

User Manual

tSENSE VAV No Disp

CO₂, temperature and
relative humidity sensor



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.



Table of contents

General	1
Opening of housing	3
Download software UIP5	3
Check for updates	3
Output configurations	4
Out1/Out2/Out3	4
Voltage range	5
Select source	5
Types	6
Proportional-band settings	6
Relay	6
Communication settings	6
Address/Baudrate	6
Connect meter	7
Check for updates	8
Connection configurations	8
Measured values	9
Temperature unit selection	9
Calibration options CO ₂	9
Zero cal/Background/Target cal	9
ABC	10
Automatic system test	10
UIP Logger	10
Log to file	11
Error codes and action plans	11
Maintenance	12



Opening of housing

See Installation Manual

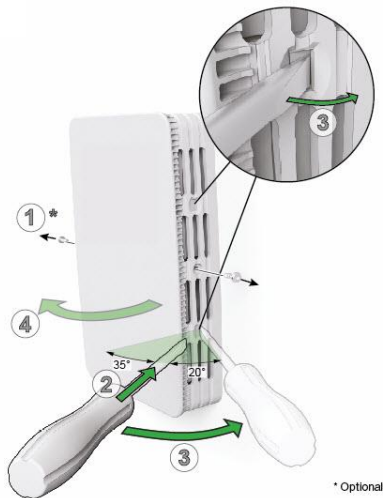


Figure 1: Opening of housing

Download software UIP5

senseair.com

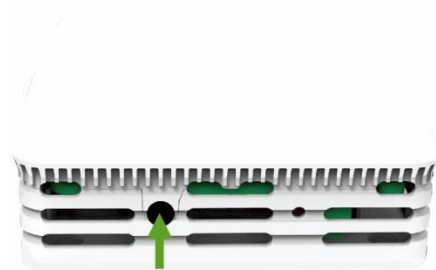
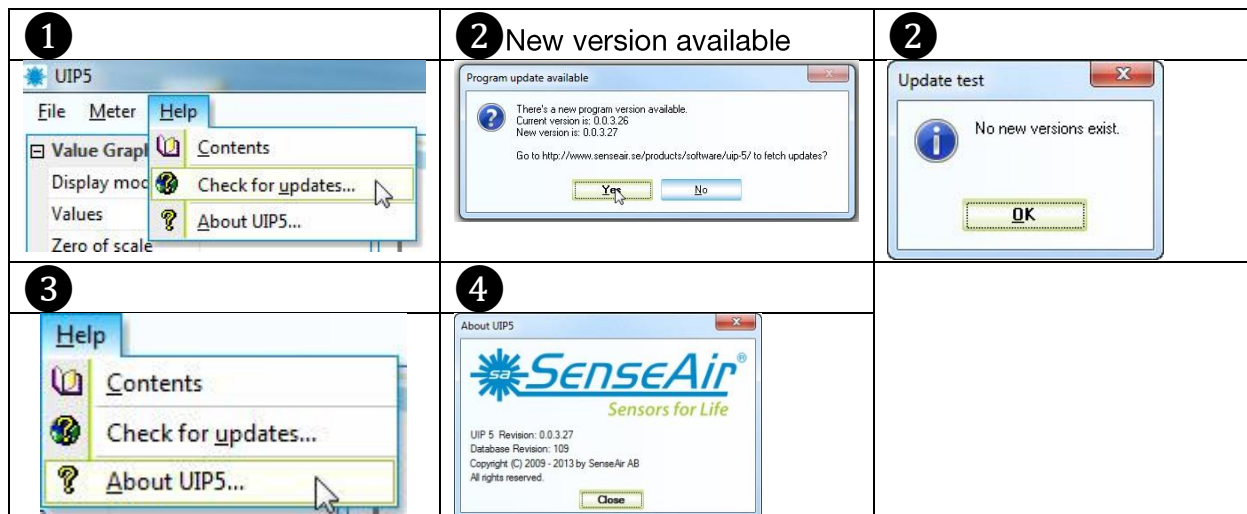


