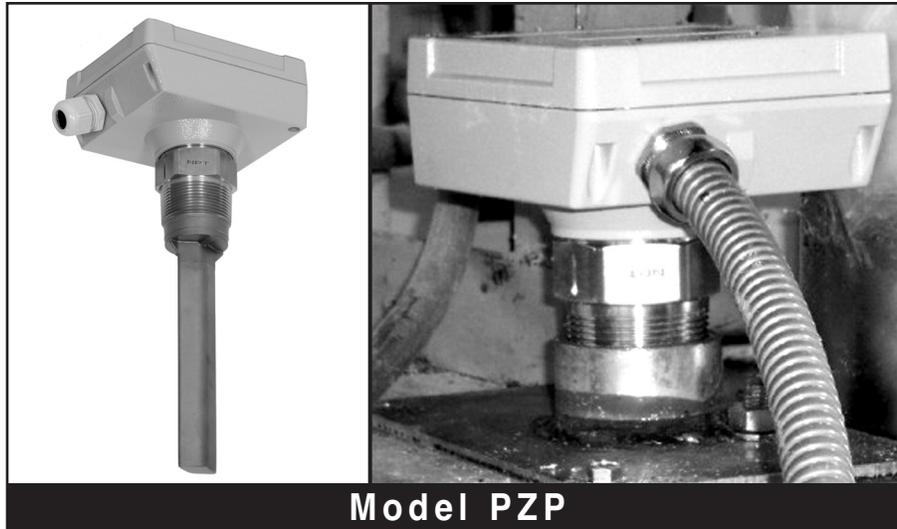


# BULLETIN 524A

## INSTALLATION & OPERATION

### PZP Vibratory Level Sensor



Thank you for purchasing a quality product from Monitor Technologies LLC. We realize that you do have a choice of vendors when procuring vibratory level sensors and we sincerely appreciate your business!



This manual contains the information necessary to ensure a safe and successful installation. Please read and comply with the section on page 6 of this manual pertaining to SAFETY. Doing so will ensure proper operation of the equipment and the safety of all personnel.



Before discarding shipping container, please inspect it thoroughly and verify that all parts ordered are accounted for. Sometimes smaller parts become stuck under carton flaps and other packaging materials.

In the event that information contained herein does not completely satisfy your requirements or answer your questions, you may contact Technical Support on our website [www.monitortech.com](http://www.monitortech.com), by telephone at 800-766-6486 (630-365-9403), or by fax at 630-365-5646. If your sensor ever requires service either in or out of warranty, please contact us and obtain an RMA number prior to shipping the unit to us.



[www.monitortech.com](http://www.monitortech.com)

## PRE-INSTALLATION CONSIDERATIONS

**Choosing a Location:** (See Figure 2)

- 1) Material Flow** - When selecting a location for the PZP, choose a point in the vessel where the probe will be out of the direct flow of incoming and outgoing material to prevent any mechanical damage that may be caused by the pressure of the flow (see section regarding Protective Baffles). The PZP must be positioned at a point where incoming material will reach and cover the probe in its normal flow, and when receding, will flow away from the probe in an even manner. Choose a position where a majority of the probe (not just the tip) will be covered. This is particularly important when detecting materials with low densities.
- 2) Vessel Interference** - Select an area where the probe will not come in contact with internal structures of the vessel. When using the flexible cable extension probe, consider the angle of repose of the material. Insure that the swing of the cable will not allow the probe to touch the vessel wall during filling or emptying.
- 3) Pipe Extension Reinforcement** - When top mounting a probe with a pipe extension, select a location where it is feasible to reinforce the extension to the vessel wall. See Mechanical Installation for further details.

