

# VT8000 Room Controllers

## CO2 + TRH Sensor Installation Guide

Wireless CO2, Temperature and Humidity Sensor



## Introduction

The wireless CO<sub>2</sub> + TRH (Carbon Dioxide + Temperature and Relative Humidity) sensor is a wall mounted device for ambient (indoor) comfort monitoring and HVAC control applications.



Please note the sensor is available in two variations:

1. CO<sub>2</sub> + TRH sensor (SED-CO2-G-5045)
2. TRH only sensor (SED-TRH-G-5045)

All information related herein applies to both models, except for CO<sub>2</sub> functionalities which are only available on the CO<sub>2</sub> + TRH sensor.

The sensor can measure ambient temperature, relative humidity and depending on the model - CO<sub>2</sub> concentration. The measured data is communicated wirelessly using Zigbee Green Power protocol to a Room/ Zone controller.

Selected as Room Temperature Source?	Mode	Communication Rate
No	Normal mode (CO <sub>2</sub> >= 600ppm)	2 minutes 30 seconds
No	Power-saving mode (CO <sub>2</sub> < 600ppm)	10 minutes
Yes	Active mode	2 minutes 30 seconds

## Description

The sensor integrates an ultra-low power CO<sub>2</sub> and a digital temperature (T) and relative humidity (RH) sensor.

The Human Machine Interface (HMI) of the sensor is based on a bi-color Light-Emitting Diode (LED) and a pushbutton, both covered by a plastic housing. A small tool or stylus is needed to push the button located through a small hole. The LED flashes and is visible through the top plastic cover. All communication with the device is done wirelessly via a bidirectional Zigbee Green Power protocol after a successful pairing/commissioning procedure.

The sensor is powered by an embedded AA size lithium-thionyl chloride spiral battery (not rechargeable, not removable). The battery capacity allows up to 10 years of operating time at nominal conditions. The device must be replaced and recycled when the battery is discharged.

## Box Contents

The wireless CO<sub>2</sub> + TRH sensor box contains the following:

- Wireless CO<sub>2</sub> + TRH sensor or TRH sensor
- Wall-mounting bracket
- Two screws for wall-mounting bracket
- Installation guide

## System Requirements

When used with a Schneider Electric VT8000 Room Controller, it requires at least:

- Firmware version: 1.7
- Zigbee VCM version: 10

The maximum number of sensors supported by the VT8000 Room Controller is:

- Zigbee VCM versions 10 to 24: 1
- Zigbee VCM versions 30 and higher: 20



The CO<sub>2</sub> + TRH sensor is not compatible with VT7000 Room Controllers.



To perform an accurate ambient comfort measurement, the sensor should not be installed in areas exposed to direct sunlight or near doors, windows or areas exposed to air flow.

## Installation

The wireless CO<sub>2</sub> + TRH sensor can be secured directly on a wall or flat surface using double-sided adhesive tape (Figure 2), or by securing the plastic bracket to the wall (Figure 1) and mounting the sensor (Figure 3). Using the screws is the recommended method.

### Attaching a sensor using the wall bracket

1. Using the two screws provided, secure the wall bracket to the wall (Figure 1).
2. Once bracket is secured, slide sensor on bracket using downward motion (Figure 3).

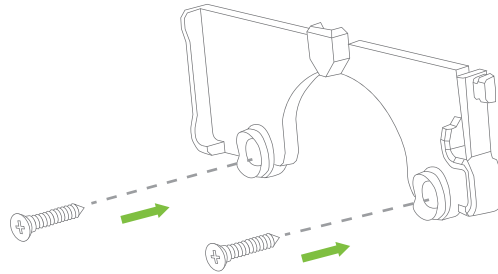


Figure 1



It is strongly recommended to attach the sensor to the wall by using the two screws. The adhesive in double-sided tape may not be as long-lasting or as strong to support the sensor throughout its lifetime.

