

GMP343 Carbon Dioxide Probe for Demanding Measurements



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

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 $\pm 0.5\%$ 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 ... 2 000 - 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

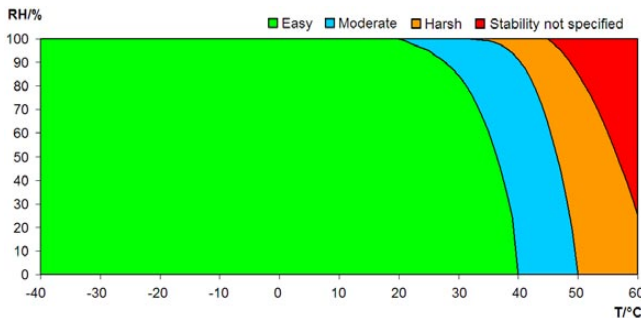
Pressure

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 |
| M170 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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