CARBON DIOXIDE DUCT SERIES

Installation & Operation Instructions

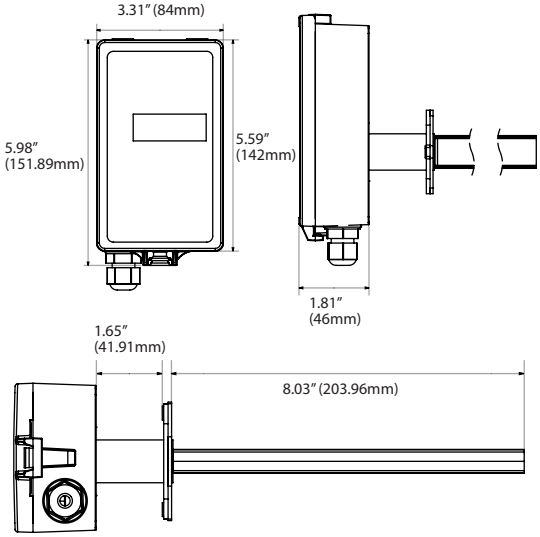
A/CO2-DUCT

Phone: 1-888-967-5224
Website: workaci.com

GENERAL INFORMATION

The ACI Carbon Dioxide Duct Series (A/CO2-D) monitors the carbon dioxide (CO2) levels in industrial, commercial, school, and office-type environments. The concentration of CO2 is a strong indication of the overall indoor air quality. The A/CO2 Series is based on a single beam, non-dispersive infrared technology and is a cost-efficient solution for measuring carbon dioxide levels for building climate control. In addition, ABC software eliminates the need for manual calibration. Carbon Dioxide concentration is measured up to 2,000 ppm and is converted into proportional analog outputs. The factory default output is 4-20 mA, whereas 0-5 VDC and 0-10 VDC outputs are field selectable via integral dip switches. The A/CO2-D provides data which can be used in conjunction with a Building Automation System or Demand Control Ventilation to decrease energy consumption while creating a healthier indoor climate.

FIGURE 1: DIMENSIONS



MOUNTING INSTRUCTIONS

Since there might be a substantial pressure difference in duct mounting applications, it is essential to avoid ambient air from suction into the duct mounting box. For correct function it is indispensable that the sealing of the box cover, the cable entry bushings, the cable feed through and the duct entrance are absolutely tight. The duct entrance may need extra sealing paste in order to prevent leakage. The PCB must be handed carefully and protected from electrostatic discharge.

• Place the O-ring around the hole at the back of the box. See **figure 2**.

• Electrical cable entry: The box has a factory mounted cable entry bushing. Never feed more than one cable through each cable entry bushing, or else gas might leak through!

• Mounting the tube: Drill a 1" (25 mm) diameter hole for the sampling probe and two holes with 0.16" (4 mm) diameter for the screws (5) into the air duct and mount the tube (1) with the gasket (2). The sampling probe should be mounted with the largest locking knob on top. The unit can be mounted with the air coming from the left or right.

• Attaching the sensor box is made to the sampling probe by a snap-in bayonet fitting. Orient the box onto the sampling probe so that the box upside is on the same side as the largest locking knob (3). When the

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probe is fitted into the notches of the box, then turn the box clockwise until stop (see **Figure 2**). Position 1 indicates open where the box can be removed from the sampling probe. In position 2 the box is locked to the probe.

FIGURE 2: MOUNTING

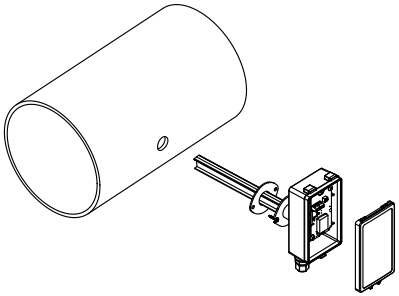
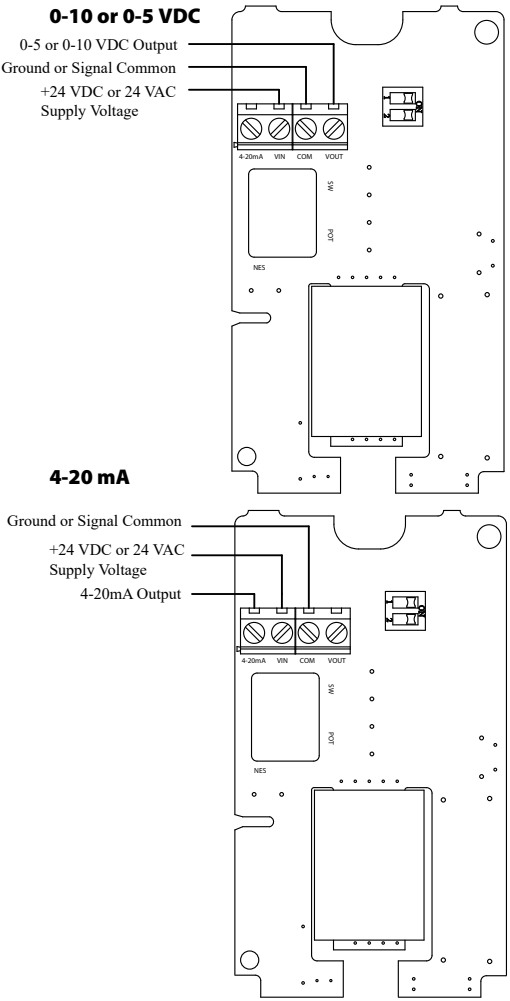


FIGURE 3: WIRING



WIRING

PRECAUTIONS

• Remove power before wiring. Never connect or disconnect wiring with power applied.

