



# Generator Health Monitoring End Winding Vibration

## for Online Generator Stator Winding Condition Monitoring

Along with the deregulated energy environment, the operating and maintenance schedules of many machines have changed. Generators that were designed for baseload operations are operating with more frequent load changing cycles.

To extend the machine's overall life expectancy, prevent major failures, and enhance economic performance, it is increasingly important under these conditions to recognize the deterioration of generator components at an early stage.

Problems related to stator end winding vibrations are the primary cause of generator forced outages. The stator winding overhang region is particularly susceptible to vibration induced by electromagnetic forcing at twice synchronous frequency.

### Supporting your operational goals

As part of GE's GHM condition monitoring portfolio, our GHM End Winding Vibration solution lets you accurately assess end winding structural condition. Used in conjunction with accelerometer sensors, our GHM End Winding Vibration module provides a reliable tool for monitoring vibration of the generator stator overhang region to help proactively prevent damage through the early identification of potentially harmful end winding vibrations.

#### Application

All types of generators, independent if they operate in industrial plants or power utilities, OEM and other OEMs

#### Scope

Generator monitoring using GHM hardware and software modules

#### Requirements

- GHM Box to host the GHM End Winding Vibration module
- Accelerometers installed on the generator end winding
- GHM Center for long-term data storage (optional)
- One per revolution shaft phase reference

### Customer benefits

- Reduced risk. Protect your generator assets and avoid critical damage leading to high replacement costs.
- Greater reliability. Assess end winding vibration data for timely and planned intervention and reliable maintenance planning.
- Improved availability. Avoid forced outages with precise condition-based monitoring and trend analysis.

### Accurate end winding vibration monitoring

Experience has shown that the monitoring of only the absolute vibration level is not sufficient to accurately assess end winding support structure integrity. At a minimum, additional data needs to include the phase and amplitude of the first and second synchronous frequencies. GE's GHM End Winding Vibration module measures:

- Overall vibration amplitude
- The first six synchronous frequencies
- The vibration's phase position relative to the shaft marker reference

By analyzing the relationship between end winding vibrations and generator operational parameters, the GHM End Winding Vibration module helps you proactively detect any deterioration in the tightness of the end winding structure.



## Universal sensor compatibility

- Is suitable for both fiber optic and piezoelectric sensors
- Includes power supply accessories for optic and piezoelectric sensors
- Includes a passive terminal board to connect existing vibration signals

## Extensive engineering experience

GE's technicians and engineers draw on more than 40 years of experience with piezoelectric accelerometer installations on more than 200 generators rated up to 1,300 MW. Sensor installation positions can be determined by operational deflective shape and modal analysis to help make sure key vibration modes are monitored. Sensors are well protected and tested to withstand up to 50 kV and 150° C.

Our low capital cost installations can be fitted at short notice, during a routine or forced outage.

### About end winding vibrations

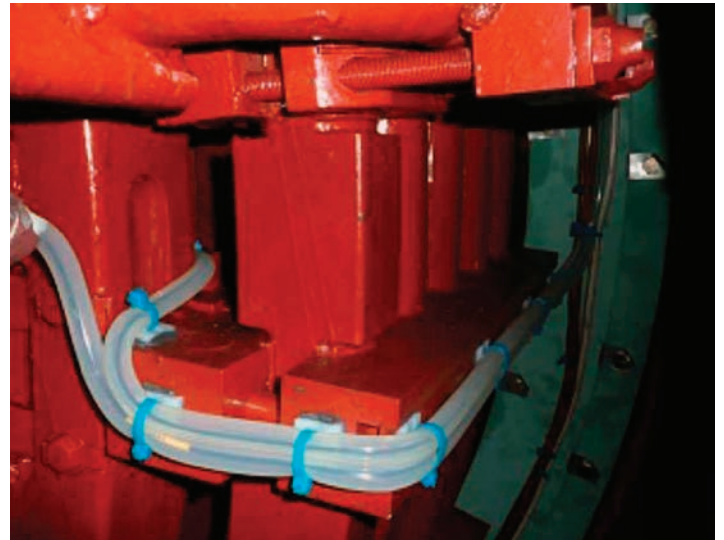
The stator end winding is the section of winding projecting on both ends—beyond the length of the laminated core.

The end winding must be able to withstand the electro-magnetic forces and mechanical and thermal stresses without the direct support of the core slot.

Excessive vibration of the end winding structure continuously flexes the insulation, translating to failures due to insulation cracking, partial discharge, cooling leaks, and even stator winding short circuit conditions.

## 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 End Winding Vibration, please contact your local GE representative or visit [gepower.com](http://gepower.com).

[gepower.com](http://gepower.com)

© 2018 General Electric Company - All rights reserved.

GE Power reserves the right to make changes in specifications and features shown herein, or discontinue the product described at any time without notice or obligation. Contact your GE Power representative for the most current information. GE and the GE Monogram, are trademarks of General Electric Company. GE Power, a division of General Electric Company.

GEA33588 (03/2018)

