



VAISALA

MGP241 Multigas Probe for Carbon Dioxide and Humidity Measurement



Features

- Continuous process monitoring for carbon capture, utilization and storage (CCUS) applications
- Direct installation into process: no moisture removal or other sample treatment needed
- Standalone probe with digital Modbus® RTU over RS-485 and 3 analog outputs (4–20 mA)
- Analog input (4–20 mA) for external temperature or pressure compensation for more accurate measurement
- Available measurement parameters: carbon dioxide (CO₂) and humidity (H₂O vapor)
- Compatible with Vaisala Insight PC software and Vaisala Indigo80, Indigo300, and Indigo520

Vaisala CARBOCAP® MGP241 Multigas Probe for Carbon Dioxide and Humidity Measurement is designed for continuous measurement of carbon dioxide (CO₂) and humidity (H₂O vapor) measurements in industrial processes, especially in carbon capture, utilization and storage (CCUS) applications. It is designed to be installed directly in the process gas pipeline, removing the need for sample treatment.

2-in-1 measurement probe

The MGP241 probe measures carbon dioxide (CO₂) and humidity (H₂O vapor) in demanding conditions. MGP241 measures carbon dioxide and humidity in vol-% or ppm by volume units, or alternatively dew point temperature (T_d) and frost point temperature (T_f). The patented CARBOCAP infrared technology enables simultaneous detection of multiple gases unlike the traditional non-dispersive infrared (NDIR) measurement technique. This allows compensation for sensor drift, sensor aging, and for any cross-interference effects between measured gases. Calibration gases are not needed for routine operation; a functional check and drift check every 12 months is recommended.

Continuous process monitoring

MGP241 measures gases directly in the process without a need for drying or other sample treatment. This simplifies the installation and minimizes the footprint of the measurement solution compared to traditional gas analyzers. The rapid measurement cycle takes only seconds, providing direct real time measurements for process control and monitoring. The CO₂ measurement can be shown either as wet basis or dry basis values. Thanks to the built in temperature and pressure compensation algorithms, and the CARBOCAP infrared technology, the measurement is stable and reliable across a wide range of process and environmental conditions.

Flexible connectivity

The MGP241 probe has 3 4–20 mA analog outputs for CO₂ and H₂O vapor concentrations and for retransmission of analog input, as well as a 4–20 mA analog input for external pressure or temperature signal used for compensation. The probe also offers Modbus RTU protocol for digital connectivity. For easy-to-use access to configuration, diagnostics, and calibration and adjustment functionalities, the MGP241 probe can be connected to Vaisala Insight PC software with a USB cable accessory, and it can also be connected to Indigo devices: Indigo80, Indigo300, and Indigo520.

Technical data

Measurement performance

Property	Carbon dioxide CO ₂	Water vapor H ₂ O
Sensor	CARBOCAP®	CARBOCAP®
Measurement unit	Volume-%, ppm _v	Volume-%, ppm _v , dew point °C, dew point °F
Measurement range	0-100 vol-%	0-25 vol-%, -10 ... +60 °C (+14 ... +140 °F)
Accuracy at +25 °C (+77 °F) and 1013 mbar ¹⁾ ²⁾	0-90 vol-%: ±2 vol-% 90-100 vol-%: ±1 vol-%	0-25 vol-%: ±0.5 vol-%
Repeatability ²⁾	±0.4 vol-% at 95 vol-%	±0.1 vol-% at 2.5 vol-%
Temperature dependence (typical)	Compensated, 0-100 vol-%: ±0.1 % of reading / °C	Compensated, 0-25 vol-%: ±0.1 % of reading / °C
	Uncompensated, 0-100 vol-%: ±0.6 % of reading / °C	Uncompensated, 0-25 vol-%: ±0.4 % of reading / °C
	Compensated, 0-100 vol-%: ±0.015 % of reading / mbar	Compensated, 0-25 vol-%: ±0.01 % of reading / mbar
	Uncompensated, 0-100 vol-%: ±0.25 % of reading / mbar	Uncompensated, 0-25 vol-%: ±0.20 % of reading / mbar
Pressure dependence (typical)		
Long-term stability	±2 vol-% / year	±2 vol-% / year
Startup time ³⁾		3 min
Warm-up time ⁴⁾		30 s ⁵⁾
Response time (T ₉₀)		90 s ⁶⁾
Response time with flow-through adapter		90 s at ≥ 0.5 l/min ⁶⁾ (recommended: 0.5-1 l/min)

