

# RCMFX-3 | INTELLIGENT MULTIFUNCTIONAL ROOM SENSOR

Modbus register map



## MODBUS REGISTER MAP

| INPUT REGISTERS |                                    |                  |   |                |  |
|-----------------|------------------------------------|------------------|---|----------------|--|
|                 |                                    | Data type        | Description   | Raw data range | Values   |
| 1               | Temperature reading                | signed integer   | Actual temperature level  | -300—700       | 500 = 50,0°C   |
| 2               | Temperature output value           | unsigned integer | Output value according to temperature   | 0—1.000        | 0 = 0 %<br>1.000 = 100 %   |
| 3               | Temperature alert flag             | unsigned integer | Flag indicates that measured temperature is outside set alert values. Set to '1' when the measured value is outside the Temperature alert values defined by holding registers 13 and 14               | 0, 1           | 0 = Temperature measurement OK<br>1 = Temperature measurement too low / high             |
| 4               | Temperature range limit flag       | unsigned integer | Flag indicates that measured temperature is outside set range limit values. Set to '1' when the measured temperature is outside limit range values defined by holding registers 11 and 12             | 0, 1           | 0 = Temperature range OK<br>1 = Temperature range too low/high                           |
| 5               | Temperature sensor state           | unsigned integer | Flag that shows if the communication with temperature sensor is lost  | 0, 1           | 0 = OK<br>1 = Temperature sensor problem   |
| 6—9             |                                    |                  | Reserved, return 0  |                |  |
| 10              | Relative humidity level            | unsigned integer | Actual relative humidity level  | 0—1.000        | 1.000 = 100 % rH   |
| 11              | Relative humidity output value     | unsigned integer | Output value according to relative humidity   | 0—1.000        | 1.000 = 100 %  |
| 12              | Relative humidity alert flag       | unsigned integer | Flag indicates that measured relative humidity is outside set alert values. Set to '1' when the measured value is outside the Relative humidity alert values defined by holding registers 21 and 22   | 0, 1           | 0 = Relative humidity measurement OK<br>1 = Relative humidity measurement too low / high |
| 13              | Relative humidity range limit flag | unsigned integer | Flag indicates that measured relative humidity is outside set range limit values. Set to '1' when the measured Relative humidity is outside limit range values defined by holding registers 19 and 20 | 0, 1           | 0 = Relative humidity range OK<br>1 = Relative humidity range too low/high               |
| 14              | Humidity sensor state              | unsigned integer | Flag that shows if the communication with the humidity sensor is lost   | 0, 1           | 0 = OK<br>1 = Humidity sensor problem  |
| 15              | Dew point level                    | signed integer   | Calculated dew point  | -700—700       | 200 = 20,0°C   |
| 16—20           |                                    |                  | Reserved, return 0  |                |  |

## INPUT REGISTERS

|       |                                    | Data type        | Description   | Raw data range    | Values  |
|-------|------------------------------------|------------------|---|-------------------|---|
| 21    | CO <sub>2</sub> level              | unsigned integer | CO <sub>2</sub> level   | 0—5.000           | 1.000 = 1.000 ppm   |
| 22    | CO <sub>2</sub> output value       | unsigned integer | CO <sub>2</sub> output value  | 0—1.000           | 1.000 = 100 %   |
| 23    | CO <sub>2</sub> alert 1 indication | unsigned integer | Indicates if CO <sub>2</sub> value is higher than Alert 1 Level defined by holding register 25  | 0, 1              | 0 = CO <sub>2</sub> measurement OK<br>1 = CO <sub>2</sub> measurement too high    |
| 24    | CO <sub>2</sub> alert 2 indication | unsigned integer | Indicates if CO <sub>2</sub> value is higher than Alert 2 Level defined by holding register 26  | 0, 1              | 0 = CO <sub>2</sub> measurement OK<br>1 = CO <sub>2</sub> measurement too high    |
| 25    | CO <sub>2</sub> sensor status      | unsigned integer | Flag that shows if the communication with the CO <sub>2</sub> sensor is lost  | 0, 1              | 0 = OK<br>1 = Fault   |
| 26—38 |                                    |                  | Reserved, return 0  |                   |   |
| 39    | Actual output value                | unsigned integer | The actual output value   | 0—1.000           | 1.000 = 100 %   |
| 40    | Output control mode                | unsigned integer | The source of the output value  | 0, 1, 2, 3 and 99 | 0 = overwrite<br>1 = temperature<br>2 = rH<br>3 = CO <sub>2</sub><br>99 = all OFF |
| 41    | Ambient light intensity            | unsigned integer | Measured ambient light intensity  | 0—32.000          | 1.000 = 1.000 lux   |
| 42    | Active / Standby                   | unsigned integer | Active or Standby indication according the Active / Standby light level defined by holding registers 35 and 36. If the measured light level is between the two levels the indication is 0 (Low intensity) | 0—2               | 0 = Low light intensity<br>1 = Active<br>2 = Standby                              |
| 43    | Ambient light sensor state         | unsigned integer | Flag that shows if the communication with the ambient light sensor is lost  | 0, 1              | 0 = OK<br>1 = ambient light sensor problem  |
| 44—50 |                                    |                  | Reserved, return 0  |                   |   |