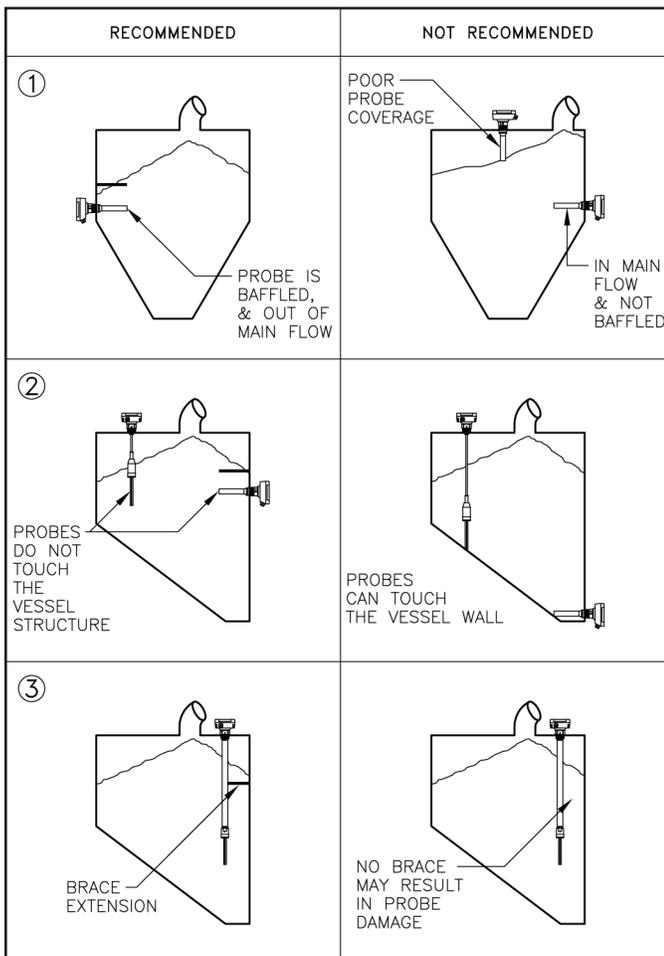


Figure 1

**Protective Baffles:** (See Figure 2)

The PZP is a sensitive level sensing instrument. Therefore, particular attention should be given to assure that the mechanical construction of the probe is not damaged by material. Probe deflection (bending) as little as 1/16 inch (1.5mm) can render the probe inoperative. Failure to properly protect the probe will invalidate the warranty. Install a protective baffle above side mounted probes. The baffle can be created using a number of materials including angle irons, welded plates and pipe sections. It should be securely mounted to the vessel wall and should extend the full length of the probe. The lowest part of the baffle should be 4 to 6 inches (101.6 to 152.4 mm) above the upper edge of the probe.

