

ABSTRAK

IKHSAN ARIEF ARMANSYAH. Rancang Bangun Sistem Berbasis IoT Pemantauan Tekanan Air Bersih di PDAM Tirta Kepri. Dibimbing oleh HOLLANDA ARIEF KUSUMA dan M HASBI SIDQI ALAJURI.

Pemantauan tekanan air pada jaringan distribusi PDAM Tirta Kepri masih dilakukan secara manual sehingga proses pencatatan dan pemantauan tekanan belum dapat dilakukan secara kontinu serta berpotensi memperlambat deteksi perubahan tekanan pada jaringan distribusi. Meskipun berbagai penelitian berbasis *Internet of Things* (IoT) telah dilakukan di PDAM Tirta Kepri, sebagian besar masih berfokus pada pemantauan kualitas air, sedangkan penelitian mengenai pemantauan tekanan air masih relatif terbatas. Penelitian ini bertujuan merancang sistem pemantauan tekanan air berbasis IoT yang mampu melakukan pengukuran, penyimpanan, dan pengiriman data secara otomatis serta mengevaluasi kinerja sistem melalui pengujian akurasi sensor, konsumsi daya, performa komunikasi, dan kepuasan pengguna. Sistem dikembangkan menggunakan sensor tekanan WPT-83G, mikrokontroler Wemos ESP8266 D1 Mini Pro, modul ADS1115, RTC DS3231, MicroSD Shield, dan platform ThingSpeak. Hasil penelitian menunjukkan bahwa sensor memiliki akurasi pengukuran sebesar 96,5% dengan nilai *Root Mean Square Error* (RMSE) sebesar 0,0402 bar. Sistem berhasil melakukan pencatatan data secara otomatis pada kartu MicroSD dan mengirimkan data ke ThingSpeak setiap 15 menit dengan *Packet Delivery Ratio* (PDR) sebesar 96,98%, *latensi* rata-rata 15,93 detik, serta memperoleh Indeks Kepuasan Pengguna (IKP) sebesar 94% dengan kategori Sangat Baik. Dengan demikian, sistem yang dikembangkan mampu menyediakan pemantauan tekanan air secara otomatis, berkelanjutan, dan andal untuk mendukung pengelolaan jaringan distribusi air PDAM Tirta Kepri.

Kata kunci: *Internet of Things*, Tekanan Air, PDAM, ThingSpeak, ESP8266.

ABSTRACT

IKHSAN ARIEF ARMANSYAH. Design and Development of an Internet of Things (IoT)-Based Clean Water Pressure Monitoring System for PDAM Tirta Kepri. Supervised by HOLLANDA ARIEF KUSUMA dan M HASBI SIDQI ALAJURI.

Water pressure monitoring in the water distribution network of PDAM Tirta Kepri is still conducted manually, resulting in discontinuous monitoring and delayed detection of pressure fluctuations within the distribution system. Although several studies have implemented *Internet of Things* (IoT)-based systems at PDAM Tirta Kepri, most have focused on water quality monitoring, while research on water pressure monitoring remains limited. This study aims to design an IoT-based water pressure monitoring system capable of automatically measuring, storing, and transmitting pressure data while evaluating system performance in terms of measurement accuracy, power consumption, communication performance, and user satisfaction. The proposed system was developed using a WPT-83G pressure sensor, a Wemos ESP8266 D1 Mini Pro microcontroller, an ADS1115 analog-to-digital converter module, an RTC DS3231 module, a MicroSD Shield, and the ThingSpeak platform. The results show that the pressure sensor achieved a measurement accuracy of 96.5% with a Root Mean Square Error (RMSE) of 0.0402 bar. The system successfully performed automatic data logging to the MicroSD card and transmitted data to ThingSpeak every 15 minutes, achieving a Packet Delivery Ratio (PDR) of 96,89 %, an average latency of 15,93 seconds, and a User Satisfaction Index (USI) of 94%, categorized as Very Good. Therefore, the developed system provides an automatic, reliable, and continuous solution for supporting water pressure monitoring in the PDAM Tirta Kepri distribution network.

Keywords: *Internet of Things*, water pressure, PDAM, ThingSpeak, ESP8266.