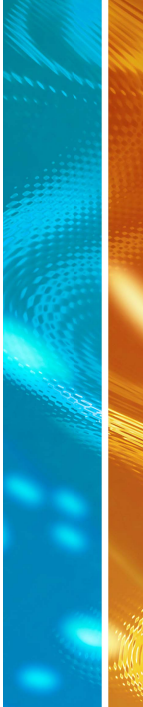


QUICK REFERENCE GUIDE



Vaisala CARBOCAP[®] Carbon Dioxide Module GMM111



- Compact flow aspirated CO2 measurement module
- CO2 measurement range options of 0 ... 5 %CO2, 0 ... 10 %CO2 or 0 ... 20 %CO2
- For OEM applications



GENERAL

Vaisala CARBOCAP[®] Carbon Dioxide Module GMM111 measures CO₂ concentrations up to 5, 10, or 20 % depending on the choice of measurement range. The module features flow-through aspiration and is intended for applications such as incubators and bioreactors. GMM111 powers up from 24 VDC/VAC and provides both voltage and current analog outputs. The module also supports digital RS485 communication.

ELECTRICAL CONNECTIONS

Make the connections according to the table below. See Figure 1 below the table for wire terminals.

mA	Signal 4 ... 20 mA
V	Signal (+) 0 ... 10 V
0	Signal (-)
B	RS485 Signal B
A	RS485 Signal A
0	Power supply (-)
24V	Power supply (+) 24 VDC/VAC

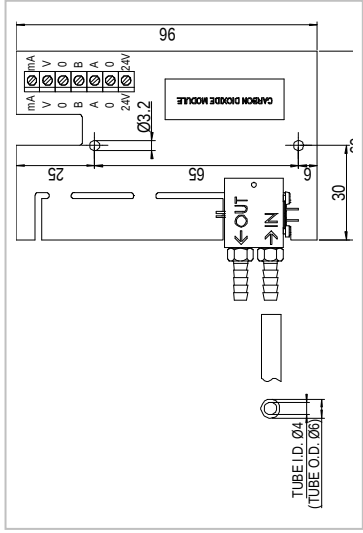


Figure 1 Module Connections and Dimensions

Powering

The module requires a nominal 24 VDC/VAC power supply maintaining a voltage of 18 ... 30 VDC or 20 ... 26 VAC for all load conditions and all mains voltages. Although the power input includes a half-wave rectifier, it is recommended to use a DC supply to avoid current peaks.

Connections to 24 VAC Power Supply

Connecting more than one module to a single 24 VAC transformer forms a common loop and increases the risk of a short-circuit. Therefore, a separate floating supply for each module is recommended (see Figure 2).

If several modules share a common transformer, the phase (~) must always be connected to the 24 V connector in each module (see Figure 3).

GAS SAMPLE CONSIDERATIONS

The unit has been designed for strictly non-condensing conditions. If the gas sample is drawn from humid conditions, special care must be taken to prevent condensation from occurring in the sensor. In practice this means lowering the dewpoint of the gas sample below the sensor temperature, for example by drying the sample gas.

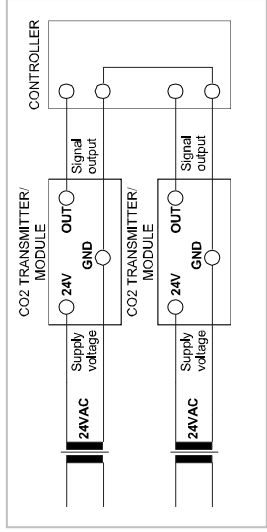


Figure 2 Connection of Separate AC Supplies (Recommended)

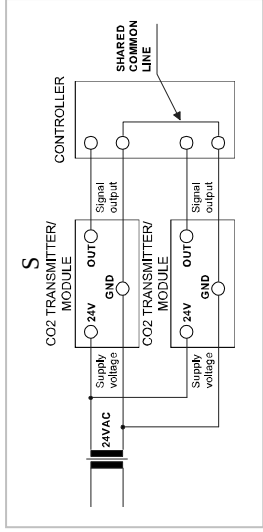


Figure 3 Connection of Single AC supply to Several Modules

SERIAL COMMUNICATION INTERFACES

The modules support RS232 or RS485 communication. RS232 is set as factory default. The RS485 interface is selected by serial command. The communication settings for both interfaces are: 9600, N, 8, 1.

