Detection of Partial Discharges Using Ultrasound

PROBLEM

In electrical systems and installation parts, secure insulation plays a deciding role. Through inhomogeneities, production errors and signs of wear and tear affecting the insulation, unwanted local electrical partial discharges are created such as corona, tracking or arcs. These will damage the insulation and cause the fault to spread. If partial discharges are not recognized in time, they can spread within the foreseeable future to become critical insulation damage. The consequence may be complete failure of the system or operating materials.

PROBLEM DEFINITION

Particularly in the field of energy systems, failure of the power supply is not only associated with costly repairs, but will also lead to breakdown damage in industrial operations and households. In order to identify critical errors early and rectify them, it is essential to regularly inspect insulators, switches and fuse elements at medium voltage lines, transformer stations, transformers and switching units.

Under practical conditions, thermal images and infrared cameras are frequently used for these checks, in order to identify high levels of heating at insulators, not visible to the eye, caused by partial discharges. However, defects to insulation material do not inevitably cause an increase of temperature, or they may also be covered by other hot components in the vicinity and are simply missed when using this traditional test method.

SOLUTION

The reliable SONAPHONE devices can safely and accurately detect insulation damages, even of the "cold kind". Not every insulation void will also create temperature increases, although they

do have one thing in common: they all produce ultrasound.

Droning insulators and vibrating screw connections transmit ultrasonic waves into the environment, that are not audible to the human ear. The highly sensitive ultrasound location devices of the SONAPHONE series will detect these sound waves and will transform them into audible frequencies. By means of loudspeakers or headsets, the site where the sound waves have been created is localized.

Additionally the values are shown on the display or in bar graphs. Depending on the application and requirement, in addition to the cost-efficient beginner models, multi-functional devices with an illuminated display, data logger and USB interface can also be chosen, which can transmit all irregularities into graphical or tabular displays on your PC.

Thanks to a number of optional accessories and probes, the SONAPHONE test devices can be perfectly adapted to the respective application. For example, they can use detection through short distances with the L50 airborne sound probe, or be adapted for investigating angled locations with the L53 bendable probe. A perfect addition is the parabolic mirror, SONOSPOT, which has a range of up to 20 meters for test tasks over greater distances, and is designed for sources of faults that are difficult to reach or a distance away. The good directivity of the parabolic mirror not only recognizes insulation faults in networks between 1kV and 6kV, but is also suitable for localizing compressed air leaks in pneumatically operated switching elements.

The insensitivity of the SONPAHONE to interfering noises in the scope of audible sound offers optimum prerequisites for application in noisy industrial environments. Thanks to the multi-functionality of the SONAPHONE devices and the coordinated accessories, costs are saved in many areas because searching for faults is easier and can proceed more quickly.

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DO YOU HAVE ANY QUESTIONS?

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