

# CD-Wxx-00-0 Series Wall Mount CO<sub>2</sub> Transmitter

## Product Bulletin

CD-Wxx-00-0

Code No. LIT-216527

Issued July 14, 2011

Supersedes June 1, 2001

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

Johnson Controls offers a full line of Carbon Dioxide (CO<sub>2</sub>) transmitters for measuring and transmitting CO<sub>2</sub> levels, ranging from 0 to 2,000 parts per million (ppm), within Heating, Ventilating, and Air Conditioning (HVAC) CO<sub>2</sub> applications. Specific HVAC CO<sub>2</sub> 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 10 V (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
- as part of any integrated Building Automation System (BAS)

These new CO<sub>2</sub> transmitters are easy to install, offer a full three year warranty, and require no maintenance or field calibration.



**Figure 1: Wall Mount CO<sub>2</sub> Transmitter with Display**

**Table 1: Features and Benefits**

| Features                                      | Benefits                                                            |
|-----------------------------------------------|---------------------------------------------------------------------|
| Energy Savings from DCV Strategies            | Offer potential for 10 to 70% energy savings.                       |
| CARBOCAP® Single-Beam, Dual-Wavelength Design | Provides superior performance compared to other technologies.       |
| CARBOCAP Silicon, Micro-machined Construction | Provides reliable CO <sub>2</sub> measurement in room environments. |
| Calibration Reliability                       | Offers 5 years of reliable calibration.                             |
| Stable Infrared Reference                     | Compensates for light-source drift.                                 |

## Product Overview

This transmitter uses a completely new CO<sub>2</sub> 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 uses the optical, mechanical, and electronic properties of silicon at the same time.

The transmitter is factory set to measure CO<sub>2</sub> levels up to 2,000 ppm. It requires a Class 2, 24 VDC/VAC power source and generates an output signal proportional to the CO<sub>2</sub> 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 10 V (default)

**IMPORTANT:** The CD-Wxx-00-0 CO<sub>2</sub> Transmitter is 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.

## Calibration

Johnson Controls® CO<sub>2</sub> transmitters are calibrated using certified gases for the following:

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

## CARBOCAP Technology

Johnson Controls is licensed to integrate the new, silicon based CARBOCAP CO<sub>2</sub> sensor into HVAC or Building Automation Systems. This sensor has 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 CO<sub>2</sub> 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.

## Energy Efficiency

Johnson Controls® CO<sub>2</sub> 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 CO<sub>2</sub> transmitter and mounting flange dimensions.

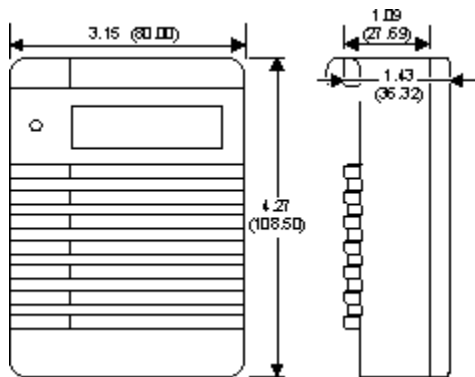


Figure 2: Cover Dimensions, in. (mm)

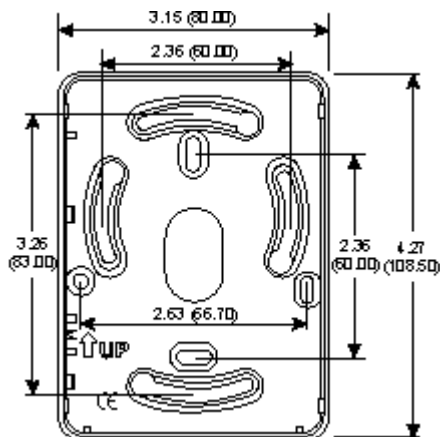


Figure 3: Wall Mount Base Dimensions, in. (mm)

## Optional Features

### Analog Temperature Module

For applications requiring measurements and outputs for both CO<sub>2</sub> 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 30 V, 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 CO<sub>2</sub> 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 (LED), 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 Information

If the CD-Wxx-00-0 Series Wall Mount Transmitter fails to operate within its specifications, replace the unit. For a replacement CO<sub>2</sub> transmitter, contact the nearest Johnson Controls representative.

## Altitude Compensation

These devices are intended for an altitude range of 0 to 2,000 ft (0 to 600 m) without compensation. To compensate for higher altitudes, refer to the installation instructions for this device.

## Ordering Information

Contact the nearest Johnson Controls representative to order a CO<sub>2</sub> transmitter, and specify the desired product code number from Table 2. See Table 3 for replacement parts and Table 4 for accessories available for the duct mount CO<sub>2</sub> transmitter.

