

Reference: **ISH2015_624**



Type:
ISH Collection

Title:
POWER GRID PROTECTION IN THE RENEWABLE ENERGY BY CONTINUOUS CONDITION MONITORING OF HIGH VOLTAGE TRANSFORMERS BY SENSOR MONITORING OF OIL AGING

File Size:791 KB

Year: 2015

Abstracts

An online, continuous, condition monitoring system can ensure asset protection of valuable power plant equipment such as high voltage transformers, oil-filled circuit breakers, oil-filled cables and oil regeneration plants. Effective control saves money, reduces maintenance and prolongs lifetime. This diagnostics system measures components of the specific complex impedance of oils. This directly correlates with the degree of contamination of the oil. Contamination products such as those remaining after production, formed acids, aldehydes and peroxides, all result in a significant increase of the electrical conductivity. This leads to the formation of sludge, which in turn attacks the cellulose insulation, inhibits oil flow and traps heat inside the transformer. Unchecked this leads ultimately to the destruction of the transformer. The presented sensor system measures conductivity σ , dielectric constant ϵ_r and temperature T online and continuously. It then calculates the breakdown-voltage, loss angle $\tan \delta$ and acidification. Humidity in insulation oils should also be able to be derived. These sensor measurements give an accurate overview of the chemical aging of the lubricant and consumption of its additives. The oil condition monitoring sensors are installed directly on high voltage transformers, or other components such as the oil regeneration system or oil-filled cables. The measured data can be displayed and evaluated remotely. The signals are transmitted to a web-based condition monitoring system via LAN, WLAN or serial interface of the sensor unit. A stand-alone server system is used to collect data from multiple sensor systems attached to all the transformers of a smart grid.