

User Manual



tSENSE (Disp) T RH RL

CO₂-, temperature- and
relative humidity transmitter



General

tSENSE (Disp) for wall mounting measures indoor air carbon dioxide concentration, temperature and relative humidity in rooms. *tSENSE (Disp)* is available with or without 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 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

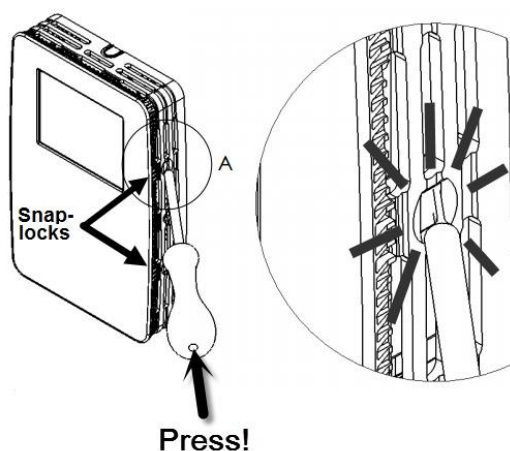


Figure 1

Download of software UIP

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

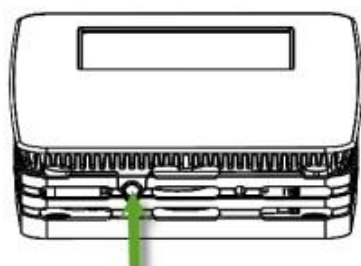


Figure 2: Connection to PC via phone jack
Connect Interface cable USB – 3.5mm Art.no.:00-0-0070

Enter PIN code

PIN1 Delivered product
0000, Code off
PIN2 Delivered product
2001 (if not implemented: 0000)

			0 Power ON  V1.03
1 CO₂ 429ppm Temperature 23.1°C Humidity 21%RH 	2 CO₂ Screen Temperature Settings Humidity «	3 PIN2 (PIN1 Off) Enter PIN 2001  2 3 5 6 7 8 9 Del 0 «	4 Meter Measurements Outputs Misc «

Output Configurations

Terminal	Default Output	Default Output Range	Outputs of this sensor	Output Ranges of this sensor
OUT(1)	0 - 10 VDC	0 - 2000ppm CO ₂	See label	See label
OUT(2)	0 - 10 VDC	0 - 50°C	See label	See label
OUT(3)	0 - 10 VDC	0 - 100%RH	See label	See label

Table 1. Default output configurations of *tSENSE (Disp)*

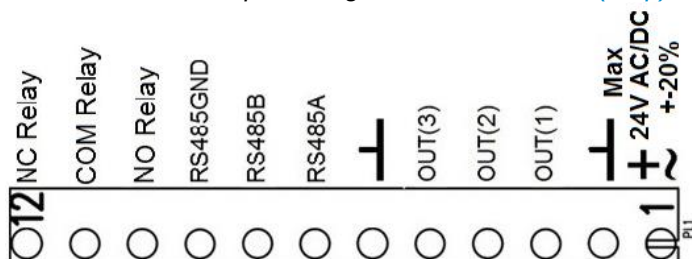


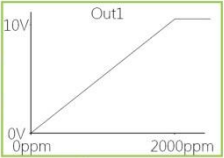
Figure3: Screw Terminal

Connect the sensor to PC with the connect interface cable USB – 3.5mm Art.no.: 00-0-0070

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

Outputs

Out1/Out2/Out3

1 CO₂ 429ppm Temperature 23.1°C Humidity 21%RH  	2 CO₂ Screen Temperature Settings  Humidity «	3 Enter PIN 2001 <table border="1"> <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	«	4 Outputs Meter Measurements Outputs  Misc «
	2	3													
	5	6													
	8	9													
Del	0	«													
5 Out1 Out1  10.0V Out2 4.8V Out3 4.8V Relay 1(active) «	6 Out1  CO2 «	7 Max 10.0V Min 0.0V Source CO2 Type Analog Low 0ppm High 2000ppm « 													

Voltage range

Max (the same approach with "Min")