RS485 interface

The interface is non-isolated two-wire interface with no internal bus termination. If termination is needed, use RC termination (100 Ω resistor in series with 1 nF capacitor) at both ends of the bus. See serial commands list below to activate the RS485 interface.

RS232 Interface

Use the RS232 interface for setting the operating parameters. The connection cable between PC and module (a serial COM adapter for maintenance purposes) is available from Vaisala (order code: 19040GM).

SERIAL COMMANDS

Serial commands are the same for RS232 and RS485 interface. <cr> stands for pressing ENTER.

Polling command for CO2 measurement (ppm):

SEND <cr>

Setting the interval for the RUN (continuous output) mode:

INTV X Y<cr>
X = 0 (default) ... 255
Y = S/MIN/H

Starting the continuous mode printing:

R<cr>

Stopping the continuous mode printing:

S<cr>

Saving the parameters into the memory:

SAVE<cr>

Enabling/disabling the RS485 interface:

RS485 X<cr>
X = ON/OFF

Changing the operation mode:

SMODE X<cr>
X = STOP (default) / RUN / POLL

Giving the device address:

ADDR X<cr>
X = 0 (default) ... 99

Opening the polling line:

OPEN addr<cr>
addr = 0 (default) ... 99

Closing the polling line:

CLOSE<cr>

SERVICE, CALIBRATION AND ADJUSTMENT

This product is designed to operate its lifetime without maintenance. The modules are calibrated before shipping from the factory. For technical questions, contact the Vaisala technical support; by e-mail helpdesk@vaisala.com, or by fax +358 9 8949 2790.

Repair and calibration services are provided by Vaisala Service Centers. For contact information, see www.vaisala.com

TECHNICAL DATA

Property	Description / Value
Performance	
Measurement ranges	0 ... 5 %CO2, 0 ... 10 %CO2 or 0 ... 20 %CO2
Measurement accuracy (incl. repeatability, non-linearity and calibration uncertainty)	±(1.5 % of range + 3 % of reading)
Long-term stability	< ±1 %CO2 / 2 years
Response time	1 min @ 0.5 l/min flow
Flow rate dependence of reading	
< 1 l/min	no effect
1 ... 10 l/min	4 % of reading / l/min
Temperature dependence of reading	-0.35 % of reading / °C (typical)
Pressure dependence of reading	+0.15 % of reading / hPa (typical)
Warm-up time	1 min, 10 min full specification
Product lifetime	> 10 years
Operating environment	
Operating temperature range	+5 ... +55 °C
Operating humidity range	0 ... 99 %RH non-condensing
Operating pressure range	700 hPa ... 1200 hPa
Operating gas flow range	< 10 l/min
Recommended gas flow range	0.2 ... 0.8 l/min
Inputs and outputs	
Operating voltage	24 V (±20 %) AC/DC
Power consumption	< 2 W
Outputs	
analog	0 ... 10 V, 4 ... 20 mA
serial	RS485, 2-wire, non-isolated
Recommended external load	
current output	< 500 Ω

voltage output	> 1 kΩ
Electromagnetic compatibility	EN61326-1: Generic Environment.
Materials	
Weight	47 g

GUARANTEE

Vaisala issues a guarantee for the material and workmanship of this product under normal operating conditions for one (1) year from the date of delivery. Exceptional operating conditions, damage due to careless handling and misapplication will void the guarantee.

WARRANTY

For certain products Vaisala normally gives a limited one-year warranty. Please observe that any such warranty may not be valid in case of damage due to normal wear and tear, exceptional operating conditions, negligent handling or installation, or unauthorized modifications. Please see the applicable supply contract or Conditions of Sale for details of the warranty for each product.

NOTE

This manual does not create any legally binding obligations for Vaisala towards the customer or end user. All legally binding commitments and agreements are included exclusively in the applicable supply contract or Conditions of Sale.

