

Typical Applications

- Structural Health Monitoring of Bridges, Buildings, Cranes, Platforms, Machines, aircraft, etc.)
- Fatigue Analysis, Bridge Load Rating, Fracture Critical Monitoring, Extreme Load Tests
- Roof Load Monitoring: monitoring the roof deflection due to snow

Benefits

- **Long battery lifetime:** several years.
- **Small size and light weight**
- **High Accuracy:** 1 micro strain typical resolution.
- **Wireless communication:** no wiring needed.
- **Easy mounting:**
 - Self-adhesive, no drilling is required (on metallic/smooth surfaces).
 - Flange-mount, drilling is needed (on concrete, wood).
- **Quick installation:** 5-6 minutes
- **High compatibility:** easily can be integrated with thirds party strain transducers with gauge resistance from 120-ohm to-1000 ohm. Configurations can be full-bridge, half-bridge, quarter-bridge and rosette which consist of three quarter-bridge gauges. By default, comes with 350-ohm full bridge foil strain gauge for attachment to smooth surface (e.g., steel).
- **Complementary sensing:** the ambient temperature is also measured and transmitted
- **Different gauges:** Can be customized with different strain gauges for different surfaces and applications. Please refer to table1 for more information

Specifications



- **Dimensions:**
 - Wireless transmitter: 50mm (1.96") x 50mm (1.96") x 34mm (1.34").
 - Strain Gauge sensor: 76.2mm (3") x 33.4mm (1.3") x 10mm (0.4").
- **Weight:** about 147 g (5.19 oz.)
 - Wireless transmitter: 120 g (4.23 oz.).
 - Strain transducer: 27 g (0.95 oz.).
- **Operating temperature:** -40°C to +65°C . (-40 °F to +150°F)
- **Adjustable transmission interval:** From 12sec to 360sec.
- **Ingress Protection:** IP66, weatherproof. Protected against rain, snow, and UV exposure
- **Power source:** Standard non-rechargeable CR123 battery.
- **Adjustable sampling interval:** From 50ms (20 samples/sec) to 15sec

■ **Burst mode: High-rate data transmission triggered by sudden strain changes (Only Type C):**

- Perfect for recording the waveform of a sudden strain change caused by live load (e.g. heavy trucks passing over a bridge, wind gust, loading cycles).
- User adjustable sampling rate for burst mode event detection and high-rate data from 10 to 100 samples per second
- User adjustable triggering threshold from 8 micro-strain to 512 micro-strain for burst mode event detection

■ **Communication range:** 300m (980ft) for reliable communication.

■ **Different Types:**

- **Type D:** Normal sampling from every 100ms (10 samples/sec) to every 15 seconds without event detection capability.
- **Type C:** Normal sampling with event detection capability. Start transmitting high-rate measurement (up to 100sample/second) upon detecting sudden change of strain
- **Type R:** The same as type D except it can measure up to three different strain signals. Suitable for measuring Rosette gauges (please refer to table 1) where typically there are three gauges in different orientations on top of each other.

Description

SenSpot™ is designed to operate maintenance-free for more than a decade. After installation, SenSpot™ does not need calibration, battery replacement or any other maintenance during its service life. Due to the small size and the light weight, large number of adhesive mount wireless SenSpot™ sensors can be installed on a structure in a short time.

<p>Full Bridge Foil Strain Gauge (default): Consist of four 350ohm gauges with full bridge configuration. Suitable for attachment to smooth surfaces such as steel surfaces. By default, SenSpot™ comes with this strain gauge.</p>	
<p>Rosette Foil Strain Gauge: Consist of three 350ohm gauges with 0/45/90 degree arrangement and quarter bridge configuration. Comes with Type R SenSpot™.</p>	
<p>Load Cell: Consist of four 350ohm gauges with full bridge configuration. Suitable for weight or force strain measurement.</p>	

<p>Bolted Strain Gauge: Consists of four 350ohm gauges with full bridge configuration. Suitable for attachment to concrete or wood surfaces. Can be removed and re used for another application after measurement.</p>	
<p>Embedded (Concrete) Strain Gauge: Consists of four 350ohm gauges with full bridge configuration. Put inside the concrete during casting to measure the strain/stress within the concrete structure.</p>	

Table 1: Some strain gauges that can be connected to Resensys wireless SenSpot™ node