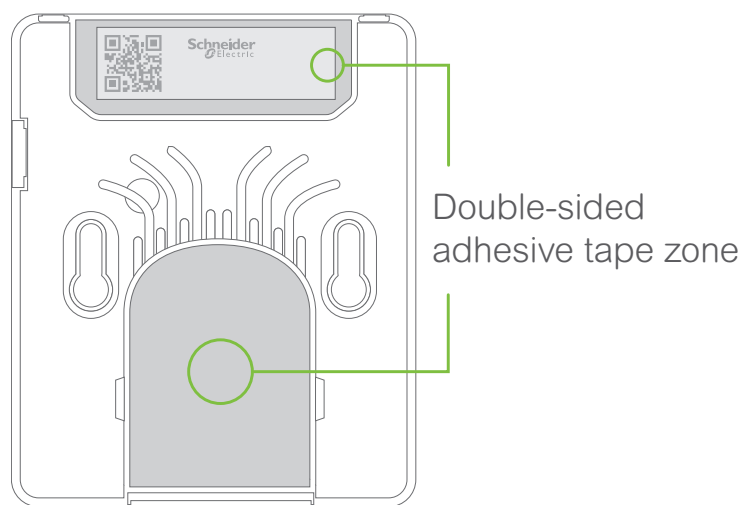


Figure 2

3. Ensure click sound is heard to verify sensor is secured to bracket and ensure side tab of bracket is aligned with opening on side of sensor (Figure 3).

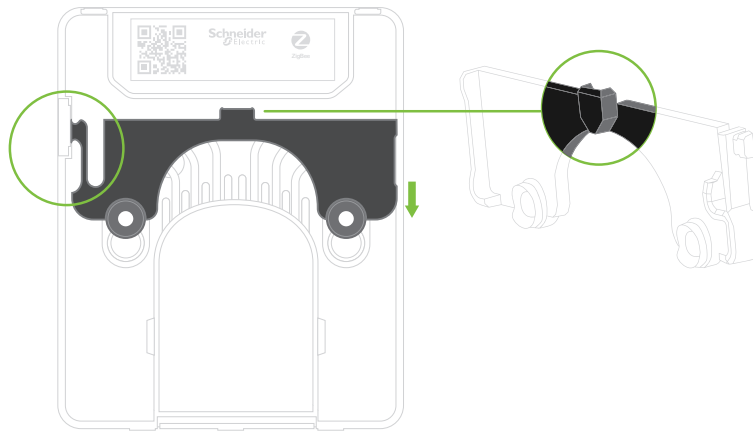


Figure 3

#### De-mounting the sensor from the wall bracket

To remove the sensor from the wall bracket, press on the side tab as circled in Figure 3 and slide the sensor up and then out.

#### Interface

A wireless CO<sub>2</sub> + TRH sensor is deployed by setting the interface with a push button and a multi-color LED. Both are hidden under the sensor housing and intended for use by a trained installer only.

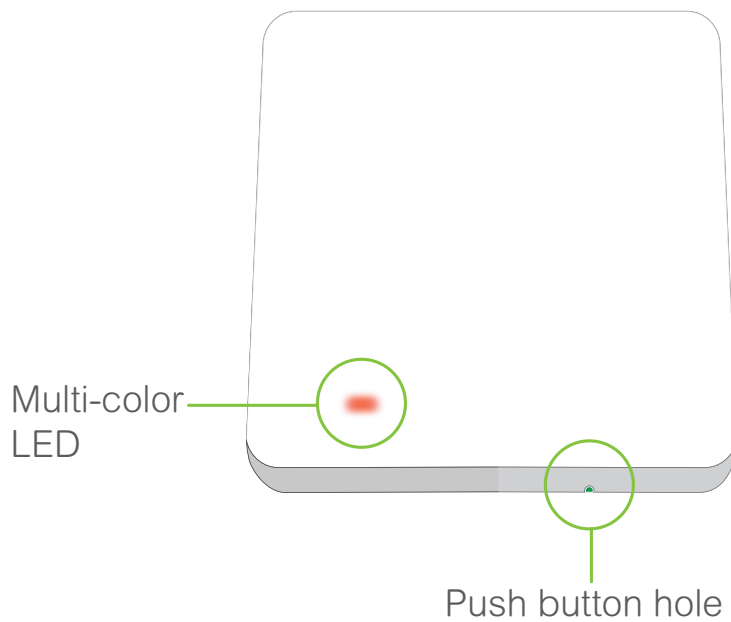


Figure 4

### Push button

The push button can be pressed through a hole from the bottom side of the sensor, with a slim tool (Figure 4). Each recorded button press is signaled by 2 yellow LED flashes.

