

CD-W00-x0-1 Series Wall Mount CO₂ Transmitters

Installation Instructions

CD-W00-00-1, CD-W00-N0-1

Part No. 24-9601-94, Rev. D

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Refer to the [QuickLIT Web site](#) for the most up-to-date version of this document.

North American Emissions Compliance

United States

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when this equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his/her own expense.

Canada

This Class (A) digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe (A) respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Installation

IMPORTANT: The CD-W00-x0-1 Series Wall Mount CO₂ Transmitters are intended to provide an input to equipment under normal operating conditions. Where failure or malfunction of the transmitter could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the control system. Incorporate and maintain other devices, such as supervisory or alarm systems or safety or limit controls, intended to warn of or protect against failure or malfunction of the transmitter.

Parts Included

The CD-W00-x0-1 Series Wall Mount CO₂ Transmitters include a base, Printed Circuit Board (PCB), and cover (Figure 1).

Special Tools Needed

A 1/16 in. (1.5 mm) Allen wrench or a Johnson Controls® T-4000-119 Allen-Head Adjustment Tool is required during installation.

Mounting

The CO₂ transmitter is shipped ready for standard wallbox or surface mounting.

IMPORTANT: Avoid touching or applying force to the components on the PCB. Handle the PCB by the edges only.

Location Considerations

This device mounts either on a U.S. wallbox or directly to a wall surface.

Locate the transmitter on an inside wall, free from drafts, and out of direct sunlight. The devices are shock and vibration resistant; however, be careful not to drop the unit or to mount it where it could be exposed to excessive vibration.

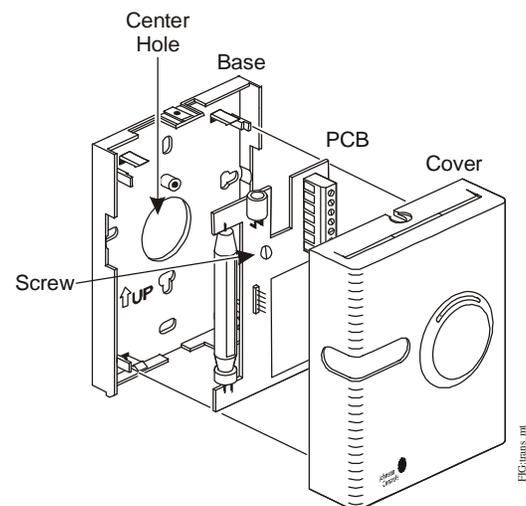


Figure 1: Mounting the Transmitter to the Base

Surface Mounting

Use the following procedure to mount the CO₂ transmitter to a drywall surface:

1. Use a 1/16 in. (1.5 mm) Allen wrench or Johnson Controls T-4000-119 Allen-Head Adjustment Tool to loosen the security screw on the top of the unit.
2. Insert a quarter or other small rounded object that fits into the slot next to the security screw location, and then carefully pry the top edge of the sensor assembly away from its mounting base and remove. Remove the screw holding the PCB to the base.
3. Carefully remove the PCB from the base by releasing the PCB from the top two hooks (Figure 2).
4. Pull out approximately 6 in. (152 mm) of wire from the wall and insert the wire through the hole in the mounting base.
5. Align the mounting base on the wall, and use the base as a template to mark the location of the two mounting holes on the surface.

Note: Confirm that the arrow imprinted on the mounting base is pointing up, which indicates proper positioning.

6. Secure the mounting base to the wall using the appropriate mounting hardware (field furnished).
7. To install the PCB into the base, see Figure 1 and:
 - a. Align the PCB between the bottom two locating tabs and under the hooks at the bottom of the base (Figure 2).
 - b. Route the wire through the notch in the top of the PCB by the terminal block.
 - c. Make sure the cable is clear of any components on the back side of the PCB and press down on the PCB until it snaps into place so that it is secured by the top two latches.
 - d. Secure the PCB to the base using the screw removed in Step 2.
8. Proceed to the [Wiring](#) section.

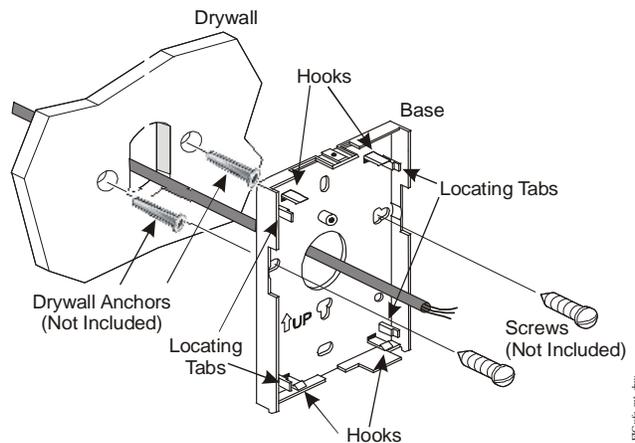


Figure 2: Surface Mounting to Drywall

Wallbox Mounting

To mount the CO₂ transmitter to a standard wallbox, see Figure 3 and proceed as follows:

