CD-Px000

Duct mount CO_2 and temperature transmitter

Product Bulletin

Carbon dioxide gas (CO_2) is a component of the earth's atmosphere. Although carbon dioxide is invisible and odorless, an increased CO_2 content in the indoor air leads to fatigue and reduced concentration for humans.

In rooms with high occupancy, such as conference rooms and theatres, the negative effects on humans becomes all the more evident.

The CD-P series duct mount transmitters are designed for the measurement of Carbon Dioxide (CO_2) and Temperature in Heating Ventilating and Air Conditioning applications where Demand Control Ventilation (DCV), fresh air and indoor Air Quality (IAQ), and rooftop air handling economizer control systems are often required.

The CD-Px000 sensors incorporate the a dual wavelength NDIR CO_2 sensor, which compensates for ageing effects, is highly insensitive to pollution and offers outstanding long term stability.

The CD-P1000 Transmitter is available with CO_2 output only, 0-10 V or 4-20 mA while the CD-P2000 range offers CO_2 and Temperature measurement with active or passive outputs.

A multiple point CO_2 and Temperature factory adjustment procedure leads to excellent CO_2 measurement accuracy over the entire temperature working range.

Features

- **Support demand control ventilation**
  Offer potential for 10 to 70% energy savings
- **Single beam dual wavelength NDIR CO_2 sensor**
  Highly insensitive to pollution and outstanding long term stability
- **Range includes CO_2 + temperature outputs**
  Reduce installation time and cost
- **0…10 V or passive temperature output**
  Suitable for a wider range of applications
- **Factory calibration certificate**
  Test report according to DIN EN10204 - 2.2 included

Johnson Controls

Product overview

This transmitter uses NDIR CO_2 sensing technology operates in accordance with the single-beam, dual-wavelength method. The temperature calibrated sensor has unique reference measurement capabilities, offering excellent stability over both time and temperature.

The transmitter is factory set to measure CO_2 levels up to 2,000 (ppm). It requires a 24 VAC or 15 / 30 VDC power source and generates an output signal proportional to the CO_2 level detected.

The duct mounted CO_2 transmitter series offers:

- CO_2 transmitter with 0...10 V or 4…20 mA output field selectable
- CO_2 transmitter with 0...10 V or 4…20 mA output field selectable and Temperature output 0…10V
- CO_2 transmitter with 0...10 V or 4…20 mA output and Passive Temperature output Pt1000 or NCT10K

CD-Px000 can operate in support of Demand Control Ventilation (DCV), with fresh air and Indoor Air Quality (IAQ) systems, with rooftop air handling Economizer controls systems, in Standalone applications or as part of any integrated Building Automation strategy.

Using the CO_2 transmitter results in considerable savings in installation, operation, and maintenance costs with no recalibration expenses. Johnson Controls CO_2 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

CO_2 concentrations guide

~ 40,000 ppm	Exhaled human breath (20L CO_2/h / 0.7ft3/h)
~ 5,000 ppm	Limit of CO_2 concentration at the workplace
> 1,000 ppm	Fatigue and reduced concentration
~ 1,000 ppm	Recommended max. CO_2 level in indoor air
~ 400 ppm	Outdoor air

Installation

The installation of electrical wiring must conform to local codes and should be carried out by authorized personnel only. Users should ensure that all Johnson Controls products are used safely and without risk to health or property.

IMPORTANT

The CD-Px000 CO_2 and temperature sensors are intended to provide input to equipment under normal operating conditions. Where failure or malfunction of a CD-Px000 sensors 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 CD-Px000 sensors must be incorporated into and maintained as part of the control system.