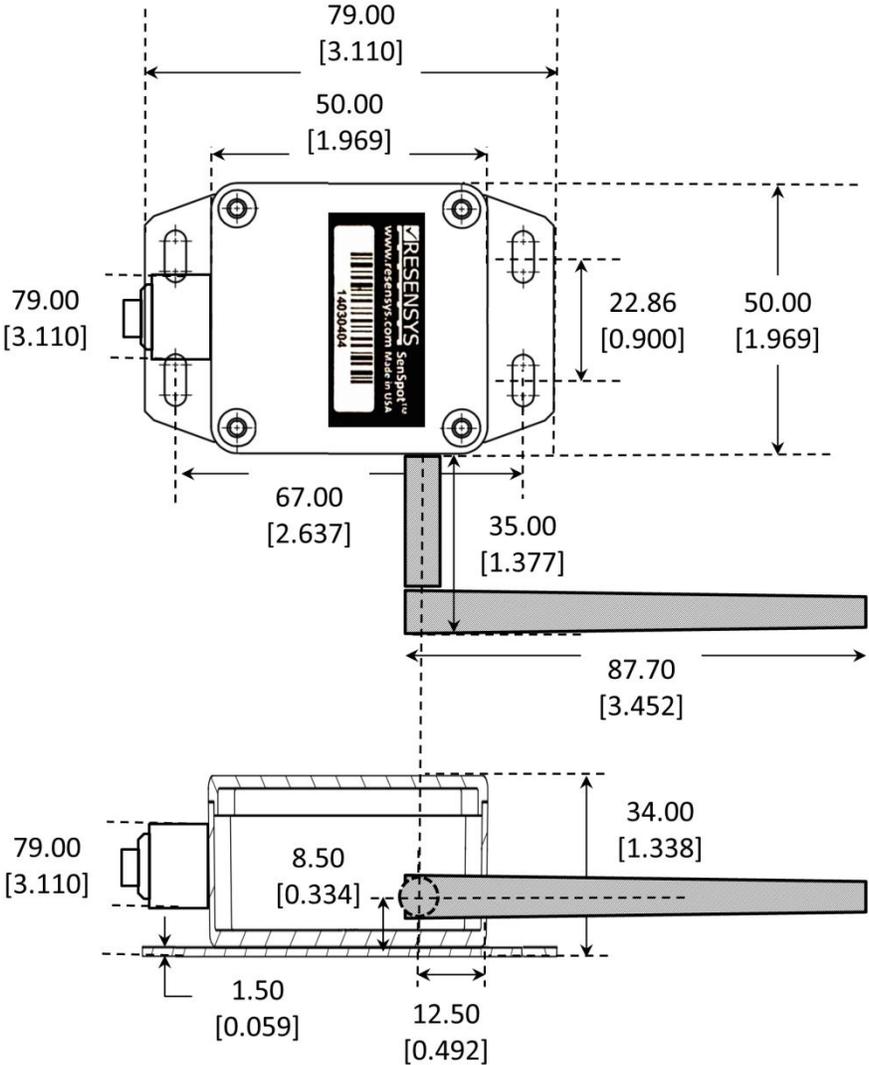


Figure 1: Wireless transmitter dimensions for strain gauge SenSpot™. All dimensions are in mm [inch].

Default Strain Gauge Sensing Element Dimensions

The strain gauge sensing element produces the strain analog signal through its cable after it gets the excitation signal from the wireless transmitter part. By default, the product comes with a full bridge 350 ohm strain gauge. It is self-adhesive and suited to be attached to steel surface. However, it can be customized upon customer request with other types of strain gauges for other applications such as concrete or wood surfaces (please refer to table 1).

