Technical University of Denmark

31342 Introduction to Programmable Logic Controllers

Exercise 1

Introduction to PLC

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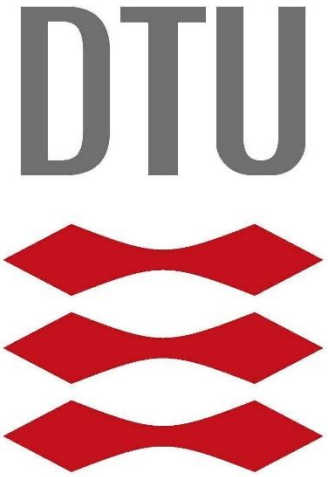


Spring, February 9, 2019

Part 1: Finding PLC systems that meet the requirements

I tried to find PLC systems that is capable of controlling a system containing the following parts:

- 4 digital inputs
- 2 actuators (analog outputs)
- 1 network interface for communication

I found 2 different PLC systems that meet the specifications: Ace 7096 from Velocio Network and 1766-L32BWAA (MicroLogix 1400) from Allan-Bradley. (Datasheets of the PLCs are in the References part.)

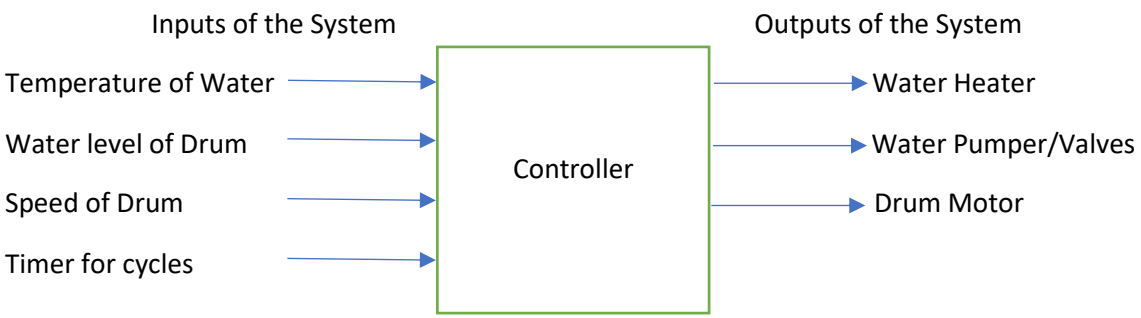
Ace 7096:

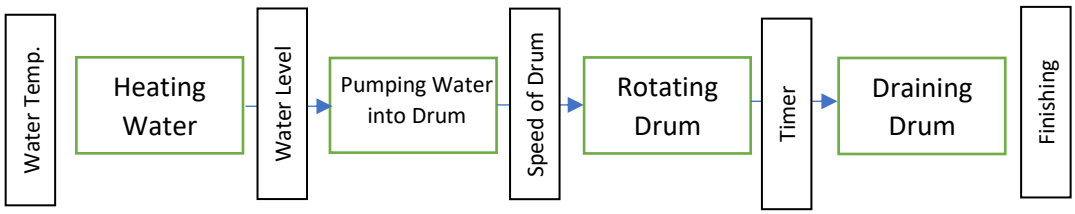
The Ace 7096 includes IO interfaces for 6 digital inputs, 12 digital outputs, 4 analog inputs, four thermocouple/differential voltage inputs, two analog outputs and two RS232 ports. The three different models of Ace 7096 differ only in the analog signal range they are designed to interface (v5 = 0-5VDC, v10 = 0-10VDC and c = 0-20mA). [1]

1766-L32BWAA (MicroLogix 1400):

MicroLogix 1400 has the features such as EtherNet/IP, online editing, and a built-in LCD, plus provides you with enhanced features, such as: higher I/O count, faster High Speed Counter/PTO and enhanced network capabilities.
Controllers without embedded analog come with 32 digital I/O count, while analog versions have 32 digital I/O and 6 analog I/O.
Three embedded communication ports provide you with superior communications capabilities. MicroLogix 1400 offers an isolated RS232C/RS485 combination port; a non-isolated RS232C port; and an R J-45 port for 10/100 Mbps EtherNet/IP peer-to-peer messaging.
Similar to the rest of the MicroLogix family, MicroLogix 1400 is programmed with RSLogix 500 programming software (Version 8.1 and above) as well as new RSLogix Micro programming software. [2]

Part 2: A system controlling cycles of washing machines:





If it isn't 100, then heat water

If it doesn't reach the required level, then pump water

If it is slow, then speed up

If the time is up, then drain drum

- Each cycle should have a process time. This time is counted in the timer for cycles and according to time values, a shift from one action to another should occur.

I think the choice of PLC to process these kinds of actions and to implement this system would be perfect since this system has a lot of digital and analog inputs/outputs (not only ones that mentioned above in the diagram) this system has an interdisciplinary approach involving motor, heater, pumper, counter, etc. So, PLCs are able to handle these inputs and they can operate in a proper way to give appropriate outputs to the subsystems.

References:

[1] Velocio.net. (2019). Page: 10. [online] Available at: http://velocio.net/AceDatasheet.pdf [Accessed 6 Feb. 2019].

[2] Configurator.rockwellautomation.com. (2019) Page: 1. [online] Available at: https://configurator.rockwellautomation.com/api/Doc/1766-pp001_-en-p.pdf [Accessed 6 Feb. 2019].