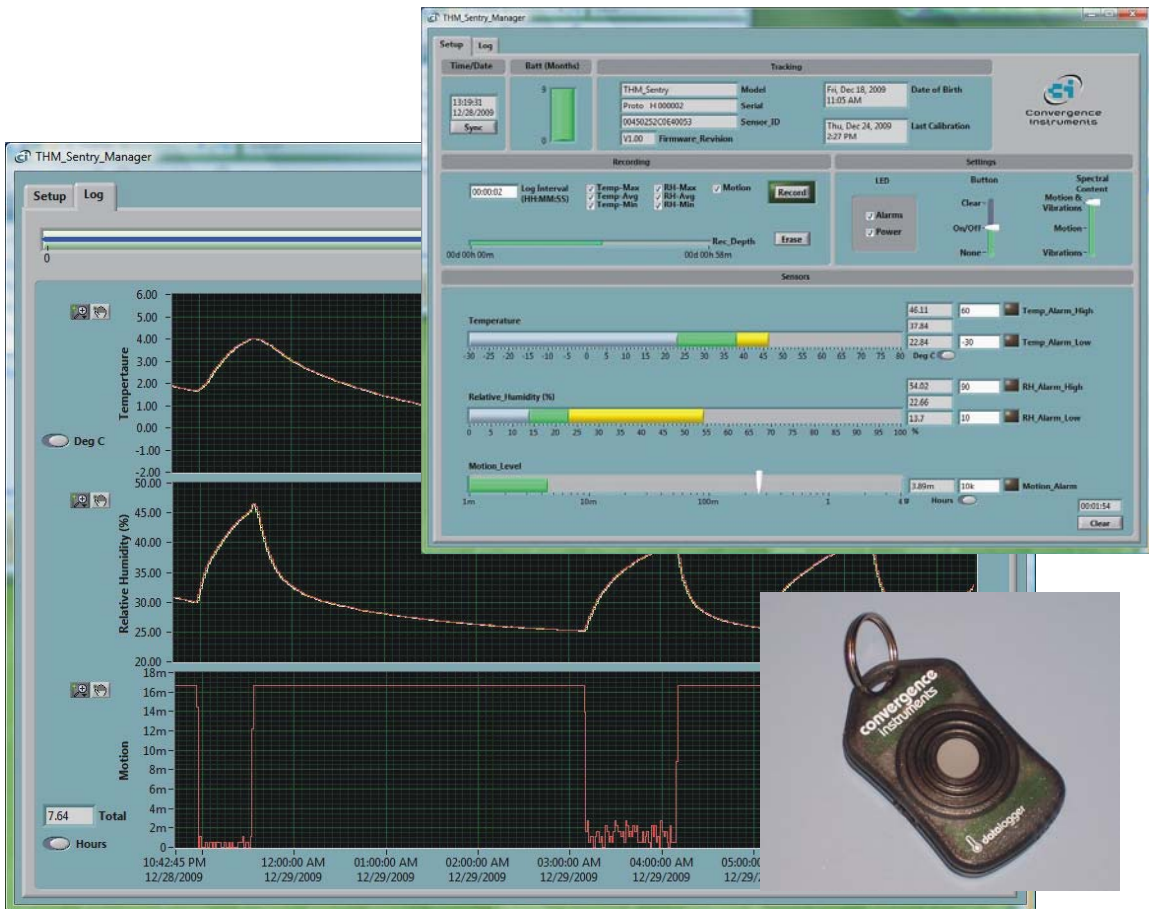




# THM\_Sentry

## Data Sheet



March 25 2010  
Bruno Paillard

<b>1</b>	<b>PRODUCT DESCRIPTION</b>	<b>2</b>
<b>2</b>	<b>FEATURES</b>	<b>2</b>
<b>3</b>	<b>APPLICATIONS</b>	<b>3</b>
<b>4</b>	<b>SPECIFICATIONS</b>	<b>3</b>
<b>4.1</b>	<b>Precision</b>	<b>5</b>
4.1.1	Temperature	5
4.1.2	Relative Humidity	5
<b>5</b>	<b>SPECIAL HANDLING INSTRUCTIONS</b>	<b>5</b>
<b>6</b>	<b>SPECIFICATIONS OF <i>THM_SENTRY_MANAGER</i> SOFTWARE</b>	<b>6</b>

