RSMFXB-2R

MULTIFUNCTIONAL ROOM SENSOR WITH BUZZER

Mounting and operating instructions

RSMFXB-2R | MULTIFUNCTIONAL ROOM SENSOR WITH BUZZER

SENTERA
C O N T R O L S

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SAFETY AND PRECAUTIONS

Read all the information, the datasheet, Modbus map, mounting and operating instructions and study the wiring and connection diagram before working with the product. For personal and equipment safety, and for optimum product performance, make sure you entirely understand the contents before installing, using or maintaining this product.

For safety and licensing (CE) reasons, unauthorised conversion and / or modifications of the product are inadmissible.

The product should not be exposed to abnormal conditions, such as extreme temperatures, direct sunlight or vibrations. Long-term exposure to chemical vapours in high concentration can affect the product performance. Make sure the work environment is as dry as possible; avoid condensation.

All installations shall comply with local health and safety regulations and local electrical standards and approved codes. This product can only be installed by an engineer or a technician who has expert knowledge of the product and safety precautions.

Avoid contacts with energised electrical parts. Always disconnect the power supply before connecting, servicing or repairing the product.

Always verify that you apply appropriate power supply to the product and use appropriate wire size and characteristics. Make sure that all the screws and nuts are well tightened and fuses (if any) are fitted well.

Recycling of equipment and packaging should be taken into consideration and these should be disposed of in accordance with local and national legislation / regulations.

In case there are any questions that are not answered, please contact your technical support or consult a professional.

RSMFXB-2R | MULTIFUNCTIONAL ROOM SENSOR WITH BUZZER

SENTERA CONTROLS

PRODUCT DESCRIPTION

The RSMFXB-2R series are multifunctional room transmitters with integrated audible alarm output which measure temperature, relative humidity, CO_2 concentration and ambient light level. These rooms sensors also feature a wide range of low voltage power supply and three analogue/ modulating outputs - one for temperature, one for relative humidity and one for CO_2 concentration. All parameters are accessible via Modbus RTU.

ARTICLE CODE

Code	Supply	Imax
RSMFFB-2R	18—34 VDC	130 mA
RSMFGB-2R	15—24 VAC ±10%	130 mA
	18—34 VDC	130 mA

INTENDED AREA OF USE

- Monitoring temperature, relative humidity and CO_2 level in HVAC applications
- Suitable for residential and commercial buildings
- For indoor use only

TECHNICAL DATA

- 3 analogue / modulating outputs:
  - 0—10 VDC mode: min. load 50 kΩ (R_L ≥ 50 kΩ)
  - 0—20 mA: max. load 500 Ω (R_L ≤ 500 Ω)
  - PWM (open-collector type): PWM Frequency: 1 kHz, min. load 50 kΩ (R_L ≥ 50 kΩ); PWM voltage level 3,3 VDC or 12 VDC
- Ambient light sensor with adjustable 'active' and 'standby' level
- CO_2 sensor stabilising time: 35 seconds
- Replaceable CO_2 sensor element
- Replaceable audible alarm module, settable via Modbus register (OFF, continuous or pulsed)
- Green, yellow and red LEDs for status indication with adjustable light intensity
- Accuracy: ±0,4 ºC (0—50 ºC); ±3 % rH (0—100 % rH), ± 30 ppm CO_2 (400—2.000 ppm CO_2)
- Enclosure:
  - rear plate: plastic ABS, black (RAL 9004)
  - front cover: ASA, ivory (RAL 9010)
- Protection standard: IP30 (according to EN 60529)
- Typical range of use:
  - temperature: 0—50 ºC
  - relative humidity: 0—95 % rH, (non-condensing)
  - CO_2: 400—2.000 ppm
- Storage temperature: -10—60 ºC

