

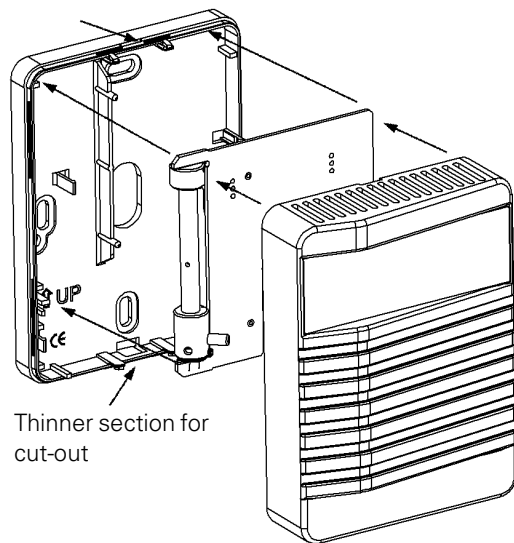


CO₂ Demand-Controlled Ventilation Wall-Sensor

Ordering number: 4190 4100

The carbon-dioxide (CO₂) sensor, shown in Figure 1, is designed especially for demand-controlled ventilation zone applications. The exceptional stability and reliable performance come from advanced silicon based Non-Dispersive InfraRed (NDIR) technology.

Figure 1: CO₂ demand-controlled ventilation sensor



Specifications

Table 1 shows the specifications of the CO₂ sensor.

Table 1: Sensor specifications

Measuring range	0–2000 parts per million (ppm) CO ₂
Accuracy at 25°C	< ± [40 ppm CO ₂ + 3% of reading] (includes repeatability and calibration uncertainty)
Non-linearity	< 1.0% full scale (FS)
Temperature dependence of output	0.3% FS/°C
Long-term stability	< 5.0% FS/5-years
Recommended calibration interval	5 years
Response time	1 minute (0–63%)
Operating temperature	From 59 to 95°F (15 to 35°C)
Storage temperature	From –4 to 158°F (–20 to 70°C)
Humidity range	0–85% relative humidity (RH)

Table 1: Sensor specifications (Continued)

Output signals (jumper selectable)	4–20 mA, 0–20 mA, 0–10 Vdc
Resolution of analog outputs	10 ppm CO ₂
Recommended external load	Current output: max. 500 Ω Voltage output: min. 1000 Ω
Power supply	Nominal 24 Vac
Power consumption	< 5 VA
Warm-up time	< 15 minutes
Housing material	ABS plastic
Mounting holes	For standard Asian, European, and North American junction boxes
Dimensions	4 ¹ / ₄ in. × 3 ¹ / ₈ in. × 1 ⁷ / ₁₆ in. (108 mm × 80 mm × 36 mm)

Power supply requirements

CAUTION

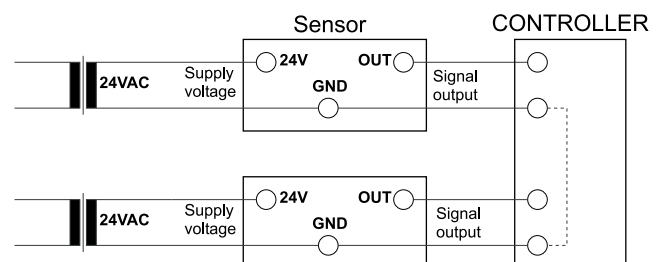
AVOID EQUIPMENT DAMAGE!

Make sure that you connect the power wire only to the 24V terminal. Connecting the power wire to the output terminal may result in equipment damage.

The CO₂ sensor is designed to operate with a nominal 24 Vac supply. The power supply should maintain the voltage between 20 to 26 Vac.

Use a 24 Vac power supply according to the following guidelines. If more than one sensor is connected to one 24 Vac transformer, a common loop is formed and the risk of a short-circuit increases. To avoid this, use a separate floating supply for each sensor, as shown in Figure 2.

