

## 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 CO<sub>2</sub> 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:

- CO<sub>2</sub> soil respiration
- Ambient CO<sub>2</sub> 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-login 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 CO<sub>2</sub> not specified for 2 % range option

Noise (repeatability) at 370 ppm CO<sub>2</sub>  
with no output averaging ±3 ppm CO<sub>2</sub>  
with 30 s output averaging ±1 ppm CO<sub>2</sub>

## Temperature

Effect on accuracy **with** temperature compensation:

CO <sub>2</sub> range options	0 ... 1000 ppm	0 ... 2000 - 5000 ppm	0 ... 2 %
Temperature °C (°F)	Accuracy (% of reading)		
+10 ... +40 (+50 ... +104)	±1	±1	±2
+40 ... +60 (-104 ... +140)	±2	±3	±4
-40 ... +10 (-40 ... +50)	±3	±3	±5

For readings below 200 ppm CO<sub>2</sub> ±5 ppm CO<sub>2</sub>  
Temperature compensation is performed by an integrated Pt1000  
element

## Pressure

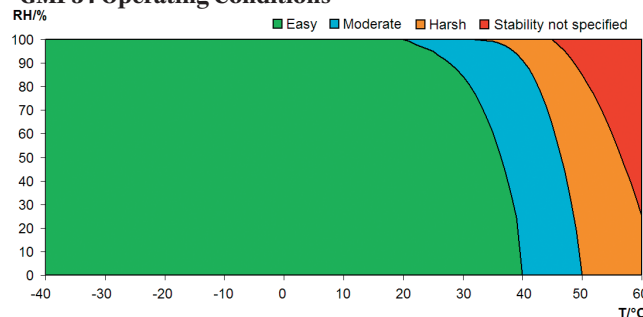
Effect on accuracy **with** pressure compensation:

CO <sub>2</sub> 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

## GMP34 Operating Conditions



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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