

ABSTRAK

RANCANG BANGUN *TRAINER KIT* HUBUNGAN KUMPARAN TRANSFORMATOR 3 FASA

(2025: xiv + 50 Halaman + 10 Tabel + 26 Gambar + 12 Lampiran)

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Transformator tiga fasa memainkan peranan vital dalam sistem tenaga listrik karena mampu mendukung proses distribusi energi secara stabil dan efisien. Pemahaman terhadap konfigurasi hubungan kumparan, seperti bentuk bintang (Y) dan segitiga (Δ), menjadi hal yang penting dalam kegiatan pembelajaran, khususnya di lingkungan pendidikan vokasi Jurusan Teknik Elektro, Program Studi DIII Teknik Listrik. Penelitian ini bertujuan untuk merancang serta membuat trainer kit sebagai sarana praktikum pembelajaran mengenai hubungan kumparan pada transformator tiga fasa. Trainer kit dibuat dengan menggunakan tiga transformator satu fasa yang dapat disusun dalam lima konfigurasi, yakni Y–Y, Δ – Δ , Y– Δ , dan Δ –Y. Proses pengujian meliputi pengukuran tegangan pada sisi primer dan sekunder, penentuan kelompok jam berdasarkan sudut fasa, serta perhitungan rasio transformasi. Berdasarkan hasil uji coba, trainer kit mampu menunjukkan karakteristik masing-masing konfigurasi dengan akurat, seperti simbol $Yy0$, $Dd0$, $Yd1$, dan $Dy11$. Rasio transformasi yang diperoleh juga sesuai dengan teori dasar transformator. Oleh karena itu, trainer kit ini dinilai layak digunakan sebagai media praktikum sistem kelistrikan berbasis transformator tiga fasa.

Kata Kunci: Transformator Tiga Fasa, *Trainer Kit*, Hubungan Kumparan, Jam Vektor, Rasio Transformasi

ABSTRACT

DESIGN AND DEVELOPMENT OF A TRAINER KIT FOR THREE-PHASE TRANSFORMER WINDING CONNECTIONS

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Three-phase transformers play a vital role in power systems, especially in supporting efficient and stable power distribution. Understanding coil connection configurations, such as star (Y) and delta (Δ), is a crucial aspect of the learning process, particularly in vocational education within the Department of Electrical Engineering, DIII Electrical Engineering Study Program. This research aims to design and develop a trainer kit as a learning medium for practical exercises on three-phase transformer coil connections. The trainer kit is designed using three single-phase transformers that can be configured into four types of connections: Y–Y, Δ – Δ , Y– Δ , and Δ –Y. Testing was carried out by measuring the voltage on the primary and secondary sides, determining the clock group based on the phase angle, and calculating the transformation ratio. The results show that the trainer kit can effectively represent the characteristics of each configuration, as indicated by the conformity of the connection symbols Yy0, Dd0, Yd1, and Dy11. Furthermore, the obtained transformation ratio values align with the basic transformer theory. Thus, this trainer kit is considered effective as a practical learning medium for three-phase transformer-based electrical systems.

Keywords: *Three-Phase Transformer, Trainer Kit, Winding Connection, Vector Group, Voltage Ratio*