STANDARDS

CE

- 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
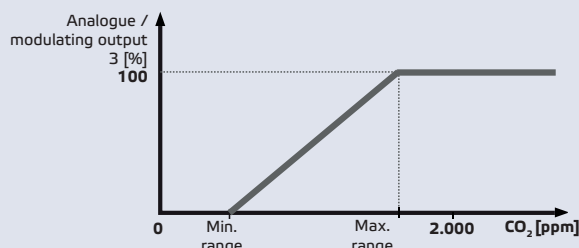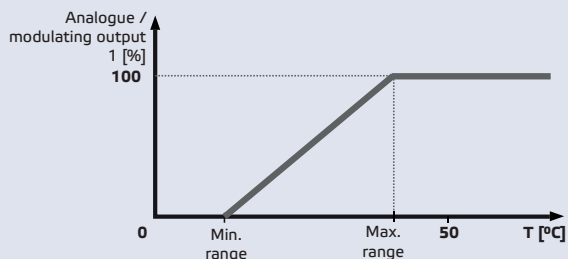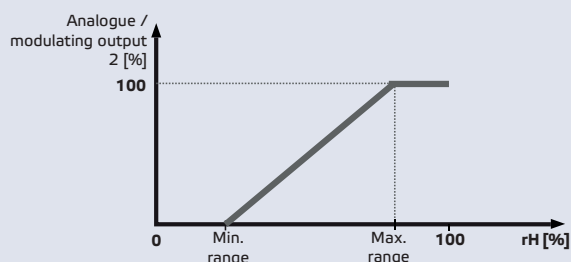
▸ EN 61000-6-3:2007 Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments Amendments A1:2011 and AC:2012 to EN 61000-6-3

▸ 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

■ 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

■ WEEE 2012/19/EC

■ RoHs Directive 2011/65/EC

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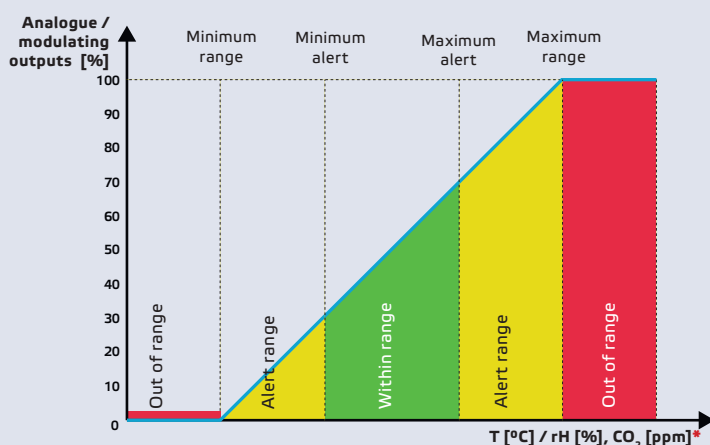
*LED indications - CO_2 (default), T or rH

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WIRING AND CONNECTIONS

Article type	RSMFFB-2R	RSMFGB-2R	
VIN	18—34 VDC	18—34 VDC	15—24 VAC ±10%
GND	Ground	Common ground	AC ~
A	Modbus RTU (RS485), signal A	Modbus RTU (RS485), signal A	
/B	Modbus RTU (RS485), signal /B	Modbus RTU (RS485), signal /B	
AO1	Analogue / modulating output 1 for temperature measurement (0—10 VDC / 0—20 mA / PWM)	Analogue / modulating output 1 for temperature measurement (0—10 VDC / 0—20 mA / PWM)	
GND	Ground AO1	Common ground	
AO2	Analogue / modulating output 2 for relative humidity measurement (0—10 VDC / 0—20 mA / PWM)	Analogue / modulating output 2 for relative humidity measurement (0—10 VDC / 0—20 mA / PWM)	
GND	Ground AO2	Common ground	
AO3	Analogue / modulating output 3 for CO_2 measurement (0—10 VDC / 0—20 mA / PWM)	Analogue / modulating output 3 for CO_2 measurement (0—10 VDC / 0—20 mA / PWM)	
GND	Ground AO3	Common ground	
Connections	Spring contact terminal blocks, cable cross section: 1,5 mm^2		

⚠ **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.

MOUNTING & OPERATING INSTRUCTIONS IN STEPS

Before you start mounting the unit, read carefully **"Safety and Precautions"**. Choose a smooth surface for installation (a wall, panel, etc.).

