

Considerations For Low Pressure Measurement



Low pressure measurements are required in various applications such as air flow, static duct and clean-room pressures in HVAC and energy management systems. Other applications include use in medical instrumentation, environmental pollution control, boiler combustion efficiency and a wide variety of research and development requirements. Although the focus will center mainly on air flow and pressure, the same principles apply to liquids. Since there are pressure transducers (voltage output proportional to applied pressure) and pressure transmitters (current output proportional to applied pressure), each will be referred to as pressure sensors.

Low pressure ranges are typically from 0.1" H₂O (.004 PSI) Full Scale (FS) up to 25" H₂O (.903 PSI) FS. The pressure sensors used to make these measurements are very sensitive and overpressure can adversely effect accuracy or, in extreme cases, damage the units.

Pressure Cautions

Low differential pressure measurements can be made with high line pressure, although, be sure that the line pressure does not exceed the maximum pressure rating of the device. Pressure relief valves with adequate venting capacity should be used in any system if the supply is capable of delivering the air, gas or fluid at pressure greater than the capacity of the pressure sensor.

Installation Recommendations

For differential pressure measurements at high line pressure, it's recommended to install the pressure sensor with a valve in each line. A shunt valve across the high and low (reference) pressure ports should also be installed as shown in Figure 1.

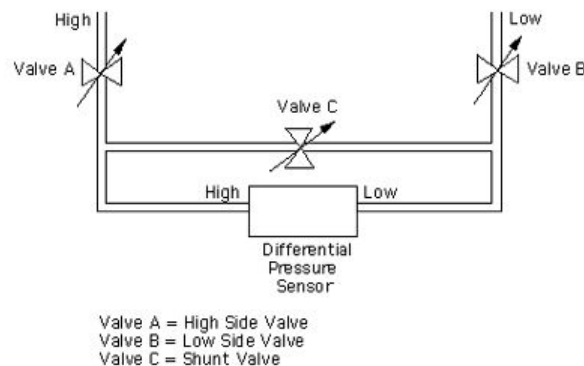


FIGURE 1

Figure 1 is especially helpful for a liquid measurement application. Valve C should be open and Valves A and B closed whenever the system is first being wetted or pressurized. Next, Valves A and B should be opened slowly to avoid fluid hammer. Valve C can then be closed, allowing the system to operate.

When the differential pressure sensor is removed, open Valve C first, then close Valves A and B. Many types of pressure sensors are sensitive to vibration and the mounting position. Contact the manufacturer if either are an issue within the application, because both can affect the accuracy of the pressure measurement.

Temperature Cautions

Temperature variations in both the ambient conditions and the media (liquid or gas) can affect the accuracy of the pressure sensor's output signal. Check the operating temperature range and thermal error specification of the pressure sensor to determine suitability for the application.

Media Compatibility

Media compatibility with the pressure sensor must be insured to prevent failure of the pressure sensor and/or contamination of the media itself. Most manufacturers will list the materials of construction that will come in contact with the media, and provide recommendations on which to avoid.