

User Manual

tSENSE VAV Disp

CO₂, temperature and
relative humidity transmitter



General

tSENSE VAV for wall mounting measures indoor air carbon dioxide concentration, temperature and relative humidity in rooms. tSENSE VAV is available with colour touch display (LCD).

The unit connects to Direct Digital Control (DDC).

Linear outputs are pre-programmed as CO₂, temperature and relative humidity transmitter.

Measuring ranges can be modified via touch display, from PC (Windows) software UIP (version 5 or higher) and USB communication cable, alternative via Modbus or BACnet.

Table of contents

General	1
Opening of housing	3
Download of software UIP	3
Enter PIN code	4
PIN1 Access to display settings. Delivered product: Code Off	4
PIN2 Access to meter settings. Delivered product: 2001	4
Output configurations	4
Outputs	5
Out1/Out2/Out3	5
Voltage range	8
Select source	8
Types	8
Measure range settings	10
Relay	11
Communication settings	12
Protocol	12
Address/Baudrate	13
Connect meter	14
Check for updates	15
Connection configurations	15
Measured values	16
Display settings	17
Limits	17
Chart 24h/Week	17
Screen settings	18
Brightness	18
Background	18
Screensaver, Time setting	18
Toggle (Time and CO ₂ and/or Temperature and/or Humidity)	19
Meter settings	20
Meter information	20
Temperature unit (°C/°F)	20
Calibration options CO ₂	21
Zero cal/Background/Target cal	21
ABC	22
Temperature/Humidity Offset	23
Automatic system test	24
Error codes and action plans	25
PIN codes	26
Create PIN code for access to display settings (PIN1)	26
Create PIN code for access to meter settings (PIN2)	27
Maintenance	27

Opening of housing

See Installation Manual

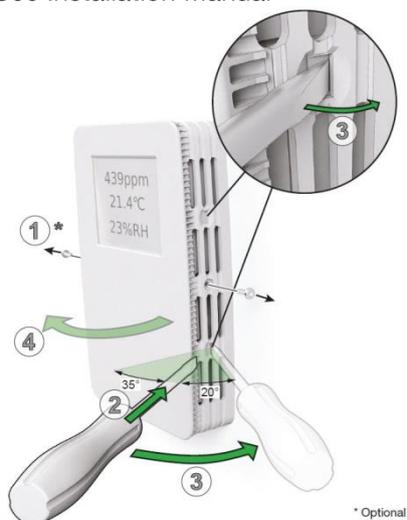


Figure 1

Download of software UIP

senseair.com

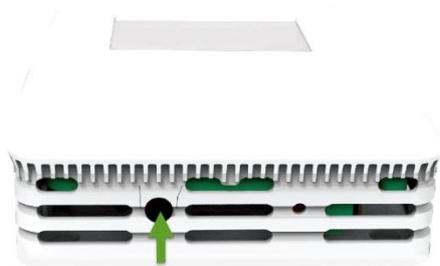
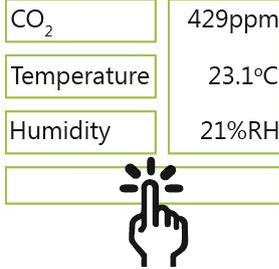
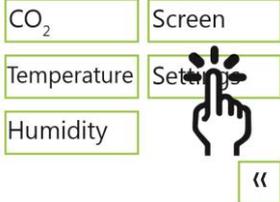
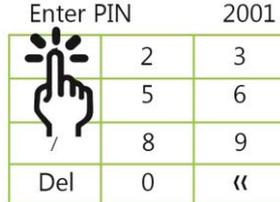
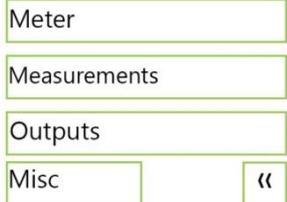
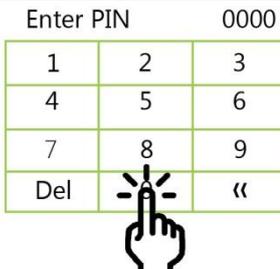
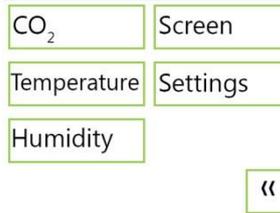


Figure 2: Connection to PC via phone jack
Connect Interface cable USB – 3.5mm Art.No.:00-0-0070

Enter PIN code

			0 Power ON
PIN1 Access to display settings. Delivered product: Code Off PIN2 Access to meter settings. Delivered product: 2001 <i>See page 24 PIN codes</i>			
1	2 NOTE! PIN1 code OFF	3 PIN2 code	4
			
	2 NOTE! PIN1 code ON	3	
			

Output configurations

Terminal	Default output	Default output range	Outputs of this sensor	Output ranges of this sensor
OUT(1) CO ₂ : Temperature: Relative Humidity:	0 – 10VDC	600 – 900ppm 22 – 23°C 75 – 85%	See label	See label
OUT(2) CO ₂ :	0 – 10VDC	0 – 2000ppm	See label	See label
OUT(3) Temp:	0 – 10VDC	0 – 50°C	See label	See label
Relay CO ₂ :	0 – 10VDC	900 – 1000ppm	See label	See label

Table 1. Default output configurations of tSENSE VAV.

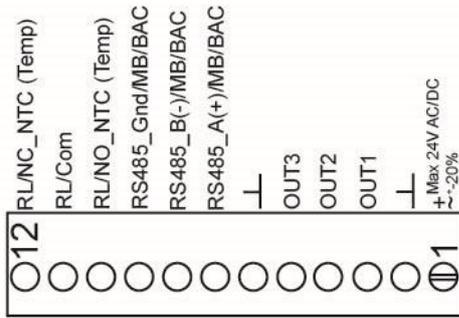


Figure 3: Screw Terminal

The sensor is supplied with 0 – 10VDC linear analogue outputs for Out(1), Out(2) and Out(3) (see Table 1). Alternative output ranges can be configured via touch display and/or PC software UIP (version 5 or later). See information at senseair.com.

