

A Review on Modular Multi-level Converter Based HVDC Systems

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Abstract: *Modular Multilevel Converters (MMCs) have emerged as a promising technology for High Voltage Direct Current (HVDC) transmission systems, offering several advantages such as reduced harmonic distortion, high voltage capability and modularity. This paper presents a comprehensive review of MMC-based HVDC systems, focusing on their applications, control strategies and challenges. The paper begins by discussing the basic principles and structure of MMCs, highlighting their modular design and operation. The paper delves into the control strategies employed in MMC-HVDC systems, emphasizing the importance of coordinated control between the AC and DC sides to ensure stable and efficient operation. Furthermore, the paper addresses the challenges associated with MMC-HVDC systems, such as fault ride-through capability, harmonic interactions and grid integration. It highlights recent advancements in control techniques and technologies that are being developed to address these challenges. The paper provides a valuable overview of MMC-based HVDC systems, highlighting their potential benefits and the ongoing research efforts to overcome their challenges. As the demand for renewable energy sources and long-distance power transmission increases, MMC-HVDC systems are poised to play a crucial role in shaping the future of the power grid*

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