

CDN-Automation TIA Portal Service 1 v15

General Information

Course Code: CDN-ST-TIASERV1v15
Length: 4½ Days

Audience

This course is for SIMATIC S7-1500, S7-1200, S7-300, and S7-400 PLC users (Maintenance technicians, electricians, supervisors and others), who need an understanding of their Siemens control system and are involved with sustaining automation systems and their application programs.

Prerequisites

- MS Windows Expertise
- Introduction to Simatic PLCs

Profile

This course is the first in a three part series which builds basic maintenance skills with Siemens STEP7 TIA Portal software. Students will learn 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 are also included.

This course takes a systems approach using the S7-1500 PLC, plus basic connectivity and functionality of an TP1200, HMI, G120 Drive, and ET200SP, PROFINET I/O.

Throughout the course, students will build a STEP7 project from the beginning, learning proper program structure and documenting. Software diagnostic tools will be used for debugging both hardware and code. Various instruction sets, memory areas, program blocks, and libraries will be reviewed to provide the student with the basic concepts of structured programming.

The course format consists of instruction and hands-on exercises. The course uses a conveyor model for realistic demonstrations and exercises.

Objectives

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

- Address and wire signal modules
- Perform startup and reset procedures for S7 system hardware and software
- Configure and parameterize S7-1500
- Configure and parameterize PROFINET IO
- Backup and document executed program changes

- Perform basic hardware assembly, cabling, wiring and testing.
- Establish PLC communication with multiple technologies.
- Retrieve, Archive, and Download S7 programs.
- Use standard STEP 7 tools and methods for Testing, Diagnosing, and Correcting hardware & software problems in a running program.
- Operate, Monitor, & Maintain components of a typical SIMATIC TIA system.

Topics

1. SIMATIC S7 System Family
 - SIMATIC S7 system family
 - S7-1200 and S7-1500 automation systems
 - The concept of "Totally Integrated Automation" (T.I.A.)
2. Installation and Maintenance of the Automation System
 - Identify the structure of a SIMATIC S7-1200/1500
 - Discover the functions of the basic components
 - Recognize the installation and expansion options of an S7-1200/1500 system
 - Identify the tools for installing an automation system
 - Interpret how to work with the electronic S7 manuals
3. Introduction to the TIA Portal
 - Scope of TIA Framework
 - Engineering products and product ranges
 - TIA operator interface
 - Online Help
4. Training Devices
 - Get familiar with the configuration of the training area
 - Get familiar with the wiring of the training area components
5. Device configuration and Hardware commissioning
 - Establish an online connection via Industrial Ethernet between PG and CPU
 - Reset the CPU to the factory settings, download new, stop and start
 - Check and adapt the device configuration
 - Modify I/O modules addresses of an S7-1500
6. PLC and DB tags, Wiring test
 - Recognize tags and their storage area
 - Create and edit a PLC tag table or DB tags
 - Monitor and modify tags in a PLC tag table or DB tags
 - Rename tags and rewire PLC tags

7. Block Editor and simple Binary instructions
 - Explain the principle of cyclic program processing
 - Distinguish the difference between NC and NO contacts connected in the hardware and programmed query symbols
 - Edit, save and load a block using the editor
 - Program simple binary logic operations
 - Perform a simple program test with "Monitoring a block"
8. Block Architecture and extended Binary instructions
 - Identify different block types
 - Recognize program structure and infer when there are expansions
 - Analyze binary process signals using binary logic operations
 - Troubleshoot the system
9. Counter, Timer and Arithmetic
 - Define various data types
 - Classify various counter and timer functions
 - Program counter and timer functions by selecting a data type
 - Use basic arithmetic operations
10. Introduction to HMI
 - Set the interface for the touch panel
 - Describe the principle of data exchange between touch panel and CPU using tags
 - Place a touch panel project into operation
 - Identify basic functions of HMI configuration
11. Adapting to HMI → a DB as user interface
 - Define the relationship between the S7 program and HMI device
 - Expand the configuration on the touch panel
 - Apply a STEP 7 program
12. Introduction to Distributed I/O PROFINET and PROFIBUS
 - Explain the principles on which PROFINET works
 - Identify a PROFIBUS DP network
 - Configure, network and put a distributed IO station (PROFINET controller, PROFIBUS master) into operation
 - Configure PROFINET IO
 - Configure a PROFIBUS slave
13. Introduction to SINAMICS Startdrive with a SINAMICS G120
 - Parameterize and test a drive with Startdrive
 - Integrate a drive in the device configuration
 - Reset (restore) the inverter to factory settings
 - Set basic parameters via Startdrive
 - Monitor and control the drive
14. Backup, download, archiving, updates and version compatibility
 - Identify backup options of the CPU and panel
 - Complete a CPU backup and restoration
 - Know how to update the firmware of a module
 - Archive/retrieve a project and libraries

15. Final Exercise - Commissioning and Expanding the Program