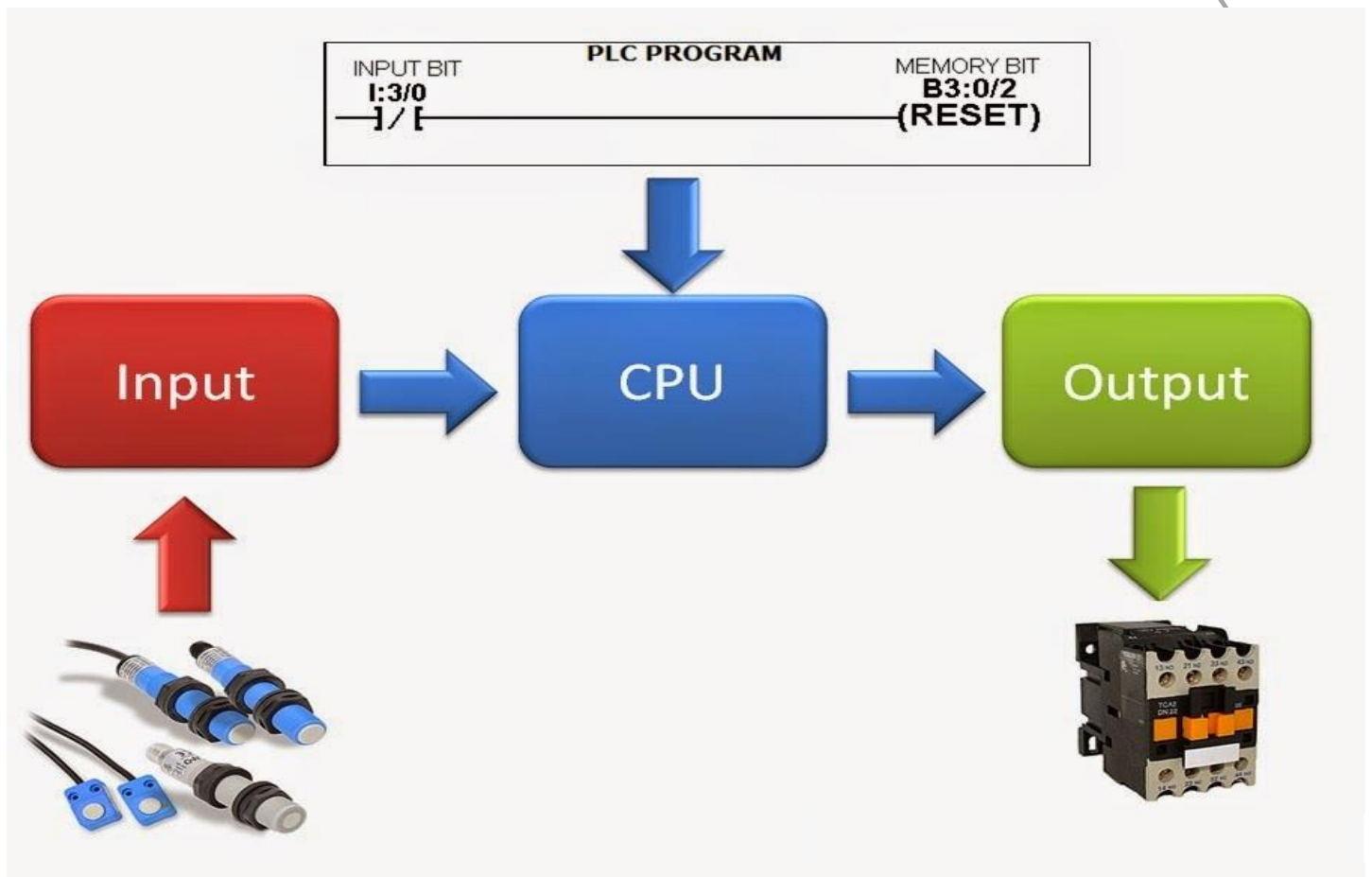




# Process Operation Control (PLC)



## Process Operation Control (PLC)

### ➔ Course Objective

- In this course the participants will learn about PLC hardware
- and how each piece of the PLC contributes to its overall operation and reliability.
- Discussions will cover the different numbering systems which form the basis of digital control logic as well as the various types of programming and options available in building a control program.
- The course will close with coverage of how to properly install, maintain and troubleshoot the PLC.
- Safety is included and will be stressed throughout this course.