DIMENSIONS ARE SHOWN IN INCHES WITH MILLIMETER EQUIVALENT IN BRACKETS

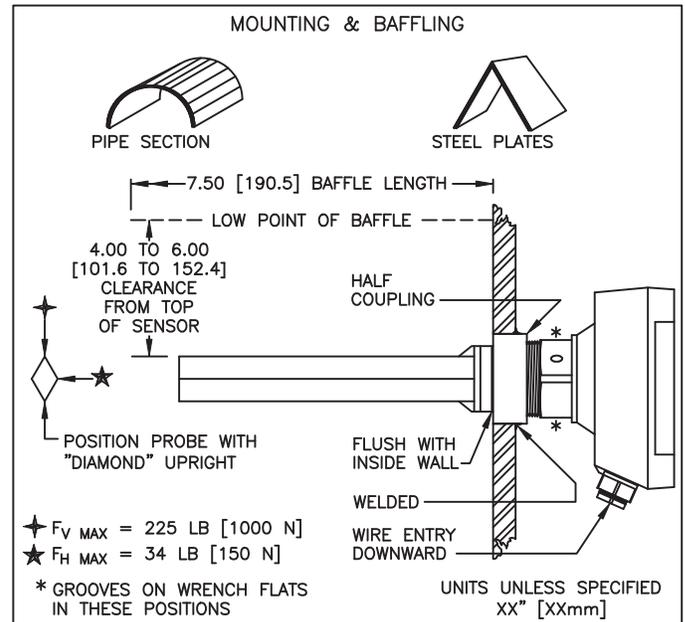


Figure 2

## MECHANICAL INSTALLATION

**Probe Mounting:** (See Figure 2)

- 1) Coupling Mount** - Cut a hole into the vessel that corresponds to the outer diameter of a 1-1/2" pipe coupling. <sup>Note 1</sup> Position a half coupling flush with the inside of the vessel and weld into place. Thread the PZP into the coupling and tighten using the wrench flats provided on the probe. Do not tighten by rotating the housing. Pipe joint sealant or Teflon® tape may be used to achieve pressure sealing capability if desired.
- 2) Probe Orientation** - On side mount applications, tighten so that the diamond shape is positioned vertically. This is achieved when the two "grooves" in the hexagonal flats are re-aligned vertically.
- 3) Housing Orientation** - On side mount applications, if the housing is positioned without the wire entrances in a downward position, orientate the housing as follows:
  - Remove cover. Loosen (do not remove) the screw that is visible through the hole in the center of the circuit board.
  - Rotate the housing to the desired position.
  - Tighten the screw in the center of the circuit board.
 Replace the cover.

**Note 1:** Mounting should be a 1-1/2" NPSC pipe coupling (which is a straight thread coupling) and mounted per the illustration. Use of an NPT (tapered pipe thread) type coupling or flange is not recommended unless the minimum inside diameter is greater than 1.734".

## ELECTRICAL INSTALLATION

### Pipe Extension Reinforcement: (See Figure 3)

Mechanical reinforcement of the pipe extension should be considered whenever installing a probe length greater than 72 inches (1829 mm). The pipe extension should be anchored to the side wall with braces to reduce mechanical stress at the connection point of the extension and to protect the PZP from damage. When bracing, never weld or drill into the pipe extension since the electrical wires within the extension may be damaged. Use mechanical clamping techniques.

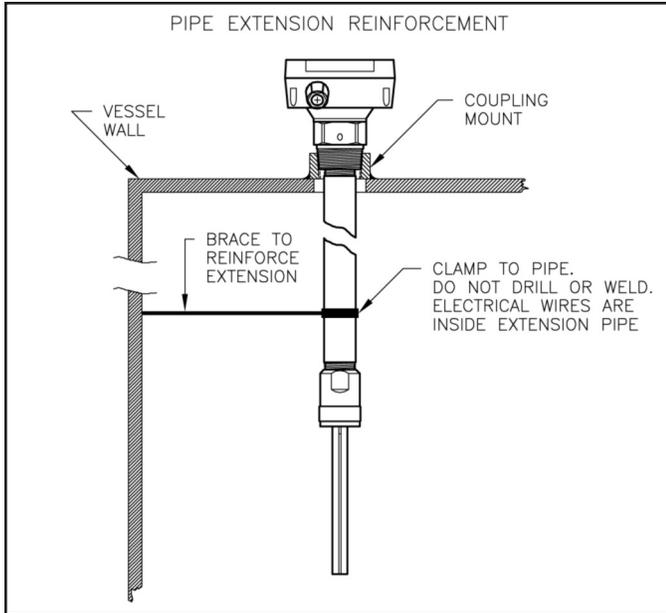


Figure 3

### Hi-Temp/Remote Electronics Models: (See Figure 4)

- 1) **Probe Mounting** - Follow instructions as earlier stated in this section. Note that the hi-temperature/remote electronics PZP has been completely assembled at the factory to insure performance and assembly integrity. This may cause some installation inconveniences as the electronic portion of the assembly will require simultaneous rotation as the probe is installed.
- 2) **Remote Electronics** - This portion is connected to the probe via a 6 foot (1829 mm) flexible conduit. Mount the remote electronics to a structure away from the heat or vibration being avoided. Position the wire entrances such that the risk of moisture infiltration is minimized. Reference the hole pattern of the mounting plate and securely fasten into place.

