Data Sheet

CO2/T/..

CO2, Temperature, Humidity Sensors

CO2/T/.. Series Sensors

Description

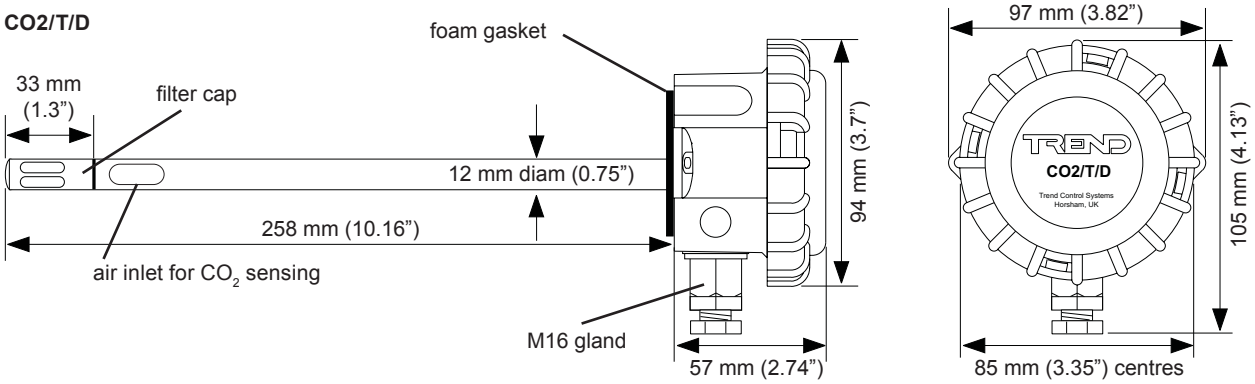
The CO2/T/.. series sensors monitor the carbon dioxide concentration and temperature of the air.
A range consists of duct and space sensors.
The space sensors have additional options of humidity monitoring and a 4 digit display. The display will show the measured values in succession.
The duct sensor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

Features

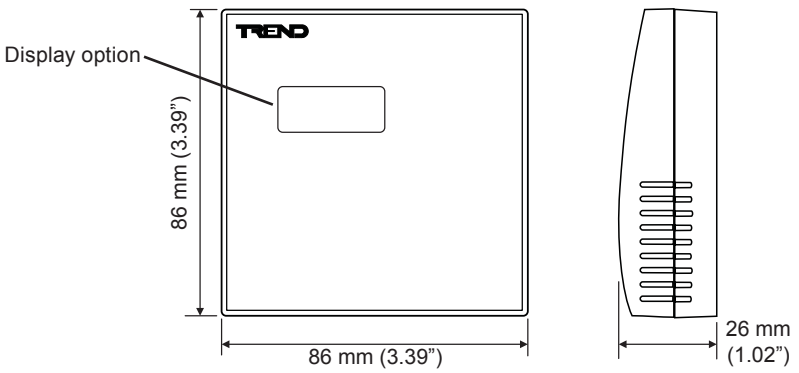
- Low cost
- High quality thermistor temperature sensor
- Humidity monitoring option for space sensor
- Optional digital display for space sensor
- IP67 housing (duct sensor)
- Quarter turn quick release lid (duct sensor)
- Two part terminals to facilitate wiring
- 24 Vac/dc supply

Physical

CO2/T/D



CO2/T/../S



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 CO_2 range. The CO_2 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.

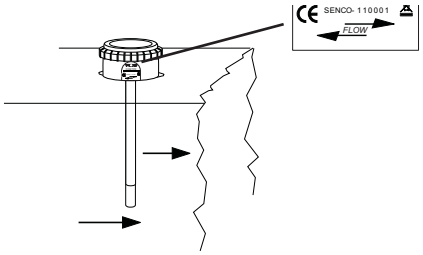
The optional 4 digit display will alternate between CO_2 concentration (ppm) and temperature (°C). If the humidity option is fitted (CO2/T/H/DISP/S only) it will alternate between CO_2 concentration, temperature, and humidity (%RH).

