

## INDOOR AIR QUALITY TRANSMITTERS SIRO-MOD SERIES

Multifunctional indoor air quality transmitters for building automation systems that use Modbus serial communication protocol

Siro-MOD is an indoor air quality transmitter with a modern design. The transmitter is available with several optional air quality sensors. The modular device can be equipped with CO<sub>2</sub> concentration and VOC (Volatile Organic Compounds) measurements or alternatively PM (Particulate Matter) measurement and in addition temperature and humidity measurements. It offers easy installation and adjustment, several different model options and various output signals that are configurable separately for each measurement parameter.

The Siro-MOD series devices are available with user interface that includes LCD display and buttons making the configuration of the device quick and easy. An external configuration tool is necessary for commissioning preparations for Siro-MOD without user interface. Configuration is also possible via Modbus network. Siro-MOD utilizes the industry standard NDIR measurement principle with self-calibrating ABC logic™ for CO<sub>2</sub> measurement.

### Siro-MOD series devices include:

- Several options for indoor air quality measurements (CO<sub>2</sub>, VOC, PM, rH, T).
- Field configurable outputs for selected measurements.
- Proportional output options including voltage (0-10 V, 0-5 V, 2-10 V) and optional current (4-20 mA).
- Offset feature enabling field calibration for each measurement parameter (CO<sub>2</sub>, VOC, PM, rH, T).
- Optional LCD-display and buttons.



### APPLICATIONS

Siro-MOD series devices are commonly used to monitor and control:

- indoor air quality in offices, public spaces, meeting rooms and classrooms
- CO<sub>2</sub> and VOC concentration to regulate demand-controlled ventilation and to keep the indoor air quality in a good level
- PM concentration to measure the size and amount of particulates in the indoor air for example to assess the performance of air filters
- temperature and humidity in HVAC/R environment

### MODEL SUMMARY

Model	Product code	Model	Product code	Model	Product code	Model	Product code
Siro-MOD-CO2	304.005.001	Siro-MOD-CO2-rH-T-D	304.005.011	Siro-MOD-PM	304.007.001	Siro-MOD-PM-T-D	304.007.011
Siro-MOD-CO2-A	304.005.002	Siro-MOD-CO2-rH-T-A-D	304.005.012	Siro-MOD-PM-A	304.007.002	Siro-MOD-PM-T-A-D	304.007.012
Siro-MOD-CO2-D	304.005.003	Siro-MOD-CO2-T	304.005.013	Siro-MOD-PM-D	304.007.003	Siro-MOD-rH-T	304.008.001
Siro-MOD-CO2-A-D	304.005.004	Siro-MOD-CO2-T-A	304.005.014	Siro-MOD-PM-A-D	304.007.004	Siro-MOD-rH-T-A	304.008.002
Siro-MOD-CO2-VOC-rH-T	304.005.005	Siro-MOD-CO2-T-D	304.005.015	Siro-MOD-PM-rH-T	304.007.005	Siro-MOD-rH-T-D	304.008.003
Siro-MOD-CO2-VOC-rH-T-A	304.005.006	Siro-MOD-CO2-T-A-D	304.005.016	Siro-MOD-PM-rH-T-A	304.007.006	Siro-MOD-rH-T-A-D	304.008.004
Siro-MOD-CO2-VOC-rH-T-D	304.005.007	Siro-MOD-VOC-rH-T	304.006.001	Siro-MOD-PM-rH-T-D	304.007.007	Siro-MOD-T	304.008.005
Siro-MOD-CO2-VOC-rH-T-A-D	304.005.008	Siro-MOD-VOC-rH-T-A	304.006.002	Siro-MOD-PM-rH-T-A-D	304.007.008	Siro-MOD-T-A	304.008.006
Siro-MOD-CO2-rH-T	304.005.009	Siro-MOD-VOC-rH-T-D	304.006.003	Siro-MOD-PM-T	304.007.009	Siro-MOD-T-D	304.008.007
Siro-MOD-CO2-rH-T-A	304.005.010	Siro-MOD-VOC-rH-T-A-D	304.006.004	Siro-MOD-PM-T-A	304.007.010	Siro-MOD-T-A-D	304.008.008

CO<sub>2</sub> = Carbon dioxide sensor, VOC = Volatile Organic Compounds sensor, PM = Particulate Matter sensor, rH = Humidity sensor, T = Temperature sensor, A = mA output, D = Display

# SPECIFICATIONS

## Performance

### Measurement ranges:

CO<sub>2</sub>: 0–2000 ppm / 400–2000 ppm (selectable via jumper)

VOC: CO<sub>2</sub>eq: 400–2000 ppm  
TVOC ppm: 0–30.0 ppm  
TVOC µg/m<sup>3</sup>: 0–10000 µg/m<sup>3</sup>  
IAQ index: 1–5 (UBA rating)

