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CD-Wxx-00-0 Series Wall Mount CO₂ Transmitter

Johnson Controls offers a full line of Carbon Dioxide (CO₂) transmitters for measuring and transmitting CO₂ levels, ranging from 0 to 2,000 parts per million (ppm), within Heating, Ventilating, and Air Conditioning (HVAC) CO₂ applications. Specific HVAC CO₂ applications include: Demand Control Ventilation (DCV), fresh air and Indoor Air Quality (IAQ), and rooftop air handling Economizer controls systems.

These compact, wall-mounted devices output 0 to 10V (default), 0 to 20 mA, or 4 to 20 mA signals and feature analog temperature outputs, relay outputs, and/or a digital display as (optional) features. They are designed to work:

- in standalone mode
- connected to Metasys® system or the AD-DME series controllers
- as part of any integrated Building Automation System (BAS)

These new CO₂ transmitters are easy to install, offer a full three year warranty, and require no maintenance or field calibration.



Figure 1: Wall Mount CO₂ Transmitter with Display

Features and Benefits

<input type="checkbox"/> Energy Savings from DCV Strategies	Offers potential for 10 to 70% energy savings
<input type="checkbox"/> CARBOCAP® Single-beam, Dual-wavelength Design	Provides superior performance compared to other technologies
<input type="checkbox"/> CARBOCAP Silicon, Micro-machined Construction	Provides reliable CO ₂ measurement in room environments
<input type="checkbox"/> Calibration Reliability	Offers five years of reliable calibration
<input type="checkbox"/> Stable Infrared Reference	Compensates for light-source drift

Product Overview

This transmitter uses a completely new CO₂ sensing technology. The silicon-based CARBOCAP sensor provides stability and reliability.

The CARBOCAP sensor operates in accordance with the single-beam, dual-wavelength method. This patented sensor has unique reference measurement capabilities, offering excellent stability over both time and temperature. The monolithic Fabry-Perot Interferometer (FPI) chip utilizes the optical, mechanical, and electronic properties of silicon at the same time.

The transmitter is factory set to measure CO₂ levels up to 2,000 ppm. It requires a Class 2, 24 VDC/VAC power source and generates an output signal proportional to the CO₂ level detected. One simple wire to a screw terminal and a jumper on the Printed Circuit Board (PCB) combine to select the analog output signal from the following options:

- 0 to 20 mA
- 4 to 20 mA
- 0 to 10V (default)

IMPORTANT:	The CD-Wxx-00-0 transmitters are intended to provide input to equipment under normal operating conditions. Where failure or malfunction of the device could lead to an abnormal operating condition that could cause personal injury or damage to the equipment or other property, other devices, (limit or safety controls) or systems (alarm or supervisory) intended to warn of, or protect against, failure or malfunction of the device must be incorporated into and maintained as part of the control system.
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Calibration

Johnson Controls CO₂ transmitters are calibrated using certified gases for the following:

- output signal (0 to 10V) proportional to CO₂ concentration (0 to 2,000 ppm)
- altitude range of 0 to 1,969 ft (0 to 600m) above sea level without compensation
- relay output trigger point set at 1,000 ppm (in models featuring the optional relay output)

CARBOCAP Technology

Johnson Controls is licensed to integrate the new silicon-based CARBOCAP sensor into HVAC or Building Automation Systems. Integrating this sensor delivers several advantages: high accuracy, excellent stability, negligible temperature dependence, and ease of installation.

The structure of the diffusion-aspirated, single-beam, dual-wavelength sensor is remarkably simple. It consists of an Infrared (IR) source, a sample cell, a tunable-interference filter, and an IR detector. The tunable-interference filter enables measurements at two wavelengths. As a result, references are measured accurately, without the typically broad tolerances inherent in dual-beam sensors.

Dust, water vapor, and most chemicals do not affect the measurement accuracy of the sensor. No special software compensation patches are required, and the device requires no maintenance.

