

Installation Instructions

NOTE: Read these instructions completely before attempting to install the accessory fan/filter status switch

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SAFETY CONSIDERATIONS

Installation and servicing of air-conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair, or service air-conditioning equipment.

Untrained personnel can perform the basic maintenance functions of replacing filters. All other operations should be performed by trained service personnel.

When working on air-conditioning equipment, observe precautions in the literature, tags and labels attached to the unit, and other safety precautions that may apply.

Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloth for unbrazing operations. Have fire extinguishers available for all brazing operations.

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, and CAUTION. 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 a hazard 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 8-18 x 1/2 In	4	AL56AU166
Wiring Harness Assembly	1	50TG403368
Wire Tie	2	HY76TB110

WARNING

ELECTRICAL OPERATION HAZARD

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

Prior to installation of this accessory, make sure all power is disconnected to the unit and locked out.

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 EconoMi\$er 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.

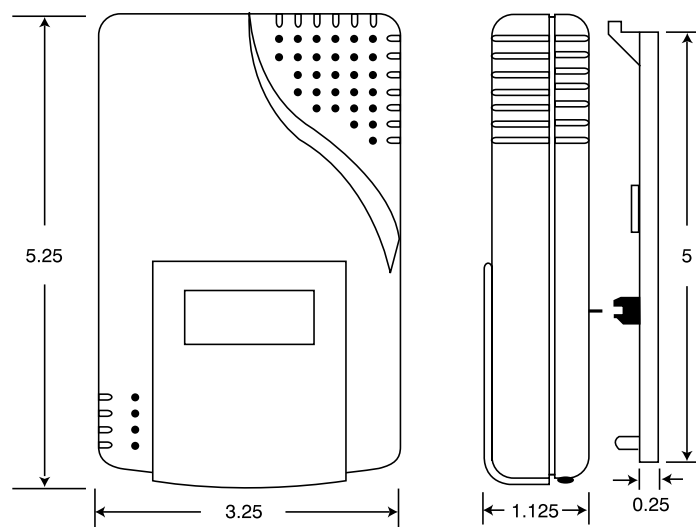
USAGE

The CO₂ sensor is used with the EconoMi\$er IV. When the sensor is wired to the EconoMi\$er 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.

The CRCBDIOX005A00 CO₂ sensor and aspirator box are used with the EconoMi\$er IV (part numbers CRECOMZR008C00, 020A02, 021A02, 024A02, 025A02, 038A00, 039A00, 040A00, 041A00, 042A00, 046A00, 047A00, 050A00, 051A00, 056A00, 057A00) and are used on the following units:

UNIT	SIZE	UNIT	SIZE
48HE	003-006	581C	024-060
50HE	003-006	551C	024-060
50HEQ	003-006	549C	024-060
48HJ	004-028	581A,B	036-300
50HJ	004-028	551A,B	036-300
50HJQ	004-016	549B,J	036-180
48PG	03-28	-	-
50PG	03-28	-	-
48TC	04-14	580J	04-14
50TC	04-14	558J	04-14
50TCQ	04-09	548J	04-09
48TF	004-014	580F	036-150
50TF	004-014	558F	036-150
50TFQ	004-012	548F	036-120
48TJ	016-028	579F	180-300
50TJ	016-028	559F	180-300
48TM	004-028	580F	036-300
50TM	004-028	558F	036-300

The accessory CO₂ sensor can be used on all rooftop units with a factory-installed or accessory EconoMi\$er IV. The CRCBDIOX005A00 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.



NOTE: Dimensions are in inches.

