Trainer Bhawesh Kumar Singh
Experiance 18 Years in Installation , Commissiong & Corporate Training

Hardware

panel 1. Basic PLC Micrologix 1400

Panel 3 . New & Advance PLC CompactLogix 5370

Panel 3 . RIO Distributed Remote Input Output

1. Discontinue PLC Micrologix Family :- 1000/1100/1200/1500
2. SLC Family :- 5/01, 5/02, 5/03, 5/04
3. CompactLogix :- without 5370
4. ControlLogix L5 & L6

Software

- Selection Tool
- Wireshark
- Studio 5000 V35.0

. Old RSLogix 5000 V20.

. Old RSLogix 500 V12.0

Language

- LD/ FBD

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Allen Bradley CompactLogix 5370 PLC Training

Protocols:- Ethernet IP/Ethernet IP, Modbus RTU, OPC UA & Web Server

Objective

This course aims to provide participants with a comprehensive understanding of Allen Bradley PLC systems, with a focus on integration and communication using the following protocols: Ethernet IP/Profibus, Modbus RTU. By the end of this course, participants will be able to:

Couse Outline

Module 1: Overview of Industrial Automation and Control Systems

- Introduction to the concept of industrial automation.
- Overview of different types of control systems.
- Importance of automation in industrial processes.

Module 2: Allen Bradley PLC Programming

- Introduction to Allen Bradley PLCs, with a focus on CompactLogix 5370 and ControlLogix 5370 series.
- Basics of PLC programming using Allen Bradley Step 7 software.
- Hands-on exercises for programming simple logic.

Module 3: Configuring and Programming Allen Bradley Distributed CPUs

- Understanding communication protocols for distributed systems, especially Ethernet IP.
- Configuring and programming Allen Bradley Distributed CPUs.
- Hands-on exercises for distributed system programming.

Module 4: Instrument Interfacing

- Connecting RTD sensors to Allen Bradley PLCs through Modbus RTU.
- Integration of encoders and energy meters on Modbus RTU.
- Troubleshooting and optimization techniques.

Module 05:Project Work and Troubleshooting

- Participants work on a comprehensive integration project that combines elements from all modules.

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Week 01

Course Highlights

- PLC Description and Operation:
- Allen Bradley Automation Systems:
- Overview of Allen Bradley PLCs and programming devices.
- Hardware Configuration:
- Data Types and addressing:

Software

- Studio 5000 V35.0 V17

Protocol

- Modbus TCP/IP
- Ethernet IP
- Modbus RTU
- OPC UA

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Allen Bradley PLC Programming Course

Course Contents

PLC Description and Operation:

- Understand the basic principles and functions of Programmable Logic Controllers.
- Explore the internal operation and architecture of PLCs.

PLC Programming Languages:

- LAD (Ladder Diagram),FBD (Function Block Diagram)SCL (Structured Control Language)STL (Structured Text Language),GRAPH (Sequential Function Chart)

Allen Bradley Automation Systems:

- Logix Designer (Studio 5000 V35.0): Allen Bradley'engineering framework for automation.
- Introduction to the Rockwell family: Allen Bradley' brand for a rangeof industrial automation products.

Overview of Allen Bradley PLCs and programming devices.

- Display devices used in Allen Bradley systems.
- Communication protocols in Allen Bradley systems.

Studio 5000 V35.0 Programming Tools:

- Overview of Studio 5000 V35.0.
- Installation and configuration of Studio 5000 V35.0.
- General functioning overview of Studio 5000 V35.0.

Hardware Configuration:

- Adding and configuring new devices in Studio 5000 V35.0.
- Establishing hardware connections.
- Compiling and loading programs into devices.
- Parametrization of hardware.
- Addressing modules in Allen Bradley PLCs.

Structure and Execution of Programs:

- Understanding different block types in PLC programming.
- Overview of program structure and execution.

Data Types and addressing:

- Elementary data & complex data Types. Bool | Byte | Word | Double word
- complex data Types. Pointer | Array | date & time | Struct | string | UDT
- Compare Symbolic & Absolute addressing

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Week 02

Course Highlights

- Catalogue and Article number:
- Memory and Data Types:
- Basic Functions:
- Digital Functions:
- Function and Function Block:
- Online Troubleshooting:

Software

- Studio 5000 V35.0 V17

Protocol

- Modbus TCP/IP
- Ethernet IP
- Modbus RTU
- OPC UA

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Allen Bradley PLC Programming Course

Course Contents

Hardware Overview:

- Introduction to Allen Bradley CompactLogix 5370, S7-300, S7-400 and ControlLogix 5370 PLC families.

