

# Low Frequency Velocity Sensor

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Many of today's hydroelectric turbine-generators operate under conditions that introduce significant mechanical and electrical stress on the assets – stresses that are a direct result of a power market that requires tremendous operational flexibility. As detailed in the Second Quarter 2004 issue of ORBIT, we now offer a comprehensive condition monitoring solution to fully address these important assets and integrate all of their monitored parameters into a single system.

Key measurements within this offering are stator frame and bearing housing vibration. Today, we are pleased to introduce the new Bently Nevada® Low Frequency Velocity Sensor, specifically designed for these important measurements. Intended for hydro applications to detect vibration of the stator core, stator frame, and bearing supports, the sensor measures absolute vibration within the range of 0.5Hz to 1.0kHz. Its two-wire design uses moving-coil technology and embedded signal conditioning circuitry to provide a voltage output directly proportional to the vibration velocity.

Stator core and frame vibration can cause fretting and damage to the winding insulation. Core and frame vibration can be caused by uneven air gap, manufacturing flaws, or a weak support structure. To detect these problems before serious damage occurs, the seismic sensor is mounted on the outer diameter of the stator core and frame.

Bearing housing vibration is likewise an important measurement, alerting operators to premature failure of machine components and other significant machine problems. In addition, housing vibration can also distort levels of vibration measured by shaft-observing proximity probes, and having both the shaft-relative and bearing-absolute vibration signals available can be a valuable diagnostic tool. Bearing frame vibration can be


**The new 330505 Low Frequency Velocity Sensor is specifically designed for measuring stator frame and bearing housing vibration on hydro units.**



caused by a weak support structure, resonances, and loads originating within the machine or other nearby sources. The sensor is mounted to the bearing housing either as a stand-alone measurement or in the same orientation as existing proximity sensors.

The sensor is connected to the Bently Nevada 3500/46M Hydro Monitor, for a solution that meets the requirements of International Organization for Standardization (ISO) Standard 10816-5 (Mechanical Vibration – Evaluation of machine vibration by measurements on non-rotating parts – Part 5: Machine sets in hydraulic power generating and pumping plants). In addition, powerful System 1® Optimization and Diagnostic Software provides comprehensive condition monitoring capabilities including advanced plots and sophisticated data analysis tools.

Due to the nature of high amplitude, low frequency velocity events, the 330505 Low Frequency Velocity Sensor is not recommended for automated machinery protection. It is designed to provide an early warning of pending machinery problems and to assist in diagnostics. Detecting problems early, before serious damage occurs, facilitates condition-based maintenance and allows time to plan for repairs before scheduled outages.

You can learn more about our hydro condition monitoring solutions and this new sensor by requesting literature via our reader service card, by visiting [www.bently.com](http://www.bently.com), or by contacting your nearest sales professional. 

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