**Note:** The input registers can be read via the Modbus command: "Read input registers".

| HOLDING REGISTERS |   |                  |   |                |  |                        |  |
|-------------------|---|------------------|---|----------------|--|------------------------|--|
|                   |   | Data type        | Description   | Raw data range | Values   | Factory default values |  |
| 1                 | Device slave address                      | unsigned integer | Modbus device address   | 1–247          |  | 1                      |  |
| 2                 | Modbus baud rate                          | unsigned integer | Modbus communication baud rate  | 0–6            | 0 = 4.800<br>1 = 9.600<br>2 = 19.200<br>3 = 38.400<br>4 = 57.600<br>5 = 115.200<br>6 = 230.400 | 2                      |  |
| 3                 | Modbus parity                             | unsigned integer | Parity check mode   | 0–2            | 0 = 8N1<br>1 = 8E1<br>2 = 8O1  | 1                      |  |
| 4                 | Device type                               | unsigned integer | Device type. Read only  | 1.797–1.799    | 1.797 = RCMFG-3<br>1.798 = RCMFF-3<br>1.799 = RCMFH-3  |                        |  |
| 5                 | HW version                                | unsigned integer | Hardware version of the device. Read only   | XXXX           | 0x0200 = HW version 2.0  |                        |  |
| 6                 | FW version                                | unsigned integer | Firmware version of the device. Read only   | XXXX           | 0x0100 = FW version 1.0  |                        |  |
| 7                 |   |                  | Reserved, returns 0   |                |  |                        |  |
| 8                 | Modbus safety timeout                     | unsigned integer | Timeout setting for no Modbus communication. After time runs out, with no Modbus communication, all outputs SET to minimum output | 0–60           | 0 = no timeout<br>10 = 10 minutes  | 0                      |  |
| 9                 | Modbus network resistor termination (NBT) | unsigned integer | Set device as end device of the line / or not by connecting NBT   | 0, 1           | 0 = NBT disconnected<br>1 = NBT connected  | 0                      |  |
| 10                | Modbus registers reset                    | unsigned integer | Reset Modbus Holding registers (above 10) to default values. When finished this register is automatically reset to '0'            | 0, 1           | 0 = Idle<br>1 = Reset Modbus Registers   | 0                      |  |
| 11                | Minimum temperature range                 | unsigned integer | Minimum value of temperature range, cannot be set higher than maximum temperature range minus 5°C                                 | 0–(Max - 50)   | 100 = 10,0°C   | 0                      |  |
| 12                | Maximum temperature range                 | unsigned integer | Maximum value of temperature range, cannot be set less than minimum temperature range plus 5°C                                    | (Min + 50)–500 | 500 = 50,0°C   | 500                    |  |

## HOLDING REGISTERS

|       |                                 | Data type        | Description  | Raw data range  | Values            | Factory default values |
|-------|---------------------------------|------------------|--|---|-------------------|------------------------|
| 13    | Minimum temperature alert       | unsigned integer | Minimum temperature alarm value  | Min. temperature range—<br>Max. temperature alarm             | 100 = 10,0°C      | 0                      |
| 14    | Maximum temperature alert       | unsigned integer | Maximum temperature alarm value  | Min. temperature alarm—<br>Max. temperature range             | 500 = 50,0°C      | 500                    |
| 15–18 |                                 |                  | Reserved, return 0   |   |                   |                        |
| 19    | Minimum relative humidity range | unsigned integer | Minimum value of relative humidity range, cannot be set higher than maximum relative humidity range minus 5% | 0—(Max - 50)  | 200 = 20,0 % rH   | 50                     |
| 20    | Maximum relative humidity range | unsigned integer | Maximum value of relative humidity range, cannot be set less than minimum relative humidity range plus 5%    | (Min + 50)—1.000  | 1.000 = 100 % rH  | 950                    |
| 21    | Minimum relative humidity alert | unsigned integer | Minimum relative humidity alarm value  | Min. relative humidity range—<br>Max. relative humidity alarm | 200 = 20,0 % rH   | 0                      |
| 22    | Maximum relative humidity alert | unsigned integer | Maximum relative humidity alarm value  | Min. relative humidity alarm—<br>Max. relative humidity range | 1.000 = 100 % rH  | 1.000                  |
| 23    | Minimum CO <sub>2</sub> range   | unsigned integer | Minimum value of the CO <sub>2</sub> range. The value is used for calculating CO <sub>2</sub> output level   | 0—(Max - 100)   | 350 = 350 ppm     | 350                    |
| 24    | Maximum CO <sub>2</sub> range   | unsigned integer | Maximum value of the CO <sub>2</sub> range. The value is used for calculating CO <sub>2</sub> output level   | (Min + 100)—5.000   | 2.000 = 2.000 ppm | 2.000                  |
| 25    | CO <sub>2</sub> alert 1 level   | unsigned integer | CO <sub>2</sub> value for "Alert 1" indication, when higher Alert 1 indication                               | 0—(Alert 2 Level - 100)                                       | 400 = 400 ppm     | 900                    |
| 26    | CO <sub>2</sub> alert 2 level   | unsigned integer | CO <sub>2</sub> value for "Alert 2" indication, when higher Alert 2 indication                               | (Alert 1 Level + 100)—<br>5.000                               | 2.000 = 2.000 ppm | 1.200                  |
| 27–34 |                                 |                  | Reserved, return 0   |   |                   |                        |

