Installation Instructions

Part No. 33ZCT55CO2, 33ZCT56CO2

> IMPORTANT: Read entire instruction before installing the sensor.

SAFETY CONSIDERATIONS

Installing, starting up and servicing HVAC (Heating, Ventilation, and Air Conditioning) equipment can be hazardous due to system pressures, electrical components and equipment locations.

Only trained, qualified installers and service technicians should install, start up and service this equipment.

When working on HVAC equipment, 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 when handling and installing the sensor

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 would result in minor personal injury or property damage.

GENERAL

The CO$_2$ and space temperature sensors are comprised of two sensors housed in one unit. They are designed to monitor carbon dioxide (CO$_2$) levels in the air and measure the interior building temperature. Two models are available: Part no. 33ZCT55CO2 and part no. 33ZCT56CO2, which has a set point adjustment potentiometer. Using a CO$_2$ sensor is an approved method of monitoring CO$_2$ levels and providing adequate ventilation in a building and meeting the requirements of local building codes and ASHRAE (American Society of Heating, Refrigerating, and Air Conditioning Engineers) standard 62-1999.

NOTE: There are 2 locking screws provided on the bottom of the cover for security. A special tool is required to remove and install the cover if the locking screws are used.

The CO$_2$ and space temperature sensors are factory calibrated to measure levels in the 0 to 2000 parts per million (ppm) range over a voltage range of 0 to 10 vdc or 4 to 20 mA. The CO$_2$ sensor readings can interface with a CCN (Carrier Comfort Network) controller to control the ventilation damper position and ensure an adequate level of outside air in the building as well as providing space temperature control functions. Both models include a push-button override that may be disabled through controller software. See Table 1 for sensor specifications.

PACKAGE CONTENTS

ITEM	QUANTITY
Sensor Top	1
Sensor Base	1
Mounting Plate	1
Machine Screws (6 x 32)	2
Locking Screws	2

INSTALLATION

The sensor must be placed in an area that is representative of the conditioned space or zone. A mounting height between 4 and 6 feet is recommended. The sensor is comprised of three separate pieces: mounting plate, sensor premounted on the sensor bottom and the sensor case top.

Field-Supplied Hardware — The following hardware is field supplied:

• Two no. 6 x 1-in. phillips pan head wood screws and anchors for wall mount installation.

• One 2 x 4-in. junction box for junction box installation

Step 1 — Sensor Location — The sensor should be mounted:

• on an internal wall near a return air grille or duct
• at least 3 ft from any corner, 2 ft from an open doorway and 4 to 6 ft from the floor
• proximal to the wiring egress on the wall
• where temperature operating limits are 32 to 122 F

The sensor should **NOT** be mounted:

• close to a window, on an outside wall, or next to a door leading to the outside
• close to or in direct airflow of areas such as open windows, drafts or over heat sources
• in areas with poor air circulation, such as behind a door or in an alcove in areas where there are dramatic temperature fluctuations or moisture accumulation
• where it may be exposed to direct occupant breathing such as near water coolers or coffee machines

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⚠ WARNING

Before performing service or maintenance operations on the system, turn off main power switches to the unit. Electric shock can cause personal injury.

Step 2 — Wiring Requirements — The sensor wiring has the following requirements:

1. Power requirements: 18 to 36 vac RMS 50/60 Hz at 4 va.

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

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| Tab | 11a | 13a | | | | | | | | |

2. All system wiring must be in compliance with all applicable local and national codes.

3. A dedicated power supply is required for this sensor.

4. All sensor wiring should be color coded for ease of maintenance and service.

5. Wiring should be 18 to 22 AWG (American Wire Gage) stranded wire. 20 AWG is recommended.

Step 3 — Mounting the Sensor — The sensor can be mounted on a surface, wall or in a junction box. See Fig. 1-3.

