

ABSTRAK

RANCANG BANGUN ALAT PENGERING OTOMATIS BERBASIS ATMEGA328 DAN SENSOR KELEMBAPAN

(Aura Jatra Ratu Semendawai: 2025: XV + 76 Halaman + Lampiran)

Pengeringan pakaian di daerah dengan kelembapan tinggi dan cuaca tidak menentu sering menghadapi kendala yang mengakibatkan pakaian tidak kering optimal dan berpotensi mengalami pertumbuhan jamur. Oleh karena itu, diperlukan sistem pengering yang efisien, hemat waktu, dan mampu mencegah masalah tersebut. Laporan ini mengusulkan pemanfaatan mikrokontroler ATMEGA328 sebagai pengendali utama dalam sistem pengering pakaian otomatis. Dengan menggunakan metode perancangan sistem kontrol otomatis, dibuat sistem pengering pakaian menggunakan mikrokontroler ATMEGA328. Sistem dilengkapi sensor DHT22 untuk deteksi suhu dan kelembapan secara *real time*, *relay module 8 channel* untuk mengontrol komponen *output* seperti *heat bulb* (3 unit 100W), *blower fan* (2 unit), dan *exhaust fan* (1 unit). Tampilan informasi status sistem berupa suhu, kelembapan, dan mode operasi disajikan melalui LCD 16x2, didukung indikator LED dan *buzzer* untuk notifikasi *audio*. Hasil pengujian menunjukkan sistem mampu mendeteksi kondisi pakaian basah dengan kelembapan 90% dan menghentikan proses saat kelembapan mencapai kurang dari 45%. Pengujian kinerja dengan 10 kali percobaan menunjukkan durasi pengeringan dipengaruhi kondisi awal kelembapan dan jumlah pakaian. Pada kondisi pakaian basah (kelembapan 82-87%), waktu pengeringan berkisar 1 jam 12 menit hingga 2 jam 34 menit untuk 1-3 potong pakaian. Pada kondisi setengah basah (kelembapan 80-84%), proses berlangsung 27-59 menit. Sistem mampu menurunkan kelembapan pakaian hingga 44%, menunjukkan efektivitas alat dalam menyediakan solusi pengeringan pakaian otomatis.

Kata Kunci: Pengering Pakaian Otomatis, ATMEGA328, Sensor Kelembapan, DHT22, Relay.

ABSTRACT

DESIGN AND DEVELOPMENT OF AUTOMATIC DRYER DEVICE BASED ON ATMEGA328 AND HUMIDITY SENSOR

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Drying clothes in areas with high humidity and unpredictable weather often faces constraints that result in suboptimal drying and potential mold growth. Therefore, an efficient, time-saving drying system capable of preventing these problems is needed. This report proposes the utilization of ATmega328 microcontroller as the main controller in an automatic clothes drying system. Using automatic control system design methods, a clothes drying system was developed using ATmega328 microcontroller. The system is equipped with DHT22 sensor for real-time temperature and humidity detection, 8-channel relay module to control output components such as heat bulbs (3 units of 100W), blower fans (2 units), and exhaust fan (1 unit). System status information display including temperature, humidity, and operating mode is presented through 16x2 LCD, supported by LED indicators and buzzer for audio notifications. Test results demonstrate the system's capability to detect wet clothing conditions at 90% humidity and stop the drying process when humidity reaches below 45%. Performance testing with 10 trials shows drying duration is influenced by initial humidity conditions and clothing quantity. For wet clothing conditions (humidity 82-87%), drying time ranges from 1 hour 12 minutes to 2 hours 34 minutes for 1-3 pieces of clothing. For semi-wet conditions (humidity 80-84%), the process takes 27-59 minutes. The system successfully reduces clothing humidity to 44%, demonstrating the tool's effectiveness in providing automatic clothing drying solutions.

Keywords: Automatic Clothes Dryer, ATmega328, Humidity Sensor, DHT22, Relay.