Setting Pressure Switches

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There are three kinds of pressure switches in the world:

1. **Blind mechanical**.

   a. Mechanical switch with dry contacts and no setting dial.

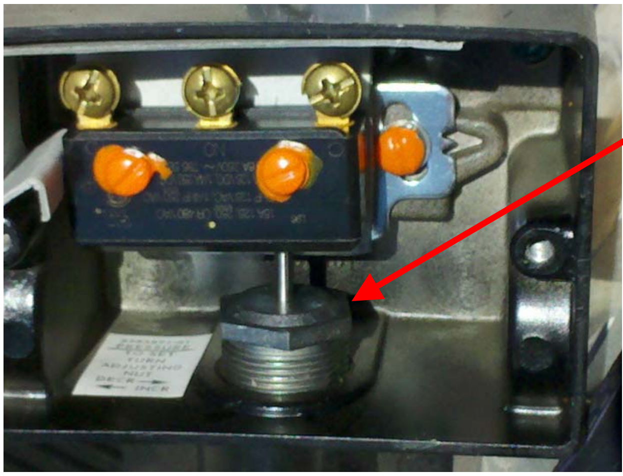
   b. Typical switches that fall into this category:
      i. Ashcroft B4
      ii. Ashcroft B7

   c. Electrical characteristics: Can operate on virtually any voltage from 12 through 460 volts, either AC or DC power. It can handle relatively high current loads, generally 10 Amps or more.

   d. Set-point is field adjustable.

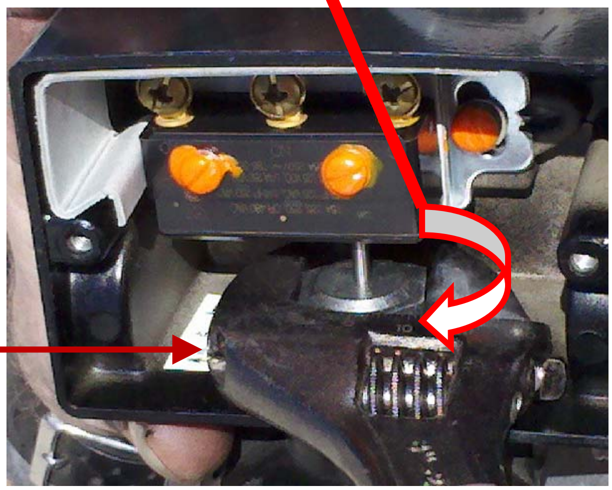
   e. Dead band is **not** adjustable.

   f. Set-point is field adjustable but it is a blind setting – strictly trial and error. You pressurize the process pipe and observe where the switch contacts transfer. If the set-point is too high or too low, you use a wrench to rotate the adjusting screw a few turns one way or the other, pressurize the system again, and see how much it's moved.



Adjusting screw

Turn clock-wise for higher set-pint



Changing the set point

2. **Mechanical with dial**.

   a. Mechanical switch with dry contacts but includes a dial to show approximate set-point.

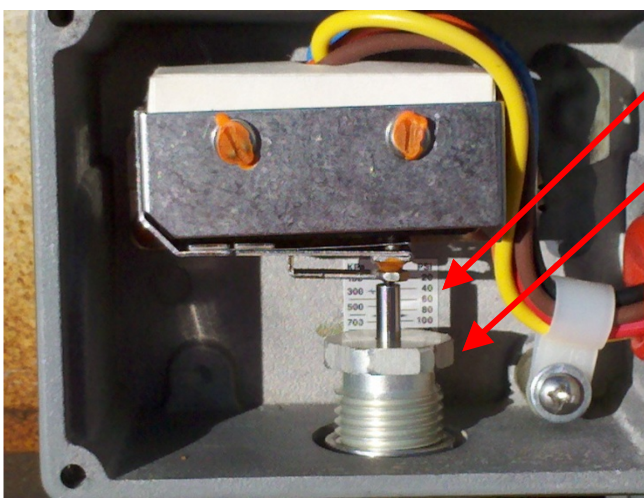
   b. Typical switches that fall into this category:
      i. SOR
      ii. Ashcroft G-series, L-series, and P-series
      iii. Barksdale
      iv. SQ-D class 9012
      v. Mercoid

   c. Electrical characteristics: Can operate on virtually any voltage from 12 through 460 volts, either AC or DC power. It can handle relatively high current loads, generally 10 Amps or more.

   d. Set-point is field adjustable.

   e. Dead band is adjustable on Ashcroft LPA, GPA, and PPA series switches.

