

Installing the Sensor

!WARNING!

Before performing service or maintenance operations on the systems, turn OFF main power switches to the unit. Electric shock can cause personal injury. Please read and follow the wiring instructions precisely; mis-wiring may cause permanent damage to the product.

Basic Installation

1. Separate the case into its front and rear sections.
2. Secure the rear section of the case to the wall or junction box using the supplied screws, and make necessary wire connections.
3. Select Voltage or Current output option and Voltage range (0-10 V or 0-5 V) using the SW1, switches #1 and #2 as shown on the internal label (Figure 1 and Table 1).

Note: SW1 controls both CO₂ and Temperature outputs simultaneously.

Factory default setting is Voltage outputs 0-10V.

Table 1: Voltage and Current Output Options

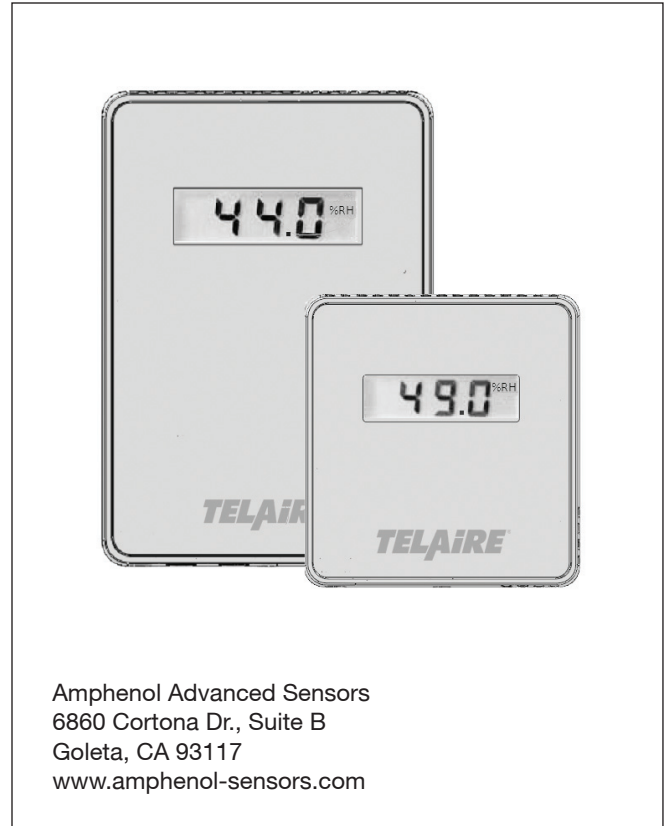
Switch #1	Switch #2	Configuration
Down, Low	Down, Low	Factory default setting CO2 0-10 V/0 - measuring range Temperature 0-10 V/ 0 - 50°C
Up, High	Down, Low	CO ₂ 0-5V/0 - measuring range Temperature 0-5 V/ 0 - 50°C
Down, Low	Up, High	CO ₂ 4-20 mA/0 - measuring range Temperature 4-20 mA/ 0 - 50°C
Up, High	Up, High	RESERVED

4. Select CO₂ relay threshold settings using SW1, switches #3 and #4.

Table 2: Relay Settings

Switch #3	Switch #4	CO ₂ Relay Threshold and Hysteresis
Down, Low	Down, Low	Factory default setting 800 ppm, 100 ppm
Down, Low	Up, High	1000 ppm, 100 ppm hysteresis
Up, High	Down, Low	1200 ppm, 100 ppm hysteresis
Up, High	Up, High	1500 ppm, 100 ppm hysteresis

Customizable settings available via UIP software T2090



5. Mount the Controller on the base by aligning the top clips and then securing to the bottom clips. Secure the Ventostat with the supplied set screw. A one-minute stabilization warmup will take place.

