

DEMONSTRATION UNIT PLC (PLC TRAINER)

With the advent of microelectronic PLC has become work-horse for innumerable industrial applications. The system is based on the world standard Allen-Bradley micrologics controller or equivalent. The system is designed to give the student a direct interface with PLC application. Some very frequently required applications are selected and necessary hardware is also supplied.

MODEL PLC – 1:

The system consists of

PART A) Main experimental board with PLC mounted on it .

PART B) 6 no. of hardware applications alongwith accessories, cable and software with detailed instruction manual.

The micrologix PLC controller of Allen-Bradley make is mounted on an elegant box with anodized top, which includes 10 no. of input switches and 6 no. of isolated relay alongwith LED displays.

Six no. of hardware applications with following description are provided.

1) SIMPLE RESISTANCE WELDING &

2) REPEAT RESISTANCE WELDING

These two applications share common hardware like relay for solenoid valve and relay for welding operation. A toggle switch identifies the repeat mode of welding operation. The system includes a pressure regulator, solenoid valve, two port pneumatic cylinders, electrode system and a small welding transformer. Entire operation of resistance welding specially complete control logic can be fully demonstrated (except actual welding operation). The system has built in power supplies. The system is housed on a elegant board with following dimensions.

BOARD SIZE: 63(L)*48(B)*15(H) CMS.

3) SIMPLE (EVENT) COUNTER:

This set up exhibits of counter facility in PLC for industrial counting. It consists of a light source and phototransistor combination for counting objects moving on a manually controlled strip (thus simulating conveyer belt). A reset switch enables to reset accumulator by PLC and LED for wait operations are provided. The set up represents low speed counting and has built in power supplies and cables.

BOARD SIZE: 42(L)*17(B)*10(H)cms.

4) STAR DELTA STARTER:

The widely used star-delta starter scheme for induction motors in industry is simulated with the help of a lamp bank. The incoming three phase 4 wire 440 volt system is stepped down to a three phase 17 volts (line to line).the load bank is switched from star mode to delta mode (after a fixed time delay) under software control. The set up is provided with two relays, start and stop push buttons and LEDs. The system has built in power supplies and is housed on a board. BOARD SIZE: 35(L)*27(B)*10 CMS.

5) PICK AND PLACE APPLICATION:

Proper placement of various objects (items) under overall control of a master PLC (simulated by 2 no. toggle switches), the d. c. motor having a disc with 40 holes and photo sensor positions the tray at various locations, representing movement of 1 revolution (40 holes), 2 revolution (80 holes) and 3 revolution (120 holes), and finally 4 revolution (160 holes), meant for 4 no. of different items. Various time delays are introduced to actually simulate the industrial operation. Manual control is also provided for the d. c. motor if required. The system includes power supplies, 2 relays, start, stop and reset push buttons. This set up represents the application of a high-speed counter for PLC. BOARD SIZE: 35(L)*30(B)*21(H) CMS.

6) ANNUNCIATOR SYSTEM:

Widely used industrial annunciator system can be readily understood with the help of this particular set up. Following parameters can be monitored.

- a) Temperature (with the help of thermistor)
- b) Open or closed door (with the help of microswitch)
- c) Liquid level with the help of level sensor.
- d) Load with the help of strain gage load cell.

All these parameters can be set with the help of set potentiometers on the front panel of the system. If a particular parameter is crossing the set level, flasher lamp swing into operation and buzzer gives audio signal. As soon as the fault is acknowledged by the operator by pressing a push button, the buzzer stops, lamp flashing stops and the particular lamp (LED) glows which indicates the parameter that is at fault.

All the required electronics is included for signal conditioning of various parameters. Appropriate test points are provided on the left-hand side of the panel.

BOARD SIZE: 32(L)*32(B)*22(H) CMS.

GENERAL COMMENTS:

Out of 10 no. of input switches available on the PLC, 3 no. i.e. 19, 18 and 17 are used to select the particular application. Six applications are provided (with remaining two unused).

12 pin johnson plug socket is used for input interfacing i.e. switch, push button or pulses etc and 8 pin johnson plug socket is used for output interfacing i.e. for LED's and relays using a common cable for each.

In a NUT SHELL, the HEM make PLC trainer means:

Part A- Allen-Bradely PLC (with 10 inputs and 6 outputs) mounted on the panel with input switches 10 no. and output LED's 6 no. with isolated relay outputs. The system has built in power supplies and is provided with interfacing for communication with PC alongwith necessary software. Panel size: 50(L)*30(B)*20(H) CMS approx.

Part B – Represents the following applications with complete hardware power supplies, accessories and cables.

- 1) Simple resistance welding.
- 2) Repeat resistance welding.
- 3) Simple event counter (low speed).
- 4) Star delta starter.
- 5) Pick and place application (high speed counter)
- 6) Annunciator system.

