

# FCVCX-R | INTELLIGENT MULTIFUNCTIONAL 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 % 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 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 measurement OK 1 = Temperature measurement too low / high
5	Temperature sensor state	unsigned integer	Flag that shows if the communication with temperature sensor is lost	0, 1	0 = OK 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	0 = 0 % 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 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 measurement OK 1 = Relative humidity measurement 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 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
16–20			Reserved, return 0		
21	CO <sub>2</sub> eq level	unsigned integer	Actual CO <sub>2</sub> equivalent level	400–60.000	1.000 = 1.000 ppm
22	CO <sub>2</sub> eq output value	unsigned integer	Output value according to CO <sub>2</sub> equivalent	0–1.000	0 = 0 % 1.000 = 100 %
23	CO <sub>2</sub> eq alert flag	unsigned integer	Flag indicates that measured CO <sub>2</sub> equivalent level is outside set alert values. Set to '1' when the measured value is outside the CO <sub>2</sub> equivalent values defined by holding registers 25 and 26	0–1	0 = CO <sub>2</sub> eq measurement OK 1 = CO <sub>2</sub> eq measurement too low / high
24	CO <sub>2</sub> eq range limit flag	unsigned integer	Flag indicates that measured CO <sub>2</sub> equivalent is outside set range limit values. Set to '1' when the measured CO <sub>2</sub> equivalent is outside limit range values set defined by holding registers 23 and 24	0–1	0 = CO <sub>2</sub> eq measurement OK 1 = CO <sub>2</sub> eq measurement too low / high
25	CO <sub>2</sub> eq Sensor state	unsigned integer	Flag that shows if the communication with the CO <sub>2</sub> equivalent sensor is lost	0, 1 and 4	0 = OK 1 = Fault 4 = Warming up
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	0 = 0 % 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 33 and 34	0–1	0 = TVOC measurement OK 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 31 and 32	0–1	0 = TVOC measurement OK 1 = TVOC measurement 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 1 = Fault 4 = Warming up
31–38			Reserved, return 0		

## INPUT REGISTERS

		Data type	Description	Raw data range	Values
39	Actual output value	unsigned integer	The actual output value	0–1.000	0 = 0 % 1.000 = 100 %
40	Output control mode	unsigned integer	The source of the output value	0–4	0 = Overwrite      1 = Temperature 2 = rH              3 = TVOC 4 = 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 light intensity)	0–2	0 = Low light intensity 1 = Active 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 1 = Fault
44–50			Reserved, return 0		

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      1 = 9.600      2 = 19.200 3 = 38.400      4 = 57.600      5 = 115.200 6 = 230.400	2
3	Modbus parity	unsigned integer	Parity check mode	0–2	0 = 8N1 1 = 8E1 2 = 8O1	1
4	Device type	unsigned integer	Device type. Read only	1659–1661	1659 = FCVCG-R 1660 = FCVCF-R 1661 = FCVC8-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	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, output(s) is set to Min Output	0–60	0 = no timeout 60 = 60 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 1 = NBT connected	0
10	Modbus registers reset	unsigned integer	Reset Modbus Holding registers (8 and above 10) or Reset Modbus Holding registers (excluding 1–6 and 9) to default values. When finished this register is automatically reset to '0'	0, 1	0 = Idle 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
13	Minimum temperature alert	unsigned integer	Minimum temperature alarm value	Min. temperature range– Max. temperature alarm	500 = 50,0°C	0

## HOLDING REGISTERS

		Data type	Description	Raw data range	Values	Factory default values
14	Maximum temperature alert	unsigned integer	Maximum temperature alarm value	Min. temperature alarm—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)—1000	850 = 85 % rH	1.000
21	Minimum relative humidity alert	unsigned integer	Minimum relative humidity alarm value	Min. relative humidity range—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—Max. relative humidity range	850 = 85 % rH	1.000
23	Minimum CO <sub>2</sub> eq range	unsigned integer	Minimum CO <sub>2</sub> equivalent range, cannot be set higher than maximum CO <sub>2</sub> equivalent range minus 100 ppm	0—(Max - 100)	100 = 100 ppm	400
24	Maximum CO <sub>2</sub> eq range	unsigned integer	Maximum CO <sub>2</sub> equivalent range, cannot be set less than minimum CO <sub>2</sub> equivalent range plus 100 ppm	(Min + 100)—60.000	1.000 = 1.000 ppm	2.000
25	Minimum CO <sub>2</sub> eq alert	unsigned integer	Minimum CO <sub>2</sub> equivalent alarm value	Min. CO <sub>2</sub> eq range—Max. CO <sub>2</sub> eq alarm	100 = 100 ppm	400
26	Maximum CO <sub>2</sub> eq alert	unsigned integer	Maximum CO <sub>2</sub> equivalent alarm value	Min. CO <sub>2</sub> eq alarm—Max. CO <sub>2</sub> eq range	100 = 100 ppm	2.000
27	Minimum TVOC range	unsigned integer	Minimum TVOC range, cannot be set higher than maximum TVOC range minus 100 ppb	0—(Max - 100)	1.000 = 1.000 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	100 = 100 ppb	2.000
29	Minimum TVOC alert	unsigned integer	Minimum TVOC alarm value	Min. TVOC range—Max. TVOC alarm	100 = 100 ppb	0

HOLDING REGISTERS						
		Data type	Description	Raw data range	Values	Factory default values
30	Maximum TVOC alert	unsigned integer	Maximum TVOC alarm value	Min. TVOC alarm—Max. TVOC range	1.000 = 1.000 ppb	1.000
31—34			Reserved, return 0			
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—40			Reserved, return 0			
41	Output 1 mode	unsigned integer	Select analogue / modulating output 1 type	1—3	1 = 0—10 VDC 2 = 0—20 mA 3 = PWM	1
42	Output 1 enable / disable	unsigned integer	Enables the direct control over the output 1	0, 1	0 = Disabled 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	0 = 0 % 1.000 = 100 %	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 1 = 12,0 VDC	0
45	Minimum output 1 value	unsigned integer	Set minimum value of output signal in percentage	0—40	20 = 20 %	0
46	Maximum output 1 value	unsigned integer	Set maximum value of output signal in percentage	60—100	60 = 60 %	100
47	Temperature sensor selection (ON / OFF)	unsigned integer	Turn ON or OFF the temperature sensor (related to output 1)	0, 1	0 = OFF 1 = ON	1

## HOLDING REGISTERS

		Data type	Description	Raw data range	Values	Factory default values
48–56			Reserved, return 0			
57	Relative humidity sensor selection (ON / OFF)	unsigned integer	Turn ON or OFF the rH sensor (related to output 1)	0, 1	0 = OFF 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)	0, 1	0 = OFF 1 = ON	1
68–78			Reserved, return 0			
79	LED indication	unsigned integer	LED indication related to one of the parameters	1–4	1 = Temperature 2 = rH 3 = CO <sub>2</sub> eq 4 = TVOC	1
80	LED intensity / brightness	unsigned integer	LED intensity (incrementing with step of 10 %)	0–10	0 = OFF 5 = 50 % 1 = 10 % 10 = 100 %	5

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