

CO₂, Humidity, and Temperature Transmitters



I-T8100

DESCRIPTION

Combination carbon dioxide (CO₂) transmitter and temperature sensor (thermistor type); or combination CO₂, humidity and temperature transmitter, with an additional temperature sensor (thermistor type) in one housing.

APPLICATION

To sense simultaneously: Carbon Dioxide (CO₂), relative humidity, and temperature in air in a wide variety of commercial applications, such as demand controlled ventilation in buildings, schools, theaters, etc., and transmit to any compatible electronic analog control, DDC/PLC control or automation system in accordance with ASHRAE standards.

FEATURES

- *Sensor combo in one (1) housing*
 - CO₂ and temperature (thermistor), or
 - CO₂, humidity, temperature active, & temperature passive (thermistor)
- *Non-dispersive infrared sensor*
- *0-2,000 ppm CO₂*
- *Thermistor, 10K, type II*
- *0-5 VDC, 0-10 VDC, or 4-20 mA selectable for CO₂, humidity, or temperature (simultaneous voltage & current output for CO₂)*
- *24 VAC or 24 VDC power*
- *Easy installation*
- *Maintenance-free using self-calibration technique****



SPECIFICATIONS

Electrical

Power supply 18-30 VAC RMS, 50/60 Hz, half-wave rectified, or 18-42 VDC
 Power consumption 0.7 Watts @ 24 VAC

Carbon Dioxide

Sensor Performance

Gas detected Carbon Dioxide (CO₂)
 Sensor element Single beam absorption infrared (NDIR), gold plated optics
 Gas sampling method Diffusion sampling
 Range 0-2,000 ppm CO₂, factory calibrated

Accuracy

within CO₂ range
 - 400 to 1,250 ppm ± 30 ppm or 3% of reading; whichever is greater
 - 1,250 to 2,000 ppm ± 30 ppm, plus 5% of reading

Temperature dependence ± 0.11% FS/°F (0.2% FS/°C)

Stability < 2% of FS over sensor life

Altitude dependence Calibrated for 1000 ft above sea level, add 0.13% of reading per mmHg decrease from 760 mmHg

Response time Every 5 seconds

Calibration interval Not required, built-in automatic self-calibration software, ABC Logic™***

Sensor life expectancy 15 years, normal service

Temperature

Sensor Performance

Sensor element Thermistor, 10K Ω, type II
 10K Ω @ 77°F (25°C)
 Range
 - thermistor -40°F to 158°F (-40°C to 70°C)
 - active temperature 32°F to 122°F (0°C to 50°C)

Accuracy

- thermistor ± 1.8°F / 59°F to 95°F (± 1°C / 15°C to 35°C)
 - active temperature ± 0.8% @ 72°F (22°C)

Humidity

Sensor Performance

Sensor element Capacitive polymer
 - type Relative humidity (RH)
 Range 0-99% RH, non-condensing
 Accuracy ± 2.5% RH / 10-90% RH

Type of Control

General Continuous proportional analog sensor and thermistor resistance outputs

Analog outputs

- CO₂, RH and temperature, active 0-5 VDC, 0-10 VDC, 100 Ω output impedance; and/or 4-20 mA, 500 Ω max., selectable "Simultaneous voltage and current output for CO₂"

*** ABC Logic™ Automatic Background Calibration, is a patented self-calibration technique designed to be utilized in applications where concentrations will drop to outside ambient conditions, about 400 ppm CO₂, at least 3 times in a 14-day period, typically during unoccupied periods. Full accuracy is achieved after two weeks of operation.

SPECIFICATIONS

Type of Control (cont...)

Analog outputs (cont...)

- temperature/thermistor, passive Ohm value
- Warm-up time
- operational 2 minutes
- max accuracy 10 minutes

Environmental

Permissible ambient

- humidity 0 to 95% RH, non-condensing
- working pressure related to altitude dependence
- working temperature 32°F to 122°F (0°C to 50°C)
- storage temperature -40°F to 158°F (-40°C to 70°C)

Physical

Enclosure

- material Impact plastic, UL 94-5 VA
- color Off-white, or optional black
- cover Snap-on, w/set screw
- installation Wall (surface) mounted, or single gang electrical box

Dimensions

4.58 x 3.20 x 1.07 in.
(117 x 82 x 27 mm)

