



Features

- Measurement range 0 ... 20 %CO₂
- Intelligent, standalone probe with analog and digital outputs
- Compatible with Vaisala Indigo products, Insight PC software, and RFL100 data logger
- Wide operating temperature range (-40 ... +60 °C) (-40 ... +140 °F)
- IP65-classified housing
- Integrated temperature measurement for CO₂ compensation purposes
- Compensations also for pressure, oxygen, and humidity
- Sensor head heated to prevent condensation

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

Benefits

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

GMP251 is based on Vaisala's patented, latest-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 and the Indigo80 handheld indicator 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 software for Windows®. 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.

A flow-through adapter with gas ports is available as an accessory, enabling tubing for easy and flexible remote measurement with a separate pump. A multiplexer can also be added for sampling gas from several locations. ¹⁾

1) Third-party pump and multiplexer not provided by Vaisala.

Technical data

Measurement performance

Measurement range 0 ... 20 %CO₂

Accuracy ¹⁾

At 5 %CO₂ ±0.1 %CO₂

At 0 ... 8 %CO₂ ±0.2 %CO₂

At 8 ... 20 %CO₂ ±0.4 %CO₂

Calibration uncertainty

At 5 %CO₂ ±0.07 %CO₂

At 20 %CO₂ ±0.27 %CO₂

Long-term stability

At 0 ... 8 %CO₂ ±0.3 %CO₂/year

At 8 ... 12 %CO₂ ±0.5 %CO₂/year

at 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 ... 1100 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

Start-up, warm-up, and response time

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 option with > 0.1 l/min < 1 min

With spray shield < 2 min

Flow rate dependence (for flow-through option)

Flow rate dependence:

< 1 l/min flow No effect

1 ... 10 l/min flow < 0.6 % of reading/ l/min

¹⁾ At 25 °C (77 °F) and 1013 hPa (incl. repeatability and non-linearity).

Compliance

EU directives and regulations EMC, RoHS

EMC compatibility EN 61326-1, basic electromagnetic environment

EMC emissions CISPR 32 / EN 55032, Class B

Compliance marks CE, RCM

Operating environment

Operating temperature of CO₂ measurement -40 ... +60 °C (-40 ... +140 °F) ¹⁾

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

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

Condensation prevention Sensor head heating, when power on

IP rating, probe body IP65

Chemical tolerance (temporary exposure during cleaning)

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

Pressure

Compensated 500 ... 1100 hPa

Operating < 1.5 bar

Gas flow (for flow-through option)

Operating range < 10 l/min

Recommended range 0.1 ... 0.8 l/min

¹⁾ Occasional short-term exposure to up to +90 °C (+194 °F) allowed, provided that the probe is fully installed inside the measured condition and power is switched on. Accuracy specification not applicable if used in temperatures above +60 °C (+140 °F).

Mechanical specifications

Weight, probe 45 g (1.59 oz)

Connector type M12 5-pin male

Materials

Probe housing PBT polymer

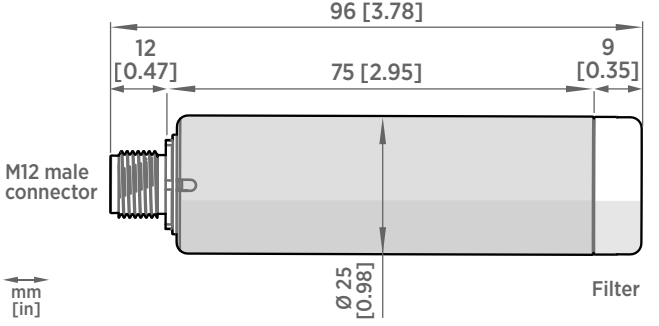
Filter PTFE membrane, PBT polymer grid

Connector Nickel plated brass

Dimensions

Probe diameter 25 mm (0.98 in)

Probe length 96 mm (3.78 in)



