



PRESSURE AND TEMPERATURE TRANSMITTERS



Measurement Solutions Overview

Pressure Measurement: Our comprehensive range of pressure measurement devices caters to diverse requirements, from high-accuracy, ultra-stable pressure transmitters to basic transducers. We offer:

- **High Accuracy Pressure Transmitters:** Ideal for applications requiring precise measurements and stability.
- **Standard Pressure Transducers:** Suitable for general pressure measurement needs.
- **Specialist Devices:** Custom specifications and production schedules to meet the demands of large-scale projects.
- **Availability:** We stock pressure sensors for rapid next-day delivery, ensuring timely support for your needs.

Temperature Measurement: Choose from our selection of temperature measurement solutions to match your specific application:

- **High Performance Universal Temperature Transmitters:** Versatile and suitable for a range of applications.
- **Standard Thermocouples:** Available in various types (K, J, T, R, S) for different temperature ranges.
- **Pt100 Head-Mounted Transmitters:** For precise temperature measurement in diverse environments.
- **Temperature Probes:** Offered with or without thermowells or pockets for flexible installation.
- **Level Measurement:** We provide advanced level measurement solutions to suit different applications:
 - **Hydrostatic Level Measurement:** Utilizes differential pressure with direct mount flange types for accurate liquid level detection.

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- **Ultrasonic Level Measurement:** Ideal for applications where direct mounting is impractical, commonly used for tanks and vessels.
- **Capabilities:** Measures both liquid and solid levels, with signal transmission available through wired or wireless devices.

Flow Measurement: Our flow measurement technology covers a wide range of methods to ensure accurate readings:

- **Orifice Plates, Venturi Tubes, and Pitot Tubes:** Traditional flow measurement technologies.
- **Electromagnetic Flowmeters:** For measuring conductive fluids with high accuracy.
- **Ultrasonic Flowmeters (Clamp-On):** Non-invasive flow measurement suitable for various pipe sizes.
- **Expert Advice:** Our flow specialists are available to recommend the most suitable flowmeter for your specific application.

Transmitters: Transmitters integrate sensors with electronics to convert sensor signals into a format suitable for external systems:

- **Function:** Outputs a signal representative of the measured parameter (e.g., pressure, temperature, level, or flow).
- **Types:** Devices that measure and transmit data, such as pressure transmitters, are part of this category.

Considerations for Measurement Devices: When selecting measurement devices, consider the following specifications:

- **Process Fluid and Materials of Construction:** Ensure compatibility with the measured medium.
- **Accuracy and Reliability:** Assess the performance standards required.
- **Warranty and Drift:** Evaluate the longevity and stability of the device.
- **Process Connection and Signal Type:** Match the device to your system's requirements.
- **Certifications:** Check for Atex, FM, CSA, hazardous area approvals, SIL rating, MCERT compliance.
- **Additional Factors:** Price, availability, size, and weight may influence your decision.

At Coulton, we are committed to understanding your requirements and providing tailored solutions to meet your measurement needs. Whether you need immediate stock availability or custom solutions for large projects, we strive to deliver the best fit for your specifications.

PRESSURE TRANSMITTERS FOR LEVEL MEASUREMENTS



Pressure Transmitters for Fluid Level Measurement: Technical Overview

Principle of Operation: Pressure transmitters used for fluid level measurement operate on the principle of hydrostatic pressure. The core concept is:

- **Hydrostatic Head Pressure:** The pressure at the bottom of a fluid column is directly proportional to the height of the fluid above it. This pressure, known as hydrostatic head pressure, is used to infer the fluid level.
- **Measurement Process:** The pressure transmitter measures this hydrostatic pressure to determine the fluid level in a vessel.

Differential Pressure (DP) Transmitters:

- **Usage:** DP transmitters are frequently employed in industrial applications for level measurement.
- **Operation:**
 - **Inferential Measurement:** DP transmitters measure fluid levels by detecting the difference in pressure between two points, typically the top and bottom of the fluid column.
 - **Diaphragm Sensing:** The device features a diaphragm that senses the head pressure created by the height of the material in the vessel. This pressure difference is used to calculate the fluid level.

Types of Level Sensors:

1. **Continuous Level Sensors:**
 - **Function:** Measure the fluid level continuously within a specified range.
 - **Output:** Provide precise data on the amount of substance present at any given level.