Outputs

Out1/Out2/Out3

<p>1</p> <table border="1"> <tr><td>CO₂</td><td>429ppm</td></tr> <tr><td>Temperature</td><td>23.1°C</td></tr> <tr><td>Humidity</td><td>21%RH</td></tr> <tr><td></td><td></td></tr> </table>	CO ₂	429ppm	Temperature	23.1°C	Humidity	21%RH			<p>2</p> <table border="1"> <tr><td>CO₂</td><td>Screen</td></tr> <tr><td>Temperature</td><td>Settings</td></tr> <tr><td>Humidity</td><td></td></tr> <tr><td></td><td>«</td></tr> </table>	CO ₂	Screen	Temperature	Settings	Humidity			«	<p>3 PIN1: OFF</p> <p>Enter PIN 2001</p> <table border="1"> <tr><td>2</td><td>3</td></tr> <tr><td>5</td><td>6</td></tr> <tr><td>8</td><td>9</td></tr> <tr><td>Del</td><td>0 «</td></tr> </table>	2	3	5	6	8	9	Del	0 «	<p>4 Outputs</p> <table border="1"> <tr><td>Meter</td></tr> <tr><td>Measurements</td></tr> <tr><td>Outputs</td></tr> <tr><td>Misc</td></tr> </table>	Meter	Measurements	Outputs	Misc					
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<p>5 Out1</p> <table border="1"> <tr><td>Out1</td><td>10.0V</td></tr> <tr><td>Out2</td><td>4.8V</td></tr> <tr><td>Out3</td><td>4.8V</td></tr> <tr><td>Relay</td><td>1(active)</td></tr> <tr><td></td><td>«</td></tr> </table>	Out1	10.0V	Out2	4.8V	Out3	4.8V	Relay	1(active)		«	<p>6</p> <table border="1"> <tr><td>Out1_a</td><td>CO₂</td></tr> <tr><td>Out1_b</td><td>Temp</td></tr> <tr><td>Out1_c</td><td>RH</td></tr> <tr><td>Out1_d</td><td>Temp</td></tr> <tr><td></td><td>«</td></tr> </table>	Out1_a	CO ₂	Out1_b	Temp	Out1_c	RH	Out1_d	Temp		«	<p>7</p> <table border="1"> <tr><td>Max</td><td>10.0V</td></tr> <tr><td>Min</td><td>0.0V</td></tr> <tr><td>Source</td><td>CO₂</td></tr> <tr><td>CO₂</td><td>0ppm 900ppm</td></tr> <tr><td>Type</td><td>Low</td></tr> <tr><td>Analog</td><td>600ppm High 900ppm</td></tr> <tr><td></td><td>«</td></tr> </table>	Max	10.0V	Min	0.0V	Source	CO ₂	CO ₂	0ppm 900ppm	Type	Low	Analog	600ppm High 900ppm		«
Out1	10.0V																																			
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Type	Low																																			
Analog	600ppm High 900ppm																																			
	«																																			

e.g.

The voltage level of OUT1 is the result of the *largest* demand from Proportional-bands.

Out1_a/Out1_b/Out1_c => OUT1

The voltage level of the one of Out1_a, Out1_b or Out1_c which has the highest voltage level provides the voltage level of OUT1.

The values below are default values.

Out1Standard							
Out1_a	CO2	Out1_a: CO ₂ has a Proportional-band of 600–900ppm Out1_b: Temp has a Proportional-band of 22–23°C Out1_c: RH has a Proportional-band of 75–85%RH Out1_d: Disabled NOTE! Possibility to set measurement range (“Low” and “High”) higher (out of range) than what is possible to measure.					
Out1_b	Temp						
Out1_c	RH						
Out1_d	Disabled		«				
Out1_a	CO ₂ = 714ppm =>3V	Out1_b	Temp = 22.4°C =>4V	Out1_c	Humidity = 80%RH=>5V	Out1_d	Disabled
Max 10.0V Min 0.0V Source CO2 Type Analog Low 600ppm High 900ppm «		Max 10.0V Min 0.0V Source Temp Type Analog Low 22°C High 23°C «		Max 10.0V Min 0.0V Source RH Type Analog Low 75%RH High 85%RH «		Max 10.0V Min 0.0V Source Disabled Type An,Inv Low 17°C High 18°C «	

5V (Out1_c) – 0V (Out1_d Disabled) = 5V => OUT1

The (e.g.) VAV valve opens from minimum set-point position, with full opened state at the maximum set-point position.

The values below are default values.

Voltage on OUT1 = 0V if measured values are:	Voltage on OUT1 will increase if measured values are:	Voltage on OUT1 = 10V if measured values are:
CO ₂ ≤ 600ppm and Temp ≤ 22°C and RH ≤ 75%RH (Out1_d = Disabled)	600ppm ≤ CO ₂ < 900ppm or 22°C ≤ Temp < 23°C or 75%RH ≤ RH < 85%RH (Out1_d = Disabled)	CO ₂ > 900ppm or Temp > 23°C or RH > 85% (Out1_d = Disabled)

Voltage on OUT1 = 0V if: the measured CO₂ value is less than, or equal with, 600ppm **and** the measured temperature value is less than, or equal with, 22°C **and** the relative humidity value less than, or equal with, 75%.

Voltage on OUT1 will increase if: the measured CO₂ value is between 600ppm and 900ppm **or** the measured temperature value is between 22°C and 23°C **or** the measured relative humidity value is between 75% and 85%.

Voltage on OUT1 = 10V if: the measured CO₂ value is higher than 900ppm **or** the measured temperature value is higher than 23°C **or** the measured relative humidity value is higher than 85%.

Temp protection (Out1_d) Enabled

Out1_a CO ₂ : 1205ppm (higher than set "High" 900ppm) => 10V	Out1_b Temp: 16.4°C (lower than set "Low" 22°C) => 0V	Out1_c Humidity: 80%RH => 5V	Out1_d Temp: 16.4°C (lower than set "Low" 17°C) => 10V <i>See Note!</i>
Type Analog Low 600ppm High 900ppm «	Type Analog Low 22°C High 23°C «	Type Analog Low 75%RH High 85%RH «	Type An,Inv Low 17 °C High 18 °C «

10V (Out1_a) – 10V (Out1_d) = 0V (OUT1).

The voltage level of the one of Out1_a, Out1_b or Out1_c which has the highest voltage level is in this case 10V (Out1_a), minus 10V (the voltage level of Out1_d) provides the voltage level of OUT1 which is 0V.

Despite high value of CO₂ (1205ppm), OUT1 is 0V (no signal to ventilation system to start), because of low value of Out_b (16.4°C) when temperature protection Out1_d is Enabled.