Figure 2: Connection to PC via phone jack
Connect Interface cable USB – 3.5mm Art.no.:00-0-0070

Check for updates



Output configurations

Terminal	Default output	Default output range	Outputs of this sensor	Output ranges of this sensor
OUT1 CO ₂ : Temperature: Relative Humidity:	0 - 10 VDC	600 - 900ppm 22 - 23°C 75 - 85%	See label	See label
OUT2 CO ₂ :	0 - 10 VDC	0 - 2000ppm	See label	See label
OUT3 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

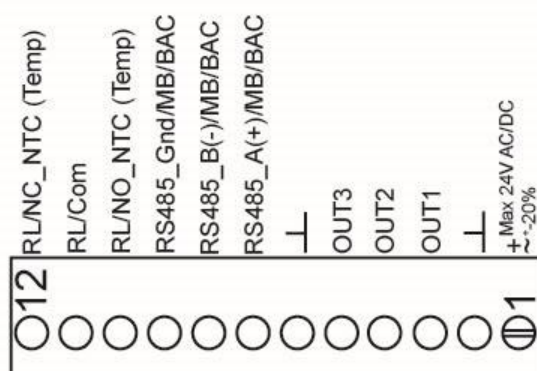


Figure 3: Screw Terminal

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:
$CO_2 \leq 600ppm$ and $Temp \leq 22^\circ C$ and $RH \leq 75\%RH$ (Out1_d = Disabled)	$600ppm \leq CO_2 < 900ppm$ or $22^\circ C \leq Temp < 23^\circ C$ or $75\%RH \leq RH < 85\%RH$ (Out1_d = Disabled)	$CO_2 > 900ppm$ or $Temp > 23^\circ C$ or $RH > 85\%$ (Out1_d = Disabled)

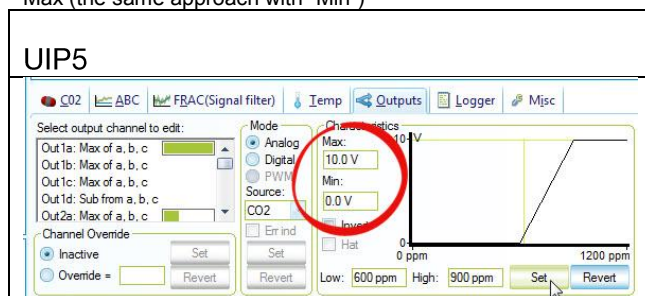
e.g. Temp protection (Out1_d) Enabled

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

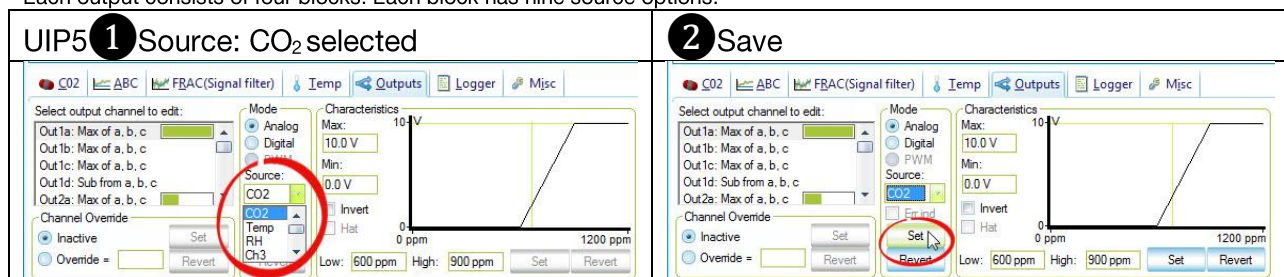
Voltage range

Max (the same approach with "Min")



Select source

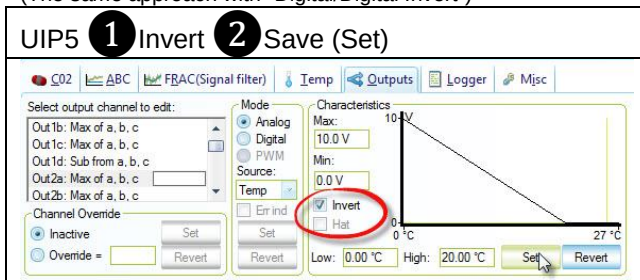
Each output consists of four blocks. Each block has nine source options.



