CO2/T/.. Series Sensors

Description

The CO2/T/.. series sensors monitor the carbon dioxide concentration and temperature of the air. A range consists of duct and space sensors. The space sensors have additional options of humidity monitoring and a 4 digit display. The display will show the measured values in succession.

The duct sensor has a quick-release lid to facilitate installation.

Features

- Low cost
- High quality thermistor temperature sensor
- Humidity monitoring option for space sensor
- Optional digital display for space sensor
- IP67 housing (duct sensor)
- Quarter turn quick release lid (duct sensor)
- Two part terminals to facilitate wiring
- 24 Vac/dc supply
- Adjustable depth duct mounting flange option

Physical (Heading Physical)

CO2/T/D

- 33 mm (1.3”)
- 258 mm (10.16”)
- 12 mm diam (0.75”)
- Air inlet for CO2 sensing
- Foam gasket
- M16 gland

CO2/T/..S

- Display option
- 86 mm (3.39”)
- 86 mm (3.39”)
- 26 mm (1.02”)
- 12 mm clamp

4 screws supplied on a 45 mm (1.77”) circle

ACC/FLANGE/12MM/5

- 57 mm (2.24”)
- 24 mm (0.94”)
- Foam gasket
- Screw supplied

Trend

Horsham, UK
CO2/T/.. Series Sensors Data Sheet TA201169 Issue 4, 27-Sep-2012

FUNCTIONALITY

The CO2/T/.. series carbon dioxide and temperature sensors can be used for a wide range of HVAC applications, operating over a 0 to 2000 ppm concentration CO₂ range. The CO₂ sensor offers an accuracy of ±50 ppm +2% of measured value.

For the CO2/T/D duct sensor, the temperature working range is -20 °C to +60 °C (-4 to +140 °F) utilising a 10 kohm at 25 °C thermistor temperature sensing element. Recommended scaling is given for 0 °C to +40 °C (32 to +104 °F).

For the CO2/T/../S space sensor, the temperature measurement range is 0 °C to +40 °C (32 to +104 °F) utilising a 10 kohm at 25 °C (77 °F) thermistor temperature sensing element. The output signal is 0 to 10 V corresponding to 0 to +40 °C (32 to +104 °F) with an accuracy of ±3 °C (±5.5 °F).

The humidity sensor option on the CO2/T/../S has a measurement range of 0 to 95 %RH range with ±3 %RH accuracy over 30 to 70 %RH, and ±5 %RH accuracy over 10 to 90 %RH. The output signal is 0 to 10 V corresponding to 0 to 100 %RH.

The optional 4 digit display will alternate between CO₂ concentration (ppm) and temperature (°C). If the humidity option is fitted (CO2/T/H/DISP/S only) it will alternate between CO₂ concentration, temperature, and humidity (%RH).

INSTALLATION

CO2/T/D

Choose an accessible location where the sensor element will lie in the airstream to be measured. Ensure that there is no stratification in the airstream being measured (i.e. downstream of mixing dampers, heating coils, cooling coils).

Mount the probe in the duct by screwing the sensor box directly onto the duct. It should be mounted in the orientation indicated on the label on the side of the unit so that the air flows into and out of the inlet/outlet slots. The probe requires a 15 mm (0.59") hole cut into the duct. The sensor box may be screwed directly to the duct using 2 screws at 85 mm (3.35") centres.

The installation involves:

Choose location
Drill sensor probe hole
Drill fixing holes
Mount sensor on prepared location
Remove sensor lid
Feed IQ cables through gland
Wire cables
Replace sensor lid
Set up IQ input channels to voltage (V) for CO₂ concentration and to thermistor (T) for temperature.
Configure IQ sensor modules
Test sensor

The optional mounting flange enables the probe depth to be adjusted by tightening the flange clamp to secure the position. It is flange is screwed to the duct using 4 off screws (provided) at 45 mm (1.77") centres.

Full installation details are given in the CO2/T/D Installation Instructions, TG201170.

CO2/T/../S

The sensor housing consists of a front panel and a backplate. The backplate can be separated from the front panel by inserting a screwdriver in the bottom slot and twisting.

Choose an accessible location for the sensor where the surrounding air temperature is representative of the room. The backplate is designed so that it can be mounted on a back box or a standard recessed wall box, or surface mounted with mini-trunking by using a knockout in one of the sensor’s side walls.

Choose location
Mount sensor (via two screws - minimum)
Connect terminals
Assemble sensor unit
Set up IQ input channels to voltage (V) for CO₂ concentration, temperature, and humidity (if option fitted).
Configure IQ sensor modules
Test

Full installation details are given in the CO2/T/../S Installation Instructions, TG201171.
CONNECTIONS

The 24 Vac/dc supply should be dedicated, isolated, and greater than 650 mA.

*The humidity output is only available on CO2/T/H/DISP/S and CO2/T/H/S.

Full installation details are given in the CO2/T/D installation instructions TG201170, or CO2/T/.S installation instructions TG201171.

