

## Typical Applications

- Bridge health monitoring
- Monitoring inclination of bridge piers
- Monitoring retaining wall movements
- Monitoring bridge bearing movements
- Scour critical bridge monitoring
- General structural integrity monitoring (buildings, dams, tunnels, etc.)
- Automation technology
- Aerospace engineering
- Monitoring of manufacturing process



## Benefits

- **Long lifetime:** (battery life of up to 10 years).
- **Wireless communication:** No wiring is required for data collection.
- **Lightweight:** 400 g (14.1 oz.)
- **Easy mounting:** Comes with a pair of specific stainless steel mounts that allows fine tuning pitch and roll values during installation.
- **Adjustable sampling interval:** 12 seconds to 6 minutes.
- **Communication range:** 300m (980 ft) for reliable communication.
- **2D-Measurement:** Monitoring the tilt of the whole surface instead of just one direction.
- **Two separate sensing elements:** High Resolution Electrolyte Tilt sensor for Pitch and Roll as well as MEMS chip for Medium Resolution Tilt (MRT-X, MRT-Y and MRT-Z) readings.

## Specifications

- **Two Types:** Mid-Range (lower resolution) and Narrow-Range (higher resolution).
- **Operating range:**
  - Narrow Range 2DHRT:  $\pm 1^\circ$  (with respect to vertical position).
  - Mid-Range 2DHRT:  $\pm 10^\circ$ .
  - Medium Resolution Tilt (MRT) readings: all direction (both types).
- **Resolution:**
  - Narrow Range 2DHRT:  $\leq 0.0003^\circ$  ( $5.2\mu\text{rad}$ ).
  - Mid-Range 2DHRT:  $\leq 0.003^\circ$  ( $52\mu\text{rad}$ ).
  - Medium Resolution Tilt (MRT) readings:  $0.01^\circ$  (both types).

- **Linear range:**
  - Narrow Range 2DHRT:  $\pm 0.5^\circ$ .
  - Mid-Range 2DHRT:  $\pm 10^\circ$ .
  - Medium Resolution Tilt (MRT) readings:  $\pm 60^\circ$ .
- **Repeatability:**
  - Narrow Range HRT:  $\leq 0.001^\circ$  (17.5 $\mu$ rad).
  - Mid-Range HRT:  $\leq 0.001^\circ$  (17.5 $\mu$ rad).
  - Medium Resolution Tilt (MRT) readings: 0.01 $^\circ$ .
- **Time constant:**
  - $\leq 1$ sec (High resolution electrolyte tilt)
  - $\leq 0.01$ sec (MEMS chip)
- **Working temperature:** -40 $^\circ$ C to +65 $^\circ$ C (-40 $^\circ$ F to +150 $^\circ$ F).
- **Transmitter Dimension:** 79.6mm (3.13") x 74.6mm (2.94") x 52mm (2.05").
- **Assembly Dimension:** 120.8mm (4.76") x 96.6mm (3.8") x 149.9mm (5.9").
- **Ingress Protection:** IP67, weatherproof, waterproof, protected against rain, snow, and UV exposure.
- **Power source:** Standard non-rechargeable CR123 battery.

# 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 for at least 10 years. Due to small size and lightweight, SenSpot™ sensors can be applied easily to as many critical spots on a structure as needed, with minimal installation effort.

As a part of the Resensys solution for integrity monitoring system, SenSpot™ inclination/tilt can be used to monitor the smallest movements of structural components such as piers, decks, bearings on a highway bridge. In addition, SenSpot™ inclination/tilt monitors changes in these quantities as the structure expands or contracts as a result of temperature variations. In addition to bridges, SenSpot™ inclination/tilt can be used in a variety of other structures. Examples include buildings, dams, etc.

# Installation and Dimensions

The tilt sensors are built-in the SenSpot™ unit. They come by a pair of stainless steel mount that is especially designed for 2DHRT SenSpot™ and allows fine tuning of the mounting orientation in both Pitch and Roll directions. For proper installation of the device, please refer to 2DHRT user manual.

