UNIVERSITI TEKNOLOGI MARA

Advanced Current and Power Consumption Monitoring with Overload Protection

DINIE HAQEEMY BIN ABDUL MU'IZZ

Thesis submitted in fulfillment
of the requirements for the degree of
Diploma of Electrical Engineering

Centre of Electrical Engineering Studies, UiTM Johor Branch, Pasir Gudang Campus

JANUARY 2024

ABSTRACT

In today's increasingly digitized and energy-conscious society, it is critical to correctly measure and analyze current and power usage while preventing overloads. To solve these difficulties, this proposal presents an improved monitoring and protection system that uses cutting-edge technologies. The system combines modern current and power monitoring devices with an intelligent overload protection mechanism. The monitoring devices use highly precise sensors and advanced algorithms to measure and analyze current and power consumption in real time. The acquired data is analyzed and presented in a user-friendly interface, allowing users to track and analyze their energy consumption habits. The system provides extensive insights into individual appliance usage as well as the system's overall energy profile. This information enables customers to make more educated decisions about energy usage optimization and efficiency enhancement. Furthermore, the project emphasizes the need for overload protection in preventing electrical equipment damage and ensuring the electrical system's safety. The system continuously monitors the load on the system and uses advanced algorithms to detect and prevent overloads. In the event of an impending overload, the system takes appropriate precautions to reduce the danger, such as automatically shedding non-critical loads or warning the user to act. The proposed system stands out for its excellent precision, real-time monitoring, and intelligent overload protection. It provides a scalable system that may be used in a variety of environments, including residential, commercial, and industrial. This project intends to contribute to the sustainability and safety of modern electrical systems by enabling effective energy consumption monitoring and safeguarding against overload situations.

ACKNOWLEDGEMENT

First and foremost, I would want to thank Allah SWT for providing me with the opportunity to pursue my diploma and successfully complete this long and difficult road; without God's guidance, my project would never function properly. My gratitude and thanks go to my supervisor, Nur Asfahani Binti Ismail, who always guides, assists, and observes me to ensure that my project is completed properly.

Next, I'd like to thank Madam Nur Asfahani and one of my fellow friends for providing facilities and support during the sample process. Special thanks to my colleagues and friends that assisted me with this project.

Finally, I devote this thesis to the loving memory of my father and mother, who had the vision and determination to educate me. This slice of success is dedicated to you both. I'd also like to thank all the FYP1 (EEE358) and FYP2 (EEE368) panelists for their guidance and good words about my work and project. Alhamdulillah.

TABLE OF CONTENT

CHAPTER ONE

INTRODUCTION

1.1   Research Background

Advanced technologies and systems that enable exact monitoring and effective management of current and power consumption while protecting against overload scenarios are becoming increasingly important in today's energy-conscious environment. To satisfy this need, the "Advanced Current and Power Monitoring Consumption with Overload Protection" project provides a comprehensive solution based on cutting-edge technology, intelligent algorithms, and precise sensors. This approach improves energy efficiency and protects electrical systems. This project provides a comprehensive solution combining cutting-edge technology, intelligent algorithms, and precise sensors. The combination of these components enables the development of a complex monitoring and management system. The primary goals of this project are twofold: optimizing energy usage and assuring the safety of electrical equipment. The utilization of cutting-edge technology, such as smart sensors, allows for real-time and accurate monitoring of current and power usage. These sensors generate precise data, allowing the system to adjust dynamically to changing usage patterns and potential problems. The use of sophisticated algorithms improves the system's capabilities, enabling enhanced data analytics and predictive maintenance. Energy consumption is optimized by intelligent analysis of use trends. Using the sensor data, the system may identify areas for improvement and make changes to improve overall efficiency. This not only helps to conserve energy, but it may also result in cost savings. The project works to keep electrical systems safe from overloads. Smart algorithms in the system detect potential issues early and automatically prevent failures. This proactive approach makes electrical parts more reliable, reducing downtime and costs.