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Patent Search

Invention Title	A Compact Multilevel Inverter with Reduced Switch Count for EV Applications
Publication Number	08/2026
Publication Date	20/02/2026
Publication Type	INA
Application Number	202641016475
Application Filing Date	14/02/2026
Priority Number	
Priority Country	
Priority Date	
Field Of Invention	ELECTRICAL
Classification (IPC)	H02M7/483, B60L50/60

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Abstract:

The present invention proposes a compact multilevel inverter with a reduced switch count for electric vehicle applications. The system is designed to generate multiple levels using a minimized number of power semiconductor switches, thereby reducing system complexity, cost, and switching losses. The proposed topology produces quality output voltage with reduced harmonic distortion, making it suitable for electric vehicle motor drives. The inverter employs advanced control techniques to generate efficient switching patterns, ensuring optimal performance under varying load conditions. The compact design enhances power density and reliability while reducing standing voltage across switches. The proposed system offers a scalable, efficient, and cost-effective solution for modern electric vehicle and renewable energy applications.

Complete Specification

Description: The proposed system consists of the following components:

1. DC Source(s)

The inverter utilizes one or more DC sources, such as batteries or energy storage systems, which supply power to the inverter.

2. Reduced Switch Configuration

A minimized number of power semiconductor switches are arranged in an innovative topology to generate multiple voltage levels efficiently.

3. Gate Driver Circuit

The gate driver circuit provides switching signals to control the operation of the semiconductor devices.

4. Control Unit

A microcontroller or DSP-based system generates switching pulses using modulation techniques such as PWM or nearest level control.

5. Load (Electric Vehicle Motor)

The inverter feeds an electric motor (induction motor or BLDC motor) used in EV propulsion.

Working Process

- The DC source supplies power to the inverter circuit.
- The control unit generates appropriate switching signals based on the desired output waveform.
- The switches operate in a coordinated manner to produce stepped multilevel voltage.

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Page last updated on: 26/06/2019