

FCMFX-R

Intelligent CO₂ sensor



The FCMFX-R series are intelligent sensors featuring adjustable temperature, relative humidity and CO₂ ranges. The used algorithm controls a single analogue / modulating output based on the measured T, rH and CO₂ 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
- Adjustable temperature, relative humidity and CO₂ ranges
- Fan speed control based on T, rH and CO₂
- Inset or surface mounting
- Bootloader for updating the firmware via Modbus RTU communication
- Ambient light sensor with adjustable 'active' and 'standby' level
- Replaceable CO₂ sensor element
- Modbus RTU (RS485)
- 3 LEDs with adjustable light intensity for status indication
- Long-term stability and accuracy

Technical specifications

Analogue / modulating output	0–10 VDC mode: R _L ≥ 50 kΩ	
	0–20 mA mode: R _L ≤ 500 Ω	
	PWM mode: 1 kHz, R _L ≥ 50 kΩ, PWM voltage level: 3,3 VDC or 12 VDC	
Typical field 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)	

Article codes

Article code	Supply	Imax
FCMFG-R	18–34 VDC	90 mA
	15–24 VAC ±10%	180 mA
FCMFF-R	18–34 VDC	90 mA

Area of use

- Demand controlled ventilation based on temperature, relative humidity and CO₂
- Suitable for residential and commercial buildings
- For indoor use only

Wiring and connections

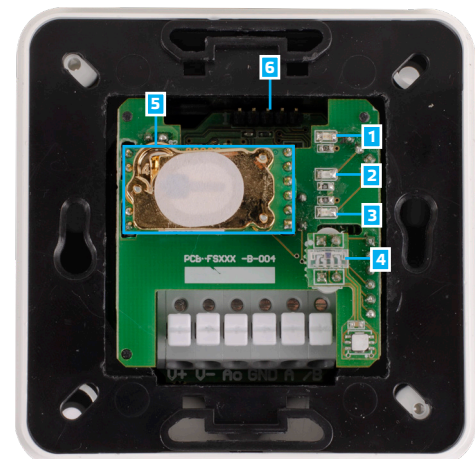
Article code	FCMFF-R	FCMFG-R	
V+	18–34 VDC	18–34 VDC	15–24 VAC ± 10 %
V-	Ground	Common ground	AC ~
A	Modbus RTU (RS485), signal A		
/B	Modbus RTU (RS485), signal /B		
Ao	Analogue / modulating output (0–10 VDC / 0–20 mA / PWM)		
GND	Ground	Common ground	
Connections	Spring contact terminal block, cable cross section: 2,5 mm ² ; pitch 5 mm; shielded cable		

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.



Indications



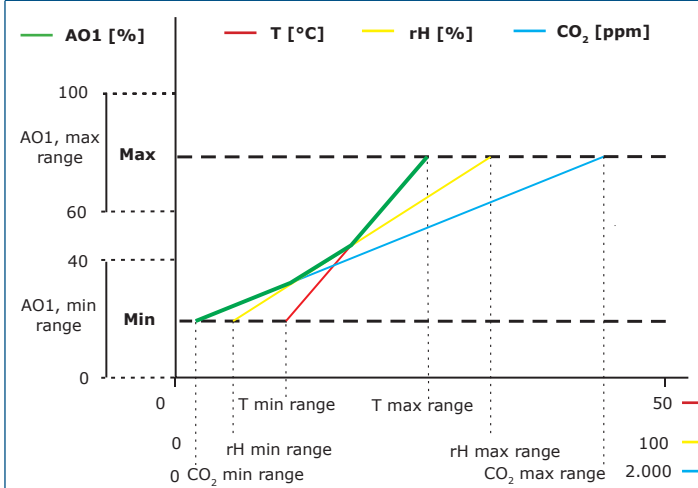
1 - Red LED	On	Measured temperature, relative humidity or CO ₂ values are out of range
	Blinking	Communication with one of the sensors fails
2 - Yellow LED	On	Measured temperature, relative humidity or CO ₂ values are in the alert range
	Blinking	Modbus communication has stopped and HR8 is activated (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 - PROG header, P1		Put a jumper onto pins 1 and 2 and wait for at least 5 seconds to reset the Modbus communication parameters
		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 CO₂ 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.

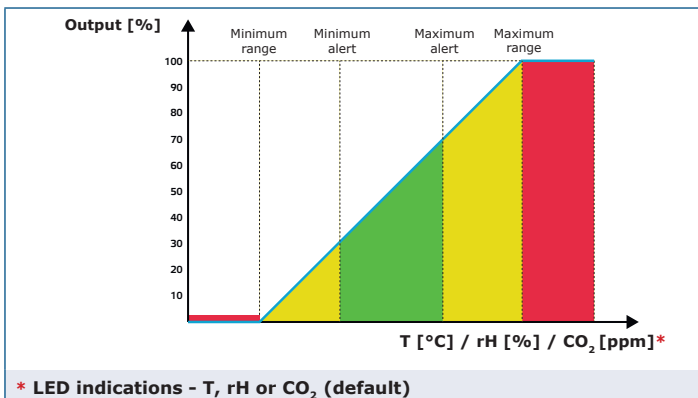
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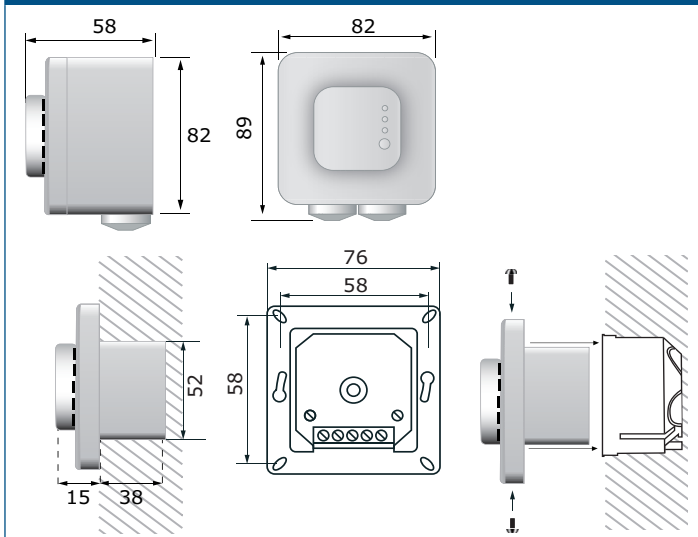
Operational diagram



Note: The output changes automatically depending on the highest of the T, rH or CO₂ 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 CO₂ value only.



Fixing and dimensions

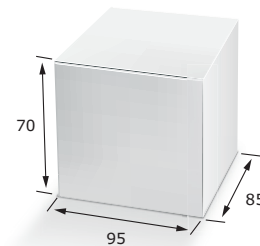


Standards

- 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 for transducers with integrated or remote signal conditioning
- WEEE 2012/19/EU
- RoHS Directive 2011/65/EU



Packaging



Article	Packaging	Length [mm]	Width [mm]	Height [mm]	Net weight	Gross weight
FCMFG-R FCMFF-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	14,2 kg

Global trade item numbers (GTIN)

Packaging	FCMFF-R	FCMFG-R
Unit	05401003006214	05401003006221
Carton	05401003300749	05401003300756
Box	05401003501153	05401003501160

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.