Redefining Performance for Today’s Non-Invasive Sensor Solutions

Non-Invasive Air Bubble / Air-In-Line Detectors
Blood Leak Detectors
Drip Chamber Sensors
Point Liquid Level Detectors
Continuous Liquid Level Detectors
Flow Sensors

www.introtek.com

INTROTEK
Excellence in Ultrasonic Technology™
Driven to Make the World’s Best Sensor Solutions Even Better.

A Long History of Achievement

At Introtek – a subsidiary of Magnetrol International – we’re never satisfied unless we’re pushing the boundaries of sensor technology performance. Starting 35 years ago – long before the FDA mandated air bubble sensors in many medical devices – Introtek has been on a mission to produce the most reliable and accurate non-invasive liquid sensing solutions for a variety of industries. This pursuit of excellence is evident in all of our products, from air bubble and air-in-line detectors, to drip chamber sensors, continuous liquid and point level sensors, and optical blood component detectors.

Found in many groundbreaking medical OEM devices in use today, Introtek sensors are also used in various chemical and pharmaceutical processing, life sciences, and aerospace applications, as well as the food and beverage industries. They play a crucial role in improving performance and safety in critical applications and in the most extreme environments.

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Pulse Ultrasound Technology is Our Specialty.

Pulse ultrasound is the beating heart of our technology. The advantages are many:

- **Application Flexibility** — Pulse-wave technology is unaffected by the optical, dielectric or physical properties of the tubing or fluid.

- **Non-Invasive Design** — No physical contact between Introtek sensors and the fluid eliminates liquid compatibility and sterility concerns to dramatically improve safety while reducing system maintenance.

- **Solid State Design** — With no moving parts in its design, mechanical failure is virtually eliminated.

- **Calibration Free** — The high-efficiency system design provides optimum performance while eliminating the need for intricate and tedious field calibration.

- **High Noise Immunity** — Introtek’s pulse technology greatly reduces the effects of EMI and RFI noise to its air detection components.

While a variety of standard designs are available, from single stand-alone systems to low cost high-volume designs for OEM applications, Introtek regularly collaborates with customers to develop unique sensor and electronic options that address their toughest design challenges. With Introtek as their virtual design arm, OEMs have peace of mind knowing Introtek can take their product from concept to completion.
Introtek non-invasive sensors are primarily used in a variety of patient-connected medical devices and laboratory diagnostic processes. Designed to protect patients and improve care during numerous medical procedures, Introtek sensors detect air bubbles in tubing to prevent arterial and venous air embolisms, and monitor fluid levels to ensure optimum fluid delivery.

**Apheresis**: Introtek sensors and electronics perform a critical safety role in Apheresis Systems in which specific blood components are removed from separated blood that is then returned to the donor.

**Auto Transfusion**: Introtek sensor products are an integral part of Continuous Autologous Transfusion Systems (CATS) and transfusion procedures where a patient’s blood is removed for subsequent reinfusion.

**Blood Processing**: Processing equipment used to treat blood that’s returned to the patient, or to remove pathogens in blood stored for future use, rely on Introtek sensors.

**Hemodialysis**: Introtek products enable safe dialysis procedures during use of an “Artificial Kidney” machine that removes wastes from blood and then returns cleansed blood back to the patient.

**Liquid Chromatography**: High Performance Liquid Chromatography (HPLC) used to identify, separate, purify, and quantify various compounds, utilizes Introtek sensors.

**Infusion and Syringe Pumps**: Introtek products are used in neonatal, anesthesia, and epidural devices that administer intravenous medications and solutions.

**Cardio-Pulmonary Systems**: Heart/Lung machines used during surgical procedures such as organ transplants, employ Introtek sensors, ensuring embolism protection.

**Catheter / RF / Cardiac Ablation**: Introtek air bubble detectors are routinely used to help prevent air infusion with surgical devices used during the removal of abnormal tissue.

**Dispensing**: Biotechnology, medical device, and life science manufacturers credit Introtek’s sensors with improving the dispensing of drugs, coatings, therapeutic agents, and hot melt adhesives.
Introtek Non-Invasive Sensor Technology Impacts Nearly Every Industry.

Biotechnology

Introtek is an instrumental source of non-invasive end-of-sample, level sample, and level and bubble detection sensor solutions for precision equipment used in egg vaccine production, DNA analysis, stem cell research, fluid analysis, and chromatography, as well as other biotechnology, pharmaceutical, chemical and academic research applications.