1 	2 	3 	4 Outputs
5 Out2 	6 	7 Max 	8 10.0V, 9.9V..5.0V..
9 	10 	UIP5 	

Select source

7 Source 	8 	9 	10
UIP5 1 Source CO ₂ selected 		2 Save 	

Types

Analogue/Analogue Invert

7 Analogue Max 5.0V Min 0.0V Source Temp 10V Out2 0V 0°C 20.0°C Low 0.0°C High 20.0°C «	8 Type An,Inv Analog Digital Analog invert Digital invert «	9 Type An,Inv Analog Digital Analog invert Digital invert «	10 Analogue invert Max 5.0V Min 0.0V Source Temp 10V Out2 0V 0°C 20.0°C Low 0.0°C High 20.0°C «
--	--	--	--

UIP5 **1** Invert **2** Save (Set)

CO2

ABC

FRAC(Signal filter)

Temp

Outputs

Logger

Misc

Select output channel to edit:

Out1: 0-10V

Out2: 0-10V

Out3: 0-10V

Out4: Relay

Channel Override

Inactive

Override =

Set

Revert

Mode

Analog

Digital

PWM

Source: Temp

Err ind

Set

Revert

Characteristics

Max: 5.0 V

Min: 0.0 V

Source: Temp

Invert

Low: 0.00 °C High: 20.00 °C

Set

Revert

Digital/Digital Invert

10 Digital Max 5.0V Min 0.0V Source Temp 10V Out2 0V 0°C 20.0°C Low 18.0°C High 20.0°C «	10 Digital Invert Max 5.0V Min 0.0V Source Temp 10V Out2 0V 0°C 20.0°C Low 18.0°C High 20.0°C «
---	--

Measure range settings

Low (the same approach with "High")

7 Low 600ppm Max 5.0V Min 0.0V Source CO2 10V Out2 0V 0ppm 900ppm Low 600ppm High 900ppm «	8 600, 550...400ppm Low 400ppm «	9 Low 400ppm Low 400ppm «	10 Max 5.0V Min 0.0V Source CO2 10V Out2 0V 0ppm 900ppm Low 400ppm High 900ppm «
---	---	--	---

UIP5

CO2

ABC

FRAC(Signal filter)

Temp

Outputs

Logger

Misc

Select output channel to edit:

Out1: 0-10V

Out2: 0-10V

Out3: 0-10V

Out4: Relay

Channel Override

Inactive

Override =

Set

Revert

Mode

Analog

Digital

PWM

Source: CO2

Err ind

Set

Revert

Characteristics

Max: 5.0 V

Min: 0.0 V

Source: CO2

Invert

Low: 400 ppm High: 900 ppm

Set

Revert

Outputs

Relay

1 CO₂ 429ppm Temperature 23.1°C Humidity 21%RH  	2 CO₂ Screen Temperature Settings  Humidity «	3 Enter PIN 2001  <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 «	4 Outputs Meter Measurements Outputs  Misc «
2	3										
5	6										
8	9										
Del	0 «										
5 Relay Out1 10.0V Out2 4.8V Out3 4.8V Relay 1(active) « 	6 Relay  CO₂ «	7 Type Digital Max 1 Min 0 Source CO₂ Relay Low 900ppm High 1000ppm « 	8 Type Dig,Inv Digital Digital invert  «								
9 Type Dig,Inv Digital Digital invert 	10 Max 1 Min 0 Source CO₂ Relay Type Dig,Inv Low 900ppm High 1000ppm «	UIP5 CO₂ ABC FRAC(Signal filter) Temp Outputs Logger Misc Select output channel to edit: Out1: 0-10V Out2: 0-10V Out3: 0-10V Out4: Relay Mode Analog Digital PWM Source: CO₂ Channel Override Inactive Override = Set Revert Err ind Invert Set Revert Characteristics Max: 1 Min: 0 Low: 900 ppm High: 1000 ppm Set Revert									

Communication settings

Address/Baudrate

4 Meter  Measurements  Outputs Misc  «	5 RS-485 Meter info RS-485  PIN1 PIN2  Reset «	6 Address  10 Baudrate  9600 Parity None Stop bits 1 «	7 Address 12 -  «
8 Address 12 - + 	9 NOTE! Meter info RS-485 PIN1 PIN2 Reset  «		

UIP Address

1 Meter information Vendor Name SenseAir AB Product Code tSENSE Serial Number 0xFFFFFFFF Firmware 0x66010A Type ID 402 Map Version 69 Network Address 10 Error Flags	2 Meter information Vendor Name SenseAir AB Product Code tSENSE Serial Number 0xFFFFFFFF Firmware 0x66010A Type ID 402 Map Version 69 Network Address 12 Error Flags	3 Change Network Address? Are you sure you want to change meter network id from 10 to 12? Yes No
--	--	--

UIP Baudrate

1 	2 Property value Select: 19200 9600 19200 38400 57600	3 Property value Select: 9600 Set Revert
---	--	---

NOTE!