Fig. 1 - CO₂ Sensor Dimensions

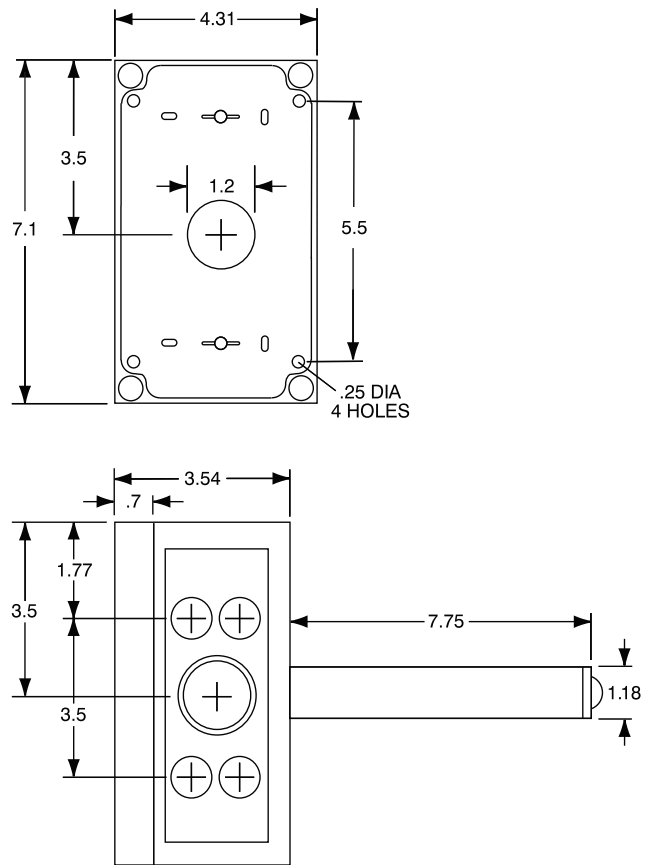
INSTALLATION

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.

- For 48/50PG03-16 units, the sensor and aspirator box are installed on the EconoMi\$er IV. See Fig. 3.
- For 48/50PG20-28, 48/50HJ020-028, and 581A,B/551A,B210-300 units, the sensor and aspirator box are installed in the return air section of the unit. See Fig. 4.
- For 48/50TC04-14, 48/50HJ,TF,TM004-014, 48/50HE003-006, 50HEQ003-006, 50HJQ,TFQ004-012, 50TCQ04-09, 580J/558J04-14, 581A,B/551A,B/580F/558F036-150, 581C/551C024-060, 549C024-060, 548J04-09, and 549B,J/548F036-120 units, the sensor and aspirator box are installed in the return air duct. See Fig. 5.
- For 48/50HJ015-017, 48/50TJ,TM016-028, 50HJQ014-016, 581A,B/551A,B155-180, 579F/559F/580F/558F180-300, and 549B,J150-180 units, the sensor and field-fabricated bracket are installed in the return air section of the EconoMi\$er IV. See Fig. 6.

NOTE: For 48/50PG03-16, 48/50PG20-28, 48/50HJ020-028, 48/50TJ,TM016-028, 50HJQ014-016, 581A,B/551A,B210-300, 579F/559F/580F/558F180-300, and 549B,J150-180 units, the sensor and aspirator box can also be installed in the return air duct if desired.



NOTE: Dimensions are in inches.

