

## ABSTRAK

ALAN PRIANSYAH

Evaluasi Pemasangan DC Clip Monitoring di Unit Kerja  
ULTG Baturaja UPT Baturaja  
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*Sistem DC 110 Vdc pada Gardu Induk memiliki peran penting sebagai sumber catu daya untuk sistem proteksi, relay, SCADA, dan sistem kontrol. Gangguan seperti drop tegangan atau ketidakseimbangan terhadap ground dapat menyebabkan kegagalan fungsi proteksi dan menurunkan keandalan sistem. Oleh karena itu, diperlukan sistem monitoring yang mampu memantau kondisi tegangan secara real-time guna mendeteksi gangguan lebih dini. Penelitian ini bertujuan untuk menganalisis pemasangan, cara kerja, tingkat akurasi, serta efektivitas DC Clip Monitoring berbasis IoT di wilayah kerja ULTG Baturaja. Metode penelitian yang digunakan adalah eksperimen dengan pendekatan kuantitatif melalui pengukuran dan perbandingan data tegangan DC antara pembacaan DC Clip Monitoring dan multimeter standar pada lima Gardu Induk, yaitu GI Baturaja, GI Martapura, GI Muara Dua, GI Bukit Asam, dan GI Blambangan Umpu. Analisis dilakukan dengan menghitung persentase error untuk mengetahui tingkat keakuratan alat. Hasil penelitian menunjukkan bahwa rata-rata tingkat error pengukuran DC Clip Monitoring sebesar 3,78%, masih berada dalam batas toleransi monitoring sistem DC ( $\pm 5\%$ ). GI Blambangan Umpu memiliki tingkat error terkecil sebesar 0,97%, sedangkan GI Martapura dan Muara Dua menunjukkan error sekitar 6%. Secara umum, sistem mampu menampilkan data tegangan secara real-time dan efektif dalam membantu deteksi dini gangguan, termasuk ketidakseimbangan tegangan terhadap ground. Berdasarkan hasil tersebut, dapat disimpulkan bahwa pemasangan DC Clip Monitoring di ULTG Baturaja efektif dan layak digunakan sebagai sistem monitoring serta early warning untuk meningkatkan keandalan dan keamanan sistem DC pada Gardu Induk.*

**Kata kunci:** DC Clip Monitoring, 110 Vdc DC system, IoT, real-time monitoring, error percentage, system reliability.

## **ABSTRACT**

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*Evaluation of the Installation of DC Clip Monitoring at ULTG  
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*The 110 Vdc DC system at the substation plays a crucial role as a power source for protection systems, relays, SCADA, and control systems. Disturbances such as voltage drops or ground imbalances can cause protection failures and reduce system reliability. Therefore, a monitoring system capable of monitoring voltage conditions in real time is required to detect disturbances early. This study aims to analyze the installation, operation, accuracy, and effectiveness of IoT-based DC Clip Monitoring in the Baturaja ULTG work area. The research method used was an experiment with a quantitative approach through measuring and comparing DC voltage data between DC Clip Monitoring readings and standard multimeters at five substations: Baturaja Substation, Martapura Substation, Muara Dua Substation, Bukit Asam Substation, and Blambangan Umpu Substation. The analysis was conducted by calculating the error percentage to determine the accuracy of the instrument. The results showed that the average error rate for DC Clip Monitoring measurements was 3.78%, well within the tolerance limit for DC system monitoring ( $\pm 5\%$ ). The Blambangan Umpu Substation had the lowest error rate at 0.97%, while the Martapura and Muara Dua Substations showed errors of around 6%. Overall, the system displayed real-time voltage data and was effective in assisting in the early detection of disturbances, including voltage imbalances with respect to ground. Based on these results, it can be concluded that the installation of DC Clip Monitoring at the Baturaja ULTG is effective and suitable for use as a monitoring and early warning system to improve the reliability and safety of the DC system at the substation.*

*Keywords: DC Monitoring, microcontroller, real-time system, energy efficiency, voltage and current monitoring.*