

ET 438b
PLC Lab 1
Programming PLC Instructions

The following exercises give practice in using the XIC, XIO and OTE instructions discussed in class. The XIC instruction is similar to the normally open contact in electromechanical control logic and the XIO instruction is similar to the normally closed contact. The OTE instruction is the output instruction that take the place of the relay coils in the electromagnetic systems.

The PLCs' in the lab are Allen Bradley SLC500, Micrologics 1500s, and Micrologics 1000. This model of the SLC500 and 1000 series controllers are not expandable, so all I/O is in slot 0. A mounting box provides power and gives basic I/O indication. The PLCs' use this supply to function and the output points use the ac supply to energize the indicator lights mounted on the box with the PLC. PLC output points connect to the indicator lights through internal wiring. Labels located under the lamps show the address of the output point connected to the indicator lamp. Internal wiring connects normally open and normally closed push-button switches to the PLC chassis. These switches simulate input points from field devices. Labels near the switches identify their addresses on the PLC.

Using the XIC, XIO and OTE instructions, produce the desired results described in the following five exercises. Sketch the rung of PLC logic used to implement the control and include the addresses of the I/O points on the sketch.

- 1.) Turn on outputs O:0/0 and O:0/3 when input I:0/0, a normally open push-button, is pressed. Also have output O:0/5 turn on when I:0/0 is in the un-actuated position
- 2.) Turn on output O:0/5 when I:0/3, a normally closed push-button, is in the un-actuated position. Also make the output O:0/8 energize when O:0/5 is off without using the input address, I:0/3, more than one time in the logic.
- 3.) When I:0/4 or I:0/1 or I:0/2 is pressed, the output O:0/1 is energized
- 4.) When the input I:0/4, a normally closed push-button, and input I:0/1, a normally open push button energize the output O:0/2.
- 5.) Simulate a latching motor starting rung with inputs I:0/11 and I:0/10 as inputs and O:0/6 as the output. The I:0/10 simulates the stop button and I:0/11 the start button.

Running RsLogics PLC Software

Viewing PLC on Network

- 1.) Start Allen-Bradley (AB) RS Logics software by going to start menu, select **Programs**, then **Rockwell Software**, and finally, **RSLOGIX 500 English**.
- 2.) Select **Comms** menu choice, followed by **Who Active**, then **Go Online**, and finally **Views**. Click on AB-PIC-1, DH-485. This shows the PC and the PLCs that are connected to this communication network. Clicking on the PLC icon will connect the PC to the PLC. A programmer can view the operation of any PLC connected to the PC using these functions

Creating a New PLC Program

- 1.) Go to the menu choice **File** and select the choice **New**. You will be prompted for the processor type and configuration. For programming the SLC500s located in the lab, select 1747-L20A as the processor type. This information can be verified by examining the PLC nameplate information. After entering this information, the ladder diagram editor starts.
- 2.) A listing of the PLC commands is located in the upper righthand corner of the display. The **User** tab has the basic functions of rung programming. These include, branch insert, OTE, XIC, and XIO. Clicking on the timer/counter tab displays these commands.

To insert an XIC instruction in a rung, place the red rung cursor on the desired rung. Click on the instruction. The symbol is placed in the location and the user is prompted for the bit location. Enter the address using the bit address syntax covered in the lecture. The program automatically increments the locations of the I/O points in the program. Follow a similar procedure for the XIO and OTE instructions.

- 3.) To save the program, select the **File** menu choice and then click on **Save**. Follow the program prompts to complete the command.

Load a Program to the PLC

- 1.) When programming editing is completed, select the **Comms** menu choice. The PC will be off line from the PLC while in the program editing mode. Click on **Go Online**. This connects the PC to the PLC and shows the current program that the PLC is running. The RS LOGIX software must be offline to load the PLC program to the processor. Click the **Download** command from the **Comms** menu and follow the prompts to complete the download process.