TREND

CO2/T/..
CO2, Temperature, Humidity Sensors

Description

The CO2/T/.. series sensors measure the carbon dioxide concentration and air temperature. The range consists of duct and space sensors.
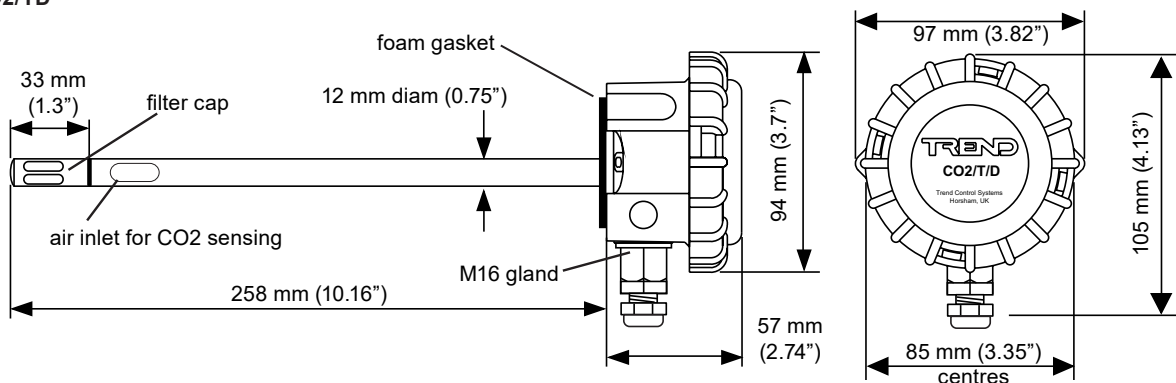
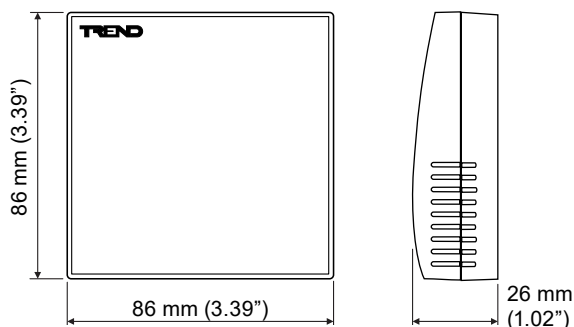Space sensors have an option for humidity measurement.

Features

▪ High quality thermistor temperature sensor
▪ Humidity measuring option for space sensor
▪ IP67 housing (duct sensor)
▪ Two part terminals to facilitate wiring
▪ 24 Vac/dc supply
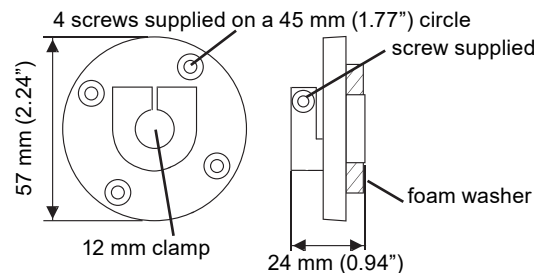▪ Adjustable depth duct mounting flange option

Physical

CO2/TD

CO2/T/../S

ACC/FLANGE/12MM/5

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.

The CO2/T/D duct sensor, as a 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).

The CO2/T/../S space sensor, has 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 ±0.3 °C (±0.54 °F).

The humidity sensor option on the CO2/T/H/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.

INPUT CHANNELS AND SENSOR SCALING

The input channel must be set to the appropriate input type (see controller documentation for details) and the sensor type module must be set up with the correct scaling.

The recommended method of setting the sensor scaling is to use the 'Unique Sensor Reference' provided, see below for details.

The scaling parameters used by SET can be seen when the sensor type is configured. If this is not suitable you can create your own sensor scaling using SET.

Carbon dioxide concentration: The input channel used should be set for voltage (V), and sensor scaling set as below.

Controller	Unique Sensor Reference
IQ3, IQ4, IQeco, IQ2 >v2.1	C02 V
IQ1, IQ2 <v2.0	Refer to the IQ Configuration Manual (90-1533)

Temperature: The input channel used should be set for voltage (V) for CO2/T/./H/S, and Thermistor (T) for C02/T/D, and sensor the scaling set as below.

CO2/T/./H/S

Controller	Unique Sensor Reference
IQ3, IQ4, IQeco, IQ2 >v2.1	Temp V 0+40 for value in °C Temp V +32+40 F for value in °F
IQ1, IQ2 <v2.0	Refer to the IQ Configuration Manual (90-1533)

C02/T/D

Controller	Unique Sensor Reference
IQ3, IQ4, IQeco, IQ2 >v2.1	Thermistor HTST DT for value in °C Thermistor HTST DT F for value in °F
IQ1, IQ2 <v2.0	Refer to the IQ Configuration Manual (90-1533)

Humidity: The input channel used should be set for voltage (V), and sensor scaling set as below.

| Controller	Unique Sensor Reference
IQ3, IQ4, IQeco, IQ2 >v2.1	Humidity V
IQ1, IQ2 <v2.0	Refer to the IQ Configuration Manual (90-1533)

INSTALLATION

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.