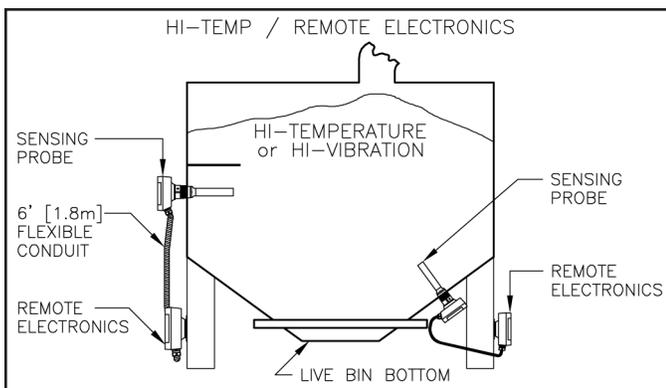


Figure 4

Remove the housing cover to access all electronics. All wires shall be routed through the cord connector provided. If necessary, refit the connection with a 1/2" NPT fitting (steel is recommended since minor rethreading is required).

### Factory Wiring:

The PZP probe wires are connected to the frontside of the PCB. **DO NOT** alter this connection. Doing will likely cause improper operation of the sensor.



### Permanently Connected Equipment:

Disconnecting devices shall be included in the system installation. In installations where multiple circuits are used (i.e. independent circuits for power input and output relay), individual disconnects are required. The disconnects shall be within close proximity of the equipment, accessible to operators, and marked appropriately as the disconnect for the associated circuit. Assure the disconnect ratings are appropriately sized for the circuit protected (See Specifications).



### Protective Earthing:

Each PZP is provided with a "protective conductor terminal"Ⓢ which shall be terminated to the local earth ground potential to eliminate shock hazard in the unlikely event of internal insulation breakdown. Select wire size that can carry in excess of the sum of all circuit's maximum amperage.

### Power Input: (See Figure 5)

The PZP is designed with a universal power supply that can accept a wide range of AC and DC voltages (see Specifications to insure compatibility). Select wire size that can deliver suitable voltage and current for the application. Connect power as shown in Figure 5.

### Output Contact Connections:

The PZP is equipped with two sets of isolated contacts (DPDT) which indicates whether or not material is being detected within the vessel. This output is also influenced by the selection of the "fail-safe" jumper as described in the "Setup" section of this manual. The designations on the circuit board relate to the contact status when the material is "not" sensed and the fail-safe jumper is in the "low" (FL) mode. These contacts can be connected to any type of control device, provided that ratings are observed (See Specifications). Select wire size that can deliver suitable voltage and current for the application.

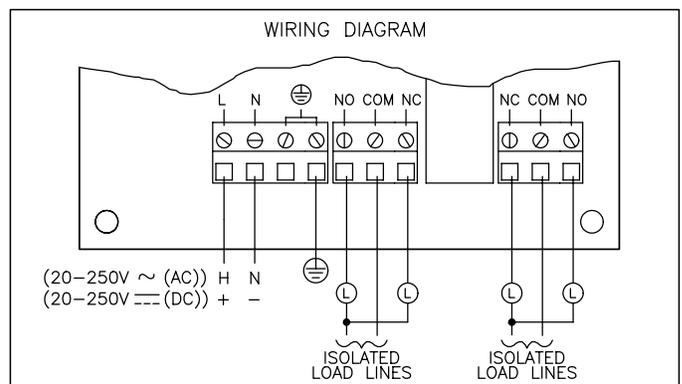


Figure 5

## SETUP

Complete set-up of the PZP is accomplished by two functions: sensitivity and fail-safe. Each application can be adjusted independently for optimum operation.

### Sensitivity: (See Figure 6)

Select sensitivity based on application as shown below.

- 1) **Position A** - For materials  $\geq 1.5 \text{ lb/ft}^3$  ( $24 \text{ kg/m}^3$ )
- 2) **Position B** - For materials  $\geq 10 \text{ lb/ft}^3$  ( $160 \text{ kg/m}^3$ )
- 3) **Position C** - For materials that have caused false signals due to probe coating in Position B. Use only as a last resort.

