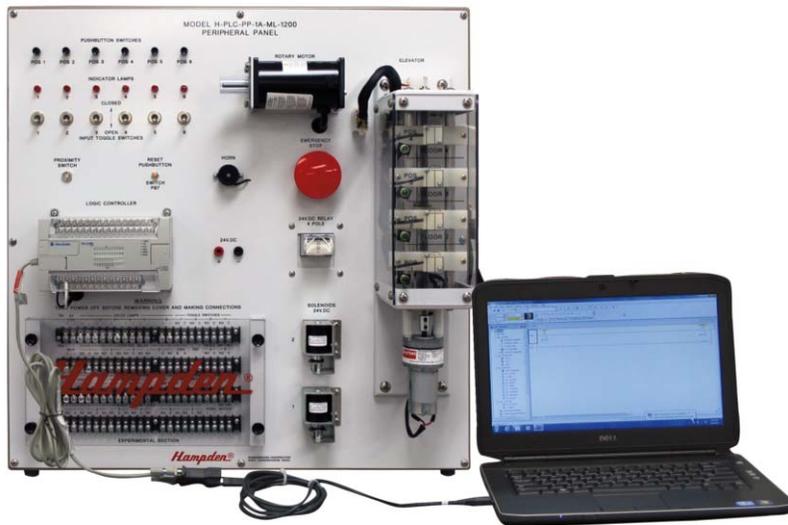


# Programmable Logic Control Trainers

Educational Training Equipment for the 21st Century

Bulletin 296L



## H-PLC-PP-1A-ML-1200 Programmable Logic Controls Training System

MODEL H-PLC-PP-1A-ML-1200 Programmable Logic Controls Training System shown is the H-PLC-PP-1A Peripheral Panel, the Allen Bradley ML-1200, the H-LTCS Laptop Computer and the Allen Bradley RSLogix Micro Software

### Purpose

The Hampden **Model H-PLC-PP-1A-ML-1200** Programmable Logic Controls Training System offers a complete package that provides students with an industry standard PLC and hardware that allows them to design, connect and debug real-world circuits.

The Hampden **Model H-PLC-PP-1A-ML-1200** Programmable Logic Controls Training System provides students with hands-on experience, utilizing standard commercially available programmable logic controllers interfaced with actual input and output devices.

The student gets hands-on experience with:

- Interconnection Wiring
- General Programming Information
- Ladder Diagram Programming
- Programming Trainers
- Counters and Timers
- Motor Control
- Self-Diagnostic Function
- Power Failure Protection

### Description

The Hampden **Model H-PLC-PP-1A-ML-1200** Programmable Logic Controls Training System is a complete system that utilizes an Allen-Bradley MicroLogix 1200 PLC linked with a Hampden Peripheral Panel. The Allen-Bradley PLC is a state-of-the-art, high capacity, self-contained system with 6K Word Instruction capacity, a power supply, 24 VDC inputs and 16 relay outputs, mounting rack, the Hampden **Model H-LTCS** Laptop Computer System and the Allen Bradley RSLogix Micro Software in one complete package.

The Hampden Peripheral Panel provides input and output devices for use with the MicroLogix 1200 Programmable Logic Control. Mounted on the equipment panel are the following:

- (1) Emergency disconnect relay with reset switch
- (1) Pushbutton reset switch
- (6) Switches, toggle
- (1) Proximity switch
- (6) Pushbuttons
- (6) Lamps, 24 VDC
- (2) Solenoids, 24 VDC

- (1) Control relay, 4-pole
- (2) Power supply, 24 VDC, 2.5A
- (1) Rotary motor, 24VDC
- (1) Horn, 24 VDC
- (1) Lead screw elevator training device complete with reversible gear motor, four positioning switches and two limit switches, and four neon lamps
- (1) Electromagnetic circuit protector 15 ampere, with neon pilot light indicator
- (1) Duplex receptacle, 15 ampere
- (1) Interconnection cord set (65)

The above components are brought to terminal strips which are to be connected to the ML-1200 Programmable Logic Controller via the provided interface cables.

### Input Voltage

1Ø AC 50/60Hz via 3/c 6 ft. power cord

### Other PLC's Available

- Compac Logix PLC
- ML-1100 PLC
- Siemens S7-200 PLC
- Siemens S7-400 PLC



Siemens S7-200



Siemens S7-400

All Hampden units are available for operation at any voltage or frequency

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## Courseware

- Operations guide
- Teacher and Student Experiment Manuals
- Text - Introduction to Programmable Logic Controllers by Glen A. Mazur and William J. Weindorf
- Answer Key for above
- Applications Manual – Introduction to Programmable Logic Controllers by Glen A. Mazur and William J. Weindorf
- Operational text from Allen Bradley

The following is a list of topics covered by the supplied courseware.

- **PLC and Electrical Safety**

Programmable Logic Controllers; PLC Safety; Electrical Shock; Electrical Properties; Current; Voltage; Resistance; Grounding; Grounding Systems; Force and Disable Safety Considerations; Electrical Noise Suppression; Static Electric Charges; PLC Enclosures; NEC® Hazardous Locations; Electrical Safety; PLC Safety; Personal Protective Equipment; Protective Clothing; Head Protection; Eye Protection; Ear Protection; Hand Protection; Foot Protection; Back Protection; Rubber Insulating Matting; Lockout/Tagout; Inspecting a PLC System.

