ABSTRAK

RANCANG BANGUN ALAT PENGECEKAN TEKANAN DARAH TUBUH MEMANFAATKAN SENSOR MPS20N0040D BERBASIS *INTERNET OF THINGS* (IOT)

Karya tulis ilmiah berupa Laporan Akhir, 2025

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Rancang Bangun Alat Pengecekan Tekanan Darah Tubuh Memanfaatkan Sensor MPS20N0040D Berbasis *Internet of Things* (IoT) (2025 : lxviii + 63 Halaman + 28 Gambar + 16 Tabel + 8 Lampiran)

Laporan akhir ini bertujuan untuk merancang dan mengimplementasikan alat pengecekan tekanan darah dengan memanfaatkan sensor MPS20N0040D berbasis *Internet of Things* (IoT). Hipertensi merupakan suatu kondisi meningkatnya tekanan darah secara persisten di atas ambang normal dan sering dijuluki sebagai *silent killer*, karena gejalanya kerap tidak disadari hingga memicu komplikasi berat seperti stroke, gagal jantung, maupun gangguan ginjal kronis, sehingga pemantauan rutin sangat penting untuk pencegahan komplikasi lebih lanjut. Perancangan alat ini mencakup integrasi antara sensor tekanan, mikrokontroler ESP32, pompa udara, solenoid, serta sistem antarmuka berbasis LCD dan platform Telegram untuk pemantauan jarak jauh secara real-time. Alat ini mampu mengukur tekanan darah sistolik dan diastolik, kemudian mengirimkan hasil pengukuran ke pengguna melalui koneksi internet. Pengujian dilakukan terhadap dua puluh lima responden dan dibandingkan dengan alat referensi digital, menghasilkan rata-rata error 2,29% untuk tekanan sistolik dan 17,62% untuk tekanan diastolik, dengan rata-rata akurasi sebesar 97,71% untuk sistolik dan 82,38% untuk diastolik. Hasil dari laporan akhir ini menunjukkan bahwa sistem yang dikembangkan dapat memberikan informasi tekanan darah secara akurat dan efisien, serta meningkatkan kesadaran masyarakat dalam memantau kondisi kesehatan secara mandiri. Dengan demikian, rancangan alat ini berpeluang menjadi instrumen pendukung dalam deteksi awal penyakit kronis, khususnya hipertensi.

Kata Kunci: Tekanan Darah, Hipertensi, MPS20N0040D, *Internet of Things*, ESP32.

ABSTRACT

DESIGN AND CONSTRUCTION OF A BLOOD PRESSURE CHECKING DEVICE USING THE MPS20N0040D SENSOR BASED ON THE INTERNET OF THINGS (IOT)

Scientific Paper in the Form of Final Report, 2025
Ibreza Indra Alhaj; *under the guidance of* Dewi Permata Sari, S.T., M.Kom. *and* Ir. Faisal Damsi, M.T.
Design and Construction of a Blood Pressure Monitoring Device Utilizing the MPS20N0040D Sensor Based on the Internet of Things (IoT) (2025: lxviii + 63 pages + 28 figures + 16 tables + 8 appendices)

This final report aims to design and implement a blood pressure monitoring device utilizing the MPS20N0040D sensor based on the Internet of Things (IoT). Hypertension is a condition characterized by persistently elevated blood pressure above the normal threshold and is often referred to as a silent killer, as it frequently presents without noticeable symptoms until severe complications such as stroke, heart failure, or chronic kidney disease occur. Therefore, routine monitoring is essential for preventing further complications. The device design includes the integration of a pressure sensor, ESP32 microcontroller, air pump, solenoid valve, and an interface system based on an LCD display and Telegram platform for real-time remote monitoring. The device is capable of measuring both systolic and diastolic blood pressure and transmitting the measurement results to users via an internet connection. Testing was conducted on twenty-five respondents and compared to a digital reference device, resulting in an average error of 2.29% for systolic pressure and 17.62% for diastolic pressure, with an average accuracy of 97.71% for systolic and 82.38% for diastolic. The results of this final project demonstrate that the developed system can provide blood pressure information accurately and efficiently, while also raising public awareness of the importance of self-monitoring health conditions. Therefore, this device design has the potential to serve as a supportive instrument in the early detection of chronic diseases, particularly hypertension.

Keywords: *Blood Pressure, Hypertension, MPS20N0040D, Internet of Things, ESP32.*