### Red LED: (See Figure 7)

The red LED indicates the status of the output relay which is dependent on material sensing and fail-safe selection. Refer to Figure 7.

### Fail-Safe: (See Figure 7)

Selection of the fail-safe mode will permit the output contacts to be signaled in a manner which assures proper control of loads in the event of power failure. Select fail-safe mode based on which condition is most critical to signal (high level or low level).

- 1) **FH** - When no material is sensed, the relay will be energized. The relay will de-energize when material is sensed, or if power failure occurs.
- 2) **FL** - When material is sensed, the relay will be energized. The relay will de-energize when no material is sensed, or if power failure occurs.

### PROBLEM: Sensor will not sense material.

#### CAUSE/SOLUTION:

- 1) Verify power is applied to the sensor.
- 2) Verify sensitivity setting. Position sensitivity switch in position "A" therefore making the probe more sensitive to "difficult to sense" materials.

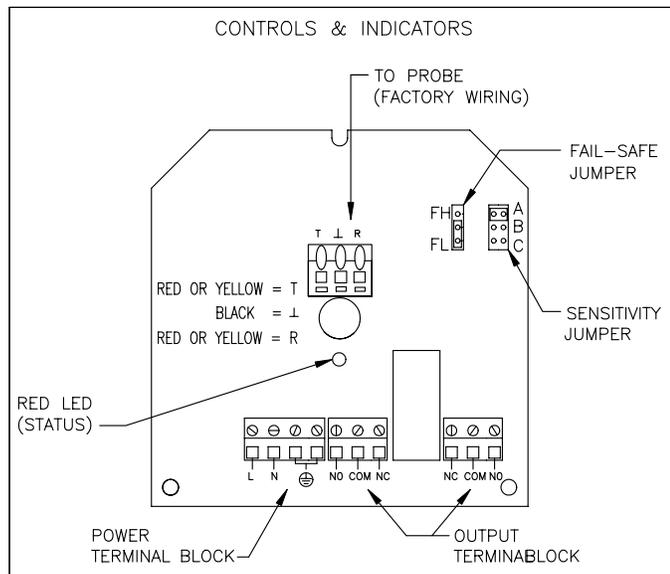


Figure 6

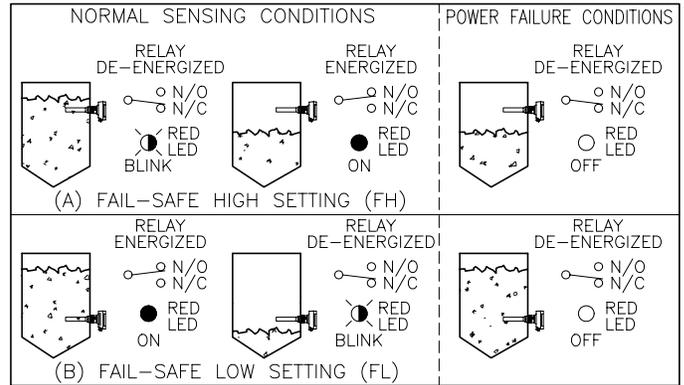


Figure 7

## TROUBLESHOOTING

- 3) Verify probe coverage when sensing is expected. The sensor is not designed to be "tip sensitive". Permit significant probe coverage before expecting material sensing.
- 4) Verify electrical connection between the probe and circuit board. The red wires should be connected to the "T" and "R" terminals. The black wire should be connected to the GND terminal.

### PROBLEM: Sensor remains in "DETECT" mode even when material is absent.

#### CAUSE/SOLUTION:

- 1) Verify the probe is not in direct contact with any internal vessel structure. If so reposition sensor.
- 2) Verify sensitivity setting. Position sensitivity switch in position "B" therefore making the probe less sensitive to "easy to sense" materials and more immune to material buildup. If problems continue, select Position C.
- 3) Verify material buildup on probe. Product buildup across the probe surface or between the probe and vessel wall may create false detection. Clean probe if necessary.