⚠ **ATTENTION**

Mount the sensor in a well-ventilated area, where it receives adequate airflow for proper operation and hide it from direct sunlight. Make sure it can be easily accessed for service.

Follow these steps:

1. Switch off the power supply.
2. Using a flat screwdriver, remove the front white cover by releasing the snap-fits on both sides (see **Fig. 1** *Snap-fits release*).
3. Insert the cables through the opening on the rear plate (see **Fig. 2** *Mounting dimensions*.)
4. Using suitable fastening materials (not supplied), position the room sensor at least 1,5 m from the floor. When planning the installation, allow enough clearance for maintenance and service. See **Fig. 2** and **Fig. 3**.

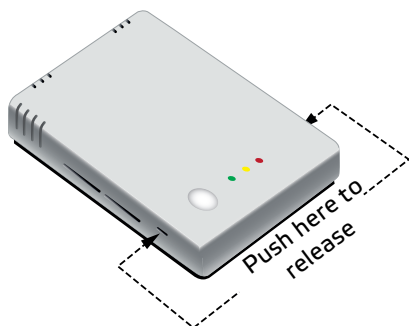# RSMFXB-2R | MULTIFUNCTIONAL ROOM SENSOR WITH BUZZER

Fig. 1 Snap-fits release

Push here to release

Fig. 2 Mounting dimensions

59,8
2x Ø 6
9,8
74,5
104,5
70,5
20
25,6
104,5

Fig. 3 Mounting position

Correct	Incorrect

Position at min. 1,5 m from the floor
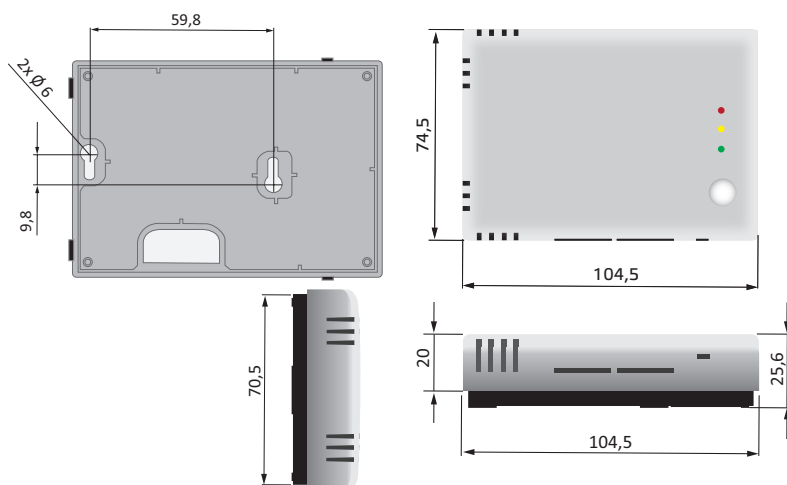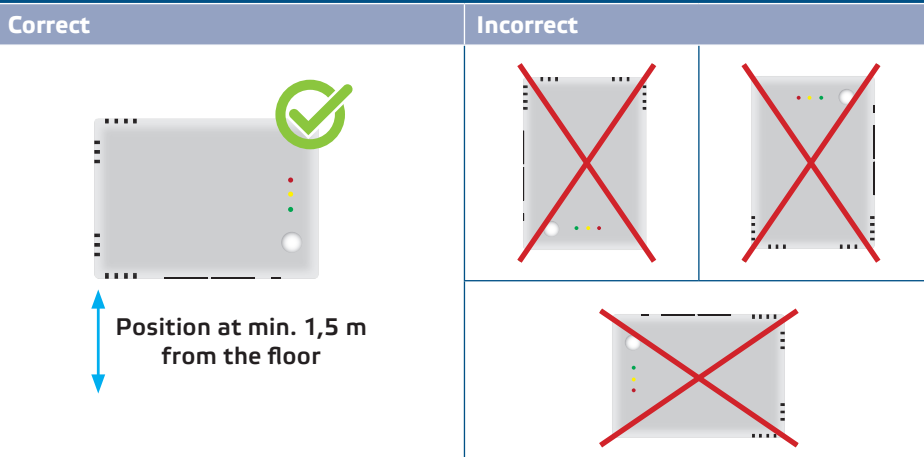
5. Do the wiring according to the wiring diagram (see **Fig. 4**).

