

ABSTRAK

RANCANG BANGUN SISTEM MONITORING OPERASI MESIN PENGGIILING OTOMATIS BERBASIS HMI DAN *SOFTWARE NB-DESIGNER*

(2025 : xviii + 74 Halaman + 22 Tabel + 64 Gambar + Lampiran)

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Perancangan sistem monitoring dan kontrol otomatis pada mesin penggiling berbasis HMI dan *NB-Designer* bertujuan menciptakan sistem yang efisien dan responsif. Sistem ini menggunakan HMI OMRON NB7W-TW00B dan PLC OMRON CP1E-N30DR-A. Mode manual dikendalikan melalui tombol fisik (START 0.00, STOP 0.01, emergency 0.02), sementara mode otomatis menggunakan tombol virtual pada HMI yang ditautkan ke alamat CIO (1.00–1.05). Integrasi HMI–PLC dilakukan melalui pemetaan alamat logika pada CX-Programmer dan *NB-Designer*, sehingga kontrol terhadap motor penggiling, *belt conveyor*, dan *ballvalve* dapat dijalankan secara otomatis dan real-time. Hasil pengujian menunjukkan selisih berat output hanya 0,5–2 gram dari target, dengan penyimpangan 1–2% dan waktu kerja proporsional terhadap berat. Arus motor meningkat dari 0,24 A menjadi 0,91–0,94 A saat berbeban, dengan tegangan stabil di 12 V. Sistem ini terbukti presisi, terintegrasi, dan andal dalam menjalankan logika kontrol otomatis.

Kata kunci: HMI, PLC, *NB-Designer*, kontrol otomatis, CIO

ABSTRACT

DESIGN AND BUILD OF AUTOMATIC GRINDING MACHINE OPERATION MONITORING SYSTEM BASED ON HMI AND SOFTWARE NB-DESIGNER

(2025: xviii + 74 Pages + 22 Tables + 64 Figures + Attachments)

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The design of an automatic monitoring and control system for a grinding machine using HMI and NB-Designer aims to create an efficient and responsive solution. The system employs an OMRON NB7W-TW00B HMI and an OMRON CP1E-N30DR-A PLC. Manual mode is operated via physical buttons (START 0.00, STOP 0.01, emergency 0.02), while automatic mode is controlled through virtual HMI buttons linked to internal CIO addresses (1.00–1.05). Integration between HMI and PLC is achieved through logical address mapping in CX-Programmer and NB-Designer, enabling real-time control of the grinder motor, belt conveyor, and ballvalve. Testing results show output weight deviations of only 0.5–2 grams with 1–2% variation, and operating time increasing proportionally with material weight. Motor current rises from 0.24 A (no-load) to 0.91–0.94 A under load, with voltage remaining stable at 12 V. The system proves to be precise, integrated, and reliable in executing automated control logic.

Keywords: HMI, PLC, NB-Designer, automatic control, CIO