RCMFX-3
Intelligent multifunctional CO_2 room sensor

The RCMFX-3 are intelligent multifunctional room sensors featuring adjustable CO_2, temperature and relative humidity ranges. The used algorithm controls a single analogue / modulating output based on the measured CO_2, T and rH values, which can be used to directly control an EC fan, an AC fan speed controller or an actuator powered damper. All parameters are accessible via Modbus RTU.

Key features

- Spring contact terminal block
- Selectable CO_2, temperature and relative humidity ranges
- Fan speed control based on temperature, humidity and CO_2 measurements
- Bootloader for updating the firmware via Modbus RTU communication
- Modbus RTU communication
- Day / night detection via ambient light sensor
- 3 LEDs for status indication with adjustable light intensity
- Long-term stability and accuracy

Area of use

- Demand controlled ventilation based on temperature, relative humidity and CO_2
- Suitable for residential and commercial buildings
- For indoor use only

Article codes

Article code	Supply	Imax
RCMFG-3	24 VDC	50 mA
	24 VAC ±10%	120 mA
RCMFF-3	24 VDC	50 mA

Technical specifications

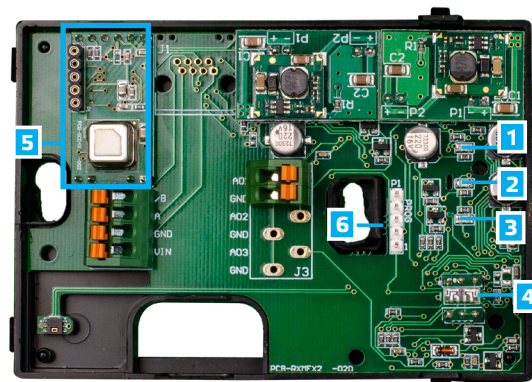|		
Analogue / modulating output	0—10 VDC mode: min. load 50 kΩ ($R_L \geq 50$ kΩ)	
	0—20 mA mode: max. load 500 Ω ($R_L \leq 500$ Ω)	
	PWM (open-collector type) mode: 1 kHz, min. load 50 kΩ ($R_L \geq 50$ kΩ), PWM voltage level: 3,3 VDC or 12 VDC	
Typical range of use	Temperature range	0—50 °C
	Relative humidity range	0—95 % rH (non-condensing)
	CO_2 range	400—2.000 ppm
Accuracy		±0,4 ºC (5—50 ºC)
		±3 % rH (20—80 % rH)
		400—1.000 ppm | ±50 ppm | +2,5% of reading 1.001—2.000 ppm | ± 50 ppm | + 3% of reading 2.001—5.000 ppm | ± 40 ppm | + 5% of reading
Protection standard		IP30 (according to EN 60529)

Standards

- Low Voltage Directive 2014/35/EU:
  - EN 60529:1991 Degrees of protection provided by enclosures (IP Code) Amendment AC:1993 to EN 60529
  - EN 60730-1:2011 Automatic electrical controls for household and similar use - Part 1: General requirements

- EMC Directive 2014/30/EU:
  - EN 60730-1:2011 Automatic electrical controls for household and similar use - Part 1: General requirements
  - EN 61000-6-1:2007 Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light industrial environments
  - EN 61000-6-3:2007 Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments Amendments A1:2011 and AC:2012 to EN 61000-6-3
  - EN 61326-1:2013 Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements
  - EN 61326-2-3:2013 Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-3: Particular requirements Test configuration, operational conditions and performance criteria

- WEEE 2012/19/EU

- RoHs Directive 2011/65/EU:
  - EN IEC 63000:2018 Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

CE

Indications

1 - Red LED	On	Measured temperature or relative humidity values are out of range or CO_2 is higher than or equal to Alert 2 level
	Blinking	Communication with one of the sensors fails
2 - Yellow LED	On	Measured temperature or relative humidity values are in the alert range or CO_2 is higher than or equal to Alert 1 level
	Blinking	Modbus communication has stopped and Holding register 8 is activated (Modbus timeout > 0 seconds)
3 - Green LED	On	Measured temperature or relative humidity values are within range or CO_2 level is lower than Alert 1 level
4 - Ambient light sensor		Low light intensity / Active / Standby
5 - CO_2 sensor element		To measure CO_2 concentration, self-calibrating
6 - PROG header, P1	1 2 3 4 5	Put a jumper onto pins 1 and 2 and wait for at least 5 seconds to reset the Modbus communication parameters
	1 2 3 4 5	Put a jumper onto pins 3 and 4 and restart the supply to enter bootloader mode

