User Manual

tSENSE (Disp)

CO_2, temperature and
relative humidity sensor

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 CO_2, 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

See Installation Manual

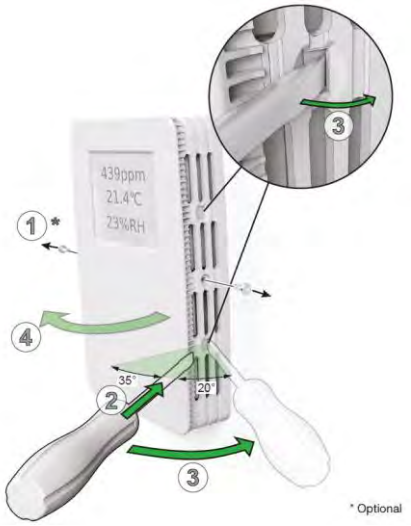


Figure 1

Download of software UIP

senseair.com

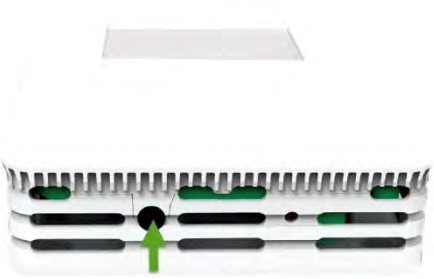
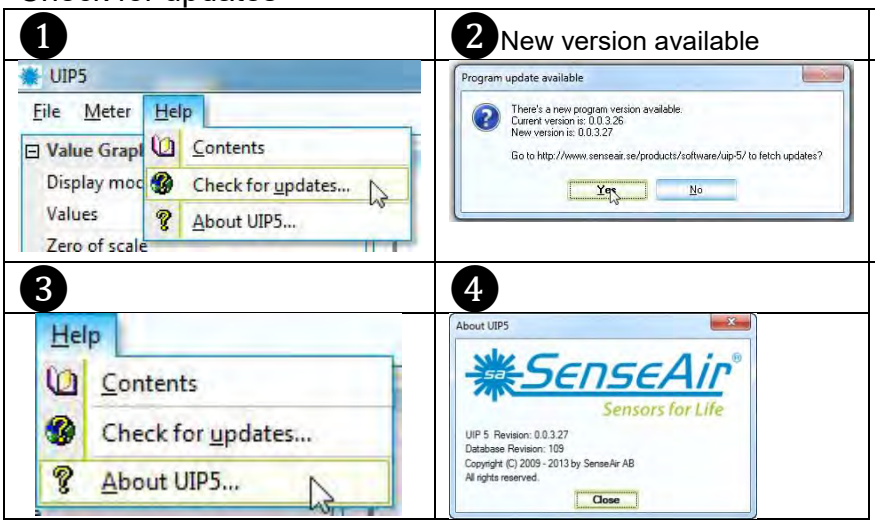
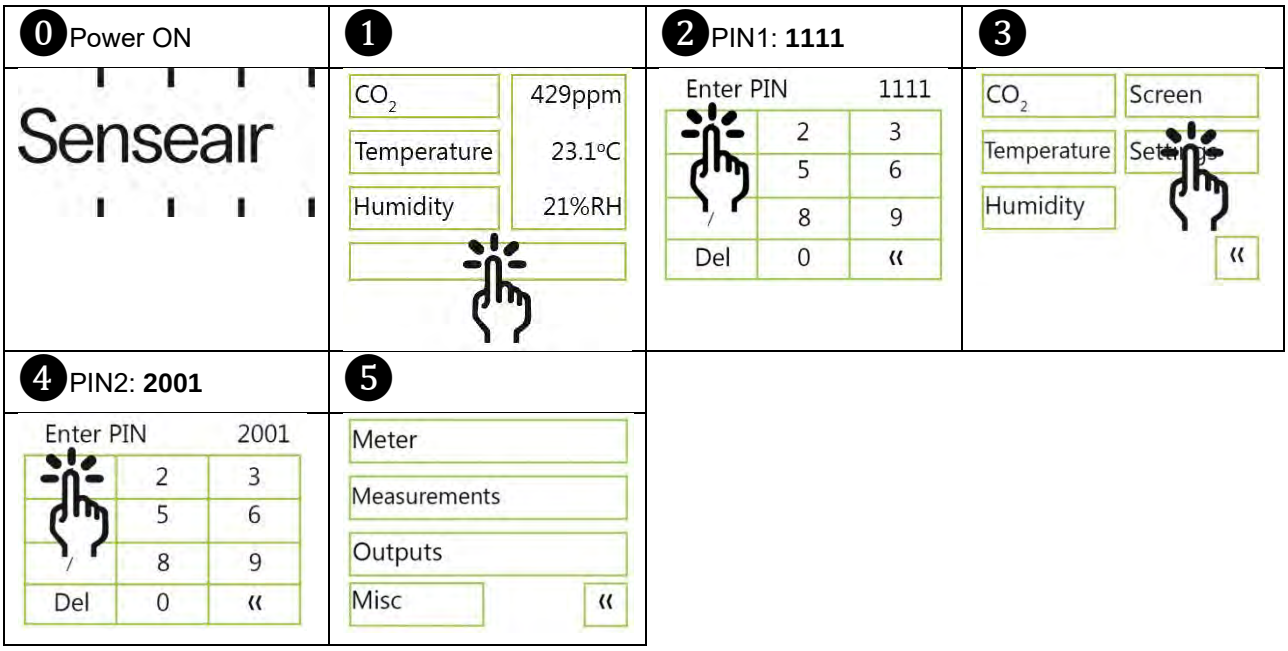