## 1 Product Description

The *THM\_Sentry* series of instruments are high-performance temperature, humidity and motion data loggers. They include a high-resolution temperature sensor, a high-resolution relative humidity sensor, a motion and vibration sensor, an accurate date/time clock and a non-volatile 12000-point recording memory. The motion sensor measures the number of motion events where the acceleration is above an adjustable threshold, or the number of hours where motion is detected (hours of operation). Their very small size allows them to be attached to or embedded within the monitored equipment.

There are presently two models in the series:

- **THM12N:** Includes Temperature, Humidity and Motion sensors
- **TM12:** Includes only Temperature and Motion sensors

## 2 Features

The *THM\_Sentry* series include the following features:

Feature	TM12	THM12N
<b>Sensors</b>	Temperature, Motion	Temperature, Humidity, Motion
<b>All-digital design</b>	✓	✓
<b>NIST traceable</b>		✓
<b>Very high temperature resolution and precision</b>	✓	✓
<b>Very high relative humidity resolution and precision</b>		✓
<b>Adjustable motion type (Motion/Vibrations/Both) and threshold</b>	✓	✓
<b>Counts motion events or hours of operation</b>	✓	✓
<b>Extremely long battery life</b>	✓	✓
<b>Alarms on all measurements</b>	✓	✓
<b>Non-volatile memory, preserves recorded data in case of battery failure</b>	✓	✓
<b><i>THM_Sentry_Manager</i> application to setup operating and recording parameters, download, visualize and export data</b>	✓	✓
<b><i>Displays data while recording</i></b>	✓	✓
<b><i>LabVIEW driver</i></b>	✓	✓

### 3 Applications

- Logging hours of operation or duty rate of motors machinery and equipment.
- Monitoring of storage, transport conditions and movements of perishable items (fresh produce... etc.)
- Tamper-proof Monitoring of Environmental Conditions
- Monitoring of Storage Conditions for Musical Instruments and Other Delicate Items.
- Detection and logging of the handling of pieces of equipments (Asset Management).
- Monitoring of indoors and outdoors temperature and humidity conditions
- Monitoring of temperature and humidity for:
  - Museums
  - Freezers
  - Incubators
  - Exotic Animal Habitat
  - Electronic Equipment (Servers...)

### 4 Specifications

<b>Dimensions</b>	5.7 cm x 3.5 cm x 1.1 cm (2.25 in x 1.35 in x 0.43 in)
<b>Weight</b>	15 g (0.5 oz)
<b>Measurements</b>	<ul style="list-style-type: none"> <li>• MaxTemperature</li> <li>• Avg Temperature</li> <li>• Min Temperature</li> <li>• Max Relative Humidity (<i>THM12N</i> Model only)</li> <li>• Avg Relative Humidity (<i>THM12N</i> Model only)</li> <li>• Min Relative Humidity (<i>THM12N</i> Model only)</li> <li>• Motion (Number of events or hours of operation)</li> </ul>
<b>Alarms</b>	<ul style="list-style-type: none"> <li>• MaxTemperature</li> <li>• Min Temperature</li> <li>• Max Relative Humidity (<i>THM12N</i> Model only)</li> <li>• Min Relative Humidity (<i>THM12N</i> Model only)</li> <li>• Motion (Number of events or hours of operation)</li> </ul>
<b>Battery life</b>	<ul style="list-style-type: none"> <li>• 12 months to 19 months (<i>TM12</i> model, depending on mode of operation)</li> <li>• 9 months to 13 months (<i>THM12N</i> model, depending on mode of operation)</li> </ul>
<b>Battery type</b>	<ul style="list-style-type: none"> <li>• BR2032 lithium battery for full temperature range</li> <li>• CR2032 lithium battery for reduced temperature range</li> </ul>
<b>Temperature range (operating and storage)</b>	<ul style="list-style-type: none"> <li>• <math>-30\text{ }^{\circ}\text{C}</math> to <math>80\text{ }^{\circ}\text{C}</math> (<math>-22\text{ }^{\circ}\text{F}</math> to <math>176\text{ }^{\circ}\text{F}</math>) if BR2032 battery</li> </ul>