NOTE: Before mounting the sensor, disassemble the sensor into three parts. See Fig. 3.
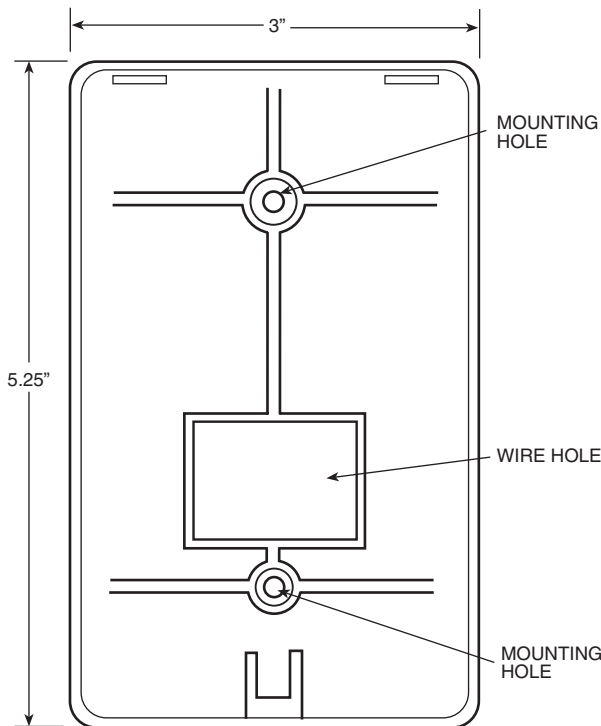
SURFACE OR WALL MOUNTING

1. Place the mounting plate on the wall. Mark the desired location of the two mounting holes on the wall through the holes in the mounting plate. See Fig. 1.

2. Pull the wires through the wire hole in the middle of the mounting plate.

3. Drill two mounting holes in the wall in the location marked in Step 1.

4. Mount the sensor mounting plate with two wood screws and anchors (field supplied).

JUNCTION BOX MOUNTING

1. Run wires through knockout in a 2 x 4-in. junction box (field supplied).

2. Pull wires through the wire hole in the middle of the mounting plate.

3. Secure the sensor mounting plate to the junction box using the two 6 x 32 machine screws (included).

Step 4 — Wiring the Sensor — Perform the following procedure to wire the sensor:

1. Run the wall wiring through the wire hole in the sensor base. See Fig. 2.

2. Align the top clips and secure the bottom clips of the sensor base to the wall mount plate. See Fig. 3.

3. Gently rock the case from top to bottom, using gentle pressure. A "snap" sound will indicate that the sensor is secure. See Fig. 3.

→ 4. Separate the wires into two bundles. One bundle should contain the wires for the CO_2 sensor (J4 and J1) and the other bundle should contain the wires for the temperature sensor and CCN (J5 and J6). See Table 2 and Fig. 4.

NOTE: A large number of sensors were produced with incorrect designations printed on J6. Ignore the CCN+ and CCN– designations printed on the circuit board and refer only to the wiring diagram in this book.

5. Terminate the wires to J1, J4, J5, and J6. See Table 2 and Fig. 4.

6. Push excess wire back through the hole. Align the sensor top over the sensor base.

7. Install the cover on the sensor. Two Allen wrench locking screws are provided to lock the cover onto the sensor for security reasons. They are located on the bottom of the cover. See Fig. 3.

Step 5 — Sensor Start-Up — Perform the following procedure to start up the sensor:

Once the installation is complete, apply power to the sensor. A two-minute warm-up will take place.
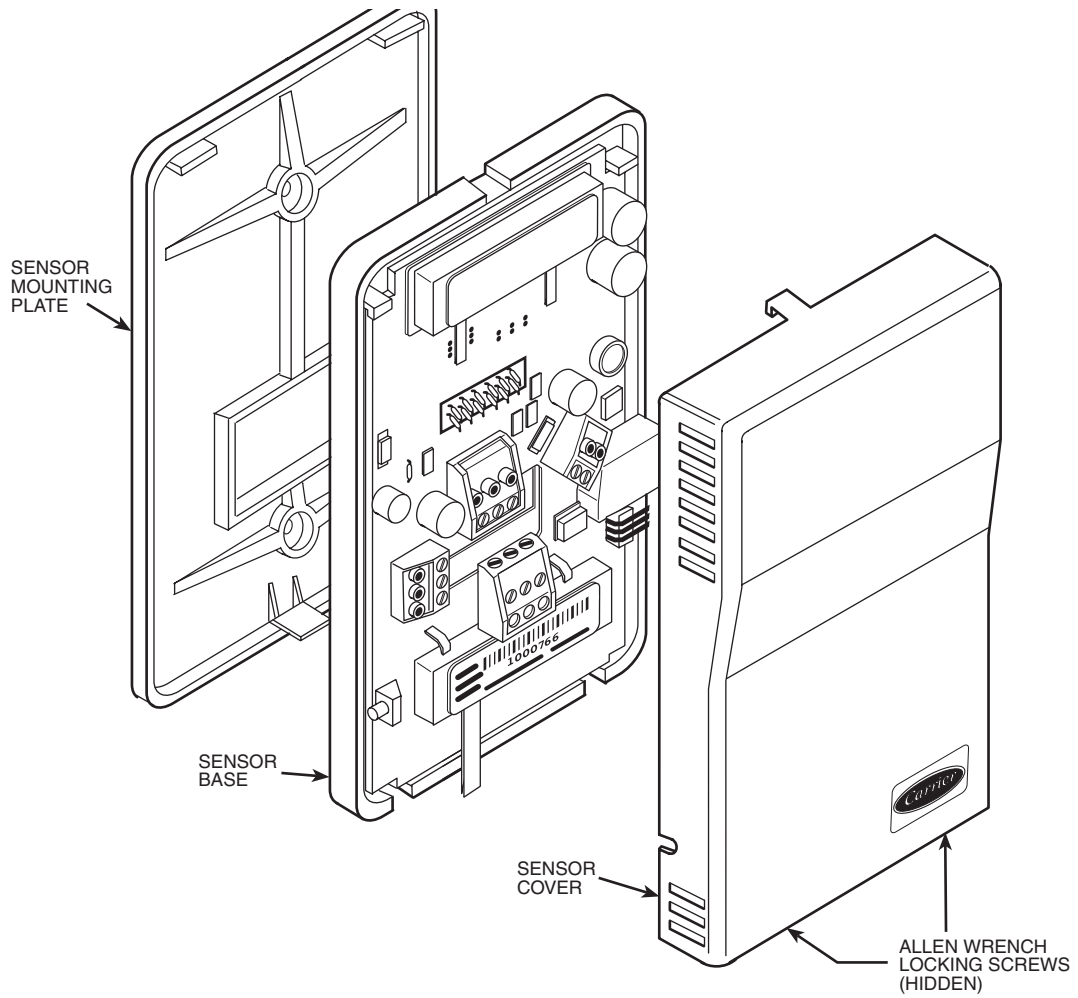
Measure and read the temperature and CO_2 sensor levels by using a meter or checking the readings at the attached controller. Be sure the CO_2 levels are above the minimum, up to the maximum acceptable level in the range.

