

Typical Applications

- Bridge health monitoring
- General structural integrity monitoring (buildings, dams, tunnels, levies, etc.)

Benefits

- **Long lifetime** (minimum expected life without battery replacement 10 years)
- **Wireless communication** (IEEE 802.15.4)
- **Lightweight**, about 120 gr
- **Easy mounting**
 - Self-adhesive, no drilling is required (e.g. steel)
 - Flange-mount, drilling is required (e.g. concrete)
- **Quick installation**, 1-2 minutes
- **Adjustable sampling interval**
- **Resolution**: 16 mg
- **Working temperature**: -40 to +150°F (-40 to +65°C)
- **Long communication range**: 1.0km free space
- **Small size**: 1.96" x 1.96" x 1.34"
- **Power source**: replaceable lithium-ion battery

Description

SenSpot™ provides an easy to install, scalable solution for distributed structural integrity monitoring. SenSpot™ vibration uses Resensys's proprietary Active RF Technology, similar to other SenSpot™ in its family. Resensys ART technology offers a high performance method for large-scale sensing,

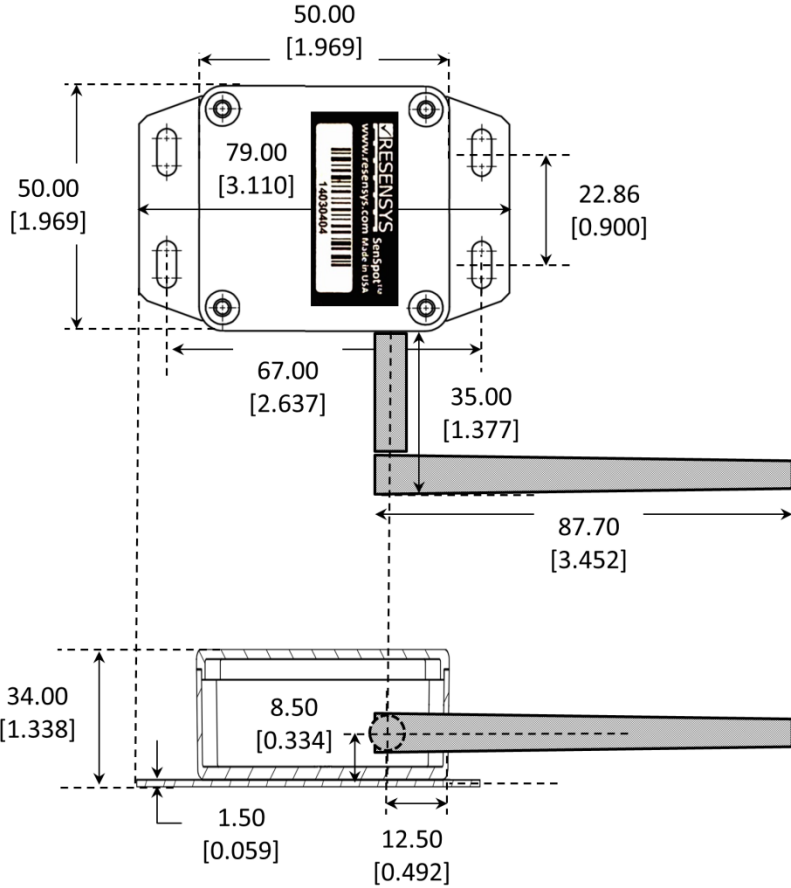


SenSpot™ Vibration

wireless synchronization, and ultra-energy efficient wireless communication. SenSpot™ is designed to operate maintenance-free for decades. After installation, SenSpot™ does not need calibration, battery replacement, or any other maintenance during its entire service life. Due to small size and lightweight, adhesive-mount SenSpot™ sensors can be applied easily to as many critical spots on a structure as needed, with minimal installation effort. SenSpot™ vibration can be used on different elements of a structure to monitor vibration.

Vibration SenSpot

Vibration SenSpot comes in either self-adhesive or flange-mount form factors. A general diagram of this unit is shown below.



