

RLQ-CO2

Room air quality and CO₂ sensor



Summary

The microprocessor-controlled RLQ-CO2 sensor with autocalibration is used to detect the air quality regarding VOC. The CO₂ content in the air is determined by a two-ray NDIR sensor (non-dispersive infrared technology) in the range of 0...2000 ppm, 0...5000 ppm or 0...10000 ppm. The output signal is proportional, 0...10 V DC.

Applications

- Quantitative assesment of air pollution in rooms with contaminating gases (cigarette smoke, body odour, exhaled breathing air, emission from detergents and building materials).
- For demand-based ventilation controls in those rooms.

Functions

To measure the CO₂ concentration, a non-dispersive infrared (NDIR) sensor is used.

Room air quality is to be understood as subjective air quality felt by human beings with their olfactory organs. As perception varies from person to person, no general definition of air quality is available. The air quality sensor does not trace concentration of any individual gas; it assesses the mixed gas and thus it is not possible to specify gas concentrations in the ppm units. A broadband VOC (volatile organic compounds) sensor is used to provide as universal value as possible.

Detectable gases: Mixed gas, vapours of alkanoles, automobile exhaust gases, exhaled breathing air, combustion smoke (from wood, paper, plastics). The sensor can be reset by means of zero point and final value potentiometers.

Technical data

Power supply	24 V AC/DC
Sensor CO₂	NIDR (non-dispersive infrared technology)
Measuring range	0...2000 ppm, 0...5000 ppm, 0...10000 ppm CO ₂
Output signal	0...10V DC (0V = 0 ppm, 10V = 2000 / 5000 / 10000 ppm) or with potential-free changeover contact (24 V)
Ambient temperature	0...50°C
Measuring accuracy	+/- 70 ppm + 5 % of measured value

Temperature dependence	< 5 ppm/K (referred to 20 °C)
Prepressure dependence	+/- 1.6 % measured value /kPa (referred to standard pressure)
Long-term stability	+/- 1 % of final value per year
Gas exchange	by diffusion
Air quality sensor	VOC (metal oxide)
Output signal	0...10 V DC (0 V – clean air, 10 V – polluted air) or with potential-free changeover contact (24 V)
Measuring accuracy	+/- 20 % of final value (referred to calibrating gas)
Warm-up period	> 60 months (under normal load conditions)
General	
Enclosure	ABS, pure white colour, similar RAL9010 optional stainless steel enclosure
Protection type	IP30 (according to EN 60529)
Protection class	III (according to EN 60730)
Installation	wall mounting or in-wall flush box Ø 55 mm, base with 4-hole for mounting
Terminals	screw terminals for wires 0,14 – 1,5 mm ²
Optional	display, 36 x 14 mm
Dimensions	see below

Terminals

RLQ – CO₂

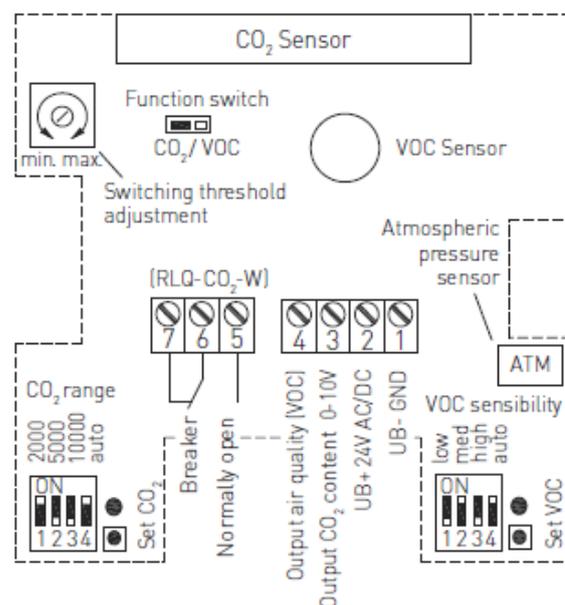
- 1 UB- GND
- 2 UB+ supply voltage 24 V AC / DC
- 3 Output 0-10 V CO₂ – content in ppm
- 4 Output 0-10 V air quality (VOC)

Terminal 1 is also the reference potential for the output signals. The sensor must not be used for safety purposes

only for RLQ – CO₂ – W

- 5 Normally open
- 6 Common terminal
- 7 Normally closed

Terminals 5 and 6 close and 6 and 7 open when the sensor reads above its setpoint value. The function switch selects which value (CO₂ or VOC) is used to control the relay.



Calibration CO₂

Manual calibration

Manual CO₂ calibration: It is executed by pressing a button inside of the sensor for at least 5 s. Before the button is pressed, it is necessary to expose the sensor to fresh air for at least 10 minutes. The LED starts flashing. At the calibration time, the output signal is set to 1.75 V, which corresponds to 350 ppm CO₂. At this stage the LED lights continuously. After successful calibration, the LED goes off.

Automatic calibration (default)

The automatic calibration follows approximately each 7 days. For its correct execution, it is necessary that the sensor is exposed to fresh air (300...400 ppm CO₂) at least 10 minutes each 7 days. The sensor registers the minimum measured value and after 7 days assigns to this value the CO₂ concentration of 350 ppm. This also affects the output signal. Maximum correction is limited to 100 ppm per a 7-day interval.

