

Automation - SIMATIC S7 with TIA Portal TIA Portal Service 1

General Information

Course Code: SCT-PTTIAS1A
Length: 4½ Days

Audience

This course is the first in a two part series and is designed for "first responders" to industry operations utilizing Siemens S7 automated control systems with TIA Portal Software. Maintenance technicians, electricians, supervisors and others, who need an understanding of their Siemens control system, should attend this course to maximize line uptime.

PLEASE NOTE: If training in S7 PLC programming is required, please consider the SIMATIC TIA Portal Programming 1 course.

Prerequisites

- MS Windows Expertise
- Introduction to SIMATIC PLCs

Profile

This course consists of instructor led training and hands-on exercises which teaches the basic S7 system concept, hardware configuration and parameterization, S7 software (SIMATIC TIA Portal) basics, and an overview of programming fundamentals. Human Machine Interface (HMI) and PROFINET IO basics and introduction to G120 drives are also included.

Numerous hands-on exercises using a Totally Integrated Automation (TIA) plant model reinforce practical experience and theoretical knowledge. The TIA Hardware system consists of an S7-1500 rack with ET200SP remote IO, Comfort Panel HMI, G120 Drive and a moving conveyor system. Students experience and learn TIA concepts and gain an understanding of the relationships between key industrial automation components. Upon completion of the course, students are able to utilize STEP 7 tools, and techniques to accurately recognize, diagnose, and remedy control system faults, reducing costly downtimes.

Modular in design, this course is fully customizable for those interested in on-site training. Topics are designed for adjustments to meet plant specific needs. Call 1.800.241.4453 for more details.

Students needing additional skills in S7 system sustaining to include basic program modifications and advanced systems diagnostics should consider the SIMATIC TIA Portal Service 2 course.

Objectives

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

- Configure, parameterize and download the device configuration for S7-1500 hardware, Comfort Panel HMI, and G120 Drives over PROFINET
- Perform basic hardware maintenance, testing, and startup procedures for local and remote S7 system hardware
- Use standard STEP 7 tools and methods for Testing, Diagnosing, and Correcting hardware & software problems in a running System.
- Operate, Monitor, & Maintain components of a typical SIMATIC TIA system.
- Work with Online and Offline devices and programming blocks
- Work with S7 Libraries, and Tag tables
- Retrieve and Archive an S7 project
- Backup and document executed program changes

Topics

1. System Overview
 - a. S7-1500, S7-1200, S7-300, and S7-400, Function Comparison
 - b. Communications
2. Introduction: Engineering Software "TIA Portal"
 - a. Portal-View/ Project View
 - b. Task Cards and Libraries
 - c. Inspector Windows
 - d. Archiving/Retrieving Projects
 - e. Online Help
 - f. Tips and Tricks
3. Installation/Maintenance of the Automation System
 - a. S7-1500 Hardware Components & Installation
 - b. Replacing S71500 I/O Modules
 - c. Signal Modules/Communication Modules
4. Training Devices
 - a. S7-1500 Training Stations used for Class
 - b. S7-1500 I/O addressing
 - c. Setup and connection of Conveyor Model
 - d. PROFINET Networking of Classroom Devices
5. Device and Networks Configuration
 - a. Online Tools and Online Device Access
 - b. Device Configuration
 - c. Parameterizing CPU and Signal Modules
 - d. Inserting/Deleting/Changing Modules
 - e. PROFINET Network Configuration
6. PLC Tags
 - a. PLC Tag Tables
 - b. Creating/Monitoring PLC Tags
 - c. Using Tags as Code Operands
 - d. Renaming/Rewiring Tags
 - e. Retentive PLC Tags

- f. PLC Tag Constants
- 7. Hardware Commissioning
 - a. LED Status of Power Supply, CPU, Modules, Remote Stations, G120 Drive
 - b. Hardware Diagnostics
 - c. Watch and Force Tables
 - d. Wiring Test for Class Stations
 - e. Tips and Tricks
- 8. Block Architecture and Block Editor
 - a. S7 Block Types
 - b. Structured programming
 - c. Process Image Inputs/Outputs
 - d. Cyclic Program processing
 - e. Ladder Logic and Function Block Diagram
 - f. Using the Block Editor
 - g. Program Testing & Troubleshooting using the "Monitor Block" function
- 9. Binary Operations
 - a. Binary Logic Operations
 - b. Field Device contacts vs Logic contacts
 - c. Edge Evaluation
 - d. Tips and Tricks
- 10. Digital Operations
 - a. Data Types
 - b. Counters & Timers
 - c. Basic Math Operations
 - d. Basic Comparison Operations
- 11. Introduction to HMI
 - a. Data Exchange between CPU and HMI
 - b. Configuring the Physical HMI
 - c. Software Parameterization of HMI
 - d. Downloading to the HMI
 - e. Updating the HMI OS
- 12. Adapting HMI by Rewiring
 - a. Cross Referencing HMI Tags
 - b. Using the S7 Rewire Function
 - c. Testing/Troubleshooting the HMI
- 13. Distributed I/O - PROFINET/PROFIBUS
 - a. Identification of Distributed I/O
 - b. PROFINET Networks
 - c. ET200SP Remote I/O Stations
 - d. Configuring/Parameterizing Remote I/O Stations
 - e. PROFINET Device Name Assignments
 - f. PROFIBUS Networks
 - g. Structure of a PROFIBUS DP System
 - h. Addressing of PROFIBUS Interface Modules
- 14. Introduction to SINAMICS Startdrive with G120 Drive
 - a. PROFIdrive Communication Standard
 - b. G120 Control and Status Words
 - c. PROFINET Drive Communication
 - d. Integrating and Parameterizing a Drive in a Project
 - e. Commissioning the G120 Drive