

User Manual

tSENSE VAV No Disp

CO₂-, temperature- and
relative humidity controller



General

tSENSE VAV No Disp for wall mounting measures indoor air carbon dioxide concentration, temperature and relative humidity in rooms. The unit connects to Direct Digital Control (DDC). Linear outputs are pre-programmed as CO₂-, temperature- and relative humidity controller. Output parameters can be modified from PC (Windows) software UIP (version 5 or higher) and USB communication cable, alternative via Modbus or BACnet.

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Opening of housing

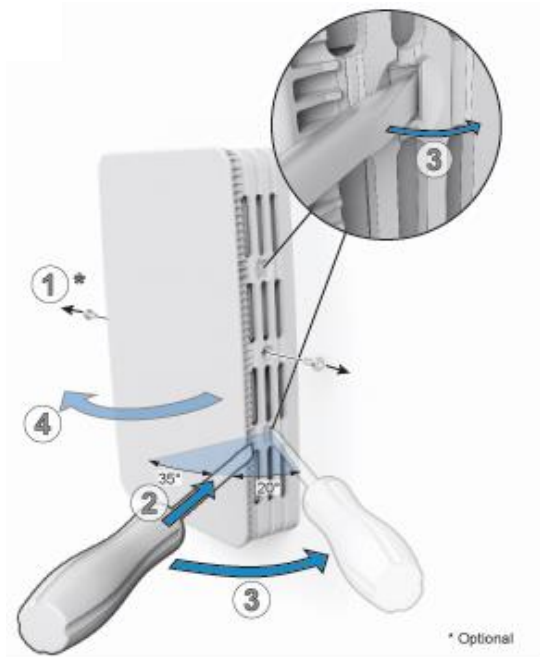


Figure 1: Opening of housing

Download of software UIP5

senseair.se/products/software/uip-5/

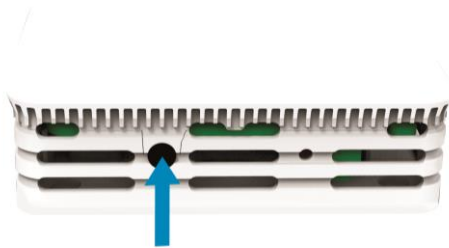


Figure 2: Connection to PC via phone jack
Connect Interface cable USB – 3.5mm Art.no.:00-0-0070

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 - 10 VDC	600 - 900ppm 22 - 23°C 75 - 85%	See label	See label
OUT(2) CO ₂ :	0 - 10 VDC	0 - 2000ppm	See label	See label
OUT(3) Temp:	0 - 10 VDC	0 - 50°C	See label	See label
Relay CO ₂ :	0 - 10 VDC	900 - 1000ppm	See label	See label

Table 1. Default output configurations of *tSENSE VAV No Disp*

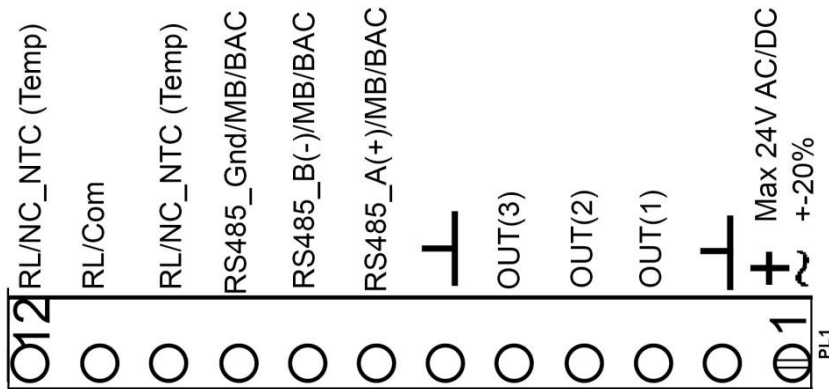


Figure 3: Screw Terminal

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 PC software UIP (version 5 or later). See information at senseair.com.

Out1/Out2/Out3

e.g

Each output consists of four blocks. Each block has nine source options. OUT1 (OUT2/ OUT3/(Relay)) is the *largest* (Max of a, b , c) demand from Proportional-bands.

