

## GMP231

Vaisala · Authorized Partner

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## GMP231 Carbon Dioxide Probe for CO<sub>2</sub> Incubators



### Features

- Maximum temperature durability +195 °C (+383 °F)
- Incubator can be heat sterilized with probe in place, saving time and reducing risk of cross-contamination
- Heat durability and excellent long-term stability with next generation CARBOCAP® sensor
- Designed for OEM use in CO<sub>2</sub> incubators – installation options available
- CO<sub>2</sub> sensor measurement optimized for 5 % CO<sub>2</sub>, measurement range up to 20 % CO<sub>2</sub>
- 4-point traceable calibration for CO<sub>2</sub>

Vaisala CARBOCAP® Carbon Dioxide Probe GMP231 withstands high temperature sterilization.

GMP231 is designed to provide incubator manufacturers with accurate and reliable carbon dioxide measurements and sterilization durability at high temperatures. The probe is based on Vaisala's patented CARBOCAP® technology and a new type of infrared (IR) light source. These technologies allow for continuous sterilization temperatures of up to 180 °C (+356 °F), enabling easier and more complete sterilization without the risk of cross-contamination. Maximum temperature durability of +195 °C (+383 °F) provides a comfortable operating margin.

The probe is installed through the incubator wall, ensuring that only the IR sensor and optical components are exposed to the incubation

environment. This allows the incubator to be sterilized with the probe in place, removing the need to decontaminate the probe separately. This saves time and reduces the risk of contamination.

The probe's sensor performance is optimized at 5 %CO<sub>2</sub>, but the sensor measures CO<sub>2</sub> up to 20 % with high accuracy. In addition, GMP231 can measure pressure and temperature for CO<sub>2</sub> measurement compensation purposes, ensuring the product remains stable and accurate in all CO<sub>2</sub> incubation conditions. The sensor is made of highly durable materials to achieve outstanding stability over both time and temperature.

Since water vapor, dust, and most chemicals do not affect measurements, GMP231 module is ideal for CO<sub>2</sub> incubator environments.

### Benefits

- Internal pressure and temperature measurement improves accuracy and stability
- Full temperature and pressure compensations available
- Sensor head heating for condensation prevention

# Technical Data

## Measurement Performance

|                                                                           |                                    |
|---------------------------------------------------------------------------|------------------------------------|
| Measurement range                                                         | 0 ... 20 %CO <sub>2</sub>          |
| Calibration uncertainty at 5 %CO <sub>2</sub>                             | ±0.1 %CO <sub>2</sub>              |
| Start-up time                                                             | < 20 s                             |
| Warm-up time for full spec.                                               | < 3 min                            |
| <b>Response Time</b>                                                      |                                    |
| T63                                                                       | < 30 s                             |
| T90                                                                       | < 50 s                             |
| <b>Accuracy at 37 °C, 1013 hPa</b>                                        |                                    |
| Repeatability at:                                                         |                                    |
| 0 ... 8 %CO <sub>2</sub>                                                  | ±0.1 %CO <sub>2</sub>              |
| 8 ... 12 %CO <sub>2</sub>                                                 | ±0.2 %CO <sub>2</sub>              |
| 12 ... 20 %CO <sub>2</sub>                                                | ±0.4 %CO <sub>2</sub>              |
| Non-linearity at 0 ... 20 %CO <sub>2</sub>                                | ±0.1 %CO <sub>2</sub>              |
| <b>Temperature Dependence</b>                                             |                                    |
| With compensation at 3 ... 12 %CO <sub>2</sub> , 20 ... 60 °C             | ±0.1 %CO <sub>2</sub>              |
| Without compensation (typical)                                            | -0.4 % of reading/°C               |
| <b>Pressure Dependence</b>                                                |                                    |
| With compensation at 3 ... 12 %CO <sub>2</sub> , 700 ... 1100 hPa         | ±0.015 % of reading/hPa            |
| Without compensation (typical)                                            | +0.15 % of reading/hPa             |
| <b>Humidity Dependence</b>                                                |                                    |
| With compensation at 0 ... 20 %CO <sub>2</sub> , 0 ... 100 %RH            | ±0.9 % of reading (at 37 °C)       |
| Without compensation (typical)                                            | +0.05 % of reading/%RH             |
| <b>O<sub>2</sub> dependence</b>                                           |                                    |
| With compensation at 0 ... 20 %CO <sub>2</sub> , 0 ... 90 %O <sub>2</sub> | ±0.6 % of reading                  |
| Without compensation (typical)                                            | -0.08 % of reading/%O <sub>2</sub> |
| <b>Long-term Stability</b>                                                |                                    |
| 0 ... 8 %CO <sub>2</sub>                                                  | < ±0.2 %CO <sub>2</sub> /year      |
| 8 ... 12 %CO <sub>2</sub>                                                 | < ±0.5 %CO <sub>2</sub> /year      |
| 12 ... 20 %CO <sub>2</sub>                                                | < ±1.0 %CO <sub>2</sub> /year      |