Versatile Transmitter

Designed for use with a standard U.S. wallbox or mounting directly to a wallboard surface, the CO₂ transmitter generates considerable savings in installation, operation, and maintenance with no recalibration costs. Johnson Controls includes a Drywall Spring-clip Mounting Kit with each unit.

Johnson Controls CO₂ transmitters, when used with BAS/Economizer controllers (featuring DCV strategies), can generate energy savings ranging up to:

- 20 to 40% in office buildings
- 20 to 60% in restaurants/light retail facilities
- 10 to 70% in educational/business settings

Dimensions

See Figure 2 and Figure 3 for wall mount CO₂ transmitter dimensions.

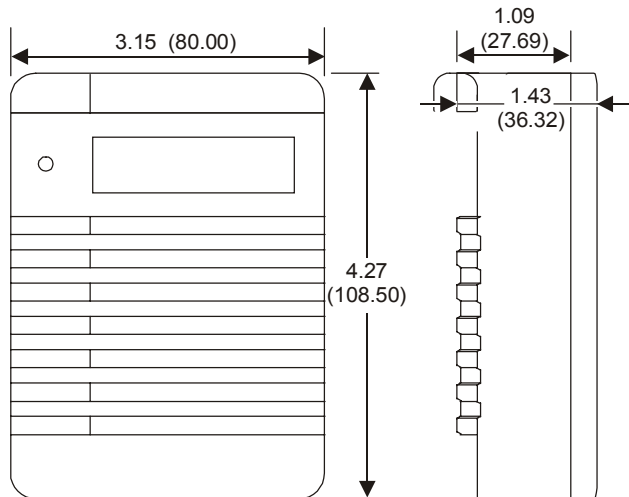


Figure 2: Cover Dimensions, in. (mm)

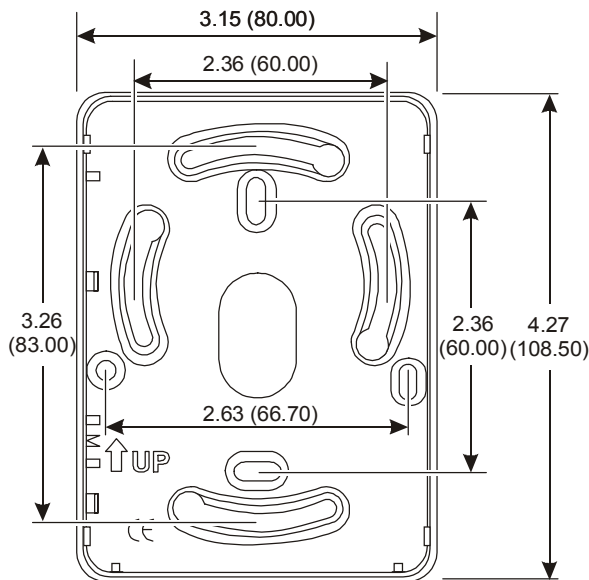


Figure 3: Wall Mount Base Dimensions, in. (mm)

Optional Features

Analog Temperature Module

For applications requiring measurements and outputs for both CO₂ and temperature, order the CD-WA0-00-0 transmitter. This model includes an analog temperature module that plugs into the main PCB and has an active temperature output, linear from 0 to 10 VDC for 32 to 122°F (0 to 50°C).

Relay Module

Order the CD-WR0-00-0 transmitter for applications where On/Off ventilation or fan control is required to provide fresh air. This model includes a relay output module that plugs into the main PCB offering a 30V, 0.5A Class 2 output with configurable On and Off trip points. Default On is 1,000 ppm, and default Off is 950 ppm.

Note: To redefine the relay On and Off trip points to suit the application, use the ACC-CD-S Relay Setpoint Software.

Relay and Display Module

For applications where the display of the measured CO₂ level and a relay output and relay On notification are required, order the CD-WRD-00-0. This module contains a relay and a digital display. The unit plugs into the transmitter PCB. The display includes a 4-digit display and a Light-Emitting Diode, which indicates when the relay is On.