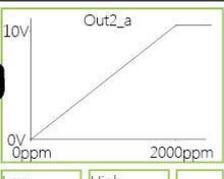
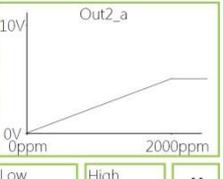
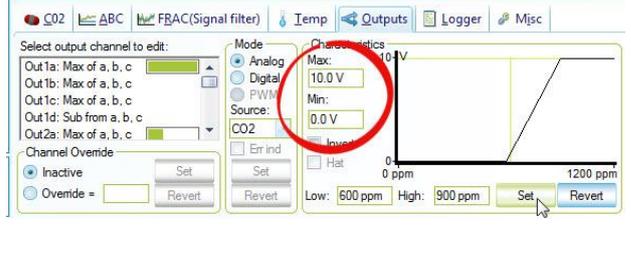
NOTE!

Out_d (sub) in display picture: (sub) = subtraction, (Temperature protection)

Voltage range

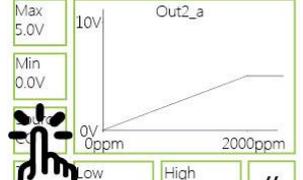
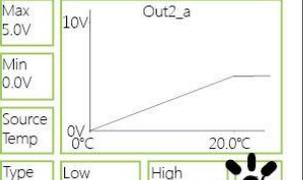
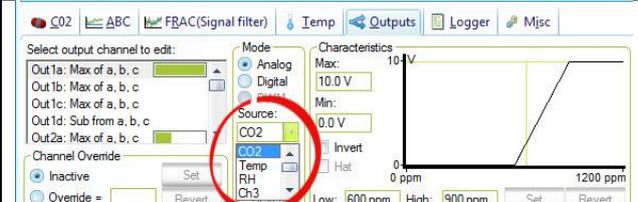
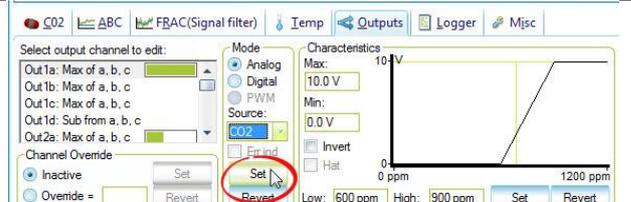
Max voltage limit can be changed, in steps of 0.1V, from set Min voltage limit *plus* 0.1V to 10.0V

Min voltage limit can be changed, in steps of 0.1V, from 0.0V to set Max voltage limit *minus* 0.1V

<p>1</p> <p>CO₂ 429ppm Temperature 23.1°C Humidity 21%RH</p> 	<p>2</p> <p>CO₂ Screen Temperature Set Humidity</p> 	<p>3</p> <p>Enter PIN 2001</p> <table border="1"> <tr><td>2</td><td>3</td></tr> <tr><td>5</td><td>6</td></tr> <tr><td>8</td><td>9</td></tr> <tr><td>Del</td><td>0</td></tr> <tr><td></td><td>«</td></tr> </table>	2	3	5	6	8	9	Del	0		«	<p>4</p> <p>Meter Measurements Outputs Misc</p> 						
2	3																		
5	6																		
8	9																		
Del	0																		
	«																		
<p>5 Out2</p> <table border="1"> <tr><td>Out1</td><td>10.0V</td></tr> <tr><td>Out2</td><td>4.8V</td></tr> <tr><td>Out3</td><td>4.8V</td></tr> <tr><td>Relay</td><td>1(active)</td></tr> </table> 	Out1	10.0V	Out2	4.8V	Out3	4.8V	Relay	1(active)	<p>6 Out2_a</p> <table border="1"> <tr><td>Out2_a</td><td>CO2</td></tr> <tr><td>Out2_b</td><td>Disabled</td></tr> <tr><td>Out2_c</td><td>Disabled</td></tr> <tr><td>Out2_d</td><td>Disabled</td></tr> </table> 	Out2_a	CO2	Out2_b	Disabled	Out2_c	Disabled	Out2_d	Disabled	<p>7 Max</p>  <p>Source CO2 Type Analog Low 0ppm High 2000ppm</p>	<p>8 10.0V, 9.9V..5.0V..</p> <p>Max limit 5.0V</p> 
Out1	10.0V																		
Out2	4.8V																		
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Out2_a	CO2																		
Out2_b	Disabled																		
Out2_c	Disabled																		
Out2_d	Disabled																		
<p>9</p> <p>Max limit 5.0V</p> <p>- +</p> 	<p>10</p>  <p>Max 5.0V Min 0.0V Source CO2 Type Analog Low 0ppm High 2000ppm</p>	<p>UIP5</p> 																	

Select source

There are eight sources to choose among: CO₂ (Ch0), Temp. (Ch1), Relative Humidity (Ch2) and Ch3 to 7 (contains no data) plus the Disable-button.

<p>7 Source</p>  <p>Max 5.0V Min 0.0V Source CO2 Type Analog Low 0ppm High 2000ppm</p> 	<p>8</p> <p>Source Temp</p> <table border="1"> <tr><td>CO2</td><td>Temp</td><td>RH</td></tr> <tr><td>Ch3</td><td>Ch4</td><td>Ch5</td></tr> <tr><td>Ch6</td><td>Ch7</td><td>Disable</td></tr> </table> 	CO2	Temp	RH	Ch3	Ch4	Ch5	Ch6	Ch7	Disable	<p>9</p> <p>Source Temp</p> <table border="1"> <tr><td>CO2</td><td>Temp</td><td>RH</td></tr> <tr><td>Ch3</td><td>Ch4</td><td>Ch5</td></tr> <tr><td>Ch6</td><td>Ch7</td><td>Disable</td></tr> </table> 	CO2	Temp	RH	Ch3	Ch4	Ch5	Ch6	Ch7	Disable	<p>10</p>  <p>Max 5.0V Min 0.0V Source Temp Type Analog Low 0.0°C High 20.0°C</p> 
CO2	Temp	RH																			
Ch3	Ch4	Ch5																			
Ch6	Ch7	Disable																			
CO2	Temp	RH																			
Ch3	Ch4	Ch5																			
Ch6	Ch7	Disable																			
<p>UIP5 1 Source: CO₂ selected</p> 		<p>2 Save</p> 																			

Types

Analogue/Analogue Invert (Analogue Invert is usable e.g. temp. protection page 6)

<p>7 Analogue</p>	<p>8</p> <p>Type An,Inv</p> <p>Analogue Analog invert</p> <p>Digital Digital invert</p> <p>«</p>	<p>9</p> <p>Type An,Inv</p> <p>Analogue Analog invert</p> <p>Digital Digital invert</p> <p>«</p>	<p>10 Analogue invert</p>
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UIP5 **1** Invert **2** Save (Set)

Digital/Digital Invert

<p>10 Digital</p>	<p>10 Digital Invert</p>
--------------------------	---------------------------------

Measure range settings

CO₂:

Low value can be changed, in steps of 100ppm, **from 0ppm to set High value minus 100ppm**.