### ➔ Target Audience

- This course is mainly targeted to process technicians working in the field as an introduction or refresher.
- The course can be applicable to technicians working in other disciplines,
- equipment purchasers,
- procurement and storage personnel,
- job planners and immediate supervisors to the working technicians.
- Divisional managers



**Course Outline**

**Introduction to Programmable Logic Controllers**

Topics

- The Electromagnetic Relay; Characteristics of Programmable Controllers; Applications of Programmable Controllers; Limitations of Programmable Controllers; Parts of a Programmable Logic Controller System; The Input Side; The Processor; The Output Side; Programming Devices; Power Supplies

Objectives

- Describe an electromagnetic relay and define the terms control circuit, power circuit, NO and NC.
- Define programmable logic controller.
- Describe the general type of application in which a programmable logic controller would best be used, and give examples.
- Define scan time.
- Name each of the blocks in a block diagram of a programmable logic controller system and explain how each functions within the system as a whole.
- Define memory and explain the different types.

**Number Systems and Logic**

Topics

- Number Systems; Binary-Coded Decimal (BCD); ASCII; Gray Code; Boolean Logic; Ladder Logic

Objectives

- Compare the decimal, binary, octal, and hexadecimal number systems.
- Explain the purpose for using each of the following: BCD, Gray code, and ASCII.



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- Explain what AND, OR, and NOT mean in Boolean logic, and identify the symbols for each.
- Identify AND and OR logic circuits in a relay ladder diagram, and construct a truth table for each.
- Explain the basic concepts of ladder logic.

### **Programming the System**

#### Topics

- PLC Programming; Ladder Logic Programming; Boolean Programming; The AND Instruction; The OR Instruction; The Stack Register

#### Objectives

- Explain the relationship between a programmable logic controller processor and program.
- Define the term scan and explain the basic steps involved in a scan.
- Explain the basic concepts of ladder logic programming.
- Explain the purpose of a parallel branch in a ladder logic program.
- Explain the basic concepts of Boolean programming.
- Define stack register and state the stack rule.

### **Input/Output Devices and Modules**

#### Topics

- Definition of I/O Devices; Discrete Input Devices; Analog Input Devices; Digital Input Devices; Discrete Output Devices; Analog Output Devices; Sourcing and Sinking; Definition of I/O Modules; Input Modules; Output Modules

#### Objectives

- Explain the operation of common input and output devices and identify their symbols.
- Describe the relationship of an input/output device to a terminal on an input/output module.

- Contrast the basic concepts of a sourcing device and a sinking device.
- Explain the operation of various input and output modules.

## **Developing a Programmable Logic Controller System**

### Topics

- Before You Begin; Equipment Operation Specifications; Sizing the System; Program Development; Assembling the Documentation Package; Functional Model; Startup and Debugging

### Objectives

- Explain the importance of working with accurate information from a specification.
- Demonstrate how to size a system.
- List the elements in a good documentation package.
- Name the steps involved in specifying the hardware and developing the program for a simple control system.
- Describe system startup and debugging procedures.

## **Lesson 6: Maintenance and Troubleshooting**

### Topics

- The Importance of Documentation in Maintenance Troubleshooting; Using the Hardware Documentation; The Maintenance Log; Using the Program Documentation; Operational Documentation; Routine Maintenance; Batteries; Troubleshooting; Problems in Troubleshooting; Troubleshooting in Practice

### Objectives

- Explain the importance of good documentation.
- Tell what type of information can be found in user's manuals and operations manuals.
- Tell what types of logs are kept and why they are necessary.
- Explain the major concepts of troubleshooting, including problems sometimes encountered.

- Describe routine maintenance procedures required by a programmable controller system.
- Practical skills in designing financial models using Excel
- The design of financial models for forecasting and decision-making

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- we give the participant training bag includes all the necessary tools for the course.
- Working within groups to achieve the best results.
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- We can assist you in booking hotels at discounted prices if you wish to book through us.
- We offer the certificate from Asia Masters Center for Training and Administrative Development.

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- 3) Training.
- 4) Coffee break.
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**➔ Course schedule**

- 1) Pick up & drop from the Airport
- 2) The training hours daily 5-6 hours
- 3) Theoretical and practical training as needed
- 4) Professional trainer from Malaysian Petroleum Company (Petronas) and other trainers.

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