INTRODUCTION TO PNEUMATIC CONTROL

The word ‘Pneuma’ means breath or air. Pneumatics is application of compressed air in automation. In Pneumatic control, compressed air is used as the working medium, normally at a pressure from 6 bar to 8 bar. Using Pneumatic Control, maximum force up to 50 kN can be developed. Actuation of the controls can be manual, Pneumatic or Electrical actuation. Signal medium such as compressed air at pressure of 1-2 bar can be used [Pilot operated Pneumatics] or Electrical signals [D.C or A.C source- 24V – 230V] can be used [Electro pneumatics]

1.1 Characteristics of Compressed Air

The following characteristics of Compressed air speak for the application of Pneumatics

• Abundance of supply of air
• Transportation
• Storage
• Temperature
• Explosion Proof
• Cleanliness
• Speed
• Regulation
• Overload Proof

1.2 Selection Criteria for Pneumatic Control System

• Stroke
• Force
• Type of motion [Linear or Angular motion]
• Speed
• Size
• Service
• Sensitivity
• Safety and Reliability
• Energy Cost
• Controllability
• Handling
• Storage
1.3 Advantages of Pneumatic Control

• Unlimited Supply
• Storage
• Easily Transportable
• Clean
• Explosion Proof
• Controllable (Speed, Force)
• Overload Safe
• Speed of Working Elements

Disadvantages
• Cost
• Preparation
• Noise Pollution
• Limited Range of Force
  (only economical up to 25 kN)

1.4 General Applications of Pneumatic Control

• Clamping
• Shifting
• Metering
• Orienting
• Feeding
• Ejection
• Braking • Bonding
• Locking
• Packaging
• Feeding
• Door or Chute Control
• Transfer of Material
• Turning or Inverting of Parts
• Sorting of Parts
• Stacking of Components
• Stamping and Embossing of components

1.5 Applications in Manufacturing

• Drilling Operation
• Turning
• Milling
• Sawing
• Finishing
• Forming
• Quality Control
1.6 Structure of Pneumatic Control System

A typical Pneumatic control system comprises of the above groups of components. In direct actuation controls signal processing group is not required. In electro pneumatic Control signal processing can be carried out using combination of relays and contractors or using PLC. The final control valves are solenoid actuated in the case of electro pneumatic controls.