High value can be changed, in steps of 100ppm, **from set Low value plus 100ppm**.

(SenseAir guarantees accuracy $\pm 30\text{ppm} \pm 3\%$ of reading, in the measurement range 0 – 2000ppm).

Temperature:

Low value can be changed, in steps of 1°C, **from 0°C to set High value minus 1°C**.

High value can be changed, in steps of 1°C, **from set Low value plus 1°C**.

(SenseAir guarantees accuracy $\pm 1.0^\circ\text{C}$ of reading, at the operating temperature range: 0 – 50°C)

Relative Humidity:

Low value can be changed, in steps of 1%, **from 0% to set High value minus 1%**.

High value can be changed, in steps of 1%, **from set Low value plus 1%**.

(SenseAir guarantees accuracy $\pm 5\text{RH}$ of reading at 20 – 80%RH. Operating humidity range: 0 – 95%)

NOTE!

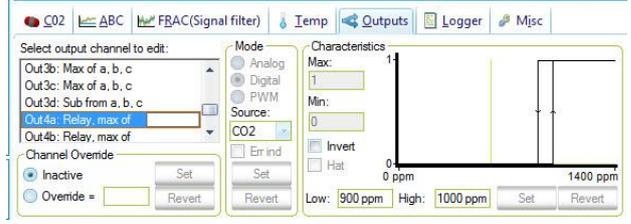
Possibility to, in software, set measurement range higher (out of range) than what is possible to measure.

e.g. CO₂

<p>1</p>	<p>2</p>	<p>3</p>	<p>4</p>
<p>5 Out2</p>	<p>6 Out2_a</p>	<p>7 Low 600ppm</p>	<p>8 600, 500...400ppm</p>
<p>9 Low 400ppm</p>	<p>10</p>	<p>UIP5</p>	

Outputs

Relay

<p>5 Relay</p> <p>Out1 10.0V Out2 4.8V Out3 4.8V Relay 1(active) «</p> 	<p>6</p> <p>Relay_a CO2 Relay_b Disabled Relay_c Disabled Relay_d Disabled «</p> 	<p>7 Type Digital</p> <p>Max 1 Min 0 Source CO2 Relay_a 0ppm 1000ppm Low 900ppm High 1000ppm «</p> 	<p>8</p> <p>Type Dig,Inv Digital Digital invert «</p> 
<p>9</p> <p>Type Dig,Inv Digital Digital invert </p>	<p>10</p> <p>Max 1 Min 0 Source CO2 Relay_a 0ppm 1000ppm Type Low High « Dig,Inv 900ppm 1000ppm</p>	<p>UIP5</p> 	

Communication settings

Protocol

When the sensors RS-485 Protocol parameter is set to “Auto”, the sensor selects protocol depending on the protocol used on the network it is connected to. After power on, the sensor then listens to the traffic on the RS-485 network. If the sensor detects valid BACnet, or Modbus messages, the sensor will start to use the detected protocol.

<p>1</p>	<p>2</p>	<p>3</p>	<p>4</p>
<p>5 RS-485</p>	<p>6</p>	<p>7</p>	<p>8</p>
<p>9 NOTE!</p>			
<p>UIP5 1 Misc</p>	<p>2</p>	<p>3</p>	

Address/Baudrate

Address can be changed from 1 to 253

Baudrate can be chosen as either 9600, 19200, 38400, 57600, 76800 or 115200

<p>5 RS-485</p>	<p>6</p>	<p>7</p>	<p>8</p>
<p>9 NOTE!</p>	<p>UIP5 Address 1</p>	<p>2</p>	<p>3</p>
<p>UIP Baudrate 1 Misc</p>	<p>2</p>	<p>3</p>	

NOTE!

UIP baudrate ≠ RS-485 baudrate if tSENSE VAV is connected *via phone jack* (see fig. 2).

UIP baudrate = RS-485 baudrate if tSENSE VAV is connected *via screw terminal* (see fig. 3).

To change settings via UIP requires Reset (Power OFF – Power ON) to execute them.

Connect meter

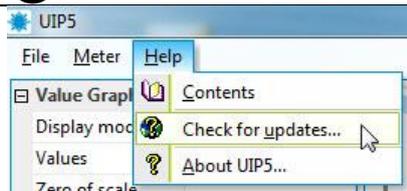
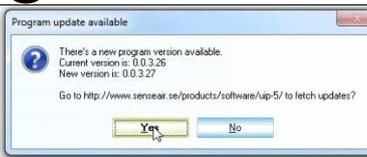
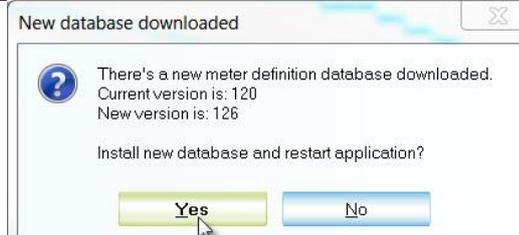
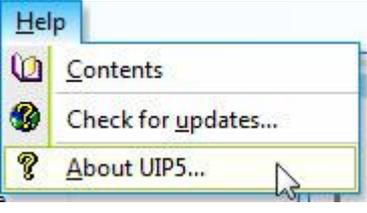
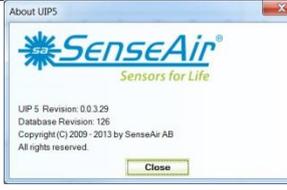
1

2

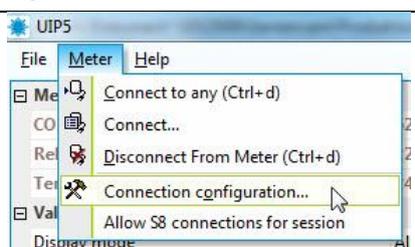
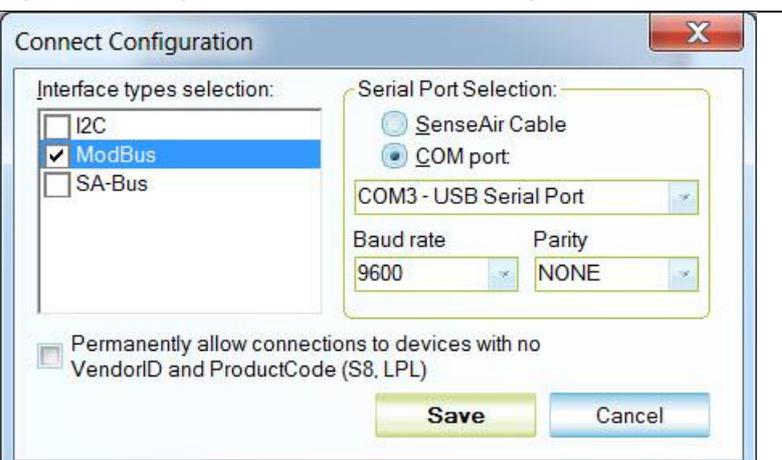
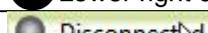
3 Information