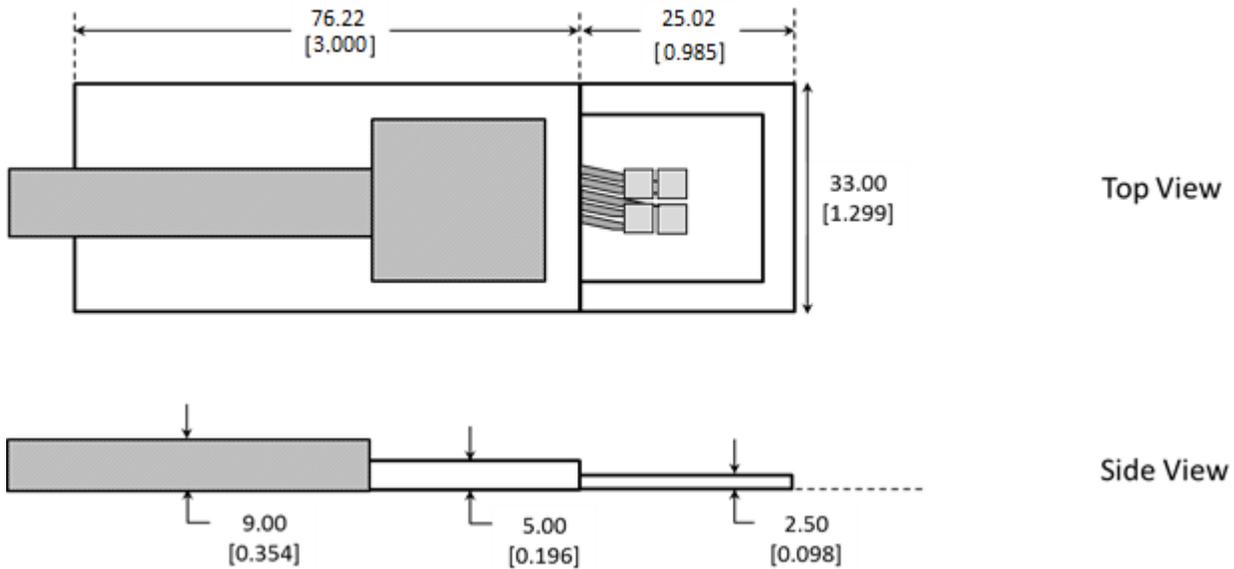


Figure 2: Default sensing element (for steel surface) dimensions. All dimensions are in mm (inch)

Sample Data in SenScope™

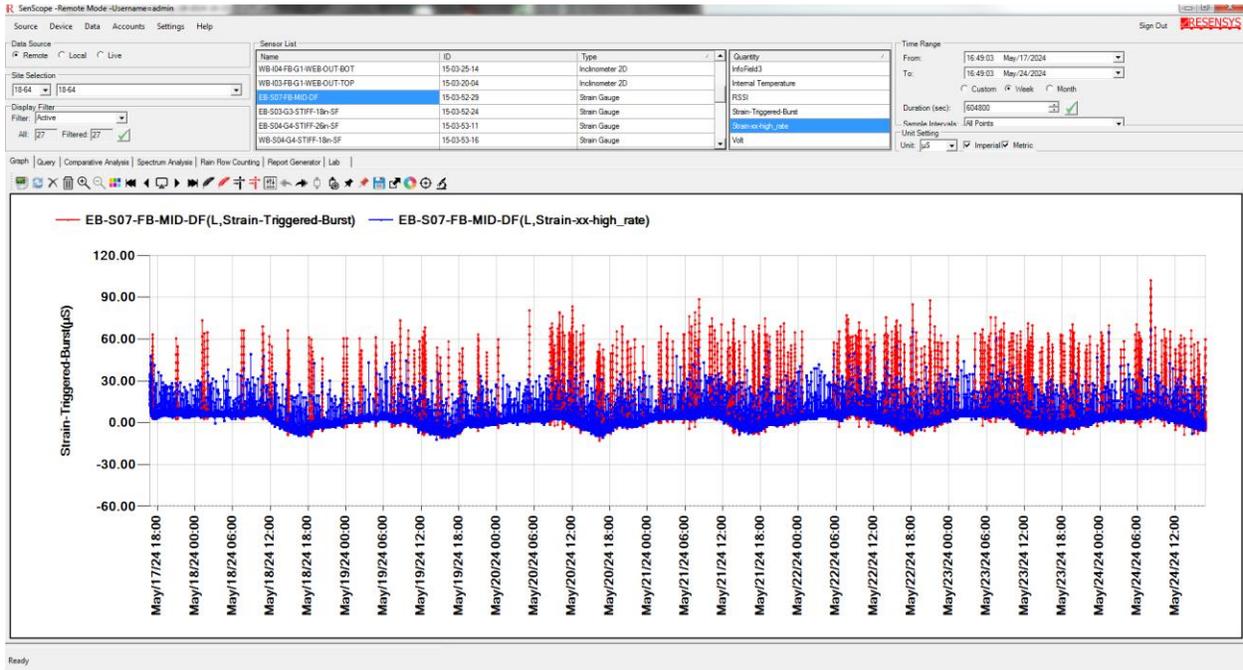


Figure 3: High rate (Blue) and triggered burst (red) strain measurements of an installed wireless SenSpot™ (Type C)

