



**Features**

- CO<sub>2</sub> range 0-2000 ppm or 0-5000 ppm, jumper selectable
- Accuracy ± 30 ppm ± 3% of measured value
- Output 0-10 Vdc or 4-20 mA, jumper selectable
- Change over contact
- Optical NDIR sensor (non-dispersive Infra-red technology)
- Automatic calibration
- Including duct mounting flange
- IP65 enclosure with quick locking screws
- CDK 24 is with out display and CDK 24D is with display



**Description**

The duct carbon dioxide (CO<sub>2</sub>) transmitter CDK 24-series is a maintenance-free, micro-processor-controlled unit designed for duct installation and is used to detect the CO<sub>2</sub> content of the air.

The CO<sub>2</sub> measuring range for carbon dioxide (CO<sub>2</sub>) transmitter CDK 24 is 0-2000 ppm or 0-5000 ppm converted to standard signals 0-10 Vdc or 4-20 mA.

The duct carbon dioxide (CO<sub>2</sub>) transmitter CDK 24-series also have a change over contact.

The CO<sub>2</sub> content of the air is measured using an optical NDIR sensor (non-dispersive infra-red technology).

The duct carbon dioxide (CO<sub>2</sub>) transmitter CDK 24-series have automatic calibration of the carbon dioxide measurement – ABC logic (default).

The detection range of the duct CO<sub>2</sub> sensor is calibrated for standard applications such as monitoring residential rooms and conference rooms.

Room ventilation on and as-needed basis, improved well-being and customer benefit, increased comfort as well as reduced operating costs through energy conservation are just some of the benefits of employing duct CO<sub>2</sub> sensors.



**Ordering**

Type no.	Description
CDK 24	Duct CO <sub>2</sub> transmitter 0-10 Vdc or 4-20 mA, 0-2000 ppm or 0-5000 ppm, change over contact
CDK 24D	same as CDK 24 and with Display

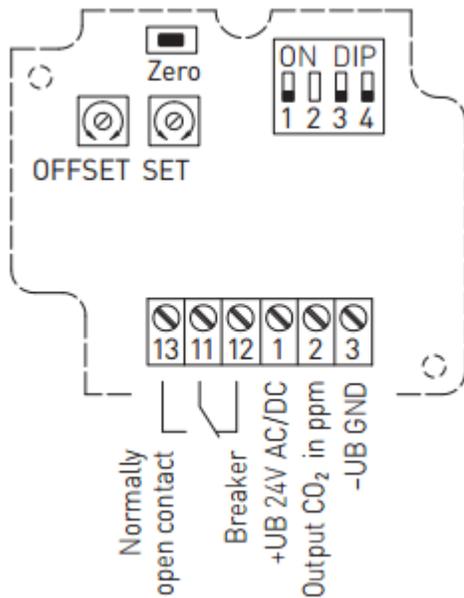
## Technical data

Voltage supply	24 Vac/dc (+/-10%)
Power consumption	< 1.5W / 24 Vdc typical < 2.9 VA / 24 Vac typical Peak current 200 mA
Sensor	optical NDIR sensor (non-dispersive infra-red technology) with automatic calibration
Measuring range	0-2000 ppm or 0-5000 ppm, jumper selectable
Output	0-10 Vdc or 4-20 mA, jumper selectable
Measuring Accuracy	± 30 ppm ± 3% of measured at 25°C
Temperature dependence	± 5 ppm / °C ± 5% of measured value / °C (which ever is higher)
Pressure dependence	±0.13% / mm Hg
Long-term stability	< 2 % in 15 years
Gas exchange	by diffusion
Warm up time	approx. 1 hour
Ambient Temperature	-10 to +60 °C
Response time	approx. 1 minute
Electrical connection	0.14 - 1.5 mm <sup>2</sup> , via screw terminals
Enclosure	plastic, material polyamide, 30 % glass-globe-reinforced, with quick-locking screws (slotted/Phillips head combination), colour traffic white (similar to RAL 9016)
Dimensions	72 x 64 x 37.8 mm
Cable gland	M 16 x 1.5; including strain relief, exchangeable
Protective tube material	polyamide (PA6), Ø 20 mm, NL = 202.5 mm, with torsion protection
Process Connection	via flange made of plastic (included in scope of delivery)
Protection class	III (according to EN 60 730)
Protection type	IP 65 (according to EN 60 529) enclosure only!
Standards	CE conformity, electromagnetic compatibility according to EN 61 326, EMC Directive 2004/108/EC

