

PID implementation of heating tank in mini automation plant using programmable logic controller (PLC)

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ABSTRACT

This paper presents the implementation of PID controller using Programmable Logic Controller (PLC) in heating tank of mini automation plant. PID controller is implemented by using ladder diagram in PLC OMRON CJIM-CPU12. A temperature control unit CJ1W-TC001 is also used where the temperature control unit is a special I/O unit that receives inputs directly from thermocouple, to perform PID control. Desired temperature or set point (SP) is set by the user using the Human Machine Interface (HMI) and the controller within the PLC will try to maintain the current temperature base on the set point temperature set by the user. Temperature control is very difficult to be implemented by using ordinary control techniques; hence the purpose of this research is to implement PID controller design using programmable logic controller (PLC) in order to control the time to heat up a particular solution to a desired temperature efficiently without scarifying the stability of the system. A complete analysis using different kind of PID parameters is presented in terms of system response. Performance of the controller is examined in terms of settling time, rise time and percent overshoot. Finally, a comparative assessment of the PID controller on the system performance is presented and discussed.

KEYWORDS:

Mini automation plant; heating tank; Programmable Logic Controller (PLC); Proportional-integral-derivatives (PID) Controller; Human Machine Interface (HMI).

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