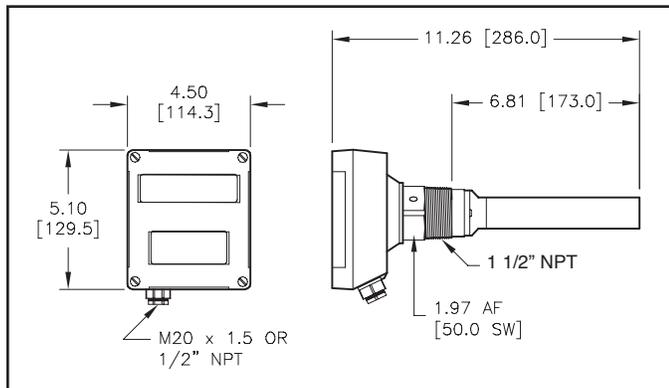
### PROBLEM: Output contacts perform opposite of designations (N/O, N/C).

#### CAUSE/SOLUTION:

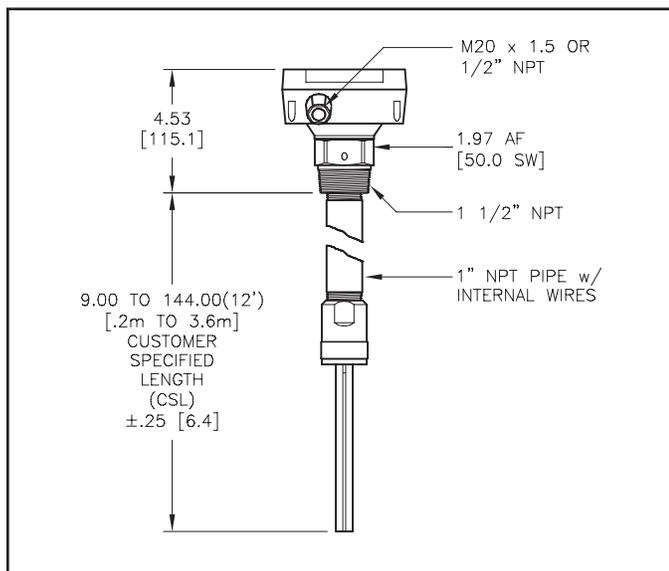
- 1) Designations on the PCB relate to relay status when in "Fail-safe Low" (FL) mode and when no material is sensed. When in "Fail-safe High" (FH) mode and when no material is sensed, the designations are reversed. Swap wire terminations of N/O and N/C if necessary. Changing the fail-safe selection is not recommended unless fail-safe feature is not a concern to the application.

