

ABSTRAK

ANALISA TAHANAN ISOLASI GENERATOR GT 1.2 BERBASIS

INDEKS POLARITAS DI PLTGU INDRALAYA

(2026 : xiv + 52 Halaman + 13 Daftar Gambar + 3 Daftar Tabel + Lampiran)

Redho Adi Syabiren

062330310458

Jurusan Teknik Elektro

Program Studi Teknik Listrik

Politeknik Negeri Sriwijaya

Generator sinkron merupakan salah satu peralatan utama pada pembangkit listrik yang berfungsi mengubah energi mekanik menjadi energi listrik. Keandalan generator sangat dipengaruhi oleh kondisi sistem isolasinya sehingga diperlukan pengujian secara berkala untuk menjamin keamanan dan kontinuitas operasi. Penelitian ini bertujuan untuk menganalisis kondisi tahanan isolasi generator menggunakan metode Polarization Index (PI) di PT PLN Indonesia Power UBP Keramasan UP Indralaya. Pengujian tahanan isolasi dilakukan menggunakan insulation tester (megger) 500 VDC pada belitan stator dan rotor generator. Pengukuran dilakukan pada interval waktu 1 menit dan 10 menit, kemudian nilai PI dihitung berdasarkan perbandingan nilai tahanan isolasi pada menit ke-10 terhadap menit ke-1, hasil pengujian menunjukkan nilai tahanan isolasi berada pada kisaran gigaohm ($G\Omega$) dengan nilai PI berkisar antara 1,59 hingga 3,22. Berdasarkan standar IEEE 43-2000, kondisi isolasi generator secara umum masih berada dalam kategori layak untuk dioperasikan, meskipun beberapa titik pengukuran memerlukan pemantauan berkala sebagai bagian dari pemeliharaan preventif. Hasil penelitian menunjukkan bahwa metode Polarization Index efektif digunakan untuk mengevaluasi kondisi isolasi generator dan dapat dijadikan dasar dalam menjaga keandalan peralatan pembangkit.

Kata kunci: generator sinkron, tahanan isolasi, Polarization Index (PI), pemeliharaan generator.

ABSTRACT

ANALYSIS OF GT 1.2 GENERATOR INSULATION RESISTANCE BASED ON THE POLARIZATION INDEX AT PLTGU INDRALAYA

(2026: xiv + 52 Pages + 13 Figures + 3 Tables + Appendices)

Redho Adi Syabiren

062330310458

Department of Electrical Engineering

Electrical Engineering Study Program

Sriwijaya State Polytechnic

A synchronous generator is one of the main pieces of equipment in a power plant that functions to convert mechanical energy into electrical energy. The reliability of a generator is highly dependent on the condition of its insulation system; therefore, periodic testing is required to ensure operational safety and continuity. This study aims to analyze the insulation resistance condition of the generator using the Polarization Index (PI) method at PT PLN Indonesia Power UBP Keramasan UP Indralaya. Insulation resistance testing was conducted using a 500 VDC insulation tester (megger) on the stator and rotor windings of the generator. Measurements were taken at 1-minute and 10-minute intervals, and the PI value was calculated based on the ratio of the insulation resistance measured at the 10th minute to that measured at the 1st minute. The test results showed that the insulation resistance values were in the gigaohm ($G\Omega$) range, with PI values ranging from 1.59 to 3.22. Based on the IEEE 43-2000 standard, the overall insulation condition of the generator is considered suitable for operation, although several measurement points require periodic monitoring as part of preventive maintenance. The results of this study indicate that the Polarization Index method is effective for evaluating the condition of generator insulation and can serve as a basis for maintaining the reliability of power plant equipment.

Keywords: synchronous generator, insulation resistance, Polarization Index (PI), generator maintenance.