

Indoor Air Quality CO₂ Sensor and Duct-Mounted Aspirator Box for use with EconoMi\$er® IV System

Installation Instructions

Part Number CRCBDIOX005A00

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SAFETY CONSIDERATIONS

Installation of this accessory can be hazardous due to system pressures, electrical components, and equipment location (such as a roof or elevated structure). Only trained, qualified installers and service technicians should install, start-up, and service this equipment.

When installing this accessory, observe precautions in the literature, labels attached to the equipment, and any other safety precautions that apply:

- Follow all safety codes
- Wear safety glasses and work gloves
- Use care in handling and installing this accessory

It is important to recognize safety information. This is the safety-alert symbol: . When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury.

Understand the signal words DANGER, WARNING, CAUTION, and NOTE. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which **will** result in severe personal injury or death. WARNING signifies hazards which **could** result in personal injury or death. CAUTION is used to identify unsafe practices, which **may** result in minor personal injury or product and property damage. NOTE is used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

PACKAGE CONTENTS

DESCRIPTION	QTY	PART NUMBER
CO ₂ Sensor	1	HH99ZZ009
Aspirator Box	1	50HJ500288
Snap Bushing	2	HY93NH069
Screw 8-19 x 1/2 in.	4	AL56AU166
Wiring Harness Assembly	1	50TG403368
Wire Tie	2	HY76TB110

NOTE: Read these instructions completely before attempting to install this accessory.

DANGER

ELECTRICAL SHOCK HAZARD

Failure to follow this warning will result in personal injury or death.

Before performing service or maintenance operations on unit, turn off main power switch to unit and install lock(s) and lock-out tag(s). Ensure electrical service to rooftop unit agrees with voltage and amperage listed on the unit rating plate. Unit may have more than one power switch.

CAUTION

EQUIPMENT DAMAGE HAZARD

Failure to follow this caution may result in damage to equipment.

When removing panels from the unit, be careful not to damage the roof or other surfaces with the panels.

GENERAL

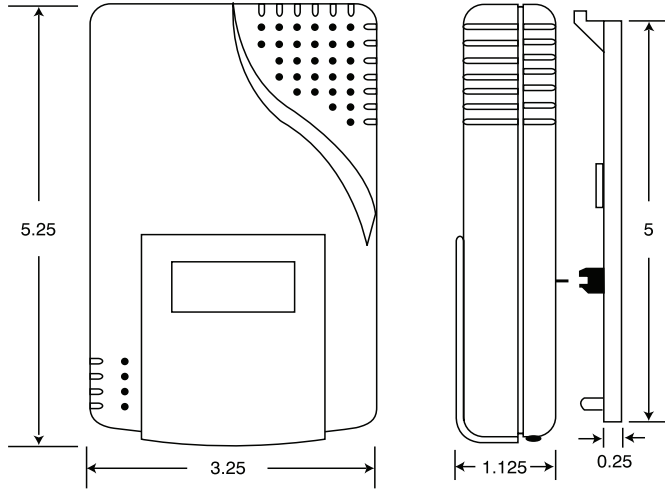
The carbon dioxide sensor is designed to monitor carbon dioxide (CO₂) levels in the air and interface with the ventilation damper in an HVAC system using the patented ABC (automatic background calibration) Logic system. The ABC Logic system is a self-calibrated system that measures indoor CO₂ levels.

The CO₂ sensor utilizes single beam absorption infrared sensing technology that produces stable, reliable, and highly accurate carbon dioxide readings. The sensor measures CO₂ levels in the 0 to 10,000 parts per million (ppm) range (with a default range of 0 to 2000 ppm) and provides the reading as output in the form of an analog signal (4 to 20 mA or 0 to 10 vdc) or a discrete output (dry contact) based on an adjustable set point. The CO₂ level output can be used as input to a Direct Digital Control (DDC) system to control the ventilation damper position and ensure an adequate level of outside air in the building. This is one of several approved methods of controlling the indoor air quality (IAQ) in a building and meet the requirements of local building codes

and ASHRAE (American Society of Heating Refrigerating, and Air Conditioning Engineers) standard 62-1999.

The CO₂ sensor input is used by the EconoMiSer IV controller to perform the demand controlled ventilation (DCV) function. The DCV function controls the outside air damper position in order to regulate indoor air quality.