MODEL PLC – 2:

The system consists of

PART - A) Main experimental board with PLC mounted on it and (PART A)

PART- B) 8 no. of hardware applications alongwith accessories, cable and software with detailed instruction manual. (PART B)

The micrologix PLC controller of Allen-Bradley make is mounted on an elegant box with anodized top, which includes 20 no. of input switches and 12 no. of isolated relay alongwith LED displays.

Eight no. of hardware applications with following description are provided.

MODEL PLC 2:-

This particular model PLC 2 is using micrologics controller 1000 with 20 inputs and 12 outputs. Of course the basic PLC is from Allen-Bradley only. With larger no of inputs and outputs, more complicated industrial problems requiring higher no. of inputs and outputs can be handled. In addition to the 6 no. of hardware projects supplied with the model PLC 1, this particular set up comes with 2 models for traffic light controllers. These are complete simulations of typical traffic light control for 4 road and 3-road crossing. They include features like start, stop controls and selection for normal, lean, peak traffic and flashing/holiday mode. The system comes on a neatly labeled anodized plate with clear marking for traffic signals are relevant information. It has a built in a power supply and necessary hardware. It can be interfaced with PLC 2 model with suitable cables provided alongwith. The model includes provision for pedestrian crossing signal also.

In a nut shell the model PLC 2 means

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Part A: Allen-Bradley PLC (with 20 inputs and 12 outputs) mounted on the panel with 20 different combinations of switches (toggle switch, N/O and N/C push buttons) and outputs 12 no. LEDs with isolated relay output. The system has built in power supply and is provided with interfacing for communication with PC alongwith necessary software (if required)Panel size: 50(L)*30(B)*20(H) CMS approx.

Part B: Includes the following applications with complete ready to use hardware, **power supplies, cables & manuals.**

- 1) **Simple resistance welding.**
- 2) **Repeat resistance welding.**
- 3) **Simple event counter (low speed).**
- 4) **Star delta starter.**
- 5) **Pick and place application (high speed counter)**
- 6) **Annunciator system.**
- 7) **Traffic light controller with 4 road crossing**
- 8) **Traffic light controller with 3 road crossing**

NEWLY ADDED APPLICATIONS:-

1.OPTICAL ENCODER INTERFACED TO PLC .

With Necessary Hardware and Software.

2.LOAD CELL BASED SIMPLE COIN COUNTER USING PLC

PLC-4 PART A

Programmable Logic controller Trainer

A **Crouzet France make PLC** with 12 I/Ps - 8 O/ps .12 I/Ps (8 analog ,0-10 v,8 bit) , 8 O/Ps (all solid state digital)1no. of output configurable as PWM ouput.Necessary 1 No. of PWM converter (range 0-10V)will be provided that can be attached to the output side.

In built LCD display (4 *12 characters) will be provided. PLC operating voltage is 24V D.C. PC-module communication link (RS-232 based) will also be provided.

Demonstration Panel Consist of,

The above PLC unit will be mounted on neatly labeled front panel. Different types of switches such as toggle, push button etc. are provided for simulation of digital I/Ps . 1 No. 0-5 V variable D.C power supply for analog I/Ps check is provided. LED indicators on the output side for showing O/P status . 1 No. 3 and 1/2 digit DPM for displaying analog I/P value.

All I/Ps and outputs will be brought on the front panel. This module will be provided along with programming software millenium II(authorised version)

It is a F.B.D. programming (Functional block diagram programming language).This software is having programmable timers ,counters, PID controller function.

OPTIONAL ACCESSORIES:-

PLC -4 PART B:-

HARDWARE EXPERIMENTATION.

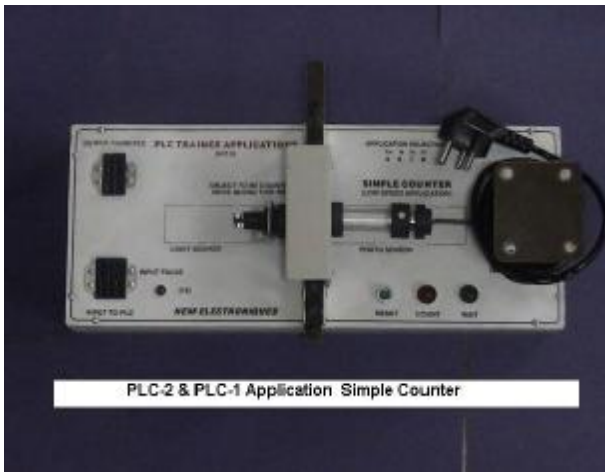
Speed controller using PLC.

Separately excited D.C.servomotor (60 W,24 V) will be used.Tachogenerator will be mechanically coupled to the motor .Voltage generated by the tachometer will be fed to PLC.

IGBT /MOSFET based chopper circuit will be provided which will be receiving PWM controlled pulses from PLC. Loading arrangement for the motor will also be provided.3 and 1/2 digit DPM for speed indication will also be provided.



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PLC-2 Programmable Logic Controller SETUP