
White Paper

Gage vs. Absolute vs. Sealed Pressure



The conventional units for defining pressure are PSI, pounds per square inch. However, in all pressure measuring devices, a reference pressure has to be established and the PSI qualified to indicate the reference datum. The suffixes “G”, “A” and “S” identify the measured pressure as follows:

PSIG -- Gage Pressure

PSIA -- Absolute Pressure

PSIS -- Sealed Pressure

By design, pressure transducers are available to measure gage, absolute or sealed pressure. The most common reference is atmospheric pressure and the units are designated as PSIG. In this case the measuring device is referred to as a Gage Pressure Transducer.

Gage Pressure Transducer – PSIG

Measures pressure referenced to local atmospheric pressure and is vented to the atmosphere. When the pressure port is exposed to the atmosphere, the transducer will indicate 0 PSIG. This occurs because the pressure on both sides of the diaphragm is the same and there is no net output.

Venting is accomplished by means of a small diameter hole located near the transducer's electrical termination – connector or cable. The vent hole contains a porous, stainless steel disk designed to filter out harmful airborne particles from entering the transducer.

Depending on accuracy class, PSIG transducers above certain pressure levels may in fact be sealed. This can be done because the possible measurement errors due to sealing will stay within the accuracy specification of the transducer.

Absolute Pressure Transducer – PSIA

Measures pressure referenced to an absolute vacuum, hermetically sealed at 0 PSIA. When the pressure port is exposed to the atmosphere, the transducer will indicate atmospheric pressure; approximately 14.7 PSIA. This occurs because there is a vacuum on one side of the diaphragm and atmospheric pressure on the other. The net output represents the difference, which is atmospheric pressure.

Depending on accuracy class, PSIA transducers above certain pressure levels may not have an absolute vacuum reference. They can be sealed with atmospheric pressure because the possible measurement errors will stay within the accuracy specification of the transducer.

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Sealed Pressure Transducer – PSIS

Measures pressure referenced to the prevailing atmospheric pressure hermetically sealed within the transducer. When the pressure port is exposed to the atmosphere, the transducer will indicate approximately 0 PSIS. This occurs because there is a fixed atmospheric pressure on one side of the diaphragm and the ambient atmospheric pressure on the other side. If they are the same the net output is 0 PSIS. If they are not the same, then the net output will be a reading other than 0 PSIS.

Depending on accuracy class, and design considerations, PSIS transducers below certain pressure levels are not available. Internal pressure changes due to temperature will produce measurement errors that will exceed the accuracy specification of the transducer. If a sealed transducer is required at low pressure levels, then the PSIA version should be used.

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