output signals (Optional)
Liquid:	Bubbles will be detected in almost any liquid
Calibration:	Customized threshold calibration
Temperature Limits:	Operating: +41° to +140 °F (+5° to +60 °C) Storage: -4 to +185 °F (-20 to +85 °C)
Humidity:	0 to 95%, non-condensing

Please contact an Introtek application specialist to determine the optimal configuration for your application.

AVAILABLE OPTIONS

- Programmable electronic
- Chip only interface
- Custom-engineered OEM designs

VALIDATION TESTING

The Miniature Air Bubble Sensor was designed to be tested in conjunction with the following specifications:

- Electrical Fast Transients: IEC 61000-4-4:2012
- Radiated Emissions, Group I, Class B: CISPR 11
- Electrostatic Discharge: IEC 61000-4-2:2008
- Radiated Immunity: IEC 61000-4-3:2006
- Power Frequency Magnetic Fields: IEC 60601-1-2:2014 (4th Edition)
- General Safety Requirements: IEC 60601-1:2005+A1:2012 (E)

THREE-YEAR WARRANTY

All Introtek systems are warranted free of defects in materials or workmanship for three full years from the date of original factory shipment.

If returned within the warranty period, with no modifications to the sensor, the original manufacturing label intact, and, upon factory inspection of the unit, the cause of the malfunction is determined to be defective material or workmanship, Introtek will repair or replace the system at no cost to the purchaser (or owner) other than transportation. **If a unit is returned without an original label, the warranty is void.**

Introtek shall not be liable for misapplication, labor claims, direct or consequential damage or expense arising from the installation or use of the equipment. There are no other warranties expressed or implied except special written warranties covering some Introtek products.

INTROTEK / **AMETEK**[®]

Excellence in Ultrasonic Technology™

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Performance specifications are effective with date of issue and are subject to change without notice.



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