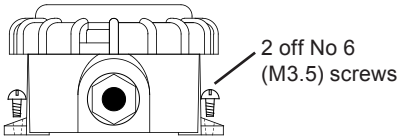
INSTALLATION

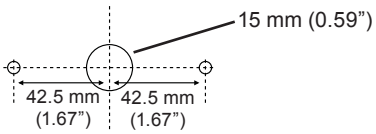
CO2/T/D

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.







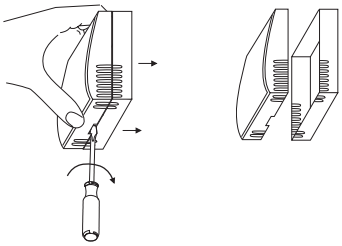
The installation involves:

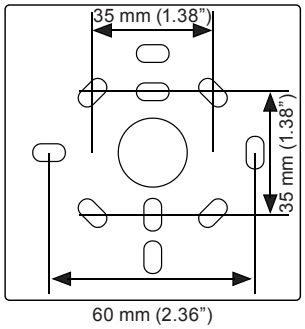
- Choose location
- Drill sensor probe hole
- Drill fixing holes
- Mount sensor on prepared location
- Remove sensor lid
- Feed IQ cables through gland
- Wire cables
- Replace sensor lid
- Set up IQ input channels to voltage (V) for CO_2 concentration and to thermistor (T) for temperature.
- Configure IQ sensor modules
- Test sensor

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.

