

## 与弱交流系统相连接的HVDC系统临界换相电压降及逆变站的运行范围

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收稿日期 修回日期 网络版发布日期 接受日期

### 摘要

分析了与弱交流系统相连的直流输电系统的运行特性及电压稳定性, 采用临界换相电压降指标和逆变器的运行范围变化研究逆变器换相失败的机理, 并比较了各种无功补偿方式对HVDC输电系统的影响, 得出在与弱交流系统相连接的直流输电系统中使用静止同步补偿器可提高系统的临界换相电压降, 有效减小故障过程中换相失败发生的概率, 扩大逆变器的运行范围, 提高弱交流系统电压稳定性的结论, 并通过对国际大电网会议(CIGRE)标准高压直流输电测试系统的仿真验证了该结论。

关键词 [弱交流系统](#); [换相失败](#); [短路比](#); [静止同步补偿器](#); [临界换相电压降](#); [高压直流输电](#)

分类号 [TM721.1](#)

## Research on Critical Commutating Voltage Reduction and Operating Range of Inverter Connected to a Weak AC System

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### Abstract

Both operating characteristic and voltage stability of HVDC system connected to weak AC power system are analyzed; the critical commutating voltage reduction and the variation of inverter operation range are adopted to research the mechanism of commutation failures in line-commutated thyristor inverter of such HVDC system; then the impacts of different reactive power compensating devices on power transmission of HVDC system are compared and the conclusion is obtained, that is, in order to raise the critical commutating voltage reduction, reduce the probability of occurring commutation failure effectively during the fault, enlarge the operation range of inverters and improve the voltage stability of weak AC power system, application of STATCOM in HVDC system connected to weak AC power system can yet be regarded as an effective measure. This conclusion is validated by the results of simulation that is carried out by the CIGRE benchmark HVDC test system with different reactive power compensating devices including STATCOM.

Key words [weak AC power system](#); [commutation failure](#); [short circuit ratio](#); [STATCOM](#); [critical commutating voltage reduction](#); [HVDC power transmission](#)

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