

RINGKASAN

ANALISIS *SETTING* DAN KOORDINASI OVERCURRENT RELAY (OCR) DAN GROUND FAULT RELAY (GFR) PADA PENYULANG GARUT KOTA (GAKO) 20KV GARDU INDUK GARUT PT PLN (PERSERO) UP2D JAWA BARAT

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Keandalan sistem distribusi tenaga listrik sangat bergantung pada kinerja sistem proteksi dalam mendeteksi dan mengisolasi gangguan secara selektif. Pada jaringan distribusi 20 kV, *Overcurrent Relay* (OCR) dan *Ground Fault Relay* (GFR) berperan penting, sehingga diperlukan analisis setting dan koordinasi proteksi berbasis perhitungan dan simulasi.

Penelitian ini menganalisis *setting* dan koordinasi OCR dan GFR pada Penyulang Garut Kota (GAKO) 20 kV di Gardu Induk Garut PT PLN (Persero) UP2D Jawa Barat menggunakan data aktual jaringan, perhitungan arus hubung singkat, dan simulasi dengan ETAP 21.0.1. Analisis dilakukan pada sisi *incoming*, *outgoing*, Zona 1, dan Zona 2 dengan mengacu pada karakteristik *IEC Standard Inverse*. Hasil simulasi menunjukkan bahwa sistem proteksi telah bekerja selektif dan berjenjang, dengan beda waktu tunda antar relay OCR dan GFR sekitar $\pm 0,3$ detik, sesuai standar IEC. Meskipun demikian, terdapat perbedaan antara *setting* relay eksisting dan hasil simulasi pada beberapa zona, yang menunjukkan perlunya optimasi dan evaluasi *setting* secara berkala agar sistem proteksi semakin andal.

Kata kunci : sistem proteksi, *Overcurrent Relay*, *Ground Fault Relay*, koordinasi proteksi, hubung singkat.

SUMMARY

ANALYSIS OF SETTING AND COORDINATION OF OVERCURRENT RELAY (OCR) AND GROUND FAULT RELAY (GFR) ON GARUT KOTA (GAKO) 20KV FEEDER AT GARUT SUBSTATION PT PLN (PERSERO) UP2D WEST JAVA

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The reliability of an electrical distribution system strongly depends on the performance of its protection system in detecting and isolating faults selectively. In 20 kV distribution networks, Overcurrent Relay (OCR) and Ground Fault Relay (GFR) play a crucial role; therefore, an analysis of relay setting and coordination based on numerical calculation and system simulation is required.

This study analyzes the setting and coordination of OCR and GFR on the Garut Kota (GAKO) 20 kV feeder at Garut Substation, PT PLN (Persero) UP2D West Java, using actual network data, short-circuit current calculations, and simulations performed with ETAP 21.0.1. The analysis covers the incoming, outgoing, Zone 1, and Zone 2 sections, referring to the IEC Standard Inverse characteristic. Simulation results indicate that the protection system operates selectively and in a coordinated manner, with time delay differences between OCR and GFR relays of approximately ± 0.3 seconds, which complies with IEC standards. However, differences between existing relay settings and simulation results were identified in several zones, indicating the need for periodic optimization and evaluation of relay settings to further enhance protection system reliability.

Keywords : *protection system, Overcurrent Relay, Ground Fault Relay, protection coordination, short circuit.*