



### Typical Applications

- Seismic monitoring
- General structural integrity monitoring (buildings, dams, tunnels, etc.)
- Platform stabilization systems
- Seismic imaging
- Serve as a gateway (SeniMax™) to upload the data to server

### Benefits

- **Long lifetime**
- **A Stand-alone IoT Device:** all-in-one device capable of sensing, collecting and uploading data
- **Easy mounting :** Flange mount or adhesive tape sensing element (separated from transceiver)

- **Ingress Protection:** IP66, weatherproof and protected against rain, snow, and UV exposure
- **Maintenance free:** Self-powered by a solar panel. No battery replacement, calibration or post-installation maintenance is required
- **Adjustable threshold and sample interval**

## Specifications

- **Dimensions (Transceiver):** 215.9mm (8.50") × 170.69mm (6.72") × 131.75mm (5.19")
- **Dimensions (Sensing Element with flange):** 149.12 (5.81") × 80.00 (3.15") × 60.50 (2.38")
- **Weight:** 1.5kg (3.3lbs) transceiver and 0.9kg (2lbs) sensing element
- **Operating temperature:** -40°C to +65°C (-40°F to +150°F)
- **Wireless Communication:** Cellular (CDMA, GPRS, HSPA+,LTE) or Wi-Fi (IEEE 802.11 b/g)
- **Wireless communication range:** 1.0km (0.62mi) free space
- **Resolution:** 0.1mm/s [0.004 in/sec]
- **Sampling Interval:** Adjustable from 2ms (500 Hz) to 100ms (10 Hz)
- **Detection Threshold:** Adjustable from 1.2mm/s (0.047 inch/s) to 30mm/s (1.18 inch/s)
- **Natural Frequency:**
  - HS-1: 4.5Hz
  - GS-1: 10Hz
- **DC Resistance:**
  - HS-1: 1250±62 Ohms
  - GS-1: 1800 ±90 Ohms
- **Full Range:**
  - HS-1: ±0.3642m/s [±14.35in/s]
  - GS-1: ±0.21m/s [±8.268in/s]
- **Maximum Tilt Angle:**
  - Vertical Models & Horizontal Models: 15° ± 2°

- **Coil/Case Displacement in operating position, peak to peak:**
  - Minimum 1.3mm (0.05")
  - Maximum 2.5mm (0.10")

## Description

SeniMax™ wireless 3D Geophone provides an easy way to install a scalable solution for monitoring seismic movements of the earth. The transceiver, sensing element and solar panel can be easily mounted with either flange or adhesive. The device comes with a high capacity lithium-ion battery charged by a solar panel. It does not require battery replacement so that once installed, it is almost maintenance free. The whole product meets IP66 standard (completely weatherproof) so it is an excellent choice for seismic monitoring applications that require the sensors to be installed some outdoor places which are often hard to reach.

The sensing element is separate from the transceiver and comes with a mounting flange that make the installation very easy in earth seismic movement monitoring applications where the sensing element should be buried inside the soil or concrete.

The SeniMax™ 3D Geophone is equipped with three HS-1 or GS-1 Geophones from Geospace Technologies. The geophone is an integral component in the monitoring and analysis of machinery vibration and earth seismic movements. This rugged, self-generating velocity sensor converts mechanical motion into an electrical signal which is proportional to relative velocity. The dual-coil construction minimizes interference from electromagnetic fields.

This product also uses Resensys's proprietary Active RF Technology, just the same as other products of Resensys. Resensys ART technology offers a high performance method for large-scale sensing, wireless synchronization and ultra-energy efficient wireless communication.

At the same time it can serve as a SeniMax™ gateway to collect data from other SenSpot™. For more

detailed information about the SeniMax™ please refer to Resensys SeniMax™ datasheet.

The detection threshold can be adjusted remotely by user from 1.2mm/s (0.047 inch/s) to 30mm/s (1.18 inch/s) based on the application. This allows the user to adjust the number of detected movements within a specific time period after installing the sensor and based on actual condition. Also the

sampling interval can be adjusted remotely from 2ms (500Hz) to 100ms (10 Hz) after installation based on application requirements.