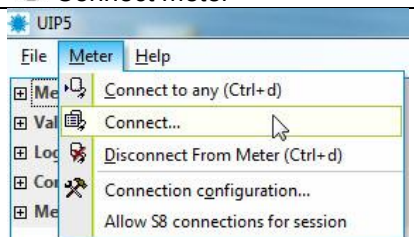
UIP baudrate $\neq$ RS-485 baudrate if *tSENSE (Disp)* is connected via *phone jack* (see fig. 2).

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

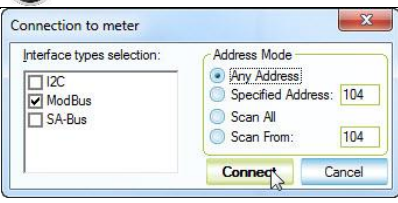
Change communication settings via UIP requires Reset (Power OFF – Power ON) to be executed.

Connect meter

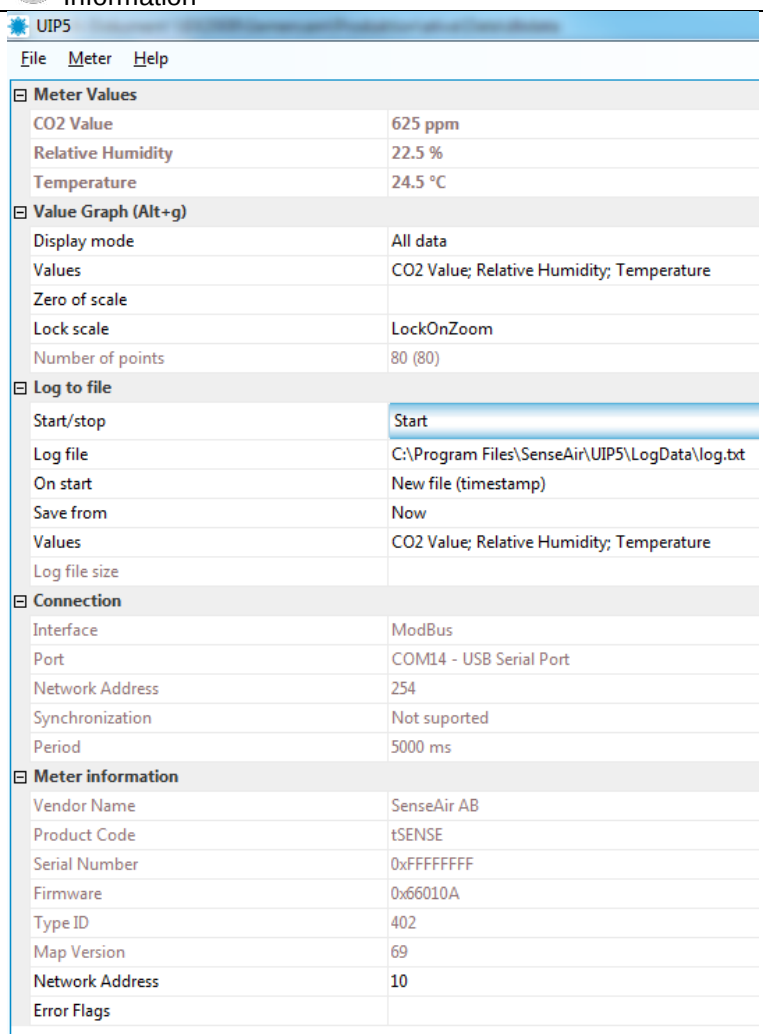
1 Connect meter



2



3 Information



Meter Values	
CO2 Value	625 ppm