1. Use a 1/16 in. (1.5 mm) Allen wrench or Johnson Controls T-4000-119 Allen-Head Adjustment Tool to loosen the security screw on the top of the unit.
2. Insert a quarter or other small rounded object that fits into the slot next to the security screw location, and then carefully pry the top edge of the sensor assembly away from its mounting base and remove. Remove the screw holding the PCB to the base.
3. Carefully remove the PCB from the base by releasing the PCB from the top two hooks (Figure 3).
4. Pull out approximately 6 in. (152 mm) of wire from the wallbox and insert the wire through the hole in the mounting base.
5. Align the mounting base on the wallbox.

Note: Confirm that the arrow imprinted on the mounting base is pointing up, which indicates proper positioning.

6. Secure the mounting base to the wallbox using two No. 6-32 screws (field furnished).
7. To install the PCB into the base, see Figure 1 and:
 - a. Align the PCB between the bottom two locating tabs and under the hooks at the bottom of the base (Figure 3).
 - b. Route the wire through the notch in the top of the PCB by the terminal block.

- c. Make sure the cable is clear of any components on the back side of the PCB and press down on the PCB until it snaps into place so that it is secured by the top two latches.
- d. Secure the PCB to the base using the screw removed in Step 2.

8. Proceed to the Wiring section.

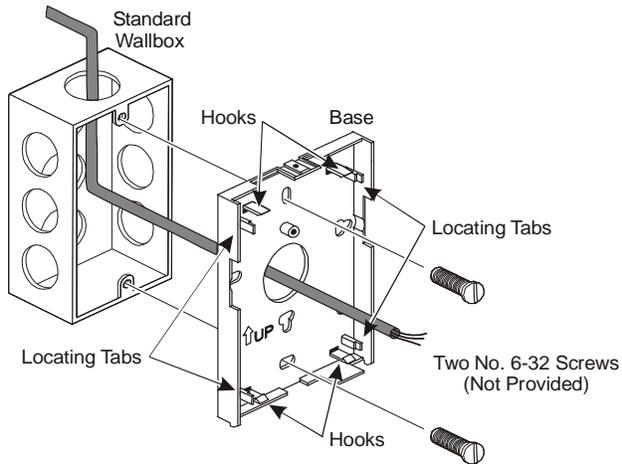


Figure 3: Wiring to a Wallbox

Wiring

Power Supply Requirements

The transmitter requires a 24 VAC/VDC, Class 2 power supply. Although the power input includes a halfwave rectifier, using a DC supply is recommended to avoid excessive current peaks.

Connections to a 24 VAC Power Supply

Connecting more than one transmitter to a single 24 VAC transformer forms a common loop and increases the risk of a short circuit; therefore, a separate floating supply for each transmitter is recommended (see Figure 4).

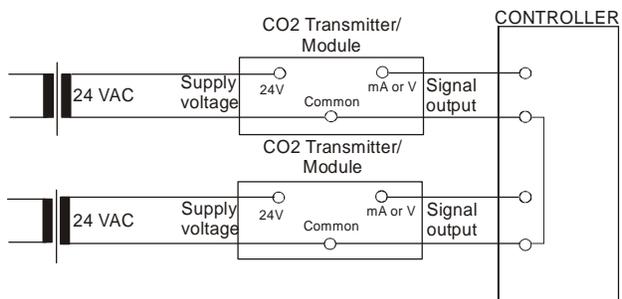


Figure 4: Connecting Separate AC Supplies (Recommended)

If several transmitters share a common transformer, always connect the transmitter common (-) to the same side of the transformer to maintain the polarity. A shared common line at the controller may cause a short circuit if the phase is not the same (Figure 5).

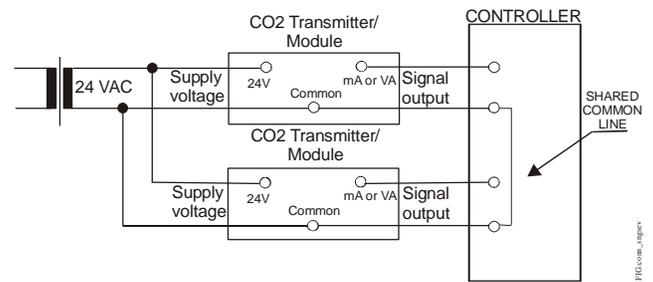


Figure 5: Connecting One AC Supply to Several Transmitters (Not Recommended)

To connect the transmitter:

1. Strip 1/4 in. (6.35 mm) of insulation from the ends of the power and output signal.

Note: To prevent a short circuit from occurring, make sure that the wires are stripped to the correct length and fully inserted into the terminal blocks. If using shielded cable, ensure that the shield is protected from contact with components on the top or bottom side of the printed circuit board. Failure to follow proper wiring procedures may cause the device to fail.