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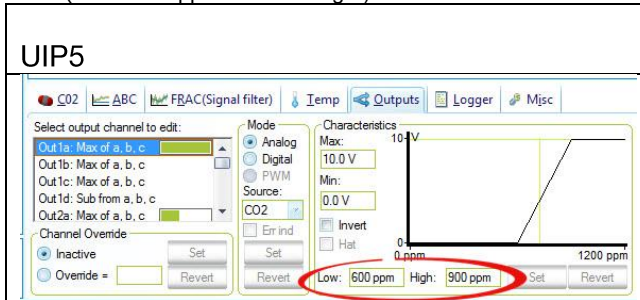
Types

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



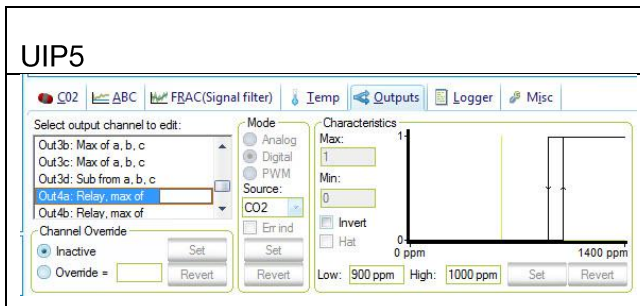
Proportional-band settings

Low (the same approach with "High")



