

# CO<sub>2</sub> TRANSMITTERS



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+44 (0) 191 490 1547  
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## TRANSMITTERS TO DETECT CARBON DIOXIDE (CO<sub>2</sub>)



- Measure carbon dioxide (CO<sub>2</sub>), carbon monoxide (CO) and temperature (T)
- Infrared measurement technology (NDIR)
- Automatic calibration eliminates maintenance requirements
- CO<sub>2</sub> Measurement ranges from 0...40,000 ppm (0...4 %vol)
- Suitable for Commercial and Industrial applications where good indoor air quality is critical
- Analog output signals
- Available with relays, display and alarms
- Power supply 24 VDC/AC
- Range of application 0...50 °C (30...120 °F) / 0...95 %RH



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## BE PRECISE: ADVANTAGES AT A GLANCE

Carbon dioxide (CO<sub>2</sub>) is a colorless and odorless gas that can only be detected with a measuring instrument and which is dangerous and can be fatal for humans and animals in high concentrations. CO<sub>2</sub> transmitters enable air monitoring in commercial and residential buildings, underground garages and tunnels, hospitals, greenhouses, transportation and storage areas.

## CF5, CO<sub>2</sub> AND TEMPERATURE TRANSMITTERS

### Applications

For ventilation control in residential properties, offices, classrooms, cinemas, hospitals, etc.

### Features

- Measurement range CO<sub>2</sub>: 0...3,000 ppm / temperature: 0...50 °C / 30...120 °F
- Measurement technique: infrared (NDIR) with automatic calibration
- Accuracy: ±30 ppm
- Power supply: 16...29 VDC/AC
- Output 1 (0...2,000 ppm): 0/2...10 VDC or 0/4...20 mA
- Output 2 (0...50 °C): 0/2...10 VDC or 0/4...20 mA
- Range of application: 0...50 °C (30...120 °F) / 0...95 %RH
- Maintenance: not necessary
- Lifetime: >15 years



CF5-W-Disp

### Order code

CF5-W  
CF5-W-Disp\*

### Description

Installed in the environment to be monitored

Dimensions: 120 x 82 x 30 mm  
Enclosure protection: IP30

CF5-D

CF5-D-Disp\*

Duct mount design for insertion into ducts and vents

Dimensions: 142 x 84 x 46 mm / Probe 245 x 22 x 15 mm  
Enclosure protection: IP65

\*includes LCD display



CF5-D-Disp



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## CF3, CO<sub>2</sub> TRANSMITTERS

### Applications

For ventilation control in residential properties, offices, classrooms, cinemas, public rooms, etc.

### Features

- Measurement range: 0...2,000 ppm
- Measurement technique: infrared (NDIR) with automatic calibration
- Accuracy: ±30 ppm
- Power supply: 16...29 VDC/AC
- Output 1 (0...2,000 ppm): 0...10 VDC
- Output 2 (0...2,000 ppm): 4...20 mA (no output 2 in CF3-W-EU(US)-Disp-FLI)
- Range of application: 0...50 °C (30...120 °F) / 0...95 %RH
- Maintenance: not necessary
- Lifetime: >15 years

| Order code         | Description                                                                                                                                                                                                                                                                                                           |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CF3-W-EU           | Installed in the enthronement to be monitored and fits directly on standard EU surface-mounted boxes                                                                                                                                                                                                                  |
| CF3-W-EU-Disp*     | Dimensions: 100 x 80 x 28 mm<br>Enclosure protection: IP30                                                                                                                                                                                                                                                            |
| CF3-W-US           | Installed in the enthronement to be monitored and fits directly on standard US surface-mounted boxes                                                                                                                                                                                                                  |
| CF3-W-US-Disp*     | Dimensions: 130 x 85 x 30 mm<br>Enclosure protection: IP30                                                                                                                                                                                                                                                            |
| CF3-D              | Duct mount design for insertion into ducts and vents                                                                                                                                                                                                                                                                  |
| CF3-D-Disp*        | Dimensions: 142 x 84 x 46 mm / Probe 245 x 22 x 15 mm<br>Enclosure protection: IP65                                                                                                                                                                                                                                   |
| CF3-W-EU-Disp-FLI* | Measures the CO <sub>2</sub> concentration in rooms and emits an audible and visual alarm (fresh air indicator) when a value of 1,400 ppm is exceeded. Mute button on the side of the housing. Fits directly on standard EU surface-mounted boxes.<br>Dimensions: 100 x 80 x 28 mm<br>Enclosure protection: IP30      |
| CF3-W-US-Disp-FLI* | Measures the CO <sub>2</sub> concentration in rooms and emits an audible and visual alarm (fresh air indicator) when a value of 1,400 ppm is exceeded. Red mute button on the front of the housing. Fits directly on standard US surface-mounted boxes.<br>Dimensions: 130 x 85 x 30 mm<br>Enclosure protection: IP30 |



