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Calibration or Verification of a GP:50 Pressure Transmitter

The procedure below is a generic procedure for calibrating or verifying a pressure transmitter's accuracy.

Basic calibration of a pressure transmitter is performed by applying a known input pressure to the device under test and measuring the output to characterize the overall accuracy of the transmitter. Normal calibration adjustment involves setting the zero point and span value.

If you have a fixed range transmitter, meaning there is no zero and span adjusts, you can only perform a verification of the transmitter's accuracy. If this type of transmitter is out of specification, typically they must be returned to the factory for re-calibration.

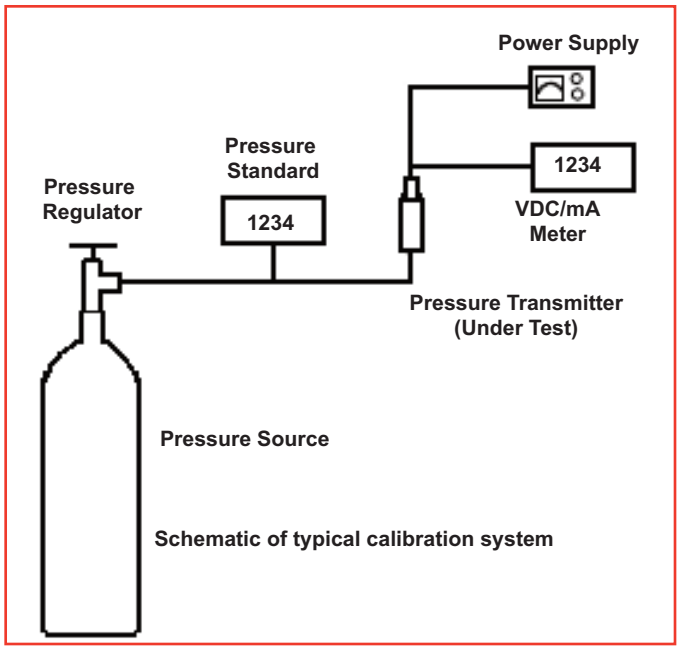
If the transmitter is used in conjunction with an adjustable panel meter or PLC and the zero and span can be altered on this measuring device, this may be done and calibrated as a system if acceptable in the application.

If you have a transmitter with zero and span adjust, "calibration" of the end points may be performed to bring the unit within specification. However if Linearity, Hysteresis or Repeatability are out of specification then the unit must be sent back to the factory.

A typical calibration setup requires an adjustable Pressure Source with a Pressure Standard, (measuring device that accurately verifies the input pressure), power supply and meter to read the transmitters output. 4-20mA, VDC or mV outputs are typical for most transmitters. This is dependant on the type of unit you are testing.

The Pressure standard, as a general rule of thumb, should be 4 times more accurate than the unit under test. For example if you have a +/-0.5% accurate device, a +/-0.125% or better measuring device (Pressure Standard) of the source should be used.

The pressure source and Standard are plumbed in line with the transmitter under test. The transmitter is then electrically powered per the transmitter's specified input requirements and a meter installed to accurately measure the output. The accuracy of the meter being used should also be taken in consideration.



Schematic of typical calibration system

The system should be powered up & allowed to warm up electrically. Typically 10-15 minutes is sufficient. The ambient & process temperature should also be stable. Calibration for standard GP:50 transmitters is done at room temperature, 68 deg F.

If just a 2-point or end point calibration or verification is required, a zero reading is first obtained. On gauge format units this can be done by removing all pressure from the system. If this is an absolute format then a full vacuum must be applied to the required absolute zero level. Once this zero pressure is achieved and some time for settling is allowed, verification of the zero can be read. If zero adjust is available on the transmitter, the zero may be adjusted to within an acceptable limit now. If no zero adjust is available verification of the zero reading is recorded and a pass fail criteria determines whether the unit needs to be sent back for recalibration or is within the acceptable limits of the system being used in.

Pressure is then applied to the full-scale range of the transmitter, or vacuum. The span reading is recorded. If the span is outside the acceptable limits and a span adjust is available it may now be adjusted to within the specifications. If there is no span adjustment then a determination as to whether the reading is outside of specification.

Pressure is then reduced back to zero. The zero reading is then measured to insure a good zero repeat is obtained.

If the unit did not repeat it's a good indication there maybe an issue with the device and may need to be returned to the factory for repair analysis.

Again, this is a simple 2 point or end point calibration/ verification procedure. Some applications may require multiple data points be taken between Zero and Full Scale pressure and a mathematical relationship between the pressure input and the electrical output derived to calculated inaccuracy. This will determine factors like Linearity and Hysteresis.

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