<b>Temperature resolution</b>	<ul style="list-style-type: none"> <li>-20 °C to 70 °C (-4 °F to 158 °F) if CR2032 battery</li> </ul>
<b>Temperature precision (typical)</b> (see curves below)	<ul style="list-style-type: none"> <li>0.06 °C /0.12 °F (TM12)</li> <li>0.01 °C /0.018 °F (THM12N)</li> </ul>
<b>Temperature time constant</b>	<ul style="list-style-type: none"> <li>0.5 °C /0.9 °F (TM12)</li> <li>0.3 °C /0.54 °F (THM12N)</li> </ul>
<b>Relative humidity normal range (operating and storage)</b>	<ul style="list-style-type: none"> <li>&lt; 15 min still air</li> <li>&lt; 6 min circulating air</li> <li>0 to 80%</li> </ul> <p><i>Note: Operating range is further restricted to values with dew point between -40 °C and 80 °C .</i></p>
<b>Relative humidity extended range</b>	<ul style="list-style-type: none"> <li>0 to 99% (non-condensing)</li> </ul> <p><i>Note: Between 80% and 100% the sensor may read a reversible offset with slow kinetics (&lt;3% after 200 hours at 90% RH)</i></p>
<b>Relative humidity resolution</b>	<ul style="list-style-type: none"> <li>0.04%</li> </ul>
<b>Relative humidity precision (typical)</b> (see curves below)	<ul style="list-style-type: none"> <li>2%</li> </ul>
<b>Relative humidity hysteresis (typical)</b>	<ul style="list-style-type: none"> <li>1%</li> </ul>
<b>Relative humidity time constant</b>	<ul style="list-style-type: none"> <li>&lt; 15 min still air</li> <li>&lt; 6 min circulating air</li> </ul>
<b>Motion detector number of axes</b>	<ul style="list-style-type: none"> <li>3 axes (omni-directional)</li> </ul>
<b>Motion type detected</b>	<ul style="list-style-type: none"> <li>Motion only (low frequencies)</li> <li>Vibrations only (high frequencies)</li> <li>Motion + Vibration</li> </ul>
<b>Motion noise level</b>	<ul style="list-style-type: none"> <li>Better than 10 mg (100 10<sup>-3</sup> m/s<sup>2</sup>)</li> </ul>
<b>Motion threshold range</b>	<ul style="list-style-type: none"> <li>Adjustable 0 to 3.5g</li> </ul>
<b>Measurement interval</b>	<ul style="list-style-type: none"> <li>2s</li> </ul>
<b>Recording interval</b>	<ul style="list-style-type: none"> <li>Adjustable 2s to 12H, with 2s resolution</li> </ul>
<b>Recording memory type</b>	<ul style="list-style-type: none"> <li>Non-Volatile</li> </ul>
<b>Recording/erasure cycles</b>	<ul style="list-style-type: none"> <li>More than 10 000</li> </ul>
<b>Recording memory Depth</b>	<ul style="list-style-type: none"> <li>12 000 individual measurement points</li> </ul>

