

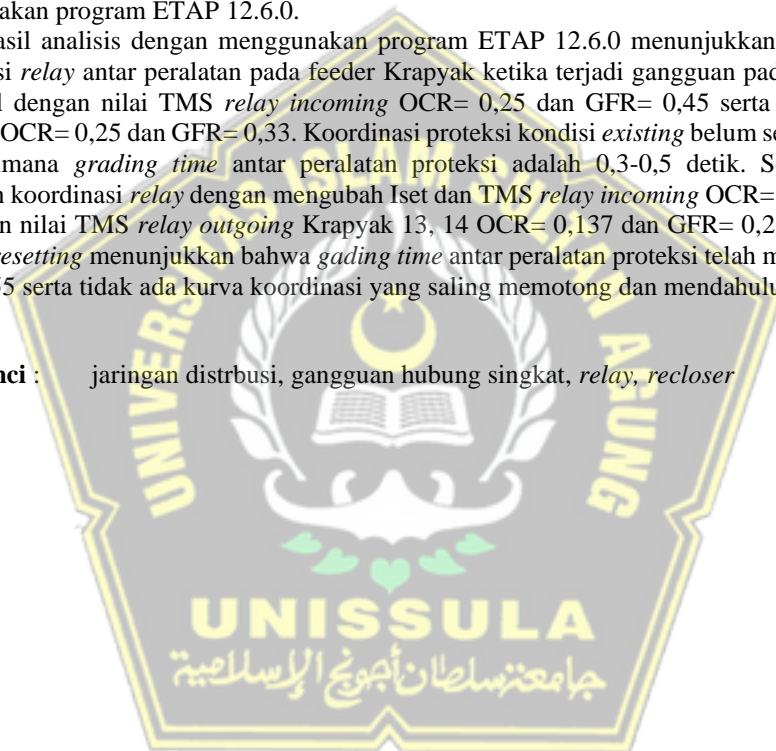
ABSTRAK

Penggunaan energi listrik akan terus berkembang dan hal ini mengharuskan adanya perkembangan jaringan distribusi. Salah satu contohnya terjadi di Kota Semarang mengalami kenaikan beban puncak dan tidak menutup kemungkinan akan terjadi gangguan, sehingga kerja sistem proteksi perlu dianalisis dan nantinya bisa dapat dijadikan bahan evaluasi perusahaan. Analisis sistem proteksi bertujuan untuk mengamankan dan meminimalisir kerusakan ketika terjadi gangguan hubung singkat. Analisis proteksi meliputi koordinasi antar peralatan proteksi dalam jaringan distribusi yang harus memenuhi standar yang ada.

Pada tugas akhir ini membahas tentang analisis koordinasi proteksi *Over Current Relay* (OCR), *Ground Fault Relay* (GFR), dan *recloser* pada *feeder* Trafo I 60 MVA Gardu Induk Krapyak Semarang. Arus *setting* pada peralatan proteksi diatur berdasarkan kuat hantar arus (KHA) dan arus hubung singkat. Koordinasi proteksi hasil *resetting* dibandingkan dengan *setting existing* menggunakan program ETAP 12.6.0.

Hasil analisis dengan menggunakan program ETAP 12.6.0 menunjukkan kondisi *existing* koordinasi *relay* antar peralatan pada *feeder* Krapyak ketika terjadi gangguan pada arus gangguan maksimal dengan nilai TMS *relay incoming* OCR= 0,25 dan GFR= 0,45 serta nilai TMS *relay outgoing* OCR= 0,25 dan GFR= 0,33. Koordinasi proteksi kondisi *existing* belum sesuai standar IEC 60255 dimana *grading time* antar peralatan proteksi adalah 0,3-0,5 detik. Setelah dilakukan perbaikan koordinasi *relay* dengan mengubah Iset dan TMS *relay incoming* OCR= 0,227 dan GFR= 0,401, dan nilai TMS *relay outgoing* Krapyak 13, 14 OCR= 0,137 dan GFR= 0,212; 0,137; 0,132. Kondisi *resetting* menunjukkan bahwa *gading time* antar peralatan proteksi telah memenuhi standar IEC 60255 serta tidak ada kurva koordinasi yang saling memotong dan mendahului.

Kata kunci : jaringan distrbusi, gangguan hubung singkat, *relay*, *recloser*



ABSTRACT

The use of electrical energy will continue to grow and this requires the development of a distribution network. One example occurred in the city of Semarang experiencing an increase in peak loads and it did not rule out the possibility of disturbances, so that the work of the protection system needs to be analyzed and later it can be used as material for company evaluation. Protection system analysis aims to secure and minimize damage when a short circuit failure occurs. Protection analysis includes coordination between protection equipment in a distribution network that must meet existing standards.

In this final project discusses the analysis of the protection coordination Over Current Relay (OCR), Ground Fault Relay (GFR), and recloser on the feeder Transformer I 60 MVA at Krapyak Substation Semarang. The current setting in the protection equipment is adjusted based on the current conductive strength (KHA) and the short circuit current. The coordination of protection from resetting results is compared with the existing setting using the ETAP 12.6.0 program.

The results of the evaluation using the ETAP 12.6.0 program show the existing conditions of relay coordination between equipment on the Kalisari feeder when a maximum disturbance occurs with the incoming OCR TMS value = 0.24 and GFR = 0.44 and the TMS relay outgoing OCR = 0.27 and GFR = 0.32. Coordination of protection in existing conditions is not in accordance with IEC 60255 standards where the grading time between protection equipment is 0.3-0.5 seconds. After repairing the relay coordination by changing the Iset and TMS relay incoming OCR = 0.236 and GFR = 0.41, and the value of outgoing Kalisari relay TMS 4.5.6 OCR = 0.137 and GFR = 0.167; 0.142; 0.209. The resetting condition shows that the ivory time between the protective equipment has met the IEC 60255 standard and there is no coordination curve that intersects and overtakes each other.

Keywords : *electric power distribution system, short circuit fault, relay, recloser*

