

GMP343 Carbon Dioxide Probe for Demanding Measurements



The GMP343 is available as an open path, diffusion aspirated model (left) and as a flow-through model (right).

Features/Benefits

- Excellent accuracy and stability
- Vaisala CARBOCAP® Sensor, a silicon-based non-dispersive infrared (NDIR) sensor
- A single-beam, dual-wavelength CO₂ measurement with no moving parts
- Compensation options for temperature, pressure, humidity and oxygen
- Low power consumption and heat emission
- Designed for outdoor use
- Compact and lightweight

The Vaisala CARBOCAP® Carbon Dioxide Probe GMP343 is an accurate and rugged probe-type instrument for ecological measurements. Typical applications include:

- CO₂ soil respiration
- Ambient CO₂ monitoring
- Plant growth chambers
- OEM applications

Open path, diffusion aspirated probe

The product concept eliminates the need for bulky and power-consuming gas sampling systems. The power consumption of the GMP343 itself is low, even below 1 W.

Novel solution for soil respiration measurements

The use of diffusion aspiration eliminates the measurement error caused by pressure differences often present in pump-aspirated measurement systems.

Rugged metal structure

The body of the GMP343 is IP67-classified and suitable for harsh

environments. The sensor's diffusion filter protects it from dust and dirt. Heated optics prevent the formation of condensation.

User-configurable measurement

The GMP343 can output both numerically filtered and raw measurement data. The instrument can also compensate the measurement with an internal temperature measurement and user-set relative humidity, pressure and oxygen values.

MI70

In combination with an MI70 indicator, the GMP343 provides an ideal tool for accurate in-situ measurement. The MI70 is used as a display, communication, and data-logger device. To achieve most accurate measurements, a Vaisala HMP75 humidity probe can be connected to the MI70 indicator for automatic humidity compensation. In that case a manual compensation is not needed. The optional MI70 Link Windows® software allows transferring logged

and real-time data of the GMP343 from the MI70 to a PC.

Calibration

Each GMP343 is calibrated using ±0.5 % accurate gases at 0 ppm, 200 ppm, 370 ppm, 600 ppm, 1000 ppm, 4000 ppm and 2 %. Calibration is also done at four temperature points, -30 °C, 0 °C, 25 °C and 50 °C. If needed, the customer can recalibrate the instrument using the multipoint calibration (MPC) feature allowing up to 8 user-defined calibration points.



With the optional mounting flange, the GMP343 can for example be installed directly into a soil respiration box. The diffusion-aspirated probe eliminates sampling systems and errors related to pressure differences caused by pumps.

Technical Data

Performance

Measurement range options 0 ... 1000 ppm, 0 ... 2000 ppm,
0 ... 3000 ppm, 0 ... 4000 ppm,
0 ... 5000 ppm, 0 ... 2 %

Accuracy (excluding noise) at 25 °C (77 °F) and 1013 hPa after
factory calibration with 0.5 % accurate gases with different range
options

0 ... 1000 ppm ±(3 ppm + 1 % of reading)

0 ... 2000 ppm - 0 ... 2 %* ±(5 ppm + 2 % of reading)

*Accuracy below 200 ppm CO₂ not specified for 2 % range option

Noise (repeatability) at 370 ppm CO₂
with no output averaging ±3 ppm CO₂
with 30 s output averaging ±1 ppm CO₂

Temperature

Effect on accuracy **with** temperature compensation:

| CO ₂ range options | 0 ... 1000 ppm | 0 ... 2000 - 5000 ppm | 0 ... 2 % |
|-------------------------------|-------------------------|-----------------------|-----------|
| Temperature °C (°F) | Accuracy (% of reading) | | |
| -10 ... +40 (+14 ... +104) | ±0.5 | ±1 | ±2 |
| -40 ... +60 (-40 ... +140) | ±2 | ±3 | ±4 |

For readings below 200 ppm CO₂ ±5 ppm CO₂
Temperature compensation is performed by an integrated Pt1000
element

