

高电压技术

高压断路器永磁无刷直流电机操动机构的设计及动态仿真

李永祥, 林莘, 徐建源

沈阳工业大学 电气工程学院, 辽宁省 沈阳市 110178

摘要:

为了提高高压断路器的动作可靠性,设计了一种新型操动机构——有限转角永磁无刷直流电机操动机构。针对40.5 kV真空断路器机械特性的要求,对驱动电机结构和主要参数(电负荷、磁负荷、极数及极弧系数等)进行了设计。并采用有限元法对电机的动态特性进行仿真,结果表明,电机设计合理、满足较高的分、合闸速度的要求。

关键词: 高压断路器 永磁无刷直流电机操动机构 电机设计 动态仿真

Design of a Novel Permanent Magnet Brushless DC Motor-Driven Operating Mechanism for High-Voltage Circuit Breaker and Its Dynamic Simulation

LI Yong-xiang ,LIN Xin ,XU Jian-yuan

School of Electrical Engineering, Shenyang University of Technology, Shenyang 110178, Liaoning Province, China

Abstract:

To improve the reliability of high-voltage circuit breakers, a novel operating mechanism, i.e., a limited rotating angle permanent magnetic brushless DC motor-driven operating mechanism, is developed. According to the requirement to mechanical characteristic of 40.5 kV vacuum circuit breaker, the structure of the driving motor and its main parameters, including electric load, magnetic load, pole number, pole-arc coefficient and so on, are designed. The dynamic characteristic of the designed prototype is simulated by finite element method. Simulation results show that the design of the permanent magnetic brushless DC motor is reasonable, its mechanical characteristics, such as electromagnetic torque, current, rotating speed and rotating angle, etc.

Keywords: high-voltage circuit breaker permanent magnet brushless DC motor-driven operating mechanism motor design dynamic simulation

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通讯作者: 李永祥

作者简介: 李永祥(1983—),男,博士研究生,研究方向为智能电器, E-mail: 57626738@163.com; 林莘(1961—),女,教授,博士生导师,从事智能电器、电器电弧理论和高电压、强电流试验技术的教学和科研工作。

作者Email: 57626738@163.com

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