2. Connect the wires to the PCB screw terminals as shown in Figure 6.

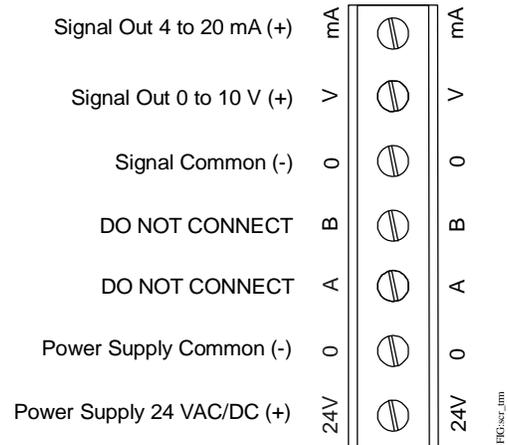


Figure 6: PCB Screw Terminals

Note: The transmitter is capable of generating both voltage and current output. Each output has its own individual positive screw terminal.

3. Reposition the cover as shown in Figure 1.

Setup and Adjustments

Commissioning

Johnson Controls CO₂ transmitters come from the factory calibrated for the following:

- output signal (0 to 10 V and 4 to 20 mA) proportional to CO₂ concentration (0 to 2,000 parts per million [ppm])
- altitude range of 0 to 2,000 ft (0 to 600 m) without compensation

For altitudes above 2,000 ft (600 m) where optimum accuracy of the CO₂ concentration measurement is essential, modify the Building Automation System (BAS) controller's Analog Input (AI) high range to compensate for sensor placement at other than the standard calibration altitude.

To do this, reset the 2,000 ppm value using the controller's Compensation Factor (CF) shown in Figure 7 or Figure 8.

The new value is calculated as follows:

$$\text{Corrected Value} = \text{CF} \times 2,000$$

For example, if the sensor is situated at an altitude of 3,000 ft (914.4 m) above sea level, the CF is 1.10 (see Figure 7 or Figure 8). The new value is calculated as follows:

$$\text{Corrected Value} = (1.10)(2,000 \text{ ppm}) = 2,200 \text{ ppm}$$

Note: For altitude compensation, only adjust the AI high range. The AI low range should remain at zero.