**Table 2: CO<sub>2</sub> 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 3: Replacement Parts for Wall Mount CO<sub>2</sub> Transmitters**

| Product Code Number | Description                         |
|---------------------|-------------------------------------|
| ACC-DWCLIP-0        | Drywall Spring-Clip Mounting Kit    |
| ACC-CD-R            | Relay Output Module for CD-WR0-00-0 |

**Table 4: Accessories for Wall Mount CO<sub>2</sub> 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 and CD-WRD-00-0                  |
| Y65T31-0            | Multiple Primary Transformer, 40 VA, 102/208/240 V Primary 24 V Class 2 Secondary with Screw Terminals, Foot Mounting or 4 x 4 in. (101.6 x 101.6 mm) Plate |

## Technical Specifications

### *CD-Wxx-00-0 Wall Mount CO<sub>2</sub> Transmitter (Part 1 of 2)*

|                                                  |                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Measuring Range                                  | 0 to 2,000 ppm CO <sub>2</sub>                                                                                                                                                                                                                                                                                   |
| CO <sub>2</sub> Accuracy at 77°F (25°C)          | ±(40 ppm CO <sub>2</sub> + 2.0% of reading) (includes manufacturing deviation and drift). All accuracy specifications reflect the testing of transmitters using high-grade, certified gases. Transmitters are intended for an altitude range of 0 to 2,000 ft (0 to 600 m) above sea level without compensation. |
| CO <sub>2</sub> Non-Linearity                    | <1.0% of Full Scale (FS)                                                                                                                                                                                                                                                                                         |
| Temperature Dependence of CO <sub>2</sub> Output | <0.083% of Full Scale/°F (<0.15% of Full Scale/°C)                                                                                                                                                                                                                                                               |
| Long-Term CO <sub>2</sub> Stability              | ±5% of Full Scale/5 Years                                                                                                                                                                                                                                                                                        |
| CO <sub>2</sub> 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)                                                                                                                                                                                                                                                                                      |
| Transmitter Output Signals CO <sub>2</sub>       | Jumper Selectable: 0 to 20 mA and 4 to 20 mA or 0 to 10 VDC (Default)<br>Maximum Output Current: 25 mA; Maximum Output Voltage: 12.5 V                                                                                                                                                                           |
| Relay Contact Ratings (Optional)                 | 30 V, 0.5 A Class 2                                                                                                                                                                                                                                                                                              |
| Analog Temperature Module (Optional)             | Linear 0 to 10 VDC for 32 to 122°F (0 to 50°C)                                                                                                                                                                                                                                                                   |

## CD-Wxx-00-0 Wall Mount CO<sub>2</sub> Transmitter (Part 2 of 2)

|                                                                                                            |                      |                                                                                                                                                                               |
|------------------------------------------------------------------------------------------------------------|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Resolution of CO<sub>2</sub> Display</b>                                                                |                      | 10 ppm                                                                                                                                                                        |
| <b>Recommended External Load (CO<sub>2</sub>)</b>                                                          |                      | Current Output: Maximum 500 ohm Load Resistance<br>Voltage Output: Minimum 1,000 ohm Load Resistance                                                                          |
| <b>Power Supply Range</b>                                                                                  |                      | 20 to 30 VAC (18 to 30 VDC), Class 2                                                                                                                                          |
| <b>Power Consumption</b>                                                                                   |                      | <2.5 W Average, 4.1 VA                                                                                                                                                        |
| <b>Warm-Up Time</b>                                                                                        |                      | 1 Minute, 15 Minutes for Full for CO <sub>2</sub> Specification, 30 Minutes for Temperature Measurement                                                                       |
| <b>Dimensions (H x W x D)</b>                                                                              |                      | 3-5/32 x 4-9/32 x 1-3/8 in. (80 x 108.5 x 35 mm)                                                                                                                              |
| <b>Shipping Weight</b>                                                                                     |                      | 3.5 oz. (100 g)                                                                                                                                                               |
| <b>Compliance</b><br><br> | <b>United States</b> | UL Listed, File E27734, CCN XAPX                                                                                                                                              |
|                                                                                                            |                      | FCC Compliant to CFR47, Part 15, Subpart B, Class A                                                                                                                           |
|                                                                                                            | <b>Canada</b>        | UL Listed, File E27734, CCN XAPX7                                                                                                                                             |
|                                                                                                            |                      | Industry Canada Compliant, ICES-003                                                                                                                                           |
|                                                                                                            | <b>Europe</b>        | 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.

### United States Emissions Compliance

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.

### Canadian Emissions Compliance

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.



### Building Efficiency

507 E. Michigan Street, Milwaukee, WI 53202

Metasys® and Johnson Controls® are registered trademarks of Johnson Controls, Inc.  
All other marks herein are the marks of their respective owners. © 2011 Johnson Controls, Inc.