

LEVEL SENSORS

Features

- Non-Intrusive, stays outside-the-bottle
- Very small footprint
- Simple installation
- Robust design for rough handling
- No calibration needed
- Highly repeatable
- Eliminates fluid compatibility issues
- Mini USB style, moisture-resistant connector for ease of use
- Works on most plastic bottles

Benefits

- Never touches the fluid
- Eliminates fluid contamination
- Improves instrument uptime
- Maximizes bottle volume
- Gets closest to high and low levels
- No special mounting required
- Eliminates testing for media compatibility

Equipment Used On

- Clinical chemistry
- Hematology
- Immuno-chemistry
- Histology
- Medical Laser Systems
- Hemodialysis
- Cytology

Fluid Monitoring Applications

- Reagents
- Waste
- Diluent
- Detergent/wash
- Dialysate
- Coolant
- Saline
- Pure water

*Thinking Outside the Box...
Sensing Outside the Bottle*

ExOsense™ Piezo-Resonant Liquid Level Sensors

Developed specifically for the In Vitro Diagnostic market.



New ExOsense™ is the first affordable, non-intrusive liquid level sensor for plastic fluid containers. ExOsense™ sensors adhere to the outside of plastic bottles and are unaffected by the color or transparency of the plastic. Liquids inside the bottle are untouched, so with ExOsense™ there is no issue of material compatibility or contamination. Best of all, ExOsense™ sensors fit any size and shape vessel, from small bottles to large tanks.

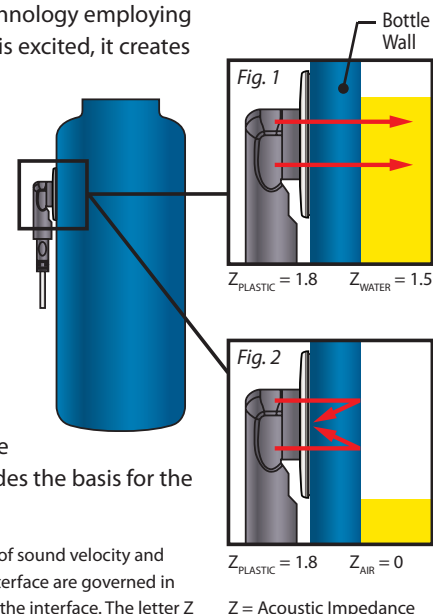
The ExOsense™ sensor head features a peel-and-stick adhesive face that can be affixed anywhere on the outside of the tank to provide high, low or any intermediate point level fluid sensing. A detachable mini USB cable feeds the solid-state switch unit.

Operating Principle

Our sensor incorporates proprietary transducer technology employing piezoelectric material. When piezoelectric material is excited, it creates an acoustic signal as a function of the natural resonance of the material. ExOsense™ sensors generate this acoustic signal, direct it through the bottle wall and sense the reflected pulse.

The amount of energy that is reflected is determined by the "acoustic impedance*" mismatch of the materials in use. For example, if sound passes through two materials with similar acoustic impedances (figure 1), very little energy will be reflected. If sound passes through two materials with dissimilar impedance values (figure 2), the majority of the acoustic energy will be reflected. This acoustic impedance mismatch provides the basis for the detection of liquid level.

*Acoustic Impedance: a material property defined as the product of sound velocity and material density. The relative transmission and reflection at an interface are governed in part by the acoustic impedances of the materials on each side of the interface. The letter Z is used for acoustic impedance and is expressed in $[\text{kg/s m}^2] = 1 \text{ Rayl}$:
Water $Z = 1.5 \text{ MRayls}$; Air $Z = 0 \text{ MRayls}$