Figure 2: Connection to PC via phone jack
Connect Interface cable USB – 3.5mm Art.No.:00-0-0070

Check for updates



Enter PIN code



Output Configurations

Terminal	Default Output	Default Output Range	Outputs of this sensor	Output Ranges of this sensor
OUT(1)	0 — 10VDC	0 — 2000ppm CO_2	See label	See label
OUT(2)	0 — 10VDC	0 — 50°C	See label	See label
OUT(3)	0 — 10VDC	0 — 100%RH	See label	See label

Table 1. Default output configurations of tSENSE (Disp)

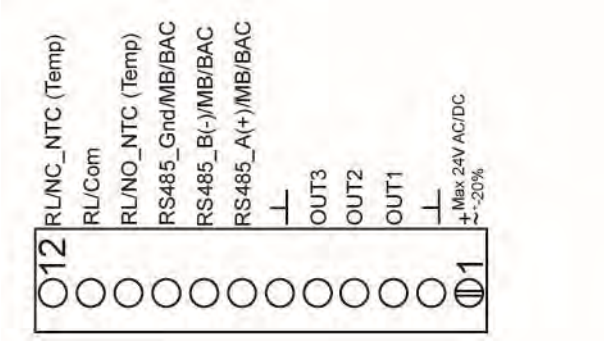


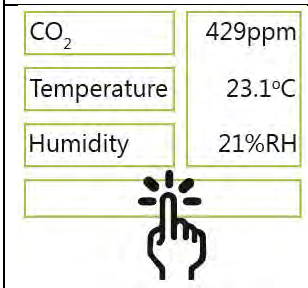
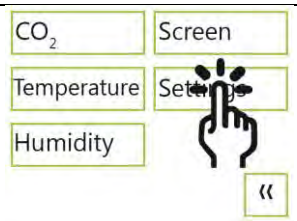
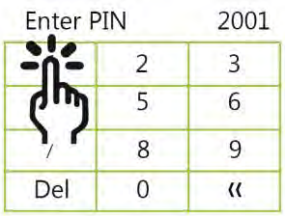
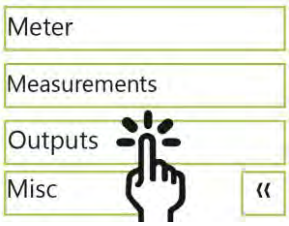
Figure3: Screw Terminal

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.

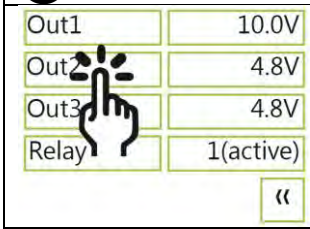
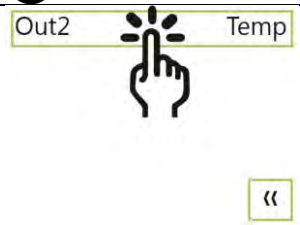
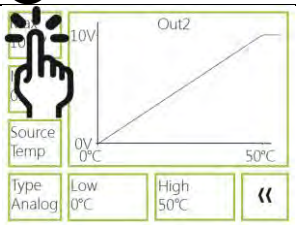
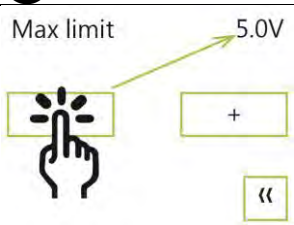
Outputs

