

Introduction to TIA Portal and Diagnostics

General Information

Course Code SCT-PTBADIA
Global Code TIA-INTRO
Length 2 Days
CEUs 1.3

Audience

This course is for engineers and maintenance personnel who are new to SIMATIC S7 PLCs and who will be creating, modifying, and doing hardware diagnostics on systems using SIMATIC TIA Portal software.

Profile

This course is an introduction to the TIA Portal Development Environment and is an ideal preparation for the TIA Portal Programming 1 or TIA Portal Service 1 courses. This course helps students unlock the potential for increased productivity by building foundational concepts and diagnostic skills. Students will learn how to apply those skills to create or open existing projects, navigate work screens and informational cross referencing, identify CPU and I/O hardware specifications, and conduct initial hardware diagnostics in TIA Portal. This is a face to face, instructor lead course consisting of in class instruction and exercises.

Recommendation: Students familiar with programming in Allen Bradley software should attend the AB to TIA Portal course (SCT-PTABSP1A in person or virtual instructor-led SCT-PTOILABSP1A).

Objectives

Upon completion of this course, the student shall be able to:

- Use TIA Portal to create a new development project.
- Navigate through an existing project using both the Portal View and the Project View.
- Configure an S7-1500 PLC with local I/O modules.
- Assign PLC tags.
- Identify key characteristics of program blocks.
- Identify important features of the automation languages LAD and FBD.
- Diagnose hardware errors

Topics

1. Number Systems & IEC61131 Standard
 - a. The binary number system in computing
 - b. The hexadecimal number system in computing
 - c. Overview of the IEC 61131-3 standard
 - d. Programming languages
2. Introduction to the TIA Portal Development Environment
 - a. Portal View vs. Project View
 - b. Libraries - Project vs. Global
 - c. Tags
 - d. Data Types
 - e. Cross References
 - f. PLCSIM
3. PLC Program Blocks and Variables in the Program Editor
 - a. Blocks and Block Types
 - b. The Program Editor
 - c. The Information System (Help Files)
4. Introduction to I/O and Addressing
 - a. Discrete I/O and S7-1500 PLC Modules
 - b. Analog I/O and S7-1500 PLC Modules
 - c. I/O Addressing Principles
5. TIA Portal Automation Languages
 - a. Ladder Diagram (LAD) language
 - b. Contact and Assignment (Coils)
 - c. AND, OR, and Exclusive OR (XOR) Functions
 - d. Function Block Diagram (FBD) language
 - e. AND, OR Exclusive OR (XOR), and Negate Functions
 - f. Ladder Diagram (LAD)
 - g. Function Block Diagram (FBD)
 - h. Structured Control Language (SCL)
6. CPU Diagnostics
 - a. Online Tools, Configuring and Parameterizing the Hardware
 - b. Connecting via Industrial Ethernet to the PLC
 - c. Accessible Devices: Online & Diagnostics