

ControlLogix® Overview Course

[CLX]



Course Overview

Length: 4-days (32 hrs)

Hands-On: 75%

Target Audience: This course is designed for personnel involved in troubleshooting or maintaining ControlLogix® PLC systems who want a bit deeper coverage of the details. This course also serves as a foundation for those who need advanced PLC and ControlLogix® knowledge or a refresher before

advanced courses but includes deeper coverage and more lab exercises than our Basic CLX course. Typical attendees include maintenance personnel, electricians, instrument technicians, automation personnel, engineers, and others working with ControlLogix® PLCs and Rockwell Logix software

Summary Description: This course introduces students to ControlLogix® PLCs using Studio 5000 Logix software. It covers all of the core principles required to perform routine maintenance, including troubleshooting hardware and IO issues, performing minor edits, uploads and downloads, force operations, bit and data manipulations, resetting faults, and more, with considerable number of very engaging lab exercises. It also addresses common problems and mistakes in the ControlLogix® series and builds a solid foundation for students to build upon.

Course Agenda:

Day 1

- Hardwired relays and how it relates to Ladder Logic
- PLC components intro
- Introduction to Logix Studio 5000 software
- Learn details of Going online, Downloading, and Uploading programs to/from PLC
- Introduction to ControlLogix core concepts (scan cycle, program layout, logic functions, basic instructions)
- Learn Ladder logic basics
- Learn Latches & Seal logic
- Scan cycle basics

DAY 2

- Batch and sequential logic
- Program layout & organization
- Introduction to multi-dimensional tag arrays (uses, interpretation, tracing)
- FORCE operations, procedures, and common mistakes and issues
- Timers & Counters
- Introduction to advanced tools and utilities of Logix Studio 5000 software
- Processor faults (recognition, basic analysis, clearing and resetting faults)

DAY 3

- PLC numbers (practical and applicable to real world details)
- Math and Compare instructions
- Analog IO (including introduction to configurations, scaling, and calibrations)
- Introduction to advanced functions and features, such as Add-on Instructions and User Defined Tags
- Understand how Tasks, Programs, Routines are arranged and used together
- Understand Diagnostic IO and be able to troubleshoot common hardware issues

DAY 4

- Gain familiarity with alternative programming styles (ST, FBD, SFC)
- Using diagnostic tools and information to troubleshoot typical PLC problems

- Setup, analyze, and troubleshoot typical comms network
- Setup, trace, and monitor Produced & Consumed tags through a system

Hands-On Exercises (only major items or group titles listed):

This course is 75% hands-on training, using 7-slot ControlLogix® racks with 1756 series processors, IO cards, and various communications cards. The PLC racks connect to exclusive training stations with digital and analog I/O inputs and communications cards, as well as external I/O for lab exercises. Students will use Rockwell's Logix Studio software to download, modify, test, and observe sample programs, analyze, troubleshoot, and perform routine tasks. The labs focus on areas where instructor help is beneficial, important, or frequently misunderstood, leading to serious field problems. Hands-on exercises include:

- Hardwired relays and how it relates to Ladder Logic
- ControlLogix® series PLC components intro
- Ladder logic basics (XIC, XIO, AND/OR functionality, etc.)
- Latches & Seal logic
- Scan cycle concept basics
- Program layout, organization, & interpretation
- Common PLC procedures, precautions, tips, & tricks
- Timer & Counter basics
- PLC analog and numerical functions
- Math and Compare instructions
- Tasks, Programs, Routines
- Basics of diagnostic I/O functionality
- Introduction to Status Indicators
- Basic diagnostic tools and information to troubleshoot
- Troubleshooting I/O problems
- Introduction to ControlLogix® communications and network layouts

Student Outcomes (Course Objectives)

By the end of this course, students will be able to:

- Properly connect to ControlLogix® series processors using RSLinx®.
- Read and interpret common ladder logic programming using Studio 5000 Logix® software.
- Troubleshoot common analog or digital field device problems.
- Search and find program components, instructions, tags, or addresses.
- Become familiar with program documentation, templates, and standards.
- Make minor edits to PLC programs (online or offline) while being aware of potential hazards and protocols.
- Understand procedures and possible problems when saving, uploading, or downloading program files.
- Read, understand, and clear processor faults properly.
- Perform online data manipulations and force operations safely and correctly.
- Use and navigate Logix software effectively.
- Troubleshoot common hardware and configuration problems.

- Trace logic through programs and troubleshoot faults with field components
- Understand and apply core concepts of ControlLogix® system
- Be able to interpret advanced functions and features such as; User Defined Tags, Add-on Instructions, Multi-dimensional tag arrays.
- Be able to interpret and analyze digital and analog IO configurations.
- Be able to interpret system architecture details and configurations such as IO sharing / ownership, comms, etc..
- Be able to read and interpret alternative programming styles (ST, FBD, SFC).
- Safely implement PLC forces and common maintenance procedures and recognize potential issues, mistakes, and problems.
- Be familiar with the differences between CLX hardware and software versions and integration with Logix family equipment.
- Analyze and troubleshoot ControlLogix® communications and MSG instructions.
- Setup, trace, and monitor Produced & Consumed tags through a system

Team / Organizational Benefits:

This course empowers personnel to perform frontline troubleshooting and maintenance, educates them on common mistakes in PLC and ControlLogix® systems, and helps grow talent with proper training. It also increases job satisfaction and team morale by enabling technical personnel to gain true competency and enjoy working with PLC systems. Lastly, it provides the foundation required for future advanced courses that delve into programming and engineering details.