

ABSTRAK

IMPLEMENTASI SISTEM SMART CHARGING BERBASIS INDUKSI ELEKTROMAGNETIK DENGAN KOMUNIKASI DATA WIRELESS DAN MONITORING SECARA REAL TIME

(2026: 73 Halaman: 32 Gambar: 5 Tabel + Daftar Pustaka + Lampiran)

M ARIE DARMAWAN

062330320716

PROGRAM STUDI DIII TEKNIK ELEKTRONIKA

JURUSAN TEKNIK ELEKTRO

POLITEKNIK NEGERI SRIWIJAYA

Perkembangan teknologi Wireless Power Transfer (WPT) berbasis induksi elektromagnetik memberikan solusi pengisian daya baterai yang lebih praktis dan aman. Penelitian ini bertujuan mengimplementasikan sistem smart charging berbasis induksi elektromagnetik dengan komunikasi data wireless dan monitoring secara real time pada baterai lead-acid 12 V 5 Ah. Metode penelitian meliputi perancangan sistem WPT, komunikasi data wireless, serta pemantauan parameter tegangan, arus, daya, energi, State of Charge (SOC), dan State of Health (SOH). Hasil pengujian menunjukkan tegangan pengisian meningkat dari 12,28 V menjadi 14,40 V, arus menurun dari 1,05 A menjadi 0,05 A, dengan daya maksimum 12,8 W, energi yang tersalurkan sebesar 43,075 Wh, dan waktu pengisian 6 jam. Nilai SOC meningkat dari 55% menjadi 100%, sedangkan nilai SOH sebesar 84% menunjukkan baterai masih dalam kondisi baik meskipun kapasitasnya mulai menurun. Hasil penelitian menunjukkan bahwa sistem berhasil diimplementasikan dan mampu melakukan pengisian baterai serta monitoring parameter secara real time dengan baik.

Kata kunci : Wireless Power Transfer (WPT), smart charging, baterai lead-acid, State of Charge (SOC), State of Health (SOH).

ABSTRACT

IMPLEMENTATION OF AN ELECTROMAGNETIC INDUCTION-BASED SMART CHARGING SYSTEM WITH WIRELESS DATA COMMUNICATION AND REAL-TIME MONITORING

(2026: 73 Page: 32 Figure: 5 Tables + Reference + Appendices)

M ARIE DARMAWAN

062330320716

STUDY PROGRAM OF ELECTRONIC ENGINEERING

ELECTRICAL ENGINEERING

SRIWIJAYA POLYTECHNIC

The development of Wireless Power Transfer (WPT) technology based on electromagnetic induction offers a more practical and safer solution for battery charging. This research aims to implement a smart charging system based on electromagnetic induction with wireless data communication and real-time monitoring for charging a 12 V 5 Ah lead-acid battery. The research method includes the design of a WPT system, wireless data communication, and monitoring of charging parameters, including voltage, current, power, energy, State of Charge (SOC), and State of Health (SOH). The experimental results show that the charging voltage increased from 12.28 V to 14.40 V, while the charging current decreased from 1.05 A to 0.05 A. The maximum charging power reached 12.8 W, with 43.075 Wh of energy delivered during a charging period of 6 hours. The SOC increased from 55% to 100%, while the SOH reached 84%, indicating that the battery remained in good condition despite a slight reduction in capacity. The results demonstrate that the proposed smart charging system based on electromagnetic induction was successfully implemented and is capable of charging the battery while providing reliable real-time monitoring of charging parameters.

Keywords : *Wireless Power Transfer (WPT), smart charging, baterai lead-acid, State of Charge (SOC), State of Health (SOH).*