Fig. 2 - Aspirator Box Accessory (Part No. 33ZCASPCO2) with Dimensions

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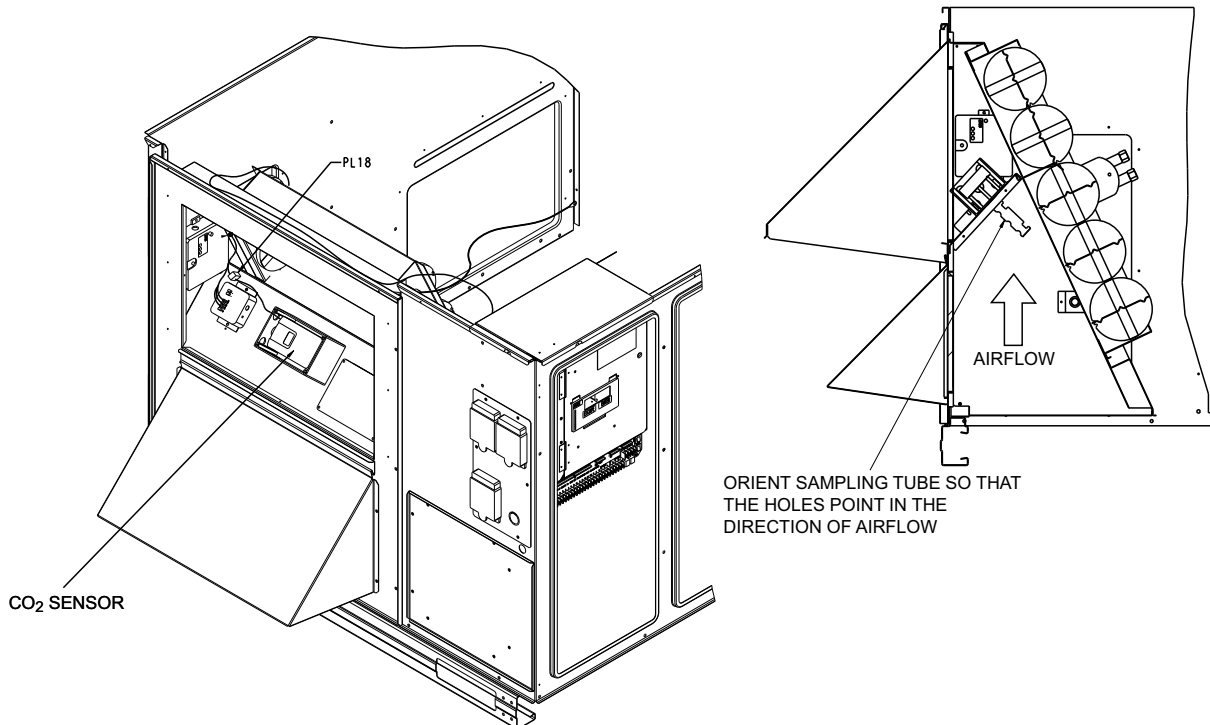
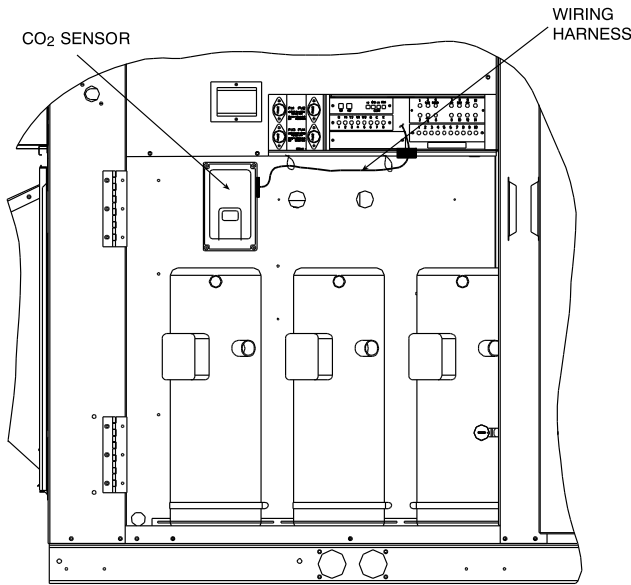


