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Transducer Recalibration Recommendation

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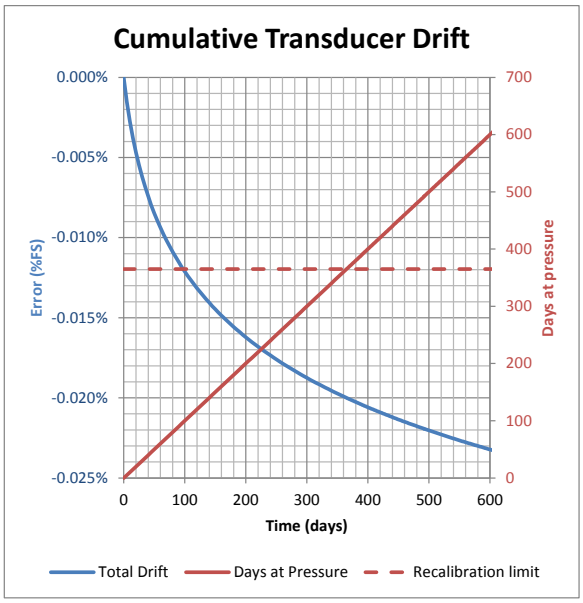
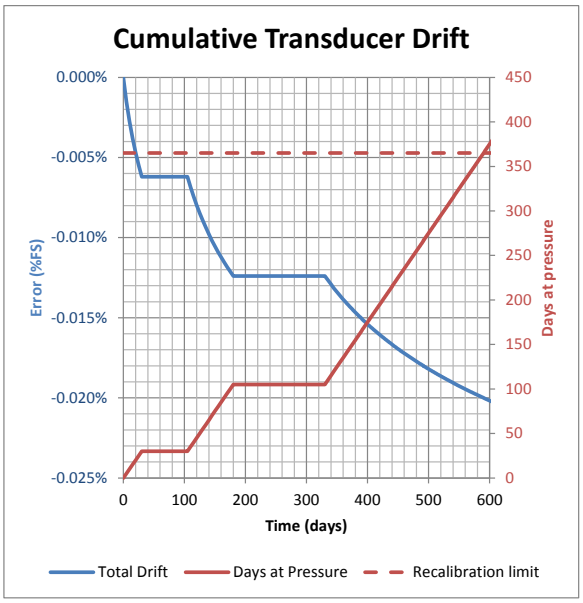
One the key virtues of quartz is its stability—the ability for it to hold a valid calibration for a long period of time. We believe that customers should be rewarded for their investment in Quartz by having less maintenance, especially, when the tool sees very few hours every year at maximum pressure and temperature. We encourage our customers to make the decision to pursue longer calibration periods based on their usage of the transducers.

Quartzdyne transducers do not require recalibration for long periods of time. However, infrequent recalibration is required to ensure accurate pressure data are reported. This requirement is caused by drift which Quartzdyne specifies as the maximum possible annual drift at full scale pressure and temperature (http://www.quartzdyne.com/spec/freqperf.pdf). Under full scale conditions, transducers will drift outside their accuracy specification after one year. Note that drift can be significantly less for pressures and temperatures lower than full scale, and all specifications and recommendations assume worst case scenarios. For example, Quartzdyne transducers have no measureable drift at standard room temperature and pressure.

Quartzdyne transducer drift is a cumulative process. During exposure to temperature and pressure, the transducer will experience some finite amount of drift which is not reversible. For example, suppose one was to use the transducer under full scale conditions during two periods separated by a period without elevated pressure or temperature. The total drift demonstrated would be equivalent with or without the ambient period in between. This is true no matter how many times the transducer is cycled between room and downhole conditions. The critical factor is the summation of time spent at full scale conditions. After the transducer has spent one year at full scale pressure and temperature with any number of room condition excursions in between, it may have drifted outside the accuracy specification and recalibration is recommended.

The charts demonstrate accumulated drift below. On the left, a transducer is exposed to full scale pressure and temperature constantly for one year. Consequently, the reading has drifted out of spec (0.02% FS) over that time. On the right, the same plot is shown with an addition of two interspersed periods of ambient room conditions. The critical curve on both plots is the “Days at Pressure” which is shown in red. Once that line has reached 365 days, one will note that the error has reached 0.02% FS and recalibration is required. In the right hand case below, that did not occur until nearly 600 days after the transducer was first exposed to downhole conditions.





Beyond this recommendation we have always, and still recommend that you verify your transducer with a secondary calibration device to ensure it is still in spec. This verification step could happen at the end of your estimated duty cycle, or whenever you determine it is necessary. Additional details about this recommendation can be found on our website.