



# GMP251 Carbon Dioxide Probe

## for %-Level Measurements



### Features

- Measurement range 0 ... 20 %CO<sub>2</sub>
- Intelligent, stand-alone probe with analog and digital outputs
- Wide operating temperature range -40 ... +60 °C
- IP65 classified housing
- Full temperature and pressure compensations
- 2nd-gen proprietary CARBOCAP® technology
- Integrated temperature measurement for CO<sub>2</sub> compensation purposes
- Compensations for background gases, O<sub>2</sub>, and humidity
- Sensor head heated to prevent condensation

Vaisala CARBOCAP® Carbon Dioxide Probe GMP251 is a new intelligent probe for measuring carbon dioxide. This robust, stand-alone measurement device is designed for use in demanding applications, such as life science incubators, where stable, reliable, and accurate performance is required.

### Benefits

- Superior long-term stability
- Reliable and accurate
- Calibration certificate included

GMP251 is based on Vaisala's unique, second-generation CARBOCAP technology that enables exceptional stability. A new type of infrared (IR) light source is used instead of the traditional incandescent light bulb, which extends the lifetime of GMP251.

GMP251 incorporates an internal temperature sensor for compensation of the CO<sub>2</sub> measurement according to ambient temperature. The effects of

pressure and background gas can also be compensated for. The measurement range is 0 ... 20 %CO<sub>2</sub> and the sensor performance is optimized at 5 %CO<sub>2</sub> measurement.

The operating temperature range of the probe is wide and the probe housing is classified as IP65. Condensation is prevented as the internal sensor head is heated.

GMP251 is resistant to dust and most chemicals, such as, H<sub>2</sub>O<sub>2</sub> and alcohol-based cleaning agents.

### Ease of Use

GMP251 is a compact probe that is easy and fast to install in a number of ways. It's easy to plug in and plug out. The surface of the probe is smooth, which

makes it easy to clean. The probe provides several outputs for the CO<sub>2</sub> measurement, analog current and voltage outputs as well as digital RS-485 with Modbus protocol.

### Applications

GMP251 is ideal for life science incubators, cold storages, fruit and vegetable transportation, and for all demanding applications where stable and accurate %-level CO<sub>2</sub> measurements are needed.

# Technical Data

## Measurement Performance

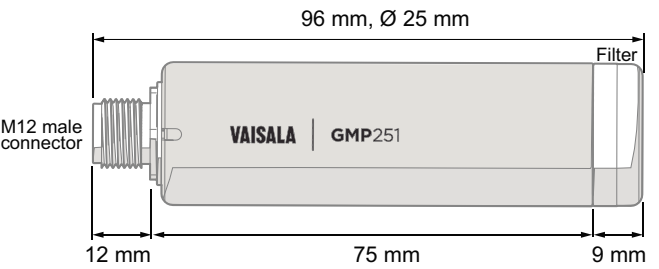
Measurement range	0 ... 20 %CO <sub>2</sub>
<b>Accuracy at 25 °C (77 °F) and 1013 hPa (incl. Repeatability and Non-linearity)</b>	
At 5 %CO <sub>2</sub>	±0.1 %CO <sub>2</sub>
0 ... 8 %CO <sub>2</sub>	±0.2 %CO <sub>2</sub>
8 ... 20 %CO <sub>2</sub>	±0.4 %CO <sub>2</sub>
<b>Calibration Uncertainty</b>	
At 5 %CO <sub>2</sub>	±0.07 %CO <sub>2</sub>
At 20 %CO <sub>2</sub>	±0.22 %CO <sub>2</sub>
<b>Long-Term Stability</b>	
0 ... 8 %CO <sub>2</sub>	±0.3 %CO <sub>2</sub> /year
8 ... 12 %CO <sub>2</sub>	±0.5 %CO <sub>2</sub> /year
12 ... 20 %CO <sub>2</sub>	±1.0 %CO <sub>2</sub> /year
<b>Temperature Dependence</b>	
With compensation at 5 %CO <sub>2</sub> , 0 ... 50 °C (32 ... 122 °F)	< ±0.05 %CO <sub>2</sub>
With compensation, 0 ... 20 %CO <sub>2</sub> , -40 ... 60 °C (-40 ... 140 °F)	±0.045 % of reading/°C
Without temperature compensation at 5 %CO <sub>2</sub> (typical)	-0.25 % of reading/°C
<b>Pressure Dependence</b>	
With compensation at 5 %CO <sub>2</sub> 700 ... 1100 hPa	±0.05 %CO <sub>2</sub>
With compensation, 0 ... 20 %CO <sub>2</sub> 500 ... 1200 hPa	±0.015 % of reading/hPa
Without compensation (typical)	+0.15 % of reading/hPa
<b>Humidity Dependence</b>	
With compensation, 0 ... 20 %CO <sub>2</sub> , 0 ... 100 %RH	±0.7 % of reading (at 25 °C (77 °F))
Without compensation (typical)	+0.05 % of reading / %RH
<b>O<sub>2</sub> Dependence</b>	
With compensation, 0 ... 20 %CO <sub>2</sub> , 0 ... 90 %O <sub>2</sub>	±0.6 % of reading (at 25 °C (77 °F))
Without compensation (typical)	-0.08 % of reading / %O <sub>2</sub>
<b>Flow Rate Dependence (for Flow-Through Model Option)</b>	
< 1 l/min flow	No effect
1 ... 10 l/min flow	< 0.6 % of reading/ l/min
Start-up time at 25 °C (77 °F)	< 10 s
Warm-up time for full spec.	< 4 min
<b>Response Time (T90)</b>	
With standard filter	< 1 min
Flow-through model with > 0.1 l/min	< 1 min
With spray shield	< 2 min

