SENTERA
C O N T R O L S

FCMFXB-R
Intelligent CO$_2$ sensor with buzzer

The FCMFXB-R series are intelligent multifunctional sensors with integrated audible alarm. They measure temperature, relative humidity and CO$_2$ ranges . The used algorithm controls a single analogue / modulating output based on the measured T, rH and CO$_2$ 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

- Adjustable temperature, relative humidity and CO$_2$ ranges
- Spring contact terminal block
- Fan speed control based on temperature, relative humidity and CO$_2$
- Inset or surface mounting
- Bootloader for updating the firmware via Modbus RTU communication
- Ambient light sensor with adjustable 'active' and 'standby' level
- Replaceable CO$_2$ sensor element
- Replaceable audible alarm module (OFF, continuous or pulsed)
- Modbus RTU communication
- 3 LEDs with adjustable light intensity for status indication
- 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	Power supply	Imax
FCMFFB-R	18—34 VDC	109 mA
FCMFGB-R	18—34 VDC / 15—24 VAC ± 10 %	190 mA

Technical specifications

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Analogue / modulating output	0—10 VDC mode: min. load 50 kΩ (R$_L$ ≥ 50 kΩ)	
	0—20 mA mode: max. load 500 Ω (R$_L$ ≤ 500 Ω)	
	PWM (open-collector type) mode: 1 kHz, min. load 50 kΩ (R$_L$ ≥ 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 °C (range 0—50 °C)	
	± 3% rH (range 0—100 %)	
	± 30 ppm (range 400—2.000 ppm)	
Protection standard	IP30 (according to EN 60529)	

Wiring and connections

Article code	FCMFFB-R	FCMFGB-R	
V+	18—34 VDC	18—34 VDC	15—24 VAC ± 10 %
V-	Ground	Common ground	AC ~
A	Modbus RTU (RS485), signal A		
/B	Modbus RTU (RS485), signal /B		
Ao	Analogue / modulating output for T, rH or CO$_2$ (0—10 VDC / 0—20 mA / PWM)		
GND	Ground	Common ground	
Connections	Spring contact terminal block, cable cross section: 2,5 mm², shielded cable, pitch 5 mm		

Attention! The -F version of the product is not suited for 3-wire connection. It has separate grounds for power supply and for analogue output. Connecting both grounds together might result in incorrect measurements. Minimum four 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 to the ground of the power supply. For this reason, -F and -G types of the product cannot be used together on the same network. Never connect the common ground of the -G type articles to other devices, powered by a DC voltage. Doing so might cause permanent damage to the connected device.

Indications
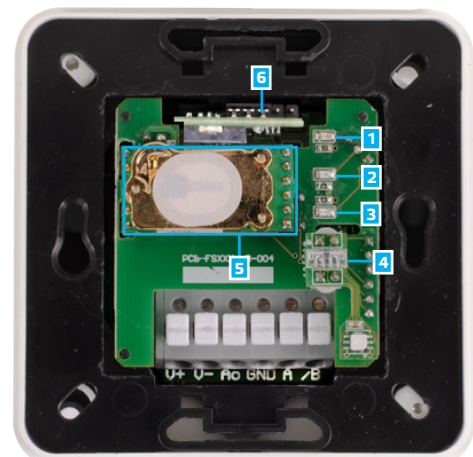
|		
1 - Red LED	On	Measured temperature, relative humidity or CO$_2$ values are out of range
	Blinking	Communication with one of the sensors fails
2 - Yellow LED	On	Measured temperature, relative humidity or CO$_2$ values are in the alert range
	Blinking	Modbus communication has stopped and HR8 is activated (Modbus timeout > 0 seconds)
3 - Green LED	On	Measured temperature, relative humidity or CO$_2$ values are within range
4 - Ambient light sensor		Low light intensity / Active / Standby
5 - CO$_2$ sensor element		Replaceable in case of faulty operation
6 - Buzzer		Adjustable audible alarm, activated simultaneously with the yellow or red LED (The buzzer is activated when the measurement has exceeded the alert value)
7 - 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 upload, the red LED is flashing additionally.