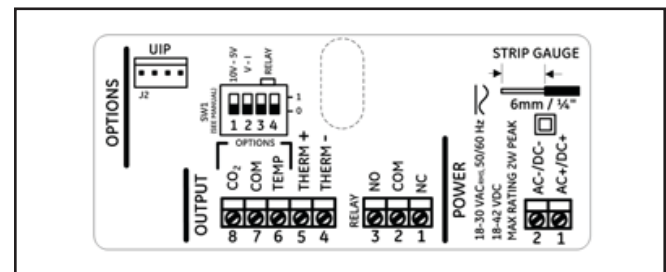


Figure 1: Internal Label

Ventostat Wiring Diagrams

!WARNING!

Ventostat T8000-R series products have two terminal pins that are connected inside the sensor to a common/ground: pin # 7 on the I/O terminal blocks and pin #2 on the power block. Do NOT connect positive (hot) 24 VAC power line to terminal number 2 of the terminal block.

Caution!

The T8000-R Ventostats are either 3-wire or 4-wire type configurations, powered by either AC or DC voltage. They are not 2-wire or loop-powered devices. Wiring the units as 2-wire or loop-powered devices will irreparably damage the sensors and void the warranty.

Note: For temperature measurements, Ventostat T8000-R models contain an active temperature output (terminal pin #6) and a passive thermistor (terminal pins #4 and 5). The passive thermistor is electrically isolated from the other circuitry and should be wired independently from active CO₂ and temperature outputs. The thermistor has no connection to the Ventostat common ground. The active temperature output has the same common (ground) as the CO₂ output.