Fig. 3 - CO₂ Sensor Location — 48/50PG03-16

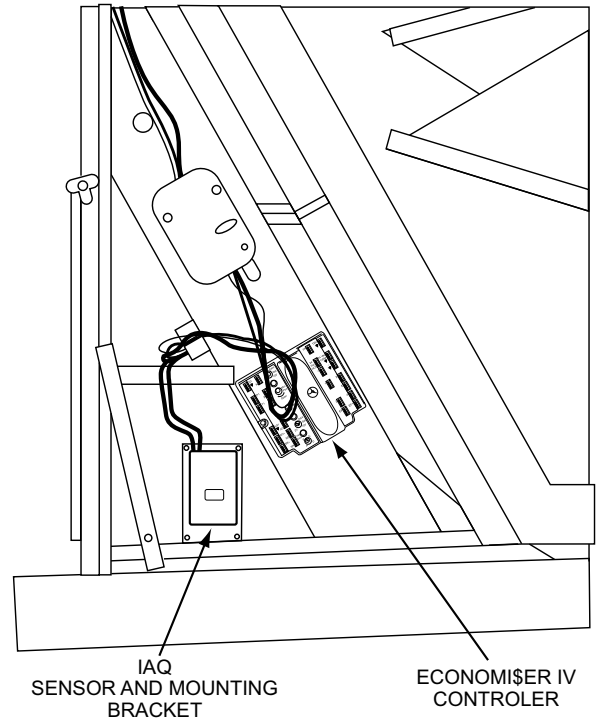
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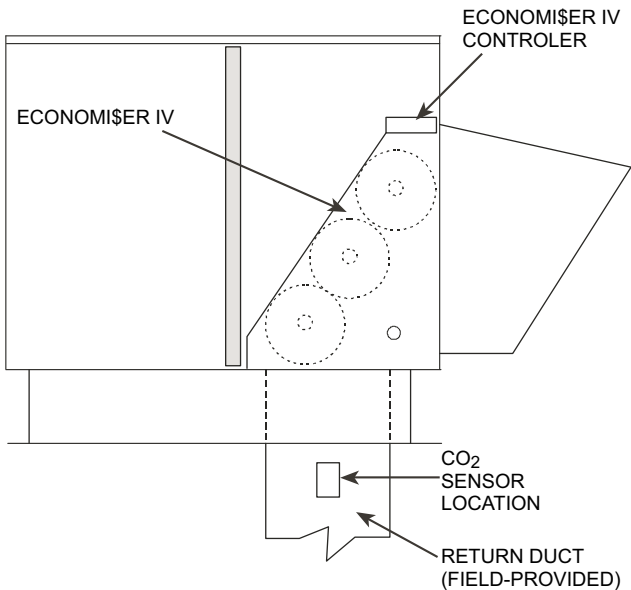
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Fig. 4 - CO₂ Sensor Location - 48/50PG20-28, 48/50HJ020-028, and 581A,B/551A,B210-300 Units



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Fig. 6 - CO₂ Sensor Location - 48/50HJ015-017, 48/50TJ, TM016-028, 50HJQ014-016, 581A,B/551A,B155-180, 579F/559F/580F/558F180-300, 549B,J150-180 Units



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Fig. 5 - CO₂ Sensor Location - 48/50TC04-14, 48/50HJ,TF, TM004-014, 48/50HE003-006, 50HEQ003-006, 50HJQ,TFQ004-012, 50TCQ04-09, 580J/558J04-14, 581A,B/551A,B/580F/558F036-150, 581C/551C024-060, 548J04-09, 549C024-060 and 549B,J/548F036-120 Units

Step 2 — Wiring Requirements —

⚠ WARNING

ELECTRICAL OPERATION HAZARD

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

Prior to installation of this accessory, make sure all power is disconnected to the unit and locked out.

The CO₂ sensor wiring has the following requirements:

NOTE: For 48/50PG units and 48/50HJ020-028 units, wiring is completed using the harness supplied with the accessory and the harness factory-installed in the unit. No additional wiring is needed.

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. 7 and Table 1.

- 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 1.

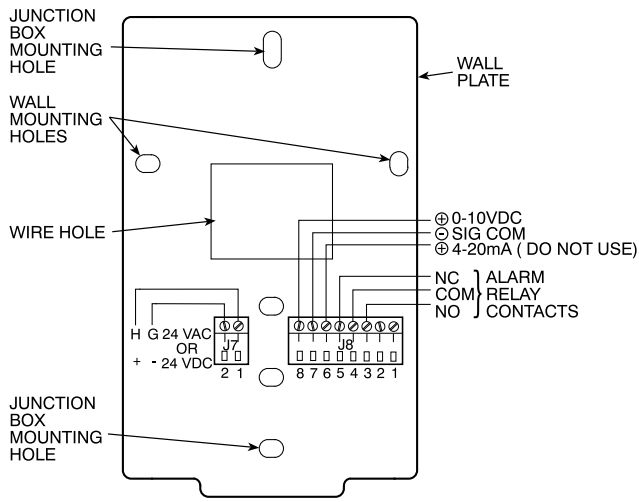


Fig. 7 - CO₂ Sensor Wiring Diagram

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Table 1 – CO₂ Sensor Terminal Block Designations

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

Step 3 — Mounting the Sensor

48/50PG03-16 Units —

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

- Shut off unit power supply and install lockout tag.
- Open the hinged economizer door and secure door.
- Prepare the aspirator box for mounting by removing the four screws from the Plexiglas cover.
- Remove the CO₂ sensor from the mounting plate.
- Attach the mounting plate to the standoffs in the aspirator box enclosure by using the 4 screws provided.
- 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.

