SIEMENS

TIA Portal Service 2

General Information

Course Code   SCT-PTTIAS2A

Global Code   TIA-SERV2

Length   4.5 Days

CEUs   3.0

Audience

This course is designed for S7-1500 and S7-1200 PLC users with basic SIMATIC control system knowledge, who install or maintain automation systems and their application programs on the TIA Portal Platform.

Prerequisites

- TIA Portal Service 1 (Face to Face or Virtual)

Profile

This course consists of instructor led training and hands-on exercises to continue skill development in troubleshooting, diagnostics, and modifying hardware and software components of a SIMATIC control system in TIA Portal. Control System Hardware consists of an S7-1500 rack with ET200SP remote IO, Comfort Panel HMI, G120 Drive, and a moving conveyor system. Participants will use SIMATIC TIA Portal software tools to build new features, diagnostics, and communications into the application project. Program development using organization blocks, system functions, and instruction libraries build software troubleshooting efficiency. Analog signal processing and alarming are included in this application. Configuration and integration of an HMI and Drive system into the student project, gives experience in managing a Totally Integrated Automation (TIA) project. An introduction to Structured Control Language (SCL) and sequence control in SIMATIC S7-GRAPH are included.

Objectives

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

- Perform basic maintenance on the Maxum Hardware.

- Commission S7-1500 rack, ET200SP station, Comfort Panel HMI, G120 Drive, and a conveyor system.

- Use advanced STEP 7 tools and methods for Testing, Diagnosing, and Correcting hardware & software problems in a running program.

- Utilize block types: FC, FB, OB, and DB.

- Eliminate logical and CPU Stop software errors.

- Utilize principles of analog value processing.

- Monitor an SCL and S7 GRAPH Block.

- Backup and document executed program changes.

Topics

1. TIA Portal Review
   a. TIA Portal Software review
   b. S7-1500 CPU display
   c. Distributed IO Systems
2. Training Devices and Addressing
   a. Classroom Trainer/Simulators
   b. Connection to Main Rack and Remote Rack Modules
   c. Reading the Firmware version of the CPU
3. Commissioning the Hardware and Software
   a. Factory Defaulting Devices
   b. Visual Check of Device LEDs
   c. Adding/Deleting a Module in Software
   d. Changing a Physical Module in Hardware
   e. Watch and Force Tables
   f. Wiring Test of the Conveyor
4. Data Blocks (DB)
   a. Data Blocks and their use
   b. Creating, Editing, Downloading, and Monitoring Data Blocks
   c. Optimized Block Access for Data Blocks
   d. SIMATIC Data Types
   e. Accessing DB Variables
   f. Modifying DB Variables Online
   g. DB Tips and Tricks
5. Functions (FC) and Function Blocks (FB)
   a. Local Block Tags
   b. Declaring Local Block Tags and Constants
   c. Reusable Parameterized Blocks
   d. Editing/Updating Parameterized Blocks
   e. Calling, Downloading and Monitoring Reusable Blocks
   f. Instance Data blocks Used with FBs
   g. Versioning Blocks
   h. Block Protection
6. Debugging and Testing Functions
   a. Categories of Faults and Errors
   b. Diagnostic Tools Overview
   c. Diagnosing Faults
   d. Call Hierarchy and Call Environment
   e. Modifying vs Forcing Tags
   f. Special Feature: Selective Tag Monitoring
7. Organization Blocks (OB) and Error Handling
   a. Organization Block Overview
   b. S7 System Startup Modes
   c. Cyclic and Hardware Interrupts
   d. Time Triggered OBs
   e. Error and Diagnostic OBs
   f. CPU Reaction to Errors

g. Optimized Block Access for OBs
8. Analog Value Processing
   a. Principal of Analog Value Processing
   b. Analog Module Addressing
   c. Analog Module Parameterization
   d. Analog Measuring Ranges
   e. Scaling Analog Values
   f. Additional Analog Math Functions
9. HMI Life Bit and CPU Time Sync
   a. Time of Day Synchronization
   b. CPU Life Status
10. HMI Alarm System
    a. Functions of an Alarm System
    b. Alarm Classes and Procedures
    c. Configuring and Displaying Alarms
    d. Discrete Alarms
    e. Analog Alarms
11. TRACE Analyzer Function
    a. TRACE Editor
    b. TRACE Configuration
    c. Downloading and Activating TRACE
    d. Saving and Viewing the TRACE Function
12. Web Based Diagnostics for CPU and HMI
    a. Web Service for PROFINET CPUs
    b. Web Service for PROFINET HMIs
    c. Access Protection for Remote Control
    d. HTML Pages
13. CPU and HMI System Diagnostics
    a. System Diagnostics Overview
    b. Configuring System Diagnostics
    c. Project Language Settings
    d. Diagnostic Alarm Text
    e. Downloading System Diagnostics
    f. Displaying System Diagnostics on the HMI
14. Introduction to SCL
    a. SCL Overview
    b. SCL Control Structures
    c. Operators
    d. Creating, Editing, Downloading, and Monitoring an SCL Block
15. Data Communication with G120 Drive
    a. Commissioning the G120 with the Commissioning Wizard
    b. Insert, Parameterize, Download and Test the G120 Drive on PROFINET