ABSTRAK

DAYA BEBAN PADA RANCANG BANGUN SISTEM POMPA AIR OTOMATIS BERTENAGA SURYA BERBASIS ARDUINO UNTUK PERSAWAHAN DI DESA ULAK DEPATI

(2026 : xvii + 107 Halaman + Daftar Gambar + Daftar Tabel + Daftar Lampiran)

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Penelitian ini bertujuan untuk menganalisis kebutuhan daya beban pada sistem pompa air otomatis bertenaga surya berbasis Arduino untuk persawahan di Desa Ulak Depati. Penelitian dilakukan melalui tahap perancangan sistem, pengujian, dan analisis terhadap kinerja pompa berdasarkan parameter tegangan, arus, daya, debit air, dan waktu pengairan. Hasil pengujian menunjukkan bahwa pompa memiliki daya aktual rata-rata sebesar 163,75 W dengan arus kerja 6,43–7,20 A serta menghasilkan debit air 9,41–10,22 L/menit. Daya yang digunakan pompa sebesar 54,58% dari daya nominal 300 W, sehingga pompa bekerja pada kondisi yang aman dan belum mencapai kapasitas maksimumnya. Hasil analisis juga menunjukkan bahwa sumber energi dari sistem tenaga surya mampu memenuhi kebutuhan daya pompa selama proses pengairan berlangsung. Berdasarkan hasil tersebut, sistem pompa air otomatis yang dirancang dapat beroperasi dengan baik dan berpotensi menjadi alternatif pengairan yang efisien dengan memanfaatkan energi surya.

Kata kunci: Daya Beban, Pompa DC, PLTS, Arduino, Irigasi.

ABSTRACT

LOAD POWER IN THE DESIGN OF AN ARDUINO-BASED AUTOMATIC SOLAR-POWERED WATER PUMP SYSTEM FOR RICE FIELDS IN ULAK DEPATI VILLAGE

(2026: xvii + 107 Pages + List of Figures + List of Tables + List of Appendices)

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This study aims to analyze the load power requirements of an Arduino-based solar-powered automatic water pump system for rice fields in Ulak Depati Village. The research was conducted through system design, testing, and performance analysis based on voltage, current, power, water discharge, and irrigation time measurements. The test results showed that the pump had an average actual power consumption of 163.75 W, with an operating current ranging from 6.43 A to 7.20 A, and a water discharge of 9.41–10.22 L/min. The pump utilized only 54.58% of its nominal power rating of 300 W, indicating that it operated safely without reaching its maximum capacity. The analysis also showed that the solar power system was capable of supplying the power required by the pump throughout the irrigation process. Based on these results, the proposed automatic water pump system operated effectively and has the potential to serve as an efficient irrigation alternative by utilizing solar energy.

Keywords: *Load Power, DC Pump, Photovoltaic System, Arduino, Irrigation.*