Design of an ATS Grid Monitoring System Using WinCC Software

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***Abstract*—This undergraduate thesis focuses on the design and implementation of an Automatic Transfer Switch (ATS) grid monitoring system using the WinCC software. The author describes the system's hardware and software components, including the configuration of WinCC RT Advanced and the creation of a user interface. The work covers the principles of ATS operation, the use of basic electrical and automation equipment, and the programming of Siemens S7-1200 PLC. The thesis also discusses potential future developments, such as integrating the system with a broader monitoring network and utilizing the web server feature of the PLC.**

***Index Terms*—ATS, WinCC, PLC, Control Algorithms, User Interface**

I. Introduction

The thesis introduces the design of an ATS grid monitoring system using WinCC software, emphasizing the importance of reliable power supply in critical facilities. It outlines the challenges of power transmission and the necessity of having a backup power source to mitigate the impact of power outages. The author explains the role of ATS in ensuring continuous power supply and the need for a monitoring system to detect and respond to power failures promptly. The work also highlights the use of Siemens S7-1200 PLC and WinCC RT Advanced for implementing control algorithms and creating a user interface [1]. Published articles on the methods and subject of this project provide context for this English summary [9]. Published books on the methods and subject of this project provide context for this English summary [10].

II. Methods

The author designed and implemented the ATS grid monitoring system using WinCC software. The system includes the configuration of WinCC RT Advanced, the creation of a user interface, and the programming of Siemens S7-1200 PLC. The thesis provides detailed descriptions of the hardware and software components, including the configuration of the PLC and the development of control algorithms. The author explains the process of setting up the PLC, configuring the I/O addresses, and programming the control logic. The user interface was developed using WinCC Advanced, allowing for real-time monitoring and control of the ATS system [1].

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III. Results

The thesis reports that the designed ATS grid monitoring system met the basic requirements, allowing for the design of both manual and automatic control circuits. The author successfully implemented control algorithms and created a user interface using WinCC Advanced. The system was tested and validated through the configuration of the PLC and the development of control networks. The author describes the implementation of the control algorithms, including the detection of voltage anomalies and the automatic switching between the main grid and the backup generator. However, no specific performance metrics or evaluation results are provided [1].

IV. Discussion

The author discusses the potential for future developments, such as integrating the system with a broader monitoring network and utilizing the web server feature of the PLC. The thesis highlights the importance of reliable power supply in critical facilities and the need for a backup power source to mitigate the impact of power outages. The author suggests that the system can be further developed to integrate with a broader monitoring network and utilize the web server feature of the PLC for remote monitoring and control. However, no specific examples or implementation details are provided [1].

V. Conclusion

The thesis concludes that the designed ATS grid monitoring system met the basic requirements and provided a comprehensive understanding of the principles of ATS operation, the use of basic electrical and automation equipment, and the programming of Siemens S7-1200 PLC. The author suggests that the system can be further developed to integrate with a broader monitoring network and utilize the web server feature of the PLC. The work offers a foundation for future research and development in the field of power system monitoring and control [1].

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