## HOLDING REGISTERS

|       |  | Data type        | Description   | Raw data range | Values                                 | Factory default values |
|-------|--|------------------|---|----------------|--|------------------------|
| 35    | Active light level                         | unsigned integer | The ambient light level above which 'Active' is indicated in input register 42  | 0–32.000       | 100 = 100 lux                          | 100                    |
| 36    | Standby light level                        | unsigned integer | The ambient light level below which 'Standby' is indicated in input register 42   | 0–32.000       | 10 = 10 lux                            | 10                     |
| 37–39 |  |                  | Reserved, return 0  |                |  |                        |
| 40    | CO <sub>2</sub> module self calibration    | unsigned integer | Enable or disable the CO <sub>2</sub> module self calibration technique. If enabled it is advisable that the CO <sub>2</sub> concentration drops to outside level (400 ppm) in a 7-day period | 0, 1           | 0 = Disabled<br>1 = Enabled            | 1                      |
| 41    | Output 1 mode                              | unsigned integer | Select analogue / modulating output 1 type  | 1–3            | 1 = 0–10 VDC<br>2 = 0–20 mA<br>3 = PWM | 1                      |
| 42    | Output 1 enable / disable                  | unsigned integer | Enable the direct control over output 1   | 0, 1           | 0 = Disabled<br>1 = Enabled            | 0                      |
| 43    | Output 1 overwrite value                   | unsigned integer | Overwrite value for output 1. Active only if Holding register 42 is set to 1  | 0–1.000        | 200 = 20 %                             | 0                      |
| 44    | Internal voltage source selection Output 1 | unsigned integer | Selection of internal voltage source for PWM output 1   | 0, 1           | 0 = 3,3 VDC<br>1 = 12 VDC              | 0                      |
| 45    | Minimum output 1 value                     | unsigned integer | Set minimum value of output signal in percentage  | 0–400          | 200 = 20 %                             | 0                      |
| 46    | Maximum output 1 value                     | unsigned integer | Set maximum value of output signal in percentage  | 600–1.000      | 600 = 60 %                             | 1.000                  |
| 47    | Temperature sensor selection (On/Off)      | unsigned integer | Turn ON or OFF the temperature sensor (related to output value - input register 39 and 40)  | 0, 1           | 0 = Off<br>1 = On                      | 1                      |
| 48–56 |  |                  | Reserved, return 0  |                |  |                        |

## HOLDING REGISTERS

|       |   | Data type        | Description   | Raw data range | Values  | Factory default values |
|-------|---|------------------|---|----------------|---|------------------------|
| 57    | Relative humidity sensor selection (On/Off) | unsigned integer | Turn ON or OFF the rH sensor (related to output value - input register 39 and 40)               | 0, 1           | 0 = Off<br>1 = On   | 1                      |
| 58–66 |   |                  | Reserved, return 0  |                |   |                        |
| 67    | CO <sub>2</sub> sensor selection (On/Off)   | unsigned integer | Turn ON or OFF the CO <sub>2</sub> sensor (related to output value - input registers 39 and 40) | 0, 1           | 0 = Off<br>1 = On   | 1                      |
| 68–78 |   |                  | Reserved, return 0  |                |   |                        |
| 79    | LED indication                              | unsigned integer | LED indication related to one of the parameters   | 1–3            | 1 = Temperature<br>2 = Relative humidity<br>3 = CO <sub>2</sub> | 3                      |
| 80    | LED intensity / brightness                  | unsigned integer | LED intensity (incrementing with step of 10 %)  | 0–10           | 0 = OFF<br>5 = 50 %   | 5                      |

**Note:** The holding registers can be managed via the following Modbus commands: "Read Holding Registers", "Write Single Register" or "Write Multiple Registers".

The free Sentera configuration and monitoring software 3SModbus can be downloaded via: <https://www.sentera.eu/en/3SMCenter>