

0617-470 and 870 Controls for Manufacturing Automation

Department of MMET-PS

Rochester Institute of Technology

Laboratory Exercise # 6

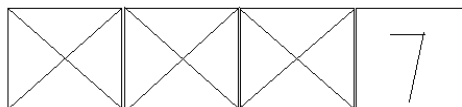
10 Points

Objective:

The objective of this laboratory exercise is to create a PLC program to calculate the RPM of the DC motor and display it on the 7 Segment LED display, using Math instruction and BCD conversion instruction

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 Seg. 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 (Local:6:O.Data.31).
4. The home position for the DC Motor is the position where motor finds the Rotation Sensor - 1 Proximity Input (Local:5:I.Data.26).
5. When an Emergency Stop Switch (Normally Closed Momentary Switch) is pressed the system should STOP and resume only when the START Switch (Normally Open Momentary Switch) is pressed again. (The application should not reset and the motor should start from the position it stopped).
6. When the START Switch (Normally Open Momentary Switch) is pressed after the DC Motor finds its home position, the motors should rotate in clock-wise direction for the number of revolutions represented by the 4th thumbwheel Switch (BCD – Input, Local:5:I.Data.00 – 15). The 4th thumbwheel switch is set to an integer 7 (HINT: You have to convert from BCD)



















7. Store the total time required to complete the revolutions of the DC Motor (use some integer tag).
8. Calculate the RPM (# of rotations per minute) for the DC motor and store it (use a new tag).
9. Display the DC motor RPM value on the 7 Segment Display (HINT: You have to convert to BCD)

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
	Emergency Stop Switch NC Momentary Switch	Local:5:I.Data.18
	DC Motor Rotation Sensor-1 (Prox-Input) NO Proximity Sensor	Local:5:I.Data.26
	Thumbwheel Switches BCD Input	Local:5:I.Data.00 – 15
Outputs	DC motor (clock wise)	Local:6:O.Data.30
	DC motor (counter clockwise)	Local:6:O.Data.31
	7 Segment Display BCD output	Local:6:O.Data.00 – 15

Instructions

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
Momentary Push Button Switch	NC	1	Activated (Opened)	1		1
						0
			Not Activated (Close)	0		0
						1
Rotation Sensor	NO	0	Not Activated (Open)	0		0
						1
			Activated (Closed)	1		1
						0