• When using a shielded cable, ground the shield only at the controller end. Grounding both ends can cause a ground loop.

• It is recommended you use an isolated UL-listed class 2 transformer when powering the unit with 24 VAC. Failure to wire the devices with the correct polarity when sharing transformers may result in damage to any device powered by the shared transformer.

• If the 24 VDC or 24VAC power is shared with devices that have coils such as relays, solenoids, or other inductors, each coil must have an MOV, DC/AC Transorb, Transient Voltage Suppressor (ACI Part: 142583), or diode placed across the coil or inductor. The cathode, or banded side of the DC Transorb or diode, connects to the positive side of the power supply. Without these snubbers, coils produce very large voltage spikes when de-energizing that can cause malfunction or destruction of electronic circuits.

Open the cover of the enclosure. ACI recommends 16 to 26 AWG twisted pair wires or shielded cable for all transmitters. Refer to **FIGURE 3** for wiring diagrams. All wiring must comply with all local and National Electric Codes.

Note: The 4-20mA output requires 3 wires.

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Note: When using a shielded cable, be sure to connect only (1) end of the shield to ground at the controller. Connecting both ends of the shield to ground may cause a ground loop. When removing the shield from the sensor end, make sure to properly trim the shield to prevent any chance of shorting.

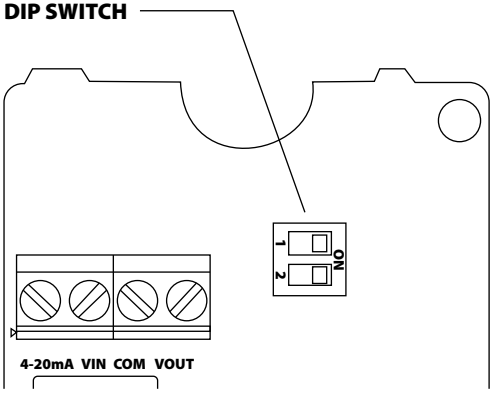
DIP SWITCH CONFIGURATION

SW 1 sets the Output Signal.
SW2 controls the ABC Logic.

The default setting is 0-10 VDC output (switch 1 on) and ABC on (switch 2 on). For 0-5 VDC output set switch 1 to off. The 4-20 mA output can be used with switch 1 in the on or off position.

ABC stands for automatic baseline correction, a self-calibration function for achieving maintenance-free gas sensors. To turn off ABC, set switch 2 to off. The ABC Logic must be turned off in applications where there is 24/7 occupancy. ie: Hospital

FIGURE 4: DIP SWITCH SETTINGS



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PRODUCT SPECIFICATIONS

Supply Voltage:	24 VAC +/-20%, 50/60 Hz (half-wave rectifier) | 16.5-40 VDC Max.
Power Consumption:	3 VA for 24 VAC, 3W for 24 VDC (peak); <0.9W (average)
Sensing Technology:	Single beam infrared sensing technology (NDIR)
Sensing Method:	Diffusion
Measurement Range Default:	0 to 2,000 ppm
Extended CO2 Ranges:	Up to 10,000 ppm (factory set)
Extended Range Accuracy:	+/- 30 ppm and +/- 5% of reading
CO2 Output Signal:	**Output 1:** 0-5 VDC or 0-10 VDC (Default) | **Output 2:** 4-20 mA (500 Ohm Load maximum)
Fail Safe:	Polarity protected
CO2 Accuracy [1]:	+/- 40 ppm +/- 3% of reading (@ 15-35°C; 20-70% RH and 101.3 kPa)
Pressure Dependence:	+ 1.6% reading per kPa (deviation from standard pressure 101.3 kPa)
Response Time:	≤ 2 minutes, diffusion
Warm-Up Time:	< 1 minute (@ full specs < 15 minutes)
Temperature Output Range:	Various (see ordering grid)
Temperature Accuracy:	+/- 1°F (+/- 0.6°C)
Operating Temperature Range:	32 to 122°F (0 to 50°C)
Operating Humidity Range:	0 to 95%, non-condensing
Enclosure:	**Duct Box:** PC & ABS blend, Flammability Rating UL94V-0 **Cover:** Makrolon® 6555 plastic, Flammability Rating UL94V-0 **Pipe:** PC & ABS blend, Flammability Rating UL94V-0
Connections | Wire Size:	Screw Terminal Blocks | 16 (1.31 mm²) to 26 (0.129 mm²) AWG
Terminal Block Torque Rating:	0.5 Nm (minimum); 0.6 Nm (maximum)
Sensor Coverage Area:	7,500 sq. ft maximum
Mounting Height:	4-6 ft
Sensor Life [2]:	> 15 years (typical)
Calibration [3]	ABC algorithm (Automatic Baseline Correction)

Note [1]: Accuracy is defined after minimum three (3) ABC periods (1 period = 8 days) of continous operations | **Note [2]:** In normal indoor air quality (IAQ) applications | Corrosive environments are excluded | **Note [3]:** Building CO2 levels must drop to 400 ppm same time during the week for ABC to work properly | If the building is occupied 24 hours / day, ABC must be turned off

WARRANTY

The A/CO2-DUCT Series is covered by ACI's Five (5) Year Limited Warranty, which is located in the front of ACI'S SENSORS & TRANSMITTERS CATALOG or can be found on ACI's website: www.workaci.com.

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