PM1/PM2.5/PM10: 0–50 µg/m<sup>3</sup> / 0–500 µg/m<sup>3</sup> (selectable via jumper)  
IAQ index: 1–5 (WHO rating)

Temperature: 0...50 °C

Relative humidity: 0–100 %rH

### Accuracy:

CO<sub>2</sub>: ±40 ppm + 3 % of reading (typical), additional ±60 ppm for first weeks

VOC\*: 15 % of reading (typical)

\*VOC sensor is tuned for typical IAQ Mix of 22 VOCs as defined by Mølhave et al. (1997)

PM: 0...100 µg/m<sup>3</sup>:

PM2.5: ±15 µg/m<sup>3</sup> (at 25 °C ±5 °C)

PM1/PM10\*: ±25 µg/m<sup>3</sup> (at 25 °C ±5 °C)

100...1000 µg/m<sup>3</sup>:

PM2.5: ±15 % (at 25 °C ±5 °C)

PM1/PM10\*: ±25 % (at 25 °C ±5 °C)

\*PM1 and PM10 values are calculated from PM2.5

measurement reading with the default particle distribution.

Temperature: ±0.4 °C (typical at 20 °C)

Relative humidity: ±2.2 %rH (typical at 20 °C, 30 % rH)

## Technical Specifications

### Media compatibility:

Dry air or non-aggressive gases

### Measuring units:

CO<sub>2</sub>: ppm

VOC: CO<sub>2</sub>eq: ppm  
TVOC: ppm, µg/m<sup>3</sup>

PM: PM1/PM2.5/PM10: µg/m<sup>3</sup>

Temperature: °C/°F

Relative humidity: %rH

### Measuring element:

CO<sub>2</sub>: Non-dispersive infrared (NDIR)

VOC: Complementary Metal Oxide Semiconductor (CMOS)

PM: Laser-based light scattering particle sensing

Temperature: Integrated to CMOS

Relative humidity: Thermoset polymer capacitive sensing element

### Calibration:

Automatic self-calibration ABC Logic™ for CO<sub>2</sub> measurement

### Environment:

Operating temperature: 0...50 °C

Storage temperature: -20...70 °C

Humidity: 0 to 95 %rH, non condensing

## Physical

### Dimensions:

Case: 95 x 103 x 30 mm (width x height x depth)

### Weight:

130 g

### Mounting:

2 screw holes slotted, distance c/c 60 mm

### Materials:

Case: ABS

### Protection standard:

IP20

### Display (optional)

Monochrome LCD, 38 x 23 mm

### Electrical connections:

10-pin spring loaded terminal block

0.2...1.5 mm<sup>2</sup> (16-24 AWG)

## Electrical

Input: 24 VAC or VDC, ±10 %

Power consumption: 2 W max + 25 mW for each voltage output or 50 mW for each current output

### Outputs:

4 outputs, have to select voltage or current

Voltage outputs:

0–10 V

2–10 V / 0–5 V (optional, display or configuration tool required)

Current output:

4–20 mA (optional)

Output signal limits:

Voltage outputs: R > 1 kΩ

Current output: R > 20 Ω, R < 500 Ω

## Communication

Protocol: MODBUS over Serial Line

Transmission Mode: RTU

Interface: RS485

Byte format 11 bits (10 bits if parity none):

Coding System: 8-bit binary

Bits per Byte:

1 start bit

8 data bits, least significant bit sent first

1 bit for parity

1 stop bit

Baud rate: selectable in configuration

Modbus address: 1–247 addresses selectable in configuration menu

## Conformance

Meets requirements for:

	CE:	UKCA:
EMC:	2014/30/EU	S.I. 2016/1091
RoHS:	2011/65/EU	S.I. 2012/3032
WEEE:	2012/19/EU	S.I. 2013/3113

COMPANY WITH  
MANAGEMENT SYSTEM  
CERTIFIED BY DNV  
ISO 9001 • ISO 14001



## HOW TO GENERATE A MODEL?

Example:	Product series				
Siro-MOD-CO2-T-D	Siro	Indoor air quality transmitter			
		Model type			
		-MOD	With Modbus communication		
			CO <sub>2</sub> sensor		
		-CO2	With CO <sub>2</sub> sensor (option not available with PM sensor)		
			Without CO <sub>2</sub> sensor		
			VOC sensor		
		-VOC	With VOC sensor (option not available with PM sensor)		
			Without VOC sensor		
			PM sensor		
		-PM	With PM sensor (option not available with CO <sub>2</sub> and VOC sensors)		
			Without PM sensor		
			Relative humidity sensor		
		-rH	With relative humidity sensor		
			Without relative humidity sensor (option not available with VOC sensor)		
			Temperature sensor		
		-T	With temperature sensor		
			Without temperature sensor (option not available with VOC or rH sensor)		
			Output		
			Voltage output		
		-A	Voltage and current output		
			Display		
			-D With display		
			Without display		
<b>Model</b>	Siro	-MOD	-CO2	-T	-D