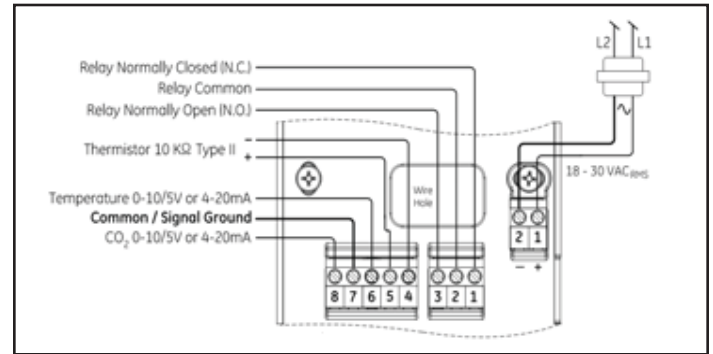


Figure 3: Unit Wiring for 4-Wire System, AC Power

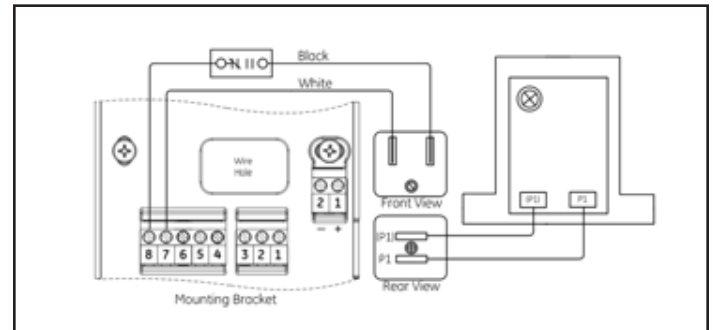


Figure 4: Wiring, CO₂ Sensor Voltage Output

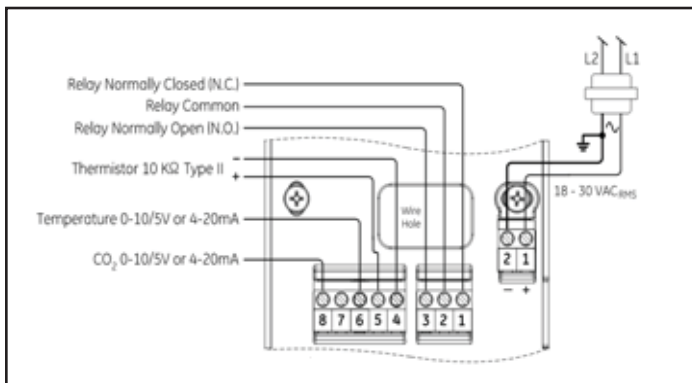


Figure 2: Unit Wiring for 3-Wire System, AC Power

Sensing Duct CO₂ Concentrations

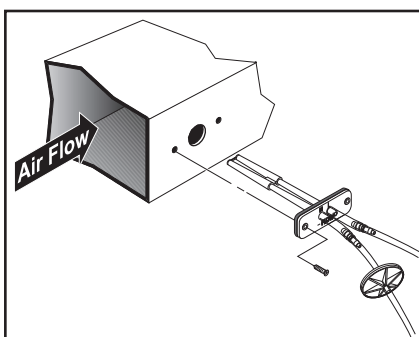
Duct-Mounting the Enclosures

Ventostat products can be installed inside the return air ductwork, if needed. As an alternative, please consider the T8031 unit. When mounting these products inside the ductwork, seal the hole around the wires and leave the duct insulation in place to prevent condensation which may damage the sensor.

Pitot Tube Installation for T8300-R and T8300-D

Install the mounting bracket, then install the pitot tube assembly as follows:

Note: The length of the Tygon® tubing is 6 ft. (1.8 m) with the optional T62892 pitot kit for the T8300. In order to maintain optimum accuracy, the tubing should not be lengthened. If the sensor is mounted closer than 3 ft. (0.9 m) the excess tubing should be shortened to avoid interference with mechanical or moving devices.



1. To mount the pitot tube, drill one 7/8" hole through the duct.
2. Insert the pitot tube and mark the two remaining holes for the mounting screws.
3. Punch or drill the two marked holes.
4. Note the direction of airflow in the duct.
5. Note the marking on the pitot tube flange and insert so that it is properly aligned with the airflow.
6. To ensure an air tight seal, make sure the mounting surface of the duct is clear of dirt or obstructions. Then, attach the pitot tube to the duct with sheet metal screws or rivets.
7. Check the length of the tubing before attaching to the sensor. The tubing should connect without stretching or pulling. If the length is long enough to create a loop or bind in the tubing, it should be shortened.
8. To shorten the tubing, remove the connectors that attach to the sensor and cut the tubing to length.
9. Replace the tubing connectors by using a twisting or screwing motion. Verify the connection is secure.

Note: If the tubing length has been shortened, be sure the in-line filter is replaced on the pitot tube connector marked with an "H".

Accessory Enclosures

Model T1508 Duct Mount Enclosure (Aspiration Box)

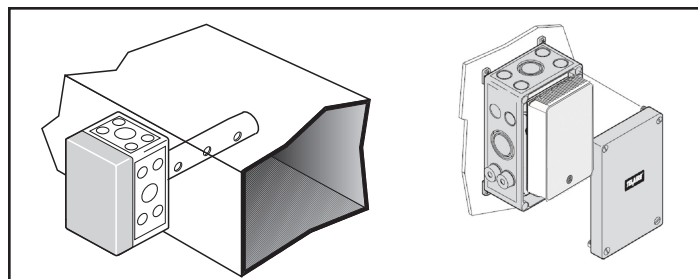
The T8100-R/T8200-R/T8300-R units can be installed inside a Model 1508 Duct Mount Enclosure.

Model T1552 Outside Air Measurement Enclosure

This NEMA-3R weatherproof enclosure includes thermostat and allows installing the sensor in environments with temperatures down to -40°F.

Model T1505 Harsh Environment Enclosure

For extreme environments where the sensor might be subjected to condensation or water spray such as those found in greenhouses or breweries- NEMA-3R rated.



T8000-R Series Specifications

CO₂ Measurements

CO₂ Sensing Method

Non-dispersive infrared (NDIR) absorption
Gold-plated optics
Single and dual-channel options
Patented ABC Logic self calibration algorithm

CO₂ Measurement Range

T8100-R/T8200-R/T8300-R/T8400-R
0 to 2000 ppm (0 ppm = 0 V, 4 mA; 2000 ppm = 10/5V, 20 mA)
T8100-R/T8200-R/T8300-R/T8400-R - 5P models
0 to 5000 ppm (0 ppm = 0 V, 4 mA; 5000 ppm = 10/5V, 20 mA)

