

高电压技术

场畸变气体开关寿命预测

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摘要:

气体开关是脉冲功率装置的关键元件之一, 快速准确地预测开关的工作寿命, 对于确定开关乃至脉冲功率装置的维修周期、预防事故的发生等具有重要的作用。选取自击穿电压和触发抖动表征开关性能, 定义开关失效率, 建立开关寿命计算模型, 预估气体开关寿命。进行不同放电电荷量和电流峰值时的触发放电验证实验, 结果表明, 开关工作寿命可以分为稳定和失效2个阶段, 所建模型能够有效地预测开关最大放电次数, 即开关工作寿命。

关键词: 开关寿命 寿命预测 自击穿电压 触发延时 触发抖动

Lifetime Prediction of Field-distortion Gas Switch

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Abstract:

Gas spark switch is one of the key parts in pulsed power devices. Lifetime prediction of gas switch has a great influence on determining the maintenance cycle of gas switch and pulsed power system, and on preventing accidents. The self-breakdown voltage and trigger jitter were used to describe the performance of the gas switch. The lifetime of the gas switch was predicted on the basis of a definition of switch failure ratio and an established lifetime calculation model. The experiment of the triggered discharge with different charge quantities and current peaks was carried out. The results indicate that the lifetime of the switch can be divided into stable stage and failure stage. The model can be used to predict the maximum switch shots, which is defined as the switch lifetime.

Keywords: lifetime of switch lifetime prediction self-breakdown voltage trigger-delay time jitter

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