UIP5			
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			
Out1_a CO ₂ = 714ppm =>3V	Out1_b Temp = 22.4°C =>4V	Out1_c Humidity = 80%RH=>5V	Out1_d Disabled

OUT1=Max of Out1_a/ Out1_b/ Out1_c minus (sub) Out1_d
 5V (Out1_c) – 0V (Out1_d Disabled) = 5V => OUT1=5V

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

U _{Out} = 0V if space has the value:	U _{Out} will be increased if space has the value:	U _{Out} = 10V if space has the value:
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)

e.g. Temp protection (Out1_d) Enabled

Out1_a CO ₂ : 1205ppm=> 10V	Out1_b Temp: 16.4°C => 0V	Out1_c Humidity: 80%RH=>5V	Out1_d Temp: 16.4°C =>10V NOTE! (sub) (Temp protection)
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OUT1 = 10V (Out1_a) – 10V (Out1_d) = 0V

Voltage range

Max (the same approach with "Min")

UIP5

Select output channel to edit:
Out1a: Max of a, b, c
Out1b: Max of a, b, c
Out1c: Max of a, b, c
Out1d: Sub from a, b, c
Out2a: Max of a, b, c

Mode: Analog
Characteristics: Max: 10.0 V, Min: 0.0 V
Source: CO2
Low: 600 ppm, High: 900 ppm

Select source

Each output consists of four blocks. Each block has nine source options.

UIP5 1 Source: CO₂ selected 2 Save

Select output channel to edit:
Out1a: Max of a, b, c
Out1b: Max of a, b, c
Out1c: Max of a, b, c
Out1d: Sub from a, b, c
Out2a: Max of a, b, c

Mode: Analog
Characteristics: Max: 10.0 V, Min: 0.0 V
Source: CO2
Low: 600 ppm, High: 900 ppm

Types

Analogue/Analogue Invert

(The same approach with "Digital/Digital Invert")

UIP5 1 Invert 2 Save (Set)

Select output channel to edit:
Out1b: Max of a, b, c
Out1c: Max of a, b, c
Out1d: Sub from a, b, c
Out2a: Max of a, b, c
Out2b: Max of a, b, c

Mode: Analog
Characteristics: Max: 10.0 V, Min: 0.0 V
Source: Temp
Low: 0.00 °C, High: 20.00 °C
 Invert

Proportional-band settings

Low (the same approach with "High")

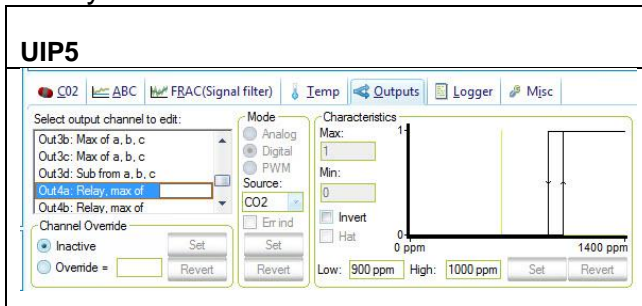
UIP5

Select output channel to edit:
Out1a: Max of a, b, c
Out1b: Max of a, b, c
Out1c: Max of a, b, c
Out1d: Sub from a, b, c
Out2a: Max of a, b, c

Mode: Analog
Characteristics: Max: 10.0 V, Min: 0.0 V
Source: CO2
Low: 600 ppm, High: 900 ppm

