SOLINST TECHNICAL BULLETIN

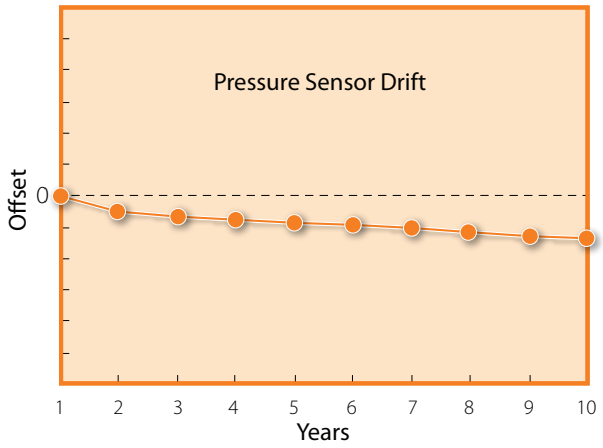
Understanding Pressure Sensor Drift

Pressure Sensor Drift

All pressure transducers - no matter what they are made of, how expensive they are, or how accurate - are susceptible to sensor drift over time. Pressure sensor drift is a gradual degradation of the sensor and other components that can make readings offset from the original calibrated state.

Based on their intended application, sensors are engineered from various materials. When exposed to certain conditions, the sensors will respond differently depending on the physical properties of the materials chosen.

Every sensor will undergo some expansion and contraction when subject to pressure and temperature cycles. Pressure change frequency and amplitude, temperature extremes, material responses and environmental changes are all factors contributing to drift. The magnitude a sensor will drift varies with actual usage and the conditions it is exposed to.



Example of Pressure Sensor Drift from the Calibrated Zero Point Over Time

Pressure Sensor Calibration

It is important to note that manufacturers test and calibrate their sensors in closed environments to achieve desired specifications and a zero point. Some manufacturers provide a value for the expected drift or long term stability, but these numbers are still based on use in very stable environments, making them somewhat irrelevant in normal use.

Solinst Leveloggers

Solinst Leveloggers are water level data loggers that use an absolute pressure sensor to detect the depth (or pressure) of water above the logger. For the Levelogger Edge, Solinst chose to use a Hastelloy pressure sensor because of durability, long term stability, accuracy, and corrosion resistance.

Hastelloy pressure sensors are more tolerant when it comes to being over-pressurized. Other sensors, such as ceramic sensors, tend to be more brittle and can shatter when they experience over-pressurization, ice accumulation, or water hammer effects.

Correcting for Drift

Factory re-calibration can be attempted to correct for drift, but may not be required. Regular "field zero readings" will serve to eliminate the effects of drift on pressure sensor readings.

The best recommendation is to compare barometrically compensated Levelogger data with a manually measured water level value (depth to water using a Model 101 or 102 Water Level Meter, or a staff gauge depending on your application).

By routinely taking manual water level measurements, and comparing these readings to those recorded by the Levelogger at the same time, an offset value can be determined. This offset value can then be used to correct future Levelogger readings.

If using a depth to water measurement for comparison, the deployment depth of the Levelogger, minus the manual depth to water measurement, should equal the compensated Levelogger reading. If not, the difference between the two readings is the offset value, or calculated sensor drift.

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