

ABSTRAK

RANCANG BANGUN SISTEM KENDALI OPERASI MESIN PENGGIILING OTOMATIS BERBASIS *PROGRAMMABLE* *LOGIC CONTROLLER* (PLC) OMRON

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Perkembangan teknologi industri menuntut peningkatan efisiensi dan otomatisasi dalam proses produksi, termasuk pada industri skala kecil hingga menengah yang masih banyak mengandalkan sistem *konvensional*. Penelitian ini mengimplementasikan sistem kendali pada mesin penggiling berbasis *programmable logic controller* Omron CP1E N30DR-A, yang dilengkapi dua mode pengoperasian, yaitu manual dan otomatis, serta didukung antarmuka *human machine interface* sebagai media kontrol dan konfigurasi. Tujuan utama dari perancangan ini adalah menggantikan sistem manual yang selama ini digunakan dengan sistem kendali otomatis yang lebih mudah dioperasikan. Perancangan dilakukan melalui penyusunan program ladder diagram, perakitan panel kontrol, dan integrasi perangkat input-output. Dan penggunaan komponen pendukung lainnya seperti motor listrik DC, *relay*, *Indikator lamp* dan *motorized ballvalve*, yang dikendalikan oleh PLC sebagai pusat pengendali utama. Hasil implementasi menunjukkan bahwa sistem kendali yang dirancang bekerja secara efektif, mampu menjalankan proses penggilingan sesuai urutan kerja yang telah diprogram. Dengan penerapan sistem ini, proses produksi menjadi lebih efisien, aman.

Kata Kunci: PLC, HMI, Mesin Penggiling , Motor, *Ballvalve*.

ABSTRACT

DESIGN AND BUILD OF AUTOMATIC GRINDING MACHINE OPERATION CONTROL SYSTEM BASED ON PROGRAMMABLE LOGIC CONTROLLER (PLC) OMRON

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The development of industrial technology demands increased efficiency and automation in the production process, including in small to medium scale industries that still rely heavily on conventional systems. This research implements a control system on a grinding machine based on the Omron CP1E N30DR-A programmable logic controller, which is equipped with two operating modes, namely manual and automatic, and is supported by a human machine interface as a control and configuration medium. The main purpose of this design is to replace the manual system that has been used with an automatic control system that is easier to operate. The design is carried out through the preparation of ladder diagram programs, control panel assembly, and integration of input-output devices. And the use of other supporting components such as DC electric motors, relays, lamp indicators and motorized ballvalve, which are controlled by PLC as the main control center. The implementation results show that the designed control system works effectively, capable of running the milling process according to the programmed work sequence. With the implementation of this system, the production process becomes more efficient, safe, and efficient.

Keywords: *PLC, HMI, Grinding Machine, Motor, BallValve.*