Relative Humidity	22.5 %
Temperature	24.5 °C

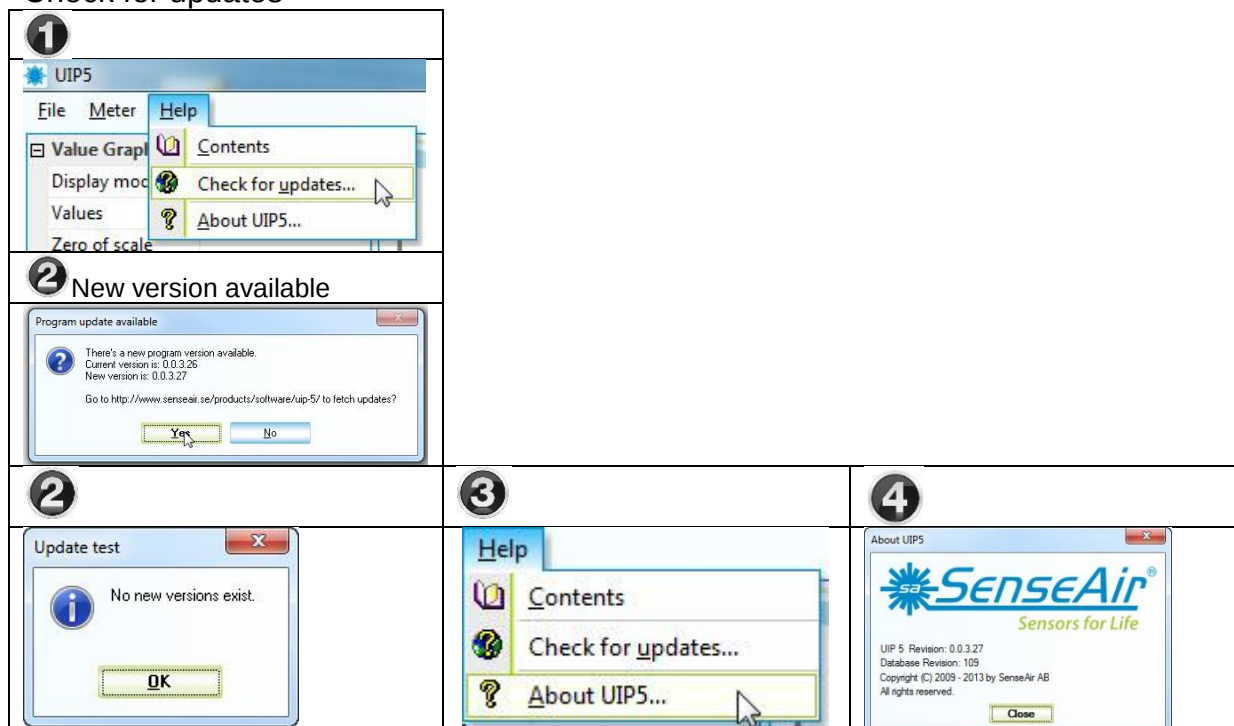
Value Graph (Alt+g)	
Display mode	All data
Values	CO2 Value; Relative Humidity; Temperature
Zero of scale	
Lock scale	LockOnZoom
Number of points	80 (80)

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	

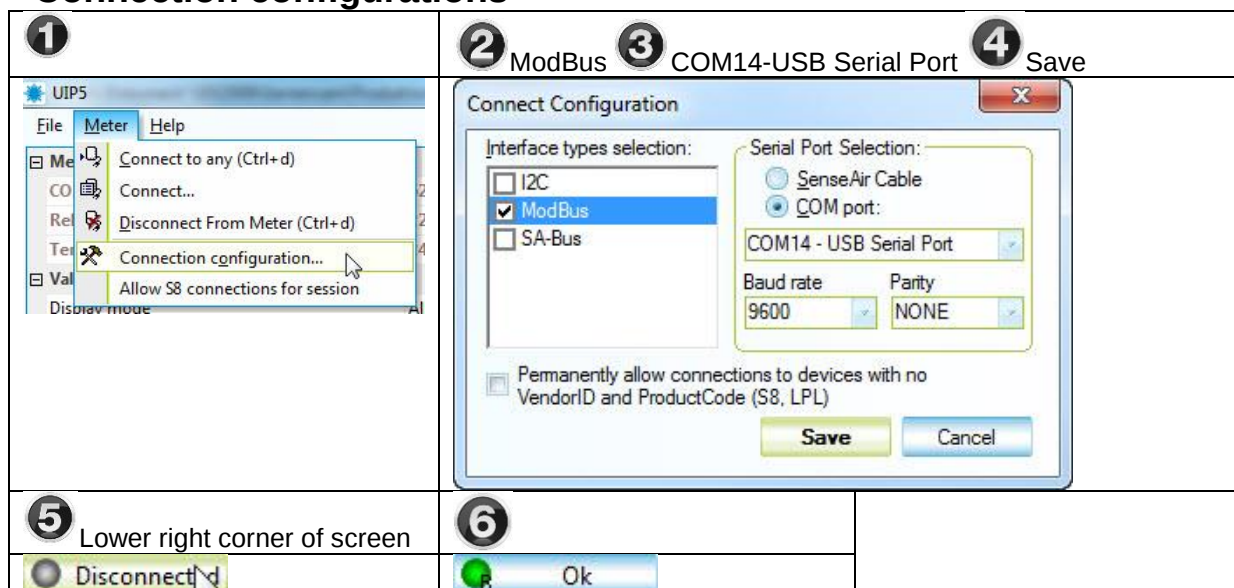
Connection	
Interface	ModBus
Port	COM14 - USB Serial Port
Network Address	254
Synchronization	Not supported
Period	5000 ms

