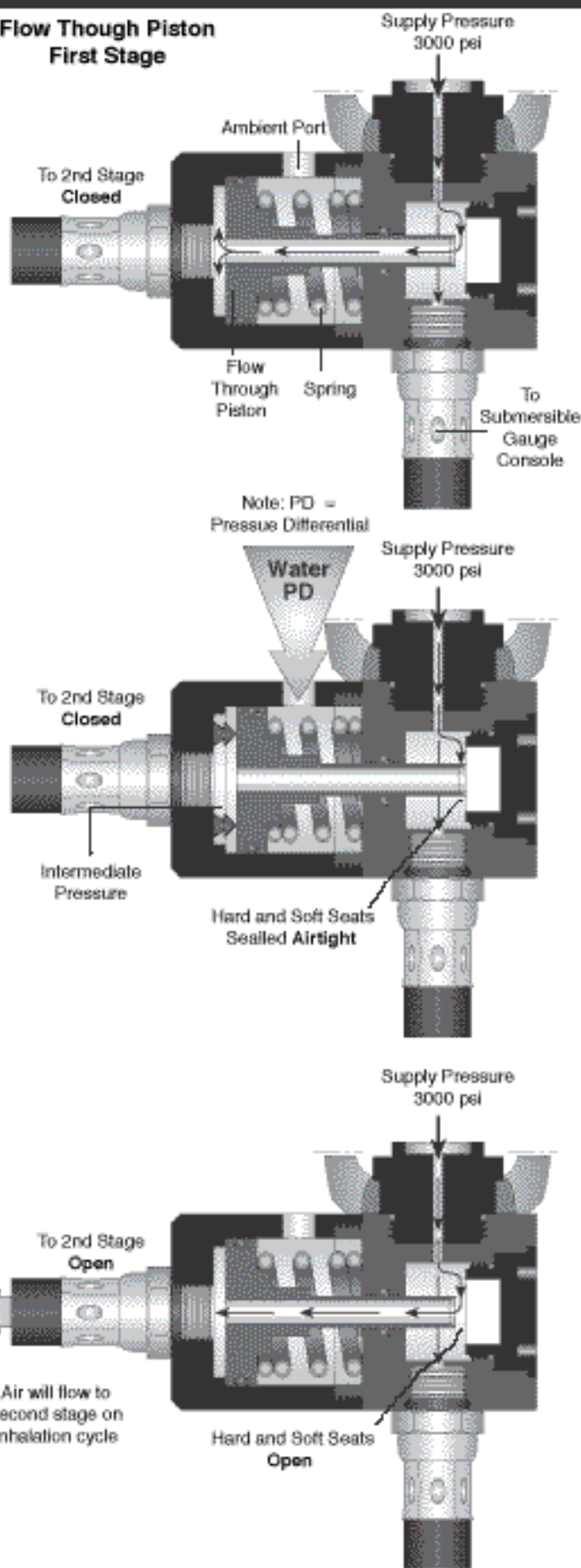


Flow Through Piston First Stage



Flow-through Piston Function: The three illustrations on this page trace the air path inside the flow-through piston first stage. The supply pressure (SP) is a constant 3000 psi.

Top Illustration: When the air enters the first stage, it will flow through the piston center hole and begin to build pressure across the piston head. Since the second stage valve is closed, the pressure will continue to increase until it begins to move the piston to the right against the spring unit force.

Middle Illustration: In the middle illustration, the piston has compressed the spring through the full working range and the hard seat on the end of the piston has sealed against the soft seat. The amount of pressure required to accomplish this seal establishes the intermediate pressure for this first stage.

Water pressure has a direct effect on the amount of intermediate pressure required to generate an airtight seal between the hard and soft seats. Water enters the first stage through the ambient port and floods the spring chamber. The water pressure applies force on the piston in the same direction as the spring. In order for the piston to move, it will need to overpower both the water pressure and the spring unit force.

The flow-through piston is only slightly influenced by diminishing supply pressure and, for all practical purposes, is air balanced. Balancing occurs because the sealing diameter at the piston stem o'ring is almost identical to the diameter of the sealing edge at the hard seat. When the piston is in the sealed position, the supply pressure will have little or no influence on the movement of the piston. This means that as the supply pressure diminishes through the full range (3000-300 psi), the intermediate pressure will remain reasonably constant. A further discussion of this principle is presented on the next page.

Air will flow to second stage on inhalation cycle