Outputs

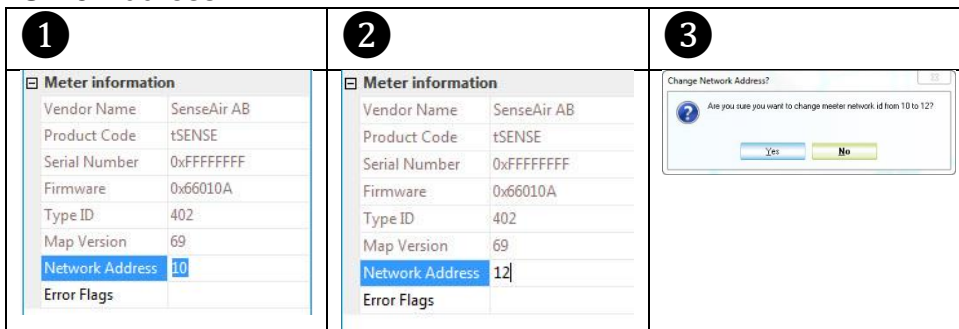
Relay



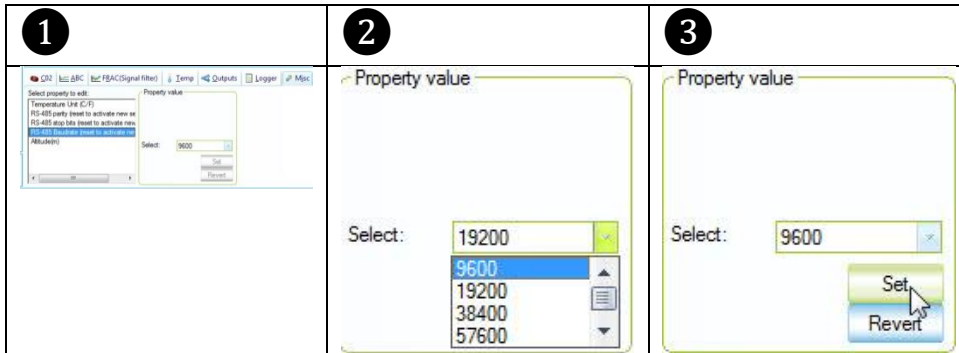
Communication settings

Address/Baudrate

UIP5 Address



UIP5 Baudrate



NOTE!

UIP baudrate \neq RS-485 baudrate if *tSENSE VAV No Disp* is connected *via phone jack* (see fig. 2).
 UIP baudrate = RS-485 baudrate if *tSENSE VAV No Disp* 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 Connect meter

The screenshot shows the main application window with the 'Meter' menu open. The 'Connect...' option is highlighted, and a mouse cursor is pointing at it. Other menu items include 'Connect to any (Ctrl+d)', 'Disconnect From Meter (Ctrl+d)', and 'Connection configuration...'. A status bar at the bottom indicates 'Allow S8 connections for session'.

2

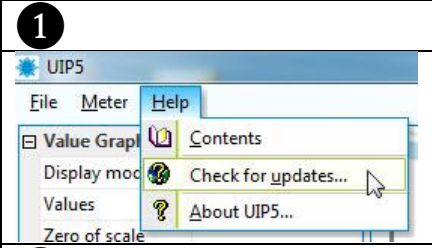


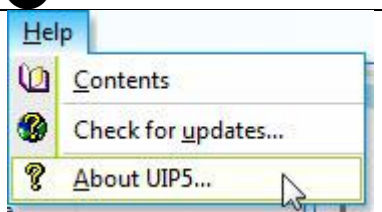
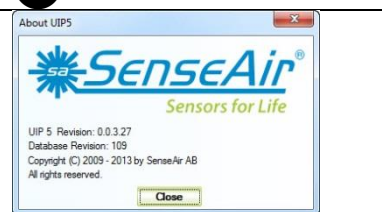
The 'Connection to meter' dialog box is shown. It has two main sections: 'Interface types selection' and 'Address Mode'. Under 'Interface types selection', 'ModBus' is checked, while 'I2C' and 'SA-Bus' are unchecked. Under 'Address Mode', 'Any Address' is selected with a radio button. The 'Specified Address' and 'Scan From' fields both contain the value '104'. There are 'Connect' and 'Cancel' buttons at the bottom.

3 Information

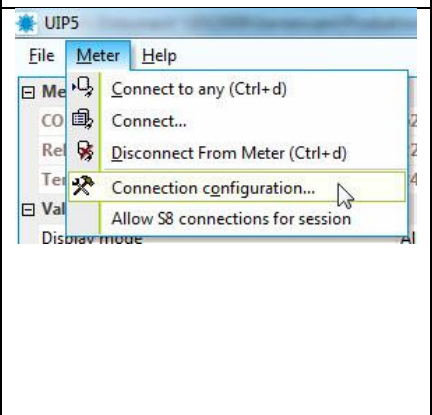
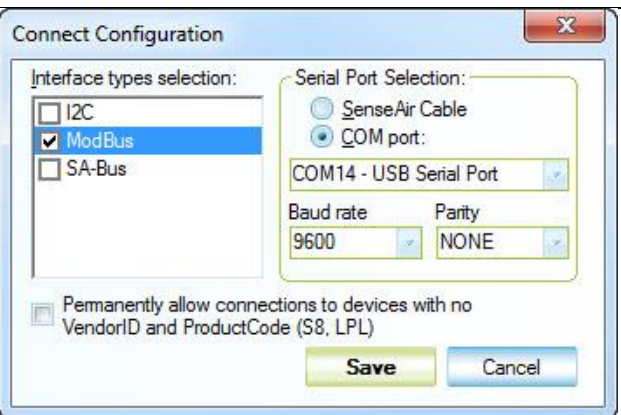
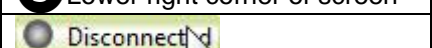