Fig. 4 Wiring

Modbus RTU /B A

/B
A
GND
VIN

AO1
GND
AO2
GND
AO3
GND

Analogue / modulating output 1 - Temperature

Analogue / modulating output 2 - relative humidity

Analogue / modulating output 3 - CO₂

Supply voltage
RSMFFB-2R: 18—34 VDC
RSMFGB-2R: 18—34 VDC / 15—24 VAC ±10 %
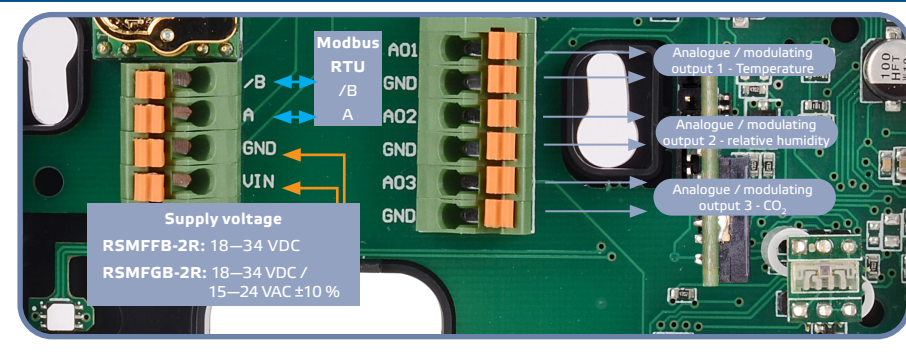
6. Put back the cover and snap it in.
7. Switch on the mains supply.
8. Customise the factory settings to the desired ones via the 3SModbus software or Sensistant (if necessary). For the default factory settings refer to the *Modbus register map* of the product.
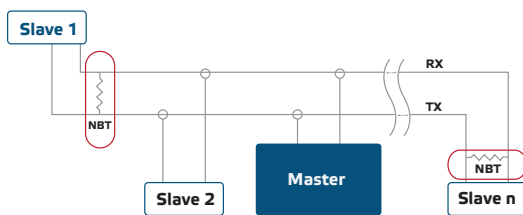
NOTE

For the complete Modbus register data, see the Modbus Register Map of the product. This is a separate document linked to the article code on the website containing the list of registers. Products with earlier firmware versions may not be compatible with this list.
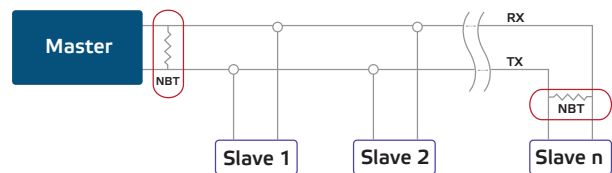
Optional settings

To assure correct communication, the NBT needs to be activated in only two devices on the Modbus RTU network. If necessary, enable the NBT resistor via 3SModbus or Sensistant (*Holding register 9*).

Example 1	Example 2

NOTE

On a Modbus RTU network, two bus terminators (NBTs) need to be activated.

OPERATING INSTRUCTIONS

Calibration procedure:

Sensor calibration is not necessary. All sensor elements are calibrated and tested in our factory. The CO_2 sensor element is self-calibrating to compensate sensor drift. The ABC logic self-calibrating algorithm is by default enabled. This algorithm is designed to be used in applications where CO_2 concentrations will drop to outside ambient conditions (400 ppm) at least one time (15 minutes) in a 7day period, which is typically seen during unoccupied periods. The sensor will reach its operational accuracy after 25 hours of continuous operation at a condition that it was exposed to ambient reference levels of air at 400 ppm ± 10 ppm CO_2. It is advisable to disable the self-calibrating algorithm in situations where the CO_2 level will not drop to 400 ppm during the above described timespan. In the unlikely event of CO_2 sensor element failure, this component can be replaced.

Firmware update

New functionalities and bug fixes are made available via a firmware update. In case your device does not have the latest firmware installed, it can be updated. SenteraWeb is the easiest way to update the firmware of the unit. In case you do not have an internet gateway available, the firmware can be updated via the 3SM boot application (part of the Sentera 3SMcenter software suite).

