

RINGKASAN

ANALISIS ARUS BOCOR PADA LIGHTNING ARRESTER BAY PURBALINGGA I GARDU INDUK 150 KV RAWALO

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Sistem penyaluran energi listrik di Gardu Induk 150 kV Rawalo memiliki permasalahan terhadap kenaikan arus bocor *Lightning Arrester*. Kenaikan arus bocor *Lightning Arrester* diketahui setelah dilakukan pengukuran dan perhitungan presentase arus bocor menggunakan *Leakage Current Measurement*. Gangguan yang terjadi mengakibatkan fungsi dari *Lightning Arrester* pada Bay Purbalingga I kurang baik. Kenaikan arus bocor *Lightning Arrester* di Gardu Induk 150 kV Rawalo dapat disebabkan oleh faktor internal maupun faktor eksternal. Faktor internal yaitu seperti peralatan yang digunakan kurang berfungsi dengan baik sehingga dapat menyebabkan kegagalan pada peralatan tersebut, sedangkan faktor eksternal yaitu seperti kesalahan manusia atau *human error* dan dapat juga seperti gangguan alam seperti petir, gempa, banjir, angin dan lain-lain. Tujuan dari dilakukannya penelitian ini adalah menganalisis arus bocor *Lightning Arrester* yang terdapat pada Bay Purbalingga I Gardu Induk 150 kV Rawalo. Kemudian membandingkan hasil perhitungan manual dengan pengukuran melalui *Leakage Current Measurement* sesuai dengan Standar PLN. Pada metode penelitian dilakukan dengan melakukan pengukuran menggunakan alat *Leakage Current Measurement* yang kemudian dibandingkan dengan hasil perhitungan manual pada *Lightning Arrester* Bay Purbalingga I Gardu Induk 150 kV Rawalo. Didapatkan hasil pengukuran arus bocor *Lightning Arrester* menggunakan *Leakage Current Measurement* nilai arus resistif R, S, T adalah R = 518 μ A, S = 60 μ A, T = 30 μ A dan nilai *corrective* R, S, T adalah R = 778 μ A, S = 90 μ A, T = 46 μ A. Hal ini menandakan bahwa arus bocor *Lightning Arrester* pada Bay Penghantar Purbalingga I dalam kondisi kurang bagus, karena melebihi batasan arus bocor yang ditentukan yaitu 150 μ A. Yang dimana nilai arus resistif fasa R = 518 μ A dan nilai *corrective* fasa R 778 μ A. Dan berdasarkan hasil perhitungan persentase arus bocor menunjukkan *Lightning Arrester* Fasa R Bay Purbalingga I memiliki persentase arus bocor sebesar 518% yang melebihi standar batasan arus bocor yang ditetapkan oleh PT PLN (Persero) yaitu sebesar 150%. Maka dari itu *Lightning Arrester* fasa R harus dilakukan penggantian *Lightning Arrester* sesuai dengan rekomendasi dari buku “Pedoman Pemeliharaan *Lightning Arrester*” PT PLN (Persero).

Kata kunci: Arus Bocor, *Leakage Current Measurement*, *Lightning Arrester*

SUMMARY

ANALYSIS OF LEAKAGE CURRENT LIGHTNING ARRESTER IN THE PURBALINGGA BAY 1 AT THE 150 KV RAWALO MAIN SUBSTATION

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The electrical energy distribution system at the Rawalo 150 kV substation has problems with increasing Lightning Arrester leakage current. The increase in Lightning Arrester leakage current was discovered after measuring and calculating the percentage of leakage current using Leakage Current Measurement. The disturbance that occurred resulted in the function of the Lightning Arrester in Bay Purbalingga I being poor. The increase in Lightning Arrester leakage current at the 150 kV Rawalo Substation can be caused by internal and external factors. Internal factors include equipment used that is not functioning properly, which can cause failure of the equipment, while external factors include human error and can also include natural disturbances such as lightning, earthquakes, floods, wind and so on. The aim of this research is to analyze the Lightning Arrester leakage current at Bay Purbalingga I Rawalo 150 kV Main Substation. Then compare the results of manual calculations with measurements via Leakage Current Measurement in accordance with PLN Standards. The research method was carried out by taking measurements using a Leakage Current Measurement tool which was then compared with the results of manual calculations on the Lightning Arrester Bay Purbalingga I Rawalo 150 kV Main Substation. The results obtained from measuring the leakage current of the Lightning Arrester using Leakage Current Measurement, the resistive current values R, S, T are $R = 518 \mu A$, $S = 60 \mu A$, $T = 30 \mu A$ and the corrective values R, S, T are $R = 778 \mu A$, $S = 90 \mu A$, $T = 46 \mu A$. This indicates that the Lightning Arrester leakage current in the Purbalingga I Conductor Bay is in poor condition, because it exceeds the specified leakage current limit, namely $150 \mu A$. Where the resistive current value of the R phase = $518 \mu A$ and the corrective value of the R phase is $778 \mu A$. And based on the results of the leakage current percentage calculation, it shows that the Phase R Bay Purbalingga I Lightning Arrester has a leakage current percentage of 518%, which exceeds the standard leakage current limit set by PT PLN (Persero), namely 150%. Therefore, the R phase Lightning Arrester must be replaced according to the recommendations from the PT PLN (Persero) "Lightning Arrester Maintenance Guidelines" book.

Keywords: Leakage Current, Lightning Arrester, Leakage Current Measurement