## MECHANICALS

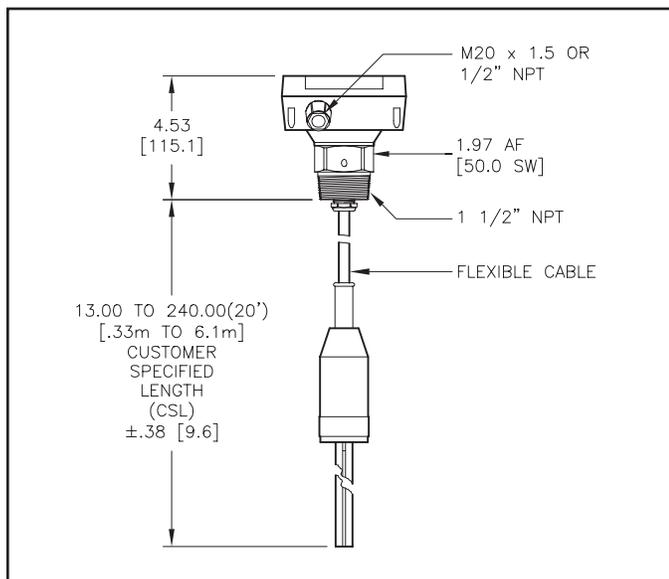
DIMENSIONS ARE SHOWN IN INCHES WITH MILLIMETER EQUIVALENT IN BRACKETS



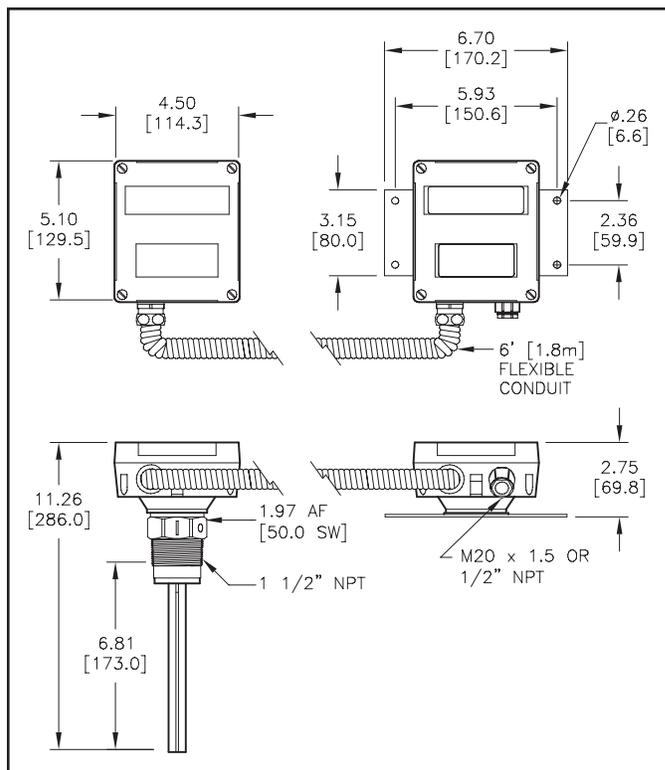
**Standard Probe**



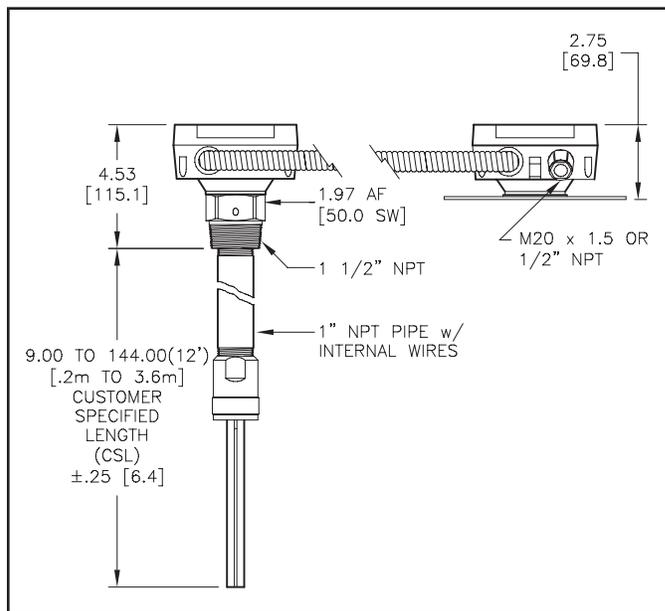
**Pipe Extension Probe**



**Flexible Cable Extension Probe**



**Hi-Temp/Remote Electronics Probe**



**Hi-Temp/Remote Electronics Probe With Pipe Extension**

## MAINTENANCE

The PZP is a maintenance-free product and should be serviced by Monitor Technologies LLC only. If operation appears inappropriate, refer to the Troubleshooting section of this bulletin. If proper operation is not achievable, consult the factory.

## SAFETY

### General Safety

**CAUTION:** It is essential that all instructions in this manual be followed to ensure proper operation of the equipment and safety of operating personnel. The use of this symbol is used throughout manual to highlight important safety issues. Please pay particular attention to these items.

### Electrical Shock Caution

Certain PZPs are powered with HIGH VOLTAGE. No operator serviceable parts are inside. All servicing is to be performed by qualified personnel. Each PZP is provided with a "protective conductor terminal" ⊕ which shall be terminated to earth ground potential (See Electrical Installation). This product's design complies with EN61010-1 installation category II and pollution degree 2.

