

AcraSensor™ Liquid Level Sensor for Tank Gauging

Features Include

- ◆ Virtually free of long term drift
- ◆ Reduced temperature sensitivity
- ◆ Pneumatic or electronic (4-20 mA) output

This pneumatic sensor detects level by sensing pressure due to liquid depth. Acting on the force balance principle, a sensitive diaphragm is exposed to the liquid contents in the tank. Compressed air pressure is generated within the sensor resulting in a 1:1 balance with the hydrostatic head pressure (created by liquid depth).

Accurate and Reliable Measurement

The pneumatic force balance diaphragm technique is virtually free of long term drift and temperature sensitivity. Mechanical deflection of the diaphragm is not measured so the effect of stress is insignificant. The compensating pneumatic balance pressure can either be directed to a suitable gauge, or converted into a proportional 4-20 mAdc output.

This approach has advantages over typical fluid-filled remote diaphragm seals due to reduced

temperature sensitivity on the part of the pneumatic sensor. Since both primary and

downstream pneumatic pressures are dynamically balanced, temperature effects on the transfer media (air/gas) are negligible as opposed to static fluid fills. The metal diaphragm version of the sensor features a thin foil of pure titanium laser-fused to the sensing probe.

This unitized construction and high tensile strength of titanium offers excellent resiliency while retaining good sensitivity to minute changes in level. Silicone rubber and buna-N diaphragm versions are also offered. These molded elastomer diaphragms offer alternatives to titanium when material compatibility is an issue.

Sanitary Configurations

These sensors are especially suited to a wide range of sanitary applications. Materials of construction include polished stainless steel and an FDA approved silicone rubber O-ring used to form a crevice-free, positive compression seal between the diaphragm probe and tank shell or adaptor (AcraSensor II metal version). Flush mount configurations are available that meet the 3-A Sanitary Standard for clean-in-place.

Monitoring Tank Inventory

A complete KING-GAGE system can be configured around the AcraSensor liquid level sensor. The output signal can be routed to either an analog column display or digital readout preconfigured for the specific geometry and capacity of the tank. Indication is then provided directly in total weight or volume of the liquid contents.



AcraSensor II diaphragm sensing probe. Pneumatic operation is compatible with continuous explosion hazard applications.

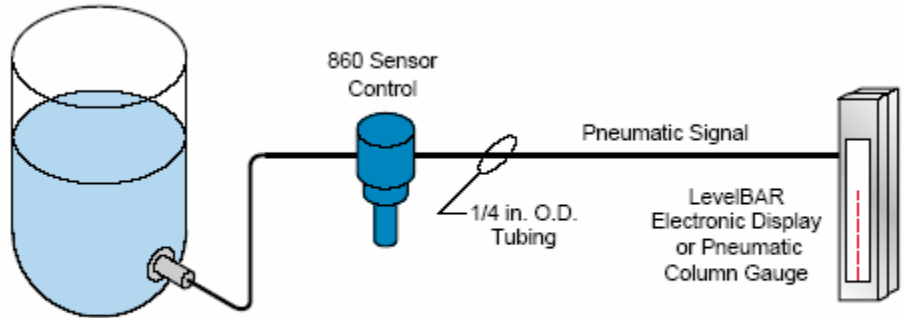


Pneumatic or Electronic Output

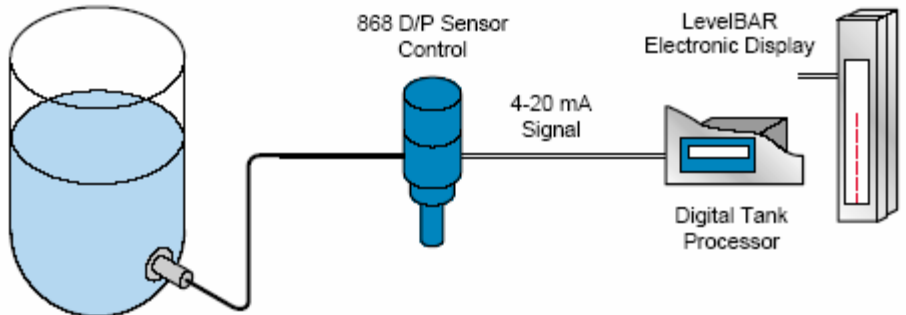
AcraSensor diaphragm units are used in conjunction with a pneumatic Sensor Control. This control provides continuous 1 CFH (cubic foot per hour) air flow to the underside of the diaphragm to create a pneumatic balance pressure. Integrated into this control is a backpressure regulator assembly that maintains linear 1:1 response throughout the entire operating pressure range. This ensures the pneumatic output signal is directly equivalent to the hydrostatic head of liquid in the tank.



