Training Program:

Programmable Logic Controllers (PLC) & SCADA System

INTRODUCTION:

SCADA has traditionally meant a window into the process of a plant and/or a method of gathering of data from devices in the field. Today the focus is on integrating this process data into the actual business and using it in real time. In addition to this, today's emphasis is on using open standards, such as communication protocols (e.g. IEC 60870, DNP3 and TCP/IP) and 'off-the-shelf' hardware and software, as well as focusing on keeping the costs down. PLCs continue to gain in popularity. In fact, many SCADA applications use PLCs as the RTU of choice, when communicating with field devices. This comprehensive workshop covers the essentials of SCADA and PLC systems, which are often used in close association with each other.

This course is designed to benefit you with practical up-to-date information on the application of PLC's and SCADA to the automation and process control of plants and factories. It is suitable for people who have little or no exposure to PLC and SCADA but expect to become involved in so m e or all aspects of PLC installation and SCADA Programming. It aims to give practical advice from experts in the field, to assist you to correctly plan, program m and install a PLC with a shorter learning curve and more confidence.

WHO SHOULD ATTEND?

Electrical Engineers, Electrical Technicians, Electrical Inspectors, Electrical Professionals & Supervisors, Instrumentation and Design Engineers, Maintenance Engineers, Supervisors & Technicians, Energy Management Consultants, Control Engineers & Technicians, Automation & Process Engineers, Chemical & Mechanical Engineers, Consulting Engineers, Field Technicians, Graduate Engineers, Project and Production Managers, Project Engineers, Electronic Technicians, Plant Managers, Process Control Engineers, System Engineers, System Integrators, Testing Engineers & Technicians, Power System Engineers, Power System Technicians, Utility Engineers, Managers & Team Leaders of Engineering Departments, Safety Professionals, Plant Electricians, Facilities Engineers, Operations & Maintenance Engineers, Supervisors & Technicians, Project Engineers, Commissioning & Testing Engineers, Consulting Engineers, Electrical Technologists, Facility & Plant Managers, IT Personnel

COURSE OBJECTIVES:

By the end of this course delegates will be able to:

- Understand the fundamentals principles of the PLC
- Identify the basic components
- Employ basic and advanced programming
- Carry out installation audit
- Be able to apply program maintenance and quality measurement
- Improve system availability
- Understand basic serial communications
- Put into place a simulation and testing programs
- Apply commonsense installation practices
- Implement and maintain software quality control
- Recognize the specific requirements of the PLC in safety-related applications
- Carry out simulation, testing and problem isolation
- Recognize the different components of a SCADA system
- Investigate the requirements for SCADA software
- Evaluate the requirements for PLC-to-SCADA communications

COURSE OUTLINE

Basic Components of PLC

- Fundamentals principles
- CPU
- Memory
- I/O section and addressing

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- Digital I/O modules
- Analog I/O modules

PLC Programming

- Ladder logic instructions
- Basic arithmetic instructions
- Matrix logic
- File or block manipulation
- Jump, skips and subroutines
- PLC instruction sets
- Memory organization
- Input/output addressing
- Duplicate coils
- Timers

Installation Practices

- Interference or noise reduction
- Cable spacing and routing
- Earthing and grounding
- Safety circuits
- Control room requirements and layout

Code Quality and Maintenance

- Program maintenance
- Change procedures
- Defect detection
- Quality measurement and demonstration

Advanced Programming

- Matrix logic

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- Multiplexing
- Coding/decoding

Analog Control

- Analog inputs
- Signal filtering
- Analog control

Fault Tolerance

- Improving system availability
- Hot standby systems
- Cold standby

Serial Data Communications

- RS-232/485 Standards
- Modbus Protocol
- Local Area Networks
- Ethernet
- Token Bus

Safety Related Systems

- Safety lifecycle
- Systematic failures/rates
- Voting systems
- Software reliability
- Field equipment

Upgrading Strategies
Simulation and Testing

- Factory acceptance testing (FAT)

- Transport and reassembly
- Simulation packages
- Physical test panels
- I/O emulation systems

Problem Isolation and Testing
SCADA Hardware

- Field level Instrumentation and control
- Marshalling terminals and RTUs
- Communication System
- Master Stations

SCADA Software

- Communications protocol
- Data objects
- Interchangeability
- Proprietary systems