The sensor is secured to a mounting plate by a locking screw. (See Fig. 1.) Power is supplied by running conduit through a knockout and wiring to the terminal blocks located on the sensor mounting bracket. A solid door is included to cover the digital display if required.



NOTE: Dimensions are in inches.

Fig. 1 — CO₂ Sensor Dimensions

USAGE

The CO₂ sensor is used with the EconoMiSer IV. When the sensor is wired to the EconoMiSer IV controller, the IAQ input can be used for demand ventilation control based on the level of CO₂ measured in the space or return air duct. (See Table 1.)

Table 1 — Model Usage

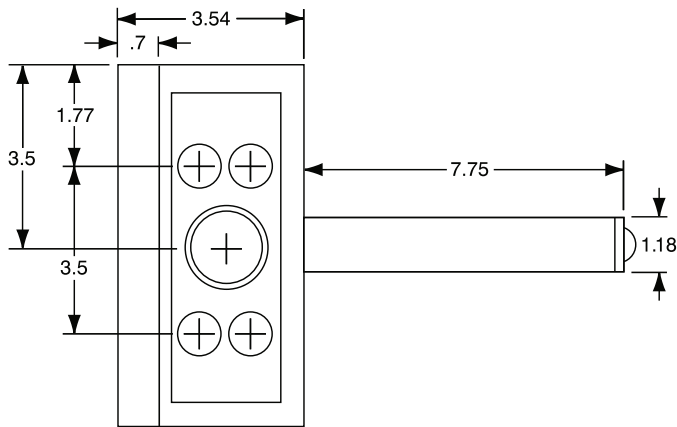
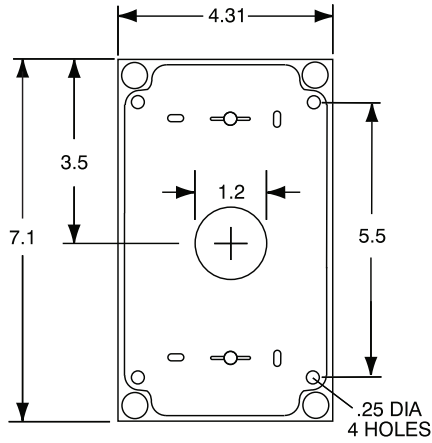
CARRIER/BRYANT/ICP MODEL NUMBER	SIZE	CO ₂ SENSOR MODEL NUMBER
48/50FC	04-30	CRCBDIOX005A00
48/50GC	04-06	
48/50HC	04-28	
48/50KC	04-06	
48/50JC	04-06	
48/50LC	04-26	
48/50TC	07-30	
50FCQ	04-28	
50GCQ	04-06	
50HCQ	04-12	
50KCQ	04-06	
50TCQ	07-24	
547K	04-28	
548J	07-24	
549J	04-12	
549K	04-06	
580J/558J	07-30	
581J/551J	04-28	
581K/551K	04-06	
582J/559J	04-06	
582K/559K	04-30	
RHH	036-120	
RHS	072-243	
RHV	036-303	
RHW	036-060	
RGH/RAH	036-303	
RGS/RAS	072-336	
RGV/RAV	036-336	
RGW/RAW	036-060	
RGX/RAX	036-060	

The accessory CO₂ sensor can be used on all rooftop units with a factory-installed or accessory EconoMiSer IV. The CRCBDIOX-005A00 kit contains one 33ZCSENCO2 sensor and one 33ZCASPCO2 aspirator box. The 33ZCASPCO2 is a self-contained aspirator box accessory that houses the sensor for duct mount installations and is used to measure CO₂ levels in ductwork. An internal mounting bracket secures the base of the CO₂ sensor inside the aspirator box.

INSTALLATION

Step 1 — Sensor Location

See Fig. 1 for CO₂ sensor dimensions. This accessory package also includes an aspirator box. See Fig. 2 for aspirator box dimensions. The sensor and aspirator box are installed in the return air duct. (See Fig. 3 or 4.)



NOTE: Dimensions are in inches.