For more detailed information about the Geophone unit, please see the product datasheet which can be found from: <http://www.geospace.com/hs-1-industrial-geophone>

## Installation

Sensing element box is separate from transceiver and comes with mounting flanges. It can be installed either with screws and anchors through the flange holes or with VHB adhesive tape (for steel and smooth surfaces).

## Wireless Transceiver Dimensions

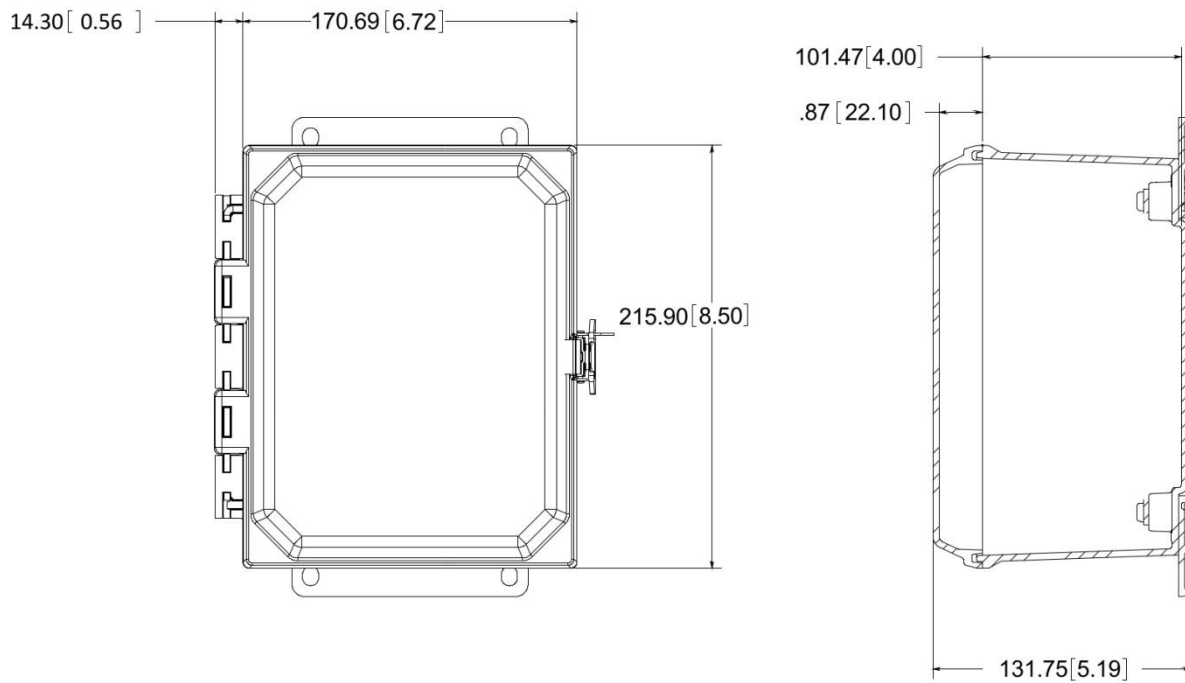


Figure 1: Wireless transceiver dimensions for SeniMax™ wireless 3D Geophone. All dimensions are in mm [inch].