2. Point-Level Sensors:

- **Function:** Indicate whether the fluid level is above or below a predefined sensing point.
- **Applications:** Typically used to detect excessively high or low levels, rather than providing continuous measurement.

Features of Pressure Transmitters:

- **Accuracy:** High accuracy over a broad temperature range, ensuring reliable measurements.
- **Repeatability:** Excellent repeatability, meaning consistent performance and output.
- **Long-Term Stability:** Designed for long-term stability, minimizing drift and maintaining accuracy over time.
- **Multi-Drop Configuration:** Multiple transmitters can be interconnected in a multi-drop setup to reduce cabling requirements.

Design and Construction:

- **Isolation:** The sensor is isolated from the process fluid by a stainless steel diaphragm and a filling liquid. This protects the sensor and ensures accurate measurements.
- **Housing:** The transmitter electronics are housed in a hermetically sealed enclosure, providing robust resistance to shock and vibration. This design contributes to the durability and reliability of the Series 500 transmitters.

Summary: Pressure transmitters, particularly differential pressure transmitters, are essential for accurate fluid level measurement in various industrial applications. By measuring hydrostatic head pressure, these devices offer precise and reliable level readings. Continuous level sensors provide detailed measurements, while point-level sensors are used for high or low-level detection. The advanced design features, including high accuracy, excellent repeatability, long-term stability, and rugged construction, make these transmitters suitable for demanding environments and complex installations.

ROTARY TYPE AND LINEER TYPE POSITIONERS



Control Valve Classification: Linear vs. Rotary Motion

Introduction: Control valves are essential components in various industrial processes, used to regulate flow, pressure, temperature, and other variables. They can be classified based on the mechanical motion of the valve stem, which generally falls into two categories: linear and rotary. Each type has distinct advantages and disadvantages, impacting their suitability for different applications.

Linear Motion Valves:

- **Design and Operation:**
 - **Description:** Linear-motion valves, also known as multi-turn valves, utilize a sliding-stem mechanism. The valve operates by moving a closure element (such as a disk, globe, or gate) linearly into or out of the flow path to control the flow.
 - **Motion:** The stem moves up and down or back and forth, creating a linear motion that adjusts the position of the closure element.
- **Advantages:**
 - **Simplicity:** The design is straightforward, making it easy to maintain and repair.
 - **Versatility:** Available in various sizes and designs, accommodating a broad range of applications and trim options.
 - **Cavitation Resistance:** Generally more resistant to cavitation compared to rotary valves, making them suitable for high-pressure drop applications.
- **Applications:**
 - **Common Uses:** Ideal for applications requiring precise flow control and where space is less of a constraint. Frequently used in services involving high pressure drops and severe service conditions.



Rotary Motion Valves:

- **Design and Operation:**
 - **Description:** Rotary-motion valves, also known as quarter-turn valves, use a rotating closure element (such as a ball, butterfly, or plug) that turns typically through 90 degrees to open or close the flow path.
 - **Motion:** The valve operates through a rotary motion, often achieved with a quarter-turn actuator.
- **Advantages:**
 - **Compact Size:** Generally smaller and lighter compared to linear valves, which can be advantageous in space-constrained environments.
 - **Ease of Emission Control:** More effective in controlling emissions due to stem packing, without the need for additional sealing mechanisms like bellows seals.
 - **Resistance to Clogging:** Less prone to clogging in dirty service applications due to the nature of the rotary motion.
- **Disadvantages:**
 - **Pressure Drop Limitations:** May be limited in terms of maximum pressure drop they can handle compared to linear valves.
 - **Cavitation and Flashing:** More susceptible to cavitation and flashing issues, although advancements in technology are addressing these concerns.
- **Applications:**
 - **Common Uses:** Suitable for applications where space is limited and where quick operation is required. Commonly used in applications involving less severe service conditions and where efficient control of flow and pressure is necessary.

Example: V-Port Ball Valve:

- **Description:** A v-port ball valve is a specific type of rotary valve with a v-shaped port that allows for precise flow control. It is commonly used in control applications where modulating flow rates is required.
- **Features:** Offers precise control with a high degree of accuracy due to its v-shaped port design, which helps in adjusting the flow rate effectively.

Conclusion: The choice between linear and rotary control valves depends on the specific requirements of the application, including factors such as space constraints, pressure drop, flow control precision, and potential for clogging. Linear valves offer simplicity and resistance to cavitation, while rotary valves provide compactness and ease of emission control. Understanding these differences helps in selecting the most appropriate valve type for any given process.