Meter Values	
CO2 Value	464 ppm
Relative Humidity	24.9 %
Temperature	24.5 °C
Value Graph (Alt+g)	
Display mode	All data
Values	CO2 Value; Relative Humidity; Temperature
Zero of scale	
Lock scale	LockOnZoom
Number of points	1567 (1567)
Log to file	
Start/stop	Start
Log file	C:\Program Files (x86)\SenseAir\UIP5\LogData\log.txt
On start	New file (timestamp)
Save from	Now
Values	CO2 Value; Relative Humidity; Temperature
Log file size	
Connection	
Interface	ModBus
Port	COM3 - USB Serial Port
Network Address	254
Synchronization	Not supported
Period	5000 ms
Meter information	
Vendor Name	SenseAir AB
Product Code	tSENSE
Serial Number	0x030DA676
Firmware	0x66010C
Type ID	402
Map Version	72
Network Address	12
Error Flags	

Check for updates

<p>1</p> 	<p>2 New version available</p> 	<p>2 No new version</p> 
<p>2 New database downloaded</p> 	<p>3</p> 	<p>4</p> 

Connection configurations

<p>1</p> 	<p>2 ModBus 3 COM13-USB Serial Port 4 Save</p> 
<p>5 Lower right corner of screen</p> 	<p>6</p> 

NOTE!

UIP baudrate \neq RS-485 baudrate if *tSENSE VAV* is connected via *phone jack* (see fig. 2).

UIP baudrate = RS-485 baudrate if *tSENSE VAV* is connected via *screw terminal* (see fig. 3).

To change settings via UIP requires Reset (Power OFF – Power ON) to execute them.

Measured values
CO₂/Temperature/Humidity

<p>1</p> <table border="1"> <tr> <td>CO₂</td> <td>429ppm</td> </tr> <tr> <td>Temperature</td> <td>23.1°C</td> </tr> <tr> <td>Humidity</td> <td>21%RH</td> </tr> <tr> <td colspan="2"><input type="text"/></td> </tr> </table>	CO ₂	429ppm	Temperature	23.1°C	Humidity	21%RH	<input type="text"/>		<p>2</p> <p>CO₂</p> <p>429 ppm</p>	<p>3</p>	<p>4</p> <table border="1"> <tr> <td>CO₂</td> <td>429ppm</td> </tr> <tr> <td>Temperature</td> <td>23.1°C</td> </tr> <tr> <td>Humidity</td> <td>21%RH</td> </tr> <tr> <td colspan="2"><input type="text"/></td> </tr> </table>	CO ₂	429ppm	Temperature	23.1°C	Humidity	21%RH	<input type="text"/>	
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Temperature	23.1°C																		
Humidity	21%RH																		
<input type="text"/>																			

Display settings

Limits

CO₂/(Temperature)/(Humidity)

CO₂ Yellow/Red limit (Temp./Humidity same method as for CO₂ limit settings)

CO₂

Yellow limit can be changed, in steps of 100ppm, **from 0ppm to set Red limit minus 100ppm.**

Red limit can be changed, in steps of 100ppm, **from set Yellow limit plus 100ppm.**

Temperature:

Yellow limit can be changed, in steps of 1°C (1.8°F), **from -99°C (-146.2°F) to set Red limit minus 1°C (1.8°F)**

Red limit can be changed, in steps of 1°C (1.8°F), **from set Yellow limit plus 1°C (1.8°F).**

Relative Humidity:

Yellow limit can be changed, in steps of 1%, **from 0% to set Red limit minus 1%,**

Red limit can be changed, in steps of 1%, **from set Yellow limit plus 1%.**

NOTE!

Possibility to, in software, set display limits higher (out of range) than what is possible to measure.

1	2	3	4 100,200...700ppm
<p>CO₂ red limit 1000ppm RH yellow limit 70%RH</p>	<p>CO₂ red limit 1000ppm</p>	<p>RH yellow limit 70%RH</p>	

Chart 24h/Week

1	2	3	4
			<p>CO₂Chart Week</p>
			<p>24h</p>

Screen settings

1	2
<div style="display: flex; flex-direction: column; gap: 5px;"> <div style="display: flex; justify-content: space-between;">CO₂429ppm</div> <div style="display: flex; justify-content: space-between;">Temperature23.1°C</div> <div style="display: flex; justify-content: space-between;">Humidity21%RH</div> <div style="border: 1px solid black; height: 20px; width: 100%;"></div> </div> 	<div style="display: flex; flex-direction: column; gap: 5px;"> <div style="display: flex; justify-content: space-between;">CO₂Screen</div> <div style="display: flex; justify-content: space-between;">TemperatureSettings</div> <div style="border: 1px solid black; height: 20px; width: 100%;"></div> <div style="border: 1px solid black; height: 20px; width: 100%; text-align: center;">«</div> </div> 

Brightness

Brightness can be changed, in steps of 2%, **from 0% to 10%**, in steps of 10%, **from 10% to 100%**

Energy save brightness can be changed, in steps of 2%, **from 0% to 10%**, in steps of 10%, **from 10% to 40%**

3	4 10, 20,...50%	5
<div style="display: flex; flex-direction: column; gap: 5px;"> <div style="display: flex; justify-content: space-between;">Brightness10%</div> <div style="display: flex; justify-content: space-between;">BackgroundNormal</div> <div style="display: flex; justify-content: space-between;">Display SchemeActive</div> <div style="display: flex; justify-content: space-between;">ToggleInd area«</div> </div> 	<div style="display: flex; flex-direction: column; gap: 5px;"> <div style="display: flex; justify-content: space-between;">Brightness50%</div> <div style="display: flex; justify-content: space-between;">-+</div> <div style="display: flex; justify-content: space-between;">Energy save brightness0%</div> <div style="display: flex; justify-content: space-between;">-+</div> <div style="border: 1px solid black; height: 20px; width: 100%; text-align: center;">«</div> </div> 	<div style="display: flex; flex-direction: column; gap: 5px;"> <div style="display: flex; justify-content: space-between;">Brightness50%</div> <div style="display: flex; justify-content: space-between;">-+</div> <div style="display: flex; justify-content: space-between;">Energy save brightness0%</div> <div style="display: flex; justify-content: space-between;">-+</div> <div style="border: 1px solid black; height: 20px; width: 100%; text-align: center;">«</div> </div> 