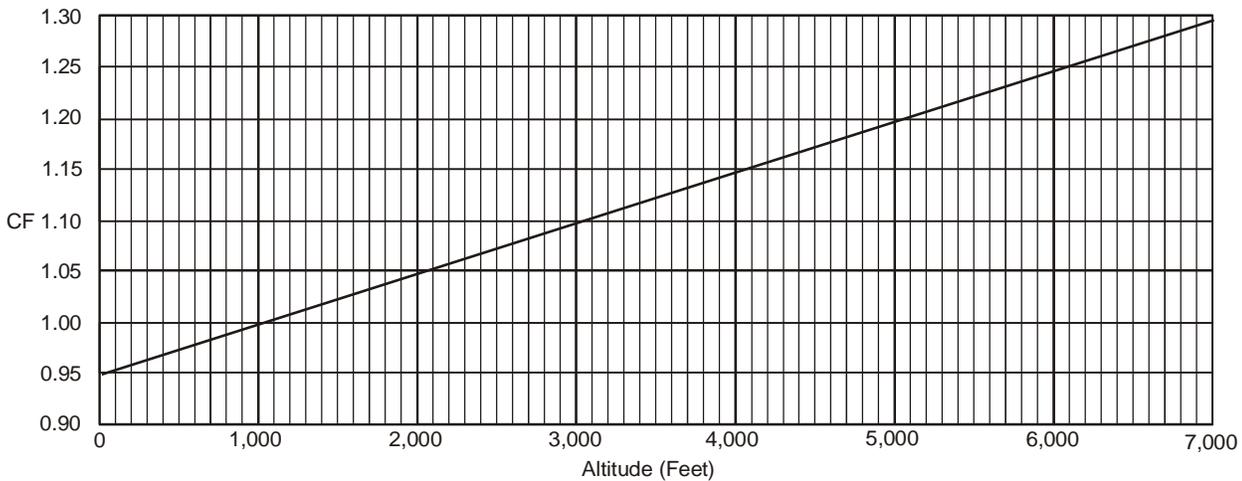


Figure 7: Altitude Compensation in Feet above Sea Level

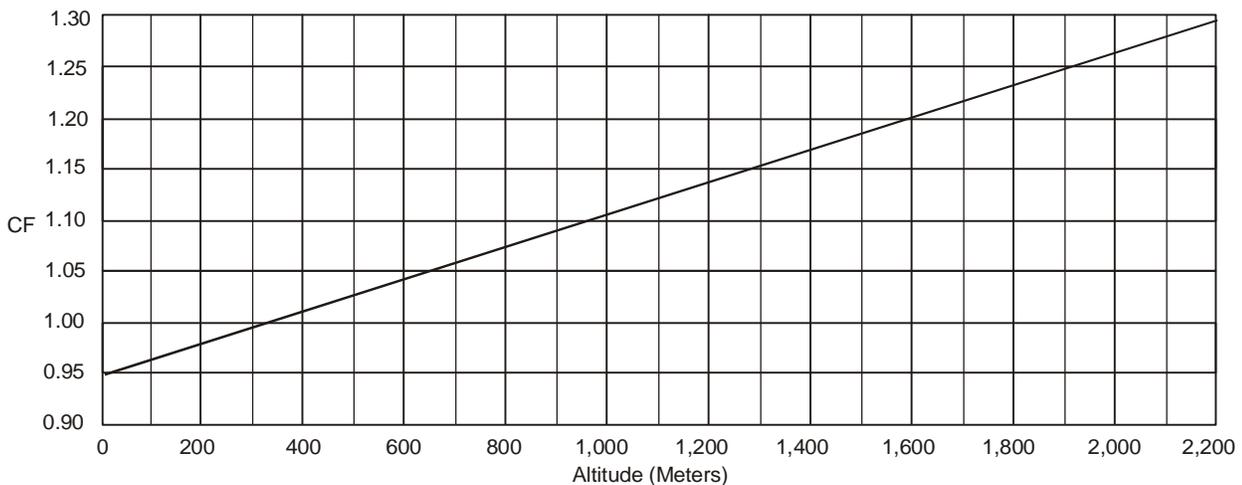


Figure 8: Altitude Compensation in Meters above Sea Level

Troubleshooting

The CO₂ transmitter is not field repairable. In the event the unit is not functioning properly, use the following checklist to identify the symptoms and determine a solution:

1. Verify that the unit is mounted properly and the appropriate output jumper is selected.
2. Verify that all wiring is correct.

3. Verify that the power supply voltage level is 20 to 30 VAC or 18 to 30 VDC.

If the CO₂ transmitter does not operate after completing these steps, replace the unit.

Repair Information

If the CD-W00-x0-1 Series Wall Mount CO₂ Transmitters fail to operate within their specifications, replace the units. For a replacement CO₂ transmitter, contact the nearest Johnson Controls representative.

Technical Specifications

CD-W00-x0-1 Series Wall Mount CO₂ Transmitters

Measuring Range	0 to 2,000 ppm CO ₂	
Accuracy at 77°F (25°C)	±[50 ppm + 3.0% of reading] (includes calibration uncertainty, repeatability, and non-linearity). All accuracy specifications reflect the testing of transmitters using high-grade certified gases. The transmitter is intended for an altitude range of 0 to 2,000 ft (0 to 600 m) above sea level without compensation.	
Temperature Dependence of Output	-0.35% of reading/°C, typical (may vary between individual units)	
Long-Term Stability	<5.0% of Full Scale/5 Years	
Response Time (0 to 63%)	1 Minute	
Operating Temperature Range	23 to 113°F (-5 to 45°C)	
Storage Temperature Range	-4 to 158°F (-20 to 70°C)	
Humidity Range	0 to 85% RH (noncondensing), 85°F (29°C) maximum dew point	
Transmitter CO₂ Output Signal	4 to 20 mA and 0 to 10 VDC Maximum Output Current: 25 mA; Maximum Output Voltage: 12.5 V	
Resolution of Analog Outputs	2.5 ppm CO ₂	
Recommended External Load	Current Output: Maximum 500 ohms Load Resistance Voltage Output: Minimum 1,000 ohms Load Resistance	
Power Supply Range	20 to 30 VAC (18 to 30 VDC), Class 2	
Power Consumption	<2.0 W Average, excluding current output consumption	
Current Consumption	150 mA peak (70 mA average)	
Warm-Up Time	<1 Minute <10 Minutes for Full Specification	
Dimensions (H x W x D)	4-23/32 x 3-5/32 x 1-7/32 in. (120 x 80 x 31 mm)	
Shipping Weight	0.26 lb (117 g)	
Compliance 	United States	UL Listed, File E27734, CCN XAPX, UL 873, Temperature Indicating and Regulating Equipment, FCC Compliant to CFR 47, Part 15, Subpart B, Class A
	Canada	UL Listed, File E27734, CCN XAPX7, CAN/CSA C22.2 No. 24, Temperature Indicating and Regulating Equipment. Industry Canada Compliant, ICES-003
	Europe	CE Mark – Johnson Controls, Inc., declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive 2004/108/EC.

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.



Building Efficiency

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