Chapter 7 Pneumatic Systems

1. Pneumatic control systems have the following advantages:

   (a) High effectiveness

   (b) High durability and reliability

   (c) Simple design

   (d) High adaptability

   (e) Safety

   (f) Selection of speed and pressure

   (g) Environmental friendly

   (h) Economical

2. Limitations of pneumatic systems:

   (a) It is less accurate because the volume of air may change when compressed.

   (b) As the volumes of the cylinders of pneumatic components are limited, a pneumatic system cannot drive loads that are too heavy.

   (c) Compressed air must be processed before use to ensure the absence of water vapour or dust. Otherwise, the moving parts of the pneumatic components may wear out much quicker due to friction.

   (d) The moving speed is uneven.

   (e) Noises will be produced

3. Filter, pressure regulator and lubricator.

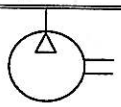
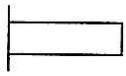
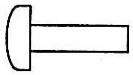
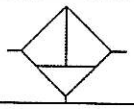
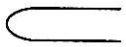
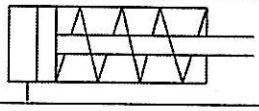
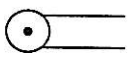
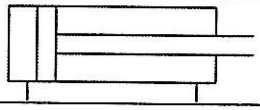
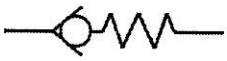
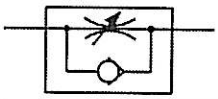
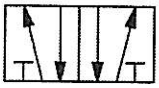
4. A single acting cylinder has only one entrance that allows compressed air to flow through. Therefore, it can only produce thrust in one direction. The piston rod is propelled in the opposite direction by an internal spring, or by the external force provided by mechanical movement or weight of a load.

   In a double acting cylinder, air pressure is applied alternately to the relative surface of the piston, producing a propelling force and a retracting force.

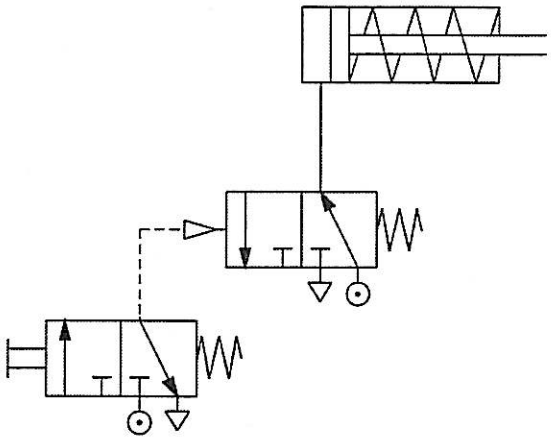
5. Directional control valves ensure the flow of air between air ports by opening, closing and switching their internal connections. Their classification is determined by the number of ports, the number of switching positions, the normal position of the valve and its method of operation.

6. Flow amplification, signal inversion, memory function, delay function, cylinder control, etc.

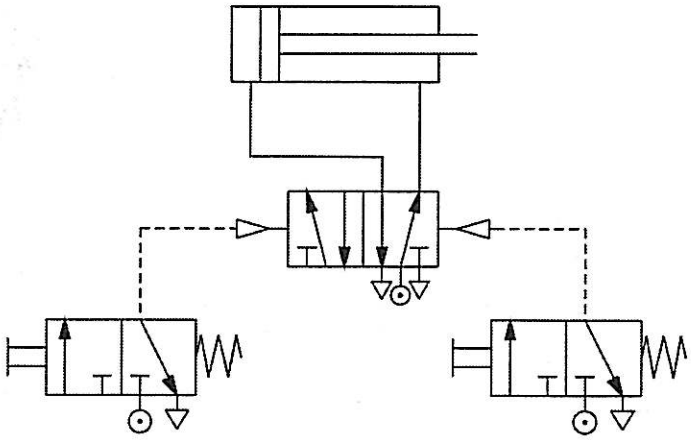
7.

Type	Symbol	Type	Symbol
(a) Compressor		(h) Manual control valve	
(b) Cylinder		(i) Push button control valve	
(c) Filter		(j) Vertical piston lever control valve	
(d) Single acting cylinder		(k) Pulley lever control valve	
(e) Double acting cylinder		(l) Non-return valve	
(f) 3/2 directional control valve		(m) Flow control valve	
(g) 5/2 directional control valve			

8.



9.



10.