



## Typical Applications

- Structural Health Monitoring (Airplanes, Bridges, Buildings, Cranes, Tunnels, Platforms, Machinery, etc.)
- Fatigue Analysis
- Bridge Load Tests
- Fracture Critical Monitoring
- Extreme Load Tests
- Detect Overweight Loads (e.g., dump trucks)

## Benefits

- **Long lifetime:** Solar powered and almost maintenance free
- **A Stand-alone IoT Device:** all-in-one device capable of sensing, collecting and uploading data to the remote server
- **Easy mounting:** Flange mount or adhesive tape
- **Ingress Protection:** IP68, weatherproof, and protection from rain, snow, and UV exposure
- **Maintenance free:** Self-powered by a solar panel. No battery replacement, calibration or post-installation maintenance is required

## Specifications

- **Dimensions (transceiver box):** 140mm (5.50") x 105mm (4.12") x 62mm (2.44")
- **Dimensions (Strain Gauge sensor):** 76.2mm (3") x 33mm (1.3") x 9mm (0.4")
- **Weight:** 0.8 kg (2 lb.)
- **Operating temperature:** -40°C to +65°C (-40°F to +150°F)
- **Wireless Communication:** LTE-M/NB-IoT
- **Two channel measurement:** performed independently of each other
- **Sampling rate:** every 1 second. Customizable up to every 100ms (10 Hz)
- **High compatibility:** integrates with third party strain transducers 120 Ohm, 350 Ohm, 700 Ohm, full-bridge, half-bridge and quarter-bridge (typically used for concrete surfaces)
- **Sensing Element: Strain gauge**
  - Resolution: 1  $\mu\epsilon$
  - Range:  $\pm 1000 \mu\epsilon$
  - Sampling rate: Up to 10Hz

## Description

The Resensys IoT sensor is versatile and provides an easy and inexpensive way to install a scalable solution for distributed structural integrity monitoring. It can measure two separate strain gauges. The transceiver and the solar panel can be easily mounted with either flanges or adhesive, both attached to the outer box. 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 IP68 standard (completely weatherproof). As a result, it is an excellent choice for strain monitoring applications that require the sensors to be installed some outdoor places which are often hard to reach.

The device needs a Nano SIM card with an active plan that supports 4G LTE and a good cellular coverage to periodically connect to a remote server and send all measured data through the cellular network. It is a completely stand-alone product and does not need any other intermediate device such as a gateway.

The strain gauge is designed by default to be attached on steel surfaces, but it can be easily customized for other surface types such as concrete or wood.

IoT sensors can be applied easily to as many critical spots on a structure as needed with minimal installation effort.

This is a completely stand-alone device. It measures, saves, and later sends data through a cellular network to the remote server. With this device, there is no need to use an expensive extra cellular gateway for sending the data that can significantly reduce the project overall cost especially in small projects where only couple of sensors are needed.

This product uses Resensys's proprietary Active RF Technology. Resensys SenSpot™ technology offers a high-performance method for large-scale sensing and ultra-energy efficient wireless communication.

# Installation

Wireless transceiver box 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 (in inch)

