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GMP343 Carbon Dioxide Probe for Ecological Measurements

The GMP343 is a compact field instrument for ecological CO_2 measurements.

Features/Benefits

- Excellent accuracy and stability
- For harsh environments
- Diffusion and flow-through models
- Wide operating temperature and humidity ranges
- Compensation options for temperature, pressure, humidity and oxygen
- Low power consumption and heat emission
- Short warm-up time
- Compact and light

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

- CO_2 soil respiration
- Ambient CO_2 monitoring
- Plant growth chambers
- OEM applications

Diffusion aspiration - no need for gas sampling systems

The product concept eliminates the need for bulky and power-consuming sampling systems. The power consumption of the GMP343 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.

Rigid metal structure

The body of the GMP343 is IP67-classified and suitable for harsh environments. The sensor's membrane filter protects it from dust and dirt. Heated optics prevent the formation of condensation.

User-configurable measurement

The GMP343 can output numerically filtered or raw measurement data. There is also a possibility to internally compensate the measurement with an internal temperature measurement and user-set relative humidity, pressure and oxygen values.

Calibration

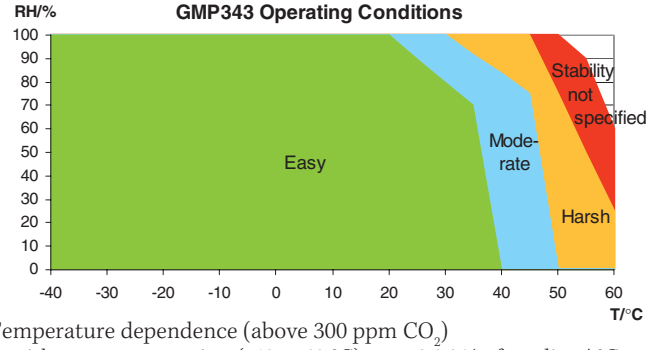
The GMP343 is linearized and calibrated using ±0.5 % gases. If needed, the customer can recalibrate the instrument himself against even more accurate gases using the multipoint calibration (MPC) feature allowing up to 10 user-definable calibration points.

The GMP343 is ideal for soil respiration box measurements. The diffusion-aspirated design eliminates sampling systems and the errors related to pressure differences caused by pumps.

Technical Data

Performance

Sensor	Vaisala CARBOCAP®
Measuring principle	Single-Beam Dual-Wavelength NDIR
Measurement range options	0...1000 ppm, 0...2000 ppm, 0...3000 ppm, 0...4000 ppm, 0...5000 ppm (reduced accuracy >4000 ppm)
Accuracy after factory calibration with 0.5 % gases	± 2.5 % of reading
at the CO_2 calibration points	± 1.5 % of reading
below 300 $ppmCO_2$	± 5 $ppmCO_2$
Short-term stability (up to 6 hours) at 350 $ppmCO_2$	±1 $ppmCO_2$
Long-term stability	see graph "GMP343 Operating Conditions"
easy	< ±2% of reading / year
moderate	< ±2% of reading / 6 months
harsh	< ±2% of reading / 3 months



Temperature dependence (above 300 ppm CO_2)	
without compensation (-40...+60 °C)	± 0.35 % of reading/ °C
with compensation (0...+40 °C)	± 0.15 % of reading/ °C
Humidity dependence	
without compensation	
< 1000 $ppmCO_2$	+ 0.04 % of reading / g/m³ H_2O
> 1000 $ppmCO_2$	+ 0.06 % of reading / g/m³ H_2O
with compensation	± 0.006 % of reading/ g/m³ H_2O
Pressure dependence	
without compensation	+ 0.15 % of reading/ hPa
with compensation	± 0.07 ppm CO_2 / hPa
Flow dependence of flow-through model	0.3% of reading / l/min
Response time (90%)	see table

Diffusion model		
Dust filter	Averaging (s)	Response (s)
Yes	0	75
Yes	10	80
Yes	30	82
No	0	< 2
No	10	12
No	30	30
Flow-through model		
Gas flow (l/min)	Averaging (s)	Response (s)
0.3	0	26
0.3	10	34
0.3	30	44
1.2	0	8
1.2	10	15
1.2	30	23

Noise (repeatability) at 350 $ppmCO_2$	
with no output averaging	±3 $ppmCO_2$
with 10 s output averaging	±2 $ppmCO_2$
with 30 s output averaging	±1 $ppmCO_2$
Warm-up time	
full accuracy ± 0.5 %	10 min
full accuracy	30 min

Operating environment

Temperature	
continuous operation	-40...+60 °C
temperature compensation range	-0...+40 °C
storage	-40...+70 °C
Relative humidity	see graph "GMP343 Operating Conditions"
Pressure	
operating range	0...5 bar
pressure compensation range	700...1300 hPa
Gas flow rate for flow-through model	< 10 liters/min

Complies with EMC standard EN61326-1:1997 + Am1:1998 + Am2:2001, Generic Environment.

Inputs and outputs

Operating voltage	10...36 VDC
Power consumption	without heating < 1 W with heating max. 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
Temperature dependence	±0.005% of reading / °C
Digital outputs	RS485, RS232

Materials

Body material	anodized aluminium
Filter cover material	plastic
Body classifications	IP66/IP67
Cable connector type	8-pin M12
Weight (probe only)	360 g

Options and accessories

Wall mount bracket	GMP343BRACKET
Mounting flange	GMP343FLANGE
Filter kit (Filter cover & dust filter)	GMP343FILTER
Calibration adapter	GMP343ADAPTER
Junction box	JUNCTIONBOX-8
Probe cable, 2 m	GMM220Z200SP
Probe cable, 6 m	GMM220Z600SP
Probe cable, 10 m	GMM220Z1000SP
PC connection cable, 2 m	213379
MI70 measurement indicator	
MI70 connection cable, 2m	DRW216050SP

Dimensions

Dimensions in mm (inches)	
length	180 (7.1)
diameter	55 (2.2)