860 Sensor Control
Pneumatic Output



Pneumatic Output - AcraSensor system with pneumatic pressure signal transmitted to compatible indicator.

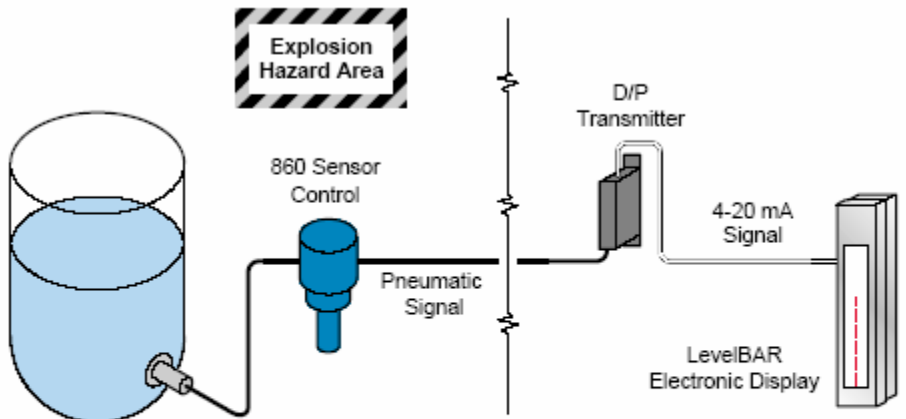


4-20 mA Output - AcraSensor system with D/P Sensor Control providing 4-20 mA signal loop.

For electronic output, the D/P Sensor Control adds a precision differential pressure transmitter that converts the pneumatic output of the sensor to a proportional 4-20 mA signal suitable for process control or remote level indication.



868 Sensor Control
4-20 mA Output



Continuous Explosion Hazard (Zone Zero or Division One) - Pneumatic sensors such as AcraSensor use no electrical energy for operation when using the 860 Control. The pneumatic pressure signal output of the sensing system can be transmitted 1000 feet or more to a safe area for electronic readout or 4-20 mA conversion.

AcraSensor II

PNEUMATIC OUTPUT

Titanium Diaphragm and 860 Sensor Control

Complete pneumatic output package includes sensor assembly with metal diaphragm, pneumatic control, 15 feet of 3-tube bundled cable for pneumatic interconnections.

4-20 mAdc OUTPUT

Titanium Diaphragm and 868 D/P Sensor Control

Hybrid pneumatic sensor with electronic output includes sensor assembly with metal diaphragm, pneumatic control with integral transmitter, 15 feet of 3-tube bundled cable for pneumatic interconnections.

AcraSensor

PNEUMATIC OUTPUT

Silicone Rubber Diaphragm and 860 Sensor Control

Complete pneumatic output package includes sensor assembly with rubber diaphragm*, pneumatic control, 15 feet of 3-tube bundled cable for pneumatic interconnections.

4-20 mAdc OUTPUT

Silicone Rubber Diaphragm and 868 D/P Sensor Control

Hybrid pneumatic sensor with electronic output includes sensor assembly with rubber diaphragm*, pneumatic control with integral transmitter, 15 feet of 3-tube bundled cable for pneumatic interconnections.

* *Buna-N diaphragm is available as an alternative to silicone rubber if desired.*

Compressed Air Supply

Operation of the AcraSensor package requires a compressed air/gas source providing supply pressure of 35-150 psig.

Specifications

Diaphragm Material
(AcraSensor II) - .001" commercially-pure titanium
(AcraSensor) - .015" silicone rubber, FDA-approved

Sensitivity
Less than .001 psi (.02" water)

Repeatability
± .002 psi (+ .05" water)

Accuracy
± .007 psi (+ 0.2" water)

Temperature Range
30° F to 300° F/-1° C to 149° C

Burst Pressure
Titanium Diaphragm - Better than 100 psid (positive or reverse differential). Refers to maximum pressure differential applied to diaphragm.
Silicone Rubber Diaphragm - Better than 6.0 psid (positive or reverse differential).

Pressure Range
Integral electronic transmitter (868 D/P Sensor Control) provides 4-20 mAdc proportional two wire output. Pressure ranges available: 0-5, -10, -15, -30, -50 psid.

Sensor is a 1:1 pneumatic force balance diaphragm capable of repeating hydrostatic pressure as an equivalent pneumatic output. Maximum measurement pressure is determined by compressed air supply pressure (35 psi min. to 150 psi max.) minus 20 psi.

Total air consumption of sensor package (including 860-series Sensor Control) is less than 10 CFH.

