Abstract

This paper presents MMC based on the half-bridge converters, to achieve higher performance as a STATCOM in a distorted and unbalanced medium voltage large-current (MV-LC) system. Further, an extended MMC (EMMC) in order to manage more accurate compensation for high-power applications. Both can be controlled for various purposes such as reactive power and unbalance compensation, voltage regulation, and harmonic cancellation. Moreover, related control strategies for both the MMC and the EMMC ensure that the source-end three-phase currents are sinusoidal and balanced. Also, the dc-link capacitors of the half-bridge converters are regulated. One interesting application for the EMMC-based STATCOM could be the improvement in power quality and performance of the electrified railway traction power supply system. Both the MMC- and the EMMC-based STATCOM with Phase Shifted PWM were simulated and simulations confirm the predefined objectives.
MMC and EMMC based STATCOM: A Comparative Study


**Index Terms**

Computer Science  
Power Systems

**Keywords**

EMMC  
Harmonics  
medium-voltage large-current (MVLC)  
MMC  
unbalanced compensation