Out1/Out2/Out3

1	2	3	4 Outputs
			

Voltage range

Max (the same approach with “Min”)

5 Out2	6	7 Max	8 10.0V, 9.9V..5.0V..
			

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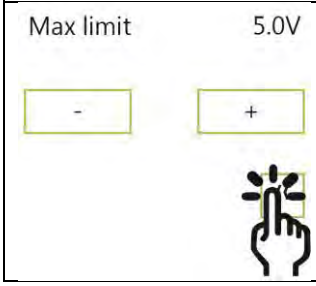	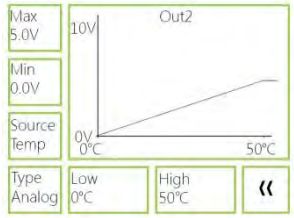	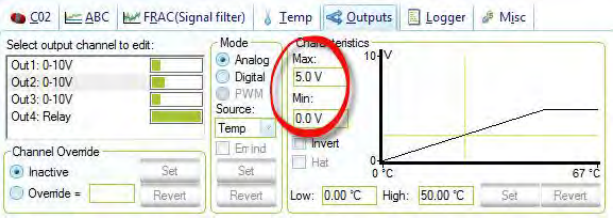

Select source

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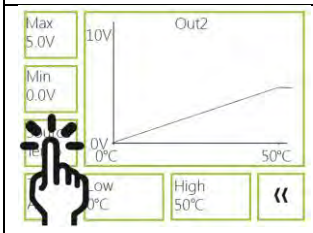
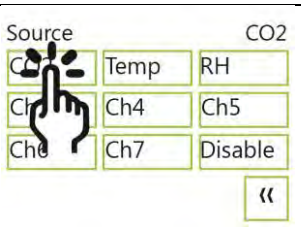
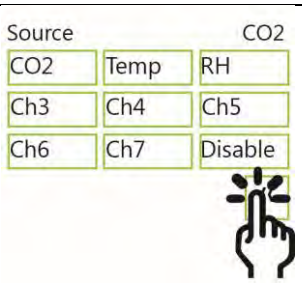
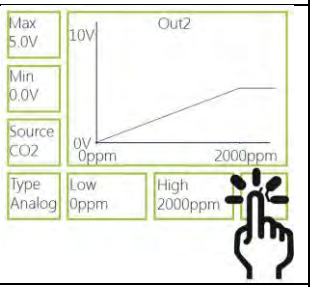
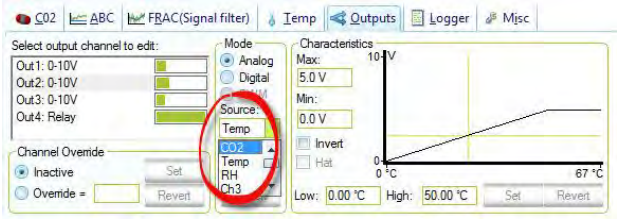
			

UIP 1 Source CO_2 selected



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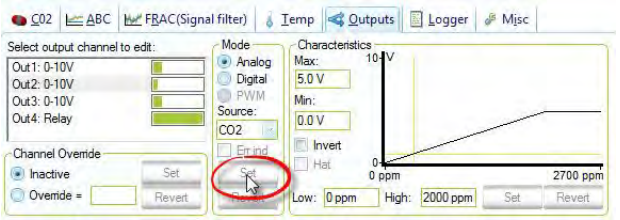
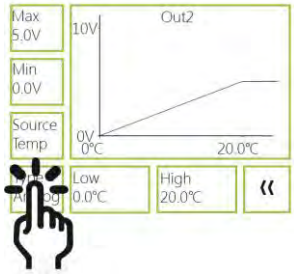
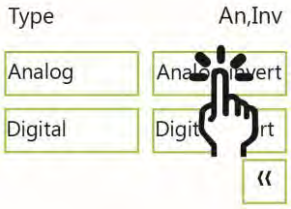
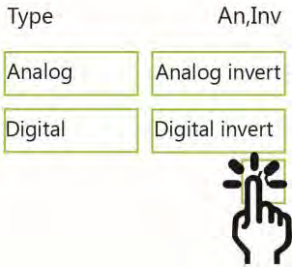
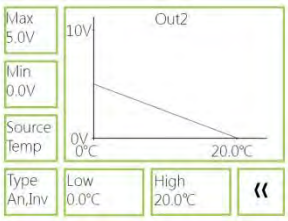
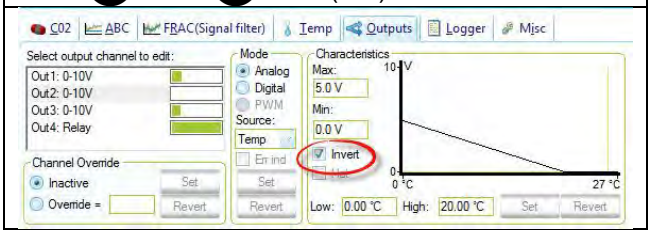


