General Pressure Descriptions

Absolute Pressure: Pressure measured relative to a “perfect” vacuum.

Barometric Pressure Transducer: An absolute pressure transducer measuring the local ambient (absolute) pressure

Differential Pressure: The pressure difference measured between two pressure sources. When one source is a perfect vacuum, the pressure difference is called absolute pressure. When one source is the local ambient, the pressure is called gage pressure.

Gage Pressure: Pressure measured relative to ambient pressure.

Vacuum Range: The range of absolute pressure between a perfect vacuum (0 psi A) and one standard atmosphere (14.697 psi A)

Pressure Transducer: A pressure sensor that translates the change in pressure to a high level voltage output or digital signal.

Pressure Transmitter: A sub group of pressure transducers that translate the change in pressure to 4-20mA output. The group of sensors typically require a sensing “load” resistor where the change in current is translated to a voltage.

Transducer Parameters

Burst Pressure: The maximum pressure that can be applied to a sensor without rupture of either the sensing element or product housing.

Common Mode Pressure: The maximum pressure that can be applied to both ports simultaneously of differential sensor.

Full Scale: The algebraic difference between endpoints. Where one endpoint is actual offset voltage and the other endpoint is the upper limit of the range.

Offset Voltage: The output signal obtained when the reference pressure is applied.

Operating Pressure Range: The specified range over a sensor’s intended measurement range. Specified by the upper (Pmax) and lower (Pmin) limits.

Proof Pressure: The maximum pressure that can be applied without changing the sensor performance or accuracy.

Reference Pressure: The pressure used as a reference in measuring a sensor’s errors.

Reference Temperature: The temperature used as reference in measuring a sensor's thermal errors.
Sensitivity: The ratio of the output signal voltage change to the corresponding input pressure change. Sensitivity is determine by computing the ratio of span to the specified input pressure range; common units are mV/psi.

Span or Full Scale Span (FSS): The arithmetic difference in the sensor output usually measured at the specified minimum and maximum operating pressures.

General Error Terms

Auto Zero: A technique for eliminating errors by sampling at one or more reference pressures, then correcting the output signal function.

Best Fit Straight Line (BFSL): The best straight line chosen such that the sensors response curve contains three points of equal maximum deviation.

Common Mode Error: An error that is independent of the major input variable (pressure). For example, all offset errors are common mode errors.

Error Band: The deviation of sensor response from it BFSL, define by lines on either side of its BFSL and including the maximum deviation measured for a given normal mode or common mode error.

Interchangeability: The error band defined by the maximum signal deviation when a sensor is replaced by another of the same type with equivalent pressure inputs and temperature range.

Ideal Transfer Function: The mathematical representation of the input (pressure) variable and determined output (voltage) of the sensor.

Normal Mode Error: An error that is a function (proportional) of the major input variable (pressure). For example, all span errors are normal mode errors.

Repeatability: The error band expressing the ability of the sensor to reproduce and output signal parameter (offset, span) at specified pressures and temperature after exposure to any other pressure and temperature within the specified range.

Stability: the error band expressing the ability of a transducer to maintain the value of an output parameter (offset, span) with constant temperature and pressure inputs.

Temperature Coefficient: The error band resulting from maximum deviation of a sensors output parameter (offset, span) as temperature is varied from 25°C to any other temperature within the specified range. Typically measured in V/°C and divided by sensitivity to express the magnitude of the error band in psi/°C.

Common Error Terms

Offset Calibration: The error band defined by the maximum error in calibrating the offset voltage.

Offset Error: The error band defined by the maximum deviation of the offset voltage from its specified valued. This may include calibration, temperature coefficient repeatability and stability errors.

Offset Repeatability: The error band expressing the ability of a sensor to reproduce the offset voltage, measured at 25°C, after exposure to any other temperature and pressure within the specified range.

Offset Stability: The error band expressing the ability of the sensor to maintain the offset voltage with constant pressure and temperature.

Offset Temperature Coefficient: The error band defined by the maximum deviation in offset voltage as the temperature is varied from 25°C to any other temperature with the specified range.

Normal Error Terms

Hysteresis of Pressure: The error band defined by the maximum deviation in output signal obtained when a specific pressure point is approached first with increasing pressure, then with decreasing pressure (vice versa) at a constant temperature.

Hysteresis of Temperature: The error band defined by the maximum deviation in output signal obtained when a specific temperature point is approached first with increasing temperature, then with decreasing temperature (vice versa) at a constant pressure.

Linearity: The maximum deviation of measured output at constant temperature (25°C) from, best straight line determine by three points (offset pressure, half scale pressure, full scale pressure).

Sensitivity Calibration: The error band defined by the maximum error in calibrating sensitivity.

Span Error: The error band defined by the maximum deviation of the span voltage from its specified valued. This may include sensitivity calibration, coefficient, linearity, hysteresis, repeatability and stability errors

Span Repeatability: The error band expressing the ability of a sensor to reproduce the span voltage and temperature held constant.

Span Stability: The error band expressing the ability of the sensor to maintain the span voltage with constant pressure and temperature.

Span Temperature Coefficient: The error band defined by the maximum deviation in offset voltage as the temperature is varied from 25°C to any other temperature with the specified range.

Overall Accuracy

Total Error Band (TEB): Maximum deviation from the Ideal Transfer Function expressed as a percentage of the %FSS over the compensated temperature range. Includes calibration errors (Offset & Span), temperature errors (Offset & Span), pressure non-linearity, pressure and thermal hysteresis.