Operation principle

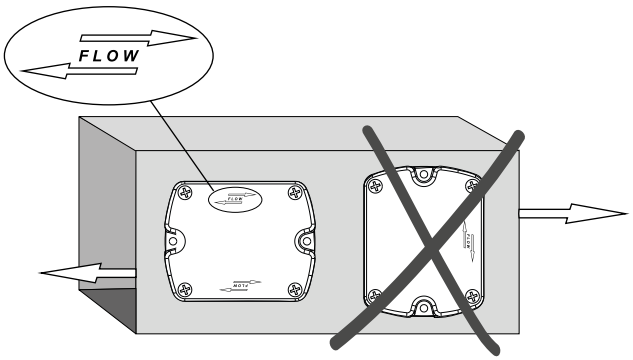
The CO_2 Sensing Cell is located in the sensor housing while the temperature sensor is located inside the probe.

Installed into a duct, a small amount of air will flow through the divided probe into the transmitter housing, where the CO_2 sensing cell is located, and back into the duct.

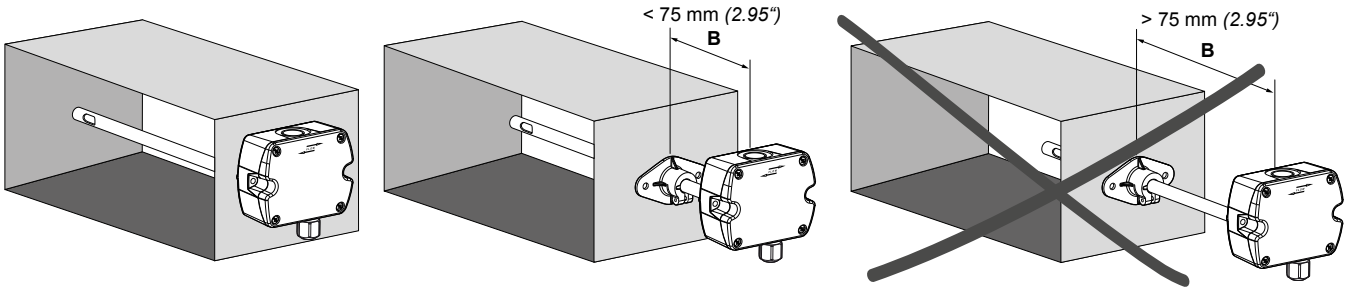
For accurate measurement the cover of the transmitter as well as the cable outlet – cable gland or conduit adapter - must be tightly closed.

This is essential for avoiding ingress of air other than from the duct into the CD-Px000 enclosure, which would falsify the measurement.

The direction of the air flow in the duct shall correspond to the direction indicated with arrows on the cover of the transmitter. Sensor is not considering from which direction the airflow is coming, left or right does not matter.



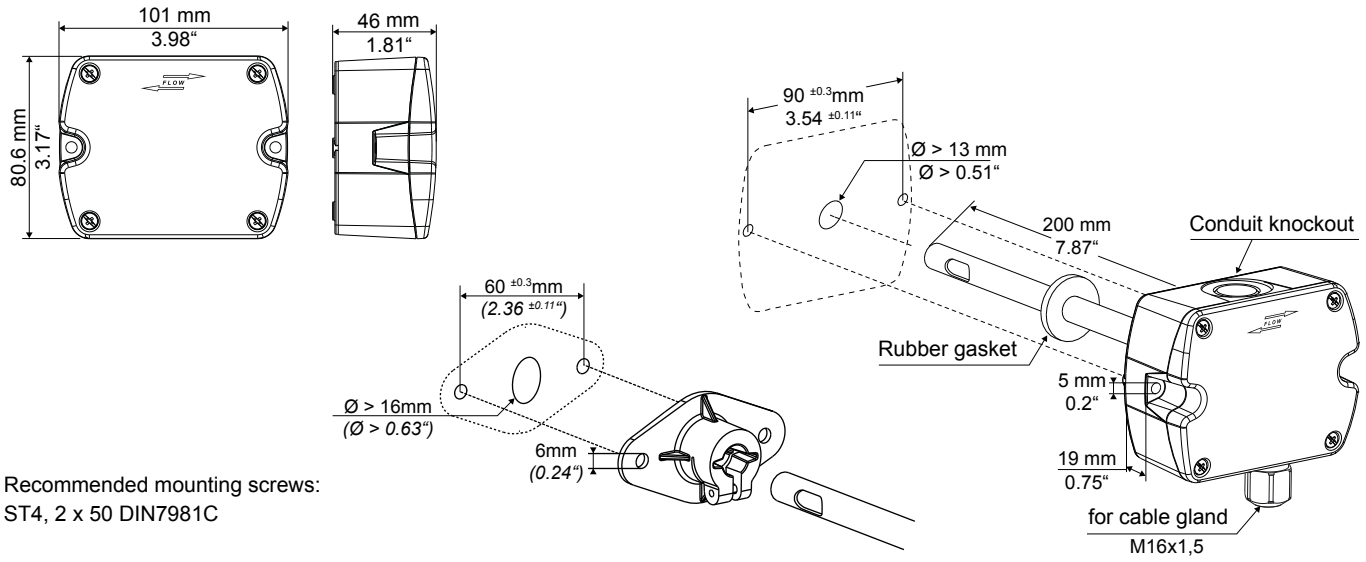
Air flow direction and sensor positioning



