ABSTRACT

The electricity demand of each consumer varies, depending on how much they use. However, electrical power consumption in buildings is often uncontrolled, which can lead to overloading. In this research, an Android application is used to develop a voltage, current, frequency, and power monitoring system that is connected to a microcontroller and has the ability to cut off electricity. The 3 phase voltage uses 380 - 415 volts to produce sufficient and efficient power. The purpose of this project is to create a tool that can regulate and control the use of power at 3 phase voltage and integrated with the Internet of Things application using the C# programming language, to track and manage power consumption at three phase voltage in the residential industry. By improving operational efficiency and reducing unplanned damage to the 3-phase voltage, this technology is connected to the internet connection source hp, intended to solve problems in the industry.

Important information such as current, voltage, and power can be tracked in real time by implementing an Internet of Things application that uses internet-connected sensors. By utilizing the ESP32 for data storage and wifi connection from a smartphone, the PZEM-004T serves as a data reader for voltage, power, and voltage through the R, S, and T voltages. This data is used to identify patterns that indicate possible damage to the 3-phase voltage. Each phase is set a maximum power usage limit of 300 watts, if it exceeds the maximum power usage limit, the device will cut off electricity to secure industrial equipment. The test was carried out 8 times and obtained data on voltage, current, and power on each phase which was monitored in real time using the application. After calculating the total voltage, current, and total power in each phase, the power in the 3-phase voltage is obtained at 356.409179 watts.

Network connectivity testing under LoS conditions is carried out to see the extent to which IoT devices can connect to a wifi connection source, using a distance of 1 meter to 30 meters has a delay of 130.9053711 ms and a packet loss of 0.13%, because at a distance of 30 meters the internet connection is lost. Meanwhile, in NLoS conditions, measurements were taken 15 times with a distance of 1 meter to 15 meters, because at a distance of 15 meters the internet connection was lost. In NLoS conditions, the delay is 131.9658247 ms and the packet loss is 0.062%.

Keywords: ***ESP32, PZEM-004T, IoT, 3 phase unbalance***