

ABSTRAK

Rara Salsa Bila Simanjuntak: Analisis Kapasitas *Circuit Breaker* Dan Koordinasi Relay Proteksi OCR Dan GFR Gardu Induk Denai. Fakultas Teknik Universitas Negeri MEDAN 2025

Analisis sistem pengamanan (proteksi) gangguan arus lebih pada transformator daya di PT. PLN (persero) Gardu Induk Denai. Tujuan dari penelitian ini adalah untuk mengetahui kondisi sistem pengamanan (proteksi) gangguan arus lebih, sehingga diketahui keandalan sistem proteksi relai OCR dan GFR. Melalui perhitungan terhadap data *existing*, maka didapatkan hasil waktu kerja relai OCR di sisi *incoming* sebesar 1s dengan TMS = 0,31, OCR di sisi penyulang sebesar 0,33s dengan TMS = 0,14s, GFR di sisi *incoming* sebesar 0,5s dengan TMS = 0,14s, dan GFR di sisi penyulang sebesar 0,27s. Sementara perhitungan berdasarkan data *reseting*, maka didapatkan hasil waktu kerja relai OCR di sisi *incoming* sebesar 0,69s dengan TMS = 0,214 s, OCR di sisi penyulang sebesar 0,298s dengan TMS = 0,149s, GFR di sisi *incoming* sebesar 0,7s dengan TMS = 0,279s, dan GFR di sisi penyulang sebesar 0,303s dengan TMS = 0,109. Melalui perbandingan hasil perhitungan yang dilakukan menghasilkan nilai seting rekomendasi terhadap sistem proteksi gardu induk denai supaya meningkatkan keandalan sistem proteksi dan HV/LV *Short Circuit Impedance : Guaranteed = 12.5 % Measured = 12.47 %* Maksimum Short Circuit Level Trafo di sisi HV Trafo dengan ambang batas yang sudah ditetapkan yaitu 12%, maka dasar pemilihan minimum kapasitas pemutusan CB(*Circuit Breaker*) untuk Bay trafo di GI DENAI 926,22 A

Kata kunci : Sistem Proteksi, *Over Current Relay*, *Ground Fault Relay* dan *Circuit Breaker*

ABSTRACT

Rara Salsa Bila Simanjuntak: *Circuit Breaker Capacity Analysis and OCR and GFR Protection Relay Coordination at Denai Substation. Faculty of Engineering, State University of Medan 2025*

Analysis of the overcurrent protection system for power transformers at PT. PLN (Persero) Denai Main Substation. The purpose of this research is to determine the condition of the overcurrent protection system, so as to determine the reliability of the OCR and GFR relay protection systems. Through calculations on existing data, the results obtained are that the OCR relay working time on the incoming side is 1s with TMS = 0.31, OCR on the feeder side is 0.33s with TMS = 0.14s, GFR on the incoming side is 0.5s with TMS = 0.14s, and GFR on the feeder side is 0.27s. Meanwhile, calculations based on resetting data show that the OCR relay working time on the incoming side is 0.69s with TMS = 0.214 s, OCR on the feeder side is 0.298s with TMS = 0.149s, GFR on the incoming side is 0.7s with TMS = 0.279s, and GFR on the feeder side is 0.303s with TMS = 0.109. By comparing the results of the calculations carried out, we produce recommended setting values for the Denai substation protection system in order to increase the reliability of the protection system. HV/LV Short Circuit Impedance: Guaranteed = 12.5% Measured = 12.47% Maximum Short Circuit Level of the Transformer on the HV side of the Transformer with a predetermined threshold of 12%, then the basis for selecting the minimum CB (Circuit Breaker) breaking capacity for the transformer bay at GI DENAI 926.22 A

Keywords : System Protection, Over Current Relay, Ground Fault Relay dan Circuit Breaker