CF3-W-EU-Disp



CF3-W-US-Disp



CF3-D-Disp



CF3-W-EU-Disp-FLI



CF3-W-US-Disp-FLI

\*includes LCD display



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## CF8, TRANSMITTERS FOR SPECIAL APPLICATIONS

### Devices

Model AL (Alarm) is equipped with two relays that can be connected to an alarm system. It measures CO<sub>2</sub> in very high concentrations.

Model GH (Greenhouse) is equipped with an extra dust and water filter and is suitable for adverse ambient conditions.

| Applications                      | Ventilation control in underground garages, transport/storage, vehicle terminals, tunnels, etc.                 | Ventilation control in greenhouses and harsh environments                            |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|                                   |                               |  |
| Model                             | AL (Alarm)                                                                                                      | GH (Greenhouse)                                                                      |
| Measurement range CO <sub>2</sub> | 0...4 %vol (0...40,000 ppm)                                                                                     |                                                                                      |
| Accuracy                          | ±200 ppm                                                                                                        |                                                                                      |
| Temperature measurement range     | —                                                                                                               | 0...50 °C (30...120 °F)                                                              |
| Power supply                      | 16...29 VDC/AC                                                                                                  |                                                                                      |
| Output 1 (0...4 %vol)             | 0/2...10 VDC or 0/4...20 mA                                                                                     |                                                                                      |
| Output 2 (0...4 %vol)             | 0/2...10 VDC or 0/4...20 mA                                                                                     | —                                                                                    |
| Output 2 (0...50 °C)              | —                                                                                                               | 0/2...10 VDC or 0/4...20 mA                                                          |
| Output 3 (CO <sub>2</sub> )       | Relay 1: open <1.4 %, closed >1.5 %                                                                             | Relay 1: open <1.9 %, closed >2.0 %                                                  |
| Output 4 (CO <sub>2</sub> )       | Relay 2: open <2.9 %, closed >3.0 %                                                                             | —                                                                                    |
| Dimensions                        | 142 x 84 x 46 mm                                                                                                |                                                                                      |
| Enclosure protection              | IP54                                                                                                            |                                                                                      |
| Range of application              | 0...50 °C (30...120 °F) / 0...95 %RH                                                                            |                                                                                      |
| Communication                     | MODBUS                                                                                                          |                                                                                      |
| Maintenance                       | Is not necessary for normal indoor applications.<br>Certain industrial applications require annual calibration. |                                                                                      |
| Lifetime                          | >15 years                                                                                                       |                                                                                      |
| Order code                        | CF8-W-Disp-AL                                                                                                   | CF8-W-Disp-GH                                                                        |



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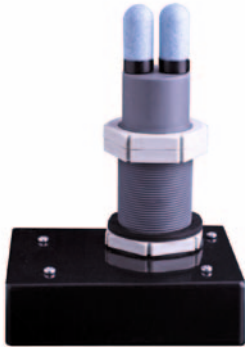
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## CF8, TRANSMITTERS FOR SPECIAL APPLICATIONS

### Devices

Model **CO (Carbon Monoxide)** is suitable for closed rooms in which a combustion process takes place.