The 'Information' tab is displayed, showing various settings and data for the connected meter. The data is organized into several sections:

- Meter Values:** CO2 Value (609 ppm), Relative Humidity (42.6 %), Temperature (23.8 °C).
- Value Graph (Alt+g):** Display mode (All data), Values (CO2 Value; Relative Humidity; Temperature), Zero of scale, Lock scale (LockOnZoom), Number of points (397 (397)).
- Log to file:** Start/stop (Start), Log file (C:\Program Files\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 (COM14 - 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 (0x66010B), Type ID (402), Map Version (71), Network Address (10), Error Flags.

Check for updates

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

Connection configurations

<p>1</p> 	<p>2 ModBus 3 COM14-USB Serial Port 4 Save</p> 	
<p>5 Lower right corner of screen</p> 	<p>6</p> 	

NOTE!

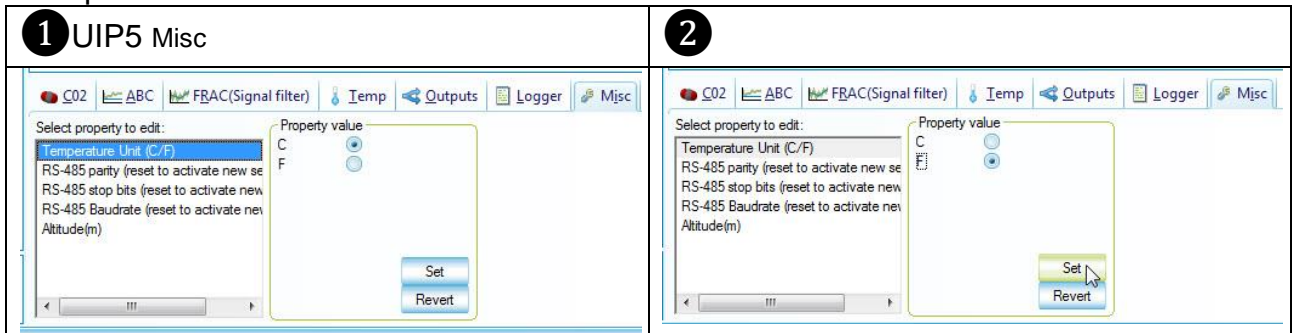
UIP baudrate \neq RS-485 baudrate if *tSENSE VAV No Disp* is connected *via phone jack* (see fig. 2).

UIP baudrate = RS-485 baudrate if *tSENSE VAV No Disp* is connected *via screw terminal* (see fig. 3).

