

# FCVCXB-R | INTELLIGENT MULTIFUNCTIONAL SENSOR WITH BUZZER

## 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 = Fault  |
| 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 humidity sensor is lost   | 0, 1           | 0 = OK<br>1 = Fault  |
| 15              | Dew point level                    | signed integer   | Calculated dew point  | -700—700       | 200 = 20,0°C   |

| INPUT REGISTERS |                            |                  |  |                |   |
|-----------------|----------------------------|------------------|--|----------------|---|
|                 |                            | Data type        | Description  | Raw data range | Values  |
| 16–25           |                            |                  | Reserved, return 0   |                |   |
| 26              | TVOC level                 | unsigned integer | TVOC level   | 0–60.000       | 1.000 = 1.000 ppb   |
| 27              | TVOC output value          | unsigned integer | Output value according to TVOC   | 0–1.000        | 1.000 = 100 %   |
| 28              | TVOC alert flag            | unsigned integer | Flag indicates that measured TVOC level is outside set alert values. Set to '1' when the measured value is outside the TVOC values defined by holding registers 29 and 30                                | 0, 1           | 0 = TVOC measurement OK<br>1 = TVOC measurement too low / high                |
| 29              | TVOC range limit flag      | unsigned integer | Flag indicates that measured TVOC is outside set range limit values. Set to '1' when the measured TVOC is outside limit range values set defined by holding registers 27 and 28                          | 0, 1           | 0 = TVOC range OK<br>1 = TVOC range too low/high                              |
| 30              | TVOC sensor state          | unsigned integer | Flag that shows if the communication with the TVOC sensor is lost  | 0, 1 and 4     | 0 = OK<br>1 = Fault<br>4 = Prestabilising                                     |
| 31–38           |                            |                  | 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, 4, 99 | 0 = Overwrite<br>1 = Temperature<br>2 = rH<br>4 = TVOC<br>...<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 to 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 = Fault   |

## INPUT REGISTERS

|       |                    | Data type        | Description   | Raw data range | Values            |
|-------|--------------------|------------------|---|----------------|-------------------|
| 44    | Buzzer alarm state | unsigned integer | Flag that shows buzzer is ON/OFF when min./max. alert flag active | 0, 1           | 0 = OFF<br>1 = ON |
| 45–50 |                    |                  | 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  | 1.758–1.760    | 1.758 = FCVCGB-R<br>1.759 = FCVCFB-R<br>1.760 = FCVC8B-R                                       |                        |  |
| 5                 | HW version                           | unsigned integer | Hardware version of the device, read only   | XXXX           | 0x0100 = HW version 1.0  |                        |  |
| 6                 | FW version                           | unsigned integer | Firmware version of the device, read only   | XXXX           | 0x0120 = FW version 1.2  |                        |  |
| 7                 |                                      |                  | Reserved, returns 0   |                |  |                        |  |
| 8                 | Modbus safety timeout                | unsigned integer | Timeout setting for no Modbus communication. After time runs out, output is set to minimum output                       | 0–60           | 0 = no timeout<br>60 = 60 minutes  | 0                      |  |
| 9                 | Modbus network Bus 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 | Resets 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   | 0                      |
| 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  | 1.000                  |
| 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                  |
| 23–26             |                                 |                  | Reserved, return 0   |   |                   |                        |
| 27                | Minimum TVOC range              | unsigned integer | Minimum TVOC range, cannot be set higher than maximum TVOC range minus 100 ppb                               | 0—(Max-100)   | 100 = 100 ppb     | 0                      |
| 28                | Maximum TVOC range              | unsigned integer | Maximum TVOC range, cannot be set less than minimum TVOC range plus 100 ppb                                  | (Min+100)—60.000  | 1.000 = 1.000 ppb | 2.000                  |
| 29                | Minimum TVOC alert              | unsigned integer | Minimum TVOC alarm value   | Min. TVOC range—<br>Max. TVOC alarm                           | 100 = 100 ppb     | 0                      |
| 30                | Maximum TVOC alert              | unsigned integer | Maximum TVOC alarm value   | Min. TVOC alarm—<br>Max. TVOC range                           | 1.000 = 1.000 ppb | 2.000                  |

| HOLDING REGISTERS |  |                  |   |                |  |                        |
|-------------------|--|------------------|---|----------------|--|------------------------|
|                   |  | Data type        | Description   | Raw data range | Values                                 | Factory default values |
| 31–34             |  |                  | Reserved, return 0  |                |  |                        |
| 35                | Active 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 level                              | unsigned integer | The ambient light level below which 'Standby' is indicated in input register 42                 | 0–32.000       | 10 = 10 lux                            | 10                     |
| 37–40             |  |                  | Reserved, return 0  |                |  |                        |
| 41                | Output 1 mode                              | unsigned integer | Select analogue / modulating output 1 mode  | 1–3            | 1 = 0–10 VDC<br>2 = 0–20 mA<br>3 = PWM | 1                      |
| 42                | Output 1 overwrite enable/disable          | unsigned integer | Enables 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        | 1.000 = 100 %                          | 0                      |
| 44                | Output 1 internal voltage source selection | unsigned integer | Select internal voltage source for PWM output 1   | 0, 1           | 0 = 3,3 VDC<br>1 = 12,0 VDC            | 0                      |
| 45                | Output 1 min. value                        | unsigned integer | Set minimum value of output 1 signal in percentage  | 0–400          | 200 = 20 %                             | 0                      |
| 46                | Output 1 max. value                        | unsigned integer | Set maximum value of output 1 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 1 value and input registers 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 1 value and input registers 39 and 40)   | 0, 1           | 0 = OFF<br>1 = ON                                    | 1                      |
| 58–66             |   |                  | Reserved, return 0   |                |  |                        |
| 67                | TVOC sensor selection (ON/OFF)              | unsigned integer | Turn ON or OFF the TVOC sensor (related to output 1 value and input registers 39 and 40) | 0, 1           | 0 = OFF<br>1 = ON                                    | 1                      |
| 68–77             |   |                  | Reserved, return 0   |                |  |                        |
| 78                | Buzzer alarm output                         | unsigned integer | Set piezo buzzer alarm output  | 0–2            | 0 = OFF<br>1 = Continuous<br>2 = Pulsed              | 1                      |
| 79                | LED indication                              | unsigned integer | Select sensor to be related to LED indication  | 1, 2, 4        | 1 = Temperature<br>2 = Relative humidity<br>4 = TVOC | 4                      |
| 80                | LED brightness                              | unsigned integer | Set LED brightness   | 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>