ABSTRAK

ANALISA TAHANAN ISOLASI BERBASIS INDEKS POLARISASI *CURRENT TRANSFORMER* (CT) GARDU HUBUNG 20KV PT.PLN (Persero) UP2D PALEMBANG

(2025: xiv + 43 Halaman + Daftar Gambar + Daftar Tabel + Lampiran)

Rani Ajrin
062230310441

Jurusan Teknik Elektro
Program Studi Teknik Listrik
Politeknik Negeri Sriwijaya

Penilaian kondisi isolasi pada *Current Transformer* (CT) penting untuk menjaga keandalan sistem distribusi tenaga listrik. Penelitian ini menganalisis kualitas tahanan isolasi CT di gardu hubung 20 kV milik PT PLN (Persero) UP2D Palembang menggunakan metode Indeks Polarisasi (*Polarization Index*/PI). Pengukuran dilakukan menggunakan insulation tester dengan tegangan 1.000–5.000 V selama interval waktu tertentu. Hasil pengukuran dibandingkan dengan standar IEEE untuk menentukan kelayakan operasional. Mayoritas CT menunjukkan nilai PI > 2, menandakan isolasi dalam kondisi baik. Namun, beberapa CT memiliki nilai PI mendekati batas minimum, yang mengindikasikan potensi degradasi akibat usia, kelembaban, atau kontaminasi. Berdasarkan temuan tersebut, disarankan pemeliharaan preventif dan evaluasi berkala guna mencegah gangguan sistem serta memperpanjang usia pakai peralatan. Metode PI terbukti sebagai alat evaluasi *non-destruktif* yang efektif untuk menilai kondisi isolasi CT pada sistem distribusi 20 kV.

Kata kunci: *Current Transformer*, Indeks Polarisasi, Tahanan Isolasi, Gardu Hubung 20 kV, PLN UP2D.

ABSTRACT

ANALYSIS OF INSULATION RESISTANCE BASED ON POLARIZATION INDEX OF CURRENT TRANSFORMERS(CT) AT THE 20KV *SWITCHYARD OF* PT.PLN (PERSERO) UP2D PALEMBANG

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Rani Ajrin
062230310441

Majoring In Electrical Engineering
Electrical Engineering Study Program
Sriwijaya State Polytechnic

The assessment of insulation condition in Current Transformers (CT) is essential to maintain the reliability of electrical power distribution systems. This study analyzes the insulation resistance of CT at the 20 kV switchyard of PT PLN (Persero) UP2D Palembang using the Polarization Index (PI) method. Insulation resistance was measured over time intervals using a tester with test voltages ranging from 1,000 to 5,000 volts. The measurements were then compared to IEEE standard thresholds to evaluate the operational feasibility of the equipment. Results show that most CT achieved PI values greater than 2, indicating good insulation condition. However, a few CT exhibited PI values close to the minimum acceptable limit, suggesting potential degradation due to factors such as aging, moisture, or contamination. These conditions highlight the importance of implementing preventive maintenance and periodic evaluation strategies to avoid failures and ensure the longevity of the equipment. The study confirms that the PI method is a reliable, non-destructive diagnostic tool for evaluating CT insulation performance in medium-voltage distribution networks.

Keywords*: Current Transformer, Polarization Index, Insulation Resistance,* 20 kV *Switchyard,* PLN UP2D.