EFFICIENT TESTING FOR GROUNDING SYSTEMS

A software-supported, automated solution with Primary Test Manager™ software and HGT1

When grounding systems are tested, the fall-of-potential is measured in order to determine the ground impedance and ground potential rise. Step and touch voltages must also be recorded to provide direct evidence about safety for individuals at the measuring locations in question. Thereby, standards must be observed, which clearly specify how to perform the measurement and analyze the data that has been collected.

Mobile testing solution

With the HGT1, we are now offering a software-supported measurement for ground impedance and step and touch voltages. By combining it with the Primary Test Manager™ (PTM) software, all the necessary tests can be performed and the asset "grounding system" can also be managed in PTM. In order for all this to happen, PTM simply needs to be installed on a tablet computer: "We have created a testing system that is extremely mobile. The voltage measurement for determining the ground impedance can be performed directly on the probe outside of the substation very easily," explains Moritz Pikisch, Product Manager at OMICRON.

GPS-supported logging

The process of logging and recording measurements has also been simplified thanks to this new device combination. In PTM, the user can either upload an image file or select an area of an online map. If a GPS signal is available, the corresponding geo coordinates are stored for each measuring point. The measuring points can also be entered manually by tapping on the map. Determining the distance to the reference point used to be a time-consuming and cumbersome process but now it can be established automatically in both cases. "We are convinced of the added value that this option creates. The measurements can of course still be performed without using maps or selecting images," says Moritz.

Standard-based assessment

The PTM can also perform an automated assessment of step and touch voltage measurements

based on EN 50522 and IEEE 80 standards. Each standard specifies a different input impedance – 1kΩ in accordance with EN 50522 or a high-ohmic input impedance in accordance with IEEE 80. Depending on the standard selected in PTM, the relevant specifications are transferred to the HGT1 and automatically recorded for each measurement point. "This clearly shows that a test has been performed in accordance with the relevant standards," underlines Moritz. The values for the input impedance can be changed manually at any time if needed.

Measurement without interference

The test current is injected at frequencies that differ from the nominal frequency in order to suppress interference; typically at 30 Hz, 70 Hz, and 90 Hz for two seconds at a time. The frequency-selective measurement of the voltage is then determined directly in the HGT1 using Fast Fourier Transformation (FFT). These results are transferred to PTM for automatically acquiring the measured values, and then the values at nominal frequency are determined through interpolation. The HGT1 also has a special detection algorithm, which identifies the recurring current injection of the source and therefore it only records the relevant data. Incorrect measurements such as those resulting from the test probe that have come into contact with the test object, can thus be excluded.

When it comes to large grounding systems, such as those in substations, the CPC 100 combined with the CP CU1 coupling unit is a suitable system for injecting the test current. Maximum safety is ensured, as the CP CU1 provides galvanic isolation between the user and the line.

The lightweight, battery-powered COMPANO 100 test set can be used as an injection source for grounding systems with small dimensions, such as high-voltage pylons.

HGT1 with tablet: In Primary Test Manager™, the measurement results are recorded and assigned to specific measuring points using GPS coordinates.