# PD testing and monitoring of HV cable systems

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## Introduction

The paper deals with on-site partial discharge (PD) testing and continuous monitoring of HV power cable systems. It describes the method that can be used to detect and locate PD at all accessories simultaneously. Multi-channel and multi-spectral techniques are used to increase the sensitivity of PD measurements [1]. Examples of on-line PD testing on internal gas pressure and XLPE cable systems are presented. For continuous monitoring, an advanced concept to assess and monitor the condition of the XLPE cable system in an underground tunnel is described [2,3].

## PD testing of 110 kV internal gas pressure cable system

PD measurements were synchronously performed at both ends of a 2 km long, 110 kV internal gas pressure cable. Inductive sensors (high-frequency current transformers / HFCTs) were used at the GIS side of the cable. At the other end the cable was connected to an over-head line via oil impregnated paper cable terminations. Besides the HFCTs, capacitive ultra-high frequency sensors were used in order to reduce the influence of the external interferences coming from the bus bars and the parallel line. The phase resolved PD patterns are presented and analyzed in the paper.

## PD testing of short 220 kV XLPE cable system

In-service PD measurements were performed on a 100 m long, 220 kV XLPE cable. The measurements were done using inductive sensors connected around the grounding connections at both ends of the cable. No outage was required to connect the sensors and to set up the measuring system. Multi-spectral synchronous techniques were used to suppress the external interferences from the substation. An internal PD signal source was detected and localized. A detailed analysis of the results is presented in the paper.

## Continuous PD monitoring system of 230 kV XLPE cable system in underground tunnel

PD is continuously monitored at the two joints of a 2.7 km long, 230 kV cable placed in an underground tunnel. The advanced features for the suppression of disturbances and for separation of different types of insulation defects based on synchronous multi-channel and multi-frequency techniques are shown. The processing of monitoring data is implemented in a modular software system that allows reliable long-term storage of monitoring data and provides remote access via a web interface.

## Key words

HV Cable Systems, Condition Assessment, Partial Discharge Measurements, Continuous Monitoring

### References

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