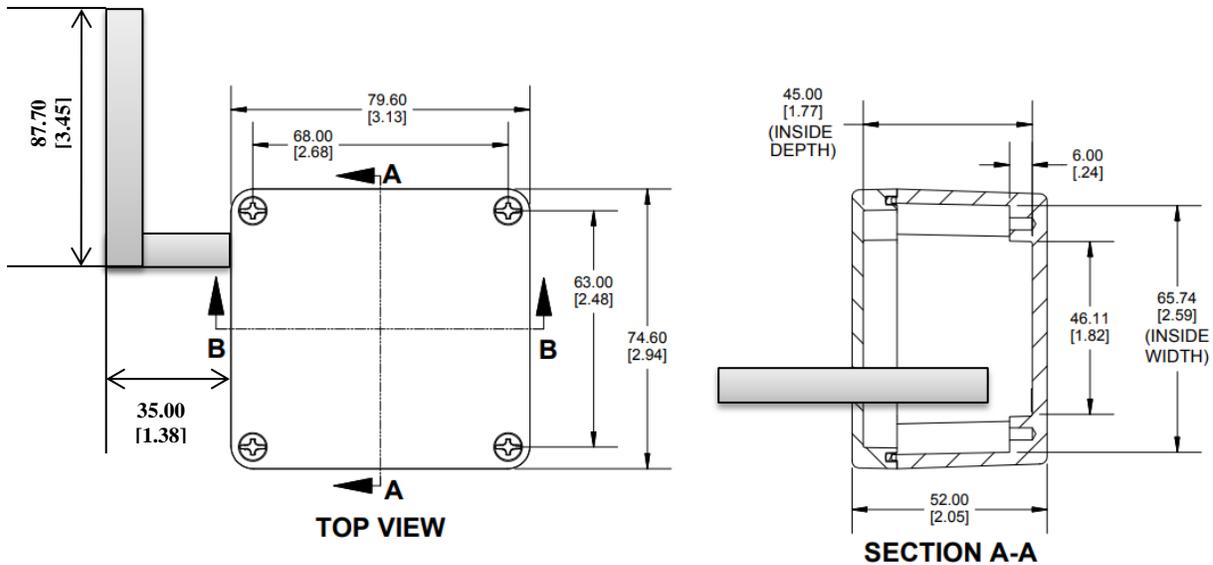


Figure 1: 2DHRT SenSpot™ Dimensions. All measurements are in mm [inch].

