

DESIGNING AND DEVELOPING NODEMCU-BASED AUTOMATIC TRANSFER SWITCH (ATS) AND AUTOMATIC MAIN FAILURE (AMF) SYSTEM WITH HMI AND BLYNK INTERFACE

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ABSTRACT

Electrical energy is a primary necessity for operating electronic devices continuously. However, the availability of non-renewable electricity sources is diminishing, prompting the need for alternative energy, such as regenerative sources, as backup power. The continuity of electricity distribution from power plants to end users cannot always be guaranteed due to potential disruptions in the generation, transmission, or distribution systems. For consumers requiring an uninterrupted power supply, a backup generator with sufficient capacity is essential to support the entire load during outages. Conventional transfer systems have limitations, including delayed response times. Therefore, implementing an automatic transfer control system enhances efficiency, safety, and accuracy. This study proposes a prototype of an Automatic Transfer Switch (ATS) and Automatic Main Failure (AMF) system using NodeMCU, equipped with an HMI (Human-Machine Interface) and IoT integration via Arduino and the Blynk application. The system enables remote monitoring and control via smartphone, real-time measurement of voltage and current from both PLN (state electricity grid) and generator sources and performs automatic switching between power inputs. The sensor accuracy exceeds 90%, and all measurement data is displayed on the HMI. This innovation offers users a practical solution for generator monitoring, fault detection, and maintenance scheduling.

Keywords: *Electrical Energy, ATS and AMF Functions, Power Generation.*