

RINGKASAN

ANALISIS SISTEM PROTEKSI DIFFERENTIAL RELAY DAN OVER CURRENT RELAY PADA TRANSFORMATOR DAYA AKIBAT GANGGUAN HUBUNG SINGKAT

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Transformator merupakan peralatan listrik di gardu induk yang berperan vital dalam penyaluran energi listrik. Salah satu permasalahan yang sering terjadi pada trafo daya di gardu induk ialah gangguan hubung singkat. Untuk mengamankan trafo dari gangguan dipasang peralatan proteksi utama berupa Relay Diferensial dan proteksi cadangan *Over Current Relay*. Penelitian ini dilakukan untuk menganalisis perhitungan *setting over current relay* dan *differential relay* transformator 1 Gardu Induk Kalibakal, menganalisis sistem kerja *over current relay* dan *differential relay* transformator 1 Gardu Induk Kalibakal saat terdapat gangguan hubung singkat. Metode penelitian menggunakan metode simulasi dengan *Software Simulink Matlab*.

Hasil dari penelitian ini menunjukkan arus diferensial trafo 1 sebesar 0,02A sama dengan arus setting trafo 1 sebesar 0,02A sehingga sesuai dengan standar PLN. TMS OCR pada trafo 1 30MVA Gardu Induk Kalibakal 150kV memiliki ΔTMS sebesar 0,3s sudah sesuai dengan standar PLN ($\Delta TMS = 0,3s - 0,5s$). Relay diferensial dan over current relay akan mengirim sinyal trip ke Circuit Breaker terdekat jika terdapat gangguan hubung singkat 3 fasa ataupun gangguan hubung singkat 2 fasa. Koordinasi antara relay diferensial dan OCR dapat bekerja dengan baik karena dapat trip sesuai setting waktu yang ditentukan.

Kata kunci : Sistem Proteksi, *Over Current Relay*, *Differential Relay*, Gangguan Hubung Singkat

SUMMARY

ANALYSIS OF DIFFERENTIAL RELAY AND OVER CURRENT RELAY PROTECTION SYSTEMS IN POWER TRANSFORMERS DUE TO SHORT CIRCUIT INTERFERENCE

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Transformers are electrical equipment in substations that play a vital role in distributing electrical energy. One of the problems that often occurs in power transformers in substations is short circuit disturbances. To protect the transformer from interference, main protection equipment is installed in the form of a Differential Relay and Over Current Relay backup protection. This research was conducted to analyze the calculation of the settings for the over current relay and differential relay transformer 1 Kalibakal Main Substation, to analyze the working system of the over current relay and differential relay transformer 1 Kalibakal Main Substation when there is a short circuit. The research method uses a simulation method with Simulink Matlab Software.

The results of this research show that the differential current of transformer 1 is 0.02A, the same as the setting current of transformer 1 of 0.02A, so it is in accordance with PLN standards. TMS OCR on transformer 1 30MVA Kalibakal 150kV Substation has a ΔTMS of 0.3s which is in accordance with PLN standards ($\Delta TMS = 0.3s - 0.5s$). The differential relay and over current relay will send a trip signal to the nearest Circuit Breaker if there is a 3-phase short circuit or 2 phase short circuit. Coordination between the differential relay and OCR can work well because it can trip according to the specified time setting.

Keywords : Protection Systems, Over Current Relays, Differential Relays, Short Circuit Faults