Cable entry

1 hole on back side of base plate for single gang electrical box mounting

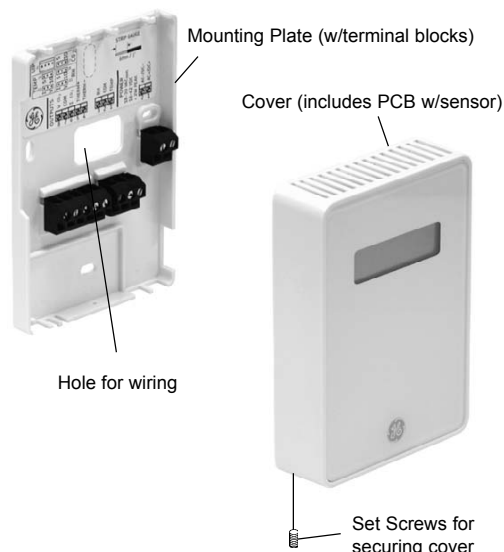
Wire connection

Terminal blocks, screw type for lead wire

Wire size

Min. 22 AWG (0.34 mm²), max. 18 AWG (0.75 mm²); Up to 2 wires for each terminal

INSTALLATION



“Two-piece design; remove unit without disconnecting wiring.”

SPECIFICATIONS

Physical (cont...)

Wire distance Loop resistance 500 Ω max.
(= wire resistance plus controller input resistance)

Weight 0.3 lb. (0.14 kg)

Installation Location

Surface mount,
4 to 6 feet (1.2 m to 1.8 m)
above floor

Manufacturing

ISO 9001 Certified

Approvals/Listings

CE

Warranty

RoHS compliant
12 months material and workmanship

OPTIONS

Digital Display “D”

- type LCD
- size (H x W) 0.50 x 1.77 in. (13 x 40 mm)
- displays 4 digits; scrolls between ppm CO₂, % RH and °F temperature
- resolution 10 ppm for CO₂
0.1% RH for humidity
0.1°F for temperature

ORDERING INFORMATION

CO₂ room transmitter, incl.

(1) 0-10(5) VDC and
(1) 4-20 mA output,
plus temperature/thermistor sensor, 10 kΩ, type II

I-T8100..... w/ off-white enclosure

I-T8100-D..... w/ digital display and off-white enclosure

I-T8100-B..... w/ black enclosure

I-T8100-DB..... w/ digital display and black enclosure

CO₂ + RH + Temp. combo room transmitter, incl.

for CO₂ : (1) 0-10(5) VDC and
(1) 4-20 mA output,
for RH : (1) 0-10(5) VDC or
4-20 mA output,
for Temp.: (1) 0-10(5) VDC or
4-20 mA output,
plus temperature/thermistor sensor, 10 kΩ, type II

I-T8100-H..... w/ off-white enclosure

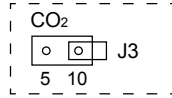
I-T8100-HD..... w/ digital display and off-white enclosure

I-T8100-HDB..... w/ digital display and black enclosure

WIRING CONFIGURATION

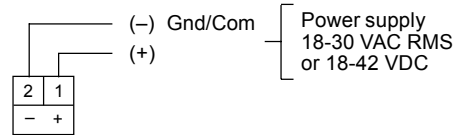
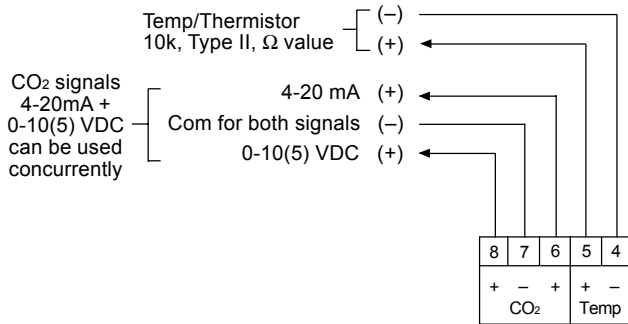
I-T8100, I-T8100-B, I-T8100-D, I-T8100-DB

CO₂ versions, with passive Temperature (thermistor) only



Output signal selection:
 (1) jumper supplied, factory set
 at 0-10 VDC for the CO₂ 0-10(5) output signal

Signal type/range	Jumper over pins
5 = 0-5 VDC	both pins covered
10 = 0-10 VDC	no pins covered