# Direction Diagram

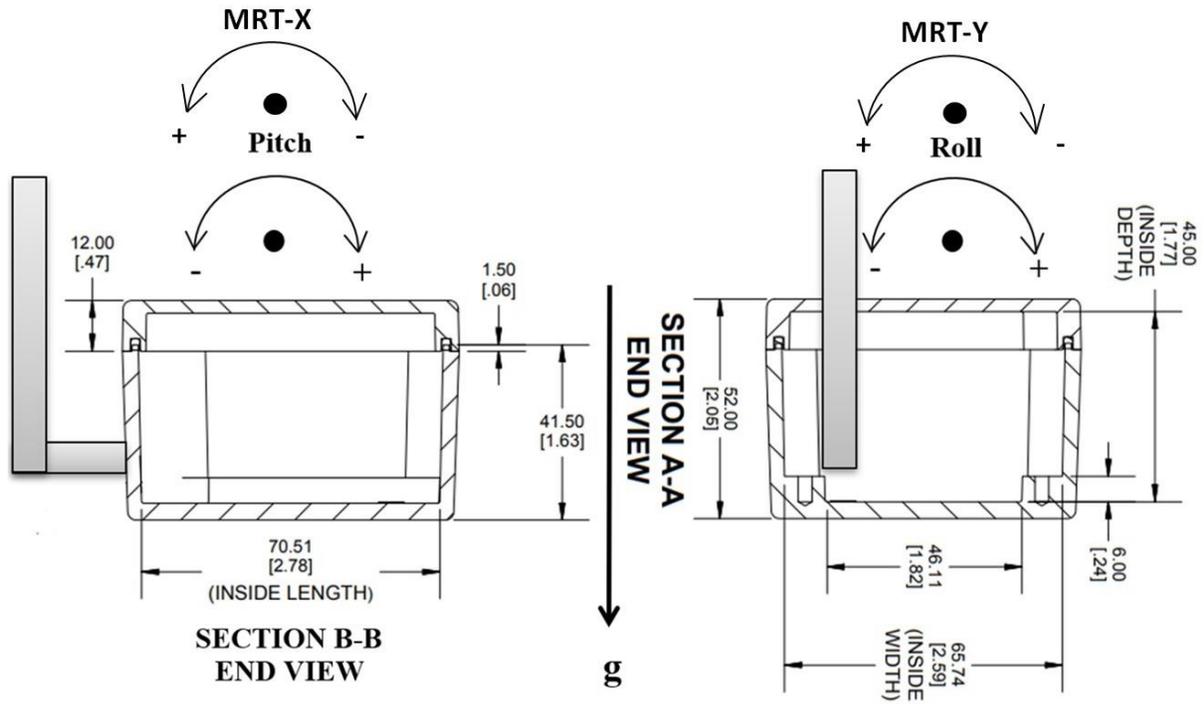


Figure 2: MRT-X, MRT-Y, Pitch and Roll orientations

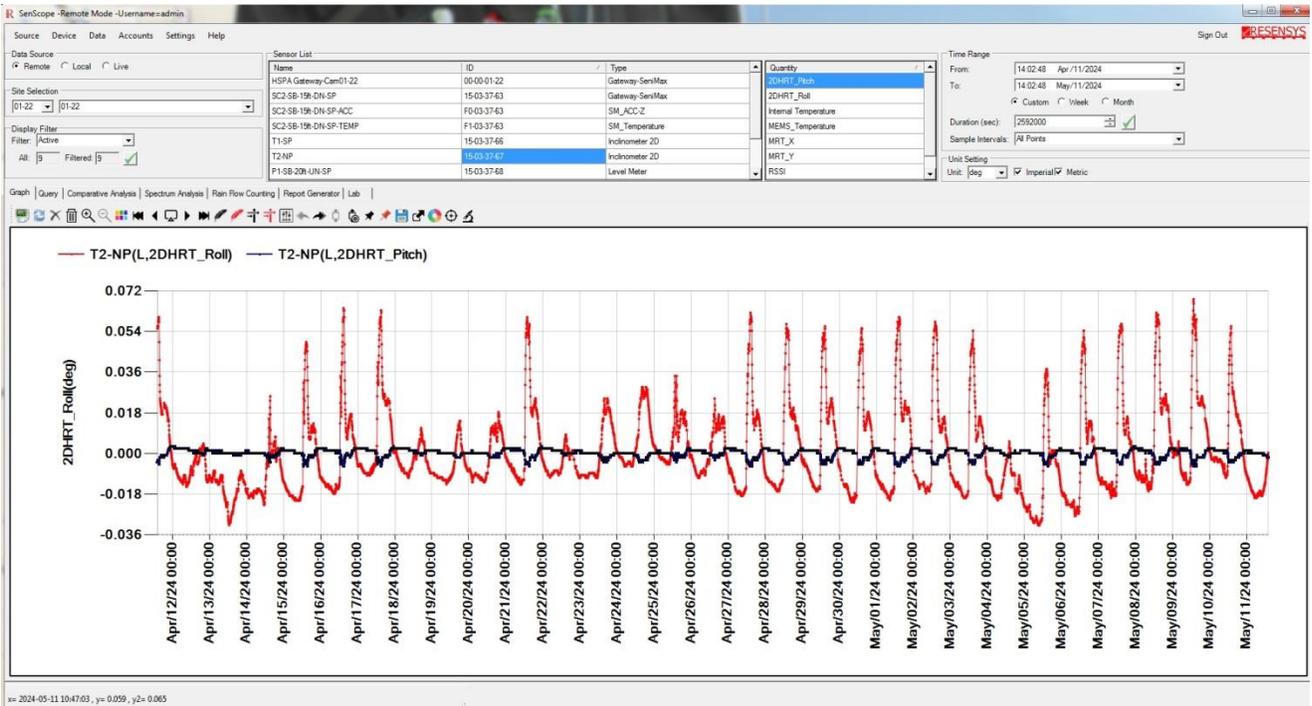


Figure 3: High resolution tilt measurements (Roll & Pitch) of an installed 2DHRT SenSpot™ (inclinometer)



Figure 4: A Resensys 2DHRT SenSpot™ installed on a retaining wall