Outputs

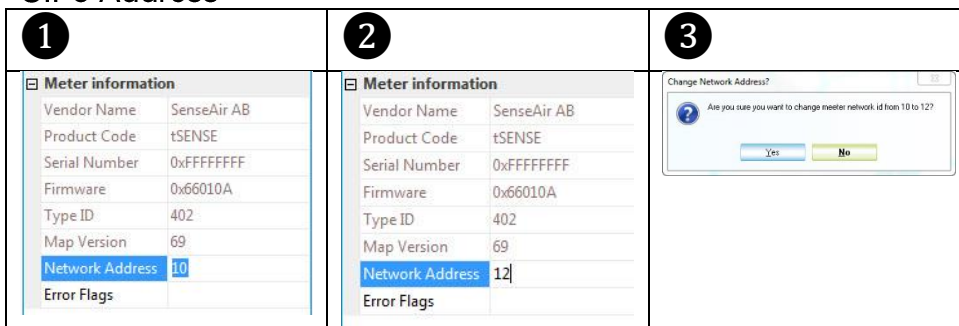
Relay



Communication settings

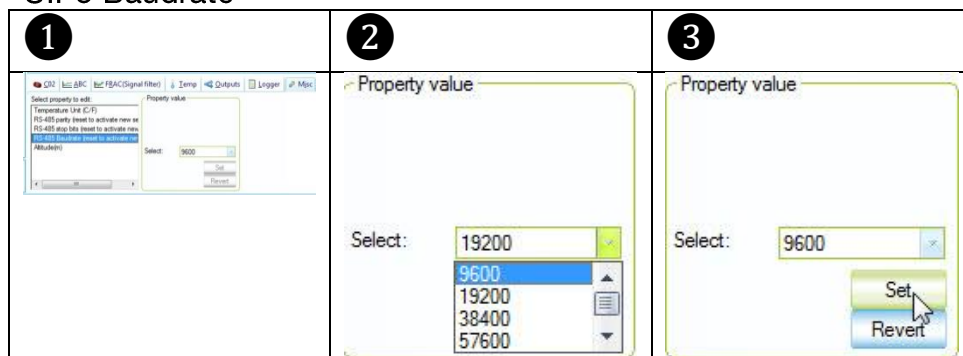
Address/Baudrate

UIP5 Address



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UIP5 Baudrate



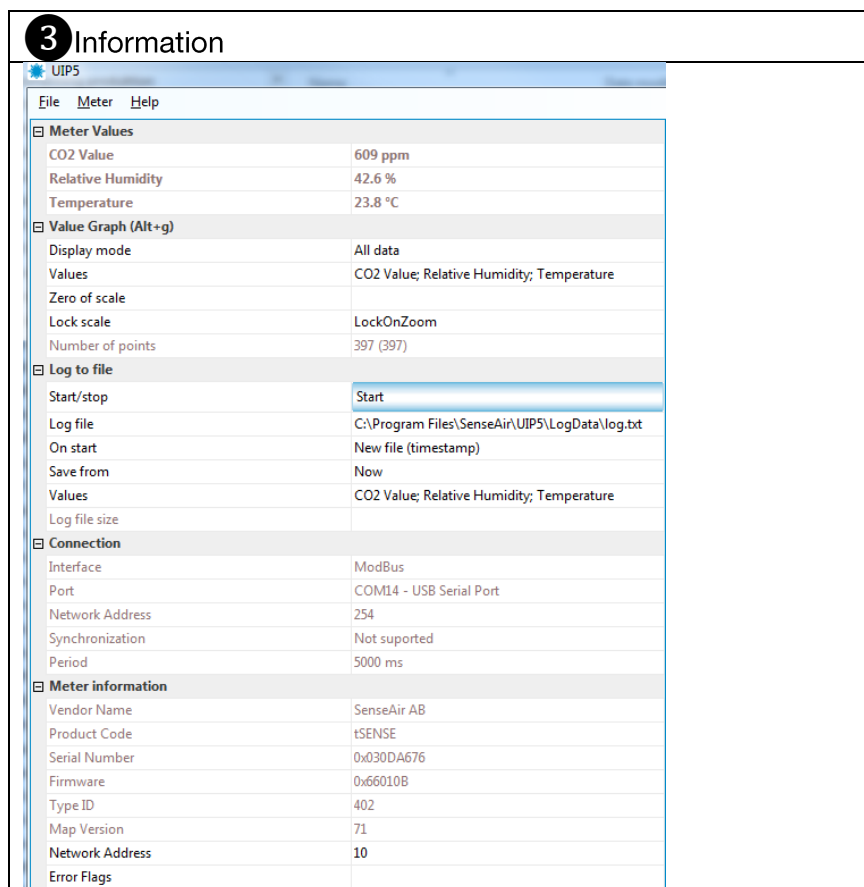
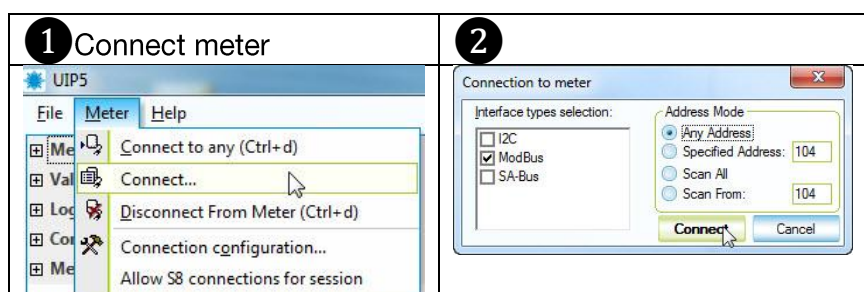
NOTE!

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).