Background

3	4	5	6
<div style="display: flex; flex-direction: column; gap: 5px;"> <div style="display: flex; justify-content: space-between;">Brightness50%</div> <div style="display: flex; justify-content: space-between;">BackgroundNormal</div> <div style="display: flex; justify-content: space-between;">Display SchemeActive</div> <div style="display: flex; justify-content: space-between;">ToggleInd area«</div> </div> 	<div style="display: flex; flex-direction: column; gap: 5px;"> <div style="display: flex; justify-content: space-between;">Background colorInvert</div> <div style="border: 1px solid black; height: 20px; width: 100%; text-align: center;">Normal</div> <div style="border: 1px solid black; height: 20px; width: 100%; text-align: center;">Invert</div> <div style="border: 1px solid black; height: 20px; width: 100%; text-align: center;">«</div> </div> 	<div style="display: flex; flex-direction: column; gap: 5px;"> <div style="display: flex; justify-content: space-between;">Background colorInvert</div> <div style="border: 1px solid black; height: 20px; width: 100%; text-align: center;">Normal</div> <div style="border: 1px solid black; height: 20px; width: 100%; text-align: center;">Invert</div> <div style="border: 1px solid black; height: 20px; width: 100%; text-align: center;">«</div> </div> 	<div style="display: flex; flex-direction: column; gap: 5px;"> <div style="display: flex; justify-content: space-between;">Brightness50%</div> <div style="display: flex; justify-content: space-between;">BackgroundInvert</div> <div style="display: flex; justify-content: space-between;">Sleep SchemeActive</div> <div style="display: flex; justify-content: space-between;">ToggleInd area«</div> </div> 

Screensaver, Time setting

Display Scheme Interval can be changed, in steps of 1s, **from 3s to 10s**.

NOTE! Set Sleep Interval to 10s => display light is OFF in 50s (60s minus 10s)

3	4	5 3,4,5... 10 s	6 50 s
<div style="display: flex; flex-direction: column; gap: 5px;"> <div style="display: flex; justify-content: space-between;">Brightness50%</div> <div style="display: flex; justify-content: space-between;">BackgroundNormal</div> <div style="display: flex; justify-content: space-between;">Display SchemeActive</div> <div style="display: flex; justify-content: space-between;">ToggleInd area«</div> </div> 	<div style="display: flex; flex-direction: column; gap: 5px;"> <div style="display: flex; justify-content: space-between;">Display Scheme Interval10s</div> <div style="border: 1px solid black; height: 20px; width: 100%; text-align: center;">Active</div> <div style="border: 1px solid black; height: 20px; width: 100%; text-align: center;">Energy save</div> <div style="border: 1px solid black; height: 20px; width: 100%; text-align: center;">Interval</div> <div style="border: 1px solid black; height: 20px; width: 100%; text-align: center;">«</div> </div> 	<div style="display: flex; flex-direction: column; gap: 5px;"> <div style="display: flex; justify-content: space-between;">Sleep Interval10s</div> <div style="border: 1px solid black; height: 20px; width: 100%; text-align: center;">-</div> <div style="border: 1px solid black; height: 20px; width: 100%; text-align: center;">+</div> <div style="border: 1px solid black; height: 20px; width: 100%; text-align: center;">«</div> </div> 	

Toggle (Time and CO₂ and/or Temperature and/or Humidity)

Toggle time

Toggle time can be changed, in steps of 1s, from 1s to 99s.

<p>3</p> <p>Brightness 50%</p> <p>Background Normal</p> <p>Display Scheme Interval</p> <p>Toggle Ind area «</p> 	<p>4</p> <p>Toggle Time 3s </p> <p>CO₂ X</p> <p>Temperature X</p> <p>Humidity X «</p>	<p>5</p> <p>Toggle Time 3s - +</p> <p>CO₂ X</p> <p>Temperature X</p> <p>Humidity X </p>	<p>6</p> <p>Brightness 50%</p> <p>Background Normal</p> <p>Display Scheme Interval</p> <p>Toggle Ind area </p>
<p>7</p> <p>CO₂ Screen</p> <p>Temperature Settings</p> <p>Humidity</p> 	<p>8</p> <p>CO₂ 429ppm</p> <p>Temperature 23.1°C </p> <p>Humidity 21.0%RH</p>	<p>9</p> <p>CO₂ 429ppm</p> <p>Temperature 23.1°C </p> <p>Humidity 21.0%RH</p>	<p>10 3 s</p> <p>CO₂ 429 ppm</p>
<p>11 3 s</p> <p>Temperature 23.1 °C</p>	<p>12 3 s</p> <p>Humidity 21.0 %RH </p>	<p>13</p> <p>CO₂ 429ppm</p> <p>Temperature 23.1°C</p> <p>Humidity 21.0%RH</p>	

Toggle CO₂ and/or Temperature and/or Humidity

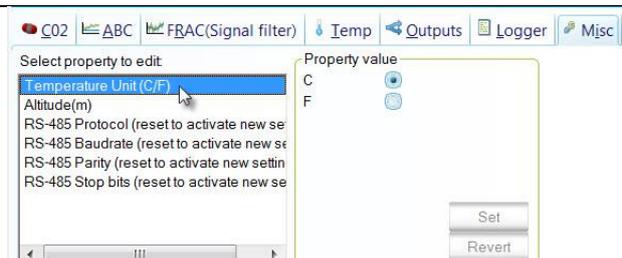
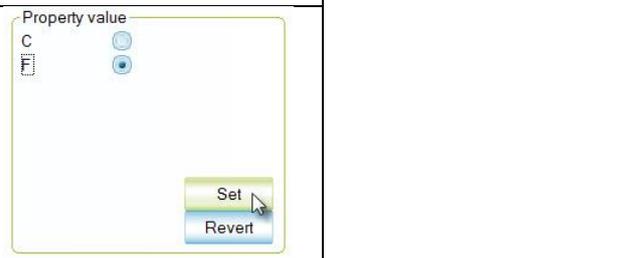
<p>3</p> <p>Brightness 50%</p> <p>Background Normal</p> <p>Display Scheme Interval</p> <p>Toggle Ind area «</p> 	<p>4</p> <p>Toggle Time 3s - +</p> <p>CO₂ </p> <p>Temperature X</p> <p>Humidity X «</p>	<p>5</p> <p>Toggle Time 3s - +</p> <p>CO₂ <input type="checkbox"/></p> <p>Temperature X</p> <p>Humidity X </p>	<p>6</p> <p>CO₂ 429ppm</p> <p>Temperature 23.1°C </p> <p>Humidity 21.0%RH</p>
<p>7 Will NOT show up</p> <p>CO₂ 429 ppm</p>	<p>8 3 s</p> <p>Temperature 23.1 °C</p>	<p>9 3 s</p> <p>Humidity 21.0 %RH</p>	