Note: *By default, the LED indicators visualise the measured CO_2 level. When the sensor is in bootloader mode, the green and yellow LEDs flash alternately. During the firmware download, the red LED is flashing additionally.*

Wiring and connections

| Article type	RCMFF-3	RCMFG-3	
VIN	24 VDC	24 VDC	24 VAC ±10%
GND	Ground	Common ground	AC ~
A	Modbus RTU (RS485) communication, signal A		
/B	Modbus RTU (RS485) communication, signal /B		
AO1	Analogue / modulating output 1 - temperature, rH or CO_2 (0—10 VDC / 0—20 mA / PWM)		
GND	Ground AO1	Common ground	
Connections	Spring contact terminal blocks, cable cross section: 1,5 mm²		

Attention! The -F version of the product is not suited for 3-wire connection. It has separate grounds for power supply and analogue output. Connecting both grounds together might result in incorrect measurements. Minimum 4 wires are required to connect -F type sensors.

The -G version is intended for 3-wire connection and features a 'common ground'. This means that the ground of the analogue output is internally connected with the ground of the power supply. For this reason, -G and -F types cannot be used together on the same network. Never connect the common ground of -G type articles to other devices powered by a DC voltage. Doing so might cause permanent damage to the connected devices.

Fixing and dimensions
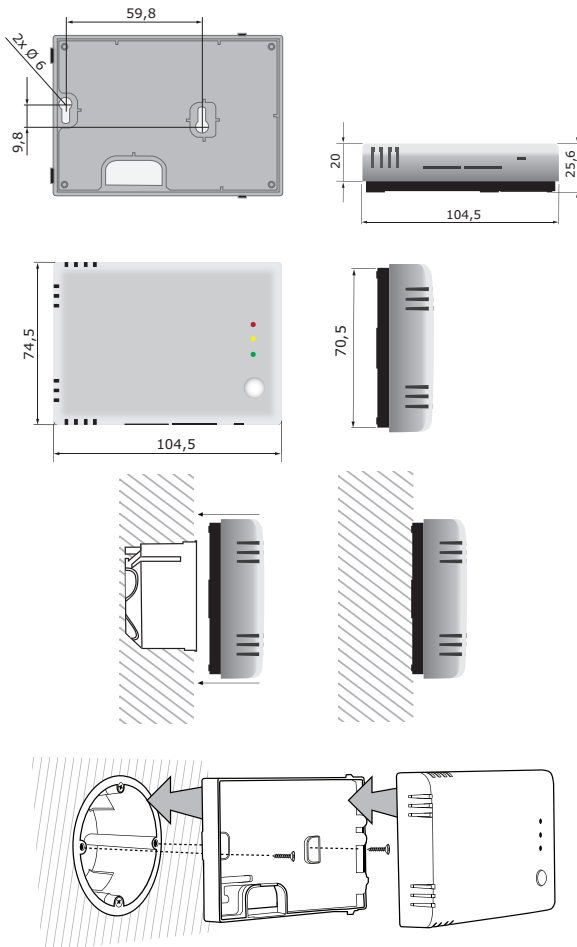

Operational diagrams
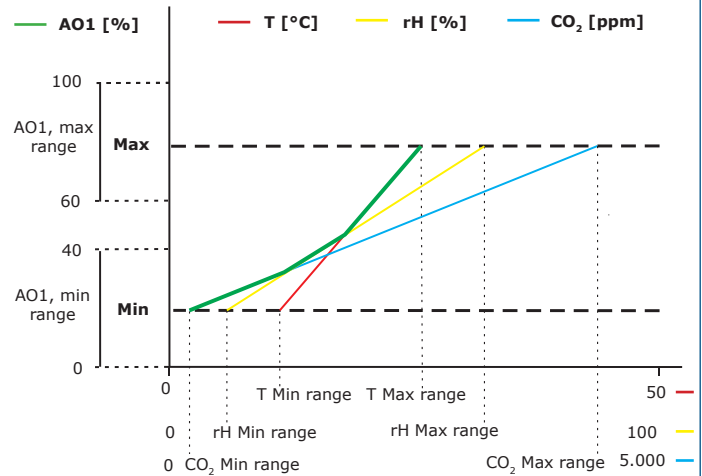
