شركة ميرك العربية السعودية
MEIRC Saudi Arabia

Basic Process Control

Duration: 5 Days

Introduction

The course covers the function of basic devices for measuring and controlling different kinds of variables in process control. It Introduces closed-loop control and PID functions, analog and digital devices and programmable logic controllers (PLCs). ISA and SAMA instrumentation symbols and interpretation and use of process diagrams are covered.

Who should attend:

This course is ideally suited for process engineers and technicians.

Objectives

At the end of the program attendees will be able to:

- Explain how measurement and control are related in industrial processes.
- Describe the four essential functions of an automatic control system.
- Discuss the functions of the CRT and PLC in control systems.
- Identify variables in industrial processes.
- Explain the importance of feedback in a closed-loop control system.
- Define setpoint and error
- Identify the standard signals used in process control.
- Explain the differences between open-loop control and closed-loop control.
- Recognize standard symbols used in process control diagrams.
- Explain how to increase the sensitivity of a control system.
- Explain the advantage of proportional control over on-off control.
- List the elements in a single-variable control loop.
- State the sequence of loop tuning in a cascade control system.
- Describe how a ratio control system works.

Course Outlines:

1. **The Nature of Process Control**
   - 1.1. Process variables;
   - 1.2. On-off control;
   - 1.3. Measuring data;
   - 1.4. Controlling variables,
   - 1.5. Error and feedback;
   - 1.6. Open- and closed-loop control
2. **Elements of Process Control**
   - 2.1. Analog and digital control signals;
   - 2.2. ASCII; Measuring pressure, level, and flow rate;
   - 2.3. Digital pulse control;
   - 2.4. System terminology;
   - 2.5. Controller action
3. **Process Control Signals**

3.1. Linear and nonlinear transducers;
3.2. Signal operating values;
3.3. Error; Controller output;
3.4. Pneumatic and electrical signal transmission;
3.5. Control loops

4. Process Control Diagrams

4.1. Symbol recognition;
4.2. Piping and instrument drawing;
4.3. Location and installation drawing;
4.4. Loop and wiring diagram

5. Using Symbols and Diagrams in Process Control

5.1. Sequence of operation;
5.2. Flowchart; Switches;
Relays; Electrical elementary diagram;
5.3. Pump system schematic;
5.4. PLC diagram;
5.5. Symbols

6. Process Control Loop Operations

6.1. On-off and proportional control;
6.2. Controller sensitivity;
6.3. Typical control loops;
6.4. Reset;
6.5. Derivative;
6.6. Cascade control;
6.7. Tuning a control loop;
6.8. Ratio control