

## eCO<sub>2</sub>-mb Sensor



- Modbus RTU communication interface
  - One analog output for 2...10 V
  - Optional LED indicator for local monitoring
  - 0-5000 ppm detection rate with  $\pm 50\text{ppm} \pm 5\%$  of reading value maximum error (NDIR<sup>1</sup>)
  - USB 5VDC or 24VDC powering options (for 2...10V output device needs to be powered by 24VDC)
  - Built-in temperature and humidity sensors ( $\pm 3\%RH$  and  $\pm 0.3\text{ }^\circ\text{C}$ )
- 1) NDIR = None dispersive infrared

### Use

eCO<sub>2</sub>-mb sensor is designed for local (via LEDs and 2...10V) monitoring of CO<sub>2</sub> levels in closed environments.

- eCO<sub>2</sub>-mb can be connected to any modbus controller easily, meaning it can be used by building automation systems.
- Optional LED indicators designed to easily monitor CO<sub>2</sub> density locally, if required.

The sensor acquires:

- The CO<sub>2</sub> concentration of the room it is placed in.
- The relative humidity of the room.
- The temperature of the room.

Typical use:

- Monitoring closed environments ventilation using CO<sub>2</sub> concentration of the said closed space, such as a classroom, a shop, movie theatre etc.

**Important!**

The eCO<sub>2</sub> sensor is not suitable for safety uses.

**Ordering**

When ordering please use eCO<sub>2</sub> as name.

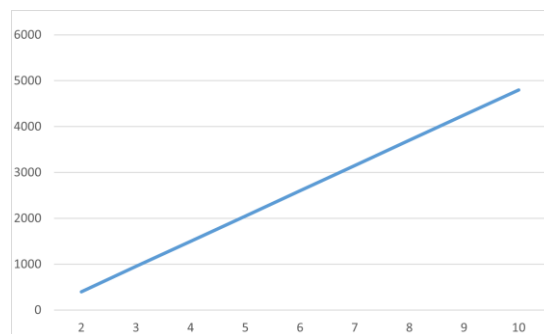
If a PM2.5 version is required, use eCO<sub>2</sub>-PM.

**Equipment Combinations**

The eCO<sub>2</sub> sensor is capable of working with any systems or devices that can acquire and handle 2...10V signal, modbus communication or it can be used as a stand-alone device.

**Mode of Operation**

eCO<sub>2</sub> sensors acquire CO<sub>2</sub> concentration using a system called NDIR. This system allows the sensor to be used for years before requiring a recalibration or service. The 2...10V DC output signal is linear, proportional to the CO<sub>2</sub> concentration.



**Mechanical Design**

The sensor is designed for wall mounting, around 1.5 meters above ground where it won't be in direct contact of sunlight or near a heat source, and away from air flow. The cables required enter the device from behind it, through the cabling holes.

The unit consists of three major sections; front cover, casing and the baseplate for wall-mounting. Front cover and casing can be attached together after the wiring via four screws, and baseplate can be attached to the casing using four more screws.

The measuring circuit and terminals are located on the PCB which is inside casing.

**Engineering Notes**

The sensor can be powered up by a 5VDC USB cable for desk use or it can be powered up with 24VDC via terminals. 5VDC USB cable will be enough to work Modbus interface but for 2...10V signal the sensor must be powered by 24VDC.

While cabling, electrical interference should be observed. If EMC problems are encountered, shielded cables should be used.

**Mounting Notes**

The sensor should be placed on the wall of the room that is to be monitored, but can also be placed on a desk and easily powered. It shouldn't be placed behind curtains or in small niches.

The sensor's functions can be checked after 10 minutes of powering up. In a well ventilated room the sensor should show the outside air's CO<sub>2</sub> concentration which should be close to 400ppm. A function check can be done by exhaling on the sensor.

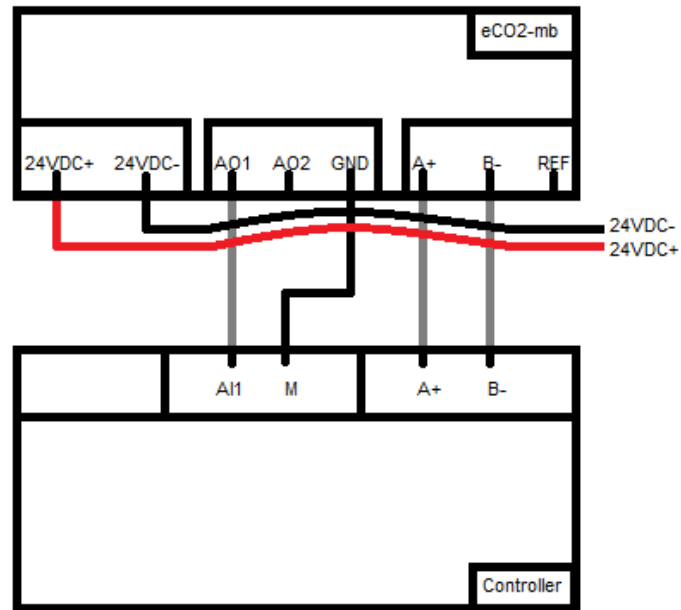
**Technical Data**

<b>Power Supply</b>	Operating Voltage	5VDC USB or 24VDC Terminal
	Power Consumption	≤ 2.5VA
	Cable Lengths	Refer to Data Sheet of the device handling the signal
<b>CO<sub>2</sub> Data</b>	Measuring Range	400....5000ppm
	Measuring Accuracy	± 50ppm ± 5%
	Time Constant	< 5 min
	Recalibration Free	>5 years
<b>Humidity Data</b>	Measuring Range	0...100%RH
	Measuring Accuracy	±3%RH
	Time Constant	< 2 min
<b>Temperature Data</b>	Measuring Range	0-65°C
	Measuring Accuracy	±0.3 °C
	Time Constant	< 2 min

**Connection Terminals**

Terminal	Description
24V+	24VDC positive terminal
24V-	24VDC negative terminal
A+	Modbus positive terminal
B-	Modbus negative terminal
Ref	Modbus reference
AO1	2...10V Output
GND	Analog Output Ground for Reference

## Visual Representation of Connection Terminals



## Communication Parameters

Address	Range	Description
4x0001	400-5000	CO <sub>2</sub> Density
4x0002	0-65	Temperature*
4x0003	0-100	Humidity*
4x0004	1-247	Modbus Address
4x0005	1-5	Baudrate <sup>1</sup>
4x0006	1-3	Parity <sup>2</sup>
4x0007	1-2	Stop Bits <sup>3</sup>
4x0008	0-1	Restart Device <sup>4</sup>

\*Temperature and humidity data need to be divided by 100 to be usable.

<sup>1</sup> 1=4800bps, 2=9600bps, 3=19200bps, 4=38400bps, 5=115200bps

<sup>2</sup> 1=None, 2=Even, 3=Odd Parity

<sup>3</sup> 1=1 Stop Bit, 2=2 Stop Bits

<sup>4</sup> 1=Restart, 0=Normal Work (Used to restart the device with the selected configuration after changes are made)

**Dimensions in mm**

