

Short-term partial discharge monitoring as a diagnostic tool on 400kV XLPE cable

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The safe and trouble-free energy supply is an important basic requirement of our modern life. Electrical equipments have a calculated lifetime of 30 years and more. They should be subject to regular diagnosis, to detect possible errors or changes in time and to ensure safe operation. This is generally done during commissioning tests (fingerprint) and/or at regular intervals. In addition to many testing methods and diagnostic measurements, monitoring of various parameters is a way to receive important information from the equipment. The monitoring is usually carried out online, but offline is also possible.

At high voltage cables in addition to temperature and load current also partial discharges can be measured. There are different concepts and manufacturers of such systems on the market. At IPH another concept was developed, the short-term partial discharge monitoring. This system was successfully tested on a 400kV cable system in the cable tunnel of 50 Hertz in Berlin. A short-term measurement is generally not a big issue. Longer measurements (e.g., more than 24 hours) are usually limited by the power supply. No external power supply was available at the joints in the tunnel, therefore an intelligent and robust solution had to be found. Because all relevant data for an entire week had to be saved (measuring time 24 hours / 7 days) the requirement of storage space is significantly higher than on conventional systems. The raw data provide more evaluation options, if abnormalities were found. Furthermore, the analysis of the data is more extensive than in usual measurements.

This paper describes the full measurement method and the technique of distributed, fully synchronous short-term partial discharge monitoring at 5 groups of joints and 2 groups of terminations. Problems, solutions and challenges for the future will be presented. Besides the description of the technology used, first results of the measurements can be shown.