

## Optical PD detection in high voltage cable accessories

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High voltage cable accessories are expected to have a life time of more than 40 years without any failure. In order to achieve this requirement, the insulation system and its performance have to be regularly checked. The today's most commonly used diagnostic method in order to perform this task is the electrical partial discharge measurement. This technique is based on the measurement of electrical signals with very small amplitude. Disadvantage of this technique is that due to the small amplitude it is very sensible against electrical noise caused by external electrical fields such as from transformers, overhead lines, etc. As a result of this, the electrical partial discharge measurement in a noisy environment does not always allow a proper interpretation of the partial discharge measurement results and consequently an understanding of the condition of high voltage equipment is not possible.

A novel method in order to perform diagnosis of the insulation system is optical partial discharge detection. This method does not work with the electrical signals which are caused in case of partial discharges but rather detects the optical signals which are coming up at the same time. Based on this different physical process, external electrical noise can be neglected which leads to a much better usability in the field.

This paper presents the physical background behind this detection technique as well as a possible solution of the integration into high voltage cable accessories. At this the setup of an integrated optical fiber including its embedding is explained. Furthermore several requirements and their solution are presented such as:

- void free integration
- mechanical stresses inside the system
- electrical tests (AC, DC and Impulse)

The paper closes with showing the results of an integrated and operating system and compares the gathered results with an electrical measurement which was done simultaneously.

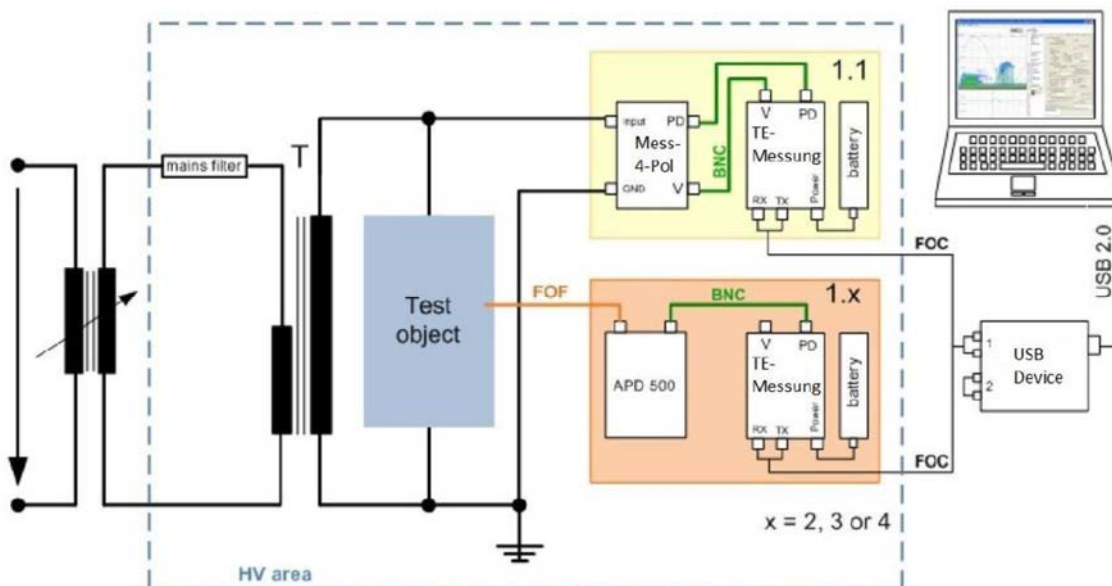


Fig. 1: Setup for a simultaneous optical and electrical partial discharge detection of a test object.