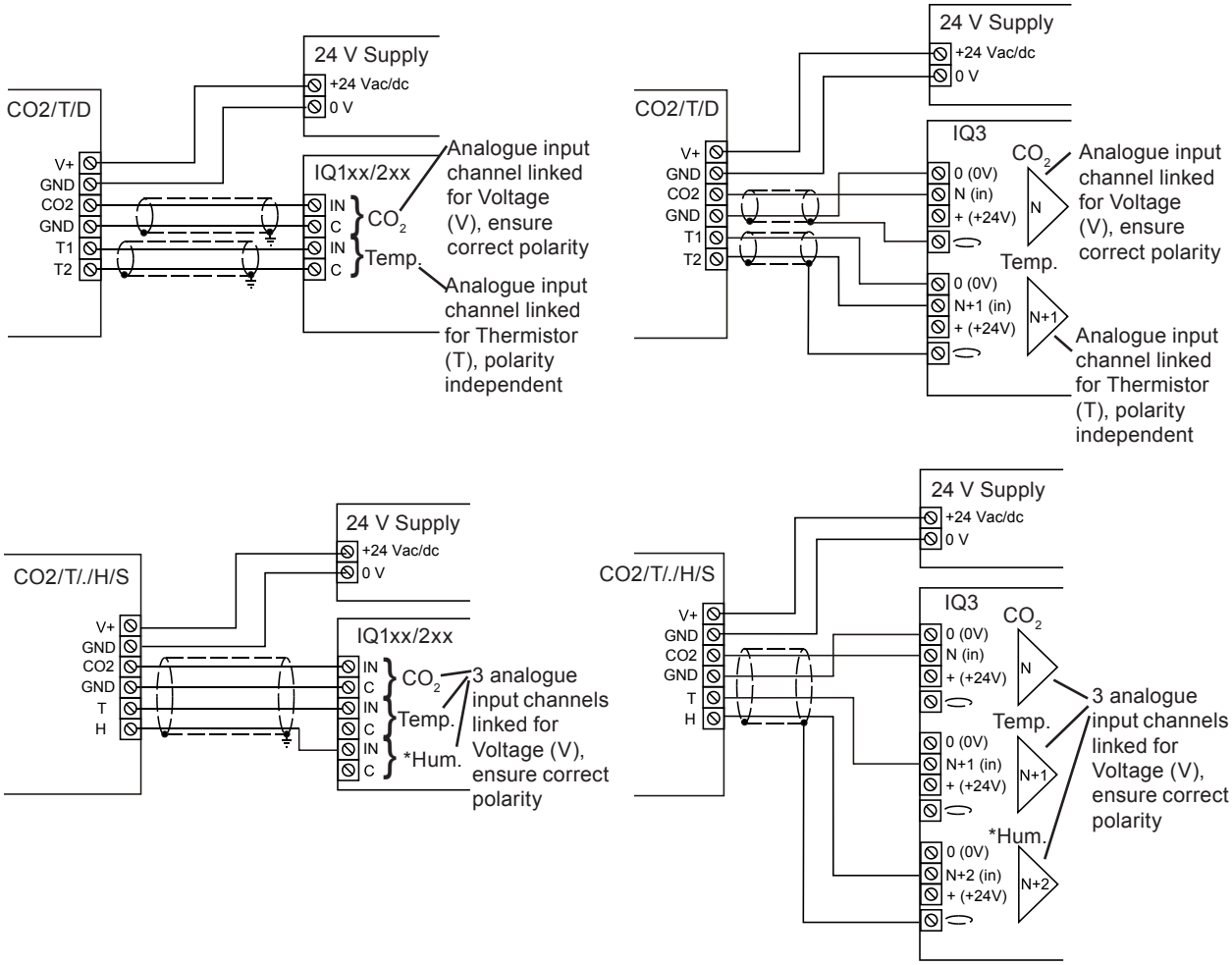




- Choose location
- Mount sensor (via two screws - minimum)
- Connect terminals
- Assemble sensor unit
- Set up IQ input channels to voltage (V) for CO_2 concentration, temperature, and humidity (if option fitted).
- Configure IQ sensor modules
- Test

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

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

DISPOSAL

WEEE Directive :

At the end of their useful life the packaging and product should be disposed of by a suitable recycling centre.

Do not dispose of with normal household waste.

Do not burn.

SPECIFICATIONS

CO_2 measurement

Working range	:0 to 2000 ppm CO_2 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	:20 ppm/year typical
Response time	:t_{90} < = 250 s

SPECIFICATIONS

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 (/H/ option on CO2/T/../S only)

Working range :0 to 95 %RH (non condensing)

Signal :0 to 10 V for 0 to 100 %RH into >10 kohm

Accuracy :±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 :0.01 %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)

Humidity V (%RH)

CO2/T/D: **Thermistor HTST DT** (°C) **Thermistor HTST DT F** (°F)

CO2/T/./S: **Temp V 0+40** (°C), **Temp V +32+104 F** (°F)

Alternatively use sensor scaling mode 5, characterise, and enter the scaling manually as defined in the tables shown. Note that for IQ3 the scaling mode and exponent (E) don't need to be set up.

For all other IQ controllers see the Sensor Scaling Reference Card, TB100521A.

CO2 concentration voltage output
0 to 10 V for 0 to 2000 ppm

	Units	ppm
Y	Input type	0 (volts)
E	Exponent	4
U	Upper	2000
L	Lower	0
P	Points	2
x	Ix	Ox
1	0	0
2	10	2000

CO2/T/D temperature thermistor recommended range:
0 to 40 °C (32 to 104 °F)

	Units	°C	°F
Y	Input type	1 (thermistor volts)	
E	Exponent	3	
U	Upper	50	122
L	Lower	-5	23
P	Points	6	
x	Ix	Ox (°C)	Ox (°F)
1	2.641	50	122
2	3.47	40	104
3	4.46	30	86
4	6.663	10	50
5	7.668	0	32
6	8.102	-5	23

CO2/T/../S temperature voltage output
0 to 10 V for 0 to 40 °C (32 to 104 °F)

	Units	°C	°F
Y	Input type	0 (volts)	
E	Exponent	3	
U	Upper	40	104
L	Lower	0	32
P	Points	2	
x	Ix	Ox	
1	0	0	32
2	10	40	104

CO2/T/H/../S humidity option voltage output
0 to 10 V for 0 to 100 %RH

	Units	%RH
Y	Input type	0 (volts)
E	Exponent	3
U	Upper	100
L	Lower	0
P	Points	2
x	Ix	Ox
1	0	0
2	10	100

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

Enclosure :Impact resistant ABS

Probe :Polycarbonate (flammability HB)

Filter :PTFE membrane filter

Material CO2/T/../S

Enclosure :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 mm^2 to 1.5 mm^2 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

Please send any comments about this or any other Trend technical publication to techpubs@trendcontrols.com

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