Title (en)

On-line diagnostics and control process of dielectric behavior of power transformers and device to implement the process

Title (de)

Verfahren zur Diagnose und Kontrolle des dielektrischen Verhaltens von Leistungstransformatoren im Betrieb und Gerät zur Implementierung des Verfahrens

Title (fr)

Méthode de diagnostic et contrôle des caractéristiques diélectriques du transformateur de puissance et un appareil afin d'implémenter cette méthode

Publication

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Application

EP 11000347 A 20110118

Priority

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Abstract (en)

On-line diagnostic and control of dielectric behavior of power transformers is based on on-line reading of the relative humidity (RH) of the oil in oil filling (102) of main tank (10) of transformer (1) by humidity sensor (2). The on-line reading of temperature of this oil is performed by temperature sensor (3). Both sensors are immersed in oil leaving the upper part of the cellulose insulation system of transformer (1) where both measured variables are periodically sampled by proces control device (4). The value of the oil temperature is also transfered into temperature governor (6) of transformer (1). Proces control device (4), in the predetermined time-intervals, stores values of measured variables into its memory and calculates the Qw-value, which represents the water content in oil, and the Ud,t-value, which represents the theoretical dielectric strength of the oil. Proces control device (4) verifies the veracity and relevancy of calculated Ud,t-value by the comparison of this theoretical value with the Ud,lab-value acquired by the direct reading of the dielectric strength of oil in lab, at the moment of the sampling of oil from transformer (1). The results of this verification process are futher utilized not only for the on-line diagnostics and control of the dielectric behavior of transformer (1), but also for the critical evaluation of mutual veracity of both Ud-reading methods: the theoretical one versus direct measurement Proces control device (4) compares the processed Ud,t-value with the Ud-value requested by the norm or by internal regulations of the provider, calculating the Tsoll-value, the value of the setting point of temperature governor (6). Temperature governor (6) then controls the temperature of transformer (1) in such a way, that the real dielectric strength of the oil never decreaeses under pre-determined limits. A device to implement the on-line diagnostics and the control of the dielectric behavior of power transformers consists of transformer (1), to which is connected humidity sensor (2) of oil filling (102), temperature sensor (3), process control device (4) and temperature governor (6). The main tank (10) includes the active part of transformer (1), consisting of magnetic circuit (100) and winding (101) and both immersed in oil filling (102) of transformer(1). The upper part of main tank (10) is connected by connecting tube (13) to conservator (12) and simultaneously right and left side of said main tank (10) is by upper sleeve (111) and bottom sleeve (112) hydraulically connected to oil coolers (11) where fan casting (113) and fan (114) is situated. The bottom part of said main tank (10) is also provided with sampling cock (14). The right upper sleeve (111) is provided with well (31) of temperature sensor (3) and with sleeve (21) of humidity sensor (2) whereas process control device (4) is connected by first measuring line (30) to temperature sensor (3), by second measuring line (20) to humidity sensor (2), by first data line (41) to the control port (42), by second data line (43) to external PC, by third data line (46) to temperature governor (6) which is also connected by first measuring line (30) to temperature sensor (3). Said temperature governor (6) is connected by first control line (61) and by second control line (62) to fans (114) of oil coolers (11) of oil filling (102).

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