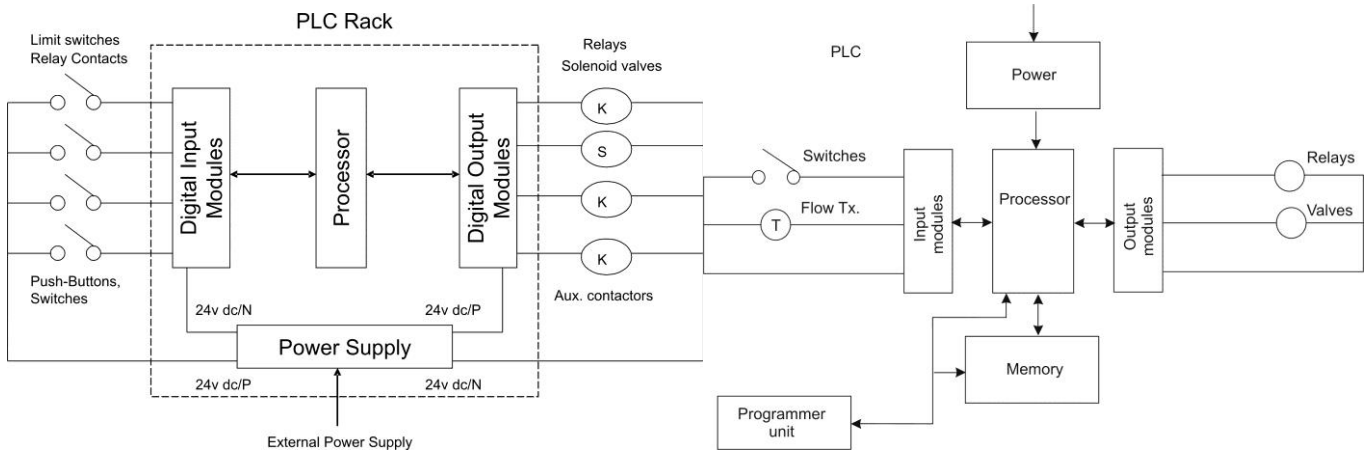




Technology Training that Works

Practical Programmable Logic Controllers (PLCs) for Automation and Process Control



4 hour live, practical online course

YOU WILL GAIN:

- An ability to specify PLC hardware and installation criteria
- Knowledge to describe PLC software structure
- Skills to write medium level PLC programs (using ladderlogic)
- An understanding of how to specify PLC systems and troubleshoot typical PLC system's

WHAT'S INCLUDED?

- Four 60 minute live, practical sessions with your instructor and attendees
- The full technical eBook manual for "Practical Programmable Logic Controllers (PLCs) for Automation and Process Control" which includes course slides, cases studies, calculations and practical exercises
- Four hours of additional in-depth video sessions covering many additional areas – yours to keep and watch at your convenience

THE COURSE

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

This online course will be focusing on the generic PLC and use the open programming IEC 61131-3 standard. The information contained in this course advances from the basics to challenge even the most experienced engineer in the industry today.



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ONLINE COURSE PRESENTER

John Piperides
BE Electrical

John is a professional electrical engineer with over 25 years experience in industrial maintenance, production, management, sales and improvement. He has held management positions in several manufacturing and sales companies. His diverse responsibilities have included contract negotiation, authoring and responsibility of departmental budgets, daily management of over 20 reports, practice of cGMP, auditing in a pharmaceutical plant, and system administration and programming of diverse IT and embedded systems. He has been directly involved with industries including building management, pest control, mining, power utilities, food, pharmaceutical, steel, building products, sugar, paper and pulp, rail and airports.



John has completed many years of further education including developing, writing and delivering many work based courses and seminars. He has spent 10 years as a part time teacher at TAFE in electrical engineering, and 15 years delivering structured courses in thermography, power quality, instrument safety, motor drive theory, PLC, SCADA, and pest inspection.

WHO SHOULD COMPLETE THIS COURSE?