**Connection diagram**

- 1 UB+ 24V AC/DC
- 2 Output CO<sub>2</sub> 0-10V/4...20mA
- 3 UB- GND
  
- 12 Breaker changeover
- 11 Normally 24V/1A
- 13 open contact

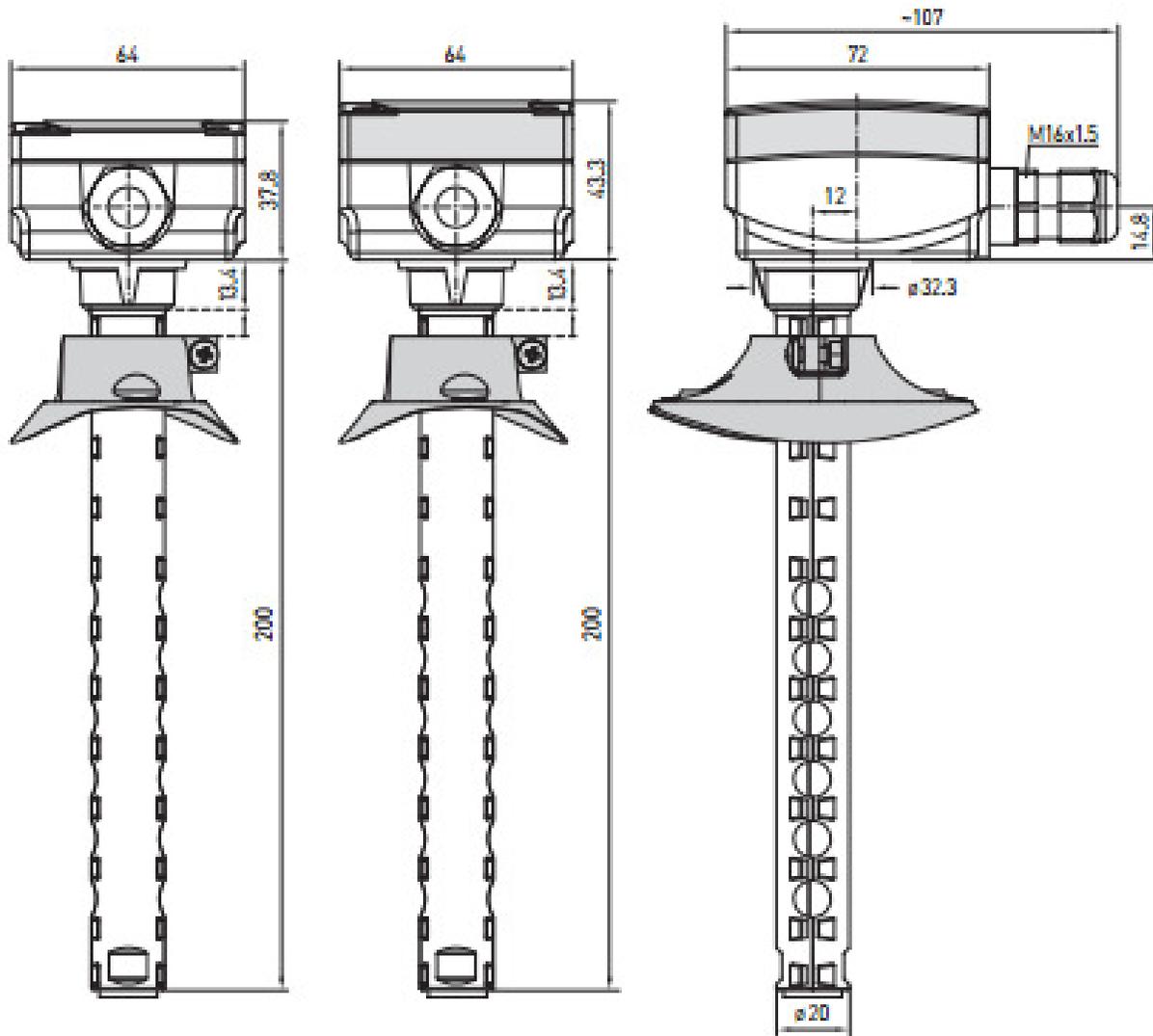
**Schematic diagram**



**DIP switches**

<b>CO<sub>2</sub> content</b>	<b>DIP 1</b>
0...2000 ppm (default)	OFF
0...5000 ppm	ON
<b>CO<sub>2</sub> - automatic zero point</b>	<b>DIP 3</b>
deactivated	OFF
activated (default)	ON
<b>Output</b>	<b>DIP 4</b>
Voltage 0-10V (default)	OFF
Current 4...20mA	ON
<b>Note: DIP 2 is not assigned!</b>	

**Dimensions**





## Mounting and Installation

### ATTENTION!

The minimum CO<sub>2</sub> concentration of outdoor air amounts to approx. 350 ppm (output voltage = 1.75 V at MR = 2000 ppm or 0.7 V at MR = 5000 ppm) in leafy, hardly industrialized areas.

Gas inter-exchange in the sensor element happens by diffusion. Depending on changes in the concentration and flow velocity of the air surrounding the sensor, the reaction of the device to changes in CO<sub>2</sub> concentration may appear with a delay.

It is absolutely necessary to choose the device mounting position to ensure that the air stream “presses” into the duct tube.

Otherwise, below-atmospheric pressure will develop in the duct tube that may cause a substantial deceleration of gas exchange or even prevent it.

### Automatic calibration of the carbon dioxide measurement – ABC logic (default)

The automatic background logic is a self-calibrating mechanism that is suitable for use in applications in which the CO<sub>2</sub> concentration regularly drops to fresh air level (350 - 400 ppm).

This should typically happen at times during which the rooms are unoccupied.

The sensor reaches its normal accuracy after 24 hours of continuous operation in an environment which has been exposed to a fresh air supply of 400 ppm CO<sub>2</sub>.

The deviation error remains minimal with at least 4 cases of sensor exposure to fresh air within 21 days.