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

Measured values

Temperature unit selection

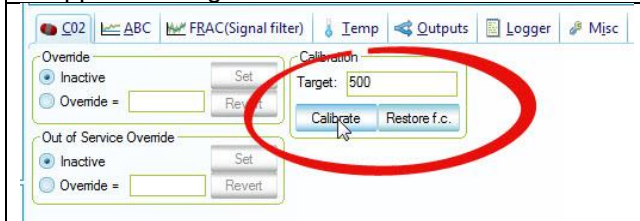


Meter information

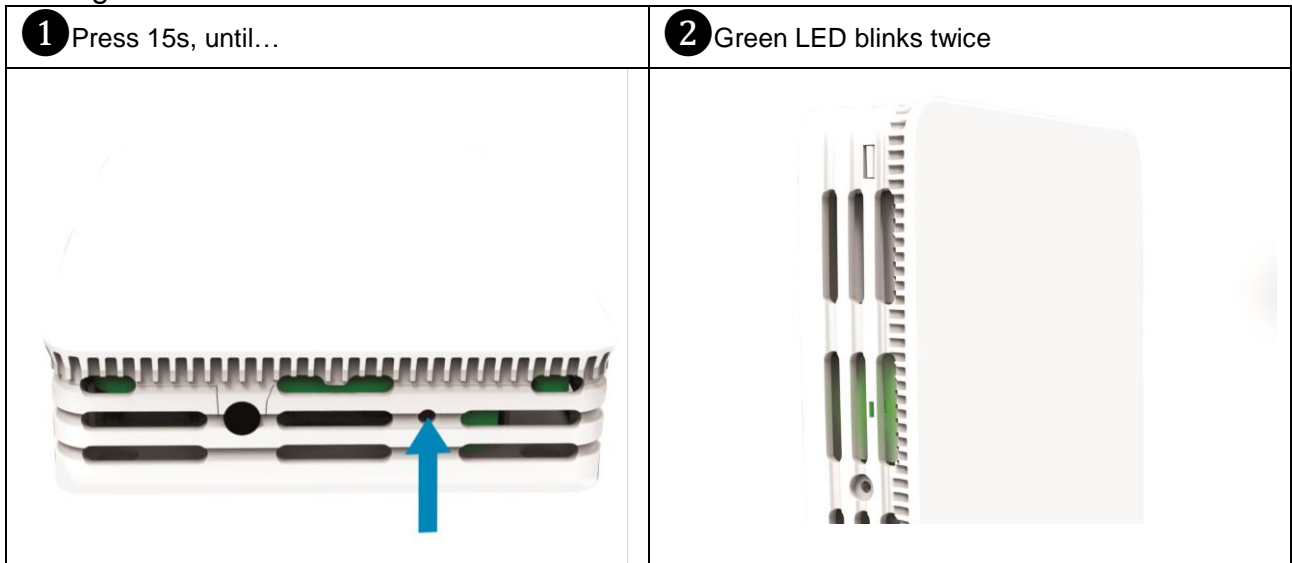
Calibration options CO₂

Zero cal/Background/Target cal

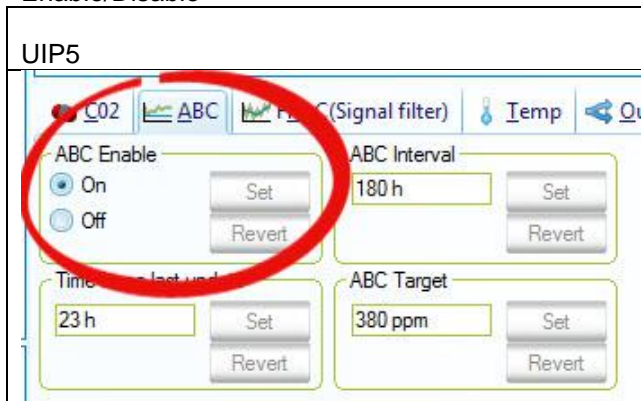
UIP: If reference meter shows e.g. CO₂-value 500ppm set Target to 500



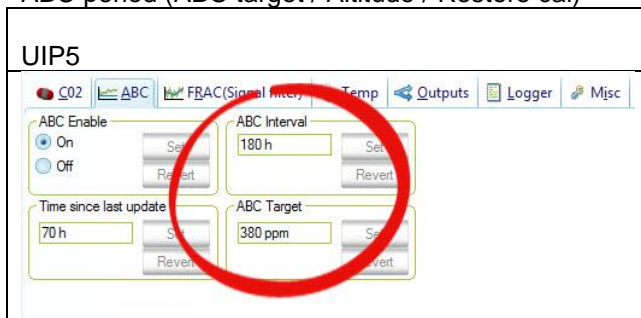
Background calibration button



ABC Enable/Disable



ABC period (ABC target / Altitude / Restore cal)



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) at "Meter information - Error Flags"

Error codes and action plans

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.

Table 2: Error codes and action plans.

NOTE!

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. 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).

Maintenance

tSENSE VAV No Disp 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 www.senseair.com.
USB-cable and zero calibration kit can be ordered from SenseAir.

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

Directives

This product is in accordance with the
EMC directive 2014/30/EC, 92/31/EEG, RoHS directive 2011/65/EU
including amendments by the CE-marking directive 93/68/EEC
The product fulfils the following demands:
EN 61326-1:2013, Class B equipment



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