Meter information	
Vendor Name	SenseAir AB
Product Code	tSENSE
Serial Number	0xFFFFFFFF
Firmware	0x66010A
Type ID	402
Map Version	69
Network Address	10
Error Flags	

Check for updates



Connection configurations



NOTE!

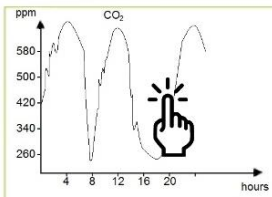
UIP baudrate $\neq$ RS-485 baudrate if *tSENSE (Disp)* is connected via *phone jack* (see fig. 2).

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

Change communication settings via UIP requires Reset (Power OFF – Power ON) to be executed.

Measured values

CO₂/Temperature/Humidity

1 CO₂ 429ppm Temperature 23.1°C Humidity 21%RH 	2 CO₂ 429 ppm	3 	4 CO₂ 429ppm Temperature 23.1°C Humidity 21%RH 
5 CO₂ 429ppm Temperature 23.1°C Humidity 21%RH	6 CO₂ 429 ppm	7 Temperature 23.1 °C	8 Humidity 21.0 %RH
9 CO₂ 429ppm Temperature 23.1°C Humidity 21%RH 			

Display settings

Limits

CO₂/(Temperature)/(Humidity)

CO₂ Orange/Red limit (Temp./Humidity, the same approach as for CO₂ limit settings)

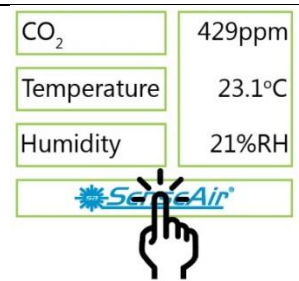
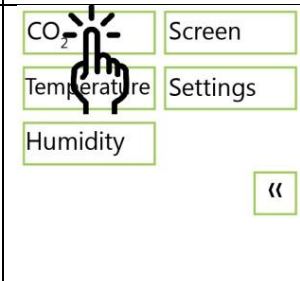
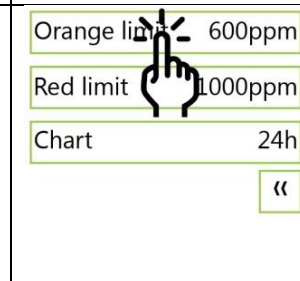
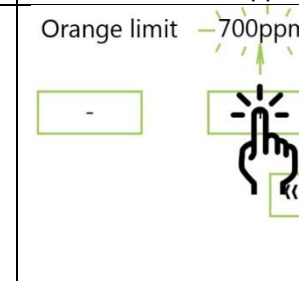
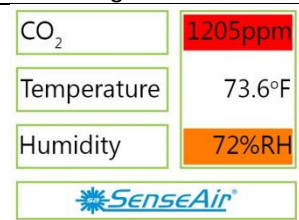
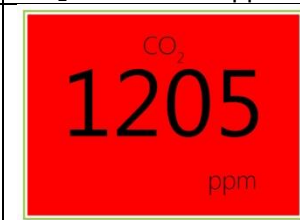
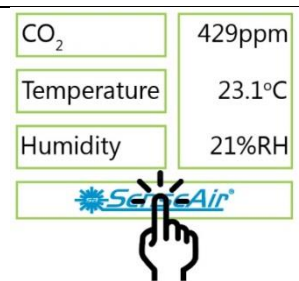
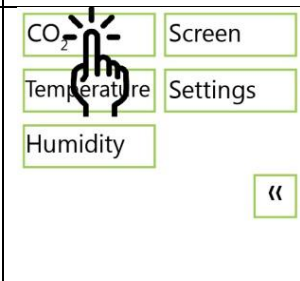
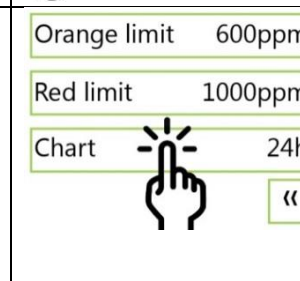
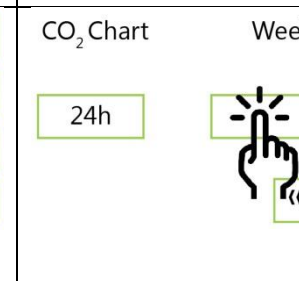
1	2	3	4
			
