FUNDAMENTALS OF PROGRAMMABLE LOGIC CONTROLLERS

Focus on the fundamentals of PLCs from setting up communications to uploading and downloading programs to troubleshooting and modifying the system.

Spend 65% of the class time on various PLCs working on hands-on exercises. Working in small groups, learn to program, connect input/output devices and solve elementary and complex problems.

Program a PLC to provide real-time, interactive, diagnostics that pinpoints the issues. Use other troubleshooting methods such as the search function, cross references, histograms and forces.

Receive a copy of LogixPro PLC simulation software to practice programming, running and troubleshooting ladder logic on any computer. It includes programming examples and animated industrial simulations.

This course is beneficial for anyone who encounters control systems in their daily functions, such as engineers, maintenance, operations and management personnel.

CLASS FORMAT:

Hands-on

The participant is able to "learn-by-doing" in the course; this knowledge can be transferred to the workplace.

STANDARD CLASS SIZE:

NTT recommends a class of 12 participants for the best results.

NTT PROVIDES:

- 3 days (24 contact hours) of on-site instruction
- Textbooks and lab manuals
- "LogixPro" software with built-in PLC simulation for ladder logic programming, running testing and troubleshooting programs
- Classroom consumables
- Completion certificates,
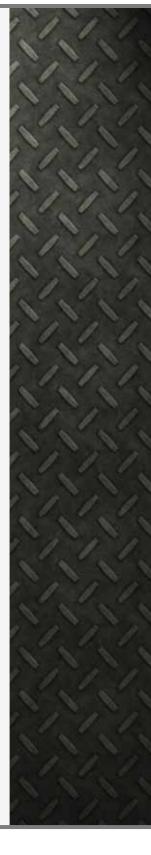- All shipping and instructor travel logistics

CLIENT PROVIDES:

- Classroom of 750 square feet or greater
- Projection screen, white board and/or flip charts
- A dock facility or a forklift is needed to unload the training equipment
- A pallet jack to move the crates after they have been unloaded may also be needed
- This equipment should be placed in the training room for the NTT instructor to test and setup prior to the start of class

SHIPPING:

2 crates at 900 lbs

- 1 @ 29" x 37" x 53"
- 1 @ 29" x 55" x 43"
  - 1 set of equipment
  - 7 trainers

FUNDAMENTALS OF PROGRAMMABLE LOGIC CONTROLLERS

COURSE AGENDA | 3-Day Hands-On

HISTORY

- Relay logic
- Programmable logic controller

PLC ARCHITECTURE

- Rack, power supply, processor, I/O
- Smart modules
- Communication networks
- Programming tools – software

INPUT AND OUTPUT (I/O) SYSTEMS

- I/O interfaces - voltages
- Data transfer from module 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
- Rungs and instructions

RELAY-TYPE INSTRUCTIONS

- Examine if on
- Examine if off
- Output energize, output latch/unlatch
- 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 – binary files
- Internal data memory – integer files
- Register memory versus bit-wise memory
- I/O, memory and rung scan process

ADDITIONAL INSTRUCTIONS & ASSOCIATED BITS

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

NUMBER SYSTEMS

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

SIZING AND SELECTION OF PLCS

- Estimating system I/O requirements
- CPU and memory sizing
- Interpreting manufacturer specifications
- Choosing a vendor

TROUBLESHOOTING AND DIAGNOSTICS

- Configuring communications
- Wiring requirements
- Debugging and diagnostic tools

HANDS-ON EXERCISE EXAMPLES

- Motor start/stop circuits
- Trapping random faults
- Signaling alarms
- Tank-level controls
- Sequence-controlled conveyors
- Inputting and outputting numerical data
- Batch control processes
- Automated control systems
- Troubleshooting communication problems

NTT PLC Training Equipment