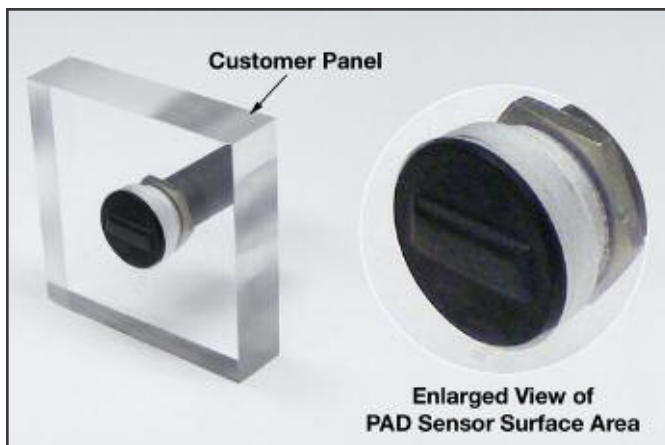




**The Introtek Advantage** provides products of unsurpassed quality, functionality and dependability that are manufactured to the highest medical device standards and backed by a three-year warranty.

## Point-Air Detection (PAD) Sensor

*The PAD Sensor delivers a reflective ultrasonic signal from a single contact point.  
The ultimate air detection sensor for a fluid-handling cassette application.*



Introtek Point-Air Detection (PAD) Sensors incorporate the state-of-the-art, patented pulse-type ultrasonic circuitry. Integral to the sensor's assembly, the Micro-Electronic Controller (MEC) features programmable algorithms for functionality control. Response times, time delays, and other functions are programmed in accordance to specific requirements.

### TECHNOLOGY

Introtek patented pulse-type ultrasound provides highly reliable, non-invasive air detection capabilities in critical applications where the safety of a patient or the integrity of a process is essential. Many of the variables which affect the accuracy of amplitude based or continuous wave ultrasound are greatly reduced if not eliminated by pulse-type technology.

### HIGHLIGHTS

- ◆ Compact design features integral MEC circuitry.
- ◆ Programmable micro-controller expands the circuit's functionality.
- ◆ High EMI and RFI noise immunity.
- ◆ Reliable pulse-type, non-invasive ultrasound.
- ◆ Air detection threshold or bubble size can be set to our customer's requirements.
- ◆ Accommodates a wide range of disposable cassette assemblies that incorporate fluidic channels.
- ◆ Dry coupled; no coupling gel is required.
- ◆ Accuracy is not affected by fluid or tubing color.

### INTROTEK CERTIFICATIONS



### APPLICATIONS

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

## Point-Air-Detection (PAD) Sensor

### SENSOR PART NUMBER

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

### FUNCTIONAL SPECIFICATIONS

#### Supply Voltage:

5 VDC, 12 VDC or 24 VDC

#### Supply Current:

15 mA

#### Output Signal:

CMOS levels, programmable for High or Low on Wet.  
Output levels to within 0.5 V of power rails with 5mA loading.

#### Self-test Input:

Provides an electronic check for false wet output signals.

#### Response Time:

Air Detection (Wet to Dry): 215  $\mu$ S typical  
Liquid Detection (Dry to Wet): 46 mS typical

#### Operating Temperature:

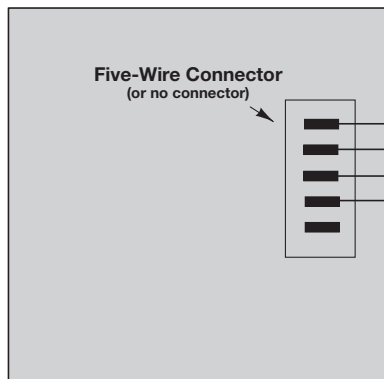
+41° to +140° F (+5° to +60° C)

#### Humidity:

0 – 95% Non-Condensing

### OPTIONS

- ◆ Reverse output logic
- ◆ Custom response times
- ◆ Custom OEM designs
- ◆ Integral or remote circuitry



#### Five-Wire Color Code (Default Configuration)

RED	Input DC Voltage (5.0 V)
BLACK	Ground (Return)
GREEN	Self-Test (Connect to Ground for Normal Operation)
ORANGE	CMOS Logic Output

**NOTE: Custom Assemblies and Provisions  
may require other system connections**

### VALIDATION TESTING

The Point-Air 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 60601-1-2:2007 (3rd 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.



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

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