Meter settings

Meter information

<p>1</p> <p>CO₂ 429ppm</p> <p>Temperature 23.1°C</p> <p>Humidity 21%RH</p> 	<p>2</p> <p>CO₂ Screen</p> <p>Temperature Set</p> <p>Humidity</p>  <p>«</p>	<p>3</p> <p>Enter PIN 2001</p> <table border="1"> <tr> <td>2</td> <td>3</td> </tr> <tr> <td>5</td> <td>6</td> </tr> <tr> <td>8</td> <td>9</td> </tr> <tr> <td>Del</td> <td>«</td> </tr> </table> 	2	3	5	6	8	9	Del	«		
2	3											
5	6											
8	9											
Del	«											
<p>4</p> <p>Meter</p> <p>Measureme</p> <p>Outputs</p> <p>Misc «</p> 	<p>5</p> <p>Meter info RS-485</p> <p>PIN1 PIN2</p> <p>Reset</p> <p>«</p> 	<p>6</p> <p>Meter information</p> <table border="1"> <tr> <td>Meter status</td> <td>0x0</td> </tr> <tr> <td>Version</td> <td>1.07</td> </tr> <tr> <td>Serial Number</td> <td>0x30DA676</td> </tr> <tr> <td>Type ID</td> <td>402</td> </tr> <tr> <td>Map Version</td> <td>72</td> </tr> </table> 	Meter status	0x0	Version	1.07	Serial Number	0x30DA676	Type ID	402	Map Version	72
Meter status	0x0											
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Serial Number	0x30DA676											
Type ID	402											
Map Version	72											

Temperature unit (°C/°F)

<p>4</p> <p>Meter</p> <p>Measureme</p> <p>Outputs</p> <p>Misc «</p> 	<p>5</p> <p>CO₂ 429ppm</p> <p>Temperature 23.1°C</p> <p>Hum 21%RH</p> <p>«</p> 	<p>6</p> <p>Temperature offset</p> <p>Temperature Unit</p> <p>«</p> 	<p>7</p> <p>Temperature Units °F</p> <p>Celsius Fahrenheit</p>  <p>«</p>
<p>UIP5 1 Misc</p> 		<p>2</p> 	

Calibration options CO₂

Zero cal/Background/Target cal

(Same display procedure for the three options. See Note)

<p>4</p>	<p>5</p>	<p>6</p>	<p>7</p>
<p>8</p>	<p>9</p>	<p>10</p>	<p>11</p>
<p>UIP: If reference meter shows e.g. CO₂ value 500ppm set Target to 500</p>			
<p>Background calibration button</p> <p>1 Press 15s, until...</p>	<p>2 Green LED blinks twice</p>		

NOTE!

Zero Calibration: procedure requires calibration gas with CO₂ value 0ppm
 Zero Calibration Kit is used to zero calibrate CO₂ sensors. The unit produces CO₂ free air from ambient air.

Background Calibration: uses ABC (Automatic Baseline Correction) target, default value is 380ppm, as calibration target. (Background Calibration button as option.)

Target Calibration (Background CO₂ level): default value is 400ppm.

e.g. The ABC requires that the sensor is exposed to fresh air (at background level of CO₂ at least once per ABC period). If sensor is operated in environments that never reaches the background level, it might still be possible to benefit from ABC function by adjusting target level.

ABC

Enable/Disable

<p>1</p>	<p>2</p>	<p>3</p>	<p>4</p>
<p>5</p>	<p>6</p>	<p>7</p>	<p>8 Activate ABC</p>
<p>9 Save</p>	<p>UIP5</p>		

ABC: the function makes the sensor automatically adjust for any drifts in sensor reading due to e.g.:

- calibration misalignment due to vibration/shock from transportation and/or installation
- component aging
- dust accumulation
- degradation of reflective surfaces in the optical system

The ABC makes use of the fundamental fact that there is a background level of CO₂ in the atmosphere that is fairly constant, currently close to 400ppm_{vol}, and that for many applications the CO₂ level will reach the background level at some points in time.

NOTE!

For the ABC time counter to work properly, the electrical power supply to the sensor needs to be continuously ON for at least four (4) hours.

ABC period (ABC target / Altitude / Restore cal)
 (Same display procedure for the four options See Note!)

<p>5</p>	<p>6</p>	<p>7 See NOTE!</p>	<p>8</p>
<p>9</p>	<p>10 180, 181, 240hours</p>	<p>11 Save</p>	<p>12</p>
<p>13</p>	<p>1 4</p>	<p>UIP5</p>	

NOTE!

The ABC period is default set to 180 hours, which means that the sensor will make an adjustment once a week.

Temperature/Humidity Offset

<p>5</p>	<p>6</p>	<p>7 0.0...-0.1...-2.5°C</p>	
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Automatic system test

A full system test is executed automatically at every power-up. Sensor probes are checked constantly during operation against failure by checking valid dynamic measurement ranges.