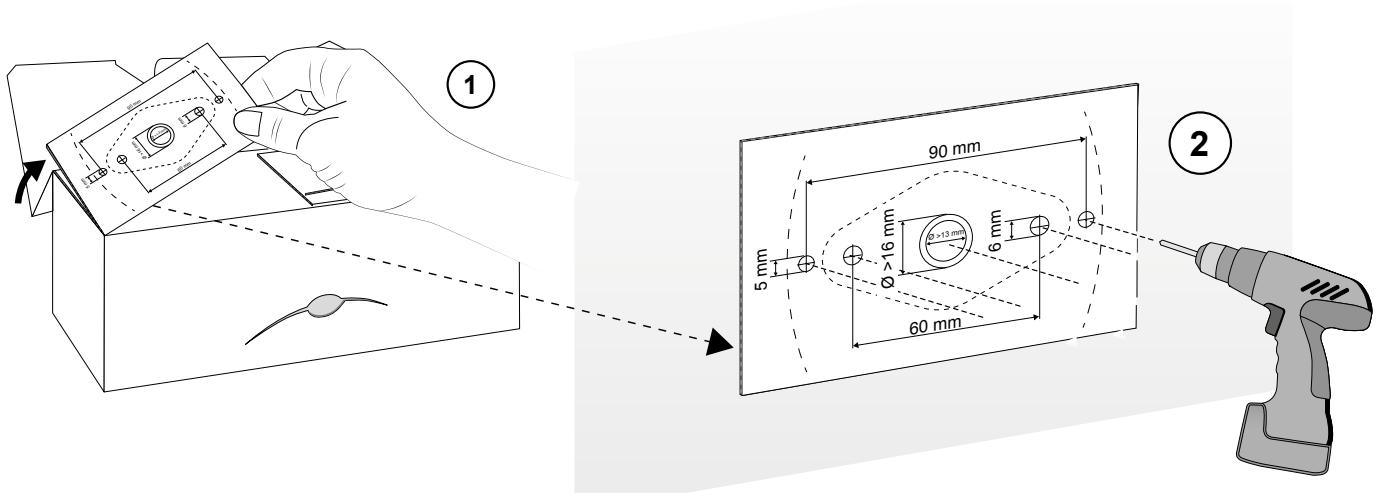
Installation examples

Mounting

The compact design of the device requires only a small hole in the ventilation duct, gasket and other mounting accessories are included in the sensor box for an easy installation.



Recommended mounting screws:
ST4, 2 x 50 DIN7981C



Accessories

Each sensor is delivered with:

- Installation guide and Calibration Test report certificate
- Duct Flange completed with gasket, diameter 37 mm
- Rubber Gasket for direct mounting, diameter 30 mm
- 2 screws ST 4,2x50 DIN7981C
- M16x1,5 Cable gland
- Drilling Pattern printed on the box

Calibration certificate

Each sensor is delivered with a calibration certificate which certifies that the product is manufactured in compliance with the latest technical standards.