**PRODUCT CODES**

- **CO2/T/D**
  - Duct carbon dioxide concentration and temperature sensor

- **CO2/T/S**
  - Space carbon dioxide concentration and temperature sensor

- **CO2/T/DISP/S**
  - Space carbon dioxide concentration and temperature sensor with a 4 digit display

- **CO2/T/H/S**
  - Space carbon dioxide concentration, temperature, and humidity sensor

- **CO2/T/H/DISP/S**
  - Space carbon dioxide concentration, temperature, and humidity sensor with a 4 digit display

- **ACC/HTD/FILTEr**
  - Replacement PTFE membrane filter for duct sensor - pack of 5

- **ACC/FLANGE/12MM/5**
  - Adjustable depth, duct mounting flange - pack of 5

*DISP/ display option only available with °C units of temperature.

**DISPOSAL**

WEEE Directive:

At the end of their useful life the packaging, product, and battery (if fitted) should be disposed of by a suitable recycling centre.

Do not dispose of with normal household waste.

Do not burn.

**SPECIFICATIONS**

**CO₂ measurement**

- **Working range**: 0 to 2000 ppm CO₂ concentration
- **Signal**: 0 to 10 V for 0 to 2000 ppm into >10 kohm
- **Accuracy**: ±(50 ppm + 2% of measured value) at 23 °C (73.4 °F) and 1013 mbar
- **Temperature influence**: 2 ppm/°C at 0 ppm typical
- **Pressure influence**: 1 ppm/1 mbar at 1000 ppm approx. (physical effect)
- **Resolution**: 0.2 ppm (internal 15 bit), display: 10 ppm
- **Long-term stability**: ±0.5 ppm/year typical
- **Response time**: t₉₀ = 250 s
### SPECIFICATIONS (continued)

**Temperature measurement**
- **Working range**: -20 to +60 °C (-4 to +140 °F)
- **Sensing element**: Trend standard thermistor 10 kohm at 25 °C (77 °F)
- **Signal**
  - CO2/T/D: thermistor (resistance)
  - CO2/T../S: 0 to 10 V for 0 to +40 °C (32 to 104 °F) into >10 kohm
- **Accuracy**
  - CO2/T../S: ±0.3 °C (±0.54 °F) at 23 °C (79 °F) and 1013 mbar with 24 Vdc supply (±0.55 °C, ±1 °F with 20 to 28 Vdc supply)
- **Resolution**: CO2/T../S: ±0.005 °C, 0.009 °F (internal 15 bit), display: 0.1 °C

**Humidity measurement**
- **Working range**: 0 to 95 %RH, non condensing
- **Signal**: ±3 %RH over range 30 to 70 %RH,
  ±5 %RH over range 10 to 90 %RH, both at 23 °C (79 °F) and 1013 mbar
- **Resolution**: ±0.1 %RH (internal 15 bit), display: 0.1 %RH

**Input channels and sensor scaling**
For IQ controllers link input channel for thermistor, T and set up the sensor type scaling; the recommended method of setting the sensor type scaling is to use SET.
For all IQ2 series controllers with firmware of version 2.1 or greater, or IQ3 series controllers, one of the following SET Unique Sensor References should be used:

**CO2 V (ppm)**

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<td>2000</td>
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<tr>
<td>L Lower</td>
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</tr>
<tr>
<td>x Ix Ox</td>
<td>1 0 0</td>
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<tr>
<td>1 2 10 20 1000</td>
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**CO2 concentration voltage output**
0 to 10 V for 0 to 2000 ppm

<table>
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<tr>
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<th>°C</th>
<th>°F</th>
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<tbody>
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</tr>
<tr>
<td>E Exponent</td>
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<td>L Lower</td>
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<tr>
<td>P Points</td>
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<td>x Ix Ox</td>
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<tr>
<td>6 8.102 -5 23</td>
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</tbody>
</table>

**Electrical**
- **Power input voltage**: 24 Vdc (15 to 35 Vdc), 24 Vac (±20%)
- **Power input current**: 12 mA dc typical (while not measuring) 500 mA dc at 23 °C (77 °F) for 350 ms (during measurement)

**Mechanical**
- **Material CO2/T/D**: Impact resistant ABS
- **Probe**: Polycarbonate (flammability HB)
- **Filter**: PTFE membrane filter
- **Duct mounting flange**: Polycarbonate (flammability HB)
- **Material CO2/T../S**: Flame retardant (V0) ABS

**Dimensions CO2/T/D**
- Duct probe: 258 mm, 10.16” (including filter) x 12 mm, 0.75” (diameter)
- Head: 105 mm (4.13") x 57 mm (2.24") x 97 mm (3.82")
- Fixing centres: 85 mm (3.35")
- Dimensions CO2/T../S: 86 mm (3.39") x 86 mm (3.39") x 26 mm (1.02")

**Weight**
- CO2/T/D: 200 g approximately
- CO2/T../S: 150 g approximately

**Connections**
- 2 part 6 pole screw terminals for 0.2 mm² to 1.5 mm² cross section area (24 to 16 AWG) cable

**Environmental**
- **Protection**
  - CO2/T/D: IP65 except filter cap and air inlet/ outlet
  - CO2/T../S: IP20
- **CE compatibility**: EN61326-1, EN61326-2-3
- **Storage Temperature**: -20 to +60 °C (-4 to +140 °F)
- **Humidity**: 0 to 95 %RH, non condensing