Reading Schematics and Symbols

Course 102: Reading Schematics and Symbols

Covers schematics and symbols used in commercial and industrial settings. Examines symbols on schematics, electrical symbols and diagrams, piping symbols and diagrams, hydraulic and pneumatic diagrams and symbols. Discusses air conditioning and refrigeration systems, including explanations of electrical/electronic control schematics. Covers welding and joining symbols.

TPC Training is accredited by IACET to offer **1.0 CEU** for this program.

Lesson 1: Introduction to Schematics and Symbols

Topics

Symbols in Schematics; Using Schematics; Electrical Schematics; Pneumatic and Hydraulic Schematics; Piping Schematics; Value of Schematics; Looking for Flow; Electric Current; Fluid Flow

Objectives

- State the definition of a schematic.
- List some characteristics of schematics.
- Identify a schematic among other kinds of technical drawings and diagrams.
- Explain how flow is indicated on a schematic.

Lesson 2: Symbols on Schematics

Topics

Common Features of Schematics; Differences in Schematics; Using the Schematic; Understanding Symbols; Identifying Symbols; Identifying Connections; Reading Diagrams

Objectives

- Identify various types of lines on schematics
- Identify the following schematics by their symbols:
  - Electrical
  - Fluid-power
  - Piping
- Give the purpose of legends and other tables of symbols.

Lesson 3: Electrical Symbols

Topics

Wires and Connections; Switches; Power Supply; Electrical Loads; Coils and Transformers; Fuses and Circuit Breakers; Grounding; Contacts; Resistors; Symbols in a Diagram

Objectives

- State the meaning of symbols and lines on an electrical schematic.
- Explain the difference between a fuse and a circuit breaker.
- Explain how to trace an electrical circuit.

Lesson 4: Electrical Diagrams

Topics

Kinds of Electrical Drawings; Schematic Diagrams; Series and Parallel Circuits; Wiring Diagrams; Reading Electrical Diagrams; Reading Industrial Schematics; Practice Exercises

Objectives

- Explain the difference in current flow between a series circuit and a parallel circuit.
- Explain the purpose of a wiring diagram.
- Demonstrate how to read an electrical schematic.
- Identify the objects represented by the symbols on an industrial schematic.

Lesson 5: Piping Symbols

Topics

Piping Systems; Kinds of Diagrams; Projections; Joints; Fittings; Symbols

Objectives

- Explain the function of a valve in a piping system.
- Name the ways of joining pipe.
- Identify the symbols for various kinds of fittings and describe the function of each fitting.

Lesson 6: Piping Diagrams

Topics

Piping Systems; Valves; Identifying Piping Symbols; Reading a Simple Schematic; Reading a Piping Schematic

Objectives

- Give the purpose of a valve in a piping system.
- Explain the difference between a check valve and a cock valve.
- Identify the symbols for various types of valves.
- Demonstrate the ability to determine pipe size from a diagram.

Lesson 7: Hydraulic and Pneumatic Symbols

Topics

Fluid Power; Reservoirs and Receivers; Pumps and Compressors; Actuators; Valves; Piping and Tubing

Objectives

- Describe a fluid-power system.
- List and give the purpose of the main parts of a hydraulic system.
- List and give the purpose of the main parts of a pneumatic system.
- Identify pneumatic and hydraulic symbols on schematics.

Lesson 8: Hydraulic and Pneumatic Diagrams

Topics

Schematic Diagrams; Composite Symbols; Understanding Circuits; Hydraulic Circuit Diagram; Pneumatic Circuit Diagram; A More Complicated Diagram; Local Areas; Putting Local Areas Together

Objectives

- Describe a composite symbol.
- Explain the difference between a closed and an open hydraulic or pneumatic system.
- Identify the actuator in a hydraulic diagram.
- Explain the purpose of local areas on a hydraulic or pneumatic diagram.

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Lesson 9: Air Conditioning and Refrigeration Systems

Topics

A/C and R Systems; Refrigeration Subsystem; Water Subsystems; Air Distribution Subsystem; Control Subsystems; Electric Control Schematics; Electronic Control Schematics; Pneumatic Control Schematics

Objectives

- Describe the subsystems of an air conditioning system.
- Identify the symbols for air conditioning and refrigeration components.
- Explain the operation of an air conditioning and refrigeration control system.

Lesson 10: Welding and Joining Symbols

Topics

Welding; Methods of Welding; Joints; Welds; Symbols for Welds; Assembled Welding Symbol; Placement of Welds; Special Symbols; Reading Welding Symbols

Objectives

- Explain fusion welding.
- Name the main methods of fusion welding.
- Name the five types of joints and three ways of welding each joint.
- Demonstrate how to read and interpret a complete welding symbol.