System checks returns error bytes to RAM. Error codes are available by connecting the sensors to a PC with a special USB cable (art.No. 00-0-0070) connected (see fig. 2). Error codes are shown in software UIP (version 5 or higher) and in the display at “Meter status”

<p>1</p> <p>CO₂ 429ppm</p> <p>Temperature 23.1°C</p> <p>Humidity 21%RH</p> <p></p>	<p>2</p> <p>CO₂ Screen</p> <p>Temperature Settings </p> <p>Humidity «</p>	<p>3</p> <p>Enter PIN 2001</p> <table border="1" data-bbox="837 515 1117 694"> <tr> <td></td> <td>2</td> <td>3</td> </tr> <tr> <td></td> <td>5</td> <td>6</td> </tr> <tr> <td></td> <td>8</td> <td>9</td> </tr> <tr> <td>Del</td> <td>0</td> <td>«</td> </tr> </table>		2	3		5	6		8	9	Del	0	«	<p>4</p> <p>Meter </p> <p>Measurements</p> <p>Outputs</p> <p>Misc «</p>
	2	3													
	5	6													
	8	9													
Del	0	«													
<p>5</p> <p>Meter info RS-485</p> <p>PIN1 PIN2</p> <p>Reset</p> <p>«</p>	<p>6</p> <p>Meter information</p> <table border="1" data-bbox="518 840 798 985"> <tr> <td>Meter status</td> <td>0x0</td> </tr> <tr> <td>Version</td> <td>1.03</td> </tr> <tr> <td>Serial Number</td> <td>0x30DA676</td> </tr> <tr> <td>Type ID</td> <td>402</td> </tr> <tr> <td>Map Version</td> <td>69</td> </tr> </table> <p>«</p>	Meter status	0x0	Version	1.03	Serial Number	0x30DA676	Type ID	402	Map Version	69				
Meter status	0x0														
Version	1.03														
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Map Version	69														

Error codes and action plans

Error symbol (a wrench appears when one or several error codes are active)



Bit #	Error code	Error description	Suggested action
0	CO ₂ sensor Com. error	No ability to communicate with CO ₂ sensor module.	Try to restart sensor by power OFF/ON. Contact local distributor.
1	CO ₂ sensor CO ₂ measure error	CO ₂ measurement error.	Try Background calibration (see fig. 4 and 5). Contact local distributor. <i>See Note 1!</i>
2	T sensor T measure error	Temp measurement error.	Try to restart sensor by power OFF/ON. Contact local distributor.
3	RH/T sensor com error	No ability to communicate with RH/T sensor module.	
4	RH/T sensor RH measure error	RH measurement error.	
5	RH/T sensor T measure error	Temp measurement error, sensor will use CO ₂ sensor temperature if RH/T Temperature is unavailable. S_Temp will be set to NTC_Temp.	
6			
7			
8	Output config. error	Error in output configuration. Output is still updated, i.e. can be 0 – 10V	Check connections and loads of outputs. Check detailed settings and configuration with UIP software version 5 or later. Contact local distributor. <i>See Note 2!</i>

Table 2: Error codes and action plans.

NOTE!

1: Occurs if probe is out of range, at very high CO₂ values. Error code resets automatically when measured values returns to normal. May also indicate need of zero point calibration. If CO₂ values are normal and error code remains, the sensor can be defect or the connections to it are broken.

2: Even if there is an error in the configuration parameters for the output, and this error code is present in the status of the tSENSE VAV, the actual voltage on the output may be somewhere in the range 0-10V. There is no error control that for example sets the output to some pre-defined level (like 0V) in case of parameter error, rather the output will be undefined but in the range 0 – 10V.

If several errors are detected at the same time, different error code numbers will be added together into one single error code!

Sensor accuracy is defined at continuous operation (at least three (3) weeks after installation).

PIN codes

<p>1</p> <p>CO₂ 429ppm Temperature 23.1°C Humidity 21%RH</p> 	<p>2 PIN1 Off</p> <p>CO₂ Screen Temperature Settings Humidity</p>  <p>«</p>	<p>3 PIN2</p> <p>Enter PIN 2001</p> <table border="1"> <tr><td>2</td><td>3</td></tr> <tr><td>5</td><td>6</td></tr> <tr><td>8</td><td>9</td></tr> <tr><td>Del</td><td>0</td></tr> </table> <p>«</p>	2	3	5	6	8	9	Del	0	<p>4</p> <p>Meter Measurements Outputs Misc</p>  <p>«</p>
2	3										
5	6										
8	9										
Del	0										

Create PIN code for access to display settings (PIN1)

<p>5 PIN1</p> <p>Meter info RS-485 PIN1 PIN2 Reset</p>  <p>«</p>	<p>6 PIN1 Code Off...</p> <p>Pin code for access to display settings PIN 0 0 0 0</p> <p>Off + + + + - - - -</p> <p>PIN On/Off Save «</p> 	<p>7 PIN(1) Code On</p> <p>Pin code for access to display settings PIN 0 0 0 0</p> <p>On + + + + - - - -</p> <p>PIN On/Off Save «</p> 	<p>8 Create PIN(1) Code</p> <p>Pin code for access to display settings PIN 1 0 0 0</p> <p>On + + + + - - - -</p> <p>PIN On/Off Save «</p> 												
<p>9 Save</p> <p>Pin code for access to display settings PIN 1 0 0 0</p> <p>On + + + + - - - -</p> <p>PIN On/Off «</p> 	<p>10</p> <p>Pin code for access to display settings PIN 1 0 0 0</p> <p>On + + + + - - - -</p> <p>PIN On/Off Save</p> 														
<p>1</p> <p>CO₂ 429ppm Temperature 23.1°C Humidity 21%RH</p> 	<p>2 PIN1 On</p> <p>Enter PIN 1000</p> <table border="1"> <tr><td>1</td><td>2</td><td>3</td></tr> <tr><td>4</td><td>5</td><td>6</td></tr> <tr><td>7</td><td>8</td><td>9</td></tr> <tr><td>Del</td><td></td><td>«</td></tr> </table> 	1	2	3	4	5	6	7	8	9	Del		«	<p>3</p> <p>CO₂ Screen Temperature Settings Humidity</p> <p>«</p>	
1	2	3													
4	5	6													
7	8	9													
Del		«													

Create PIN code for access to meter settings (PIN2)

<p>5 PIN2</p> <p>Meter info RS-485</p> <p>PIN1 PIN2</p> <p>Reset</p> <p>«</p> 	<p>6 Create PIN2 Code</p> <p>Pin code for access to settings</p> <p>PIN 1 0 0 0</p> <p>« + + +</p> <p>- - -</p> <p>Save «</p> 	<p>7 Save</p> <p>Pin code for access to display settings</p> <p>PIN 1 0 0 0</p> <p>On + + + +</p> <p>- - - -</p> <p>«</p> 	<p>8</p> <p>Pin code for access to settings</p> <p>PIN 1 0 0 0</p> <p>+ + + +</p> <p>- - - -</p> <p>Save</p> 
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Maintenance

tSENSE VAV is maintenance free. Internal self-adjusting calibration function takes care of normal long term drift. To secure highest accuracy, a time interval of five years is recommended between CO₂ calibrations, unless some special situations have occurred.

Software can be downloaded free at senseair.com.
 USB-cable and zero calibration kit can be ordered from SenseAir.

Check can be done on site without interfering with ventilation system.

CE