Note: To redefine the relay On and Off trip points to suit the application, use the ACC-CD-S Relay Setpoint Software.

Repair and Replacement

The CD-Wxx-00-0 Series is not field repairable.

To order a replacement, refer to the *Ordering Information* section.

Altitude Compensation

These devices are intended for an altitude range of 0 to 1,969 ft (0 to 600m) without compensation. To compensate for higher altitudes, see the Johnson Controls installation instructions for this device.

Ordering Information

Contact the nearest Johnson Controls representative to order a CO₂ transmitter, and specify the desired product code number from Table 1. Refer to Table 2 for replacement parts and Table 3 for accessories for the wall mount CO₂ transmitter.

Table 1: CO₂ Wall Mount Transmitters

Product Code Number	Description
CD-WA0-00-0	Transmitter with Analog Temperature Output
CD-WR0-00-0	Transmitter with Relay
CD-WRD-00-0	Transmitter with Relay and Display

Table 2: Replacement Parts for Wall Mount CO₂ Transmitters

Product Code Number	Description
ACC-CD-A	Analog Temperature Module for CD-WA0-00-0 Only
ACC-DWCLIP-0	Drywall Spring-clip Mounting Kit
ACC-CD-DR	Replacement Relay and Display Module for CD-WRD-00-0 Only
ACC-CD-R	Relay Output Module for CD-WR0-00-0

Table 3: Accessory for Wall Mount CO₂ Transmitters

Product Code Number	Description
ACC-CD-S	Relay Setpoint Software Kit; includes software and interface cable to reset the On and Off relay setpoints for CD-WR0-00-0 or CD-WRD-00-0
Y65T31-0	Multiple Primary Transformer, 40 VA, 120/208/230V Primary, 24V Class 2 Secondary with Screw Terminals: Foot Mounting or 4 x4 in. (101.6 x 101.6 mm) Plate

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Specifications

Product	CD-Wxx-00-0 Series Wall Mount CO ₂ Transmitter
Measuring Range	0 to 2,000 ppm CO ₂
Accuracy at 68°F (20°C)	<±[30 ppm CO ₂ + 2.0% of reading] (includes manufacturing deviation and drift). All accuracy specifications reflect testing the transmitters using high-grade, certified gases. Transmitters are intended for an altitude range of 0 to 1,969 ft (0 to 600m) above sea level without compensation. To compensate for higher altitudes, see the Johnson Controls installation instructions for this device.
Non-Linearity	<1.0% of Full Scale (FS)
Temperature Dependence of Output	<0.056% of Full Scale/F° (<0.1% of Full Scale/C°)
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	-4 to 158°F (-20 to 70°C)
Humidity Range	0 to 85% RH (non-condensing)
Transmitter Output Signals	
CO₂	Jumper Selectable: 0 to 20 mA or 4 to 20 mA or 0 to 10 VDC (Default) Maximum Output Current: 25 mA; Maximum Output Voltage: 12.5V
Analog Temperature Module (Optional)	Linear 0 to 10 VDC for 32 to 122°F (0 to 50°C)
Relay Output (Optional)	Maximum 30V, 0.5A, Class 2
Resolution of CO₂ Output	10 ppm (CD-WRD-00-0 only)
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	<2.5W Average, 4.1 VA
Warmup Time	<5 Minutes for CO ₂ Measurement <30 Minutes for Temperature Measurement
Housing Material	ABS Plastic
Dimensions (H x W x D)	3-5/32 x 4-9/32 1-3/8 in. (80 x 108.5 x 35 mm)
Shipping Weight	3.5 oz (100g)
Agency Listings	UL Listed, CCN XAPX (US) and XAPX7 (Canada); EMC Directive (CE Mark), 89/336/EEC; FCC and DOC Compliant

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.



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