### Electromagnetic Compatibility (EMC)

The PZP was tested and found to comply with the standards listed below. The PZP should not be used in residential or commercial environments. Compliance to EMC standards was demonstrated by means of a test setup using the following installation methods.

- 1) PZP enclosure was connected to earth ground (protective earth).
- 2) No specific wiring convention was used to supply power or to retrieve output signal from the PZP.

#### EMC Emissions:

Meets EN 61326-1 Electrical Equipment for Control Use, EMC  
EN 55011 Radiated and conducted emissions  
(Class A- industrial)  
EN 61000-3 Fluctuations/Flicker

Meets FCC Part 15B: RF Devices, Unintentional Radiators  
CISPR 11 Radiated and conducted emissions  
(Class A- industrial)

#### EMC Immunity:

Meets EN 61326-1 Electrical Equipment for Control Use,  
EMC  
IEC 1000-4-2 Electrostatic discharge (industrial)  
IEC 1000-4-3 RF radiated EM fields (industrial)  
IEC 1000-4-4 Electrical fast transients (industrial)  
IEC 1000-4-5 Electrical surges (industrial)  
IEC 1000-4-6 RF conducted EM energy (industrial)  
IEC 1000-4-8 Power frequency magnetic fields  
(industrial)  
IEC 1000-4-11 Source voltage deviation

## SPECIFICATIONS

Power Requirements:	Universal 20 – 250 VAC 50/60 Hz 20 – 250 VDC
Power Consumption:	3 VA max.
Ambient Temp. Electronics:	-22° F to 140° F (-30° C to 60° C)
Internal Bin Temperature:	
Standard models:	-22° F to 176° F (-30° C to 80° C)
High Temp. models:	-22° F to 302° F (-30° C to 150° C)
Output Relay:	DPDT dry contact; 5 amps @ 250VAC max
Sensitivity:	1.25 lb/ft <sup>3</sup> (20 kg/m <sup>3</sup> ) minimum material density Jumper selectable - A (High ≥ 1.25 lb/ft <sup>3</sup> ) (20 kg/m <sup>3</sup> ) B (Medium ≥ 10 lb/ft <sup>3</sup> ) (160 kg/m <sup>3</sup> ) or C (Low, product build-up applications)
Time Delay:	Hold-off, fixed delay of 1 second Hold-on, fixed delay of 2-5 seconds
Fail-Safe:	Jumper selectable (high - FH, low - FL)
Operating Frequency:	280 Hz
Enclosure:	Die cast alum. beige powder coat; NEMA 4; IP65
Probe/Gland Material:	304 stainless steel
Process Connection:	1-1/2" NPT (PZP); 1-1/2" NPSC (Vessel)
Pressure Rating:	150 PSI (10.4 bar)
Wire Entry:	M20 x 1.5 cablegland, remove for 1/2" NPT
Indicator:	Red LED – Status dependent on material sensing and fail-safe selection.
Solid Extension:	1" pipe, 304ss, 12' (3.6m) length max. (customer specified length)
Cable Extension:	Polyurethane sheathed, steel rope reinforced; 20' (6.1m) length max. (customer specified length)
Interconnection Distance:	6' (1.8m factory installed flexible conduit (high temp models)
Weight:	4.5 lb (2 kg) (standard model only)
Approvals:	 CHINA RoHS 2

## WARRANTY

Monitor Technologies LLC warrants each PZP vibratory point level sensor it manufactures to be free from defects in material and workmanship under normal use and service within two (2) years from the date of purchase. The purchaser must give notice of any defect to Monitor within the warranty period, return the product intact and prepay transportation charges. The obligation of Monitor Technologies LLC under this warranty is limited to repair or replacement at its factory. This warranty shall not apply to any product which is repaired or altered outside of the Monitor Technologies LLC factory, or which has been subject to misuse, negligence, accident, incorrect wiring by others or improper installation. Monitor Technologies LLC reserves the right to change the design and/or specifications without prior notice.

## Monitor Technologies LLC

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