Pharmaceutical / Analytical

The multitrillion dollar pharmaceutical industry demands complete 24/7 reliability from equipment used to manufacture medications. Introtek customers depend on our exceptionally reliable sensors for non-invasive end-of-sample, bubble detection, and sample levels needed for processes that include DNA analysis, drug quality control, fluid dispensing, and bulk-drug equipment.

Process Industries

Introtek customers range from beverage and semiconductor equipment manufacturers to water treatment contractors. Our non-invasive sensors provide equipment manufacturers with a unique sensor solution that avoids contamination during chemical, food and beverage, and semiconductor processing as well as farm irrigation and turbine oil lubricated pumps.

Military / Aerospace

For over 35 years, several US military DoD agencies as well as aerospace companies have entrusted Introtek engineers with the development of highly customized products for use in liquid level and air bubble critical application detection systems that are routinely exposed to extreme environments.
Proven for Over 35 Years.
Introtek Non-Invasive Pulse-Ultrasound Detectors.

Unique Features and Customized Options

- Air detection threshold or bubble size can be set to customer requirements
- Compact, free-entry design
- Modular design for rapid prototyping
- Low power consumption option (3.3V & 5V)
- TTL CMOS and analog output options
- High EMI and RFI noise immunity
- Wide range of tubing sizes
- Integral and remote electronics
- Accuracy not affected by fluid or tubing color
- Microbubble detection
- Self-test safety features
- Redundant safety designs

Non-Invasive Air Bubble / Air-In-Line / Liquid Level Detectors:

**AD8 / AD9 Air Bubble Detectors:** These detectors incorporate Introtek’s latest generation pulse ultrasonic circuitry. An integral component in the sensor assembly, the micro-controller-based circuitry provides advanced fail safe architecture for patient-connected medical devices.

**APPLICATIONS:**
- Hemodialysis • Auto Transfusion • Apheresis • Chromatography • Blood Processing
- Drug Delivery • Contrast Media • Ablation • Heart/Lung Machines

**Mini Air Bubble Detectors:** Incorporating Introtek’s pulse ultrasonic technology in an exceptionally compact, free entry design, these detectors are ideal for Syringe and Infusion Pumps where space is limited. Available with remote or integrated electronics and chip integration as well.

**APPLICATIONS:**
- Hemodialysis • Auto Transfusion • Infusion/Syringe Pumps • Blood Processing
- Drug Delivery • Contrast Media

**BD8 / BD9 Air Bubble Detectors:** Designed for both flexible (BD9) and rigid (BD8) tubes, Introtek’s BD series sensors allow up to 24V input and a mounted base where required. Optional open collector outputs available.

**APPLICATIONS:**
- Hemodialysis • Auto Transfusion • Apheresis • Chromatography • Blood Processing
- Drug & Fluid Dispensing • Egg Vaccine Production • Stem Cell Research
**ADU Air Bubble Detectors:** An ideal solution for non-standard, soft tube sizes from 1/8” - 3/8” where standard AD9 Air Bubble Detector housings are not available. The ADU can eliminate tooling costs for low volume, odd-sized tube requirements.

**>> APPLICATIONS:**
- Hemodialysis
- Auto Transfusion
- Apheresis
- Chromatography
- Blood Processing
- Drug Delivery
- Contrast Media
- Ablation

**Custom Latch Air Bubble Detectors:** Available in a wide variety of configurations, electronics, and outputs designed to meet customer-specific applications.

**>> APPLICATIONS:**
- Hemodialysis
- Auto Transfusion
- Apheresis
- Chromatography
- Blood Processing
- Drug Delivery
- Contrast Media
- Ablation
- Heart/Lung Machines

**Typical Analog Output Signal According to Bubble Size, Measured in Real Time**

**BDR / BDRI Clamp-On and BDS Strap-On Liquid Level Sensors:** Designed to work with a wide range of tubing materials and sizes. When utilized with Introtek’s circuitry they provide exceptionally reliable clamp-on, air-in-line, and liquid level detection.

**BDR — Remote Electronics**

**BDRI — Integrated Electronics**

**>> APPLICATIONS:**
- Aerospace
- Chemical Processing
- Semiconductors
- Food and Beverage
Introtek’s Advanced Non-Invasive Sensors for Drip Chambers.