- Consulting engineers
- Design engineers
- DCS personnel
- Electrical engineers
- Engineering managers
- Instrumentation and control engineers
- Instrumentation technicians
- Process control engineers
- Process control operators
- Shift electricians
- Trades staff working with or near PLCs

PRE-REQUISITES:

A basic electrical knowledge would be useful but is not essential.

CONTENT SUMMARY

INTRODUCTION

*This is an intensive four (4) hour presentation; we will be emphasising sections marked in **BOLD** below. Full recordings will be provided for the lower intensity sessions (another four hours of video as detailed below) to review after the course.*

LIVE SESSIONS

SESSION ONE

GOOD PROGRAMMING HABITS

- Keeping track of addresses and data used
- Looking ahead – how will programs be maintained
- Practical methods to improve program quality
 - Organisation of code
 - Through documentation
 - Simplifying changes



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BATCH PROCESSES AND SEQUENTIAL CONTROL

- Remembering the program state
- Creating a “stepper”
- Step advance
- Fault detection and recovery
- Operator intervention
- Multiple recipes or alternate paths
- Sequential function charts

Additional video session covered in-depth for review at anytime:

- INTRODUCTION
 - Introduction to PLCs
 - A brief history of PLCs
 - Alternative control systems – where do PLCs fit in?
 - Why PLCs have become so widely accepted
 - Lingering concerns about PLCs
- INTRODUCTION TO IEC 61131-3
 - Concepts
 - Common elements
 - Programming languages: structured text
 - Function block diagrams
 - Ladder diagrams
 - Instruction list
 - Sequential function chart

SESSION TWO

GOOD INSTALLATION PRACTICE

- Location of hardware
- Good wiring practice
 - Cable spacing
 - Power distribution
 - Wire numbering
- Reducing noise and interference
- Screening and shielding
- Earthing and grounding

Additional video session covered in-depth for review at anytime:

- OPC
 - Introduction to OPC
 - What is OPC?
 - Architecture
- SAFETY PROGRAMMABLE SYSTEMS
 - Why regular PLCs should not be used for safety functions
 - Programmable electronic logic solvers
 - Safety certification
 - Certified programming systems
 - Application examples
 - Growth of networked safety devices and certified networks
 - Integrated safety systems



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SESSION THREE

ADVANCED CONTROL WITH PLCS

- The concept of reusable logic - examples: drive logic, alarm handling
- Use of advanced programming functions
- Matrix logic
- Table functions and indirect addressing
- Examples: simple display driver

Additional video session covered in-depth for review at anytime:

- **FUNDAMENTALS OF PLC HARDWARE AND SOFTWARE**
 - Block diagram of typical PLC
- **USING LADDERLOGIC FOR SIMPLE DIGITAL FUNCTIONS**
 - The basic rules
 - Comparison with relay ladder diagrams
 - The concept of the “scan” and how to apply it
 - Infinite fan-out
 - Contact “normal” states
 - Positive and negative logic
 - Basic Boolean functions
 - The usefulness of De Morgan’s law
- **PLC processor module – memory organisation**
 - Input/output section – module types
 - Power supplies
 - Methods of representing logic
 - Boolean algebra
 - Instruction code
 - Graphical presentation: functional logic diagrams, ladder logic
 - Fundamental ladder logic instruction set
 - Comparison of different manufacturers
 - Memory and data representation
 - Instruction code

SESSION FOUR

PID CONTROL

- The importance of timing and scan time
- When PID is not always appropriate:
 - Intermittent measurements
 - Long transport delays

SYSTEM CHECKOUT AND TESTING

- Development and verification of code
- Factory acceptance testing
- Testing procedures
- Emulating missing hardware
- Emulating process responses

Additional video session covered in-depth for review at anytime:

- **DATA COMMUNICATIONS**
 - Interface standards, RS-232, RS-422/423, RS-485
 - Protocols, Modbus and DH+



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- Local area networks, Ethernet and token bus
- Monitoring communication links and simple watchdog timers
- USING REGISTERS (WORDS)
 - Number systems
 - Types of register data
 - Timers
 - Counters
 - Bit shift/rotate
 - Table functions
 - Register (matrix) logic functions

SUMMARY, OPEN FORUM

CLOSING