Fig. 1 — CO_2 and Space Temperature Sensor Mounting Plate
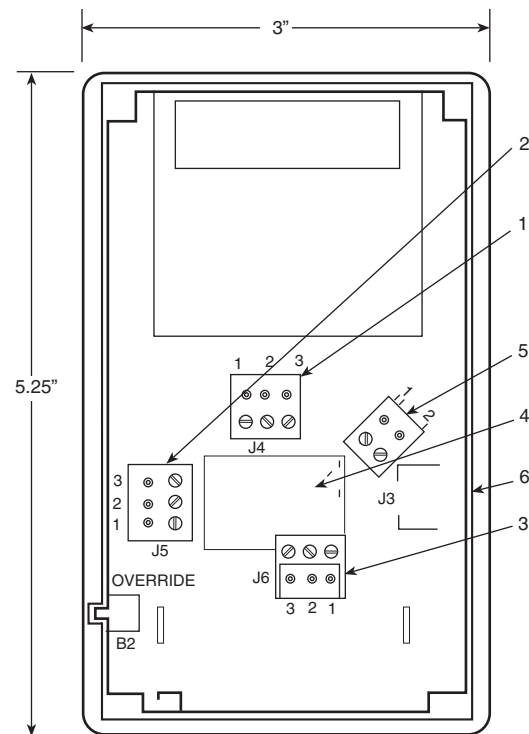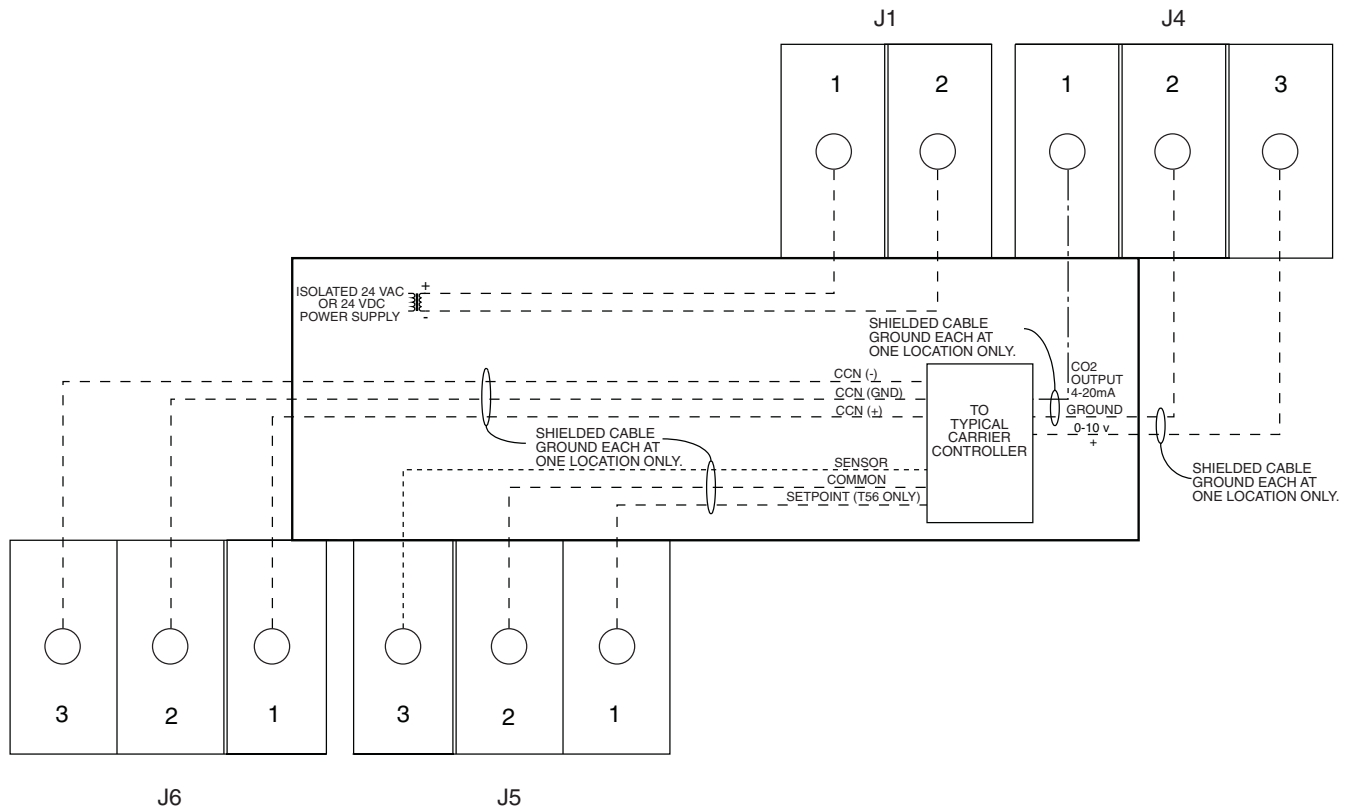

LEGEND

1 — 3-Pin Terminal Block — Signal Out
2 — 3-Pin Terminal Block — Temp Sensor
3 — 3-Pin Terminal Block — CCN
4 — Wiring Access — 1.21 in. x .75 in.
5 — 2-Pin Terminal Block — Power In
6 — RJ14 Connector — Service Communication

→ **Fig. 2 — CO_2 and Space Temperature Sensor Base — Terminal Connections**

SENSOR
MOUNTING
PLATE

SENSOR
BASE

SENSOR
COVER

ALLEN WRENCH
LOCKING SCREWS
(HIDDEN)

Fig. 3 — Sensor Assembly

J1

J4

1   2   1   2   3

ISOLATED 24 VAC
OR 24 VDC
POWER SUPPLY

SHIELDED CABLE
GROUND EACH AT
ONE LOCATION ONLY.