## Mechanical Specifications

|                          |                                                  |
|--------------------------|--------------------------------------------------|
| Connector                | M12/8 pin                                        |
| Weight                   | 150 g (5.29 oz) without cable                    |
| IP rating                | IP54 (sensor head)<br>IP20 (electronics housing) |
| <b>Materials</b>         |                                                  |
| Housing                  | Metal coated plastic ABS+PC                      |
| Inner tube               | Aluminum                                         |
| Probe tube               | PPSU                                             |
| Filter                   | PTFE                                             |
| <b>Dimensions</b>        |                                                  |
| Probe tube max. diameter | 30.2 mm (1.19 in)                                |
| Probe tube length        | 118.5 mm (4.67 in)                               |
| Sensor filter length     | 12 mm (0.47 in)                                  |

## Operating Environment

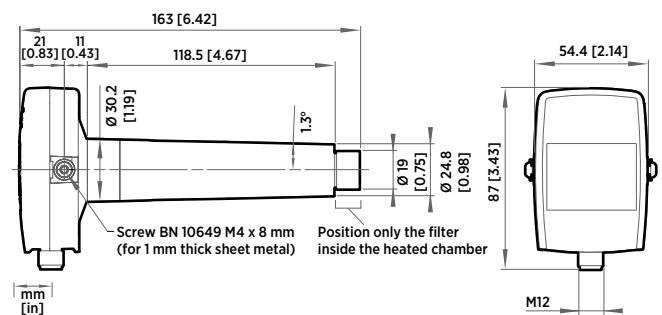
|                                                                |                                                                                                  |
|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Operating temperature for CO <sub>2</sub> measurement          | 0 ... +70 °C (+32 ... +158 °F)                                                                   |
| Max. temperature durability in standby mode (sensor head only) | Max. +195 °C (+383 °F)                                                                           |
| Heat sterilization 180 °C durability                           | At least 120 cycles                                                                              |
| Storage temperature                                            | -40 ... +75 °C (-40 ... +167 °F)                                                                 |
| Pressure (compensated)                                         | 500 ... 1100 hPa                                                                                 |
| Pressure (operating)                                           | < 1500 hPa                                                                                       |
| Humidity                                                       | 0 ... 100 %, non-condensing                                                                      |
| Condensation prevention                                        | Sensor head heating when power on                                                                |
| Chemical tolerance                                             | DMSO, IPA (70 %), H <sub>2</sub> O <sub>2</sub> (2000 ppm, non-condensing), ethanol, acetic acid |
| Electromagnetic compatibility                                  | EN61326-1, Generic Environment                                                                   |

## Inputs and Outputs

|                   |                                                                        |
|-------------------|------------------------------------------------------------------------|
| Digital outputs   | I <sup>2</sup> C 5 V, RS-485 (2-wire with Vaisala industrial protocol) |
| Analog output     | 0 ... 20 mA (scalable)<br>max. load 600 Ω                              |
| Power consumption | < 1 W (pulsed)                                                         |
| Operating voltage | 11 ... 30 VDC<br>20 ... 30 VDC (with analog output)                    |

## Accessories

|                                                      |             |
|------------------------------------------------------|-------------|
| M12 Connection Cable 0.9 m with open ends            | DRW240977SP |
| M12 Connection Cable 0.6 m with Milli-Grid connector | ASM210903SP |
| Silicone plug                                        | DRW240015SP |
| Attachment bracket                                   | DRW240247SP |
| PTFE filter                                          | DRW240494SP |
| USB PC connection cable                              | 221040      |
| MI70 connection cable                                | 221801      |
| Calibration adapter for GMP231                       | 239523      |



Dimensions



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