

Pneumatics & Electro-Pneumatics Level 1 Training

Duration: 40 Training Hours

Training Overview

This training is designed to equip technicians, operators, and engineers with practical and theoretical knowledge in Pneumatics and Electro-Pneumatics systems. The training blends classroom instruction with hands-on exercises that enable participants to understand the working of these systems, to design similar systems, operate and troubleshoot pneumatic and electro-pneumatic installations/equipment used in modern industrial automation.

The training emphasizes scenario-based learning, ensuring participants can apply concepts directly to real-world applications across various industries such as manufacturing, pharmaceutical, automotive, mining, food and beverage, printing among others.

Training Objectives:

By the end of the training, participants will be able to:

- a) Understand the principles of compressed air systems and pneumatic components.
- b) Identify, select and integrate pneumatic components such as the actuators, directional valves and other accessories into a complete and functional circuit that make up a system.
- c) Read and interpret pneumatic and electro-pneumatic circuit diagrams.
- d) Apply control logic using electrical and electronic devices (including controllers such as PLCs, relays, contactors, sensors) in pneumatic systems.
- e) Troubleshoot and maintain pneumatic and electropneumatic systems effectively.
- f) Enhance workforce readiness for automation and smart manufacturing environments.

Course Outline

Module 1: Fundamentals of Pneumatics

This is the introduction to Pneumatics and Electro-Pneumatic systems. Participants will be introduced to Pneumatics, applications, advantages of using these systems, the properties of fluid power and compressed air, compressed air generation and preparation (drying, filtering) as well as devices used, safety considerations

Module 2: Pneumatic Components

This module introduces the various components found in a pneumatic circuit. These include cylinders, Directional control valves (DCVs), Flow control valves (FCVs), Pressure control valves (PCVs), check valves/non return valves, pneumatic tubing among others

Module 3: Pneumatic Circuit Design

This module introduces participants to circuit design such as control of SAC, DAC, direct and indirect control of actuators, logic functions (AND/OR), sequential operations and multi actuator circuits.

Module 4: Introduction to Electro-pneumatics

The module covers introduction to design and representation of an electro-pneumatic system, and the electrical control elements used such as relays, sensors, solenoid valves and PLCs.

Module 5: Electropneumatic Circuit Design

Participants are introduced to the integration of electrical signals from solenoid valves with pneumatic actuators that are controlled by the solenoids in various circuits and ladder diagrams using PLCs.

Module 6: Troubleshooting & Maintenance

Participants are trained on the common faults and their diagnosis, preventive maintenance, procedure and safety during repair and maintenance, energy efficiency

Training Methodology (blended learning)

- a) Online Lectures & Visual Aids: Presentations, diagrams, charts and animations for conceptual clarity.
- b) Hands-on Workshops: Building and testing circuits on Electro-pneumatic training rigs.
- c) Scenario-Based Exercises: Realistic industrial case studies.
- d) Evaluation: Reinforcing learning outcomes and engagement.

Target Audience

- I. Machine operators
- II. Maintenance technicians
- III. Industrial operators
- IV. Engineering trainees
- V. Automation professionals