



## CO2-M/A

Multifunctional air quality sensor for CO<sub>2</sub>, mixed gas VOC, humidity, temperature and atmospheric/barometric air pressure

Measuring size: CO<sub>2</sub>, VOC, humidity, temperature, air pressure

Output: 5 x 0-10 V, 5 x 4-20 mA, Relay

Highlights: The multifunctional air quality transducer - everything at a glance



### Description

The multifunctional air quality sensor CO<sub>2</sub>-M/A registers the CO<sub>2</sub> concentration, mixed gas VOC, temperature, humidity, air pressure and converts the respective measured result into a linear output signal 0-10 V or 4-20 mA for further processing. In addition the device has a potential free changeover contact that can be defined for CO<sub>2</sub>, VOC, temperature or humidity.

The CO<sub>2</sub> concentration is measured via a nondispersive infrared sensor (NDIR). 3 different CO<sub>2</sub> scales can be selected - 0-2000 ppm, 0-5000 ppm, 0-10000 ppm. For a high precision CO<sub>2</sub> reading an air pressure compensation is performed during the infrared measurement.

The sensitivity VOC can be set on the device at "low", "medium" and "high".

The humidity and temperature are registered using a capacitive humidity sensor. 4 different scales can be selected for the temperature output signal - -30...+70°C, -20...+80°C, 0...+50°C, 0...+100°C.

As parameter for the humidity output signal the relative humidity % r.h., absolute humidity g/m<sup>3</sup>, mixing ratio g/kg or dew point temperature dp °C can be specified.

The air pressure can be defined and outputted as atmospheric air pressure, or, by entering the altitude above sea level in the menu, as barometric air pressure. The CO<sub>2</sub>/VOC zero point balance depending on the actual ambient conditions can be performed at any time on the device by manual calibration. The multifunctional air quality sensor performs an automatic self-calibration at regular interval, thus ensuring a long-term stable air quality measurement.



## Technical Specifications

Measurement range atm. air pressure	750-1150 mbar
Measurement range bar. air pressure	750-1150 mbar
Measurement range CO <sub>2</sub>	0-10000 ppm, scales: 0-2000/5000/10000 ppm
Measurement range r.H.	0-100% r.H.
Measurement range abs. humidity	0-50 g/m <sup>3</sup> , 0-80 g/m <sup>3</sup> (calculated) selectable by DIP switch
Measurement range air fuel ratio	0-50 g/kg, 0-80 g/kg (calculated) selectable by DIP switch
Measurement range dew point	-20...+50°C DP, -20...+80°C DP, 0...+50°C DP (calculated) selectable by DIP switch
Measurement range temp.	-30...+70°C, -20...+80°C, 0...+50°C, 0...+100°C selectable by DIP switch
Measurement range VOC	0-100% (good / bad air quality, referring to the calibration gas)
Scales	0-2000/5000/10000 ppm
Accuracy	CO <sub>2</sub> : 0-2000 ppm: ±50 ppm + 2% f. mv, 0-5000 ppm: ±50 ppm + 3% f. mv, 0-10000 ppm: ±100 ppm + 5% f. mv; VOC: ±15% FS; Humidity: ±3% r.H. (30%...70% r.H., else ±5% r.H. at 20°C); Temperature: 0,5 K (at 15...35°C, else ±1 K); all specifications at 20°C, 45% r.h., 1013 mbar, auto-calibration ON;
Temperature dependency	CO <sub>2</sub> : ±5 ppm / K, Humidity: ±0,04% r.H. / K; Temperature: ±0,1°C / 10 K
Pressure dependency	CO <sub>2</sub> : air pressure compensated
Running-in time	10 min
Long term stability	±1% FS/year
Sensor	CO <sub>2</sub> : nondispersive infrared sensor (NDIR); VOC: metal oxide sensor; Humidity/Temperature: capacitive humidity sensor, Air pressure: piezoresistive on-chip silicon sensor
Sensor protection	sinter filter, mounted inside housing
Supply voltage	24 V AC/DC (±5%)
Current consumption at 0-10 V	Ø 100 mA
Current consumption at 4-20 mA	ca. 200 mA
Analogue output 0-10 V	3-wire connection
Analogue output 4-20 mA	3-wire connection
Alarm output	1 x potential-free change-over contact, 48 V, 1 A
Switching Hysteresis Relay	2%
Electrical connection	screw terminals max. 1,5 mm <sup>2</sup>
Housing	ABS housing with hinge closure, colour light grey like RAL 7024
Cable gland	M16x1,5 high-strength cable gland with strain relief
Display	LCD display with backlight
Dimensions	Housing: L 150 x W 80 x H 62 mm
Protection type	IP65 (housing), IP54 (probe)
Protection class	III
Working range r.H.	0...98% r.H. in contaminant-free, non-condensing air
Working temperature	0...+50°C
Storage temperature	-20...+50°C



Initial operation	After switch-on of the device follows a self-test and the tempering, which takes ca. 10 minutes depending on the environmental conditions. At this time the analogue output drifts from the actual measurement value.
Automatic calibration	<p>The automatic CO<sub>2</sub>/VOC calibration takes place every 7 days, this compensates for any drifts and achieves excellent long-term stability. To ensure this function, the device must be supplied with power for at least 7 days without interruption and ventilated once with fresh air (CO<sub>2</sub> 300...400 ppm) for approx. 10 minutes within this period.</p> <p>For the CO<sub>2</sub> calibration, the device saves the minimum CO<sub>2</sub> value measured during this period internally. After 7 days, this minimum value is normalized to 400 ppm CO<sub>2</sub> and the output signal corrected accordingly. The maximum correction is limited to half of the determined drift. If the measured value falls below approx. 300 ppm, the calibration is initialized to 400 ppm.</p> <p>The automatic calibration can be deactivated and performed manually if necessary.</p>
Manual calibration	The manual calibration of the output signal to 400 ppm (CO <sub>2</sub> zero point) respectively 1 V (VOC zero point) will be started by pushing the button on the circuit board (push ca. 5 s until "CAL" appears in the display). Before this it is to ensure a non-stop operating of min. 10 minutes on fresh air. After successful calibration "CAL" disappears from the display.
Installation	screw fastening
Approvals	CE, EAC, RoHS

## Variants

Article Number	
Output	Description
<b>CO<sub>2</sub>-M/A-ID</b>	
4-20 mA, changer	CO <sub>2</sub> : 0-2000/5000/10000 ppm , VOC: 0-100%, Humidity: 0...100% r.F., Temperature: -30...+70°C/-20...+80°C/0...+50°C/0... +100°C, Air pressure: 750...1150 mbar
<b>CO<sub>2</sub>-M/A-UD</b>	
0-10 V, changer	CO <sub>2</sub> : 0-2000/5000/10000 ppm , VOC: 0-100%, Humidity: 0...100% r.F., Temperature: -30...+70°C/-20...+80°C/0...+50°C/0... +100°C, Air pressure: 750...1150 mbar



### Dimensional Drawing

