

# ALLEN BRADLEY CONTROLLOGIX HANDS-ON PROGRAMMING & TROUBLESHOOTING

This course will introduce students to the Allen-Bradley ControlLogix® platform. It begins with an overview of the hardware and migrates into an introduction of RSLogix™ 5000 software. You will be introduced to basic Logix5000™ concepts and terminology, and you will be exposed to Logix5000™ system hardware with hands-on experience. You will also have an opportunity to use RSLogix™ 5000 software to perform basic system configuration and troubleshooting tasks. Students will receive a basic understanding of the structure of a ControlLogix® program, which includes an introductory look at Routines and the Tag Database. Differences will be explained between this platform and conventional PLC-5™ and SLC-500™ products.

## CLASS FORMAT:

Hands-on

## STANDARD CLASS SIZE:

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

## NTT TO PROVIDE:

- Five days (40 contact hours) of on-site instruction
- 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:

- IT Technicians
- Instrumentation Technicians
- Maintenance Technicians
- Automation Technicians
- Multi-craft personnel
- Anyone who needs cross-training on PLCs



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## COURSE AGENDA

### CONTROLLOGIX® – DAY 1

**Description:** During day 1 we introduce the student to the Logix hardware platform. The student also learns to understand how RSLinx™ enables RSLogix™ 5000 software to communicate with PLC controllers; configure RSLinx™ drivers; create a project; identify and work with project elements, including the controller folder, tasks, and the I/O configuration folder; and download a project to a controller.

#### 1. Logix™ Hardware Overview

- Course Introduction
- The Logix System Overview
- CompactLogix™ versus ControlLogix®
- Chassis, Backplane, and Power Supplies
- Logix5000™ 32 Bit Architecture Processors and Memory options
- Memory, Program & I/O Scan
- Communications Options
- CPU Modes

#### 2. RSLogix™ 5000 Communications with RSLinx™ Configuring RSLinx™ software drivers for various communication hardware

- Configure the DF1 Driver
- Configure the EtherNet driver
- Configure the EtherNet IP driver
- Downloading and uploading projects

#### 3. RSLogix™ 5000 Software Introduction

- Software overview
- Menus and Toolbars
- Navigating the principal features of the RSLogix5000 software package
- RSLogix™ 5000 configuration
- RSLogix™ 5000 Project Basics
- Migrating from RSLogix™ 500 to RSLogix™ 5000
- Introduction to the Tag Database and Data Types
- Lab 1 Creating a New Project
  - Creating, Editing and Monitoring Tags
  - Using tag aliases

- Adding I/O to the Project
- Programming Basics

#### 4. RSLogix™ 5000 Tasks, Programs and Routines

- Programs and Routines
- Tasks
- Multitasking
- Program I/O Scan

#### 5. RSLogix™ 5000 Discrete I/O

- The Producer Consumer Model
- Connections and Ownership
- Adding and Configuring Discrete I/O
- Interpreting I/O addresses in the tag database
- Control Flash – Flash upgrade an I/O module

### CONTROLLOGIX® – DAY 2

**Description:** During day 2 we will be introduce and explain the Relay, Timer and Counter instructions. We will also introduce Arrays, Data types, and advanced features available in the Tag Database and configuration of analog I/O modules.

#### 1. Basic Relay Type Instructions

- Fundamentals of the Relay Ladder Logic Instruction Set
- XIC, XIO
- OTE, OTL, OTU
- ONS, OSR, OSF

#### 2. Editing Ladder Logic

- Online and offline editing skills
- Short cuts available when editing

#### 3. Timers and Counters

- Memory Usage of a Timer Structure/Tag
- The TON, TOF, RTO and RES Instructions
- Memory Usage of a Counter Structure/Tag
- The CTU, CTD and RES Instructions

#### 4. Arrays and Data Types

- Data Types Including DINT, INT, SINT, BOOL, REAL, STRING, User-Defined, etc.
- Defining & Creating user Defined Data Types
- Creating Arrays

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## 5. Adding Analog I/O

- Configuring and Addressing Analog I/O Modules
- Wiring and Processing Analog Inputs and Outputs Instrumentation Signals
- Interpreting I/O Addresses in the Tag Database

## CONTROLLOGIX® – DAY 3

**Description:** During day 3 we will introduce program control instructions, comparison and math instructions and the importance of documenting an RSLogix™ 5000 project.

### 1. RSLogix™ 5000 Documentation

- Rung Comments
- Operand Comments
- Page Titles
- Import / Export of Tags

### 2. RSLogix™ 5000 Program Control

- JMP and LBL
- JSR, RET, SBR
- MCR

### 3. RSLogix™ 5000 Comparison and Basic Math Instructions

- EQU, NEQ, LES, GRT, GEQ, NEQ
- LIM, CMP, MEQ
- ADD, SUB, MUL, DIV

## CONTROLLOGIX® – DAY 4

**Description:** During day 4 students will learn the two software tools that can be used in troubleshooting: searching and trending. Students are then introduced to status indicators on ControlLogix I/O and communication modules. We will also focus on troubleshooting. Students will learn methods for monitoring and clearing latched diagnostic bits that originate from diagnostic I/O modules. Forcing, as a troubleshooting tool, will also be covered.

### 1. Searching and Trending

- RSLogix™ Search Utility
- Search and Replace
- Trending

## 2. ControlLogix Indicators

- Discrete Input LEDs
- Output Module LEDs
- Analog I/O Module LEDs
- Communication Module LEDs

## 3. Troubleshooting

- Machine troubleshooting overview
- Diagnostic indicators
- Troubleshooting machine faults
- Zone faults
- Communication faults

## CONTROLLOGIX® – DAY 5

**Description:** During day 5 students start off reinforcing some of the basics presented in days 1-4. The student will then be introduced to some of the more advanced instructions in the RSLogix™ 5000 instruction set.

### 1. Introduction to System Instructions

- Array and UDT Review
- GSV/SSV Instructions
- Status Flags
- Move Instructions
- Special Instructions

### 2. Introduction to Advanced Instructions

- Misc Instructions
- Bit Shift Instructions
- Sequencer Instructions

### 3. Introduction to Add-On Instructions

- Using Add-On Instructions
- Creating Add-On Instructions