# Sensing Element Dimension & Orientation

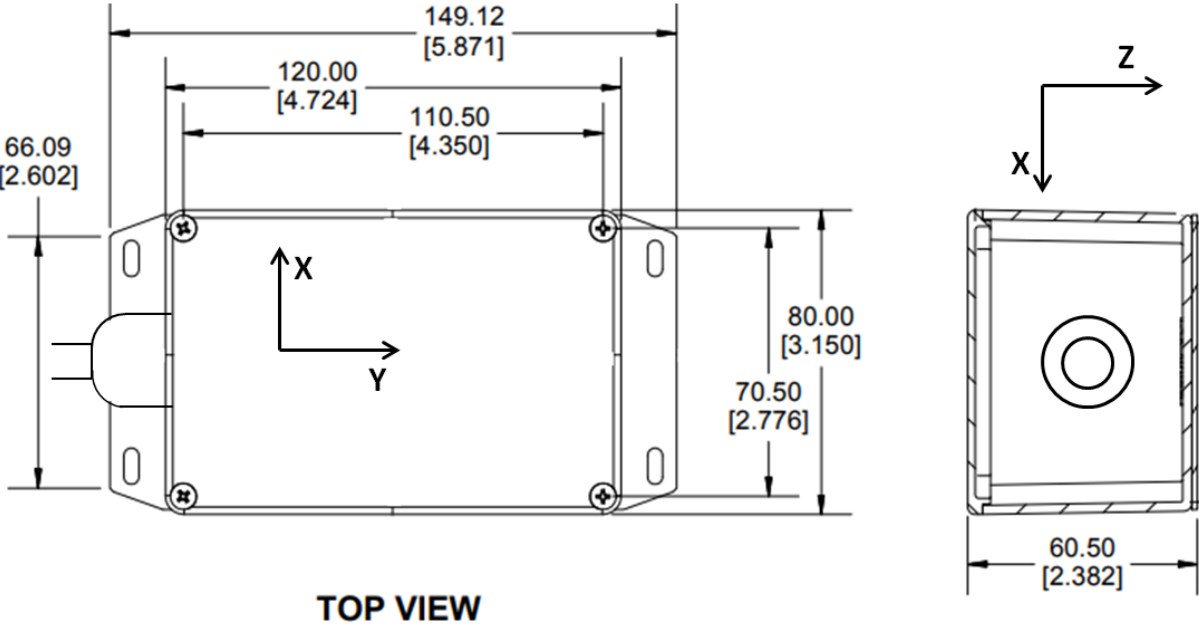


Figure 2: Sensing element dimension & orientation for SeniMax™ wireless 3D Geophone. All dimensions are in mm [inch].

# The data shown in SenScope™

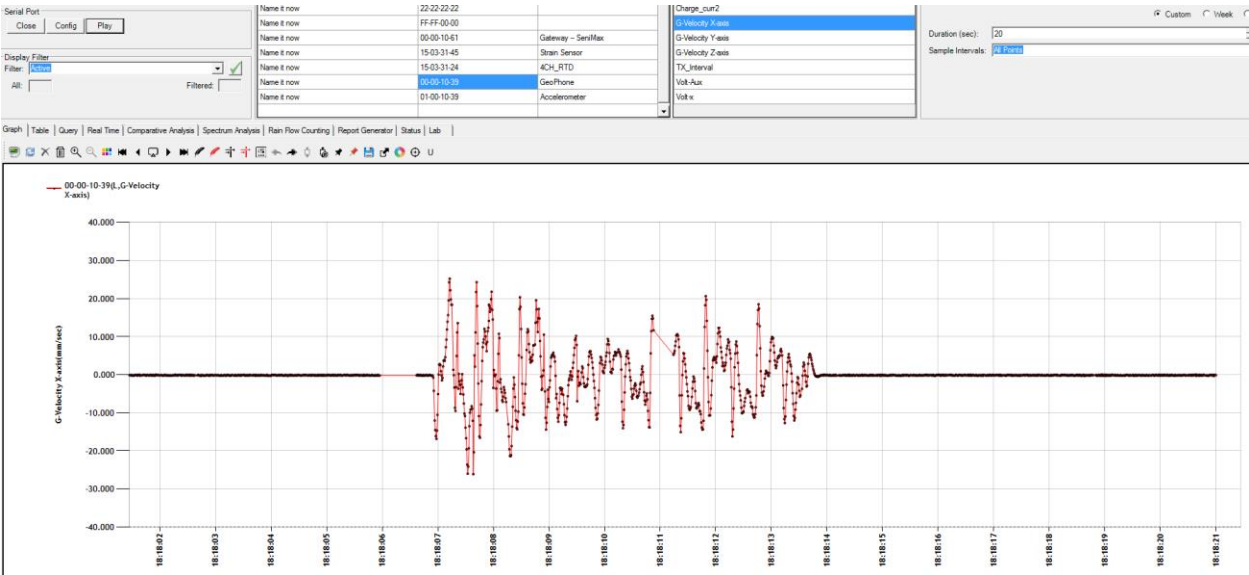


Figure 3: Geophone X axis data

This picture (Figure 3) shows the X-axis measurement of the Geophone. When there is no vibration over the threshold, the Geophone will only transmit keep-alive packets. When there is vibration, it will transmit and keep measuring for a period of time even after the vibration drops below the threshold.