PRESSURE TRANSDUCER INSTALLATION NOTES

OVERVIEW

Measurement Specialties' pressure transducers feature digitally compensated electronics that are environmentally protected within a sealed enclosure. The transducers are highly accurate over a broad temperature range, resisting the effects of wide ambient temperature swings, high humidity, condensation and icing.

The pressure port is machined from a solid piece of stainless steel. No o-rings, organic materials, or welds are exposed to the pressure media, allowing for a leak-proof, all-metal, sealed pressure system. The transducers operate with all pressure media compatible with stainless steel, including most hydraulic fluids, fuels and refrigerants.

INSTALLATION

While a pressure transducer is generally, robust there are certain precautions that can improve reliability and prevent damage. Where possible:

- Install the pressure sensor so that water does not run down the electrical cable and pool on the connector/backend
- Install the sensor in a low vibration environment
- Keep power and switching cable wiring separate from signal cables to minimize interference
- Install in a location that has some mechanical protection. Do not use the device as a hand-hold or step

Hydraulic and other liquid lines sometimes have unanticipated pressure spikes or surges caused by valve operation or impact. This momentary pressure can damage a fast responding pressure sensor.

- Use a pressure sensor incorporating a 'snubber'
- Do not install the sensor directly at the end of a long pipe run

Do not insert a foreign object, such as a pen or screwdriver, into the pressure port in an effort to simulate pressure. A small force applied to this small area can easily overpressure the device, causing permanent damage.

Ensure the sensor is installed using the correct o-rings or washers.

The device should be installed using a wrench or socket on the hex flats provided. Do not use a strap wrench on the body.

Certain MicroFused sensors have a copper-colored port, leading to confusion about the material used. The part is steel; this coloring is an oxide residue from the manufacturing process. The exact color may vary and is of no importance.

PRESSURE REFERENCE

A pressure sensor measures the difference between pressure applied to the pressure port and a reference pressure. Common references are:

Absolute Pressure

Pressure is measured relative to a hard vacuum. Typically, the device contains a small vacuum chamber.

Gauge Pressure

Pressure is measured relative to local atmospheric pressure. The device must have a vent path to let local atmosphere in to the body. The advantage is that parts automatically correct variations in local pressure or altitude. The disadvantage is the reference port creates a path for moisture and other contaminant ingress.

Sealed Gauge Pressure

Pressure is measured relative to a standard gauge pressure, with no actual reference to atmospheric pressure. Often the device contains an absolute reference and an offset to represent a standard atmosphere is added electronically. This simulates a gauge part without requiring a vent path, and is commonly used for higher pressures where atmospheric variations are of little significance.

Differential Pressure

The device has two pressure ports and measures the difference between them. This can be used to measure a small differential pressure at a high line pressure like in filter monitoring. The addition of a second port and consideration of line pressure leads to a large number of scenarios that must be considered when specifying the device.

OUTPUT SIGNAL

Generally speaking, a pressure sensor will have an electrical output that varies linearly with applied pressure.
Common output types are:

mV
Typically, a mV signal is derived directly from the sensor bridge with only simple correction electronics. Output will be proportional to supply voltage (ratiometric). The part will respond quickly and will give a valid signal well outside its rated range. The accuracy is somewhat limited by the simple circuit typically used.

0.5 to 4.5V Ratiometric
This is common for automotive applications. The device operates from a nominal 5V supply and the output varies proportional to supply voltage within a specified range. Some diagnostic codes can be provided by controlling the out-of-range output.

Amplified 1-5V
A variety of amplified signals can be provided, most commonly 1-5V. These devices normally contain a regulator so output does not vary with supply voltage.

4-20mA
A common industrial standard requiring only two wires, and having the advantage that the signal is not degraded by a very long wiring run. The device draws 4mA at low pressure and 20mA at full scale pressure. This can be monitored by measuring the voltage across a series resistor.

Digital
A wide variety of digital outputs can be provided, including CANBUS, I^2C and SPI.

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