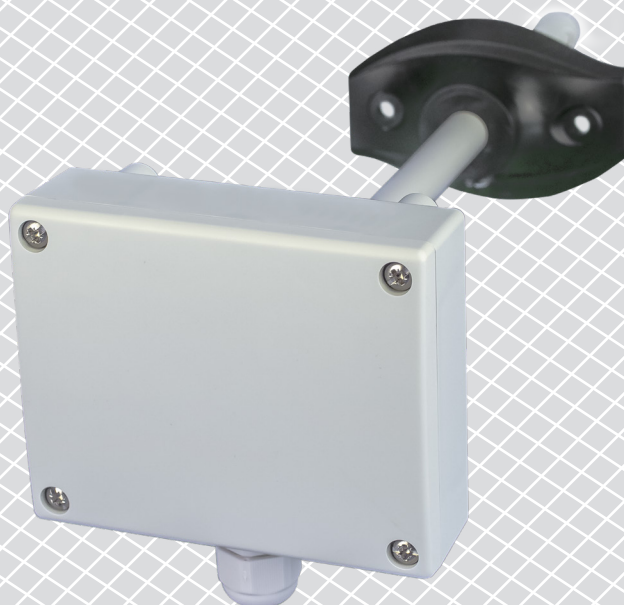


DSCDG3-4 | DUCT CO₂ SENSOR

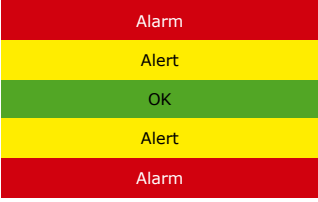
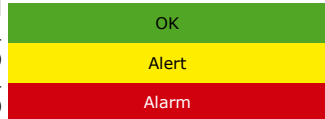
Modbus register map



MODBUS REGISTER MAP

INPUT REGISTERS						
Input register		Data Type	Description	Raw Data Range	Resolution / Unit	Values
↓ General ↓						
1	Device Status – Errors	R	Indicates the critical faults of the specific device part. When powered by AC, Supply Voltage Fault is not valid.	Bitwise b0–b15		b0 = Supply Voltage Fault b1 = Internal Voltage Fault b2 = Memory Fault b3 = Sensor Fault b4–b15 = Reserved
2	Device Status – Warnings	R	Indicates non-critical warnings related to the specific device part. When powered by AC, Supply Voltage Warning is not valid.	Bitwise b0–b15		b0 = Supply Voltage Warning b1 = Internal Voltage Warning b2 = Undefined b3 = Sensor Warning b4–b15 = Reserved
3	Supply Voltage	R	Shows the actual supply voltage of the device. When powered by AC, the displayed value is not valid.	150–340	1/10 VDC	Example: 240 = 24 VDC
↓ Temperature ↓						
11	Temperature Level	R	Measured temperature level.	-300–700	1/10 °C	Example: 200 = 20 °C
12	Temperature Output Value	R	Output value according to the temperature level and the set measurement range (HR11 and HR12).	0–1.000	1/10 %	Example: 500 = 50 % Output
13	Temperature Alert / Alarm	R	Indicates that the measured temperature level is within the OK range (HR13 and HR14), within the Alert range (HR15 and HR16) or in the Alarm range. Temperature index alert / alarm Temperature [°C] 70 T alarm maximum (HR16) T alert maximum (HR14) T alert minimum (HR13) T alarm minimum (HR15) -30	0–2		0 = OK 1 = Alert 2 = Alarm
14	Temperature Sensor State	R	Flag that shows if the communication with the temperature sensor is lost.	Bitwise b0–b15		b0 = Sensor Problem b1 = Reserved b2 = Sensor Preheating b3–b15 = Reserved
↓ Relative Humidity ↓						
21	Relative Humidity Level	R	Measured level of relative humidity.	0–1.000	1/10 % rH	Example: 500 = 50 % rH