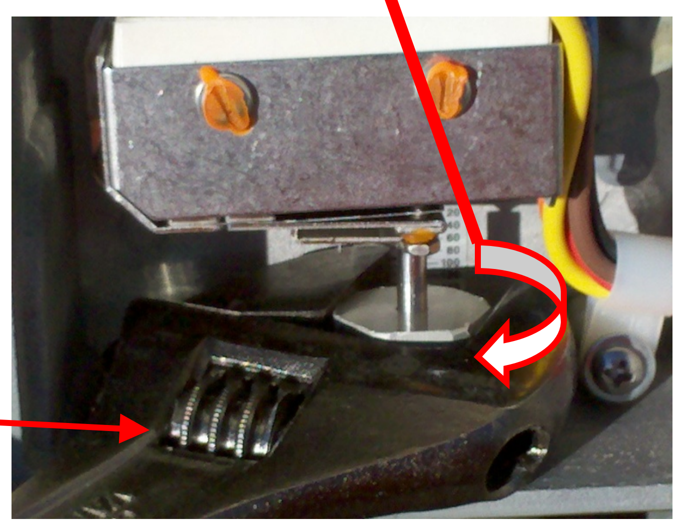
   f. Set-point is field adjustable. You sight along the top of the adjusting screw to a dial on the back plate that shows the switch setting. It's a bit crude. Depending on your visual acuity, resolution is ± 10% at best, but gives a rough approximation of where the switch is set. Final adjustment is still trial-and-error. If set-point is off target, you use a wrench to rotate the adjusting screw a few turns one way or the other, pressurize the system again, and see how much it's moved.



Setting Dial

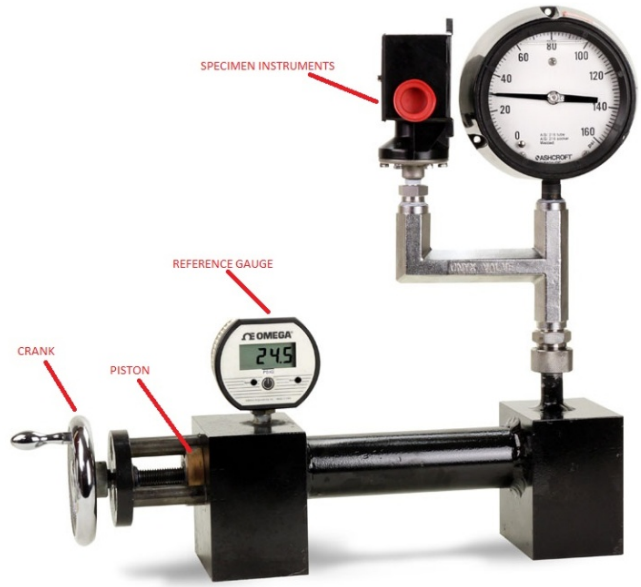
Adjusting Screw

Turn clockwise to increase setting



Changing Set Point

The set point on mechanical pressure switches is verified through a trail-and-error process that involves pressurizing the system and observing where the switch contacts actually transfer. This is usually accomplished by turning on the pump and throttling the discharge valve, gradually deadheading the pump until the switch trips.

