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Wed-Mo-Po3.09-04 [66]: The application of hybrid-type DC SFCL in shipboard MVDC system

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With the development of integrated power system (IPS) applications in navy, medium voltage direct current (MVDC) for shipboard electrical distribution is widely focused on. Compared with medium voltage alternating current (MVAC), MVDC is more adequate and affordable to meet electrical demand of future destroyer. However, one of the bottlenecks restricting the development of MVDC in shipboard is the occurrence of fault current. In order to ensure that fault current is limited within the on-off capability of the protection device, a hybrid-type DC superconducting fault current limiter (SFCL) is designed to protect MVDC in shipboard from two typical short circuit faults. In this paper, the working principle and mathematical model of the hybrid-type DC SFCL are analyzed. Two typical short-circuit fault conditions in shipboard MVDC system are chosen to be the backgrounds. The optimal installation position of the SFCL is selected and confirmed from different positions by simulation. Finally, the prototype experiment is conducted to verify the validity and feasibility of the SFCL applied to shipboard MVDC system. The verification results show that the SFCL has fast response speed and good current limiting effect in shipboard MVDC system.

Author: Ms LI, Zheng (Huazhong University of Science and Technology)

Co-authors: Prof. REN, Li (Huazhong University of Science and Technology); Mr LIANG, Siyuan (Huazhong University of Science and Technology)

Presenter: Ms LI, Zheng (Huazhong University of Science and Technology)

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