SIEMENS

TIA Portal Programming 3

General Information

Course Code	SCT-PTTIAP3A
Global Code	TIA-PROEXP
Length	4½ Days
CEUs	3.0

Audience

This course is for SIMATIC S7-1500, S7-1200, S7-300, and S7-400 PLC users with basic engineering experience in the design and sustaining of SIMATIC automation systems and their application programs.

Prerequisites

- TIA Portal Programming 2 (F2F or Virtual)

Profile

This course is the third in a three-part series which increases advanced skills with Siemens SIMATIC TIA Portal. Students will learn to leverage the power of TIA Portal software with advanced structured programming techniques. A systems approach to efficiently programming the S7-1500, S7-1200, S7-300, and S7-400 PLC is covered. Students will expand their knowledge regarding the reusability of STEP 7 blocks and their storage in user libraries while gaining an introduction to programming languages statement list (STL), Structured Control Language (SCL) and S7-GRAPH.

The core issues of efficient use of CPU resources, establishing communications, passing information, and managing integrated diagnostics are included. This course includes classroom instruction, demonstration, and considerable hands-on lab work.

Objectives

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

- Apply knowledge of the advantages of optimally created blocks and be able to program them.
- Efficiently implement the concepts of multiple Instances.
- Declare variables of complex data types.
- Commission a given SCL block.
- Configure alarms according to the Alarm Number Method.
- Commission a PID controller with automatic optimization.

Topics

1. Training Units and Addressing
   a. Workstation review
   b. Configuration of the S7-1500 Training Device
   c. Operating and Display Elements of the Training Device
   d. Connection to Distributed I/Os of the ET200SP
   e. Training Area as Processing Line with HMI Device
2. Hardware and Software Commissioning
   a. Components of the "Devices & Networks" Editor
   b. Setpoint and Actual Configuration
   c. Compiling the Hardware Configuration
   d. Online Tools
3. Reusable Blocks
   a. Blocks for Structured Programming
   b. Libraries
   c. Block Attribute: Optimized Block Access
   d. Synchronous Errors
   e. Instance Formation of Function Blocks
   f. Structure of the Multiple Instance Model
4. Complex Data and their Addressing
   a. Meaning of Variables and Data Types
   b. Meaning of Complex Data Types
   c. PLC Data Types: UDT
   d. Synchronous Errors
5. Structured Control Language - SCL
   a. Programming Complex Calculations and Algorithms
   b. Direct Addressing
   c. Indirect Addressing
6. Recipes and Alarm Number Method
   a. Recipe Principle
   b. Exchanging Data Records
   c. Creating a Recipe
   d. Alarm Classes
7. Introduction to Industrial Communication
   a. S7-1200/1500 Ethernet Communication Services in the ISO/OSI Communication Model
   b. ISO-on-TCP Communication
   c. "TSEND_C" and "TRCV_C" for Programmed Connections
   d. S7 Communication
   e. UDP Communication
8. Technology Objects
   a. Pulse Width Modulation PWM)
   b. Principle of Axis Control
   c. Implementation of a PID Controller in the S7-1200
   d. Controller Tuning