GMP251 dimensions

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

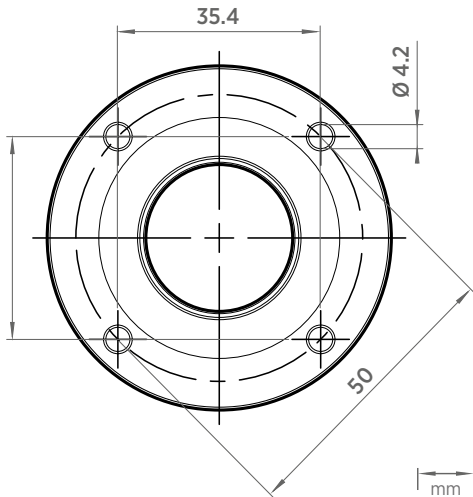
Typical (continuous operation) 0.4 W

Maximum 0.5 W

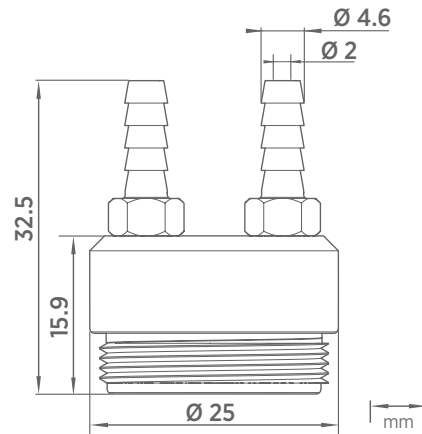
Spare parts and accessories

Standard membrane filter	ASM211650SP
Porous sintered PTFE filter	DRW243649SP
Probe connection cable with open wires (1.5 m)	223263SP
Probe connection cable with open wires (1.5 m), shielded	254294SP
Probe connection cable with open wires (3 m)	26719SP
Probe connection cable with open wires (10 m)	216546SP
Probe connection cable with open wires and 90° plug (0.6 m)	244669SP
Probe connection cable with open wires and 90° plug (1.5 m)	255102
M170 connection cable, M12 5-pin	CBL210472
Flat cable for GMP250 probes, M12 5-pin	CBL210493SP
Indigo USB adapter ¹⁾	USB2
Probe mounting clips (2 pcs)	243257SP
Probe mounting flange	243261SP
Probe holder assembly	ASM213582
Flow-through adapter with gas ports	ASM211697SP
Calibration adapter	DRW244827SP
Spray shield	ASM212017SP

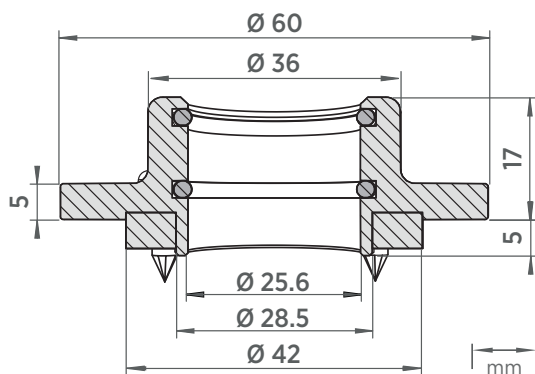
¹⁾ Vaisala Insight software for Windows available at www.vaisala.com/insight



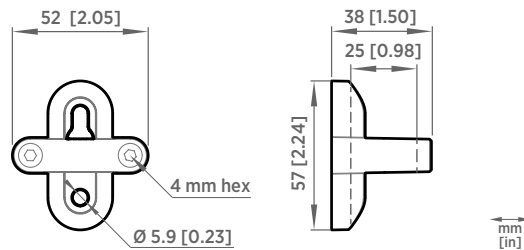
Probe mounting flange 243261SP dimensions



Flow-through adapter with gas ports ASM211697SP. Suitable for tubes with 4 mm inner diameter.



Probe mounting flange 243261SP dimensions, cross section



Probe holder ASM213582 dimensions