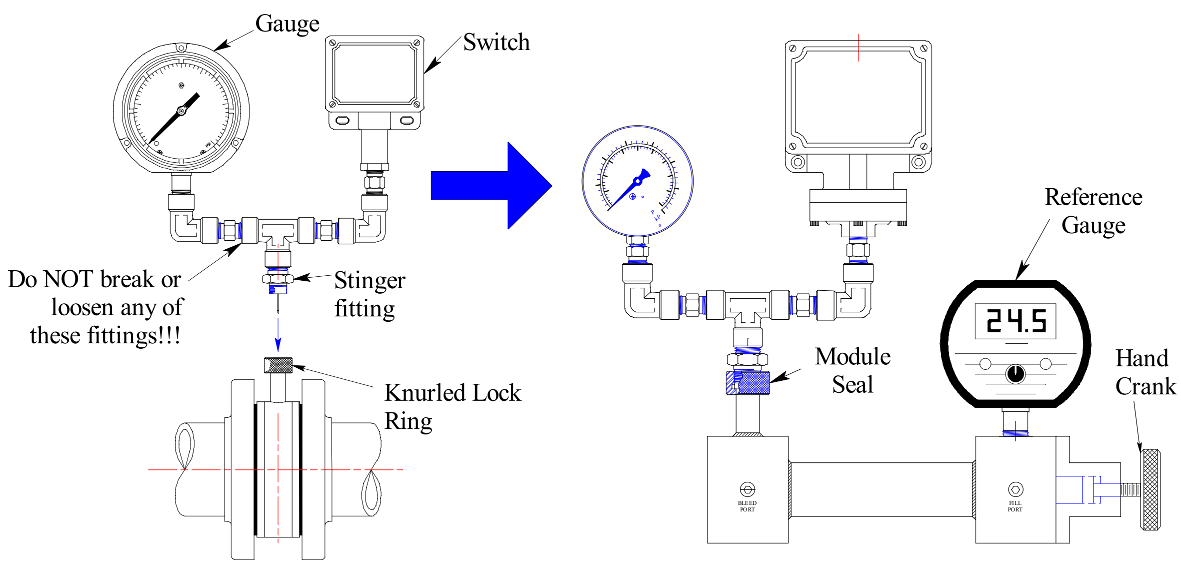


Is there a way to set and verify a mechanical pressure switch setting without having to pressurize the process?

Yes.

The **Onyx Calibrating Machine** is a simple method to calibrate gauges, switches, or transmitters mounted as integral components on Onyx Isolator Rings.

This rugged machine is light weight, portable, and requires no external power, making it ideal for field service. It can generate pressure from near full vacuum to +400 psi.



Onyx Isolator Ring

Onyx Calibrator Machine

Gauges, switches, transmitters, or any combination of these instruments can be temporarily removed from the Onyx Isolator Ring, attached to the calibration machine for verification, then put back on the isolator ring. To calibrate the instrument, simply turn the crank to build up the required pressure and compare the reading of the process instrument to the reference gauge.

The Calibrating Machine is available with a variety of reference gauges, either mechanical or electronic (battery powered), with analogue or digital readout, with accuracy equal to or better than ANSI class-3A, and traceability to NIST certificates are available.

3. **Solid state**.

a. An electronic solid state device with a DRO (Digital Read Out) displays pressure with an LCD or LED display.

b. Typical switches that fall into this category:
   i. United Electric Series-1
   ii. IFM
   iii. Keyence
   iv. Allen Bradley 836E
   v. Ashcroft NPI

c. Electrical characteristics: Unlike mechanical devices, solid state switches are NOT universal. You have to know the voltage and frequency that the switch has to interface with prior to ordering. These come in two general variations:
   i. 24 VDC
   ii. 85 to 250 VAC
   iii. These switches handle lower current loads, generally ≤ ¼ Amp in most cases

d. Set-point is field adjustable.

e. Dead band is field adjustable.

f. Set-point is field adjustable throughout the entire range and is simply programmed in. Using a stylus such as a pencil, you press buttons on the switch face to enter the set-point directly into the program. The actual set point is displayed in advance in the digital read out and can be entered precisely to three significant figures. This eliminates the guess work and the trial-and-error process common to mechanical switches.

Solid State switch

Entering "Set-Point-1" into the switch takes only a few taps with a pencil. ***So*** much more civilized than horsing around with a wrench.