NOTE

Make sure the power supply does not get interrupted during the "bootload" procedure, otherwise you risk losing unsaved data.

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LED indications and audible alarm module:

1. When the green LED is on, the measured value (temperature, relative humidity or CO_2) is between the minimum and maximum alert range values. In this case the audible alarm is OFF (**Fig. 5 - 1**).

2. When the yellow LED is on, the measured value (temperature, relative humidity or CO_2) is in the alert range. In this case the audible alarm is ON. The yellow LED is blinking when the Modbus communication has stopped and HR8 is activated (Modbus time out > 0 seconds). See **Fig. 5**.

3. When the red LED is on, the measured value (temperature, relative humidity or CO_2) is below the minimum measurement range value or above the maximum value. In this case the audible alarm is ON. Blinking red LED indicates loss of communication with a sensor (**Fig. 5 - 3**).
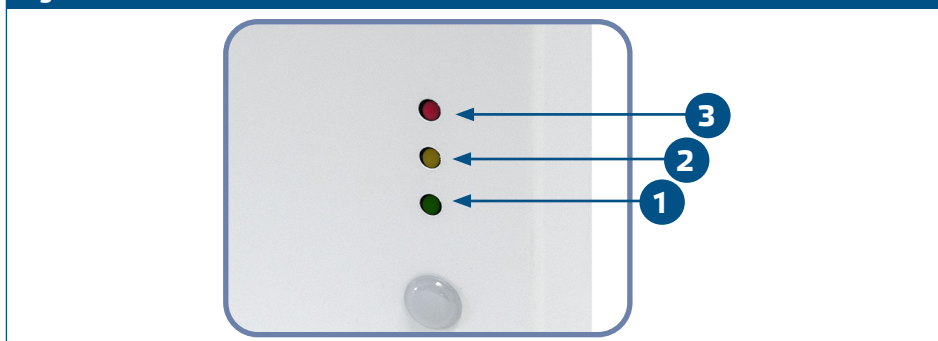
NOTE

When the sensor is in bootloader mode, the green and yellow LEDs flash alternately. During the firmware download, the red LED is flashing additionally.

NOTE

The audible alarm output can be set via Holding register 78. By writing "0" in Holding register 78, the audible alarm will be disabled. By default, the audible alarm function is set to 'continuous'. The status of the audible alarm can be changed to 'pulsed' by writing 2 in Holding register 78.

Fig. 5 LED indications

NOTE

The intensity of the LEDs can be adjusted between 0 and 100 % with a step of 10 % according to the value set in Holding register 80.

NOTE

By default, the LED indication refers to the CO_2 measurement. This can be changed to relative humidity or temperature values via Modbus Holding Register 79 (see **Table** *Holding registers).*

Ambient light sensor

The measured light intensity in lux is available in Input Register 41. Additionally, an active and standby level can be defined in Holding registers 35 and 36. Input Register 42 indicates if the measured value is below standby level, above active level or in between both levels:

- Ambient light level < standby level: Input Register 42 indicates "Standby".
- Ambient light level > active level: Input Register 42 indicates "Active".
- Standby level < Ambient light level < Active level: Input Register 42 indicates "Low intensity".

VERIFICATION OF INSTALLATION INSTRUCTIONS

After switching on the power supply one of the LEDs lights up according to the status of the measured variable. If this is not the case, check the connections.

TRANSPORT AND STORAGE

Avoid shocks and extreme conditions; stock in original packing.

WARRANTY AND RESTRICTIONS

Two years from the delivery date against defects in manufacturing. Any modifications or alterations to the product after the date of publication relieve the manufacturer of any responsibilities. The manufacturer bears no responsibility for any misprints or mistakes in this data.

MAINTENANCE

In normal conditions this product is maintenance-free. If soiled, clean with a dry or damp cloth. In case of heavy pollution, clean with a non-aggressive product. In these circumstances the unit should be disconnected from the supply. Pay attention that no fluids enter the unit. Only reconnect it to the supply when it is completely dry.