

光路结构参数对光学电流互感器运行稳定性的影响

于文斌¹, 杨以涵¹, 郭志忠², 周建新³

1. 华北电力大学 电气与电子工程学院, 北京市 昌平区 102206; 2. 哈尔滨工业大学 电气工程学院, 黑龙江省 哈尔滨市 150001; 3. 国电南瑞科技股份有限公司, 江苏省 南京市 210003

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摘要

基于法拉第磁光效应原理的光学电流互感器存在运行稳定性差的问题, 其主要表现为直流工作光强的逐步衰竭。文章分析了闭合光路与直通光路光学电流传感头的结构特点, 从光路耦合效率的角度讨论了光学电流传感头光程长度引起的光路耦合损耗对直流工作光强的影响, 从理论上论证了直通光路结构具有更好的温度稳定性。文章最后介绍了直通光路结构的应用, 提出采用直通光路的螺线管聚磁光路结构具有测量灵敏度高、抗外界电磁干扰能力强、结构简单稳定等优点, 具有很好的实用化前景。

关键词 [光学电流互感器](#) [法拉第磁光效应](#) [运行稳定性](#) [光程长度](#) [耦合效率](#) [螺线管聚磁光路结构](#)

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Influence of Optical Path Structure and Parameter on Operating Stability of Optical Current Transformer

YU Wen-bin¹, YANG Yi-han¹, GUO Zhi-zhong², ZHOU Jian-xin³

1. School of Electrical and Electronic Engineering, North China Electric Power University, Changping District, Beijing 102206, China; 2. School of Electrical Engineering, Harbin Institute of Technology, Harbin 150001, Heilongjiang Province, China; 3. NARI Technology Development Co., Ltd., Nanjing 210003, Jiangsu Province, China

Abstract

The poor operating stability is one of the primal problems of the optical current transformers (OCT) based on Faraday magnetic optic effect, which behave as the step-by-step breakdown of DC operating light intensity. The structural feature of the optical current sensing head with closed light path and that with straight through light path are analyzed; from the viewpoint of optical path coupling efficiency, the influence of coupling loss caused by optical path length of optical current sensing head on DC operating light intensity is researched, thus the straight through light path structure possesses better temperature stability is demonstrated theoretically. The application instances of the straight through light path structure are presented in this paper and it is proposed that the solenoid collecting magnetic field optical path structure based on the straight through light path possesses such advantages as high measuring sensitivity and strong ability of resisting external electromagnet interference as well as simple and stable structure, etc., therefore this kind of optical path structure possesses good prospect of practicality.

Key words [optical current transformer](#) [Faraday magnetic optic effect](#) [operating stability](#) [optical path length](#) [coupling efficiency](#) [solenoid collecting magnetic field optical path structure](#)

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通讯作者 于文斌 wenbiny@bjxj-xjgc.com; ywb_hit@126.com

作者个人主页 于文斌¹; 杨以涵¹; 郭志忠²; 周建新³

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