CONTROLLING OF PNEUMATIC CYLINDERS

Pneumatic cylinders can be controlled by the following methods:

1. Direct control of Single or Double acting cylinder
2. Indirect Control of Cylinder with Single Piloted Final Control Valve
3. Indirect Control of Cylinder with Double Piloted Final Control Valve

In the indirect control actuation, a pilot signal from a 3/2 N.C. valve is used to activate pilot ports of final control valve.

4.1 Direct Control of Single Acting Cylinder

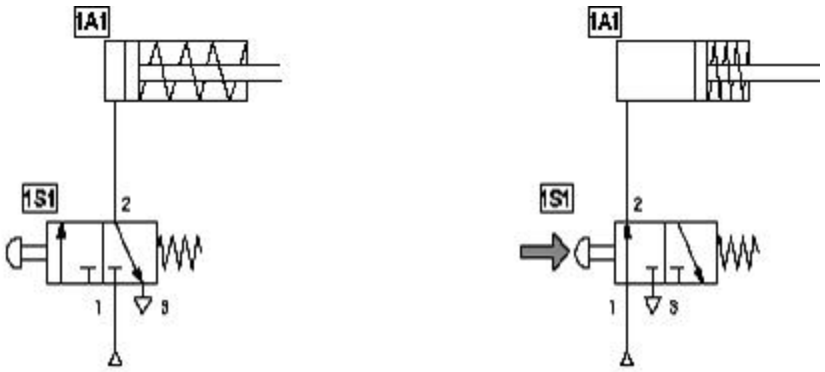

Figure 4.1 Direct Control of Single Acting Cylinder

Pneumatic cylinders can be directly actuated by actuation of final control valve, manually or electrically in small cylinders as well as cylinders which operates at low speeds where the flow rate requirements are less. When the directional control valve is actuated by push button, the valve switches over to the open position, communicating working source to the cylinder volume. This results in the forward motion of the piston. When the push button is released, the reset spring of the valve restores the valve to the initial position [closed]. The cylinder space is connected to exhaust port there by piston retracts either due to spring or supply pressure applied from the other port.

4.2 Indirect Control of Single Acting Cylinder

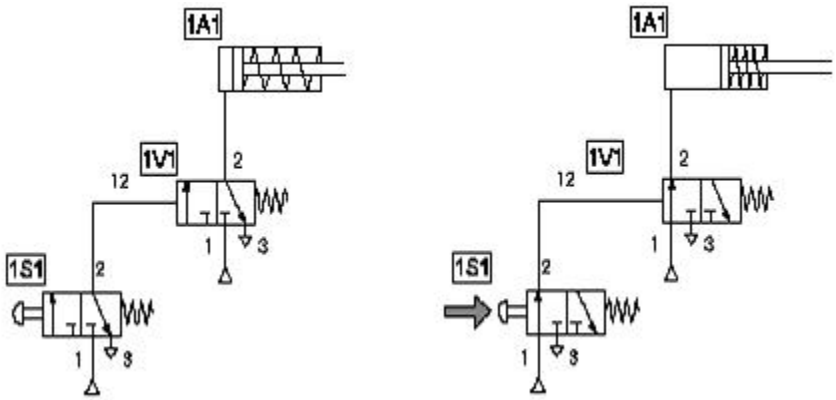

Figure 4.2: Indirect Control of Single and Double Acting Cylinders

Large cylinders as well as cylinders operating at high speed are generally actuated indirectly as the final control valve is required to handle large quantity of air. In the case of pilot operated valves, a signal input valve [3/2 way N.C type, 1S1] either actuated manually or mechanically is used to generate the pilot signal for the final control valve. The signal pressure required can be around 1-1.5 bar. The working pressure passing through the final control valve depends on the force requirement [4-6 bar]. Indirect control as permits processing of input signals.

Single piloted valves are rarely used in applications where the piston has t o retract immediately on taking out the set pilot signal -.suitable for large single acting cylinders.

4.3 Use Double Piloted Valve

Double piloted valve [Fig 3.3] is also called as the Memory valve
With the actuation of Forward push button, the out put signal activates the set pilot port [14] of final control valve. This results forward motion of the cylinder
Now even if this push button is released the final control valve remains in the actuated status as the both the pilot ports are exposed to the atmosphere pressure and the piston remains in the forward end position.

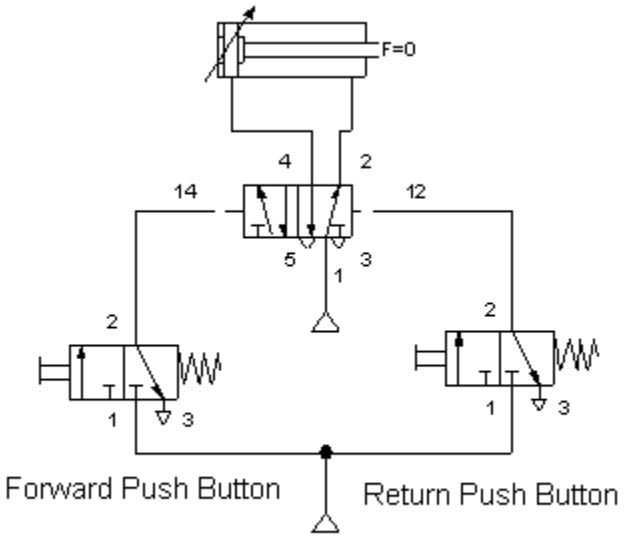

Figure 4.3 Use of Double Piloted Valve

In order to retract the cylinder, the Return push button is activated. This will convey reset signal from signal source to the pilot port of final control valve [12] . The piston retracts. Now even if the Return push button is released the status of the cylinder will not change.

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