- Short push  
One short push starts the commissioning procedure if the sensor is in the decommissioned (energy saving / hibernation) mode. If the sensor is already commissioned, it will enter "demo mode" (where the temperature will be reported every 5 seconds) for a 5-minute timeout interval. The short push is confirmed with 2 yellow LED flashes.
- Long push  
One long push puts the sensor into decommissioned / hibernate mode. The long push is confirmed by one red LED flash roughly 1 second after with 2 yellow LED push signaling flashes. After a red LED signal, the button should be released in order to prevent another unintended short push detection.

### Multi-colour LED

The multicolor LED is hidden under the top plastic cover, positioned on left (Figure 4). In normal state the LED is off in order to conserve battery life. It is only used to signal the following special events:

- 2 YELLOW flashes confirm each button push taken into account by the sensor.
- 1 RED flash acknowledges a long push. The decommissioning procedure and a sensor reset will be executed, then the sensor will enter hibernation mode.
- 3 RED flashes signal a commissioning procedure failure. The sensor stays in decommissioned / hibernation mode.
- 3 GREEN flashes signal a commissioning procedure success. The sensor will enter demo mode for 5 minutes. This demo mode will automatically timeout after 5 minutes. The sensor then stays in commissioned mode, periodically transmitting the measured values to the receiver.
- 1 GREEN flash acknowledges a valid message command received by the sensor in demo mode. This feature can be used as a feedback to an installer to confirm that the sensor is still in range during the commissioning (it works only in demo mode). In this case the receiver has to be programmed to send an acknowledgment command to the sensor after the sensor data report frames.



The multiple LED flashes are executed only in 1/2 second intervals.

## CO<sub>2</sub> Sensor Autocalibration

### Principle of operation

The CO<sub>2</sub> module inside the wireless CO<sub>2</sub> + TRH sensor is fully calibrated prior to shipping from the factory. Over time, the measurement offset needs to be calibrated to maintain the long term stability of the sensor. In most applications, this can happen automatically using the built in auto-calibration function. This technique can be used in situations in which sensors will be exposed to typical background levels (400-450ppm) at least once during the autocalibration period. For example, many buildings will drop quickly to background CO<sub>2</sub> levels when unoccupied overnight or on weekends. The autocalibration function uses the information gathered during these periods to recalibrate.

The autocalibration function uses the lowest point of CO<sub>2</sub> concentration to recalibrate the offset. During every measurement cycle, the CO<sub>2</sub> sensor stores the latest values, and also the lowest value recorded since the last calibration point.



The first 50 measurements after calibration are ignored when calculating the lowest value.

### Autocalibration default setting

The CO<sub>2</sub> sensor is shipped with the autocalibration feature enabled. There isn't any CO<sub>2</sub> measurement in the Factory Mode before the Commissioning. After the Commissioning all previous CO<sub>2</sub> measurement data stored in the sensor is erased.

By default the first autocalibration will happen 1 day after the commissioning, and the following autocalibrations in 8-day intervals.



It is normal for the sensor to display invalid readings during the first day following the initial installation and autocalibration. Minimum of 2 autocalibrations (9+ days) are required for accurate readings.

## Compliance Statements

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- this device may not cause harmful interference
- this device must accept any interference received, including interference that may cause undesired operation

Changes or modifications not approved by the manufacturer could void the user's authority to operate the equipment. This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20cm during normal operation.

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

- this device may not cause interference
- this device must accept any interference, including interference that may cause undesired operation of the device.

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée ux deux conditions suivantes:

- l'appareil ne doit pas produire de brouillage
- l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Cet équipement est conforme aux limites d'exposition aux radiations indiquées dans la norme RSS-102 de l'IC, établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec une distance minimale de 20 cm entre le radiateur et votre corps.