Note: The output changes automatically depending on the highest of the T, rH or CO_2 values, i.e. the highest of the three output values controls the output. See the green line in the operational diagram above. One or multiple sensors can be deactivated. E.g. it is also possible to control the output based on the measured CO_2 value only.

LED indication of CO_2 sensor (default setting)
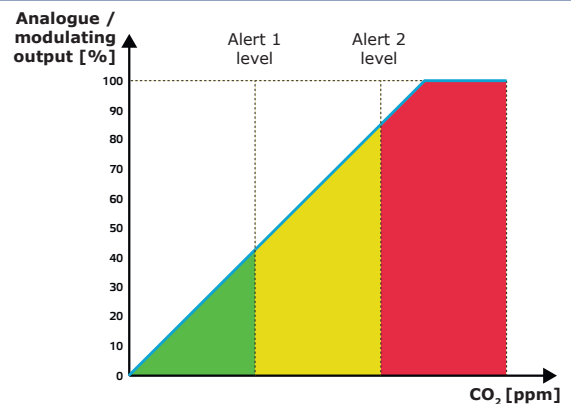
LED indication of temperature and humidity sensors
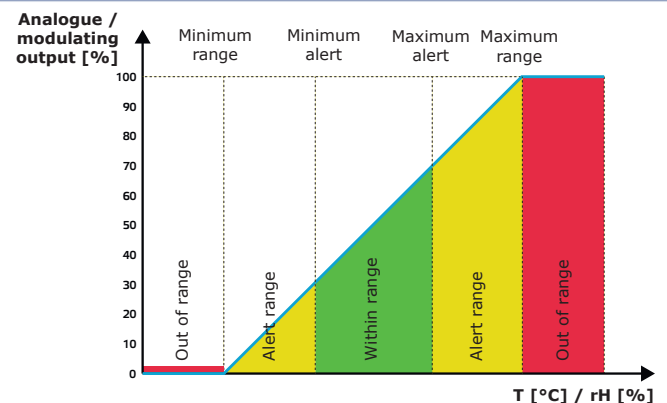
How to configure

Via a Sentera Internet Gateway you can connect your installation to the SenteraWeb HVAC cloud and:

- Easily change the parameter settings of the connected devices remotely

- Define users and give them access to monitor the installation via a standard web browser

- Log data - create diagrams and export logged data

- Receive alerts or warnings when measured values exceed alert ranges or when errors occur

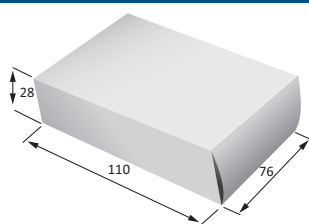- Create different regimes for your ventilation system - e.g. day-night regime

The 3SModbus software platform allows for monitoring and configuring the unit's parameters.

You can download it from the following link:

https://www.sentera.eu/en/3SMCenter

Please refer to the Modbus Register Map of the product for more details regarding the Modbus registers.

Packaging

Article	Packaging	Length [mm]	Width [mm]	Height [mm]	Net weight	Gross weight
RCMFF-3 RCMFG-3	Unit (1 pc.)	110	76	28	0,092 kg	0,105 kg
	Carton (24 pcs.)	492	182	84	2,208 kg	2,67 kg
	Box (144 pcs.)	514	414	274	13,248 kg	17,01 kg

Global trade item numbers (GTIN)

Packaging	RCMFF-3	RCMFG-3
Unit	05401003018880	05401003018897
Carton	05401003302972	05401003302989
Box	05401003504406	05401003504413