Pressure Switch Terminology and Definitions

**Actuation Point:** (commonly referred to as a setpoint) The actuation point is expressed in terms of exact pressure at which the snap-action switch is actuated to either open or close the electrical circuit (depending on how the switch is wired).

**Adjustable Range:** Actuation range within which the actuation point of a pressure actuated switch may be adjusted.

**Deadband:** Deadband is the difference between the actuation point and the reactuation point in a pressure actuation switch. (For example: if a pressure switch is set to operate at 200 psi on increasing pressure, the switch will close when pressure rises to that point. As the pressure drops to 190, the switch opens (this is the reactuation point). The deadband of this switch is 10 psi (the difference between the setpoint of 200 and the reactuation point of 190 psi.)

**Electrical Switching Element:** The electrical switching element in a pressure switch opens or closes an electrical circuit in response to the actuating force it receives from the pressure sensing element.

**Pressure Sensing Element:** A pressure sensing element is the portion of the pressure switch that moves due to a change in pressure.

**Pressure Switch:** A pressure switch is an instrument that automatically senses a change in pressure and opens or closes an electrical switching element when a predetermined pressure point is reached.

**Repeatability:** (Accuracy) The ability of a pressure switch to repetitively operate at its setpoints. For example, if a pressure switch set to actuate at 200 psi repeatedly actuates from 199 to 201 psi, it is considered to be repeatable within plus or minus 1%.

**System Pressure:** The rated pressure of a hydraulic or pneumatic system, which does not include the maximum surges that the system may encounter.

**Tolerance:** Tolerance is the normal variation in production pressure switches of the same specifications. It affects the actuation value and the reactuation point and not the accuracy of the setpoint.

**Working Pressure:** Working range is the pressure range a switch may see under normal working conditions. This is commonly referred to as the adjustable range.

**Variable Pressure:** A fluctuating pressure having characteristics of sufficient magnitude to operate a pressure actuated switch. This pressure is usually the one that is sensed by a pressure switch.
Selecting a Pressure Gauge

Depending on the application, selecting the proper pressure gauge can be challenging. These guidelines will help you select a pressure gauge that is suitable for your application.

Bourdon Tube Pressure Gauge Operating Principal
The majority of pressure gauges in use today have a bourdon tube as a measuring element. Winters’ uses the bourdon tube, spiral tube and bellows tube. The bourdon tube works by sensing pressure and converting that pressure into displacement. It is an analog system and does not require additional power sources.

Winters’ pressure gauges measure vacuum (Hg), compound and pressure ranges up to 20,000 psi. They are suitable for all clean, non-clogging liquids and gaseous media.

Environment and Application
A diaphragm seal may be necessary depending on the process media being measured. Consider using a diaphragm seal if the process media is corrosive, will leave a deposit or clog the bourdon tube, or if the media will solidify in the bourdon tube. Choosing the material of the pressure gauge is also important. If the media is corrosive, stainless steel intervals and casing should be chosen over brass. The effects of moisture and weather conditions may also be harmful to the gauge and should be considered when selecting a gauge.

Temperature
The normal temperature ranges for dry gauges are: -40°C to 65°C (-40°F to 150°F)
The normal temperature ranges for glycerine filled gauges are: -25°C to 65°C (-13°F to 149°F)

Gauge Options
To reduce the effects of vibration and pulsation and increase the service life of the pressure gauge, use a restrictor screw, snubber, or liquid fill the gauge. If your process uses high temperatures you may want to use a syphon or remote reading pressure gauge with a capillary and diaphragm seal to reduce the temperature of the process going into the gauge.

Pressure Range
It is important to select a pressure range that is approximately twice the normal operating pressure of the media. The maximum operating pressure should not exceed 75% of the full scale range. If a gauge is not selected considering this criteria it may result in fatigue of the bourdon tube.

Connections
Winters’ offers bottom and back (centre and lower) connections on our gauges. The standard thread is NPT, however, the options are available by request (i.e. BSP, SAE).

Accuracy
The degree of accuracy required should be determined to ensure the proper gauge is used. Winters’ offers pressure gauges with accuracy of */ .010% to */ 3/2/3%

*Continuous product improvements may result in specifications changing without notice.