Generator Health Monitoring Partial Discharge

for Online Generator Stator Winding Condition Monitoring

During generator operation, the stator winding must withstand significant stress conditions. Repeated stress takes a toll on winding insulation, and, if left unchecked, can result in expensive unplanned outages. Unfortunately, conventional generator protection systems are not designed to detect insulation problems at an early stage.

Reliably supporting your early detection needs

As part of GE's GHM condition monitoring portfolio, our GHM Partial Discharge solution addresses this problem by providing early detection of problems within the stator winding system and along the bus bar long before a failure appears.

Based on decades of proven experience in generator monitoring and diagnostics, GE's GHM Partial Discharge monitors the entire stator winding and offers an approach that allows a differentiated analysis of the Partial Discharge (PD).

With sensors installed on the three phases and the neutral point, the GHM Partial Discharge system provides reliable diagnostics by acquiring the PD signal that originates from pulse current sources, no matter where they occur in the winding.

Customer benefits

- Reduced risk. Protect your generator assets and avoid critical damage leading to high replacement costs by monitoring the entire stator winding
- Greater reliability. Support PD source identification for accurate assessment of the stator winding condition for reliable maintenance planning
- Improved availability. Avoid forced outages with precise condition-based monitoring and trend analysis

Application

- All types of generators, independent if they operate in industrial plants or power utilities, OEM and other OEMs
- Compliant with IEC 60270 / 60034-27-2

Scope

Generator monitoring using GHM hardware and software modules

Requirements

- GE's high capacitance PD sensors (or compatible sensors)
- GHM Box to host the GHM Partial Discharge module
- GHM Center server for long-term data storage (optional)

High capacitance sensors

During propagation of PD signals from source to sensor, the high-frequency components are more attenuated than the low frequencies. To detect PD sources throughout the entire stator winding, GE's GHM Partial Discharge offers high capacitance sensors tuned to the low-frequency signal component.

High measurement flexibility and accuracy

Thanks to advanced fully digital filtering technology, the detection frequency band is freely adjustable to suit the specific generator and site conditions. This helps ensure higher accuracy.

Sensor flexibility

With an extraordinary dynamic range and high signal-to-noise ratio, GHM Partial Discharge is able to support a wide variety of sensors with different capacitances.

High resolution patterns display

Traditionally, PD systems offer low resolution displays and pulse counting systems that do not provide accurate insights about the actual PD sources.

GHM Partial Discharge provides high resolution phase-resolved PD patterns for visual analysis. This helps you rapidly distinguish between noise and different types of valid PD signals.

Overall indication of stator winding condition

The GHM Partial Discharge module's assessed condition trending system provides an overall indication of the stator winding health and deviations over time.

Improved wide band partial discharge monitoring

To improve accuracy by reducing the impact of propagation effects, GE's GHM Partial Discharge module measures apparent charge (Coulomb) as recommended in IEC 60270.

About partial discharges

Partial discharges (PD) are localized electrical discharges that only partially bridge the insulation between conductors in high-voltage insulation systems. They are an indicator of insulation aging processes.

PD types:

- Internal discharges
- Slot discharges
- Surface discharges
- Gap discharges

Potentially detectable failures:

- Aging of the main insulation
- Semi-conductive coating deterioration
- Loose bars or contacts
- Defective support elements
- Auxiliary equipment defects
- Generator and phase bus contamination

Proven solutions

GE offers a range of availability and performance boosting solutions, covering all cooling technologies, all generator sizes, and all OEMs. Local presence, global expertise and a strong heritage are the basis of our universal portfolio of generator service solutions.

To find out more about GHM Partial Discharge, please contact your local GE representative or visit **gepower.com**.

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