Figure 2: Separate ac power supplies



If several sensors must share one transformer, the phase (~) must always be connected to the 24V connector in each sensor to maintain polarity and to avoid short-circuit through the shared common line at the controller (Figure 3).

Figure 3: One ac power supply for several sensors

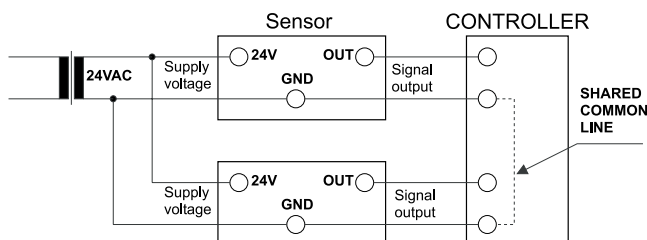
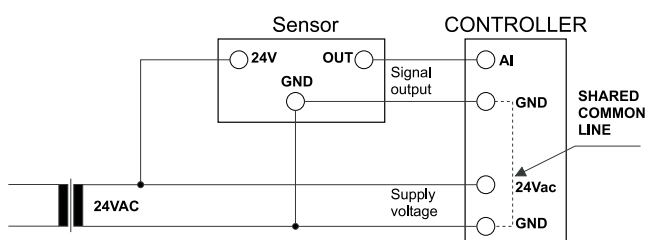


Figure 4 shows how to wire the sensor with 24 Vac power from a unit controller.

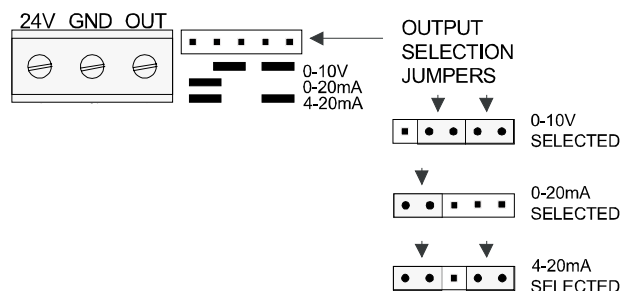
Figure 4: Power supply from controller



Mounting the sensor

1. Select a proper location in the room to mount the CO₂ sensor. Look for an interior wall with good air circulation, approximately 54 in. (1.4 m) from the floor.
2. Remove the back plate from the sensor and thread the power wires and output signal wire through the hole in the back plate (Figure 1 on page 1). For surface wiring, make cut-outs with pliers to the thinner section of the upper or lower edge of the back plate and to thread the wires through.
3. Mount the back plate to the wall with screws. Note that the arrow on the back plate shows the mounting direction.
4. On the circuit board, use the two jumpers next to the terminal block to set up the type of output (0–10 Vdc, 0–20 mA, 4–20 mA) (Figure 5). The default setting is 4–20 mA.

Figure 5: Jumper settings for output type



5. Insert the circuit board in the back plate as shown in Figure 1 on page 1. Do not press the metal tube while inserting the circuit board.
6. Connect the power and signal wires to the screw terminals of the circuit board. Figure 5 shows the terminal locations. Refer to *Power supply requirements* on page 1 for more information on wiring ac power.

CAUTION

AVOID EQUIPMENT DAMAGE!

Make sure that you connect the power wire only to the 24V terminal. Connecting the power wire to the output terminal may result in equipment damage.

Service and maintenance

This CO₂ sensor has excellent stability and requires no maintenance. In most environments the recommended calibration interval is five years. A trained service technician can use a portable CO₂ meter to certify sensor calibration.

If, when checking the sensor, the reading differs too much from the reference value, the sensor can be re-calibrated in the field. A calibration kit, software, and calibration gases are required.

If certified accuracy is required, the sensor must be calibrated against accurate and traceable calibration gases in a laboratory. Consult Trane BAS for further details.