* *Accuracy stated applies to temperature range of 30° F to 150° F/-1° C to 66° C. Total accuracy of complete system with indicator will vary based on component selections.*



Mounting Options

Flush Weld Shells

3-A authorized clean-in-place installation Polished stainless steel tank shell for welding to inner tank liner permits flush mounting of diaphragm (intended for clean-in-place installation). Weld-in type shell is offered in two lengths to accommodate various insulated tanks, as well as single wall (non-insulated) tanks offered in 304 or 316L stainless steel.

- Standard Length Shell - for single wall or insulated tanks (up to 4-1/2" thick jacket)
- Long Length Shell - for special insulated tanks (up to 6-3/4" thick jacket)

Sanitary Shell Conversion – Retrofit existing level sensors

Inserts are available to permit mounting AcraSensor II into existing sanitary tank shells from a variety of original manufacturers:

- Anderson Instrument
- Cherry Burrell
- Foxboro & Rosemount sanitary tank spuds
- Tank Mate, Wizard & Continental

Sanitary Fitting Adapter

Mates to 2" Tri-Clamp
Polished stainless steel mounting ferrule for mating with typical sanitary clamp-type fittings. (Clamp fastener is not supplied.)

- Tri-Clover MP-2" Tri-Clamp

Flange Mount Adapter Mates to 150-class ANSI flanged outlet

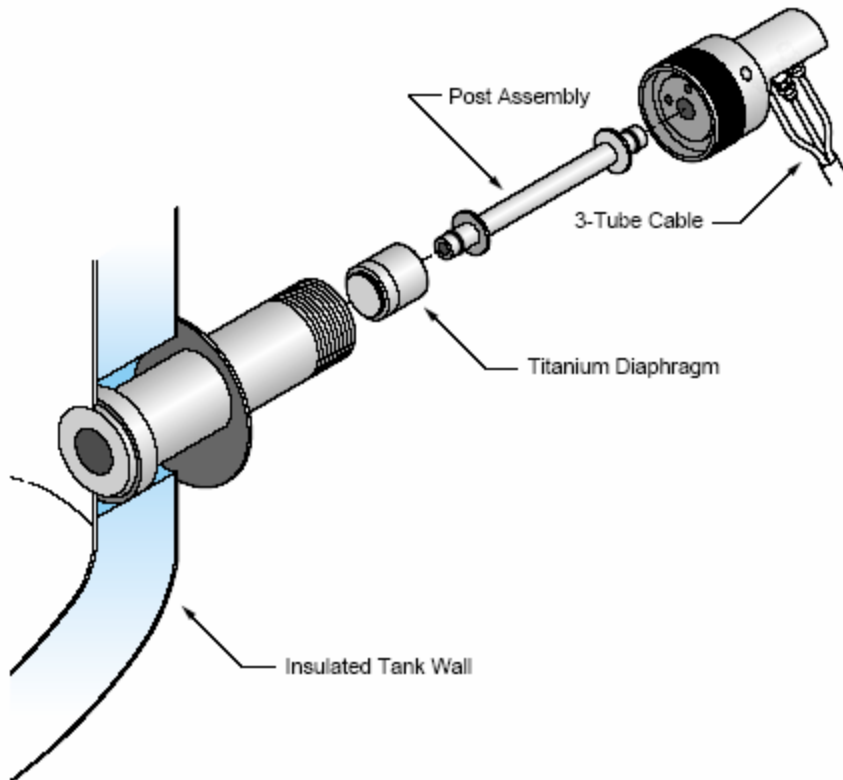
Mounting adaptor mates to flanged connection at tank, available in carbon steel, 304 stainless or 316 stainless steel.

- 2", 3", 4" 150-lb. class (flat faced) flange

1204 Main Street • Sebastian, Florida 32958
Phone: 772-581-0477 • Fax: 772-581-0481

www.wisnercontrols.com





Installation

Flush Mount Sensors

Tank shell is installed through wall of tank and flush-welded to inner tank lining. Bezel (provided with tank shell) is used to seal penetration through outer tank wall. Exploded view show diaphragm sensor assembly, including 3-tube cable, for installation on insulated wall tanks.

Diaphragm Installation and Replacement

AcraSensor II assembly uses a one-piece diaphragm probe. Post assembly is inserted into metal diaphragm probe for installation within mounting shell. Clamp nut secures assembly within mounting shell.

Non-Vented Tanks

Differential Pressure Applications

When tank contents are subject to other than atmospheric pressure, differential pressure measurement is required. This is accomplished by sensing both the internal pressure of the tank above the liquid surface and the resulting pressure at the bottom.

The differential that exists between these two pressures represents the hydrostatic pressure created by actual liquid depth.

A differential pressure transmitter (D/P) can provide suitable output to a KING-GAGE Digital Indicator/Processor. Alternatively, the KING-GAGE LevelBAR may be used to directly measure the pressure differential in non-vented systems.