Types

Analogue/Analogue Invert

7 Analogue	8	9	10 Analogue invert
			

UIP5 1 Invert 2 Save (Set)



Digital/Digital Invert

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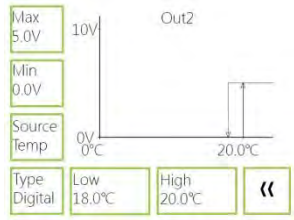
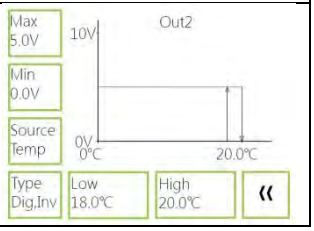
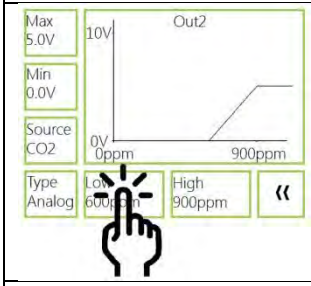
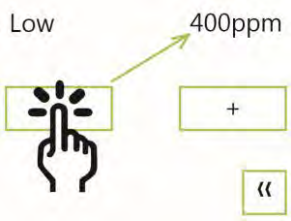
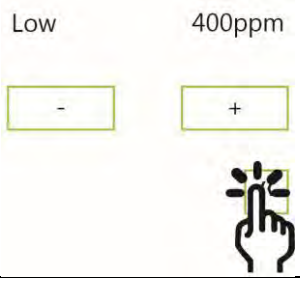
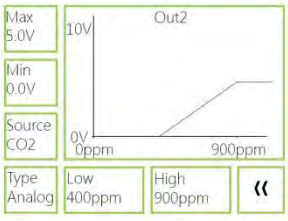
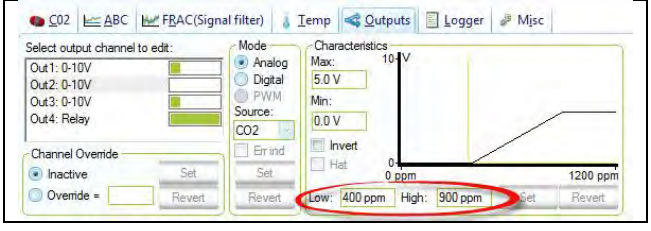
	

Measure range settings

Low (the same approach with ”High”)

