Design and Construction of a Toyota Vios 2015 Power-Window Control Circuit

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***Abstract*—This thesis focuses on the design and manufacturing of the control circuit for the Toyota Vios 2015 power-window system. The author developed a control system that can operate in both automatic and manual modes, and illustrated through circuit simulation. The system was designed to ensure smooth operation and basic window-control functions. The author used software tools such as Proteus and Arduino to simulate and control the basic functions of the window up-down system. Practical tests were conducted to verify the system's functionality in both automatic and manual modes. The system was successfully developed and tested, demonstrating the ability to operate in both modes. However, the thesis acknowledges that the system has limitations and areas for improvement, such as the need for a more comprehensive simulation of all system functions.**

***Index Terms*—window control circuit, Toyota Vios 2015, up-down system, manual and automatic modes, control system**

I. Introduction

The thesis provides an overview of the window up-down system in cars, detailing its functions and mechanisms. It then delves into the specific design and manufacturing of the control circuit for the Toyota Vios 2015, focusing on both automatic and manual operation modes. The author explains the importance of the control circuit in ensuring the smooth and safe operation of the window system. The design process involved understanding the existing system, identifying the necessary components, and selecting appropriate software tools for simulation and control. The author also discusses the challenges and considerations in the design process, such as ensuring compatibility with the vehicle's existing electrical system and addressing potential safety concerns [1].

II. Methods

The author used software tools such as Proteus and Arduino to simulate and control the basic functions of the window up-down system. The design process involved creating a schematic diagram and programming the microcontroller to control the motor and sensors. Practical tests were conducted to verify the system's functionality in both automatic and manual modes. The author also implemented a user interface using an LCD display to provide visual feedback and control options. The tests included operating the system in both modes, testing the motor's response to user inputs, and verifying the system's ability to handle object obstruction. The author documented the results of these tests, noting any issues encountered and the steps taken to resolve them [1].

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III. Results

The system was successfully developed and tested, demonstrating the ability to operate in both automatic and manual modes. The author implemented a control circuit that allowed the window to be raised and lowered using both methods. The system was illustrated through the basic window-control simulation, and the results showed that the proposed control sequence could be represented in the model. However, the thesis acknowledges that the system has limitations and areas for improvement, such as the need for a more comprehensive simulation of all system functions. The author also noted that the system's performance could be enhanced by incorporating additional features such as anti-trapping mechanisms and remote control capabilities [1].

IV. Discussion

The author discusses the advantages and disadvantages of the developed system, highlighting its simplicity and practicality, but also noting the need for further development to fully automate the system and add additional features like anti-trapping and remote control. The author suggests that the current system, while functional, could be improved by incorporating more advanced sensors and control algorithms. The author also emphasizes the importance of thorough testing and validation to ensure the system's reliability and safety. The discussion includes a comparison of the developed system with existing solutions, noting that while the system is a practical solution, it may not yet meet all the requirements for a fully automated and feature-rich window control system [1].

V. Conclusion

The thesis concludes that the developed system is a practical solution for the Toyota Vios 2015 window up-down system, but suggests that further research is needed to enhance its functionality and reliability. The author recommends that future work should focus on improving the system's performance, adding advanced features, and conducting more comprehensive testing. The author also highlights the importance of continuous improvement and innovation in the field of automotive electronics to meet the evolving needs of vehicle manufacturers and users [1].

References

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