ABSTRAK

SEPTIAN RETNO BAYU

Analisis Pemasangan Load Break Switch Motorized Guna Meningkatkan Keandalan Jaringan Pada Feeder Tapakis Zona 2 Section 1

Dibimbing oleh Ir. Meyhart Bangkit Sitorus, S.T.,M.Eng.,IPM

Sistem distribusi tenaga listrik merupakan komponen utama dalam menjaga kontinuitas penyaluran energi dari gardu induk hingga ke pelanggan. Salah satu permasalahan utama dalam sistem distribusi adalah rendahnya tingkat keandalan (reliability) akibat tingginya frekuensi dan durasi gangguan yang mengakibatkan peningkatan nilai SAIDI (System Average Interruption Duration Index) dan SAIFI (System Average Interruption Frequency Index). Berdasarkan data operasional PT PLN (Persero) ULP Lubuk Alung – UP3 Padang – UID Sumatera Barat, Feeder Tapakis Zona 2 Section 1 dengan keypoint Recloser Sei Abang tercatat mengalami 31 kali gangguan selama periode 04 Januari 2024 hingga 28 Juli 2025, yang menyebabkan durasi padam pelanggan melebihi standar keandalan PLN.Untuk mengatasi permasalahan tersebut, penelitian ini merancang penerapan Load Break Switch (LBS) Motorized sebagai solusi peningkatan keandalan sistem distribusi. LBS Motorized merupakan perangkat pemutus beban tegangan menengah yang dapat dioperasikan secara otomatis melalui sistem SCADA (Supervisory Control and Data Acquisition). Perangkat ini berfungsi mempercepat proses isolasi gangguan dan manuver beban jarak jauh, sehingga area terdampak pemadaman dapat diminimalkan.Metode penelitian yang digunakan adalah pendekatan deskriptif kuantitatif, dengan jenis penelitian terapan (applied research). Proses penelitian meliputi pengumpulan data primer dari observasi lapangan di Feeder Tapakis dan dokumentasi gangguan PLN ULP Lubuk Alung, serta data sekunder berupa standar IEEE dan literatur ilmiah. Implementasi perangkat ini juga mendukung program digitalisasi jaringan distribusi dan pengembangan Smart Grid yang sedang dijalankan oleh PT PLN (Persero) UID Sumatera Barat, sekaligus memberikan manfaat strategis dalam peningkatan mutu pelayanan tenaga listrik di wilayah kerja ULP Lubuk Alung.

Kata Kunci : Load Break Switch Motorized, Keandalan Sistem Distribusi, SAIDI, SAIFI, SCADA, PLN ULP Lubuk Alung.

ABSTRACT

SEPTIAN RETNO BAYU

Analysis ofthe Installation ofMotorized LoadBreakSwitches to Improve Network Reliability on the Tapakis Feeder Zone 2 Section 1

Supervised by TRI SUSILO TEDI, S.T., M.T.

The electric power distribution system is a key component in maintaining the continuity of energy delivery from substations to consumers. One of the main problems in distribution systems is low reliability caused by the highfrequency and duration ofdisturbances, which lead to an increase in the System Average Interruption Duration Index (SAIDI) and the System Average Interruption Frequency Index (SAIFI). Based on operational datafrom PT PLN (Persero) ULP LubukAlung — UP3 Padang — UID West Sumatra, the Tapakis Feeder Zone 2 Section 1, with keypoint Recloser Sei Abang, recorded 31 disturbance events during the periodfrom January 4, 2024, to July 28, 2025, resulting in customer outage durations that exceeded PLN,s reliability standards. To overcome this issue, this study designs the implementation of a Load Break Switch (LBS) Motorized as a solution to improve the reliability of the distribution system. The LBS Motorized is a medium–voltage load switch device that can be operated automatically through a SCADA (Supervisory Control and Data Acquisition) system. This device functions to accelerate thefault isolation and remote load transfer processes, thereby minimizing the area affected by power outages. The research method used is a descriptive quantitative approach with the type of study classified as applied research. The process includes collecting primary data from field observations on the Tapakis Feeder and disturbance documentation from PLN ULP Lubuk Alung, as well as secondary data in the form ofIEEE standards and scientific literature. The implementation of this device also supports the distribution network digitalization and Smart Grid development programs currently being implemented by PT PLN (Persero) UID West Sumatra, while providing strategic benefits in improving the quality of electricity service in the operational area of ULP LubukAlung.

Keywords: Load Break Switch Motorized, Distribution System Reliability, SAIDI, SAIFI, SCADA, PLN ULPLubukAlung.