GMP251 Carbon Dioxide Probe

For %-level measurements

Features

- Measurement range 0 ... 20 %CO_2
- Intelligent, stand-alone probe with analog and digital outputs
- Compatible with Indigo transmitters and Insight PC software
- Wide operating temperature range (-40 ... +60 °C)
- IP65-classified housing
- Full temperature and pressure compensations
- 2nd-generation proprietary CARBOCAP® technology
- Integrated temperature measurement for CO_2 compensation purposes
- Compensations for background gases, O_2, 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_2 measurement according to ambient temperature. The effects of pressure and background gas can also be compensated for. The measurement range is 0 ... 20 %CO_2 and the sensor performance is optimized at 5 %CO_2 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 H_2O_2 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 CO_2 measurements are needed.

Technical data

Measurement performance

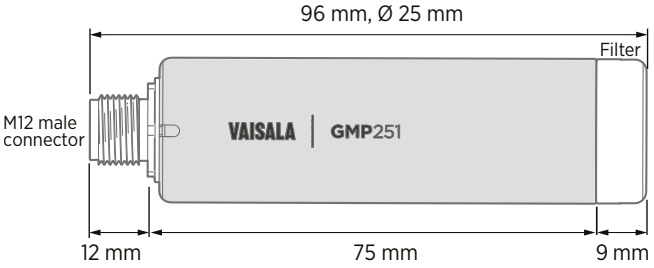
Measurement range	0 ... 20 %CO_2
Accuracy at 25 °C (77 °F) and 1013 hPa (incl. repeatability and non-linearity)	
At 5 %CO_2	±0.1 %CO_2
0 ... 8 %CO_2	±0.2 %CO_2
8 ... 20 %CO_2	±0.4 %CO_2
Calibration uncertainty	
At 5 %CO_2	±0.12 %CO_2
At 20 %CO_2	±0.32 %CO_2
Long-term stability	
0 ... 8 %CO_2	±0.3 %CO_2/year
8 ... 12 %CO_2	±0.5 %CO_2/year
12 ... 20 %CO_2	±1.0 %CO_2/year
Temperature dependence	
With compensation at 5 %CO_2, 0 ... +50 °C (+32 ... +122 °F)	< ±0.05 %CO_2
With compensation, 0 ... 20 %CO_2, -40 ... +60 °C (-40 ... +140 °F)	±0.045 % of reading/°C
Without temperature compensation at 5 %CO_2 (typical)	-0.25 % of reading/°C
Pressure dependence	
With compensation at 5 %CO_2 700 ... 1100 hPa	±0.05 %CO_2
With compensation, 0 ... 20 %CO_2 500 ... 1200 hPa	±0.015 % of reading/hPa
Without compensation (typical)	+0.15 % of reading/hPa
Humidity dependence	
With compensation, 0 ... 20 %CO_2, 0 ... 100 %RH	±0.7 % of reading (at +25 °C (+77 °F))
Without compensation (typical)	+0.05 % of reading / %RH
O_2 dependence	
With compensation, 0 ... 20 %CO_2, 0 ... 90 %O_2	±0.6 % of reading (at +25 °C (+77 °F))
Without compensation (typical)	-0.08 % of reading / %O_2
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 CO_2 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)	• H_2O_2 (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
Connector	M12 5-pin male
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 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[1)]	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

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

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