## Operating Environment

Operating temperature of CO <sub>2</sub> measurement	-40 ... +60 °C (-40 ... +140 °F)
Storage temperature	-40 ... +70 °C (-40 ... +158 °F)
<b>Pressure</b>	
Compensated	500 ... 1100 hPa
Operating	< 1.5 bar
Humidity	0 ... 100 %RH, non-condensing
<b>Gas Flow (for Flow-Through Option)</b>	
Operating range	< 10 l/min
Recommended range	0.1 ... 0.8 l/min
Condensation prevention	Sensor head heating, when power on
EMC compliance	EN61326-1, Generic Environment
Chemical tolerance (temporary exposure during cleaning)	<ul style="list-style-type: none"><li>• H<sub>2</sub>O<sub>2</sub> (2000 ppm, non-condensing)</li><li>• Alcohol-based cleaning agents (for example ethanol and IPA)</li><li>• Acetone</li><li>• Acetic acid</li></ul>

## Mechanical Specifications

Weight, probe	45 g
<b>Materials</b>	
Probe housing	PET plastic
Filter	PTFE membrane, PET plastic grid
Connector	Nickel plated brass, M12 / 5 pin
IP rating, probe body	IP65
Connector	M12 5-pin male
<b>Dimensions</b>	
Probe diameter	25 mm
Probe length	96 mm



## Inputs and Outputs

### Analog outputs

- 0 ... 5/10 V (scalable), min load 10 k $\Omega$
- 0/4 ... 20 mA (scalable), max load 500  $\Omega$

### Operating Voltage

With digital output in use 12 ... 30 VDC

With voltage output in use 12 ... 30 VDC

With current output in use 20 ... 30 VDC

### Digital output

Over RS-485:

- Modbus
- Vaisala Industrial Protocol

### Power Consumption

Typical (continuous operation) 0.4 W

Maximum 0.5 W

## Spare Parts and Accessories

Standard membrane filter ASM211650SP

Porous sintered PTFE filter (extra protection) DRW243649SP

Probe cable with open wires (1.5 m) 223263SP

Probe cable with open wires and 90° plug (0.6 m) 244669SP

Probe cable with open wires (10 m) 216546SP

Flow-through adapter with gas ports ASM211697SP

USB cable for PC connection 242659

MI70 connection cable for probe CBL210472

Flat cable for GMP250 probes, M12 5-pin CBL210493SP

Probe mounting clips (2 pcs) 243257SP

Probe mounting flange 243261SP

Calibration adapter DRW244827SP

Spray shield ASM212017SP



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