

RANCANG BANGUN SISTEM MONITORING DAN PROTEKSI DAYA UNTUK EFISIENSI MOTOR TIGA FASA BERBASIS *BLYNK CLOUD*

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ABSTRAK

Motor induksi tiga fasa merupakan motor yang banyak digunakan di industri karena memiliki efisiensi tinggi dan konstruksi yang sederhana, namun rentan mengalami penurunan kinerja akibat gangguan seperti tegangan lebih, tegangan kurang, arus lebih, dan suhu berlebih. Penelitian ini bertujuan merancang dan membangun sistem monitoring dan proteksi daya berbasis Internet of Things (IoT) menggunakan ESP32, sensor PZEM-004T, sensor MLX90614, serta aplikasi Blynk Cloud untuk memantau kondisi motor secara real-time. Sistem dirancang untuk mengukur parameter kelistrikan dan suhu motor, menghitung efisiensi berdasarkan metode rugi-rugi daya sesuai standar IEEE, serta memberikan proteksi otomatis melalui relay, kontaktor, buzzer, dan notifikasi ketika terjadi kondisi abnormal. Pengujian dilakukan pada motor induksi tiga fasa 250 W dengan pengaturan Variable Speed Drive (VSD) pada frekuensi 40 Hz (1120 rpm) selama 75 menit. Hasil penelitian diharapkan menunjukkan bahwa sistem mampu melakukan monitoring secara real-time, memberikan proteksi otomatis terhadap gangguan, serta membantu menjaga kestabilan operasi dan efisiensi motor induksi tiga fasa.

Kata kunci: *Blynk Cloud, Efisiensi, ESP32, Motor induksi tiga fasa, Monitoring, Proteksi.*

DESIGN AND IMPLEMENTATION OF A BLYNK CLOUD-BASED POWER MONITORING AND PROTECTION SYSTEM FOR THREE-PHASE INDUCTION MOTOR EFFICIENCY

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ABSTRACT

Three-phase induction motors are widely used in industrial applications due to their high efficiency and simple construction; however, their performance can deteriorate because of faults such as overvoltage, undervoltage, overcurrent, and overheating. This study aims to design and develop an Internet of Things (IoT)-based monitoring and power protection system using an ESP32 microcontroller, PZEM-004T power sensor, MLX90614 infrared temperature sensor, and the Blynk Cloud platform to monitor the motor's operating condition in real time. The proposed system measures electrical parameters and motor temperature, calculates motor efficiency based on the IEEE loss method, and provides automatic protection through a relay, contactor, buzzer, and notification system when abnormal operating conditions are detected. Experimental testing was conducted on a 250 W three-phase induction motor operated using a Variable Speed Drive (VSD) at a frequency of 40 Hz (1120 rpm) for 75 minutes. The results are expected to demonstrate that the proposed system is capable of performing real-time monitoring, providing automatic protection against electrical and thermal faults, and helping maintain stable operation and improve the efficiency of the three-phase induction motor.

Keywords: *Blynk Cloud, Efficiency, ESP32, Three-phase induction motor, Monitoring, Protection.*