- **Electrical Principles and PLCs**

Programmable Logic Controllers and Electrical Principles; PLC Problems; Voltage; DC Voltage Polarity; AC Voltage; PLC Power Supply Voltage Ratings; PLC Input Voltage Ratings; PLC Output Voltage Ratings; Current; PLC Input Current Ratings; DC Input Switching; PLC Output Current Ratings; Resistance; Series Circuits; Resistance in Series Circuits; Current in Series Circuits; Voltage Drops in Series Circuits; Parallel Circuits; Resistance in Parallel Circuits; Current in Parallel Circuits; Voltage Drops in Parallel Circuits.

- **Electrical Circuits and PLCs**

Electrical Symbols and Diagrams; Standard Electrical Symbols; PLC Programming Symbols; Pictorial Drawings; Wiring Diagrams; Line (Ladder) Diagrams; Logic Functions; AND Circuit Logic; OR Circuit Logic; NOT Circuit Logic; NOR Circuit Logic; NAND Circuit Logic; Electrical Wiring Methods; Direct Hardwiring; Hardwiring Using Terminal Strips; PLC Wiring.

- **PLC Hardware**

PLC Development; Programmable Logic controllers; PLC Sections; PLC Input Sections; PLC Output Sections; PLC Power Supplies; PLC Central Processing Units; PLC Programming Devices; PLC Classifications; Form Factors; PLC Memory; Random Access Memory; Electrically Erasable Programmable Read-Only Memory (EEPROM); PLC Operating Cycle; Operating Cycle.

- **PLC Programming Instructions**

PLC Programming Diagrams; Processor Files; Program Files; Data Table Files; Data Table File Addresses; Input and Output File Addresses; Status File Addresses; Bit File Addresses; Programming Diagram Logic; Bit Instructions; Scan Execution.

- **Programming PLC Timers and Counters**

Timer and Counter Instructions; Timer Instructions; Timer Instruction Words; Timer On-Delay (TON) Instructions; Timer Off-Delay (TOF) Instructions; Retentive Timer (RTO) Instructions; Reset (RES) Instructions; Special Applications; Counter Instructions; Counter Instruction Words; Count Up (CTU) Instructions; Count Down (CTD) Instructions.

- **PLC and System Interfacing**

Systems; Primary Systems; System Interfacing; Electrical Circuits; Basic Electrical Circuits; Improving Basic Electrical Circuits; Complex Electrical Circuits; Interfacing Circuits; Interface Devices; Electromechanical Relays; Solid-State Relays; Contactor Interfaces; Motor Starter Interfaces; Electric Motor Drive Interfacing.

- **PLC Installations and Startup**

PLC Installations; Receiving a PLC; PLC Enclosures; Electrical Noise; PLC Power Supplies; PLC Installation Safety; PLC Wiring; Initial PLC Checks; Input Section Checks; Output Section Checks; Program Checks; Final Checks.

- **PLC and System Maintenance**

PLC System Maintenance; Visual Inspections; Energized PLC Maintenance; Battery Maintenance; PLC Software Maintenance; Equipment and Documentation Verification; Software and Program Verification.

- **Troubleshooting Principles and Test Instruments**

Troubleshooting; Troubleshooting Methods; Troubleshooting by Knowledge and Experience; Troubleshooting Using Facility Procedures; Troubleshooting Using Manufacturer Procedures; Troubleshooting Using Manufacturer Flowcharts; Troubleshooting Using Manufacturer Help Lines; Measurement Precautions; Meter Abbreviations, Symbols, and Ratings; Electrical Test Instrument abbreviations; Electrical Test Instrument Symbols; CAT Ratings; Troubleshooting with Test Instruments; Voltage Tester Measurement Procedures; Voltage Measurement Rules; AC Voltage Measurement Procedures; DC Voltage Measurement Procedures; Advanced DMM Features; Continuity Tester Measurement Procedures; Ohmmeter Measurement Procedures; Clamp-On Ammeter Measurement Procedures; In-Line Ammeter Measurement Procedures; Infrared Temperature Meter Measurement Procedures.

- **Troubleshooting PLC Hardware**

Troubleshooting PLC Input Sections (Modules); Input Circuit Operation; Troubleshooting Input Sections (Modules); Testing Input Sections (Modules); Monitoring Input Devices; Input Leakage Current Problems; Troubleshooting PLC Output Sections (Modules); Output Circuit Operation; Troubleshooting Output Sections (Modules); Testing Output Sections (Modules); Monitoring Output Components.

- **Troubleshooting with PLC Software**

Programming Software; Viewing PLC Programs; Window™ Features; Programming Software Features; Debugging PLC Programs; Temporary End Instructions (TND); Cross References; Find All; Goto Data Table; Force Function; Forcing Input Devices; Forcing Output Components; Software Help Features.

All Hampden units are available for operation at any voltage or frequency

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