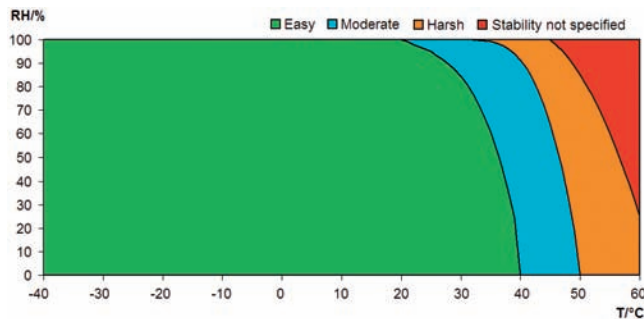
Pressure

Effect on accuracy **with** pressure compensation:

| CO ₂ range options | 0 ... 1000 ppm | 0 ... 2000 - 2 % |
|-------------------------------|-------------------------|------------------|
| Pressure (hPa) | Accuracy (% of reading) | |
| 900 ... 1050 | ±0.5 | ±1 |
| 700 ... 1300 | ±1 | ±2 |

Integrated pressure sensor is **not** included in GMP343

Long term stability see graph below
easy <±2 % of reading / year
moderate <±2 % of reading / 6 months
harsh <±2 % of reading / 3 months



Response time (90 %)

| Diffusion model | | | |
|-----------------|---------------|--------------|--|
| Filter attached | Averaging (s) | Response (s) | |
| Yes | 0 | 75 | |
| Yes | 30 | 82 | |
| No | 0 | <2 | |
| No | 30 | 30 | |

| Flow-through model | | | |
|--------------------|---------------|--------------|--|
| Gas flow (l/min) | Averaging (s) | Response (s) | |
| 0.3 | 0 | 26 | |
| 0.3 | 30 | 44 | |
| 1.2 | 0 | 8 | |
| 1.2 | 30 | 23 | |

Warm-up time
full accuracy ±0.5 % 10 min
full accuracy 30 min

Operating Environment

Temperature
operating -40 ... +60 °C (-40 ... +140 °F)
storage -40 ... +70 °C (-40 ... 158 °F)
Humidity see graph 'GMP343 Operating Conditions'
Pressure
compensated range 700 ... 1300 hPa
operating <5 bar
Gas flow for flow-through model 0 ... 10 liters/min
Electromagnetic compatibility EN61326, Generic
Environment

Inputs and outputs

Operating voltage 11 ... 36 VDC
Power consumption
without optics heating <1 W
with optics heating <3.5 W

Analog outputs

Current output
range 4 ... 20 mA
resolution 14 bits
max. load 800 Ohm @ 24 VDC,
150 Ohm @ 10 VDC

Voltage output
range 0 ... 2.5 V, 0 ... 5 V
resolution 14 bits (13 bits with 0 ... 2.5 V)
min. load 5 kOhm

Digital outputs RS485, RS232

Materials

Housing anodized aluminium
Filter cover PC
IP classification
Housing (cable attached) IP67
Diffusion filter (weather protection) IP65
Diffusion filter (sintered PTFE) IP66
Cable connector type 8-pin M12
Weight (probe only) 360 g

Options and accessories

Wall mount bracket GMP343BRACKET
Mounting flange GMP343FLANGE
Standard diffusion filter (weather
protection, IP65) + filter cover GMP343FILTER
Diffusion filter (sintered PTFE
filter, IP66) + filter cover 215521
Calibration adapter (for the
diffusion model) GMP343ADAPTER
Junction box JUNCTIONBOX-8
Probe cables
2m GMP343Z200SP
6m GMP343Z600SP
10m GMP343Z1000SP
PC connection cable, 2m 213379
MI70 connection cable, 2m DRW216050SP
USB adapter (USB-D9 Serial connection cable) 219686
Soil adapter kit for horizontal positioning 215519
Soil adapter kit for vertical positioning 215520

Dimensions

Probe dimensions in mm (inches)
length 180 (7.1)
diameter 55 (2.2)

For full technical specifications, see the User's Guide

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