

# Diagnosis Method for GTO Open Switch Fault Applied to Reconfigurable Three-Level 48-Pulse STATCOM

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**Abstract:** In the recent years, several research works are focusing on the use of STATCOM in electrical networks because it is used to regulate the voltage, to improve the dynamic stability of the power system besides allowing better management of the power flow. All these positive tasks have guaranteed an important position of STATCOM within a family of Flexible Alternating Current Transmission System (FACTS). In this paper study, the control and operation of a three-level 48-pulse GTO based STATCOM is implemented with series connected transformers. The system may, unfortunately, be prone to GTO switch faults and therefore may affect reactive power transiting. In this paper, a new diagnostic approach is proposed based on the Single-Sided Amplitude Spectrum (SSAS) method of the three-leg converter currents for detection and localization of open-circuit faults. The integration of the STATCOM reconfigurable fault tolerant to the system is also considered to ensure service continuity. Several results are presented and discussed in this paper to illustrate the performance of the STATCOM fault-tolerant diagnostic.

**Keywords :** Detection, diagnosis, FACTS, GTO, open switch fault, reconfiguration, SSAS, STATCOM