

## Level Measurement for Filled Systems using Pressure Transmitters



### **Purpose**

- Determine Span and Calibration Ranges needed to enter into transmitter – while there are a wide variety of fill system configurations available, this addresses the most common.
- During Request for Quote any process connections, material selection, or other specific transmitter and fill system specifications determine the appropriate configuration, and product is built to those specifications.
- Contact us for additional technical support on special process conditions or configurations (such as Vacuum applications, Limited low end span, Pressurized Tanks, Use of wet or dry leg with direct connect seal, etc.)

### **Best practices for general handling of seals & other considerations**

- **Avoid mounting in direct sunlight** – Extreme variations of temperature can affect the specific gravity, and viscosity of both Fill and Process Fluids
- **Zeroing periodically for maintenance is recommended** – especially if you experience any seasonal fluctuations
- **Balanced two seal systems are recommended** – same seal on both sides, and same length capillaries

### **Careful Handling of fragile Diaphragm Seals is Required -**

- **NEVER disconnect the seals or capillaries, or loosen bolts from the transmitter**
  - Resulting loss of fill fluid affects performance and warranty
- **DO NOT lift by the capillaries when unpacking or handling as it will result in damage**
- **DO NOT remove protective coverings on seals in place until ready to install**
- **DO NOT touch the diaphragm and DO NOT set seal down on a hard surface**
  - Even minor defects and scratches can impair performance.

- **Examples for EACH configuration available Online.**

**Additional troubleshooting is available through technical support, please make sure to note any symptoms or issues as they occur, including process information, or error readings.**

**(800) 325-4808**

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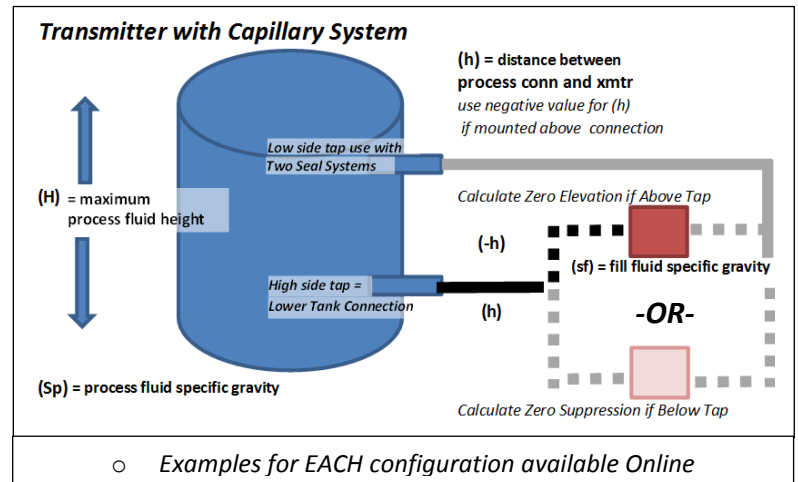
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## Application Considerations:

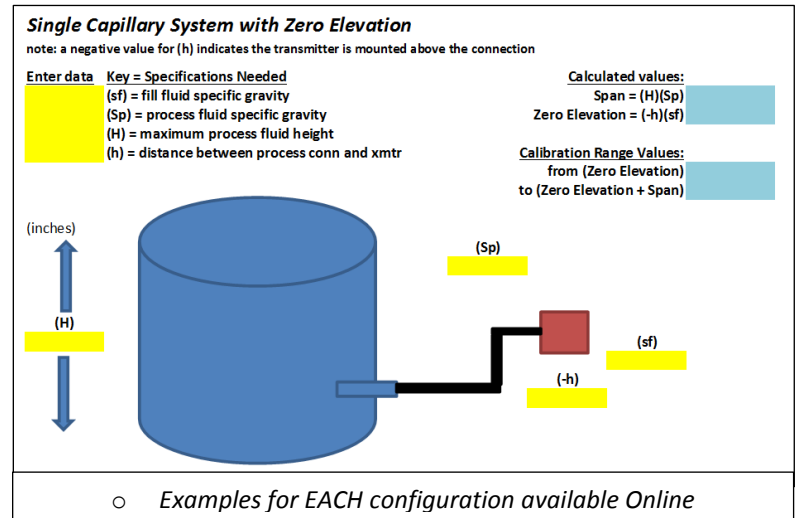
- **Range** is the low and high end measurement capability of the transmitter sensor.
- **Span** is the measurement within that range which you need to calibrate the transmitter to.
- **Determining calibration range** for filled systems is dependent on several factors, including mounting location, process and fill fluid specifications, overall level to be measured, and proper configuration.
- **Connects to high side tap** (lower tank connection) on both One or Two Seal System
  - One seal – connects to high side tap only
    - *Direct mount (no capillary) is typically a one seal system –types include flanged, extended flanged, and L-brackets*
  - Two seal – connects to high side tap at lower tank connection, and low side tap at top
- **Zero Elevation or Zero Suppression** is determined by location of pressure transmitter relative to high side tap



- Zero Elevation mounted above high side tap
- Zero Suppression mounted below high side tap
- Direct connection requires no elevation or suppression

## Specifications needed to calculate Span and Calibration Ranges:

- **Maximum Process Level (H)** – Overall height of level being measured from centerline of high side tap
  - *Single seal – measure centerline high side tap to maximum process fluid height*
  - *Two seal – measure centerline of high side tap to centerline of low side tap (at top)*
- **Distance between high side process connection and transmitter (h)** – Distance above or below high side tap
  - Direct connection would be zero
- **Fill Fluid Specific Gravity (sf)** – Use published specifications



- **Process Fluid Specific Gravity (Sp)** – Specific gravity of process fluid being measured
  - Such as water at ambient room temperature has a specific gravity of .997
  - Even small variations of the value for any process fluid can widely effect range values
- **Calculations:** Span = (H)(Sp)      Zero Suppression = (h)(sf)      Zero Elevation = (-h)(sf)
- Use Calculations to determine Range Values: LRV = Lower Range Value, URV = Upper Range Value
  - Elevation: LRV = Zero Elevation (-h)(sf)      URV = Zero Elevation (-h)(sf) + Span (H)(Sp)
  - Suppression: LRV = Zero Suppression (h)(sf)      URV = Zero Suppression (h)(sf) + Span (H)(Sp)
  - Direct: LRV = Zero      URV = Zero + Span (H)(Sp)

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