## 4.1 Precision

### 4.1.1 Temperature

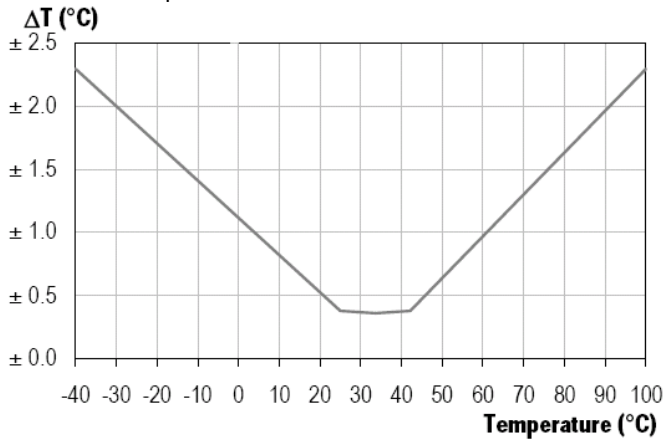


Figure 1: Maximum Temperature Tolerance

### 4.1.2 Relative Humidity

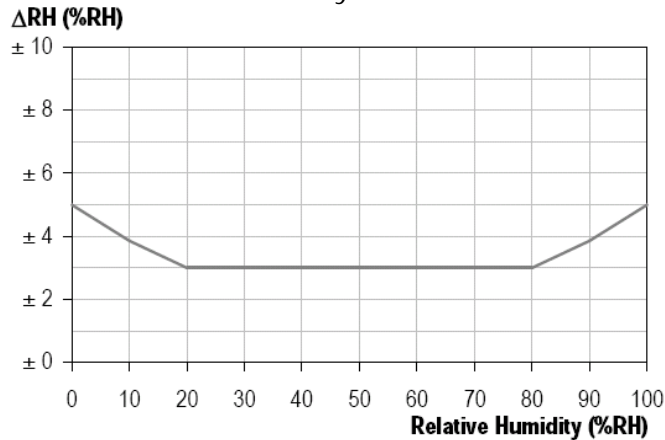


Figure 2: Maximum Humidity Tolerance at 25 °C

## 5 Special Handling Instructions



Chemical vapors at high concentrations, such as chemical solvents, out-gassing of glues, adhesive tapes etc. in combination with long exposure times may offset the relative humidity sensor reading (*THM12N* model only).

Operation and storage of the relative humidity sensor should be restricted to well ventilated areas.



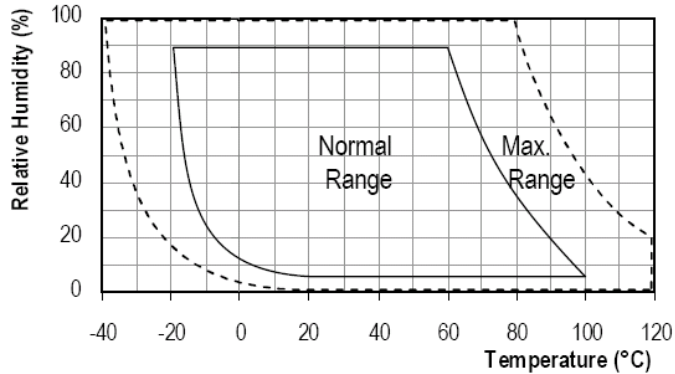
Cleaning of the *THM Sentry* should only be done with a damp cloth. Avoid all chemical solvents as the vapors may damage the humidity sensor.



Do not submerge the *THM Sentry* in liquids.



THM12N: Long term exposure to conditions outside Normal Range, especially at humidity > 80 % RH, may temporarily offset the RH reading (+3%RH after 60h). After return into the Normal Range it will slowly return toward its calibration state by itself. Prolonged exposure to extreme conditions may accelerate ageing.



TM12 and THM12N: Operation and storage beyond its specified temperature range (-30 °C to 80 °C ) may damage the instrument.



Operation and storage of the *THM Sentry* in condensing atmospheres for long periods of time, such that corrosion may occur, risks damaging the instrument.



Only use the MLI cable provided with the *THM Sentry*.



When used outdoors make sure the instrument is not directly exposed to rain or sun light. As with any thermometer direct sun light will offset the temperature measurement. Water infiltration in the casing for long periods of time may damage the instrument.

## 6 Specifications of *THM Sentry Manager* Software

- Windows XP, Windows Vista and Windows 7 compatible
- Real-time display of temperature, humidity (*THM12N* model only) and motion measurements.
- Complete instrument configuration, including date/time, alarms, motion type and threshold, types of statistics recorded and recording rate.
- Collects and displays data while recording.
- Auto-scale, zoom and pan on temperature , humidity and motion graphs
- Export temperature, humidity and motion data to Excel format.