

ABSTRAK

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Analisis Hasil Pengukuran Tahanan Pentanahan Tower SUTT 150 kV Menggunakan CT Ring di PT PLN (Persero) ULTG Aurduri
Dibimbing oleh SIGIT SUKMAJATI, S.T., M.T.

Sistem pentanahan pada tower Saluran Udara Tegangan Tinggi (SUTT) 150 kV berperan penting dalam menjaga keandalan sistem transmisi terhadap gangguan petir dan arus hubung tanah. Nilai tahanan pentanahan yang melebihi standar dapat menurunkan kinerja sistem proteksi dan meningkatkan risiko gangguan operasi. Penelitian ini bertujuan untuk menganalisis hasil pengukuran tahanan pentanahan tower SUTT 150 kV menggunakan metode CT Ring serta mengevaluasi kesesuaiannya terhadap standar PLN ($\leq 10 \Omega$). Penelitian dilakukan secara deskriptif analitis terhadap lima tower pada segmen Kuala Tungkal–Pelabuhan Dagang, yaitu KTKAL–PBDAG #0001, #0032, #0084, #0087, dan #0101. Pengukuran dilakukan pada masing-masing kaki tower (Leg A, Leg B, Leg C, dan Leg D) menggunakan alat Fluke 1625-2 dengan metode CT Ring. Hasil pengukuran menunjukkan bahwa nilai tahanan pentanahan bervariasi pada setiap tower. Tower #0084 dan #0101 memenuhi standar dengan seluruh nilai pengukuran $\leq 10 \Omega$. Sebaliknya, tower #0001, #0032, dan #0087 memiliki beberapa nilai tahanan pentanahan yang melebihi batas standar, dengan nilai tertinggi tercatat sebesar 61,3 Ω pada tower #0032. Variasi nilai tersebut dipengaruhi oleh jenis tanah, tingkat kelembapan, serta kondisi sambungan sistem grounding. Berdasarkan hasil evaluasi, diperlukan perbaikan berupa pemeriksaan dan penguatan koneksi pentanahan serta peningkatan sistem elektroda pada tower yang tidak memenuhi standar guna meningkatkan keandalan sistem transmisi 150 kV di wilayah kerja ULTG Aur Duri.

Kata Kunci : CT Ring, Tahanan Pentanahan, Tower SUTT 150 kV, *Grounding System*, Standar $\leq 10 \Omega$.

ABSTRACT

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*Analysis of Earth Resistance Measurement Results of 150 kV Transmission Towers Using CT Ring Method at PT PLN (Persero) ULTG Aurduri.
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The grounding system of 150 kV overhead transmission line (SUTT) towers plays an essential role in maintaining transmission system reliability against lightning strikes and ground fault currents. Grounding resistance values exceeding the standard limit may reduce the performance of the protection system and increase the risk of operational disturbances. This study aims to analyze the grounding resistance measurement results of 150 kV transmission towers using the CT Ring method and to evaluate their compliance with the PLN standard ($\leq 10 \Omega$). This research employed a descriptive analytical approach on five transmission towers located in the Kuala Tungkal–Pelabuhan Dagang segment, namely KTKAL–PBDAG #0001, #0032, #0084, #0087, and #0101. Measurements were carried out on each tower leg (Leg A, Leg B, Leg C, and Leg D) using the Fluke 1625-2 instrument with the CT Ring method. The results indicate that grounding resistance values vary across each tower. Towers #0084 and #0101 comply with the standard, with all measured values $\leq 10 \Omega$. In contrast, towers #0001, #0032, and #0087 show several grounding resistance values exceeding the standard limit, with the highest recorded value of 61.3 Ω on tower #0032. These variations are influenced by soil type, moisture level, and the condition of grounding system connections. Based on the evaluation results, corrective actions are required in the form of inspection and reinforcement of grounding connections, as well as upgrading the grounding electrode system for towers that do not meet the standard, in order to enhance the reliability of the 150 kV transmission system in the ULTG Aur Duri service area..

Keywords: CT Ring, Grounding Resistance, 150 kV Transmission Tower, Grounding System, $\leq 10 \Omega$ Standard.