Catalogue and Article number:

- Catalogue and Selection of Modules families. Selection Tool Software for generate order

Memory and Data Types:

- Elemental data types in PLC programming.
- Studio 5000 V35.0 data types.
- Memory addressing and symbolic addressing (tags).

Basic Functions:

- NC (Normally Closed) and NA (Normally Open) contacts.
- Bit logic operations (AND, OR, XOR, NOT).
- Signal edge detection.
- Set and Reset operations.

Digital Functions:

- Compare instructions.
- Counters (CTU, CTD, CTUD).
- Timers (TON, TOF, TP).
- Arithmetic instructions.
- Word logic operations.

Online Troubleshooting:

- Setting up hardware online diagnostic using the Studio 5000 V35.0. Firmware update, IP Change, Reset PLC, Device name
- PLC Configuration: Setting up hardware configurations using the Studio 5000 V35.0.
- Configuring I/O modules, communication interfaces, and other hardware parameters.
- Download in PLC / Uploading from PLC Compare online offline backup

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Week 03

Course Highlights

- Main Task:
- Analog Values Processing:
- Libraries:
- Pointers:
- Data Complex Handling with Studio 5000 V35.0:

Software

- Studio 5000 V35.0 V17

Protocol

- Modbus TCP/IP
- Ethernet IP
- Modbus RTU
- OPC UA

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Allen Bradley PLC Programming Course

Course Contents

Main Routine:

- Start Blocks:Understanding the role of start Routine in initiating the PLC program.

Cyclical Execution Blocks:Blocks that execute continuously in a cycle.

- Periodic Execution Blocks:
- Blocks that execute at specific intervals or periods.
- Execution of Hardware Events Blocks:
- Blocks triggered by hardware-specific events.

Analog Values Processing:

- Analog Modules:Introduction to modules that handle analog signals.
- Representation of Analog Values:
- Methods for representing and handling analog signals in PLC programs.
- Setting of Measurement Ranges:
- Configuring measurement ranges for analog inputs and outputs.

Libraries:

- Library Configuration:
- Configuring and managing libraries in Studio 5000 V35.0.
- Libraries Implementations:
- Implementing and utilizing libraries for modular and efficient programming.

Pointers:

- Pointers Description and Handling:
- Understanding the concept of pointers in PLC programming.

Multi-instance Calls:Overview of Modules for Structured Programming:

- Understanding modules for structured programming.
- Instantiation of Function Modules:
- Creating and using instances of function modules.
- Multi-instance Model:Implementing a multi-instance model for scalable and flexible programming.

Data Complex Handling with Studio 5000 V35.0:Data Complex in Studio 5000 V35.0:

- Understanding and working with data complexes in Studio 5000 V35.0.
- Array Data Type Handling:
- STRUCT Data Type Handling:
- DATE_AND_TIME Data Type Handling:
- STRING Data Type Handling:

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Week 04

Course Highlights

Project Development for Automotive Industries

1. **Types of PLC Panels:**
2. **Electric Drawing and Excel Sheet:**
3. **IO List Creation:**
4. **Tag Import/Export in Studio 5000 V35.0:**
5. **Mapping Page Development for Industry 4.0:**

Software

- Studio 5000 V35.0

Protocol

- Modbus TCP/IP
- Ethernet IP
- Modbus RTU
- OPC UA

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Allen Bradley PLC Project Development

Course Contents

- Types of PLC panel: Main control Panel ,Remote Input Output Panel , Operator Panel Box
- Read Electric drawing and make Excel sheet:
- Creating basic IO List of Main Control Panel. ,Creating basic IO List of Operator Panel Box. ,Create User define tags/ common data Tags
- Import Export 1000 tags in TIA: Import/ export Tags in TIA portal USE UDT , Create Controller Tags
- Mapping Page Development as per Industry 4.0: Creating FC Function Page ,Creating Input | Output | Alarm Mapping | Ethernet IP Network Status | Tower Mapping
- Logic Development for Human Safety: Creating Logic for Emergency Switch | Light Curtain | safety door Feedback Fault Logic
- Logic Development for electrical Safety: Creating Logic for MCCB Healthy | Transformer MCB Healthy .More than 10 internal Panel feedback healthy Logic as per DCP standard
- Logic Development for Switches: Creating Logic for Auto Mode Selector Switch | Auto Mode Selector Switch
- Auto start Push Button | Auto stop Push Button | Fault reset PB | Fault Ack PB . Lamp Test PB
- Advanced Programming and global Logic for Manual Mode Auto Mode: Pre-Condition and post condition interlock.
- Timer, Counter & Compare:
- Function Block FBs:
- Troubleshooting and Debugging: Techniques for diagnosing and resolving common PLC issues. Using the online/offline simulation for testing and debugging.

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