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 CO₂ measurement according to ambient temperature. The effects of pressure and background gas can also be compensated for. The measurement range is 0 ... 20 %CO₂ and the sensor performance is optimized at 5 %CO₂ measurement.

The operating temperature range of the probe is wide (-40 ... +60 °C (-40 ... +140 °F)), 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 H₂O₂ and alcohol-based cleaning agents.

**Ease of use**

GMP251 is a compact probe with easy and fast plug-in, plug-out installation. The surface of the probe is smooth, which makes it easy to clean. The probe provides several output options, including analog current and voltage outputs and digital RS-485 output with Modbus protocol.

GMP251 can be connected to Indigo series transmitters for an extended range of output and configuration options. See www.vaisala.com/indigo.

For easy-to-use access to field calibration, device analytics, and configuration functionality, the probe can be connected to Vaisala Insight PC software. See www.vaisala.com/insight.

**Applications**

GMP251 is ideal for life science incubators, cold storages, fruit and vegetable transportation, and for all demanding applications where stable and accurate %-level CO₂ measurements are needed.
## Measurement performance

**Measurement range**  
0 ... 20 %CO₂

**Accuracy at 25 °C (77 °F) and 1013 hPa (incl. repeatability and non-linearity)**  
At 5 %CO₂  ±0.1 %CO₂  
0 ... 8 %CO₂  ±0.2 %CO₂  
8 ... 20 %CO₂  ±0.4 %CO₂

**Calibration uncertainty**  
At 5 %CO₂  ±0.12 %CO₂  
At 20 %CO₂  ±0.32 %CO₂

**Long-term stability**  
0 ... 8 %CO₂  ±0.3 %CO₂/year  
8 ... 12 %CO₂  ±0.5 %CO₂/year  
12 ... 20 %CO₂  ±1.0 %CO₂/year

**Temperature dependence**  
With compensation at 5 %CO₂, 0 ... +50 °C (+32 ... +122 °F)  ≤ ±0.05 %CO₂  
With compensation, 0 ... 20 %CO₂, -40 ... +60 °C (<40 ... +140 °F)  ≤ ±0.045 % of reading/°C

**Without temperature compensation at 5 %CO₂ (typical)**  
-0.25 % of reading/°C

**Pressure dependence**  
With compensation at 5 %CO₂, 700 ... 1100 hPa  ≤ ±0.05 %CO₂  
With compensation, 0 ... 20 %CO₂, 500 ... 1200 hPa  ≤ ±0.015 % of reading/hPa  
Without compensation (typical)  ≤ ±0.15 % of reading/hPa

**Humidity dependence**  
With compensation, 0 ... 20 %CO₂, 0 ... 100 %RH  ≤ ±0.7 % of reading (at +25 °C (+77 °F))  
Without compensation (typical)  ≤ ±0.05 % of reading / %RH

**O₂ dependence**  
With compensation, 0 ... 20 %CO₂, 0 ... 90 %O₂  ≤ ±0.6 % of reading (at +25 °C (+77 °F))  
Without compensation (typical)  ≤ -0.08 % of reading / %O₂

**Flow rate dependence (for flow-through option)**  
< 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

**Response time (T90)**  
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 CO₂ measurement**  
-40 ... +60 °C (-40 ... +140 °F)

**Storage temperature**  
-40 ... +70 °C (-40 ... +158 °F)

**Pressure**  
Compensated  500 ... 1100 hPa  
Operating  ≤ 1.5 bar

**Humidity**  
0 ... 100 %RH, non-condensing

**Gas flow (for flow-through option)**  
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)**  
- H₂O₂ (2000 ppm, non-condensing)  
- Alcohol-based cleaning agents (for example ethanol and IPA)  
- Acetone  
- Acetic acid

## Mechanical specifications

**Weight, probe**  
45 g (1.59 oz)

**Materials**

- **Probe housing**  
PBT polymer  
- **Filter**  
PTFE membrane, PBT polymer grid  
- **Connector**  
Nickel plated brass, M12 / 5-pin

**IP rating, probe body**  
IP65

**IP rating, connector**  
M12 5-pin male

**Dimensions**

- **Probe diameter**  
25 mm (0.98 in)
- **Probe length**  
96 mm (3.78 in)

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**GMP251 dimensions**

![GMP251 dimensions diagram](image-url)

- **Probe diameter**: 25 mm (0.98 in)
- **Filter**: 96 mm, Ø 25 mm
**Inputs and outputs**

Analog outputs

- 0...5/10 V (scalable), min. load 10 kΩ
- 0/4...20 mA (scalable), max. load 500 Ω

Digital output

- Over RS-485:
  - Modbus
  - Vaisala Industrial Protocol

**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

**Power consumption**

- Typical (continuous operation): 0.4 W
- Maximum: 0.5 W

**Spare parts and accessories**

<table>
<thead>
<tr>
<th>Spare part</th>
<th>Code</th>
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</thead>
<tbody>
<tr>
<td>Standard membrane filter</td>
<td>ASM211650SP</td>
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<tr>
<td>Porous sintered PTFE filter</td>
<td>DRW243649SP</td>
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<tr>
<td>Probe cable with open wires (1.5 m)</td>
<td>223263SP</td>
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<tr>
<td>Probe cable with open wires and 90° plug (0.6 m)</td>
<td>244669SP</td>
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<tr>
<td>Probe cable with open wires (10 m)</td>
<td>265465SP</td>
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<tr>
<td>Flow-through adapter with gas ports</td>
<td>ASM211697SP</td>
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<tr>
<td>USB cable for PC connection</td>
<td>242659</td>
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<tr>
<td>MI70 connection cable for probe</td>
<td>CBL210472</td>
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<tr>
<td>Flat cable for GMP250 probes, M12 5-pin</td>
<td>CBL210493SP</td>
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<td>Probe mounting clips (2 pcs)</td>
<td>243257SP</td>
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<td>Probe mounting flange</td>
<td>243261SP</td>
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<td>Calibration adapter</td>
<td>DRW244827SP</td>
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<tr>
<td>Spray shield</td>
<td>ASM212017SP</td>
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1) Vaisala Insight software for Windows available at www.vaisala.com/insight