- Route wiring harness from the EconoMiSer IV controller to the sensor mounting location.
- Remove the plastic plug from the EconoMiSer IV blockoff partition. Mount the aspirator box to the partition, using four sheet metal screws provided. Verify that the 3 circular holes on the inlet tube are facing the direction of airflow as shown in Fig. 3.
- 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. Connect the plug on the CO₂ wiring harness to plug PL-18 on the unit wiring harness. See Fig. 7 and Table 1 for wiring information.
- 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.
- Ensure that the EconoMiSer IV can operate properly and that no wires will interfere.
- Replace the Plexiglas® cover and secure the EconoMiSer IV panel.
- Remove lockout tag and restore power to unit.
- Configure the base unit for use with the accessory. See Configuration section on page 7.

48/50PG20-28, 48/50HJ020-028, and 581A,B/551A,B210-300 Units —

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

- Shut off unit power supply and install lockout tag.
- Open the hinged compressor section door and securedoor.
- Find the plug located above compressor C1. If the unit does not have a third compressor, the sensor is installed to the left of compressor B1. Remove the plug and discard. Cut a hole in the insulation located behind the partition. See Fig. 4.
- Prepare the aspirator box for mounting by removing the four screws from the Plexiglas cover.
- Remove the CO₂ sensor from the mounting plate.
- Attach the mounting plate to the standoffs in the aspirator box enclosure by using the 4 screws provided.
- 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.
- Route wiring harness from the EconoMiSer IV controller to the sensor mounting location. See Fig. 5. Be sure to route the harness through the bottom of the mounting plate and through the snap bushing.

9. Remove the plastic plug from the unit partition. Mount the aspirator box to the partition, using four sheet metal screws provided. Verify that the 3 circular holes on the inlet tube are facing downward.
10. 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.
11. Connect the plug on the CO₂ sensor wiring harness to plug PL-18 on the unit wiring harness. See Fig. 7 and Table 1 for wiring information.
12. 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.
13. Replace the Plexiglas cover and secure the EconoMi\$er IV panel.
14. Remove lockout tag and restore power to unit.
15. Configure the base unit for use with the accessory. See Configuration section on page 7.

**48/50TC04-14, 48/50HJ,TF,TM004-014,
48/50HE003-006, 50HEQ003-006,
50HJQ,TFQ004-012, 50TCQ04-09,
580J/558J04-14,
581A,B/551A,B/580F/558F036-150,
581C/551C024-060, 548J04-09, 549C024-060
and 549B,J/548F036-120 Units—**

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 Plexiglas 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. 5.
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

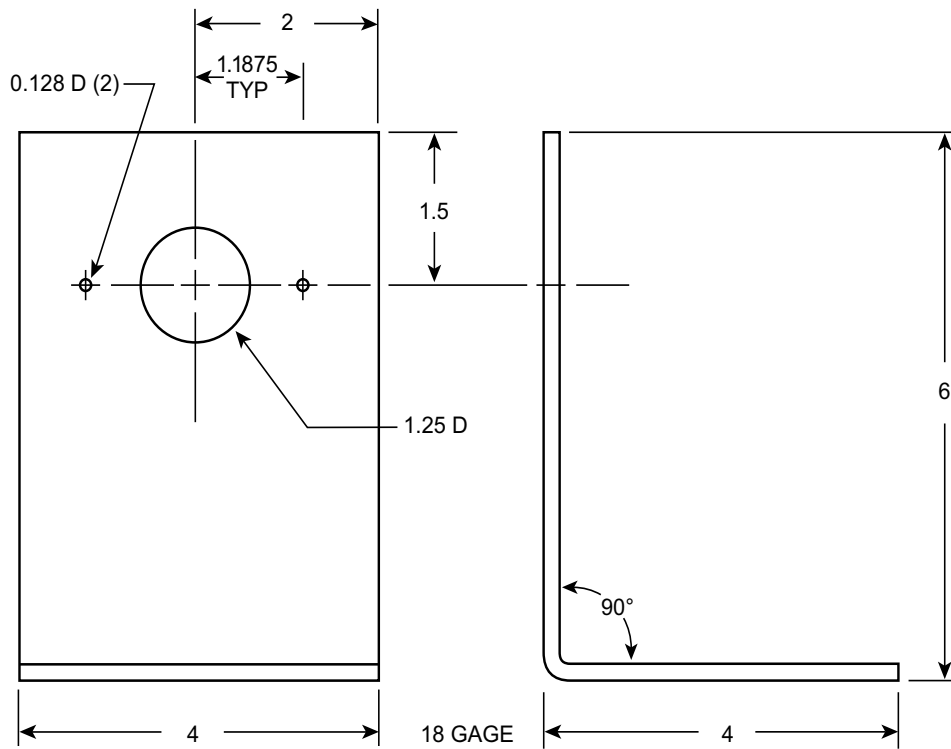
provided. Verify that the 3 circular holes on the inlet tube are facing downward.