**Fig. 2 — Aspirator Box Accessory
(Part No. 33ZCASPCO2)**

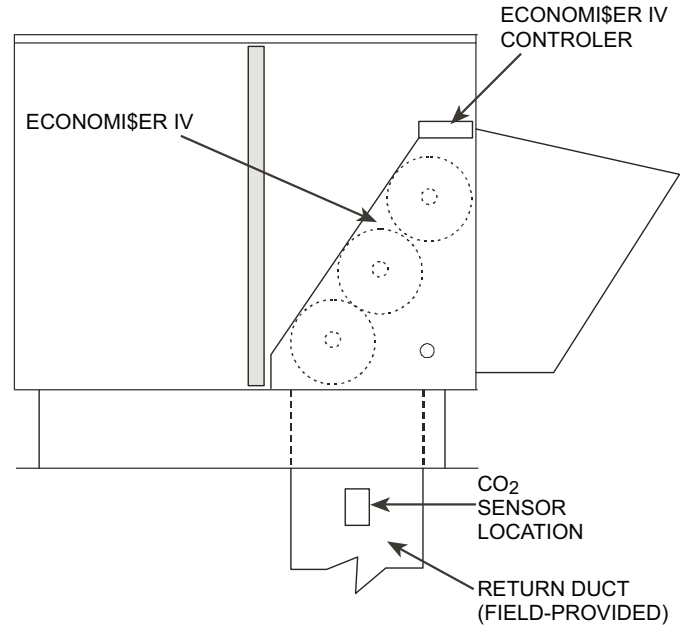
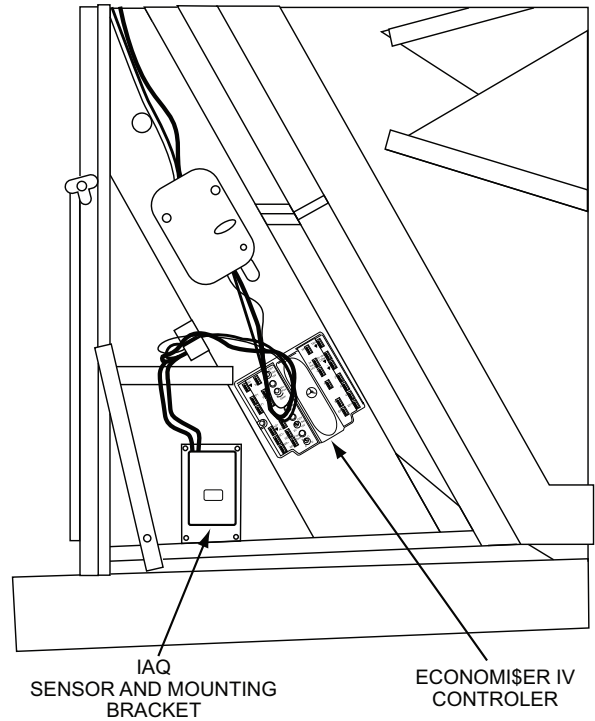


Fig. 3 — CO₂ Sensor Location



**Fig. 4 — CO₂ Sensor Location — 48/50TC17-30,
48/50HC17-28, 50TCQ17-24, 580J/558J17-30, 581J/
551J17-28, 548J17-24, RGS/RAS180-336, RGH/
RAH181-303, RHS181-243**

Step 2 — Wiring Requirements

⚠ WARNING

ELECTRICAL OPERATION HAZARD

Failure to follow this warning could result in personal injury or death.

Disconnect power supply and install lockout tag before attempting to install accessory.

The CO₂ sensor wiring has the following requirements:

1. Power requirements: 18 to 30 vac RMS 50/60 Hz; 18 to 42 vdc polarity protected/dependent; 1.75 VA maximum, 275 VA peak at 24 vdc.
2. All system wiring must be in compliance with all applicable local and national codes.
3. Unit 24-v or a separate 24 vac can be used to supply power to the sensor. If a separate 24 vac power supply is used, its secondary cannot be grounded.
4. All sensor wiring should be color coded for ease of maintenance and service. Two wires are required.
5. A two-wire cable is required to wire the dedicated power supply for the sensor. The two wires should be connected to the power supply and terminals 1 and 2. (See Fig. 5 and Table 2.)
6. A second separate pair of wires is required for the sensor output. This pair of wires should be connected to terminals 7 and 8 for a voltage output or to terminals 6 and 7 for mA output. For a normally open dry contact, use terminals 3 and 4 or for a normally closed dry contact use terminals 4 and 5. (See Table 2.)

