

Dual-Input Dual-Output (DIDO) Converter PV– Battery Interface Converter

¹Mr.Devendra O. Tiwari, ²Prof. C.M. Bobade

¹Student, G H Raisoni University, Amravati

²Assistant Professor, G H Raisoni University, Amravati

Abstract: *To enhance the reliability and driving range of electric vehicles (EVs), hybrid energy systems combining solar photovoltaic (PV) panels, batteries, and ultra-capacitors have gained prominence as a sustainable solution. This study introduces a novel dual-input, dual-output (DIDO) DC-DC converter designed to efficiently manage power flow between multiple sources, EV loads, and the grid, while also enabling vehicle-to-vehicle (V2V) energy exchange. The converter's key innovation lies in its ten operational modes, achieved through intelligent switching control within a unified circuit topology. Each mode is rigorously analysed using equivalent circuits, waveform illustrations, and derived mathematical models to characterize its dynamic behaviour. The study includes a detailed loss analysis and efficiency evaluation, highlighting the converter's performance under varying conditions. When benchmarked against conventional converters, the proposed DIDO topology demonstrates superior component utilization, adaptability, and operational flexibility, making it a promising solution for next-generation EV power systems.*

Keywords: solar photovoltaic (PV) panels