All used materials and components have passed the quality assurance system. Manufacturing, calibration and quality testing are performed according to the Quality Assurance System.

The products are calibrated against factory standards traceable to international standards units administrated by the national metrology institutes like NIST, PTB, NBL, BEV or other recognized national standard laboratories.

For engineering samples and repair parts extent of certification is restricted to test result only.

Johnson Controls

WERKSZEUGNIS NACH DIN EN 10204 - 2.2
TEST REPORT ACCORDING TO DIN EN 10204 - 2.2
RELEVÉ DE CONTRÔLE SELON DIN EN 10204 - 2.2

Zertifikat Nr. / Certificate No / Certificat N°.: C78084075

Gegenstand / Object / Objet: CD-P2010-00-00

Type / Model / Modèle: CO2/temperature transmitter

Serien Nummer / Serial Number / Numéro de série: 164013001386A1

Hiermit bestätigen wir, dass die angeführten Erzeugnisse unter Verwendung einwandfreier Werkstoffe nach dem Stand der Technik gefertigt wurden. Ausführung und Anzeigegenauigkeit wurden im Rahmen der Qualitätssicherungsmaßnahmen des Herstellers überwacht und sind rückführbar auf internationale Standards des Bundesamtes für Eich- und Vermessungswesen (BEV) Österreich.
Bei Entwicklungsmustern und Reparaturteilen bezieht sich die Bescheinigung ausschließlich auf das Prüfergebnis.

We herewith certify that above listed products are manufactured in compliance with the latest technical standards. All used materials and components have passed the quality assurance system.
Manufacturing, calibration and quality testing are performed according to the Quality Assurance System oft the manufacturer and traceable to the international standards of the "Bundesamt für Eich- und Vermessungswesen" (BEV) Austria.
For engineering samples and repair parts extent of certification is restricted to test results only.

Nous certifions par la présente que les produits ci-dessus mentionnés sont fabriqués selon les règles de l'art avec l'utilisation de matériaux de qualité. La fabrication, la calibration et le contrôle qualité des produits sont réalisés conformément au système d'assurance qualité du fabricant dont la traçabilité est rattachée au "Bundesamt für Eich- und Vermessungswesen"(BEV) Autriche.
Pour les échantillons ou prototypes et les pièces de réparation, la validité du certificat est restreinte aux seuls résultats de tests.

Rückführbare Standards / Traceable Standards / Etalons raccordés

CO2 Referenz / CO2 reference / CO2 de référence	Test gas CL.1 DIN EN ISO 6141

Prüfergebnis / Test result / Résultat de mesure

	0ppm	1000ppm
Justiert / Adjusted / Ajusté	✓	✓

Die angeführten Daten sind gültig, unter den angegebenen Bedingungen, zum Zeitpunkt der Messung und nehmen Bezug auf die angegebenen Standards und verwendeten Messeinrichtungen.

The calibrated values are valid under above conditions only at the time of measurement and are referenced to marked reference and working standards.

Les valeurs de calibration sont valides selon les conditions spécifiées ci-dessus au moment de la mesure et font référence aux spécifications et aux systèmes de mesure utilisés.

Ort, Datum / Place, Date / Lieu, date: Engerwitzdorf 07.10.2016

Techniker / Technician / Technicien

Geprüft / Supervised / Vérification

Wiring

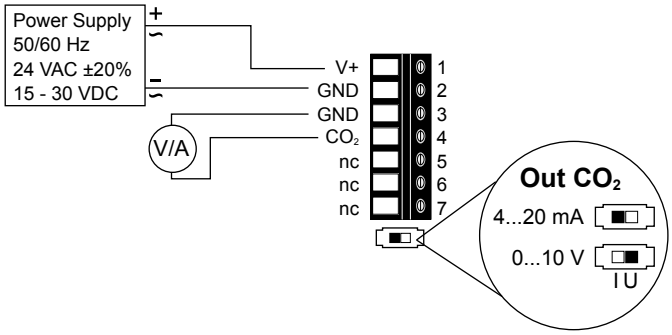
For wiring follow the instructions below:

- All wiring must be in accordance with local regulations and national rules.
- Do not attempt field repairs. If the transmitter is not operating properly, even though it is wired correctly, it should be replaced.