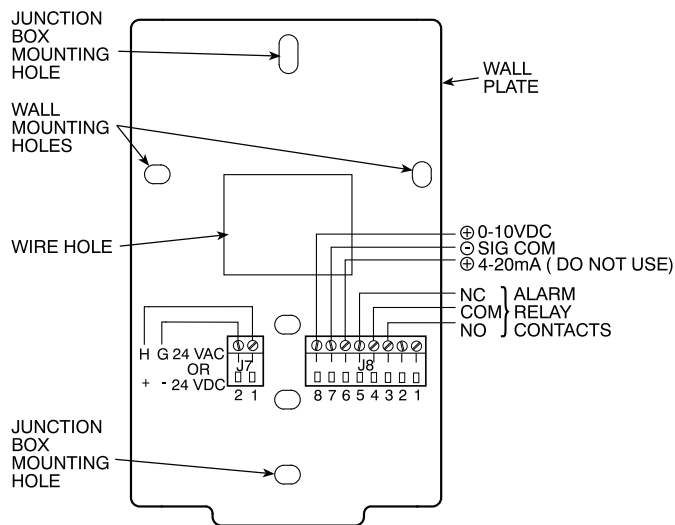


Fig. 5 — CO₂ Sensor Wiring Diagram

Table 2 — CO₂ Sensor Terminal Block Designations

JUMPER	TERMINAL NUMBER	TERMINAL BLOCK DESIGNATIONS
J7 Power Input	AC 2	G (24 vac dedicated power supply)
	AC 1	H (24 vac)
	DC 2	C (24 DC -)
	DC 1	H (24 DC +)
J8 Power Output	8	0 to 10 VDC
	7	SIG COM
	6	4 to 20 mA (Do Not Use)
	5	NC (Alarm Relay Contact)
	4	COM (Alarm Relay Contact)
	3	No (Alarm Relay Contact)
	2	Not Used
	1	Not Used

Step 3 — Mounting the Sensor

To mount the sensor and aspirator box, perform the following procedure.

1. Shut off unit power supply and install lockout tag.
2. Remove filter access panel and economizer hood. Save all screws.
3. Prepare the aspirator box for mounting by removing the four screws from the Plexiglas¹ cover.
4. Remove the CO₂ sensor from the mounting plate.
5. Attach the mounting plate to the standoffs in the aspirator box enclosure by using the 4 screws provided.
6. Hold the aspirator box vertically with the terminal blocks at the bottom and install a snap bushing into the conduit hole located on the right-hand side of the aspirator box at the bottom. See Fig. 2 for details.
7. Route wiring harness from the EconoMi\$er IV controller to the sensor mounting location in the return air duct using metal clips and wire ties to organize and protect the harness. (See Fig. 3.)
8. Drill a 1.2-in. hole in the return air duct. See Fig. 2 for aspirator box dimensions. Mount the aspirator box to the duct, using four sheet metal screws provided. Verify that the 3 circular holes on the inlet tube are facing downward.
9. Caulk the snap bushing to make certain that the aspirator box is completely sealed and attach the CO₂ sensor to the mounting plate inside the aspirator box.
10. Route the wires through the patch plate on the EconoMi\$er IV. Wire the harness to the sensor. See Fig. 5 and Table 2 for wiring information.
11. Because the return air section is at a zero or negative static pressure relative to ambient air, it is vital that the aspirator box be completely sealed. This includes areas where the control wiring enters the box. Once the aspirator box is mounted, the return air will enter through the round inlet holes, circulate through the sensor chamber and exhaust through the rectangular slots on the other side of the tube.
12. Ensure that the EconoMi\$er IV can operate properly and that no wires will interfere.
13. Replace the Plexiglas cover.
14. Install EconoMi\$er IV hood and filter access door.
15. Remove lockout tag and restore power to unit.
16. Configure the base unit for use with the accessory. See Configuration section below.

1. Plexiglas is a registered trademark of Arkema Group.

CONFIGURATION

The CO₂ sensor is shipped with factory configured settings for typical building control operation. The factory settings and adjustment parameters are shown Table 3.

Table 3 — CO₂ Sensor Factory Settings

ADJUSTMENT	TERMINAL NUMBER	FACTORY SETTINGS
Altitude Above Seas Level	0-10,000 ft.	0 ft.
ABC Logic™	On/Off	On
Select Standard Setting	1 to 9	1
Customize Setting		
PPM Range	0-10,000 PPM	0-2,000 PPM
Output Range	4-20mA/0-10v	4-20mA/0-10v
Proportional/ Exponential Output	Select One	Proportional
Relay Setpoint	0-10,000 PPM	1,000 PPM
Relay Hysteresis	0-10,000 PPM	50 PPM

The CO₂ sensor also has 9 preset standard voltage settings (STD-SET) and one non-standard setting (NONSTD). These settings can be selected and configured using the keypad on the sensor. See Table 4 for available standard settings.

