



PRESSURE SOLUTIONS

P301: Pressure Switches

There are two options to look at, indicating pressure switches and blind pressure switches.

Indicating Pressure Switches:

These can be classified according to their fundamental design.

1. Pressure gauges which have accessory electrical contacts fitted.
2. Pressure switches which have indicating scales fitted.

These are always compromise designs, and either make bad gauges or bad switches.

Pressure gauges which have accessory electrical contacts fitted.

This is an economical solution, where the pressure gauge pointer actuates a contact set. Setting is easy, a simple matter of adjusting a setting pointer, and one can see at a glance if the pressure is above or below the setpoint.

These accessory contacts come in two designs, built-in and built-on.

Built-in designs are neater, but more expensive, as a much deeper case is required to accommodate the contact sets, and usually a special movement is required.

Built-on designs are cheaper and usually more quickly available, since a modular contact assembly mounted in a transparent hood replaces the standard window. It usually incorporates a fork which slips over the gauge pointer.

Operation:

The rating of the contacts is typically about 30VA or 30W, and usually requires the use of an external relay.

Deadband is usually significant, 5 – 10%.

Chatter is caused by vibration and can lead to the contacts burning out. Magnetically assisted contacts avoid this, but do increase the Deadband.

Indication of the gauge is affected, the contacts do hold back the gauge pointer when the setpoint is passed.

Gauge filling is a significant problem. Glycerine will break down and turn black when exposed to arcing. Silicone oil is better, but in both cases the current capacity and reliability is adversely affected. If filling is necessary, use an external contact of the MSR type, which provides a monitoring pulse of high voltage to burn through any contamination, and the sets an external relay based on the results of this spike.

Where vibration is present, use a Vibragauge with magnetically assisted contacts, Kombi M.

Pressure switches which have accessory scales fitted

There are one or two specialised designs available. These do tend to be unreliable due to a complicated brass mechanism, but offer higher switching currents.

Electronic Pressure Switches:

A third version is the electronic pressure switch, such as the Sailors XS2100, which includes digital indication as well as significant current switching capacity. Another advantage is programmable Deadband.

Blind Pressure Switches:

A dedicated mechanical design to switch pressure is ideal for most alarm and monitoring applications. These designs offer good repeatability, close control of Deadband, and current carrying capacities large enough to handle electrical control circuits directly. Different designs are available to meet different applications. Look at the pressure switch page in the e-catalogue.

Deadband:

Fixed Deadband Designs: These are used for alarm purposes. The size of the Deadband should be large enough to avoid chatter induced by process noise, yet small enough to allow fast recovery. A small Deadband is usually important on temperature applications, where cooling can be very slow.

Narrow Adjustable Deadband Designs: Usually these use a special microswitch to give a range of deadbands a bit larger than a standard microswitch. These tend to be used for special purposes.

Wide Adjustable Designs: These are normally used for control purposes, eg switching a pump on at low pressure, and switching it off at high pressure, or switching a fan on when the temperature is high, and switching it after things have cooled down.

Overpressure: Some designs have the setpoint range corresponding to the safe operating pressure range, ie no overpressure capability. Other designs have the setpoint range set at the lower part of the safe operating pressure range.

Dual Setpoints: Special mechanisms are available to provide two independent setpoints in one mechanism. Usually this design is used to optimise the value of an expensive design.

Safety:

Mechanical pressure switches are classed as simple apparatus, incapable of storing electrical energy. For this reason, they do not require certification for hazardous areas if they are used in intrinsically safe circuits.

Mechanical pressure switches can be made with explosion-proof enclosures, where high current/voltage switching is necessary in hazardous areas.

Pneumatic switching is available on some designs for operation in extremely hazardous areas.

Contact Rating:

A pressure switch is a switch, and thus its fundamental purpose is to make and break current. Why do so few people identify their switching requirements. Some bright sparks think a voltage free contact doesn't need a rating because it is voltage free!

Be sensible in stating your requirements.