CD-P1000 model

CO_2 transmitter without temperature element

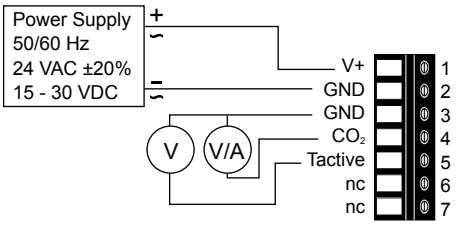
CD-P1000-00-00



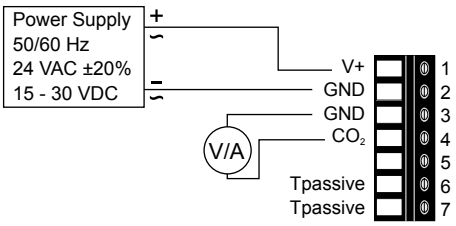
CD-P2000 models

CO_2 temperature transmitter with active or passive temperature element

CD-P2010-00-00



CD-P2016-00-00 / CD-P2017-00-00



Note:

- Wire Cu
- Wire size 14-18 AWG (2,0 – 0,8 mm²)
- Torque 0,8 Nm or 7 Lb/in.

Ordering codes

Codes	Description
CD-P1000-00-00	Duct CO_2 0/2000 PPM, output 0...10 V or 4...20 mA selectable
CD-P2010-00-00	Duct CO_2 0/2000 PPM, output 0...10 V or 4...20 mA selectable + Temperature 0...10 V @ 0...50 °C
CD-P2016-00-00	Duct CO_2 0/2000 PPM, output 0...10 V or 4...20 mA selectable + passive Pt1000
CD-P2017-00-00	Duct CO_2 0/2000 PPM, output 0...10 V or 4...20 mA selectable + passive NTC10K

Technical specification

Supply voltage	24 VAC ±20 % or 15-30 VDC
Current Consumption Analogue	Typ. 15 mA + Analog Output current; peak 0.3 A for 0.3 s
Housing (polycarbonate)	EU Version: UL94-0 approved
Protection class	Enclosure IP65/Nema 4; Probe IP20
Electrical connection	Screw terminals max. 2.5 mm² (AWG14)
Electromagnetic compatibility	EN61326-1 EN61326-2-3 FCC Part 15 ICES-003 ClassB
Operating / Storage / Ranges	0...95 % RH (non condensing) / -20...60 °C (-4...140 °F)
Measuring CO_2	
Measurement principle	Dual Wavelength Non-Dispersive Infrared Technology (NDIR)
Working range	0...2000 ppm
Accuracy at 25 °C (77 °F) and 1013 mbar	< ± (50 ppm + 2% of measuring value)
Response time T_{63}	< 100s at 3m/s (590 ft/min) air speed
Temperature dependency	typ. + (1 + CO_2 PPM concentration /1000) PPM /°C [-20...45 °C]
Measuring temperature	
Active output range	0…10 V at 0…50 °C
Accuracy at 20 °C (68 °F)	±0.3 °C (±0.54 °F)
Pt1000 accuracy	EN60751 Class A, ±(0.15 + 0.002* | T °C |)
NTC10K accurancy	NTC 10k 1% B3950
CE Compliance	Johnson Controls declares that these products are in compliance with the essential requirements and other relevant provisions of the EMC Directive.
c UL us LISTED Under inspection ***United States***	UL Listed, CCN PAZX, Under UL 916, Energy Management Equipment
Canada	UL Listed, CCN PAZX7, Under CAN/CSA C22.2 No. 205, Signal Equipment

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