The ABC logic requires continuous operating cycles of longer than 24 hours in order to function properly.

### Manual calibration of carbon dioxide measurement

Manual calibration can be carried out regardless of the position of the DIP switch (ABC logic).

Before and during the calibration process, sufficient fresh air (CO<sub>2</sub> content = 500 ppm) must be provided.

The calibration process is started by pressing the “ZERO” button (approx. 5 seconds). This is signaled by the flashing LED or the countdown timer on the display (AUTO 0).

The calibration follows. During this phase, the LED is constantly active and a 600-second countdown runs on the display CAL 0. The LED is deactivated after successful calibration.



### Putting in operation

After switching on the device, a self-test and tempering period follows. This procedure takes 30-50 minutes depending on ambient conditions. Afterwards, it is mandatory to run the manual calibration procedure. Thereafter the ABC logic may be activated.

### Switch point configuration

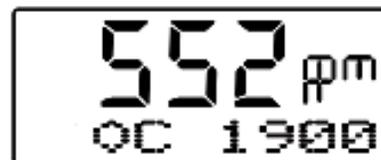
The SET potentiometer can be used to select a switch point between 10 % and 95 % of the measuring range. The 10 % is added to the fresh air limit of 400 ppm. A potential-free changeover contact is available as a switching output.

### Offset

Subsequent adjustment of the CO<sub>2</sub> measured value can be carried out using the offset potentiometer. The adjustment range is ± 10 % of the measuring range.

### Display

The first line shows the CO<sub>2</sub> measured value in ppm. In the second line, the switching status of the relay is shown on the left as a circuit (full ● = relay energized; empty ○ = relay de-energized) followed by the indicator (C for CO<sub>2</sub>) and the switch point value is shown on the right.



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