ABSTRACT

This paper presents the design and implementation of a DC micro grid system with an isolated bidirectional DC-DC converter for battery storage. The proposed system aims to enhance the efficiency and reliability of energy storage in renewable energy systems by integrating bidirectional power flow capabilities between the battery and the DC micro grid . The isolated bidirectional DC-DC converter serves as an interface for charging and discharging the battery, ensuring safe and efficient power transfer while maintaining electrical isolation between the battery and the grid.The converter is designed to provide regulated voltage levels, support energy flow in both directions, and optimize battery life through intelligent control strategies.The system's performance is evaluated under varying load conditions and demonstrates the ability to manage energy storage effectively, reduce grid dependency, and improve overall system stability.The results show that the proposed system enhances the operational flexibility and reliability of DC micro grids, making it suitable for applications in renewable energy, electric vehicles, and energy storage systems.