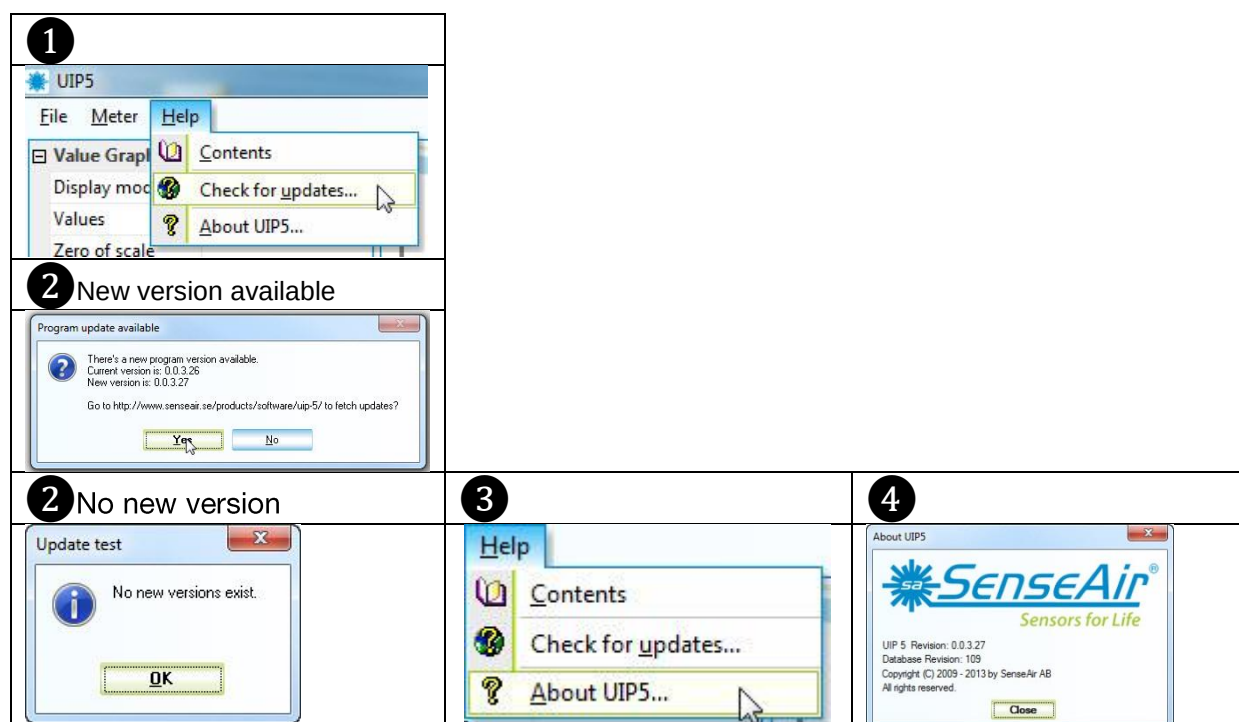
To change settings via UIP requires Reset (Power OFF – Power ON) to execute them.

