

## New 20 mm Air Gap Sensor

### Extends Air Gap Measurement to Small- and Medium-Sized Hydro Generators

In August 2004, we released our 50 mm air gap sensor, designed to address large-diameter hydroelectric generators. We have recently augmented this offering with a new 20 mm sensor, allowing air gap measurements on small- to medium-sized generators where a reduced linear range is often necessary.

Air gap, a measure of the distance between the rotor and stator, is critical to the life of a hydroelectric generator and is one of the most important parameters for proactive condition monitoring. A non-concentric rotor and stator can cause various problems that may lead to generator damage, inefficiencies, or both. The air gap measurement enables operators to monitor rotor and stator shapes and positions, along with minimum and maximum air gap dimensions. This provides them with the information needed to remove a machine from service before serious damage occurs, such as magnetically induced overheating or rotor-to-stator rubbing. These capabilities have proven to reduce maintenance costs and increase availability, both important factors in today's hydroelectric operating environment where many machines have been thrust into far more demanding operating conditions than previously encountered, making condition monitoring a necessity rather than a luxury. Because these realities impact small- and medium-sized machines — not just large-diameter generators — a selection of sensor sizes to address all classes of hydro units is essential.

Designed to operate reliably in harsh environments, our 50 mm and 20 mm air gap sensors are able to maintain their accuracy in both the temperature and magnetic field extremes found in hydroelectric generators. The sensors are intended for use with our 3500 Series Machinery Protection System, which can be configured with special modules specifically for addressing vibration and air gap measurements on hydroelectric turbine-generators (see companion article on the 3500/46M module). When coupled with GE's System 1®



### Multiple Probes, Multiple Planes For Best Results

The air gap measurement is made by attaching anywhere from 4 to 16 sensors to the stator laminations at evenly spaced intervals on the same plane. The recommended number of sensors depends on the diameter of the rotor, per the table below. In order to fully monitor rotor/stator condition, dual mounting planes are recommended for the sensors — one near the top of the stator and the other near the bottom.

Rotor Diameter (meters)	Recommended Number of Probes
<7.5	4
7.5-12	8
12-16	12
>16	16

Optimization and Diagnostic Software, users are able to view specialized air gap plots and other machinery condition parameters in real time. Learn more at [www.ge.com/energy](http://www.ge.com/energy) by entering "Hydro Air Gap" into our search engine.