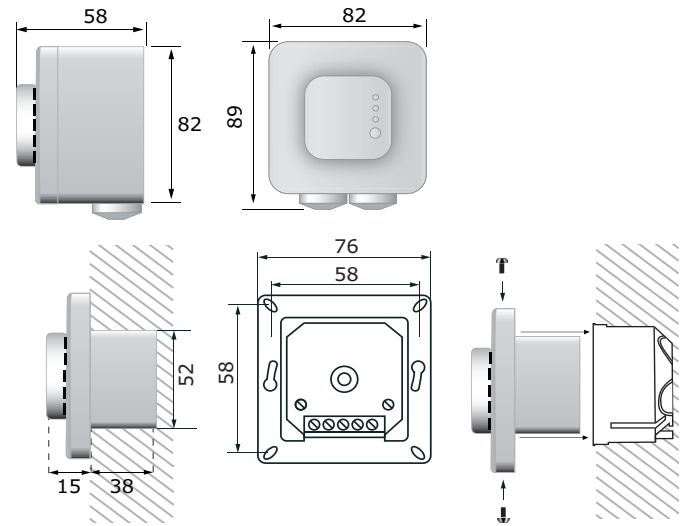## Operational diagram

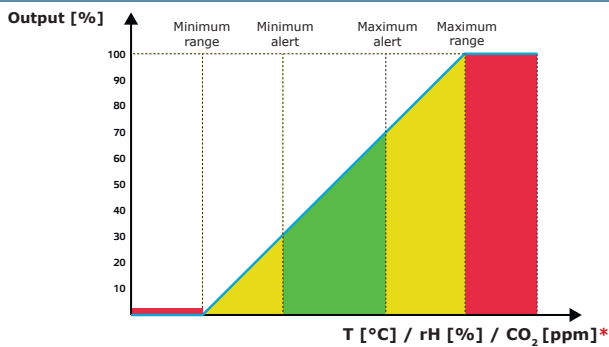— **AO1 [%]**   — **T [°C]**   — **rH [%]**   — **CO_2 [ppm]**
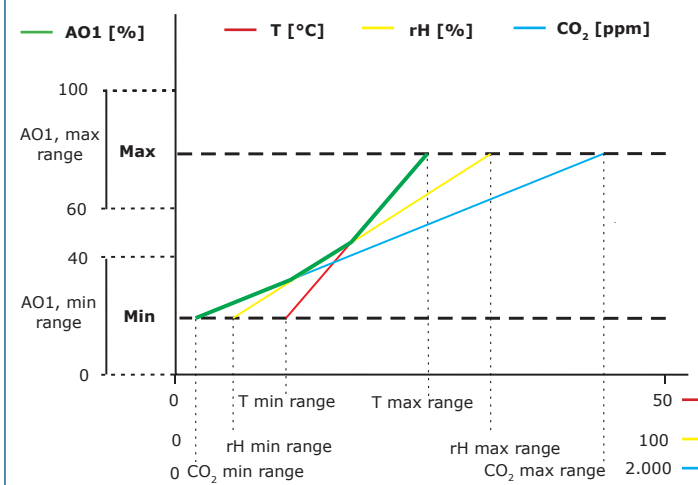
Note: *The output changes automatically depending on the highest of the T, rH or CO_2 values, i.e. the highest of the three output values controls the output. See the green line in the operational diagram above. One or multiple sensors can be deactivated. E.g. it is also possible to control the output based on the measured CO_2 value only.*

*LED indications - T, rH or CO_2 (default)

Fixing and dimensions

Standards

$C\epsilon$

- Low Voltage Directive 2014/35/EC
  - 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/EC:
  - 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 for transducers with integrated or remote signal conditioning
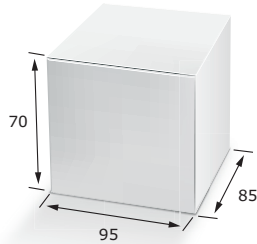
- WEEE 2012/19/EC

- RoHs Directive 2011/65/EC

Packaging

Article	Packaging	Length [mm]	Width [mm]	Height [mm]	Net weight	Gross weight
FCMFFB-R FCMFGB-R	Unit (1 pc.)	95	85	70	0,2 kg	0,21 kg
	Carton (10 pcs.)	492	182	84	2 kg	2,3 kg
	Box (60 pcs.)	590	380	280	12 kg	15 kg

Global trade item numbers (GTIN)

Packaging	FCMFFB-R	FCMFGB-R
Unit	05401003017838	05401003017845
Carton	05401003302460	05401003302477
Box	05401003503577	05401003503584

Modbus registers

The Sensistant Modbus configurator allows you to easily monitor and/or configure Modbus parameters.

The parameters of the unit can be monitored / configured through the 3SModbus software platform. You can download it from the following link:

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

For more information about the Modbus registers, please refer to the product Modbus Register Map.