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THE LEADING TRAINING PROVIDER

Instrumentation & Controls

HMI & Control Panel Maintenance PLC

Course Introduction

This is an application course which focuses on the integration of PLC and HMI (Human Machine Interface). It aims to equip the participant's knowledge in the integration of HMI and PLC by explains the set-up and basic graphic objects that the HMI uses in conjunction with PLC devices. This Course also introduces you to PLC, its general control Concept and the areas of applications in industry in which they are being applied.

It will introduce also the design of programmable controllers includes a number of rugged features that allow PLCs to be installed in almost any industrial environment. It will explore PLC installation, explaining the specifications for proper PLC component placement and environment.

PLC installation

Also explain other factors that affect PLC operation, such as noise, heat, and voltage. In addition, it will discuss wiring guidelines and safety precautions. Although proper PLC installation leads to good system operation, no programmable controller system is without faults. Therefore, we will investigate proactive maintenance techniques, as well as reactive troubleshooting processes.

Target Audience

- Control & Instrumentation Engineer
- Controls Technologist
- Instrumentation Technician / Systems Control Tech
- Senior Control & Instrumentation Engineer
- Maintaining Equipment Engineer
- Facilities I&E / Controls Engineer
- Offshore Instrumentation Engineer

Learning Objectives

- Understand the major components which make up the Systems, operation of modules, performance critical protection, basic System configuration within the software, Fault Reporting, I/O Circuits employed in the system, including redundancy and fault tolerance.
- Identify, isolate and repair faults of field interfaces as well as the Controller equipment
- Understand and perform the steps necessary to initialize the system, Including power-up sequences and program loading and execution Perform routine maintenance operations on the system
- Identify and maintain the components of a typical automation system.
- Understand the basic steps in hardware assembly, cabling, wiring and testing.
- Establish communications with the PLC with multiple technologies.
- Retrieve, Archive, and Download programs.
- Use the hardware configuration editor to inspect and troubleshoot hardware problems.
- To be familiar with the system drawings and documentation as required to Support maintenance and troubleshooting procedures.
- Interpret module information, carry out module replacement and plant maintenance
- Understand the fundamentals of PLC start-up and operation.

Course Outline

- **DAY 01**

  Module (01) Automation & Control

  - 1.1 Automation Control
  - 1.2 Inputs
  - 1.3 Outputs
  - 1.4 Processing Section
  - 1.5 Digital Systems
  - 1.6 Analog Systems
  - 1.7 Control Strategies
  - 1.8 Industrial Processes

- ◦ 1.9 Sequential Control

Module (02) Programmable logic control and System Layout

- ◦ 2.1 PLC a Process Control Computer System
- ◦ 2.2 Definition & Advantages
- ◦ 2.3 Comparison with Other Control Systems
- ◦ 2.4 Structure
- ◦ 2.5 Power Supply
- ◦ 2.6 Discrete Input & Discrete Output
- ◦ 2.7 I/O Modules
- ◦ 2.8 Communication - Point to Point
- ◦ 2.9 Communication – Networking
- **Day 02**

Module (03) Programming Languages

- ◦ 3.1 IEC 1131 & IEC 1131-3
- ◦ 3.2 Instruction List (IL)
- ◦ 3.3 Structured Text (ST)
- ◦ 3.4 Ladder Diagram (LD)
- ◦ 3.5 Function Block Diagram (FBD)
- ◦ 3.6 Sequential Function Chart (SFC)
- ◦ 3.7 LD Language - Graphic Elements

Module (04) Basic Programming

- ◦ 4.1 I/P Addressing
- ◦ 4.2 Ladder Logic Vs Conventional Control
- ◦ 4.3 Registers & timers
- ◦ 4.4 Counters
- ◦ 4.5 Arithmetic Functions
- ◦ 4.6 PLC Sequencer
- **Day 03**

Module (05) Panel Enclosure and System Components

- ◦ 5.1 Power Requirements and safety Circuitry.
- ◦ 5.2 Noise, Heat, and voltage Requirements

Module (06) I/O Installation, Wiring, and Precautions.

- 6.1 I/O Modules Installation.
- 6.2 Wiring Considerations.
- 6.3 Wiring Procedures.
- 6.4 Special I/O Connection Precautions.

Module (07) Human Machine Interface

- 7.1 Introduction to HMI
- 7.2 HMI/MMI Design
- 7.3 HMI functions
- 7.4 Exploring Displays
- 7.5 Trending Data
- 7.6 Communication of Information
- 7.7 Screen Animation
- 7.8 Screen Navigation
- 7.9 Human Information Processing

• **Day 04**

Module (08) PLC Start-Up and Checking Procedures

- 8.1 Static Input wiring check.
- 8.2 Static Output wiring check.
- 8.3 Control Program Review.
- 8.4 Dynamic System Checkout.

Module (09) PLC System Maintenance.

- 9.1 Preventive Maintenance.
- 9.2 Spare Parts.
- 9.3 Replacement of I/O Modules

• **Day 05**

Module (10) Troubleshooting PLC System

- 10.1 Troubleshooting Ground Loops
- 10.2 Diagnostic Indicators
- 10.3 Troubleshooting PLC Inputs

Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
April 7, 2025	April 11, 2025	5 days	4250.00 $	UAE - Dubai
July 7, 2025	July 11, 2025	5 days	4950.00 $	Azerbaijan - Baku
Dec. 21, 2025	Dec. 25, 2025	5 days	4250.00 $	KSA - Jeddah
Feb. 24, 2025	Feb. 28, 2025	5 days	4250.00 $	UAE - Dubai
Sept. 28, 2025	Oct. 2, 2025	5 days	4250.00 $	Oman - Muscat
Sept. 28, 2025	Oct. 2, 2025	5 days	4250.00 $	Oman - Muscat