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# Bragg system for temperature monitoring in distribution transformers

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## Abstract

Heat represents the energy loss occurring in the core and coils of a transformer. The designer must be able to predict the temperature throughout the transformer, in order to correctly determine the amount of copper and silicon steel sheet and the type of cooling ducts and insulation needed to prevent excessive hot spots. This paper presents a pilot design of a distribution transformer monitor using Fiber Bragg Grating (FBG) technology to determine the temperature at 12 points distributed along the LV and HV coils employing three optical fibers. A 100 kV A single-phase distribution transformer was utilized in order to accurately find and measure the hot spot. The thermal equivalent circuit model was built according to the heat transmission process in a transformer. The radiation and convection resistance values of this model are determined iteratively until they border on the FBG measurement results.



## Keywords

Distribution transformers; Fiber Bragg Grating; Hot spot; Losses; Measurements; Temperature

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