1) *Excluding cross-interferences to other gases.*

2) Accuracy and repeatability specification at +25 °C (+77 °F) and 1013 mbar including non-linearity, calibration uncertainty, and repeatability; temperature and pressure compensated.

3) *Time to first reading.*

- 4) *Time to specified accuracy.*

5) At +20 °C (+68 °F) ambient temperature.

6) With standard PTFE filter.

Powering

Operating voltage	19–30 V DC
Power consumption	Typical: 3 W Maximum: 6 W
Current consumption	100–300 mA

Inputs and outputs

Analog inputs	
Number of analog inputs	1
Input type	4–20 mA, isolated, for external pressure or temperature sensor ¹⁾
Analog outputs	
Number of analog outputs	3
Output type	4–20 mA, scalable, isolated
Accuracy	±0.2 % F.S. at 25 °C
Temperature dependence	±0.005% / °C full scale
External loads	R _L : 0 Ω R _L : 500 Ω
Digital communication	
Serial communication	RS-485 (Modbus RTU)

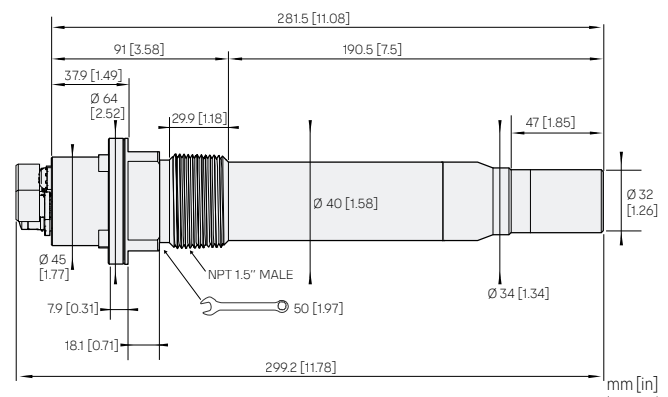
1) The optional analog input is galvanically isolated and provides power for the connected external pressure sensor.

Operating environment

Operating environment	Outdoor use
IP rating	IP65
Operating temperature	-40 ... +60 °C (-40 ... +140 °F)
Operating humidity	0-100 %RH
Operating pressure	-500 ... +500 mbar (gauge)
Storage temperature	-40 ... +60 °C (-40 ... +140 °F)
Storage humidity	0-90 %RH
Process pressure	-500 ... +500 mbar (gauge)
Process temperature	+0 ... +60 °C (+32 ... +140 °F)
Process flow	0-20 m/s

Mechanical specification

Weight	1.4 kg (3.09 lb)
Connectors	M12 5-pin male for digital output M12 8-pin male for analog output M12 4-pin female for analog input
Materials	
Probe body	AISI316L stainless steel, PPS
Filter cap	Sintered PTFE



MGP241 dimensions



Compatible devices

Device or series	Models
Indigo80 Handheld Indicator	Indigo80
Indigo300 Transmitter	Indigo300
Indigo500 Series Transmitters	Indigo520

Accessories and spare parts

Sintered PTFE filter (includes O-ring)	DRW249919SP
Flow-through adapter	258877
NPT 1.5 in thread test plug	257525SP
USB Service Cable M12-5F, RS-485	242659

Compliance

EU directives and regulations	EMC Directive (2014/30/EU) REACH Regulation (EC 1907/2006) RoHS Directive (2011/65/EU) as amended by 2015/863
Electromagnetic compatibility (EMC)	EN 61326-1, industrial environment
Compliance marks	CE, China RoHS, FCC, ICES, RCM

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