0617-470 and 870 Controls for Manufacturing Automation

Department of MMET-PS

Rochester Institute of Technology

Laboratory Exercise #7

10 Points

Objective:

The objective of this laboratory exercise is to create a PLC program to stack the RPM of the DC motor and store using FIFO and LIFO instructions.

Task to be accomplished:

1. The application should not start until the Main Power Switch is turned ON (Local:5:I.Data.20). All the outputs should turn OFF and the system should RESET (Timers and Counters used) when the main power switch is turned OFF.

2. When the Main power switch is turned ON:
   - The DC Motor should find its home position and stop. Turn the motor in the Counter Clockwise direction.
   - The 7 Segment Display (BCD - Output) (Local:6:O.Data.00 – 15) should reset and display '0000'.

3. To turn ON the DC Motor in Counter Clock wise direction, energize Counter Clockwise (Local:6:O.Data.31).

4. The home position of the DC Motor is the position where the motor finds the Rotation Sensor -1 Prox. Input (Local:5:I.Data.26).

5. When the START Switch (Normally Open Momentary Switch) is pressed after the DC Motor finds its home position, the motor should rotate in clock-wise direction for 6 revolutions and stop for 5 seconds.

6. Calculate the RPM (# of rotations per minute) for the DC motor and load the value in a stack using LIFO instruction.

7. After 5 seconds delay, turn the motor ON again and repeat the steps 5 and 6. (The only difference this time is that the DC motor is not turned ON by the pushbutton switch).

8. This above process (cycle) should be executed 4 times.

9. After all 4 RPM values (integer) are stacked, use File Average (AVE) instruction to calculate the average of all those 4 values and display the average value on the 7 segment display.

Note:

To calculate RPM:

$$RPM = \frac{\#\ of\ rototions\ \times 60}{time\ calculated\ in\ seconds}$$

Input / Output listing for the experiment:

	Inputs/Outputs	PLC
Inputs	Main Power Switch NO Selector Switch	Local:5:I.Data.20
	Start Switch NO Momentary Switch	Local:5:I.Data.16
	DC Motor Rotation Sensor-1 (Prox-Input) NO Proximity Sensor	Local:5:I.Data.26
Outputs	DC motor (clock wise)	Local:6:O.Data.30
	DC motor (counter clockwise)	Local:6:O.Data.31

What needs to be submitted?

1. Test the program and show the demo to the instructor in the lab.
   (Only for on-campus students)
2. A well documented functional PLC program (RsLogix File), containing all tasks should be submitted with title, your name and rung comments, in the drop box within MyCourses. (You should have tested the program before submission)
3. Use the table as a reference to understand the use of NO contact symbol for the Selector Switch used in this program.

Physical switch or sensor used on the experiment setup	Is the physical switch or sensor NO or NC?	Value recorded in the memory for the switch or sensor when PLC is powered (1 or 0)	User Changing Physical State (Switch can be Closed or Opened by user)	Value recorded in the memory, for the switch or sensor when the user changes its physical state	Switch or sensor programmed as a NO or NC contact	Logical State of contact (1 or 0)
Selector Switch	NO	0	Not Activated (Open)	0		**0**
						**1**
			Activated (Closed)	1		**1**
						**0**
Momentary Push Button Switch	NO	0	Not Activated (Open)	0		**0**
						**1**
			Activated (Close)	1		**1**
						**0**
Rotation Sensor	NO	0	Not Activated (Open)	0		**0**
						**1**
			Activated (Closed)	1		**1**
						**0**