Model **IN (Incubator)** is suitable for measurements in incubators or climate chambers.

|                                           |                                                                                                                                                             |                                                                                      |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>Applications</b>                       | Monitoring of carbon monoxide and carbon dioxide in underground garages, tunnels, mines, large halls, with relays for CO <sub>2</sub> and CO alarm systems. | Ventilation control in incubators and environmental chambers                         |
|                                           |                                                                           |  |
| <b>Model</b>                              | <b>CO (Carbon Monoxide)</b>                                                                                                                                 | <b>IN (Incubator)</b>                                                                |
| Measurement range CO <sub>2</sub>         | 0...3,000 ppm                                                                                                                                               | 0...3 %vol (0...30,000 ppm)                                                          |
| Measurement range CO                      | 0...100 ppm                                                                                                                                                 | —                                                                                    |
| Accuracy CO <sub>2</sub>                  | ±30 ppm                                                                                                                                                     | ±200 ppm                                                                             |
| Accuracy CO                               | ±10 ppm                                                                                                                                                     | —                                                                                    |
| Power supply                              | 16...29 VDC/AC                                                                                                                                              |                                                                                      |
| Output 1 (0...100 ppm CO)                 | 0/2...10 VDC or 0/4...20 mA                                                                                                                                 | —                                                                                    |
| Output 1 (0...3 %vol CO <sub>2</sub> )    | —                                                                                                                                                           | 2...10 VDC or 4...20 mA                                                              |
| Output 2 (0...2,000 ppm CO <sub>2</sub> ) | 0/2...10 VDC or 0/4...20 mA                                                                                                                                 | —                                                                                    |
| Output 2 (0...2 %vol CO <sub>2</sub> )    | —                                                                                                                                                           | 0...5 VDC or 0...10 mA                                                               |
| Output 3, relay                           | open >35 ppm (CO) and >1'500 ppm (CO <sub>2</sub> )<br>closed <30 ppm (CO) and <1'400 ppm (CO <sub>2</sub> )                                                | —                                                                                    |
| Dimensions                                | 142 x 84 x 46 mm                                                                                                                                            | Ø 40 x 102 mm                                                                        |
| Enclosure protection                      | IP54                                                                                                                                                        |                                                                                      |
| Range of application                      | 0...50 °C (30...120 °F) / 0...95 %RH                                                                                                                        |                                                                                      |
| Communication                             | MODBUS, RS-485 (optional)                                                                                                                                   | —                                                                                    |
| Maintenance                               | Is not necessary for indoor applications.<br>Industrial applications may require annual calibration.                                                        |                                                                                      |
| Lifetime                                  | >5 years (limited by the CO probe)                                                                                                                          | >15 years                                                                            |
| <b>Order code</b>                         | <b>CF8-W-Disp-CO</b>                                                                                                                                        | <b>CF8-D/W-IN</b>                                                                    |

## THE FUNDAMENTALS OF CO<sub>2</sub>

Carbon dioxide (CO<sub>2</sub>) is a colorless and odorless gas that exists in the earth's atmosphere and which is dangerous in high concentrations. The proportion of CO<sub>2</sub> in natural ambient air is about 0.04 % or 400 ppm. When humans and animals exhale this gas, it is quickly mixed with the ambient air, as well as in rooms that are well ventilated.

A high CO<sub>2</sub> content becomes apparent in humans through rapid fatigue and loss of concentration. The negative effects become noticeable more quickly in small rooms in which there are many people or that are not well ventilated.

Modern climate control systems measure not only parameters such as relative humidity and temperature, but also CO<sub>2</sub> content. The concentration of CO<sub>2</sub> is regarded as an important indicator for the quality of room air.

### Guidelines

| 350 - 450 ppm      | 400 - 1,200 ppm | > 1,000 ppm                                       | 5,000 ppm<br>(0.5 %vol)                                             | 38,000 ppm<br>(3.8 %vol)          | > 100,000 ppm<br>(10 %vol)                        |
|--------------------|-----------------|---------------------------------------------------|---------------------------------------------------------------------|-----------------------------------|---------------------------------------------------|
| Fresh air outdoors | Room air        | Fatigue and loss of concentration become apparent | Maximum permissible value at the workplace during an 8-hour workday | Breathing air (direct exhalation) | Nausea, vomiting, loss of consciousness and death |

### Measurement technique

The measurement technique is based on non-dispersive infrared (NDIR) technology.

### Calibration

All sensors are calibrated they have a lifetime of more than 15 years in normal indoor applications.

The automatic baseline correction means the sensors require no further calibration.



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