CO2
OUTPUT
4-20mA

GROUND

0-10 v

CCN (-)

CCN (GND)

CCN (+)

TO
TYPICAL
CARRIER
CONTROLLER

SHIELDED CABLE
GROUND EACH AT
ONE LOCATION ONLY.

SENSOR

COMMON

SETPOINT (T56 ONLY)

SHIELDED CABLE
GROUND EACH AT
ONE LOCATION ONLY.

3   2   1   3   2   1

J6

J5

→ **Fig. 4 — CO_2 and Space Temperature Sensors — Typical Field Wiring (P/N 33ZCT55CO2, 33ZCT56CO2)**

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Table 1 — Performance Specification
(P/N 33ZCT55CO2 and 33ZCT56CO2)

Sensing Method	Single Beam Absorption Infrared™ Patented TEMA self calibration software and 10K temperature sensor	
Sample Method	Diffusion	
Measurement Range	0 to 2000 ppm	
Sensitivity	± 20 ppm	
Accuracy	± 100 ppm 60 to 90 F: 760 mmHg (15 to 32 C)	
Pressure Dependency	0.13% of reading per mmHg	
Response Time 0 to 90% Step Change	<2 minutes	
Warm-Up Time at 77 F (25 C)	<2 minutes	
Operating Conditions	32 to 122 F (0° to 50 C) 0 to 99% RH, non-condensing	
Storage Temperatures	–4 to +158 F (–20 to 70 C)	
Agency Certification	FCC Part 15 Class B/CE/CA Energy Commission	
Calibration/Interval	Lifetime self-calibrating after 14 days of run time.*	
Power	18-30 VAC RMS, 50/60 Hz — half wave rectified (dedicated) 18-42 VDC polarity protected (dedicated) 1.75 VA maximum average power 2.75 VA peak power	
Analog CO_2 Output	4-20 mA (Rlmax = 500 Ohms) and 0-10 V (Source 100 mA, Sink 10 mA)	
Temperature Sensor	10 K Ohm Thermistor, 10K Ohm ± 2.5% at 77 F (25 C)	
Temperature Control (P/N 33ZCT56CO2 only)	Equipped with a slide potentiometer.	
	Positions	Resistance
	Left (Stop)	0 K (+ 5 K)
	Right (Stop)	100 K ± 10 K
Override Control	Equipped with a push button that when depressed shorts out its internal thermistor.	
Reliability	Meets applicable Carrier reliability requirements	

LEGEND

RH — Relative Humidity
RMS — Root Mean Square
TEMA — Time Extended Measurement

*Automatic background calibration (ABC) logic is a patented self-calibration procedure that is designed to be used in applications where CO_2 concentrations will drop to outdoor ambient conditions (approximately 400 ppm) at least 3 times in a 14-day period (typically during unoccupied periods).

→ ## Table 2 — CO_2 and Space Temperature Sensors — Electrical Connections
(P/N 33ZCT55CO2, 33ZCT56CO2)

CONNECTOR	TERMINAL DESIGNATION
J1	2-Pin Power Terminal 1 — 24VAC (+) (Dedicated Power Supply) 2 — 24VAC (–) (Dedicated Power Supply)
J3	RJ14 Connector CCN Service Communication 1 — Not Used 2 — CCN (+) 3 — CCN Ground 4 — Not Used 5 — CCN (–) 6 — Not Used
J4	3-Pin Terminal Signal Out 1 — 4-20 mA CO2 Output 2 — Common CO2 Output 3 — 0-10VDC CO2 Output
J5	3-Pin Terminal Temp Sensor 1 — Temperature Offset 2 — Common 3 — Thermistor
J6	3-Pin Terminal CCN Communications 1 — CCN (+) 2 — CCN Ground 3 — CCN (–)

LEGEND

CCN — Carrier Comfort Network