ELECTRO PNEUMATICS

Electro Pneumatic control integrates pneumatic and electrical technologies, is more widely used for large applications. In Electro Pneumatics, the signal medium is the electrical signal either AC or DC source is used. Working medium is compressed air. Operating voltages from around 12 V to 220 Volts are often used. The final control valve is activated [setting] by solenoid actuation.

The resetting of the valve is either by spring [single Solenoid] or using another solenoid [Double solenoid Valve]. More often the valve actuation/reset is achieved by pilot assisted solenoid actuation to reduce the size and cost of the valve.

Control of Electro Pneumatic system is carried out either using combination of Relays and Contactors or with the help of Programmable Logic Controllers [PLC].

A Relay is often used to convert signal input from sensors and switches to number of output signals [either normally closed or normally open].

Signal processing can be easily achieved using relay and contactor combinations.

A Programmable Logic Controller can be conveniently used to obtain the outputs as per the required logic, time delay and sequential operation. Finally the output signals are supplied to the solenoids activating the final control valves which controls the movement of various cylinders. The greatest advantage of electro pneumatics is the integration of various types of proximity sensors [electrical] and PLC for very effective control. As the signal speed with electrical signal, can be much higher, cycle time can be reduced and signal can be conveyed over long distances.

In Electro pneumatic controls, mainly three important steps are involved:

1. Signal input devices - Signal generation such as switches and contactor, Various types of contact and proximity sensors
2. Signal Processing – Use of combination of Contactors of Relay or using Programmable Logic Controllers
3. Signal Out puts – Out puts obtained after processing are used for activation of solenoids, indicators or audible alarms
Symbols of Switches - Contactors

![Symbols for Switches and Contactors](image)

**Figure 9.1** Symbols for Switches and contactors
Symbol- Single solenoid Valves

Single Solenoid Valve- Pilot assisted

Double Solenoid Valve- Pilot assisted

Figure 9.3 Symbolic Representation for Solenoids and Relays

Figure 9.4. Symbols of Solenoid Valves and Relays