CO ₂ 429ppm Temperature 23.1°C Humidity 21%RH	CO ₂ Screen Temperature Settings Humidity «	Orange limit 600ppm Red limit 1000ppm Chart 24h «	100,200...700ppm Orange limit 700ppm - «
CO ₂ red limit 1000ppm RH orange limit 70%RH	CO ₂ red limit 1000ppm	RH orange limit 70%RH	
			

Chart 24h/Week

1	2	3	4
			
CO ₂ 429ppm Temperature 23.1°C Humidity 21%RH	CO ₂ Screen Temperature Settings Humidity «	Orange limit 600ppm Red limit 1000ppm Chart 24h «	CO ₂ Chart Week 24h «
			

Screen settings

1	2
CO₂ 429ppm Temperature 23.1°C Humidity 21%RH 	CO₂ Screen Temperature Settings Humidity «

Brightness

3	4 10, 20,...50%	5
Brightness 10% Background Normal Display Scheme Active Toggle Ind area «	Brightness 50% - Energy save brightness 0% - «	Brightness 50% - + Energy save brightness 0% - + «

Background

3	4	5	6
Brightness 50% Background Normal Display Scheme Active Toggle Ind area «	Background color Invert Normal Invert «	Background color Invert Normal Invert «	Brightness 50% Background Invert Sleep Scheme Active Toggle Ind area «

Screensaver, Time setting

Interval

3	4	5 3,4,5...10 s	6 50 s
Brightness 50% Background Normal Display Scheme Active Toggle Ind area «	Display Scheme Interval Active Energy save Interval «	Sleep Interval 10s - «	

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

Toggle time

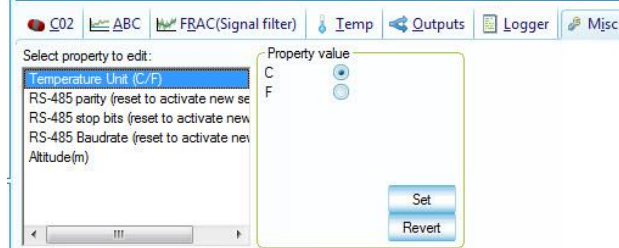
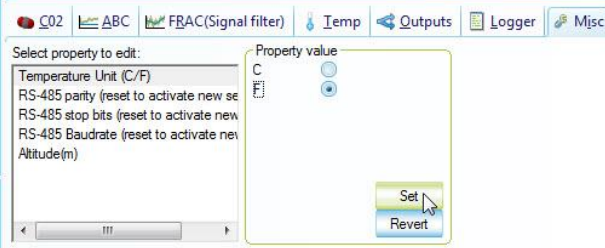
3 Brightness 50% Background Normal Display Scheme Interval Toggle Ind area «	4 Toggle Time 3s CO₂ X Temperature X Humidity X «	5 Toggle Time 3s - + CO₂ X Temperature X Humidity X «	6 Brightness 50% Background Normal Display Scheme Interval Toggle Ind area «
7 CO₂ Screen Temperature Settings Humidity	8 CO₂ 429ppm Temperature 23.1°C Humidity 21%RH 	9 CO₂ 429ppm Temperature 23.1°C Humidity 21%RH	10 3 s CO₂ 429 ppm
11 3 s Temperature 23.1 °C	12 3 s Humidity 21.0 %RH	13 CO₂ 429ppm Temperature 23.1°C Humidity 21%RH 	

Toggle CO₂ and/or Temperature and/or Humidity

3 Brightness 50% Background Normal Display Scheme Interval Toggle Ind area «	4 Toggle Time 3s - + CO₂ X Temperature X Humidity X «	5 Toggle Time 3s - + CO₂ Temperature X Humidity X «	6 CO₂ 429ppm Temperature 23.1°C Humidity 21%RH
7 Will NOT show up CO₂ 429 ppm	8 3 s Temperature 23.1 °C	9 3 s Humidity 21.0 %RH	

