MMC-HVDC AC side Line Protection based on positive sequence Fault component current ratio

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Abstract

The HVDC transmission based on modular multilevel converter shows the weak feed characteristic of limited fault current amplitude when connected to the traditional AC power grid, which leads to the risk of sensitivity reduction or even failure of the traditional pilot protection. In this paper, a MMC-HVDC AC side transmission line protection scheme based on positive sequence fault component current ratio is proposed. The positive sequence fault component current of the MMC-HVDC side is calculated by using the positive sequence fault component current of the power grid side, and the fault is identified through the significant difference between the ratio of the positive sequence fault component current of the MMC-HVDC side and the actual positive sequence fault component current of the MMC-HVDC side in the case of internal and external faults. This method has the advantages of simple principle, low requirement for synchronous data, not affected by capacitive current and strong resistance to high resistance. The simulation results show that the algorithm can correctly partition internal and external faults, and is not affected by fault location, fault type and operation mode of converter station, and has high sensitivity and reliability.

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