The installation involves:

      Choosing location
      Mounting sensor (via two screws - minimum)
      Connecting terminals
      Assembling sensor unit
      Setting up IQ input channels to voltage (V) for CO2 concentration, temperature, and humidity (if option fitted).
      Configuring IQ sensor modules
      Testing

Full installation details are given in the CO2/T/../S Installation Instructions (TG201171).


35 mm (1.38")

60 mm (2.36")
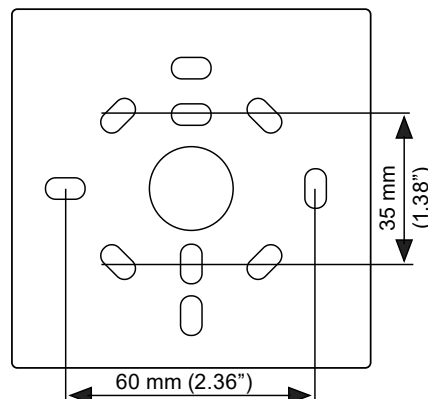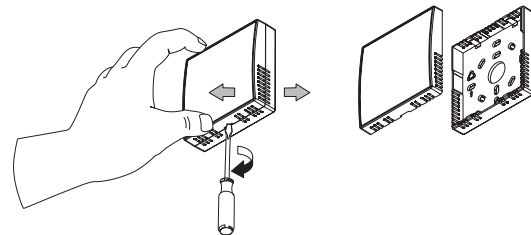
CO2/T/D

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:

    Choosing location
    Drilling sensor probe hole
    Drilling fixing holes
    Mounting sensor on prepared location
    Removing sensor lid
    Feeding IQ cables through gland
    Wiring cables
    Replacing sensor lid
    Setting up IQ input channels to voltage (V) for CO_2 concentration and to thermistor (T) for temperature.
    Configuring IQ sensor modules
   Testing sensor

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

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

Direct Mounting

2 off No 6 (M3.5) screws

Flange Mounting

15 mm (0.59")
42.5 mm (1.67")   42.5 mm (1.67")
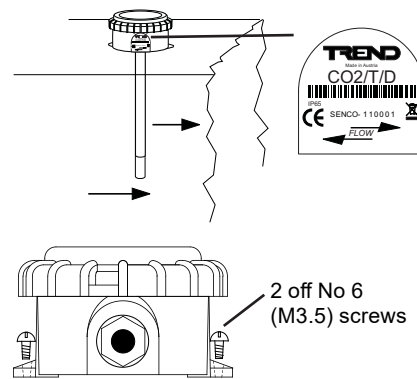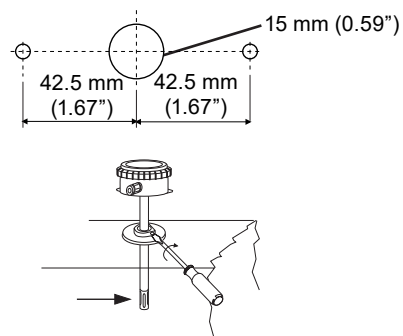
COMPATIBILITY

When connecting to an IQ4 controller the following limits apply if the IQ4 is to provide power. If the sensor is powered from a separate power supply these limits do not apply.

Controller	Max No of CO2 sensors
IQ41x	0
IQ422/24V	1
IQ422/230V	3
IQ4E/230V	6

ORDER CODES

CO2/T/D	Duct carbon dioxide concentration and temperature sensor
CO2/T/S	Space carbon dioxide concentration and temperature sensor
CO2/T/H/S	Space carbon dioxide concentration, temperature, and humidity sensor
ACC/FLANGE/12MM/5	Adjustable depth, duct mounting flange - pack of 5

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)
Long-term stability	:20 ppm/year typical
Response time	:t$_{90}$ < = 250 s

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)

HUMIDITY MEASUREMENT (CO2/T/H/.../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)

ELECTRICAL

Power input voltage	:24 Vdc (15 to 35 Vdc), 24 Vac (±20%)
Power input current	:13 mA dc typical (while not measuring) 350 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
Duct mounting flange	:Polycarbonate (flammability HB)
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

Trend Control Systems Limited
St. Mark's Court, North Street, Horsham, West Sussex, RH12 1BW, UK. Tel: +44 (0)1403 211888, www.trendcontrols.com