Temperature unit (°C/°F)

1 CO ₂ 429ppm Temperature 23.1°C Humidity 21%RH  	2 CO ₂ Screen Temperature Settings Humidity 	3 Orange limit 30°C Red limit 40°C Chart Week Unit 	4 Temperature Units °F Celsius Fahrenheit 
5 Temperature Units °F Celsius Fahrenheit 			

1 UIP5 Miscellaneous 	2 
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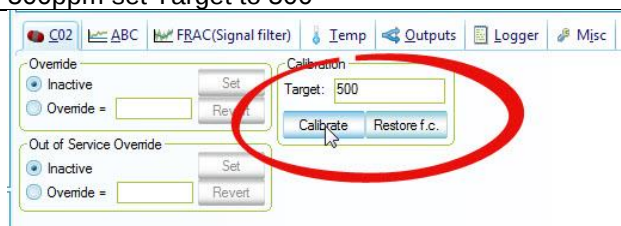
Meter information

1 CO ₂ 429ppm Temperature 23.1°C Humidity 21%RH  	2 CO ₂ Screen Temperature Settings Humidity 	3 Enter PIN 2001  <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	4 Meter Measurements Outputs Misc 		
2	3												
5	6												
8	9												
Del	0												
5 Meter info RS-485 PIN1 PIN2 Reset 	6 Meter information <table border="1"> <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>404</td></tr> <tr><td>Map Version</td><td>69</td></tr> </table>	Meter status	0x0	Version	1.03	Serial Number	0x30DA676	Type ID	404	Map Version	69		
Meter status	0x0												
Version	1.03												
Serial Number	0x30DA676												
Type ID	404												
Map Version	69												

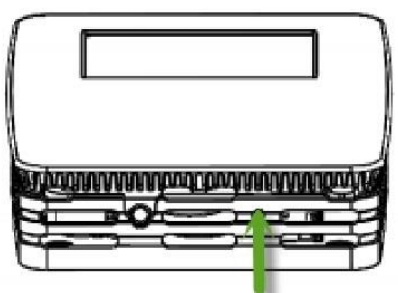
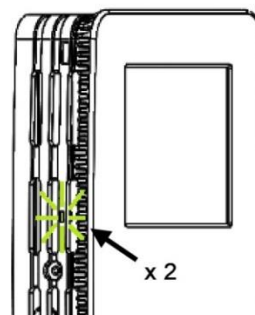
Calibration options CO₂

4	5
Meter	CO ₂ 429ppm
Measurement	Temperature 23.1°C
Outputs	Humidity 21%RH
Misc	

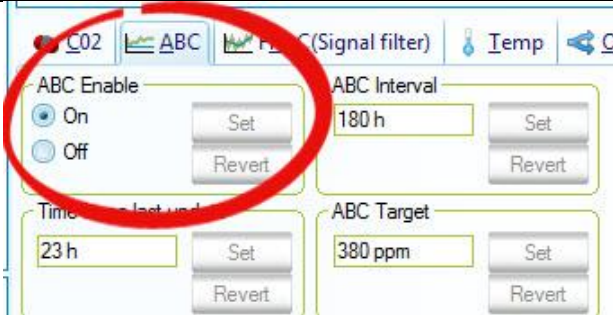
Zero cal/Background/Target cal

6	7	8	9
Zero Background Target cal	Start zero calibration cycle? No Zero calibration use 0ppm CO ₂ calibration target, calibration cycle takes ~5s	Zero calibration active	Verifying
10	11	UIP: If reference meter shows e.g. CO ₂ -value 500ppm set Target to 500	
Zero calibration succeeded	Zero cal ABC Background Altitude Target cal Restore cal		