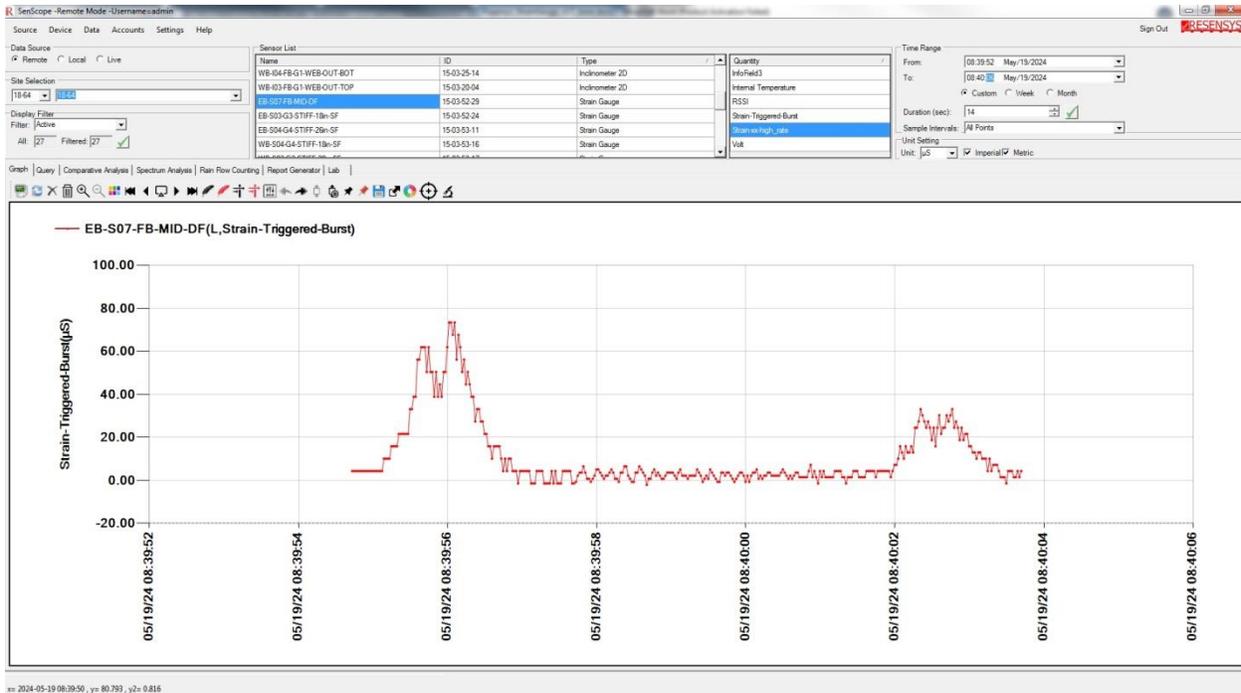


Figure 1: Detailed graph of a sample burst mode triggered event Strain gauge (Type C) on a highway bridge. The two peaks show the loading of two axles of a truck.

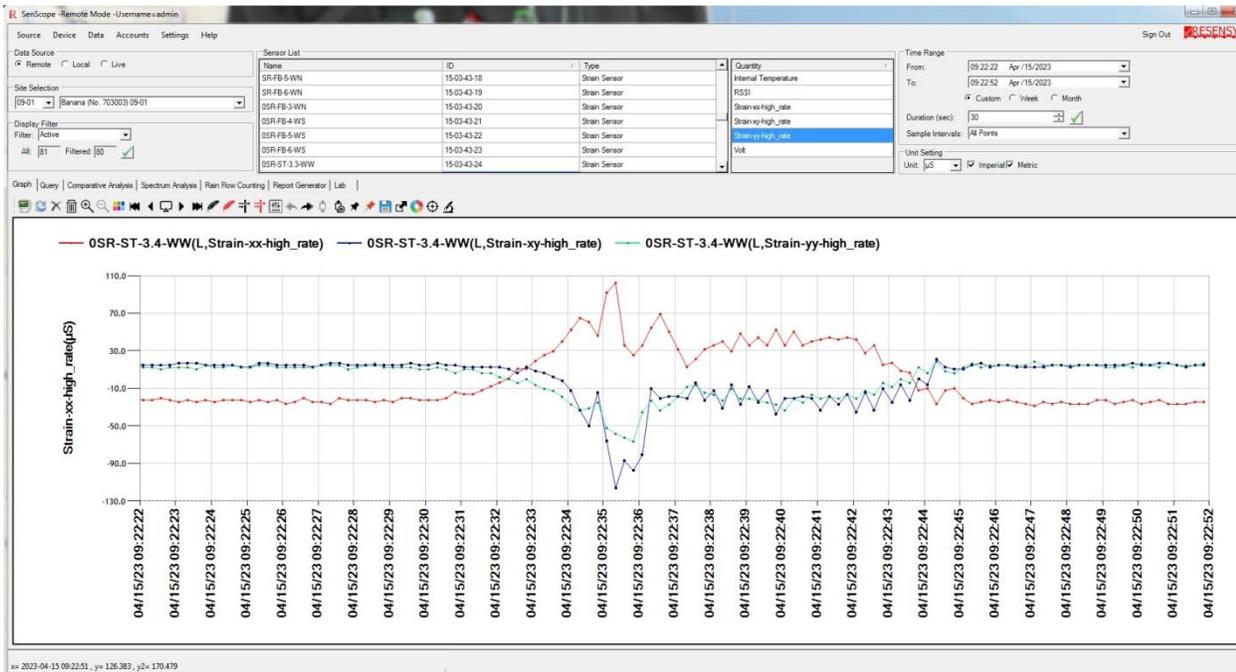


Figure 5: Strain measurements of the three channels of an installed Rosette (Type R) strain gauge



Figure 6: Installed strain gauge on a roof joist (for roof snow load monitoring)