

Vaisala Optimus™ DGA monitor OPT100 produces real time information about fault-generated gases in transformers for Fingrid



Ensuring the condition and operation of transformers is key, as they are the basis of all electricity transmission and distribution. If there is a fault in a transformer, the temperature may rise sharply at the fault point – depending on the type of fault – which results in fault-generated gases beginning to form in the transformer. Finnish transmission system operator Fingrid Oyj acquired new Vaisala Optimus™ DGA Monitor OPT100s to monitor fault-generated gas levels in its transformers.

Modernizing monitoring

Fingrid Oyj is a transmission system operator, whose mission is to ensure disturbance-free access to electricity in Finland. Fingrid secures energy supply by transmitting electricity through the main grid – the high-voltage network or “highway” of the power system – from production facilities to industrial customers and electricity companies.

In 2020, Fingrid invested in three new fault-generated gas analyzers for its transformers. *“Some of our fault-generated gas analyzers were coming to the end of their service life and we organized a tender to procure replacement analyzers. As a result, we selected the Vaisala Optimus™ DGA Monitor OPT100 gas analyzers. They met our technical requirements, and we already had a positive experience using the product earlier,”* says

Juha Mertanen, Fingrid Oyj’s expert on the matter.

Smooth cooperation

Fingrid’s long-term partner Omexom provides construction, installation and maintenance services for the generation, transmission and distribution of electricity. Cooperation between Vaisala, Omexom and Fingrid has



Juha Mertanen, Fingrid Oyj

proven to be an effective way of operating, as each company contributes to the project its own expertise. Omexom acquired the dissolved gas analyzers and installed them in transformers in October 2020.



Otso Takala, Omexom

Otso Takala, Project Manager at Omexom says that they received good support from Vaisala's expert in different phases of the project. "We quickly got the product information we needed

from Vaisala's experts. Our team participated in online training on the installation of dissolved gas analyzers, and during the installation, we discussed with the Vaisala team. The whole process was smooth," explains Takala.

OPT100 DGAs play an important role in condition-monitoring of Fingrid's transformers. They continuously provide up-to-date information on the concentration of fault-generated gases in transformers. Therefore, the changes in the transformer can be detected already at a very early stage, even in real-time.

"Fault-generated gases as such do not complicate the operation of the transformer. However, they are a symptom of some change. We need to find out that the increase in the amount of gas is not dangerous for the use of transformer," explains Mertanen.

He notes that transformers are individuals, and each of them generates gases in a slightly different way. Therefore, transformers do not have common, absolute cut-off values to assess the importance of change.

Reducing visits to the transformers

"It is essential to know the behavior of the transformer in different situations and to identify the changes. Fault-generated gas analyzers help us to catch the turning point, from which we can assess what has caused the change. For example, an external event related to a normal operating load situation can change the operation of the transformer."

In the past, monitoring has been done by taking an oil sample from the transformer

a few times annually and by analyzing the fault-generated gases from the sample. The new OPT100 dissolved gas analyzer provides accurate data about the transformer regularly. "Of course, the daily data is much better for us than the analysis of a less frequently taken oil sample. Both methods are still needed, but a gas analyzer helps us to detect problems quickly. Visits to the transformer are significantly reduced, and we save on costs," Mertanen concludes.

Updated Optimus™ OPT100 also helps in detecting air leaks

In the fall of 2020, Vaisala introduced the updated Optimus™ OPT100 dissolved gas analyzer, which now also measures the total pressure of the gases dissolved in the transformer's insulating oil. Based on this, customers can detect air leaks at an early stage, and the fault can be corrected quickly, resulting in significant cost savings.

"We are constantly looking for new solutions for measurement methods that meet the different needs of our customers. The method based on measuring the total gas pressure is a completely new, accurate, and sustainable solution to the problem of our transformer customers," says Teemu Hanninen, Vaisala's Product Manager.

The new Optimus™ OPT100 DGA dissolved gas analyzers will receive the total gas pressure measurement solution at the factory, and existing customers will receive a new measurement solution as a software upgrade.



Vaisala Optimus™ DGA Monitor OPT100

The Vaisala OPT100 dissolved gas analyzer has been developed to measure all main fault-generated gases and their quantities. The temperature of the fault area in the transformer and the materials in contact with it affect the type and amount of gases formed –

and being able to measure all fault-generated gases is a great advantage. From the gases, it is usually possible to deduce the transformer fault type and its severity, and thus even to start correcting the fault before it causes problems.

Fingrid Oyj in brief

Fingrid is Finland's transmission system operator.

We secure cost effectively reliable electricity for our customers and society and we shape the clean, market-oriented power system of the future.

- Founded in 1996.
- Revenue 789 MEUR (2019)
- Personnel 380 (2019)

www.fingrid.fi

Omexom in brief

OMEXOM operates in the energy sector and is a part of the global VINCI Energies Group that employs 82,500 committed employees in more than 50 countries. OMEXOM offers a wide range of services, e.g. in the fields of electricity distribution, fiber network of railway systems, lighting, electrical safety and charging station services for electric cars.

OMEXOM builds, maintains and secure the critical infrastructure that keeps our modern society running as smoothly as possible. The Group's net sales in 2019 were € 13.75 billion. In Finland OMEXOM operations employ some 300 professionals and overall 1600 in the Nordics.

www.omexom.fi
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