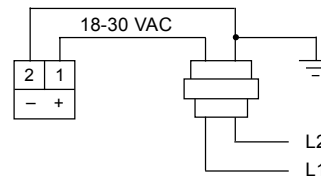
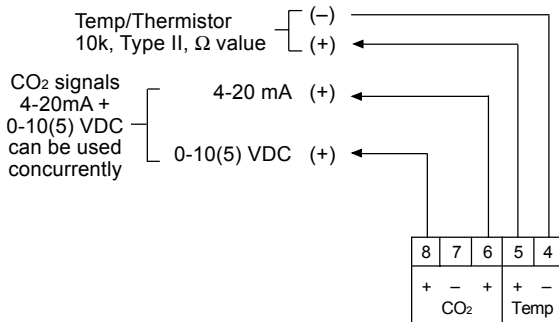
Power supply
 18-30 VAC RMS
 or 18-42 VDC

Note: • The passive Temperature/Thermistor (pin #4 and #5) is electrically isolated from the other circuitry and should be wired independently from the active CO₂ output.

The Thermistor is not internally connected to the common/ground of the CO₂ output or the power input.

- The common/ground of both the CO₂ and the power is internally connected
- To avoid damage to the unit:
 - Do not connect positive (hot) 24 VAC power line to pin #2 of the power supply terminal
 - Do not apply 2-wire / loop-powered connections
- Twisted, shielded wire is recommended

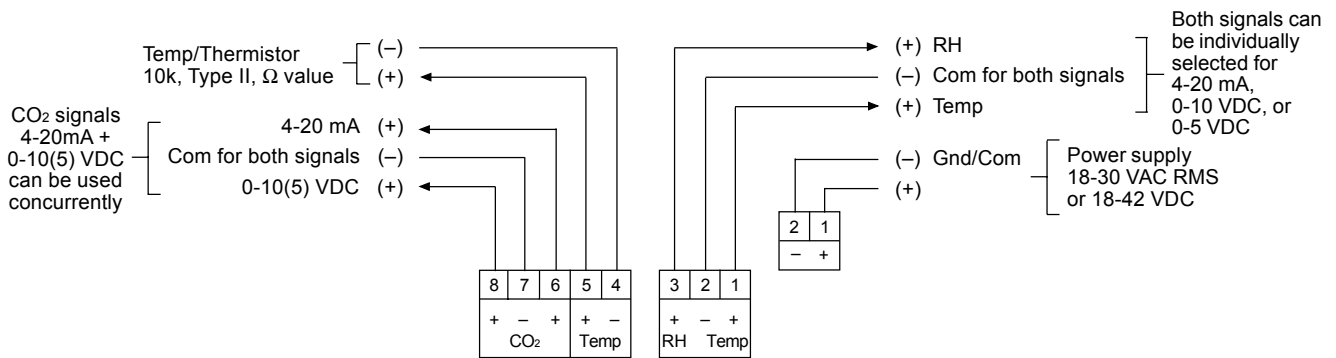
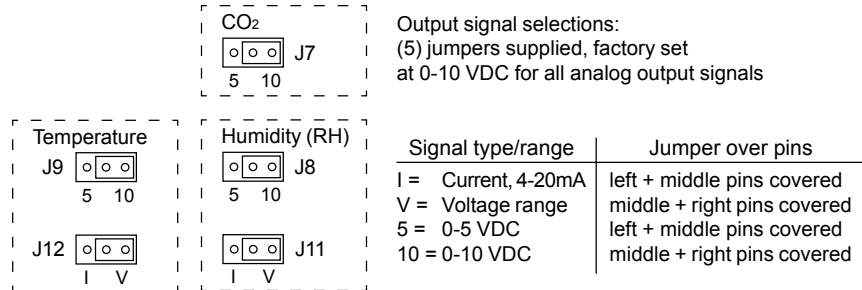
Alternative common/ground configuration



WIRING CONFIGURATION

I-T8100-H, I-T8100-HD, I-T8100-HDB

CO₂ combo versions, with Relative Humidity, active Temperature, and passive Temperature (thermistor)



Note:

- The passive Temperature/Thermistor (pin #4 and #5) is electrically isolated from the other circuitry and should be wired independently from the active CO₂/RH/Temp outputs.
- The Thermistor is not internally connected to the common/ground of CO₂/RH/Temp outputs or the power input.

- The common/ground of both the CO₂/RH/Temp and the power is internally connected
- To avoid damage to the unit:
 - Do not connect positive (hot) 24 VAC power line to pin #2 of the power supply terminal
 - Do not apply 2-wire / loop-powered connections
- Twisted, shielded wire is recommended

Alternative common/ground configuration

