Contribution ID: **220** Type: **Poster Presentation**

Advanced Method for Detection of Partial Discharge in Oil-paper insulated Transformer Bushings and Current Transformers

Friday 8 July 2016 14:40 (20 minutes)

Objective: Oil-paper insulation is widely used in transformer bushings and current transformers, and the detection of partial discharge (PD) in this type of insulation has been paid attention. However, current methods for PD detection in these apparatus usually do not have satisfying performance in either sensitivity or noise rejection capacity. In this paper, an advanced method for PD detection in oil-paper insulated bushings or CTs is proposed using a simplified coupler attached to the tap of the bushing, in order to solve the problems the conventional methods faced.

Method: The principle of the proposed method and the effect of the introduction of the coupler to the apparatus is first analyzed. PD experiments were then carried out on 110 kV transformer bushings and CTs to test the effect of the proposed method, with defects preset in the test objects during production process, including the protrusion on the grading ring of the bushing, voids in the oil-paper of the bushing and the CT. PD signals were also detected by the UHF method as contrast.

Results: The theoretic analyze shows that the introduction of the coupler will cause little influence to the apparatus. The experiments results show that the proposed method has satisfying performance in detecting typical defects in oil-paper insulation, and the frequency band of the coupler can help to eliminate interference effectively, especially when amplifiers are introduced. The test results indicate the good application prospect of the proposed method for on-site PD detection.

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Session Classification: Poster 3-C

Track Classification: High Voltage Design, Devices, Testing, and Diagnostics