

### Programmable Logic Controller Trainer

It provides a complete, structured solution to the problem of training today's industrial control engineers and technicians in the programming and troubleshooting of PLC applications. The following features make the teaching set particularly suitable for industrial training and multi-skilling courses:

- Industrial-grade controller
- Industrially relevant applications trainer
- Sequence switch module for direct control of PLC inputs
- Remote programming interface package for a PC
- Quiet source of compressed air
- Structured self-paced curriculum manual

The teaching set comprises the following products:

- **AB ML1500** - Allen-Bradley MicroLogix 1500 controller, remote programming software and interface cable.
- Applications trainer
- Sequence switch module
- Manually operated compressed air pump
- Curriculum manual

The **AB ML1500** Allen-Bradley MicroLogix 1500 controller provides **12 inputs and 12 outputs**, and carries a comprehensive range of on-board facilities, including timers, counters and sequencer functions.

The controller is supplied complete with Windows Based remote programming software, which is used to program, monitor, edit and troubleshoot sequences for each of the practical exercises provided in the curriculum manual. An interface cable that connects the computer to the controller for downloading of programs, is also included.

The **PLC AM** Applications trainer enables students to create sequences which simulate the operation of a modern industrial production line, by sorting parts according to a variety of criteria. Rugged and reliable, the trainer's flexible design allows it to be used in both introductory and advanced PLC applications. Its key features include:

- A conveyor that can be driven in both forward and reverse directions.
- A set of cylindrical parts of differing heights and diameters.

The **PLC SS** Sequence switch module provides a bank of eight switches which can be used to manually control the inputs of the PLC, in order to simulate a variety of input conditions.

The **PLC EP** Electrically operated compressed air pump provides a safe, very quiet source of compressed air.

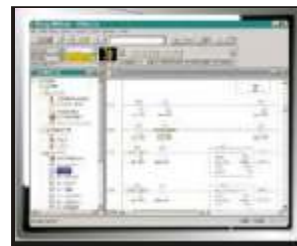
The **PLC IM** Curriculum manual provides a structured, self-paced introduction to the world of programmable logic controllers and their industrial applications. It contains a wide variety of carefully graded programming exercises, covering the following topic areas:

- Covering the following topic areas:
  - Introduction to PLCs.
  - Relays and ladder logic.
  - Introduction to ladder logic programming.
  - Input, output and auxiliary relays.
  - Latched relays.

Note: Specifications are subject to change.

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- Master control reset relays.
- Timers.
- Counters and shift registers.
- Sequencers.
- Programming the complete system.

An instructor's manual is also included, containing solutions to all programming exercises.

- A parts bin containing three sections, for sorting parts into different categories.
- Two sets of parts sensors, each separately adjustable for height and position along the conveyor.
- Three pneumatically-operated pistons, for pushing parts off the conveyor into the parts bin.
- Run/stop switches and green/red indicator lamps.
- Interface electronics to meet the requirements of standard PLC input/output circuits

#### PLC Trainer Consists of:

- **AB ML1500** Allen-Bradley MicroLogix 1500 controller,
- remote programming software and interface cable
- **PLC AM** Applications trainer
- **PLC SS** Sequence switch module
- **PLC EP** Electrically operated compressed air pump
- **PLC IM** Curriculum manual



**Introduction :**

Programmable logic controllers ( PLC ) have become the standards for control tasks in industry. For technicians and engineers, an understanding of the principles & operations of PLC is very important. The proposed PLC training package offers a complete structured solution to the problems of their training. The trainer uses Industry standard PLC with a realistic application board to achieve its objectives. By providing an industry relevant application the system allows user to gain valuable hands on skills in the use of PLC. The system teach-ware provides a structured, self-paced introduction to the world of PLC's and their applications.

**Topics Covered :**

- An introduction to relay ladder logic
- Programming the controller
- Input, Output and Auxiliary relays
- Latched relays
- Master and Zone control relays, Counters and timers, Sequencers
- Using the remote programming software.

**Technical Specifications:****Conveyor System**

The conveyor mechanism is fitted with opto-electronic sensors for detection of components and three pneumatic cylinders with solenoid valves for component selection. The system is pre-wired with start/stop switches and red/green indicators. A three-compartmented bin is provided to receive selected components. Interface units are provided for sensors, motors and solenoid valves. A selection of components for exercises is provided.

**Sequence Switch Module - PLC SS**

This module provides 8 switch selectable outputs derived from the 24V PLC supply. Inputs to the PLC and outputs from the PLC are simulated with this module. Supply Voltage 110V or 240V AC 50/60Hz.

The system is provided with all suitable hoses and connectors, also user manual, student experiments manual and lecturer's guide. The trainer comprises of the following:

- 1 x Conveyor Belt – DC Motor driven
- 2 x Optoelectronic Sensors
- 3 x Spring return single action pneumatic pistons.
- 3 x Pneumatic solinoid valves
- 3 x Reed relay position switches

On board power supply and interface.

The system is designed to be used with an industrial standard PLC unit or an IBM/PC Simulator System.

**Industrial Controller**

The controller unit should be of a type usually used in industrial applications. It should consist of a processor unit and hand-held programmer. The processor unit should have multiple inputs and outputs ( for eg. 10 inputs and 10 output ).

The industrial Controller shall have the following specification.

Inputs	: 10-30V DC optically isolated with LED status indicators.
Outputs	: Relay contact rated 10-250V AC or 10-125V DC.
Memory	: 1200 words with back up. Timers, counters, sequencers, and shift registers: 32
Timers	: 0.1 to 999.9s
Counters	: 0.1- 9999
Sequencers	: 8 bit groups, 100 steps
Shift registers	: 8 zone, cascadable.
Internal relays	: 150
Supply voltage	: 85-132V DC or 170-265V AC 50/60Hz.

**Electrically operated compressor - PLC EP**

This provides a safe source of compressed air, volume 5 litres at a pressure of 3 bar. The air supply is sufficient for at least 200 cylinder strokes (16mm dia) or 500 cylinder strokes (10mm dia).

**Sequence switch module - PLC SS**

Based on a pcb mounted on a pvc base, this module provides a switch-selectable output code facility. It is used with a PLC application device for experimentation purposes. It features 8 output lines each of which can be selected as on or off using slide switches, output termination must be via standard screw-clamp terminals.

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