

PRACTICAL PROGRAMMING FOR INDUSTRIAL CONTROL USING IEC 1131-3 AND OPC



YOU WILL LEARN HOW TO:

- Confidently work with the generic standard IEC 1131-3 for industrial programming
- Effectively utilise IsaGraf programming software to program PLCs
- Understand the concepts and common elements concerning the IEC 1131-3 programming model
- Program using languages such as: structured text, function blocks, ladder diagrams, instruction lists & sequential function charts
- Troubleshoot sequencing problems
- Define the scope and purpose of OPC
- Define OLE, COM, and DCOM
- Describe the attributes and interfaces of objects
- Use appropriate commands and processes to create and handle objects
- Boost productivity and enhance software quality

WHO SHOULD ATTEND:

This is an intermediate level workshop for:

- Technicians
- Senior Operators
- Project Managers
- Project Engineers
- Electrical Engineers
- Design Engineers
- Process Control Engineers
- Consulting Engineers
- Systems Engineers
- Electricians
- Maintenance Engineers
- Control Systems Sales Engineers
- Instrumentation and Control Engineers



The Workshop

Programmable Logic Controllers (PLCs) have become part of the backbone of industrial automation. The International Electro-technical Commission (IEC) has developed a standard set of programming languages for industrial PLCs. The large number of major PLC manufacturers who are developing products that are 1131-3 compliant is the measure of the success of these languages.

IEC 1131-3 is becoming the standard of choice in many industries and in this way it is boosting productivity and enhancing software quality.

This intensive and highly practical 2-day workshop offers you the opportunity to master this subject today, so that your programming knowledge will be applicable across brands of PLCs well into the future.

This knowledge could be vital to personal career development.

Workshop Objectives

This practical 2-day workshop's objectives are to:

- go beyond the basic concepts and introduce you to the practical techniques and applications of 1131-3 and object linking and embedding for Process Control (OPC).
- cut across apparent differences wherever PLCs are used and introduce standards that are widely applicable.
- introduce the latest developments in OPC, which provides a common link between field devices and automation systems through corporate information systems.

Practical Sessions

PLCs have become an integral part of industrial automation and it is for this reason that there are 7 practical exercise sessions in this workshop. This is to give you the vital hands-on experience you need to confidently work with 1131-3 and OPC in your workplace.



The Program

INTRODUCTION

- What is IEC 1131-3
- Why the need for IEC 113-3
- Deficiencies of current ladder logic
- IEC 1131-3 main features
- IEC 1131-3 major benefits

IEC 1131-3 CONCEPTS

- I/O interfaces
- Communication interfaces
- System interfaces
- IEC 1131-3 PLC software model main elements:
 - configuration, resource, programs, tasks
- Mapping software model to real systems

COMMON ELEMENTS

- Character set
- Identifiers
- Data types elementary: integer, floating point, date & time, strings, Boolean and generic
- Data typed derived: structured, enumerated and array
- Variables: input, output, input/output, global, external, directly represented and access
 - * Functions: numerical, Bit string, Boolean, comparison and Bit string
 - * Program: usage and instances
 - * Resources and tasks: usage, scheduling - non-pre-emptive and pre-emptive
- Configuration

PROGRAMMING LANGUAGE: STRUCTURED TEXT

- Language
- Assignment statements
- Expressions
- Operators
- Statements: calling FBs, conditional, iteration

Practical Sessions x 2:

Programming using Structured text

PROGRAMMING LANGUAGE: FUNCTION BLOCK DIAGRAMS

- Methodology
- Signal flow
- Feedback paths
- Execution control: jumps and labels
- Network evaluation rules

Practical Session: Programming using Function Block Diagrams

PROGRAMMING LANGUAGE: LADDER DIAGRAMS

- Concepts
- Symbols
- Methodology
- Connecting FBs
- Execution control: jumps and labels
- Network evaluation rules

Practical Session: Programming using Ladder Diagrams

PROGRAMMING LANGUAGE: INSTRUCTION LIST

- Language structure
- Instruction semantics: modifiers
- Comparison and jump operators
- Calling FBs

Practical Session: Programming using Instruction List

PRO RAMMIN AN UA E SE UENTIA FUNCTION CHART

- Chart structure
- Main features
- Steps
- Transitions
- Actions
- Rules of evolution

Practical Session: Programming using Sequential Function Chart

INTRODUCTION TO OPC

- What is OPC?
- Data: Where is it? How is it organised?
- Client architecture: current and custom
- The scope of OPC

COM AND COM FUNDAMENTA S

- What is COM?
- COM fundamentals: COM interfaces, major benefits, interface unknown
- COM client/server model: clients, servers, COM library and SCM
- What is DCOM?

OPC OB ECT MODE AND C IENT/ SERVER IN S

- * The OPC object model: server, group and item objects
- OPC client/server requirements
- Network issues
- Client applications

Practical Demonstration: OPC

WOR SHOP REVIEW AND UESTIONS