

# tSENSE (Disp)

CO<sub>2</sub>-, Temperature- and RH  
Transmitter with colour touch display



**tSENSE** is an advanced and versatile 3-in-1 transmitter designed for installation in the air-conditioned zone. It measures CO<sub>2</sub> concentration, temperature and humidity in the ambient air accurately without need for additional compensation – true read. The data transmits to a BMS system or stand-alone controller using industry standard output signals and communication protocols.

**tSENSE** combines all the necessary elements for effective climate control in commercial office buildings, hospitals, hotels, schools and other facilities. Using CO<sub>2</sub>-monitoring for demand control ventilation (DCV) allows healthy, comfortable and cost-effective environment for the occupants. It is flexible in design with temperature control and combination of humidity control optional. Though suitable for use in many different energy-efficient ventilation strategies, **SenseAir**<sup>®</sup> welcomes any discussions for specific needs.

Complies with ASHRAE standard 189.1  
(±50ppm @ 1000ppm of measured CO<sub>2</sub> value)

## STANDARD SPECIFICATION

Art.no	070-8-0001/070-8-0002 ( <i>Disp</i> )
Measured gas	Carbon dioxide (CO <sub>2</sub> )
Operating principle	Non-dispersive infrared (NDIR)
Measurement range	0 - 2000ppm
OUT1 CO <sub>2</sub>	0 - 10VDC, 0 - 2000ppm
OUT2 Temperature	0 - 10VDC, 0 - 50°C
OUT3 Relative Humidity	0 - 10VDC, 0 - 100%RH
Accuracy (CO <sub>2</sub> )	±30ppm ±3% of reading
Dimensions	125mm x 85mm x 22mm
Dimensions display	49mm x 37mm
Life expectancy	>15 years
Operation temperature range	0 - 50°C
Power supply	12VDC, 24VAC/DC
Communication	Modbus (MB) or BACnet (BAC) protocol over RS485

## KEY BENEFITS

- Maintenance free
- 3 sensors in one housing
- Colour touch display with possibility of customizable GUI
- Flexibility - Temperature and/or Humidity optional
- Improved housing design for effective measurement
- Five year warranty

# tSENSE™ (Disp) Technical Specification

## General Performance:

Storage Temperature Range	-30 - 70°C
Sensor Life Expectancy <sup>1</sup>	>15 years
Maintenance Interval <sup>2</sup>	Maintenance free
Self-Diagnostics	Complete function-check of the sensor module
Display (Disp)	Configurable colour LCD with CO <sub>2</sub> (ppm), Temperature (°C) and Humidity (%RH)
Buttons	Touch display (Disp)
Complies With Standards	EMC directive 2004/108/EC, RoHS directive 2011/65/EU
Warm-up Time	≤1min.(@ full specs 15min )
Operating Temperature Range	0 - 50°C
Operating Humidity Range	0 - 95%RH, non condensing humidity environment
Operating Environment	Residential, commercial

## Electrical / Mechanical:

Power Input	12VDC, 24VDC or 24VAC (50 - 60Hz) ±20%
Power Consumption	<0.35W average non-display version, <0.6W display version
Peak Power Consumption	<2W
Wiring Connections	Screw terminal, max 1.5mm <sup>2</sup> , Containing: Power, GND, Out1, Out2, Out3, RS485. Option: passive temperature or relay

## CO<sub>2</sub> Measurement:

Sensing Method	Non-dispersive infrared (NDIR) waveguide technology
Sampling Method	Diffusion
Response Time (T <sub>1/e</sub> )	<3min
Measurement Range	0 - 2000ppm <sub>vol</sub>
Accuracy <sup>3</sup>	±50ppm (@1000ppm <sub>vol</sub> , 17 - 28°C and 30 - 60%RH) Typical full range: ±30ppm +3% of measured value <sup>4,5</sup>
Pressure Dependence	+1.58% reading per kPa deviation from normal pressure, 101.3kPa
Measurement Interval	15s

## Temperature Measurement:

Measurement Range (T)	0 - 50°C
Accuracy <sup>6</sup>	±0.5°C (@ 17 - 28°C), ±1.0°C (@ 0 - 50°C)
Repeatability	±0.25°C (@ 17 - 28°C)
Response Time	<6min (Air velocity of 0.15m/s)
Measurement Interval	15s

## Relative Humidity Measurement:

Measurement Range	0 - 100%RH
Accuracy <sup>6</sup>	±5%RH (@ 20 - 80%RH)
Hysteresis	±1%RH (@ 20 - 80%RH)
Annual Drift	<±0.5%RH
Repeatability	±0.25%RH (@ 17 - 28°C)
Response Time	<6min (Air velocity of 0.15m/s)
Measurement Interval	15s

## Outputs:

### Linear Analog Outputs:

Protection	PTC-fuses (auto reset), short-circuit safe
Output Conversion Accuracy	±2% of reading ±20mV
Output Signal	Voltage output 0 - 10V, R <sub>out</sub> <100Ω, Load: >5kΩ
Output Resolution	10-bits, 10mV steps, 0.1% steps of full ppm/°C/%RH range
Out1: CO <sub>2</sub> <sup>7</sup>	0 - 10V, corresponds to 0 - 2000ppm <sub>vol</sub> , at screw terminal
Out2: Temperature (T) <sup>7</sup>	0 - 10V, corresponds to 0 - 50°C, at screw terminal
Out3: Relative Humidity (RH) <sup>7</sup>	0 - 10V, corresponds to 0 - 100%RH, at screw terminal

### Digital Output:

Relay (RL) <sup>7</sup>	On ≥1000ppm <sub>vol</sub> CO <sub>2</sub> , Off ≤900ppm <sub>vol</sub> , CO <sub>2</sub> , at screw terminal
	Form C / DPDT, I <sub>max</sub> : 1A/50VAC/24VDC
Input Source	CO <sub>2</sub> /T/RH (configurable via touch display)

## tSENSE™

Art.no.	Product	Additional features
070-8-0001	tSENSE™ Disp T RH RL MB BAC	Colour touch display
070-8-0002	tSENSE™ T RH RL MB BAC	No display
070-8-0003	tSENSE™ VAV Disp T RH RL MB BAC	Colour touch display

<sup>1</sup> SO<sub>2</sub> enriched environments are excluded.

<sup>2</sup> No maintenance required in normal indoor air as ABC (Automatic Baseline Calibration) is used.

<sup>3</sup> In normal IAQ applications, accuracy is defined after minimum three (3) weeks of continuous operation with ABC.

<sup>4</sup> Accuracy is specified over operating temperature range. Specification is referenced to certified calibration mixtures. Uncertainty of calibration gas mixtures (±1% currently) is to be added to the specified accuracy for absolute measurements.

<sup>5</sup> Repeatability is included. Uncertainty of calibration gases (±1%) is added to the specified accuracy.

<sup>6</sup> Depending on display brightness setting.

<sup>7</sup> Can be configured with PC software UIP (version 5 or later). See information at [senseair.com](http://senseair.com)