Background calibration button

1 Press for 15s, until...	2 green LED blinks twice
	

ABC Enable/Disable

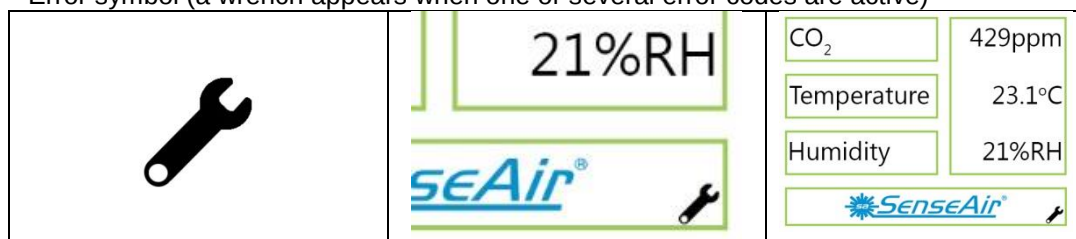
1 CO₂ 429ppm Temperature 23.1°C Humidity 21%RH  	2 CO₂ Screen Temperature Settings Humidity  «	3 Enter PIN 2001  2 3 5 6 7 8 9 Del 0 «	4 Meter Measurements Outputs Misc  «
5 CO₂ 429ppm Temperature 23.1°C Humidity 21%RH « 	6 Zero cal ABC Background Altitude Target cal Restore cal « 	7 ABC Inactive ABC period 180hours ABC target 380ppm « 	8 ABC Active Enable Disable Save new ABC state? Yes No « 
9 Save ABC Active Enable Disable Save new ABC state?  No «	UIP 		

ABC period (ABC target/Altitude (msl)/Restore cal)

5 CO2 429ppm Temperature 23.1°C Humidity 21%RH «	6 Zero cal ABC Background Altitude Target cal Restore cal «	7 ABC Active ABC period 180hours ABC target 380ppm «	8 ABC period 180 hours - + Save new ABC period? Yes No «
9 ABC period 240 hours - + Save new ABC period? Yes No «	10 180, 181, 240hours ABC period 240 hours - + Save new ABC period? Yes No «	11 Save Saving ABC period	12 Verifying
13 ABC period set to 240 hours	14 Zero cal ABC Background Altitude Target cal Restore cal «	UIP CO2 ABC FRAC(Signal) Temp Outputs Logger Misc ABC Enable On Off Set Revert ABC Interval 240 h Set Revert Time since last update 21 h Set Revert ABC Target 380 ppm Set Revert	

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 - power ON. Contact local distributor.
1	CO ₂ sensor CO ₂ measure error	CO ₂ measurement error.	Try Background calibration ("Calibration options CO ₂ " p.16). Contact local distributor. <i>See Note 1!</i>
2	T sensor T measure error	Temp measurement error.	Try to restart sensor by power OFF - power 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 higher. Contact local distributor.
9	Memory error	One or several bytes of sensors parameter memory (settings) are corrupt	Try to restart sensor by power OFF/ON 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).

PIN codes

1	2	3	4
CO₂ 429ppm Temperature 23.1°C Humidity 21%RH  	CO₂ Screen Temperature Settings  Humidity «	Enter PIN 2001 2 3 5 6 8 9 Del 0 « 	Meter  Measurements Outputs Misc «

Create PIN code for access to display settings (PIN1)

5 PIN1	6 PIN1 Code Off...	7 PIN(1) Code On	8 Create PIN(1) Code
Meter info RS-485 PIN1  PIN2 Reset «	Pin code for access to display settings PIN 0 0 0 0 Off + + + + - - - - PIN On/Off  Save «	Pin code for access to display settings PIN 0 0 0 0 On + + + + - - - - PIN On/Off  Save «	Pin code for access to display settings PIN 1 0 0 0 On  + + + + - - - - PIN On/Off Save «
9 Save	10		
Pin code for access to display settings PIN 1 0 0 0 On + + + + - - - - PIN On/Off  «	Pin code for access to display settings PIN 1 0 0 0 On + + + + - - - - PIN On/Off Save 		

Create PIN code for access to meter settings (PIN2)

5 PIN2	6 Create PIN2 Code	7 Save	8
Meter info RS-485 PIN1 PIN2  Reset «	Pin code for access to settings PIN 1 0 0 0  + + + + - - - - Save «	Pin code for access to settings PIN 1 0 0 0 + + + + - - - -  «	Pin code for access to settings PIN 1 0 0 0 + + + + - - - - Save 

Maintenance

tSENSE (Disp) is maintenance free. Internal self-adjusting calibration (ABC) 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 2004/108/EC, 92/31/EEG, RoHS 2011/65/EU
including amendments by the CE-marking Directive 93/68/EEC

The product fulfils the following demands:

EN 61000-4-2 level 2,
EN 61000-4-3 level 2,
EN 61000-4-4 level 4,
EN 61000-4-6,
EN 61000-4-8 level 4,
EN 55022 class B



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