CO₂ Accuracy

T8100-R/T8300-R Single Channel
400-1250 ppm ±30 ppm or 3% of reading, whichever is greater*,**
1250-5000 ppm ±5% of reading + 30ppm *, **

T8200-R/T8400 -R Dual Channel
±75 ppm or 10% of reading (whichever is greater)

*Tolerance based on span gas of ±2%
** ABC Logic not deactivated

CO₂ Temperature Dependence

0.2% FS per °C (±0.11% per °F)

CO₂ Pressure Dependence

0.135% of reading per mm Hg

CO₂ Stability

T8100-R/T8300- R Single Channel
<2% of FS over life of sensor (15 years)

T8200-R/T8400- R Dual Channel
<5% of FS or <10% reading annual over life of sensor (10 years)

CO₂ Warm-up Time

< 2 minutes (operational)
10 minutes (maximum accuracy)

Temperature Measurements

Active Temperature Measurement Range

0-50°C (32-122°F)

Active Temperature Accuracy

±1°C from 15 to 30°C (±1.8°F from 59 to 86°F)

Additional Passive Thermistor Type

NTC 10 KOhm, type 2

Additional Passive Thermistor Accuracy

±1°C from 15 to 30°C (±1.8°F from 59 to 86°F)

Outputs

Analog Outputs for CO₂ and Temperature

0 to 5 V, or 0 to 10 V switch selectable (100 Ω output impedance)
Or 4 to 20 mA (RL maximum 500 Ω)
Voltage and current outputs are not available simultaneously
Digital to analog error ±2%

Relay

Relay Threshold and Hysteresis are presented in Table 2.
Normally open and normally close contacts
Rated load 0.50 A at 125 VAC, 1A 24 VDC
Contact material Ag + Au-Alloy
Carry current 2 A
Max. operating voltage 125 VAC, 60 VDC
Max. operating current 1 A
Max. switching capacity 62.50 VA, 30W

Analog Outputs and Relay Update Rate

Every 5 seconds

Passive type 2 10kOhm thermistor is isolated from T8000-R series ground

Power Supply Requirements

18-30 VAC RMS, 50/60 Hz, or 18 to 42 VDC, polarity protected

Power Consumption

Typical 0.7 W at nominal voltage of 24V AC RMS

Operating Conditions

32°F to 122°F (0°C to 50°C)
0 to 95% RH, non-condensing

Storage Conditions

-40°F to 158°F (-40°C to 70°C)

Flammability Classification

UL94 5VA

Certifications

CE, RoHS and REACH compliant

ABC Logic™ Self Calibration System

ABC Logic™ (Automatic Background Calibration) self calibration allows the sensor to continually recalibrate itself when the indoor concentrations drop to outside levels while the building is unoccupied. Generally a building must be regularly unoccupied for 4 hours or more for this self-calibration system to operate properly. Under these conditions, ABC Logic™ should maintain sensor calibration over the lifetime of the sensor. The ABC Logic™ should be turned OFF where a building is continuously occupied 24 hours per day, or where there could be significant sources of non-occupant related CO₂ such as greenhouses, breweries and other industrial and food processing applications.

Warranty/Other

Warranty

18 months parts and labor

This product is covered by one or more of the following patents:
5,650,624 / 5,721,430 / 5,444,249 / 5,747,808 / 5,834,777 / 5,163,332 / 5,340,986 / 5,502,308 / 6,344,798 / 6,023,069 / 5,370,114 / 5,601,079 / 5,691,704 / 5,767,776 / 5,966,077 / 6,107,925 / 5,798,700 / 5,945,924 / 5,592,147 / 6,255,653 / 6,250,133 / 6,285,290

Warranty Repairs

Amphenol Thermometrics, Inc. will repair Telaire product that fails to meet the terms provided for in the Return and Warranty Policy Statement (See, <http://www.amphenol-sensors.com>). Warranty period shall start from date of manufacture and be based on product category and type of equipment as specified in Table 1: Product Warranty Periods. For all warranty repairs, Amphenol Thermometrics, Inc. will bear all product repair parts, labor, and standard ground shipping charges.

Customer Support Centers

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Advanced Sensors

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