Calibration VOC

Manual calibration

Manual calibration can be started independently from the position of the DIP4 switch by pushing the button. After connecting the device, a period of at least 2 hours of continuous operation of the device at "normal" air quality is to be ensured. Manual calibration of the output signal to 1 V (zero-point) is started by pressing the button "Manual calibration" (for ca. 5 seconds). Preparing for calibration is indicated by a blinking LED. Setting the output to 1 V at actual ambient conditions follows automatically thereafter. During this phase, the LED is permanently activated. After calibration is completed, the LED is deactivated.

Automatic calibration (default)

The minimum initial value for air quality is memorized within a period of ca. 4 weeks. After that period has lapsed, the output signal is standardised to zero-point (1.0 V). The maximum amount of correction is thereby limited to 1 V / interval. In this way, long-term drifts and operational aging effects of the sensor element are completely eliminated.

Jumpers

VOC (sensitivity adjustable)	DIP 1	DIP 2	DIP 3
VOC LOW	ON	OFF	OFF
VOC MEDIUM (default)	OFF	ON	OFF
VOC HIGH	OFF	OFF	ON
VOC Calibration mode			DIP 4
Automatic self-calibration			ON
Manual calibration			OFF

CO ₂ content (measuring range selectable)	DIP 1	DIP 2	DIP 3
0...2000 ppm (default)	ON	OFF	OFF
0...5000 ppm	OFF	ON	OFF
0...10000 ppm	OFF	OFF	ON
CO ₂ calibration mode			DIP 4
Automatic self-calibration			ON
Manual calibration			OFF

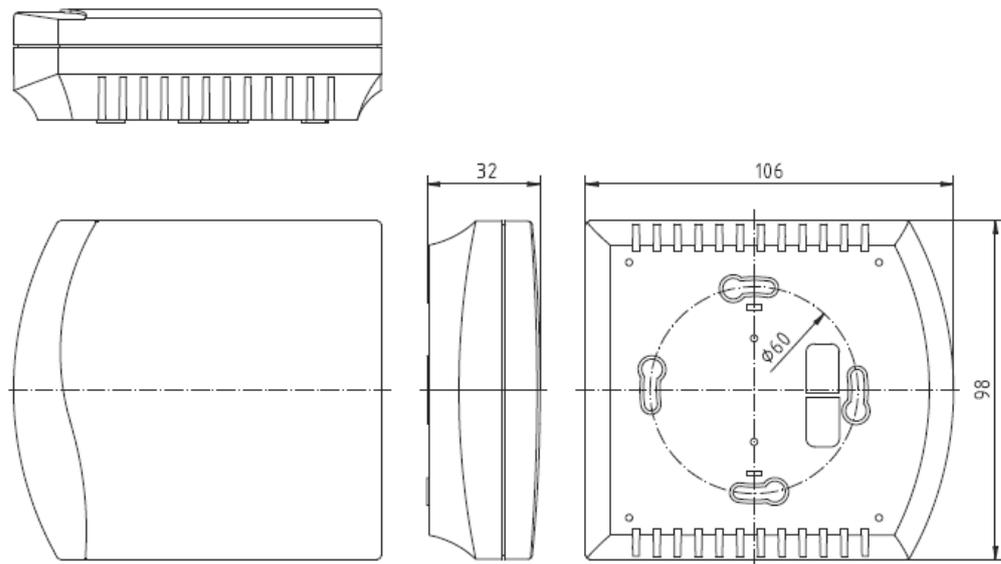
Types

Type	Measuring range VOC	Measuring range CO ₂ (switchable)	Output	Features
RLQ – CO ₂	0...100%	0... 2000 / 5000 / 10000 ppm	0-10 V	ATM
RLQ – CO ₂ – W	0...100%	0... 2000 / 5000 / 10000 ppm	0-10 V	ATM, changeover contact
-xx-Stainless steel				stainless steel enclosure display
-xx-Display				display

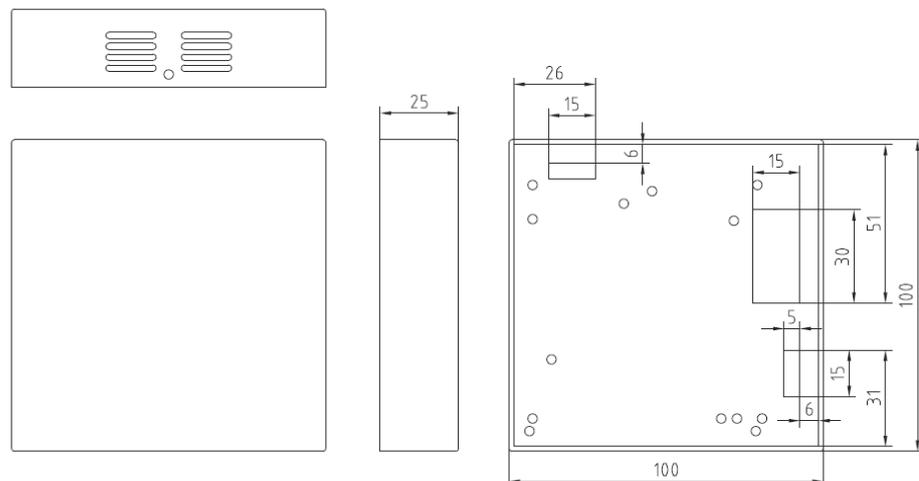
ATM = sensor for atmospheric pressure compensation included

Dimensions

All dimensions are in *mm*.



ABS, plastic, standard enclosure



Stainless steel, optional enclosure

09/2013 Subject to technical changes.