The CO₂ sensor offers non-standard custom settings for certain applications. The non-standard settings can be changed anytime after the sensor is energized. The variables that can be configured in this mode are: PPM Range, Scale (proportional or exponential), Output (V or mA), Output Range (V), Output Range (mA), Relay Setpoint, and Relay Hysteresis.

Step 4 — Altitude Correction

The CO₂ sensor is calibrated at sea level altitude. Follow the steps below to adjust the altitude settings:

1. Press Clear and Mode buttons. Hold at least 5 seconds until the sensor enters the Edit mode.
2. The Altitude menu will appear. Use the Up/Down button to adjust to the proper altitude. The adjustments will increase or decrease in 500-ft increments.
3. Press Enter to set the value.
4. Press Mode to exit and resume normal operation.

Step 5 — ABC Logic (On/Off) Calibration

The CO₂ sensor is factory set to On for ABC Logic calibration. Follow the steps below to adjust the ABC Logic calibration settings:

1. Press Clear and Mode buttons. Hold at least 5 seconds until the sensor enters the Edit mode.

2. The Altitude setting menu will appear first.
3. Press Mode to proceed to ABC Logic menu.
4. Use the Up/Down button to switch ABC Logic to On or Off.
5. Press Enter to set the value.
6. Press Mode to exit and resume normal operation.

Step 6 — Select a Preset Standard Setting (STD-SET Menu)

The CO₂ sensor has preset standard voltage settings that can be selected anytime after the sensor is powered up. (See Table 4.)

NOTE: Use setting 1 or 2 for units listed in this Installation Instruction. (See Table 4.)

1. Press Clear and Mode buttons. Hold at least 5 seconds until the sensor enters the Edit mode.
2. Press Mode 2 times. The STDSET Menu will appear.
3. Use the Up/Down button to select the preset number. (See Table 4.)
4. Press Enter to lock in the selection.
5. Press Mode to exit and resume normal operation.

Step 7 — Optional — Select a Custom Setting (NONSTA Menu)

The custom settings can be changed anytime after the sensor is energized. Follow the steps below to change the non-standard settings:

1. Press Clear and Mode buttons. Hold at least 5 seconds until the sensor enters the Edit mode.
2. Press Mode 2 times. The STDSET Menu will appear.
3. Use the Up/Down button to toggle to the NONSTD menu and press Enter.
4. Use the Up/Down button to toggle through each of the nine variables, starting with Altitude, until the desired setting is reached.
5. Press Mode to move through the variables.
6. Press Enter to lock in the selection, then press Mode to continue to the next variable.

Step 8 — Finish Installation

Finish the installation by sliding the cover over the menu keys and secure with the supplied screw.

Step 9 — Configure EconoMi\$er IV Controller

Refer to the base unit installation instructions for information on adjusting the DCV set points of the EconoMi\$er IV controller. Re-configuration of the CO₂ sensor range may be required.

Table 4 — CO₂ Sensor Standard Settings

SETTING	EQUIPMENT	OUTPUT	VENTILATION RATE (cfm/Person)	ANALOG OUTPUT	CO ₂ CONTROL RANGE (ppm)	OPTIONAL RELAY SETPOINT (ppm)	RELAY HYSTERESIS
1	Interface w/ Standard Building Control System	Proportional	Any	0-10V 4-20 mA	0 - 2000	1000	50
2		Proportional	Any	0-10V 4-20 mA	0 - 2000	1000	50
3		Exponential	Any	0-10V 4-20 mA	0 - 2000	1100	50
4	Economizer	Proportional	15	0-10V 4-20 mA	0 - 1100	1100	50
5		Proportional	20	0-10V 4-20 mA	0 - 900	900	50
6		Exponential	15	0-10V 4-20 mA	0 - 1100	1100	50
7		Exponential	20	0-10V 4-20 mA	0 - 900	900	50
8	Health & Safety	Proportional	—	0-10V 4-20 mA	0 - 9999	5000	500
9	Parking/Air Intakes/ Loading Docks	Proportional	—	0-10V 4-20 mA	0 - 2000	700	50

