ABSTRAK

RANCANG BANGUN *AUTOMATIC BATCH MIXING TANK* MENGGUNAKAN HMI MODBUS

(2025: xxv + 128 Halaman + 88 Gambar + 3 Tabel + 12 Daftar Pustaka)

Muhammad Jundi Fatahillah
062230310512
Jurusan Teknik Elektro
Program Studi Teknik Listrik
Politeknik Negeri Sriwijaya

Dalam industri skala kecil hingga menengah, proses pencampuran cairan seringkali menghadapi tantangan dalam hal efisiensi, akurasi, dan kendali proses yang terintegrasi. Untuk mengatasi permasalahan tersebut, penelitian ini merancang dan membangun sistem *Automatic Batch Mixing Tank* yang terhubung dengan antarmuka HMI menggunakan protokol komunikasi Modbus. Sistem ini dikembangkan untuk mengotomatisasi proses pencampuran dengan mengutamakan presisi dalam pengukuran serta pengendalian aliran bahan baku. HMI berperan sebagai antarmuka visual dan alat kendali utama, yang memungkinkan operator mengatur parameter penting seperti volume, durasi pencampuran, serta urutan pengisian bahan. Komunikasi antara HMI dan perangkat kontrol, seperti PLC atau mikrokontroler dilakukan melalui protokol Modbus TCP/IP atau Modbus RTU, yang menjamin keandalan dalam pertukaran data. Sistem ini juga dilengkapi dengan sensor level, katup solenoid, dan motor pengaduk yang bekerja otomatis berdasarkan logika yang telah diprogram. Berdasarkan hasil pengujian, sistem terbukti mampu menjalankan proses pencampuran secara berurutan dan stabil sesuai parameter yang ditentukan, serta memberikan kemudahan dalam pengawasan dan pengoperasian melalui antarmuka HMI yang interaktif.

Kata Kunci: *Batch Mixing Tank*, HMI, Modbus, Otomatisasi, *Solenoid Valve*, Sensor Level, Kontrol Proses

ABSTRACT

DESIGN AND DEVELOPMENT
OF AN AUTOMATIC BATCH MIXING TANK USING HMI MODBUS

(2025: xxv + 128 Pages + 88 Picture + 3 Table + 12 References)

Muhammad Jundi Fatahillah

062230310512

Department of Electrical Engineering

Electrical Engineering Study Program

State of Polytechnic Sriwijaya

In small to medium-scale industries, the liquid mixing process often faces challenges related to efficiency, accuracy, and integrated process control. To address these issues, this study designed and developed an Automatic Batch Mixing Tank system integrated with an HMI interface using the Modbus communication protocol. The system is intended to automate the mixing process with a focus on precise measurement and control of raw material flow. The HMI serves as the main visual interface and control unit, allowing operators to set key parameters such as volume, mixing duration, and filling sequence. Communication between the HMI and control devices, such as PLCs or microcontrollers is established via Modbus TCP/IP or Modbus RTU protocols, ensuring reliable data exchange. The system is also equipped with level sensors, solenoid valves, and a stirring motor, all of which operate automatically based on pre-programmed logic. Testing results show that the system can perform the mixing process sequentially and consistently according to predefined parameters, while also offering ease of monitoring and operation through the interactive HMI interface.

***Keywords**: Batch Mixing Tank, HMI, Modbus, Automation, Solenoid Valve, Level Sensor, Process Control*