MEDICAL

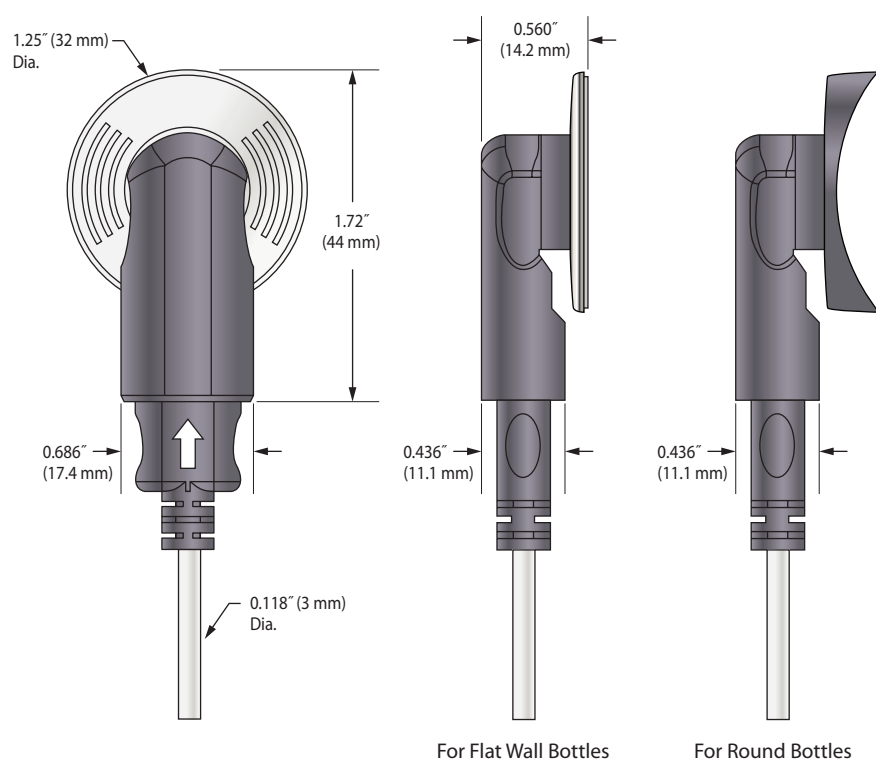
Preliminary

Specifications

Compatible Plastic Bottle Materials	Polyethylene (PE), Polypropylene (PP) Polysulfone (PS), Polycarbonate (PC)
Bottle Materials Not Recommended	Teflon® family, or Any Foamed Core Plastics
Min. Bottle Diameter for Round Bottles	2" (50.8 mm)
Bottle Wall Thickness	0.02" to 0.15" (0.5 mm to 3.8 mm)
Termination of Transducer	Mini USB Style Connector to Electronics
Input Power Supply (volts)	4.75 to 5.25 VDC (Alternative configuration available for 6 to 32 VDC.)
Power Consumption (current)	50 mA (maximum)
Calibration	None. Works on Bottle Materials or Wall Thickness Without User Input
Output Configuration	Open Collector; 40 mA, Max.
Switch Condition	Normally Open/Normally Closed
Response Time	<100 msec.
Low Noise (RFI/EMI)	3V per Meter Field Strength
Agency Approvals (pending)	UL 508, CE, IEC 60601 & IEC 61326 (EMI/RFI)
Temperature (sensor)	32°F to 158°F (0°C to 70°C)
Mean Time Between Failure	50K Hours (target)
Repeatability	±0.039" (±1 mm)
Accuracy	±0.063" (±1.6 mm)
Sealing Capability	IP65

Dimensions

Actual Size



Super Simple Installation:

- 1. Peel & Stick**
Peel the adhesive cover off the sensor and stick it on the bottle where you want to indicate the level.
- 2. Connect**
Connect the sensor to the electronic module using the mini USB connector.
- 3. Sense**
Apply power and sense the fluid level.

Our Medical Equipment Specialists are ready to discuss your sensor requirements, so don't hesitate to give us a call.



50 YEARS OF INNOVATION

GemsSensors.com

800.378.1600