Typical Applications

- Bridge health monitoring

- Structural integrity monitoring (Airplanes, Buildings, Cranes, Dams, Tunnels, Platforms, Machinery, etc.)

- Monitoring of bridge bearing and expansion joints

- Monitoring width of cracks on structures

- Monitoring timber structures and bridges

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")

- **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:** either one or two independent displacement values can be measured

- **Sampling rate:** From every 1 second. Customizable to up every 100ms (10 samples/sec)

- **Sensing Element: Displacement meter**
  - Resolution: 0.1mm (3.9 mil)
  - Range: 50mm (2"), 75mm (3"), 100mm (4"), 150mm (6"), 300mm (12")
  - Non-linearity: <= ±0.10% (Full Stroke)

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 either two separate displacement gauges.

SenSpot™ displacement meter can be used for measuring the progress of the existing cracks in a structure. This device has a sliding element which moves with displacement of structure or growth of a crack.

The displacement SenSpot™ comes with IP67 rated transducer from Novotechnik that is well known for its high-quality products but it can be customized per user request to work with other transducers from other third-party manufacturers such as OMEGA or Vishay.

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 crack-development 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.

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 then 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).
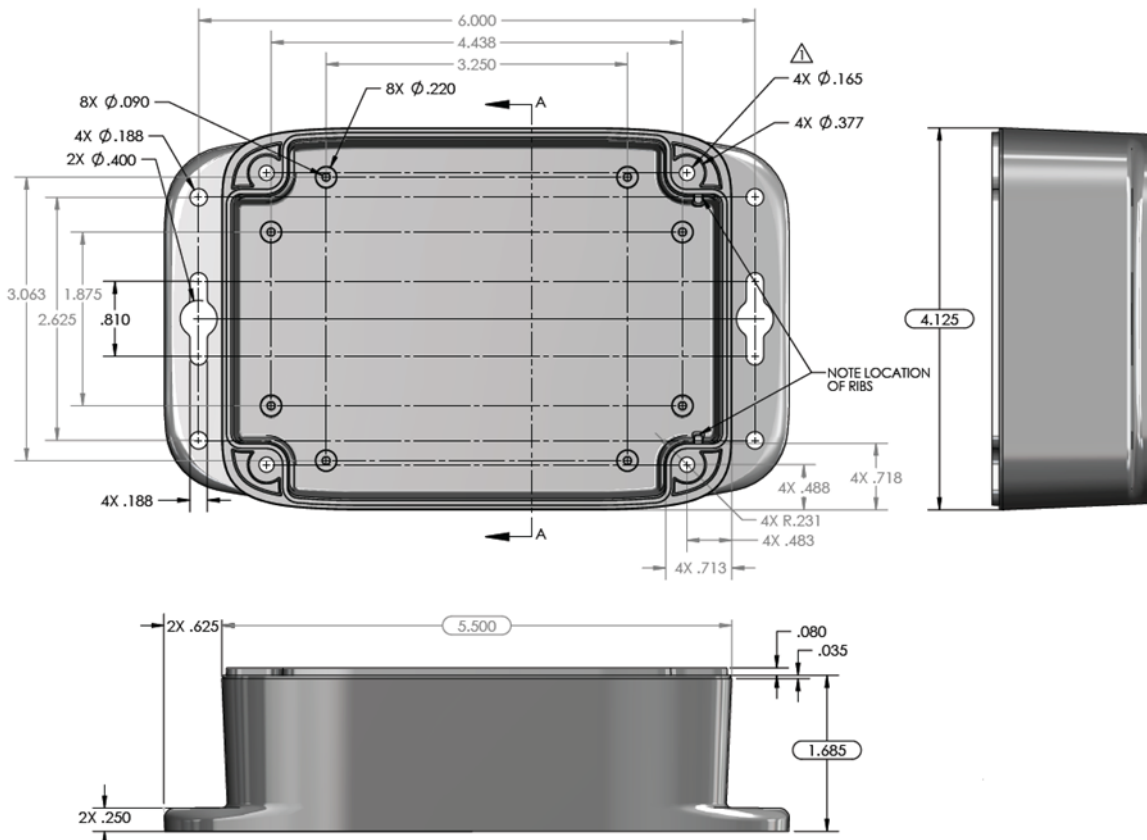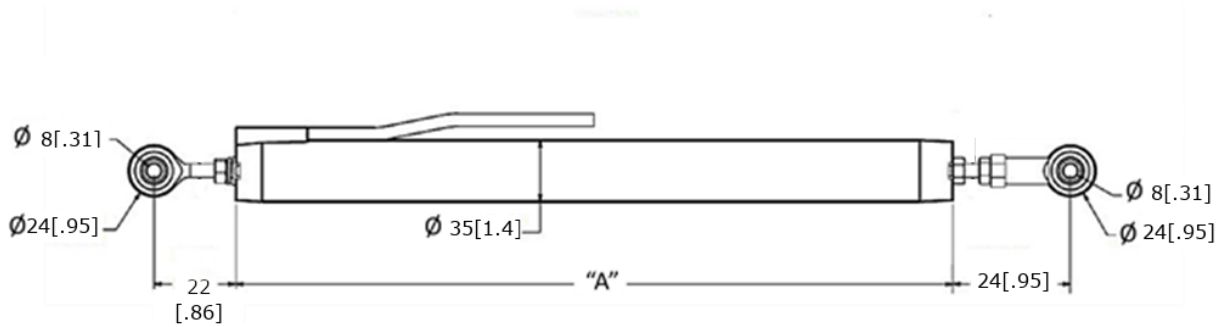
Wireless Transceiver Dimensions (in inch)

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

Displacement sensing element

All dimensions are in mm [inch].

Model	2"	3"	4"	6"	12"
Dimension "A" (mm)[inch]	176 [6.9]	201 [7.9]	227 [8.9]	277 [10.9]	430 [16.9]

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

Ordering Information

Part Number	Description
SIOT-DP022-01	2 Channels. Range 2" (50 mm)
SIOT-DP032-01	2 Channels. Range 3" (75 mm)
SIOT-DP042-01	2 Channels. Range 4" (100 mm)
SIOT-DP062-01	2 Channels. Range 6" (150 mm)
SIOT-DP122-01	2 Channels. Range 12" (300 mm)