INPUT REGISTERS

Input register		Data Type	Description	Raw Data Range	Resolution / Unit	Values
22	Relative Humidity Output Value	R	Output value according to the relative humidity level and the set measurement range (HR21 and HR22).	0–1.000	1/10 %	Example: 500 = 50 % Output
23	Relative Humidity Alert / Alarm	R	Indicates that relative humidity level is within the OK range (HR23 and HR24), within the Alert range (HR25 and HR26) or in the Alarm range. Relative humidity index alert / alarm rH [%] 100 RH alarm maximum (HR26) RH alert maximum (HR24) RH alert minimum (HR23) RH alarm minimum (HR25) 0 	0–2		0 = OK 1 = Alert 2 = Alarm
24	Relative Humidity Sensor State	R	Flag that shows if the communication with the relative humidity sensor is lost.	Bitwise b0–b15		b0 = Sensor Problem b1 = Reserved b2 = Sensor Preheating b3–b15 = Reserved
↓ Dew point ↓						
31	Dew Point Level	R	Calculated dew point temperature.	- 500–700	1/10 °C	Example: 100 = 10,0 °C
32	Dew Point Output Value	R	Output value according to the dew point level and the set measurement range (HR31 and HR32).	0–1.000	1/10 %	Example: 500 = 50 % Output
33	Dew Point Delta Alert / Alarm	R	Indicates that the dew point delta (the difference between the temperature level (IR11) and the dew point level (IR31)) is below the alert / alarm sub-thresholds (HR33 and HR34). To avoid condensation, fan speed should be regulated based on this value. Dew point alert / alarm Dew point delta [°C] Dew point delta alert sub-threshold (HR33) Dew point delta alarm sub-threshold (HR34) 0 	0–2		0 = OK 1 = Alert 2 = Alarm
34	Dew Point State	R	Flag that shows if the dew point calculation is done.	Bitwise b0–b15		b0 = Calculation Problem b1 = Reserved b2 = Data preparation b3–b15 = Reserved
↓ Carbon Dioxide ↓						
51	Carbon Dioxide Level	R	Measured carbon dioxide concentration level.	0–2.000	1 ppm	Example: 1.000 = 1.000 ppm

INPUT REGISTERS						
Input register		Data Type	Description	Raw Data Range	Resolution / Unit	Values
52	Carbon Dioxide Output Value	R	Output value according to the carbon dioxide level and the set measurement range (HR51 and HR52).	0–1.000	1/10 %	Example: 500 = 50,0% Output
53	Carbon Dioxide Alerts	R	Indicates that the measured carbon dioxide level is above one or both of the alert values (HR53 and HR54). CO₂ level 2000 CO₂ level alert / alarm CO₂ level alarm threshold (HR54) CO₂ level alert threshold (HR53) 0 Alarm Alert OK	0–2		0 = Green/OK 1 = Yellow Alert 2 = Red Alert
54	Carbon Dioxide Sensor State	R	Flag that shows if the communication with the carbon dioxide sensor is lost.	Bitwise b0–b15		b0 = Sensor Problem b1 = Reserved b2 = Sensor Preheating b3–b15 = Reserved
↓ Barometric Pressure ↓						
141	Barometric Pressure Level	R	Measured atmospheric pressure.	300–1.250	1 hPa	Example: 1.000 = 1.000 hPa
144	Barometric Pressure Sensor State	R	Flag that shows if the communication with the pressure sensor is lost.	Bitwise b0–b15		b0 = Sensor Problem b1 = Reserved b2 = Sensor Preheating b3–b15 = Reserved
↓ Analogue Output 1 ↓						
162	Output 1 Value	R	The actual value of analogue output 1 as a percentage of the full range according to the output type.	0–1.000	1/10 %	Example: 500 = 50 % Output
↓ Analogue Output 2 ↓						
172	Output 2 Value	R	Actual value of analogue output 2. As a percentage of full range according to output type.	0–1.000	1/10 %	Example: 500 = 50 % Output
↓ Analogue Output 3 ↓						
182	Output 3 Value	R	The actual value of analogue output 3 as a percentage of the full range according to the output type.	0–1.000	1/10 %	Example: 500 = 50 % Output
Note: The input registers can be read via the Modbus command: “Read input registers”.						

