



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

BDF/BDP Free-Entry Sensors

BDF/BDP series ultrasonic air bubble, air-in-line and liquid level sensors are designed for flexible or rigid tubing

Sensors shown with and without a mounting base



Introtek's BDF (for soft tubing) and BDP (for rigid tubing) sensors are available with or without a mounting base. The BDF sensor is constructed of either rigid epoxy or ABS plastic and the BDP sensor is constructed of soft polyurethane.

TECHNOLOGY

Introtek's air bubble detectors and liquid level sensors utilize high-frequency acoustic energy to monitor tubing or vessels for the presence of air, air bubbles, foam or liquid. The sensor's piezoelectric crystals are placed in direct contact with the desired point of detection. Air detection sensors and electronics emit pulses of ultrasonic energy which are sent through tubing and returned within a specified "window" of time. If air is present, the ultrasonic signal does not arrive within this "window" of time and a warning or dry signal is immediately transmitted.

HIGHLIGHTS

- ◆ Non-invasive technology does not contact the fluid or require a break in the tubing.
- ◆ No coupling agents required.
- ◆ Low cost, premium performance.
- ◆ Wide range of sizes and mounting options.
- ◆ Fastest air bubble detection circuitry available.
- ◆ Not affected by fluid color.
- ◆ Can be used by a wide range of rigid and soft tubing.
- ◆ Air detection threshold or bubble size can be user-specified.
- ◆ Custom manufactured systems for OEM applications are available.

INTROTEK's CERTIFICATIONS



APPLICATIONS

- ◆ Air bubble, air-in-line and liquid level sensing
- ◆ Patient-connected medical devices, including:
 - Apheresis
 - Auto-transfusion
 - Infusion pumps
 - Perfusion-based "life support" devices
 - Heart-lung bypass
 - Dialysis
 - Cardiac assist pumps
- ◆ Chromatography and separations technology
- ◆ Immunoassay and diagnostic equipment
- ◆ Liquid and chemical dispensing
- ◆ Blood processing equipment

BDF/BDP Free-Entry Style Sensors

FUNCTIONAL SPECIFICATIONS

Sensor:

The BDP Sensor is precision cast of soft polyurethane and works well with rigid or less pliable tubing.

The BDF sensor is precision cast of rigid epoxy resin (or injection molded of ABS plastic construction) and works well with softer, more pliable tubing.

Liquid:

Bubbles will be detected in almost any liquid; however, groups of micro-bubbles or foam will also be detected as bubbles.

Calibration:

No field calibration is required.

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

Electronics:

Utilizes remote circuitry (BD2 or BD3).

OPTIONS

- ◆ Custom OEM designs
- ◆ Custom response times
- ◆ Reverse output logic
- ◆ Open collector output
- ◆ LED
- ◆ Molex® connectors (w/BD3)
- ◆ Phono connectors (w/BD2)
- ◆ Quick connectors (w/BD2 and BD3)
- ◆ Mounting base

VALIDATION TESTING

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

Electrical Fast Transients:

IEC 61000-4-4:2004

Radiated Emissions, Group 1, Class B:

CISPR 11

Electrostatic Discharge:

IEC 61000-4-2:2002

Radiated Immunity:

IEC 61000-4-3:2002

Power Frequency Magnetic Fields:

Performed per IEC 60601-1-2:2004

General Safety Requirements:

IEC 60601-1:1988

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; and, upon factory inspection of the unit, the cause of the malfunction is determined to be defective material or workmanship; then, Introtek will repair or replace the system at no cost to the purchaser (or owner) other than transportation.

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.