Connect meter

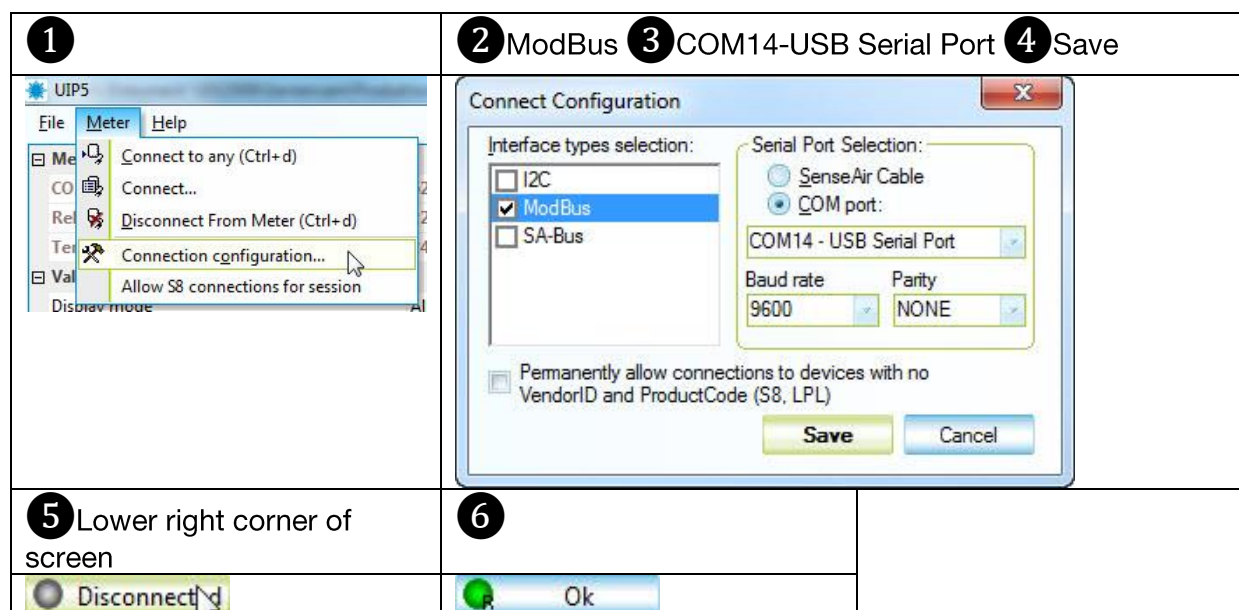


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Check for updates



Connection configurations



NOTE!

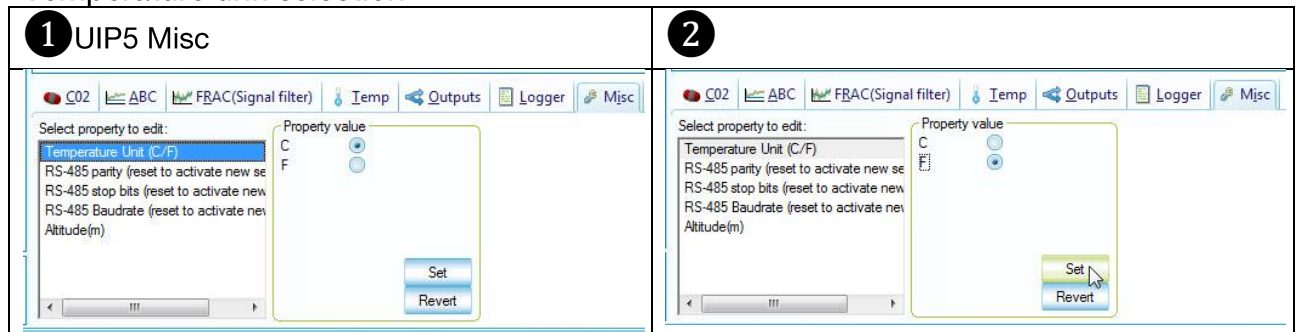
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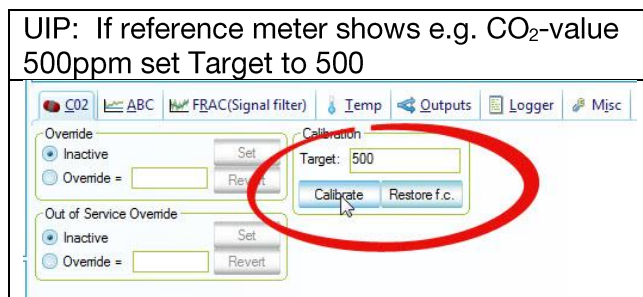
Measured values

