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The main question to be answered by the hardware-software system is the possibility or impossibility of further safe operation of high-voltage equipment. One such method is the inspection method based on the computer analysis of parameters of the partial discharge (PD) occurring long before the complete breakdown of the insulation. This method allows detecting defects in ceramic and polymeric insulation in the initial stage, to monitor their development, assess the current state of isolation and the possibility of further equipment operation.



The developed now hardware-software system provides for the registration of a large number of PD pulses and their cumulative amplitude distribution. Determined by this characteristic, parameters are the following: the average apparent charge, the maximum apparent charge, the pulse repetition rate and an average current of PD. Analysis of a variety of experimental data has shown that the most effective representation of the data are the PD signals gain-phase diagrams (GPD).

The most important characteristics of PD signals are the various characteristics of the pulses time dependences within a high voltage period. This is the so-called "phase distribution" of PD parameters that allows to determine the type of PD signal source. The most accurate phase distributions can be made by dividing the period of the alternating voltage into time slots. The accumulation of information about partial discharge makes it possible to develop a mathematical model of discharges. Creating a database helps to describe the development of defects in isolators under the influence of PD and to predict the further trouble-free insulator service.

As shown by the hardware-software system test, it's possible to measure the PD parameters in different types of polymer and ceramic insulation, determining the defects location and their impact on the working order and the residual life.



There is a patent for the invention "Method for non-contact remote diagnostics of high-voltage polymer insulators" № 2483315 from 27.05.2013

Intended use of involved resources is R&D.

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**Hardware-
software system
for monitoring
and defects
detection in
high-voltage
insulators in
service**