



Technical note

Pulse Power Excitation

What is Pulse Power Excitation

Supplying excitation power to a sensor for a brief period of time, a pulse, long enough to take a reading and then switching off the supply is defined, for this discussion, as pulse powering.

Where and why would this need to be done?

This technique is frequently used in situations where power is not readily available, for example where there is no access to mains power and there is a need to rely on a battery or other limited power supply.

Using pulse power excitation can significantly conserve available power as opposed to continuously exciting a sensor. Depending on the sensor requirements of the pulse profile; power on time, reading time, shut down, and the measurement frequency the power usage can be reduced to a very small percentage versus continuous power.

It is necessary to take into consideration several aspects of the sensor and measurement requirements to ensure that the integrity of the data is not compromised. Pressure Sensors, like all components, are not instantaneously 'on' once excitation is supplied, there is a power-on time. In a sensor that is well suited for pulse powering the power-on time should be on the order of 10-30 ms depending on the associated signal amplification circuitry. If the power-on time requirement is much longer it is possible to run into issues with self-heating effects which can impact measurement accuracy. These are not seen in continuous excitation configurations as sensors will reach equilibrium.

The measurement time, aka reading time, is defined by the sensor response time, and will generally be on the order of < 5 ms. For a sensor with a fast response time it is possible to take multiple measurements before running into self-heating effects. The whole power-on, measurement, power-off cycle can be less than 1 sec.

Remote monitoring automated systems such as weather stations, water supply wells, gas wells and pipeline metering are typically running on battery and/or solar power. Managing the power budget for long-term measurements is crucial. Using sensors in a pulse power configuration can be of great benefit in these applications.

How do Druck address these requirements?

The fundamental sensor technology of Druck pressure sensors, piezoresistive silicon strain gauge, have an inherently fast power-on time coupled with a fast response time that are beneficial use in a pulse power application. Working with customers with these types of requirements for many years have led us to develop an understanding of our technology and how we can help customers in the designs of their systems that require these benefits.

You can read more here - [Download white paper](#).

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