Temperature unit selection

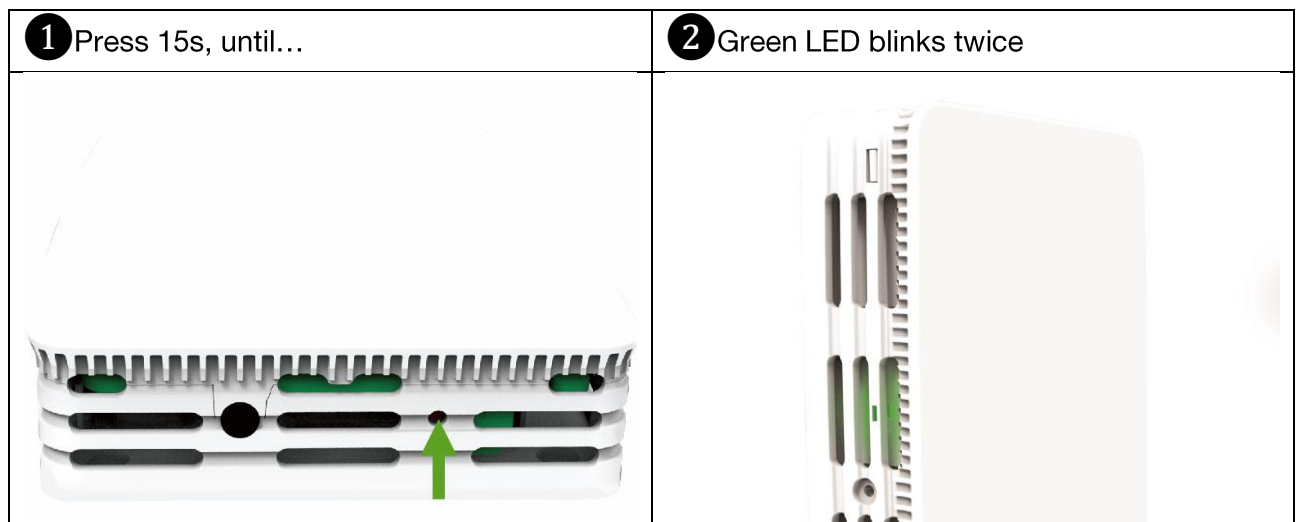


Calibration options CO₂

Zero cal/Background/Target cal

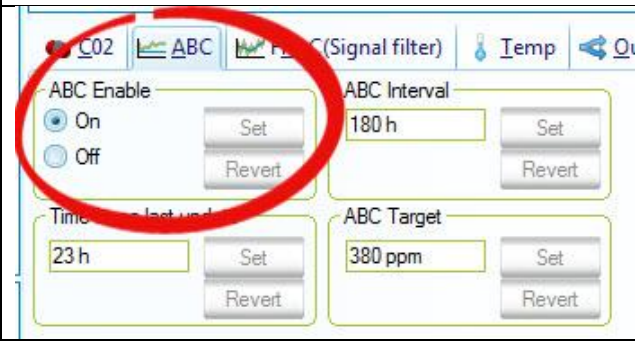
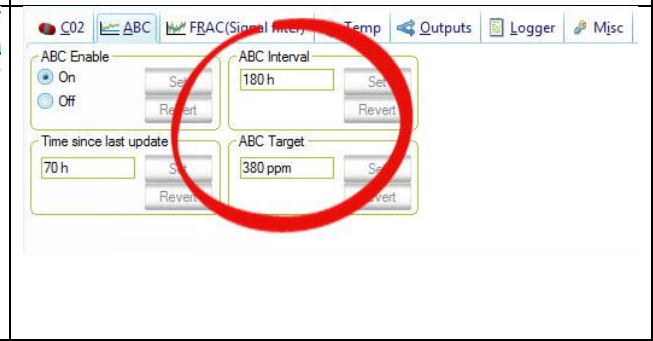


Background calibration button



ABC
Enable/Disable

ABC period (ABC target / Altitude / Restore cal)