All dimensions are in mm (inch)

Vibration SenSpot Demo

Using vibration SenSpot™, both acceleration and vibration can be monitored on different elements of a structure. For example such measurements on the beams of a bridge can be used for several analyses (e.g. modal analysis). To conserve the limited energy of the sensors they spend most of their time in the sleep mode and they wake up to sample the accelerometer in a regular interval. The inter-sleep period can be customized by user which affects the amount of energy consumption. Once the acceleration measurement exceeds a certain threshold which is also adjustable data transmission is performed. In the current version of SenSpot™ vibration, the inter-sleep interval can be adjusted in the steps of 10 milliseconds and the acceleration threshold in the steps of 16 milli-G. In each time interval, the dominated vibrations are transmitted and stored on servers.

In the following, two experimental measurements of SenSpot™ vibration are shown. In this setup, a vibration SenSpot™ is attached to a piece of steel which can be vibrated. Figure 1 shows a low frequency vibration with approximated frequency of 4 Hz. As can be seen the vibration signal with duration of 10 seconds is produced.

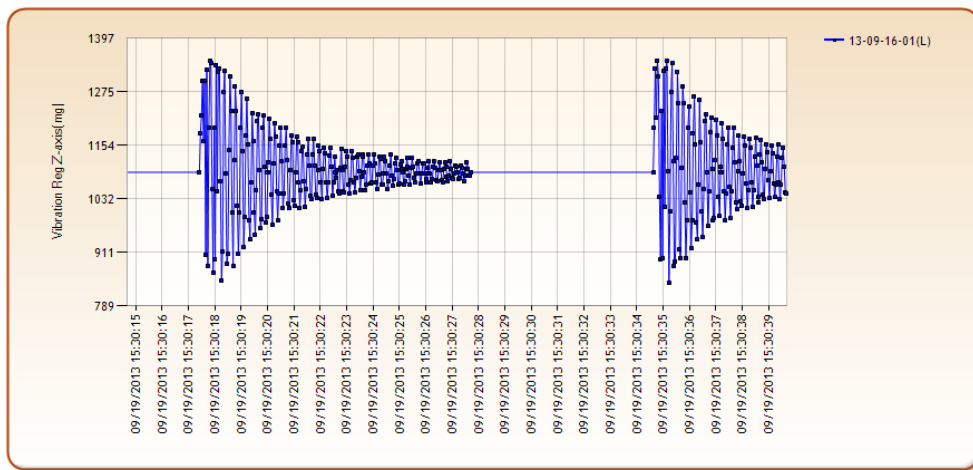


Figure 1. SenSpot™ Vibration

In the second experiment, a periodic vibration with a higher frequency of 8 Hz was applied to the piece of steel which resulted in the curve shown in Figure 2.

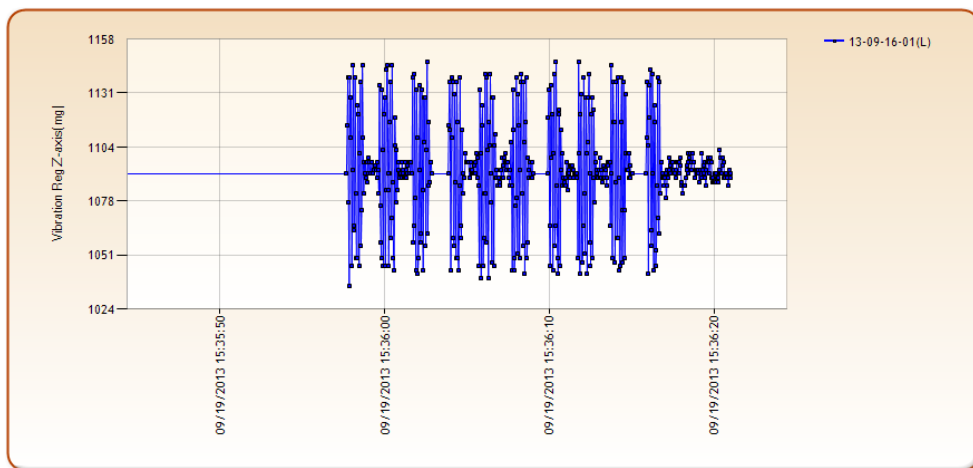


Figure 2. SenSpot™ Vibration