HOLDING REGISTERS							
Holding register		Data Type	Description	Raw Data Range	Resolution / Units	Values	Factory Default Values
↓ General ↓							
1	Device slave address	R/W	Modbus device address.	1–247			1
2	Modbus baud rate	R/W	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	R/W	Parity check mode.	0–2		0 = 8N1 1 = 8E1 2 = 8O1	1
4	Device type	R	Device type.	XXXX		Device specific	DSCDG3-4 – 1801
5	HW version	R	Hardware version of the device.	XXXX		Hardware version specific 0x0100 = HW version 1.00	Depends on the hardware release
6	FW version	R	Firmware version of the device.	XXXX		Firmware version specific 0x0100 = FW version 1.00	Depends on the firmware release
9	Modbus network resistor termination (NBT)	R/W	To avoid communication losses and reflections on the Modbus line, the NBT in two devices (at both ends of the line) must be activated.	0–1		0 = NBT disconnected 1 = NBT connected	
10	Modbus Registers Reset		Resets the Modbus Holding registers to the default values. When finished, this register is automatically reset to '0'.				
↓ Temperature ↓							
11	Minimum Temperature Range	R/W	The minimum temperature value that corresponds to the minimum output value. It cannot be set higher than the maximum temperature range –2 °C.	-300 – HR12	1/10 °C	Example: -100 = -10 °C	0
12	Maximum Temperature Range	R/W	The maximum temperature value that corresponds to the maximum output value. It cannot be set lower than the minimum temperature range +2 °C.	HR11 – 700	1/10 °C	Example: 500 = 50 °C	500
13	Temperature Alert Minimum	R/W	Temperature alert minimum level used to control IR13.	HR15 – HR14	1/10 °C	Example: 200 = 20 °C	190
14	Temperature Alert Maximum	R/W	Temperature alert maximum level used to control IR13.	HR13 – HR16	1/10 °C	Example: 300 = 30 °C	300

HOLDING REGISTERS							
Holding register		Data Type	Description	Raw Data Range	Resolution / Units	Values	Factory Default Values
15	Temperature Alarm Minimum	R/W	Temperature alarm minimum level used to control IR13.	-300 – HR13	1/10 °C	Example: 100 = 10 °C	100
16	Temperature Alarm Maximum	R/W	Temperature alarm maximum level used to control IR13.	HR14 – 700	1/10 °C	Example: 400 = 40 °C	400
20	Temperature Correction Value	R/W	Manual temperature offset correction value.	-50–50	1/10 °C	Example: 50 = 5 °C	0
↓ Relative Humidity ↓							
21	Minimum Relative Humidity Range	R/W	Minimum relative humidity value that corresponds to the minimum output value. It cannot be set higher than the maximum relative humidity range –5 % rH.	0 – HR22	1/10 % rH	Example: 100 = 10 % rH	50
22	Maximum Relative Humidity Range	R/W	Maximum relative humidity value that corresponds to the maximum output value. It cannot be set lower than the minimum relative humidity range +5 % rH.	HR21 – 1.000	1/10 % rH	Example: 900 = 90 % rH	950
23	Relative Humidity Alert Minimum	R/W	Relative humidity alert minimum level used to control IR23.	HR25 – HR24	1/10 % rH	Example: 300 = 30 % rH	300
24	Relative Humidity Alert Maximum	R/W	Relative humidity alert maximum level used to control IR23.	HR23 – HR26	1/10 % rH	Example: 700 = 70 % rH	700
25	Relative Humidity Alarm Minimum	R/W	Relative humidity alarm minimum level used to control IR23.	0 – HR23	1/10 % rH	Example: 100 = 10 % rH	100
26	Relative Humidity Alarm Maximum	R/W	Relative humidity alarm maximum level used to control IR23.	HR24 – 1000	1/10 % rH	Example: 900 = 90 % rH	900
30	Relative Humidity Correction Value	R/W	Manual relative humidity offset correction value.	-100–100	1/10 % rH	Example: 100 = 10 % rH	0
↓ Dew point ↓							
31	Minimum Dew Point Range	R/W	Minimum dew point value that corresponds to the minimum output value.	-500 – HR32	1/10 °C	Example: 200 = 20 % rH	-350
32	Maximum Dew Point Range	R/W	Maximum dew point value that corresponds to the maximum output value.	HR31 – 700	1/10 °C	Example: 200 = 20 % rH	500
33	Dew Point Delta Alert Sub-threshold	R/W	Dew point delta alert sub-threshold used to control IR33.	HR34 – 100	1/10 °C	Example: 20 = 2 °C	40