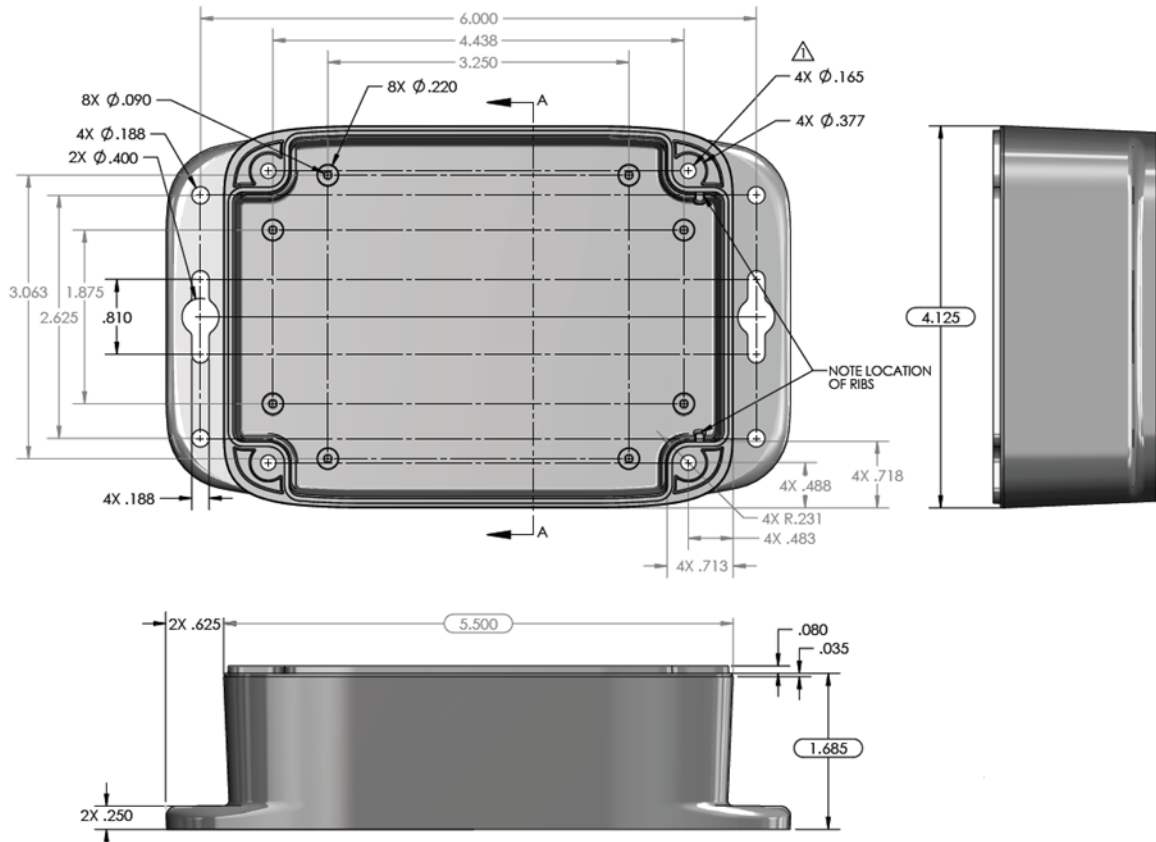
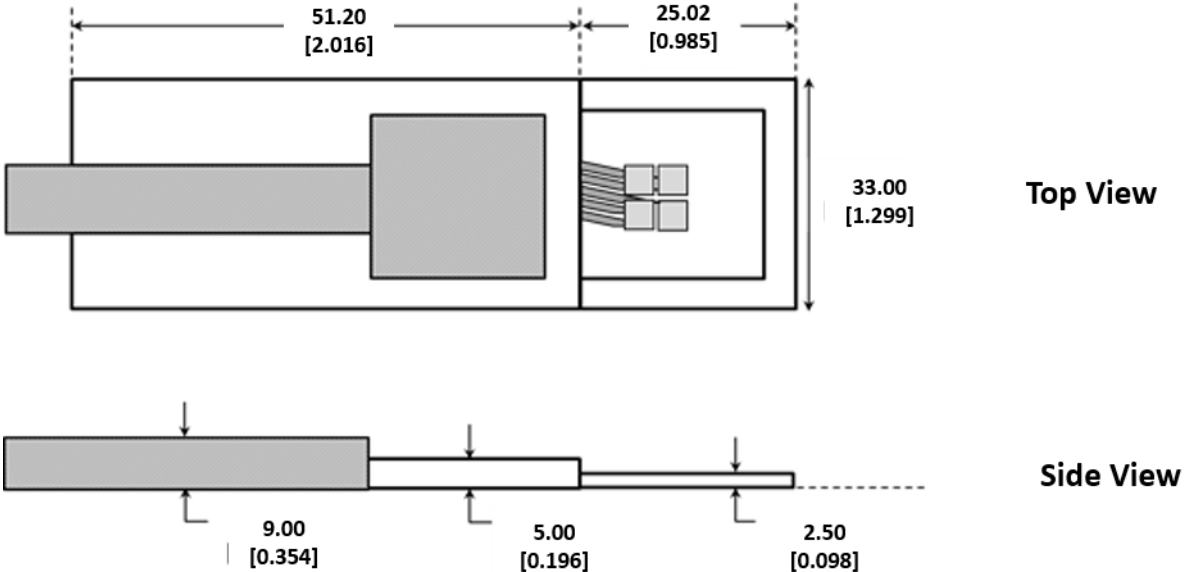


Figure 1: Wireless transceiver dimensions for enhanced strain gauge IoT sensor. All dimensions are in inch.

# 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. This sensor is self-adhesive and it is meant to be used on steel structures.



All dimensions are in mm [inch].

Figure 2: Sensing element dimensions of enhanced strain gauge IoT sensor. All dimensions are in mm [inch].

# Ordering Information

Part Number	Description
SIOT-ST02-SL-001	2 Channel steel strain gauge