UIP5	UIP5
	

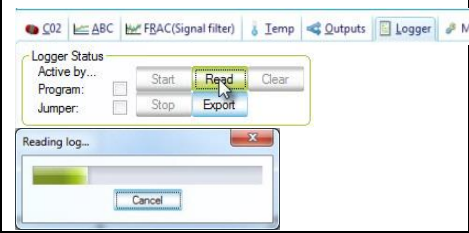
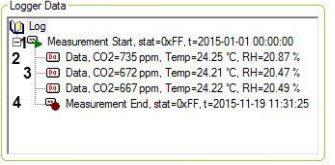
Automatic system test

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”

UIP Logger

Alternative 1

1 Start to Read Log Data from sensor	2
	 1 Measurement Start. Record added by UIP for compatibility between UIP and other sensor types. Status = dummy value Timestamp = dummy value 2 Oldest data record in log, average values for 15 minutes 3 Average values for 15 minutes after point 2 4 Measurement end. Record added to readout by UIP Status = dummy value Timestamp = time log was read from sensor

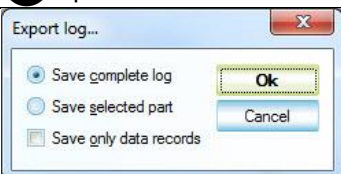
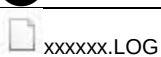
NOTE!

The log consists of 15 min averages, 672 (4 x 24h x 7d) data points for each value.

tSENSE has no real-time clock (no timestamps in the sensors log). If the sensor has not been powered on continuously, time between data points can be much longer than 15 minutes. Timestamps in UIP log file are added by UIP.

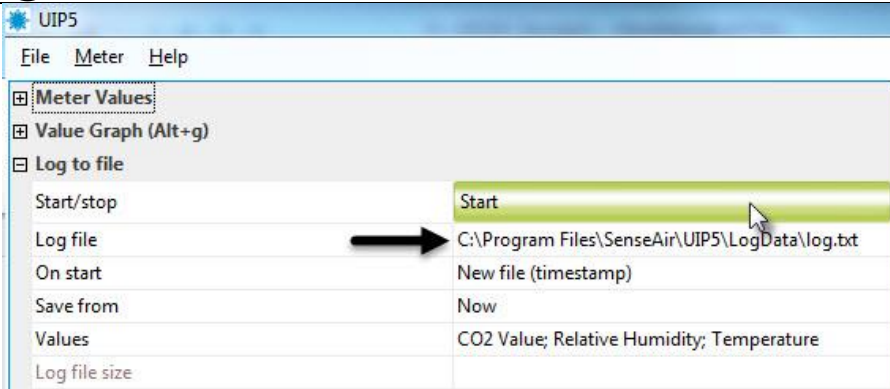
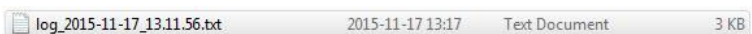
Chart 24h and Week (7 days) plots use data from the same log.

Export Logger Data

1	2 Options	3
		

Alternative 2

Log to file

1												
Start log to file on PC 												
2												
												
3												
<table border="1"> <thead> <tr> <th>Time</th> <th>Offset ÅmsÅ</th> <th>CO2 Value ÅppmÅ</th> <th>Relative Humidity Å%Å</th> </tr> </thead> <tbody> <tr> <td>2015-11-17 13:11:58</td> <td>9149974</td> <td>685.00</td> <td>24.36</td> </tr> <tr> <td>2015-11-17 13:12:03</td> <td>9154919</td> <td>685.00</td> <td>24.31</td> </tr> </tbody> </table>	Time	Offset ÅmsÅ	CO2 Value ÅppmÅ	Relative Humidity Å%Å	2015-11-17 13:11:58	9149974	685.00	24.36	2015-11-17 13:12:03	9154919	685.00	24.31
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2015-11-17 13:11:58	9149974	685.00	24.36									
2015-11-17 13:12:03	9154919	685.00	24.31									

Error codes and action plans

Red LED indicates that one or several error codes are active



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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!

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.

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.

Cleaning (exterior only):

Use mild detergent (no harsh chemicals) and wipe dry with a dry cloth.