HOLDING REGISTERS							
Holding register		Data Type	Description	Raw Data Range	Resolution / Units	Values	Factory Default Values
34	Dew Point Delta Alarm Sub-threshold	R/W	Dew point delta alarm sub-threshold used to control IR33.	0 – HR33	1/10 °C	Example: 20 = 2 °C	20
↓ Carbon dioxide ↓							
51	Minimum Carbon Dioxide Range	R/W	Minimum carbon dioxide concentration value that corresponds to the minimum output value. It cannot be set higher than the maximum carbon dioxide range –100 ppm CO ₂ .	0 – HR52	1 ppm	Example: 400 = 400 ppm	350
52	Maximum Carbon Dioxide Range	R/W	Maximum carbon dioxide concentration value that corresponds to the maximum output value. It cannot be set lower than the minimum carbon dioxide range +100 ppm CO ₂ .	HR51 – 2.000	1 ppm	Example: 2.000 = 2.000 ppm	2.000
53	Carbon Dioxide Alert 1 Level	R/W	Carbon dioxide alert level used to control alert register IR53.	0–2.000	1 ppm	Example: 1.000 = 1.000 ppm	900
54	Carbon Dioxide Alert 2 Level	R/W	Carbon dioxide alert level used to control alert register IR53.	0–2.000	1 ppm	Example: 1.000 = 1.000 ppm	1.200
58	Carbon Dioxide Baseline Control	R/W	Selection of the baseline control mode. If Factory is selected, the device will reset its baseline reference to the value written by the manufacturer. If Automatic is selected, it is advisable that the CO ₂ concentration drops to the lowest level at least once in a 7-day period. If Manual Start is selected, the device will save the current CO ₂ concentration as a 400 ppm reference. The procedure takes 12 minutes and after that the mode will be automatically changed to Manual Completed.	0–3		0 = Factory 1 = Automatic 2 = Manual Start 3 = Manual Completed (read-only)	
60	Carbon Dioxide Correction Value	R/W	Manual carbon dioxide offset correction value. The default value is set according to NASA's CO₂ chart taking into account the Automatic Baseline Control algorithm.	–100–100		Example: 100 = 100 ppm	20
↓ Barometric Pressure ↓							
150	Barometric Pressure Correction Value	R/W	Manual barometric pressure correction value.	–10–10		Example: 10 = 10 hPa	0
↓ Analogue Output 1 ↓							
161	Output 1 source	R/W	Selection of a signal source for the analogue output.	Bitwise b0–b15		b0 = Override (highest priority) b1 = Temperature Sensor b2 = Relative Humidity Sensor b3 = Dew Point Sensor b4 = Reserved b5 = Carbon Dioxide Sensor b6–b15 = Reserved	b1
162	Output 1 override value	R/W	Override value for output 1.	0–1.000	1/10 %	Example: 1.000 = 100 % Output	0

HOLDING REGISTERS							
Holding register		Data Type	Description	Raw Data Range	Resolution / Units	Values	Factory Default Values
163	Output 1 type	R/W	Selection of the analogue / modulating output type.	0 – 6		0 = 0–10 V 1 = 0–20 mA 2 = PWM 12 V 3 = PWM Open Collector 4 = 2–10 V 5 = 4–20 mA 6 = 0–5 V	0
↓ Analogue Output 2 ↓							
171	Output 2 source	R/W	Selection of a signal source for the analogue output.	Bitwise b0–b15		b0 = Override (highest priority) b1 = Temperature Sensor b2 = Relative Humidity Sensor b3 = Dew Point Sensor b4 = Reserved b5 = Carbon Dioxide Sensor b6–b15 = Reserved	b2
172	Output 2 override value	R/W	Override value for output 2.	0–1.000	1/10 %	Example: 1.000 = 100 % Output	0
173	Output 2 type	R/W	Selection of the analogue / modulating output type.	0–6		0 = 0–10 V 1 = 0–20 mA 2 = PWM 12 V 3 = PWM Open Collector 4 = 2–10 V 5 = 4–20 mA 6 = 0–5 V	0
↓ Analogue Output 3 ↓							
181	Output 3 source	R/W	Selection of a signal source for the analogue output.	Bitwise b0–b15		b0 = Override (highest priority) b1 = Temperature Sensor b2 = Relative Humidity Sensor b3 = Dew Point Sensor b4 = Reserved b5 = Carbon Dioxide Sensor b6–b15 = Reserved	b5
182	Output 3 override value	R/W	Override value for output 2.	0–1.000	1/10 %	Example: 1.000 = 100 % Output	0
183	Output 3 type	R/W	Selection of the analogue / modulating output type.	0–6		0 = 0–10 V 1 = 0–20 mA 2 = PWM 12 V 3 = PWM Open Collector 4 = 2–10 V 5 = 4–20 mA 6 = 0–5 V	0
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							