PLC: SIEMENS STEP 7

Focus on the fundamentals of Siemens S7-300 PLC from setting up communications to programming, uploading and downloading programs to troubleshooting and modifying the system.

Each student will spend 80% "hands on" during the class time on the laptop running Step7 software and a PLC simulator working on performing pre-documented exercises learning through practice to use the Simatic Step 7 software to configure, program and troubleshoot ladder and faults to solve elementary and complex problems.

Program the PLC to provide real-time diagnostics that pinpoints possible issues by using troubleshooting methods such as the search function, reference data, systems menus, and forces, using the software to practice programming, running and troubleshooting ladder logic on any computer. It includes programming examples and animated industrial simulations.

After this course participants will be able to:

- Program instructions into Functions.
- Call Functions from other sources.
- Archive and restore Siemens Step7 programs.
- File save up-load and download.
- Troubleshoot Siemens Step7 programs.
- Adding of Element symbols and comments.
- All of this will lead to a reduction of external vendor costs and production down-time impacts on maintenance and troubleshooting for Siemens PLC equipment, in addition creating a safer environment for your troubleshooters.

CLASS FORMAT:

Hands On

STANDARD CLASS SIZE:

NTT recommends a class of no more than 10 participants to obtain the best results.

LENGTH:
4-days (32-hrs)

This course is also customizable to add an additional day of instruction, each additional module will be a deeper dive into more software, hardware and troubleshooting features of the PLC system resulting in better understanding and ownership of skills.

NTT TO PROVIDE:
- Student training equipment Laptop and PLC
- Textbooks
- Classroom consumables
- Completion certificates
- Course syllabus, outline, table of contents, or training objectives
- Shipping and instructor travel logistics

CLIENT PROVIDES:
- Classroom of 500 square feet or greater
- Projection screen, white board and/or flip chart(s)

WHO SHOULD ATTEND:
- Technicians
- Electronics Techs
- Engineers

This course would also be beneficial for anyone who encounters PLC control systems in their daily functions, such as maintenance technicians, Electricians, HVAC, operations and management personnel.

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PLC: SIEMENS STEP 7 - COURSE AGENDA

The Siemens product line of PLC's mimic that of the Allen Bradley SLC 500, PLC 5 and Control Logix's 5000. Since industry has had familiarity with AB PLCs for years, reference will be made to assist in understanding how Siemens addresses PLC functions. This class will be focusing on the S7-300 with mention of the S7-400 as well as discussion relating to the S7-1200 Safety Integrated (SI) PLC that compliments both the S7-300 and 400

HISTORY

- Relay logic
- Programmable logic controller

PLC ARCHITECTURE

- Rack, power supply, processor, I/O
- CPU options
- Communication networks using Profibus, MPI and Ethernet
- Programming tools – software

INPUT AND OUTPUT (I/O) SYSTEMS

- I/O interfaces – voltages
- Configure CPU, I/O Modules and PS
- Data transfer to/from modules to processor
- Number of I/O per module
- Analog data versus digital data
- Remote I/O systems

LADDER LOGIC VERSUS RELAY LOGIC

- Ladder diagrams versus ladder logic
- Sensor and load connections to the PLC
- Network" (rungs) and instructions

RELAY-TYPE INSTRUCTIONS

- Input option types
- Output options
- Differences between instructions and field devices (on/off versus open/closed)

ADDRESSING, DATA MEMORY, AND SCAN TIME

- I/O address relation to module location
- Internal data memory storage
- I/O, memory and "network" scan process
- LAD, STL, FBD

ADDITIONAL INSTRUCTIONS & ASSOCIATED BITS

- Timer on-delay, timer off-delay
- Up/down counter and control bits
- Moving data among registers
- Math instructions
- Comparison instructions – equal, greater, less than

NUMBER SYSTEMS

- Decimal, octal, binary and hexadecimal systems Binary Coded Decimal (BCD)
- Data conversion to and from each

SIZING AND SELECTION OF PLCS

- Estimating system I/O requirements
- Understand requirement for spare I/O
- CPU and memory sizing
- Interpreting manufacturer specifications
- Configuring communications
- Wiring requirements
- Debugging and diagnostic tools

HANDS-ON EXERCISE LABS

- Convert a schematic into a complete ladder program

ADDING SYMBOLS AND COMMENTS TO EACH I/O ADDRESS

- Motor start/stop circuits
- Lock-out Circuits
- Investigating system and I/O faults
- Create troubleshooting VAT Tables
- Signaling alarms
- Inputting and outputting numerical data
- Troubleshooting communication problems

REVIEW AN ACTUAL LADDER FROM A COMPLETE SYSTEM

- Maneuver through Blocks
- Utilize the cross reference feature
- Perform search functions
- Perform re-wire function

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