



# Generator Health Monitoring Rotor Shaft Voltage

## for Online Generator Condition Monitoring

In today's competitive energy environment, plant operators need to continuously enhance power plant equipment reliability and availability. Building on decades of monitoring and diagnostics experience, GE's GHM products offer solutions for condition monitoring that help you avoid unplanned outages and critical breakdowns.

### Supporting your maintenance strategy

By monitoring shaft voltage and current on both ends of the rotor, our GHM Rotor Shaft Voltage module delivers reliable assessments of your generator's condition.

This innovative solution uses proprietary sensors and algorithms to provide early detection and identification of potential problems relating to faults in the rotor winding insulation, shaft grounding system, or bearings. The sensors also enhance the generator shaft grounding and protect the bearings on both ends of the generator. This is achieved by removing high-frequency pulses produced by the static excitation system and electrostatic charges from the turbine and by preventing high currents from circulating in the shaft.

### Customer benefits

- Reduced risk. Protect your generator assets and avoid critical damages leading to high replacement costs.
- Greater reliability. Receive intelligent automatic diagnostics of rotor problems for reliable maintenance planning.
- Improved availability. Avoid forced outages with precise condition-based monitoring that captures all critical rotor information.

### 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 Rotor Shaft Voltage module
- GHM Center for long-term data storage (optional)
- GE's sensors on both ends of the generator

### Intelligent automatic diagnostics

GE's GHM Shaft Voltage contains an intelligent early warning algorithm that is able to automatically detect and diagnose most problems, including:

- Shaft grounding issues
- Shaft rubbing
- Inter-turn shorts
- Electro-erosion
- Bearing isolation problems

These automatic indicators are displayed clearly in the user interface.



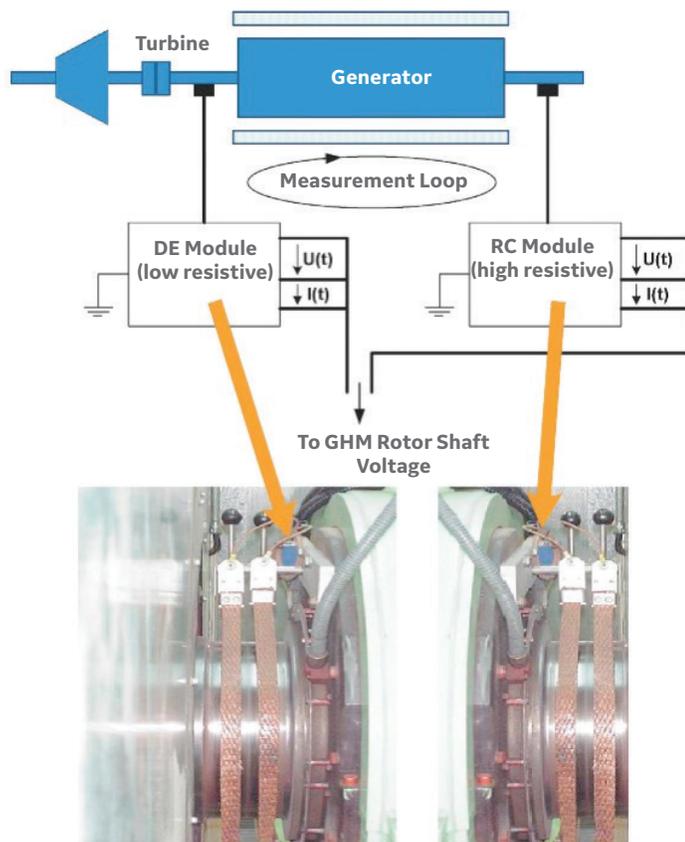
Installed shaft grounding strips on DE bearing pedestal

## Capture of critical rotor condition information

High-fidelity data compression techniques—along with responsive alarms and trigger settings— are used to store a complete record of relevant rotor condition information for later analysis.

## Sensor support for greater generator availability

Our proprietary shaft voltage/current measuring concept is shown below. The measuring circuit is based on two modules: the driving-end (DE) module at the front end, and the resistance capacity (RC) module for installation at the back end of the generator.



## About shaft voltages

Shaft voltages occur naturally in rotating machinery as a result of induction or capacitive coupling.

Inductive currents relate to stator core circumferential asymmetry, magnetic field radial imbalance, or axial residual magnetism.

Capacitive effects relate to asymmetries in the excitation systems or electrostatic charges, mainly from the turbine.

Shaft voltage problems, include:

- Unit load limitation due to increased vibration resulting from winding shorts
- Damage to the shaft and the non-rotating parts due to electro-erosion
- Ground faults that can trip the generator
- Rubbing that can lead to self-excitation, which increases shaft magnetization and local thermal unbalance, and ultimately can affect the vibration behavior of the shaft line
- Wear and pitting of the journal and/or thrust bearings

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

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