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. 7 and Table 1 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 on page 7.

**48/50HJ015-017, 48/50TJ,TM016-028,
50HJQ014-016, 581A,B/551A,B155-180,
579F/559F/580F/558F180-300, and
549B,J150-180 Units —**

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. Save all screws.
3. Fabricate the mounting bracket. See Fig. 8 for details.
4. Remove the CO₂ sensor from the mounting plate.
5. Attach the mounting plate to the field-fabricated mounting bracket by using the 4 screws provided.
6. 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. 6.
7. Install the mounting bracket and sensor mounting plate in the unit return air section. See Fig. 6.
8. Route the wires through the patch plate on the EconoMi\$er IV. Wire the harness to the sensor. See Fig. 7 and Table 1 for wiring information.
9. Attach the CO₂ sensor to the mounting plate.
10. Ensure that the EconoMi\$er IV can operate properly and that no wires will interfere.
11. Replace filter access panel.
12. Remove lockout tag and restore power to unit.
13. Configure the base unit for use with the accessory. See Configuration section on page 7



NOTE: Dimensions are in inches.

**Fig. 8 - Field-Fabricated Mounting Bracket -
48/50HJ015, 017, 48/50TJ, TM016-028, and 50HJQ014-016 Units**

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CONFIGURATION

The CO₂ sensor is shipped with factory configured settings for typical building control operation. The factory settings and adjustment parameters are shown Table 2.

Table 2 – CO₂ Sensor Factory Settings

ADJUSTMENT	RANGE	FACTORY SETTING
Altitude Above Sea 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	0–2,000
Output Range	4–20mA/0–10V	4–20mA/0–10V
Proportional/ Exponential Output	Select One	Proportional
Relay Setpoint	0–10,000 PPM	1000 PPM
Relay Hysteresis	0–10,000 PPM	50 PPM

The CO₂ sensor also has 9 preset standard voltage settings (STDSET) and one non-standard setting (NONSTD). These settings can be selected and configured using the keypad on the sensor. See Table 3 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 1 — 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 2 — 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 3 — Select a Preset Standard Setting —

(STDSET Menu) — The CO₂ sensor has preset standard voltage settings that can be selected anytime after the sensor is powered up. See Table 3.

NOTE: Use setting 1 or 2 for units listed in this Installation Instruction. See Table 3.

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

Step 4 — Optional — Select a Custom Setting (NONSTD 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 STDSETMenu 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 5 — Finish Installation —

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

Step 6 — Configure EconMi\$er IV Controller —

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

Table 3 – CO₂ Sensor Standard Settings

SETTING	EQUIPMENT	OUTPUT	VENTILATION RATE (cfm/Person)	ANALOG OUTPUT	CO ₂ CONTROL RANGE (ppm)	OPTIONAL RELAY SETPOINT (ppm)	RELAY HYSTERESIS (ppm)
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

NOTE: cfm/Person – cubic feet per minute/Person
ppm – parts per million