

Online Monitoring of Power Transformers with AE SENSOR HIGHWAY II™

Introduction and Overview

The Sensor Highway System™ is an Acoustic Emission (AE) Monitoring System with up to 16 high speed monitoring channels and 4 parametric input channels. The Sensor Highway II™ has been developed for unattended use in “Asset Integrity Monitoring” management and condition monitoring applications. The system consists of a 16 channel unit (node) in a rugged outdoor case (Figure 1), capable of operating in extreme weather and factory conditions.

Features

The key feature of the Sensor Highway System™ is its highly flexible sensor fusion interface for input and processing of most different sensors. The system is able to accept AE sensors (using the standard “phantom power” coaxial connection for powering external preamplifiers), ICP (Amplified) accelerometers, and various sensors with current and voltage outputs. This interface is accomplished through the use of standard industrial, DIN Rail Mounted Signal Conditioning Modules, with options for Proximity Probes, Tachometers, Pressure Transducers, Load Cells, Thermocouples, Environmental Sensors, Strain Gages, etc.

The Sensor Highway II™ has several communication interfaces available for data communication and remote control. The principal interface is its Ethernet 10/100 (and optionally, wireless Ethernet). Other available interfaces include: Telephone modem, RS-232/485, USB host and device, 4 - 20ma and digital I/O, and relay outputs for alarm and control purposes.



Figure 1. Inside the Sensor Highway Cabinet

Application Solutions

The system is currently offered as a “Data Collection” (Sensor Highway II™ DC) System, (the most basic and low cost system). It is capable of remote acquisition and storage of (short term) sensor data with some basic signal processing and alarm screening capabilities.

This Sensor Highway II™ DC System is a solution for situations where remote analysis is desired and is usually associated with a monitoring contract. Optionally, an Internet web access site can be made available for customer status, activity, and trend monitoring and customer data visualization. A block diagram of the system is shown in Figure 2.

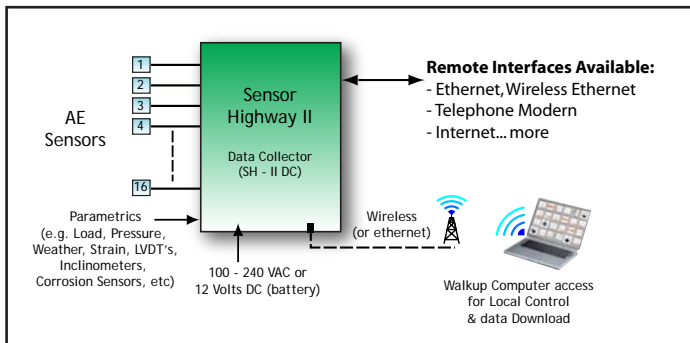


Figure 2. Sensor Highway II™ DC Data Collector System

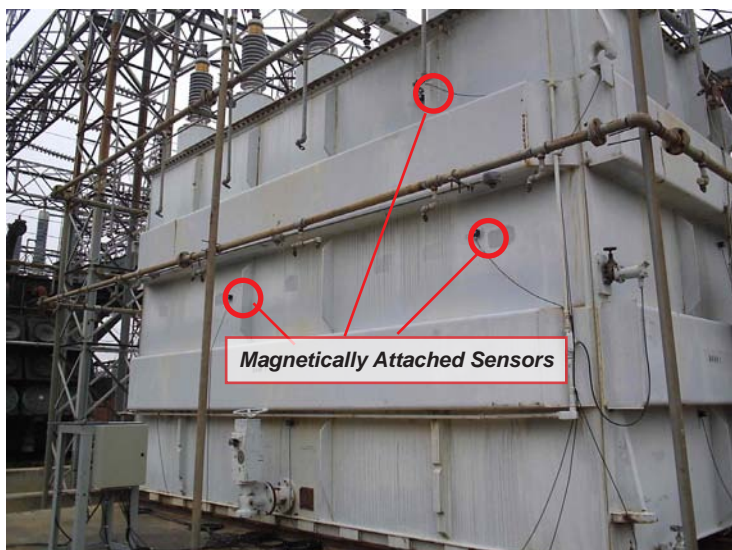


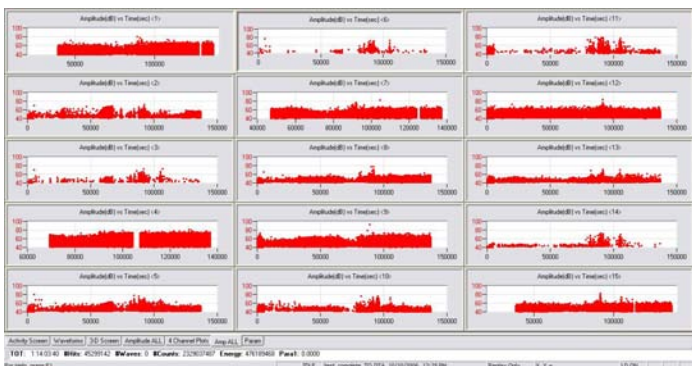
Figure 3. Typical Power Transformer of Sensor Highway II™

This system is ideal for on-line monitoring of critical transformers. Figure 3. represents a typical power transformer of Sensor Highway II™ System installed on a 3 phase, 300/336 MVA, 230/138/64.5 kV, FOA Class Transformer in North Carolina.

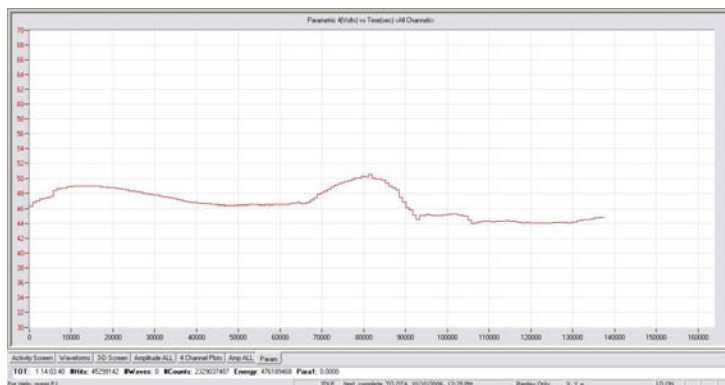
Data download can be accomplished by a walk-up attachment (plug in a notebook computer via its standard Ethernet port), see Figure 4; through an automated remote interface, either via Ethernet; optional wireless Ethernet; Internet; or Telephone Modem to a remote control and data processing station. The remote system with the aid of a trained user, performs the data analysis and asset integrity assessment.



Figure 4. Configuration of the Sensor Highway II™ System via a Laptop



Acoustic Activity in Decibels per Channel for a Transformer Test during a 24 Hour Monitoring Period



Oil Temperature Measured as a Parametric Input for a 24 Hour Test Period

For additional information on AE Sensor Highway II, please contact your local PAC Sales Representative or our headquarters at 609-716-4000.

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