

Pressure Regulators – with and without venting

The compressors on/off regulating switch will operate between set limits, for example on at 110psi, off at 130psi. The 20psi gap is known as *hysteresis* and this is a characteristic of the pressure switch itself.

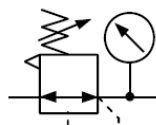
However, this variation of pressure, if felt at the machine will cause variation of the following:

- Force output of actuators.
- Speed of actuators.
- Time delays.
- Cylinder cushioning.

Given the example above of where the minimum amount of pressure to be found at the compressor is 110psi and that due to flow in the network there will be an accompanying pressure drop of let's say 10psi, then the minimum pressure possible to see at the machine would be in the order of 100psi. The pressure regulator valve reduces high *primary* or *upstream* pressure to a lower *secondary* or *downstream* pressure as required by the machine.

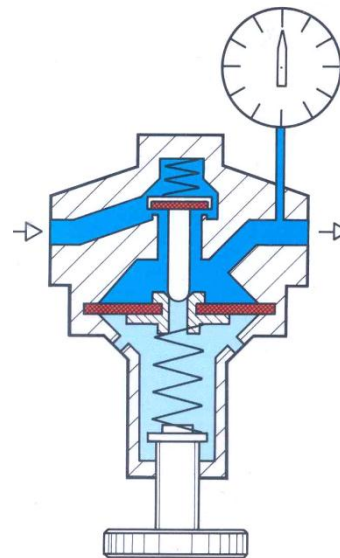
The pressure regulator can never give out more pressure into the downstream port than the pressure value that exists at the upstream port!

The ISO symbol is shown here. In addition it shows a gauge to measure the downstream pressure, which after all is the only pressure of interest to the machine user. Note the variable spring. Note also the double headed arrow and the venting facility which we will talk about in a moment. You can see from it that a pressure regulator is a normally open unit and relies on downstream air to close it.



The diaphragm presses against the push rod which is held in position by a

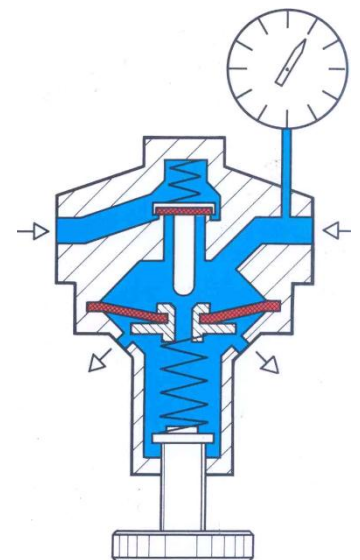
light spring. The push rod shuts off the exhaust port in the centre of the diaphragm. The set screw permits adjustment of the tension under the diaphragm, for example let's say to the equivalent of 80psi. The downstream



pressure is felt on the upper side of the diaphragm and if this is less than the equivalent of the 80psi spring the diaphragm rises and the pushrod opens the air flow from upstream. When the pressure above the diaphragm rises beyond the 80psi

set point then the pushrod lowers, shutting off air flow from the primary.

A *venting* facility is possible with the pressure regulator shown. If the screw is backed out to the equivalent of 20psi then the diaphragm will collapse as shown and the 80psi on top of the diaphragm and also in the secondary system will vent to atmosphere until the secondary



pressure drops to 20psi. This is the reason for showing the exhaust triangle and the double ended arrow on the ISO symbol. This is useful if machine actuators need to be manipulated for whatever reason but not all pressure regulators have this facility.