Non-Invasive Drip Chamber and Level Sensors

**Non-Invasive Drip Chamber Level Sensors**: Used with a soft-bodied drip chamber or larger OD tubing, these sensors promote safety by overcoming conditions such as relaxation, slippage, or vibration, which normally cause false air alarms. Custom designed for the specific drip chamber, each sensor is available with single and multipoint detection.

**APPLICATIONS:**
- Hemodialysis • Auto Transfusion • Apheresis • Chromatography • Blood Processing
- Drug Delivery • Contrast Media • Ablation • Media Volume Monitoring

**Drip Detect Sensor – DDS**: This sleek, non-invasive sensor can be customized and designed to fit any drip chamber. It accurately and dependably outputs a pulse for each drop of liquid, eliminating the need for time-consuming visual drip count to monitor flow rate at the patient site.

**APPLICATIONS:**
- Hemodialysis • Auto Transfusion • Apheresis • Blood Processing • Drug Delivery
- Media Volume Monitoring
Safety is Designed into Every Product.

Miniature Blood Component Detector

**BC1 Miniature Blood Leak / Component Detector:** Performs non-invasive optical-based detection of fluid passed within the clear tubing used in many critical processes. Unwanted fluid elements can be detected to ensure the safety of a procedure or process. Available in several configurations.

>> APPLICATIONS:
- Hemodialysis
- Auto Transfusion
- Blood Processing
- Stem Cell Research

Flow Sensor

**Flow Sensor – IntroFlow:** Non-invasive, free entry, ultrasonic performance for quick, real time detection of flow rate through flexible tubing. While exceptionally compact, the IntroFlow is totally integrated and can be customized for a variety of tube sizes as well as for specific applications.

>> APPLICATIONS:
- Medical OEM Devices
- Laboratory Processing
- Chemical Industry
- Food and Beverage

Single Point and Continuous Liquid Level Detectors

**Point-Air Detection – PAD:** The ultimate air detection sensor for a fluid-handling cassette/manifold application, delivering a reflective ultrasonic signal from a single contact point. The PAD Sensor incorporates state-of-the-art patented pulse-type ultrasonic circuitry.

>> APPLICATIONS:
- Hemodialysis
- Auto Transfusion
- Apheresis
- Chromatography
- Blood Processing
- Drug Delivery
- Contrast Media
- Ablation
- Media Volume Monitoring

**Point Level Detector – PLD:** User friendly with a sleek, compact design and integrated electronics that never require calibration. The PLD is the most advanced non-invasive pulse-wave ultrasonic sensor available for liquid level detection.

>> APPLICATIONS:
- Laboratory Processing
- Chemical Processing
- Chromatography
- DNA Analysis
- Fluid Analysis

**Continuous Level Detector – CLD:** Available in standard and customized designs to meet customer application requirements. The unique pulsed, non-invasive design allows the liquid level from the bottom of a plastic vial, container, or tank to be monitored quickly, accurately, and dependably. Scalable for small to large plastic containers and vessels for medical, industrial, pharmaceutical, food and beverage, and laboratory applications.

>> APPLICATIONS:
- Laboratory Processing
- Chemical Processing
- Chromatography
- DNA Analysis
- Fluid Analysis
Continuous Liquid Level Detector – CLM: Available in standard configurations, the patented pulse ultrasonic technology and non-invasive design enable bottom-up continuous liquid level detection in a variety of fixed vessels and tanks so they can be monitored quickly, accurately, and dependably.

>> APPLICATIONS:
- Laboratory Processing
- Chemical Processing
- Waste Management
- Food and Beverage

Confidence in Introtek.

When you put your trust in Introtek, you get a great deal in return. Product reliability, durability, safety, and accuracy, all backed by extraordinary service and support, are our highest priorities. That means you can be assured that our sensors perform efficiently and effectively day after day. Add to that, our proven track record of 97 percent on time shipment deliveries and strategic client partnerships that extend more than 25 years, it’s no wonder that Introtek supplies more air bubble detectors for vital applications worldwide than any other company.

>> All Introtek products come with a full three-year warranty.
Introtek is a subsidiary of Magnetrol International, Inc. An innovator in liquid level and flow technologies since 1932, Magnetrol supports customers in over 100 countries.