7 Low 600ppm	8 600, 550…400ppm	9 Low 400ppm	10
			

UIP



Outputs

Relay

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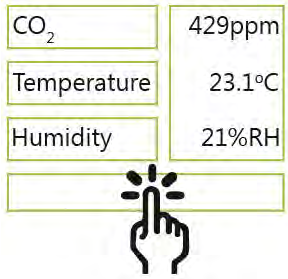	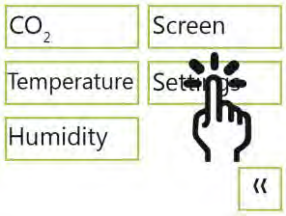	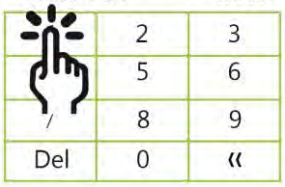	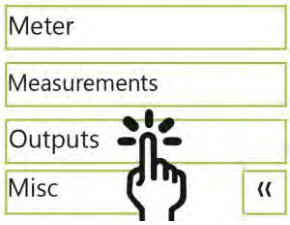
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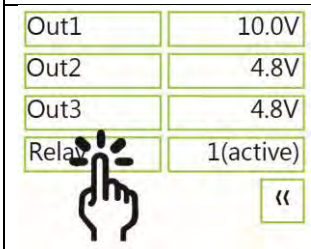
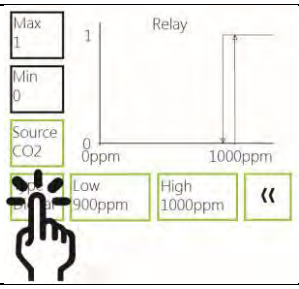
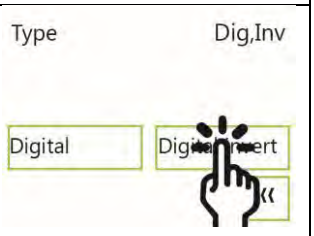
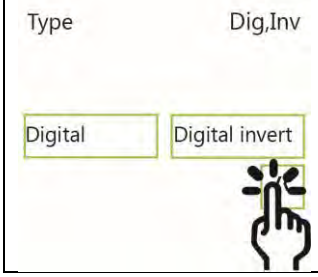
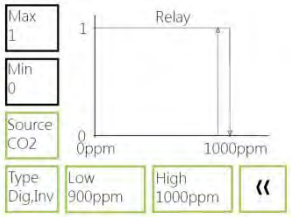
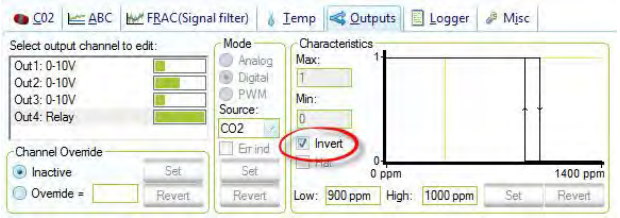
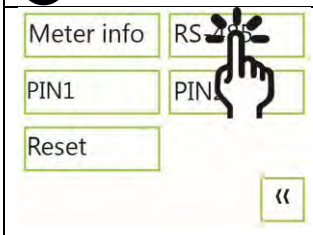
			
9	**10**	**UIP**	
			

Communication settings

Protocol

5 RS-485



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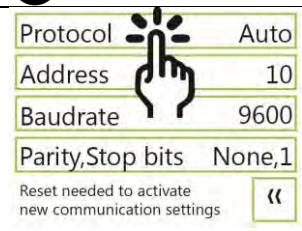

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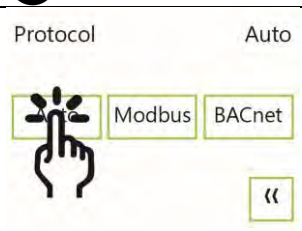

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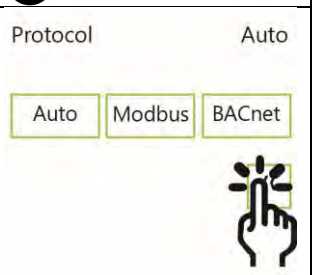
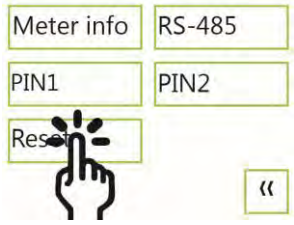


9 NOTE!



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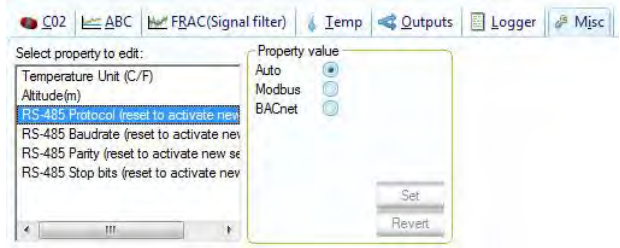

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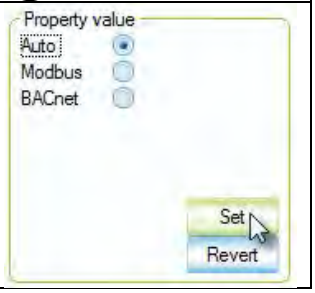
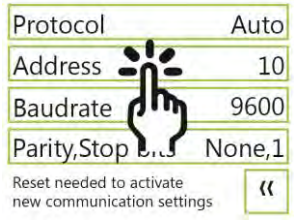


Address/Baud rate

6



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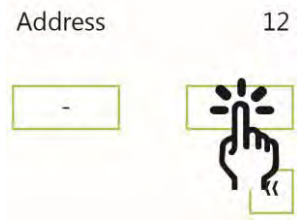

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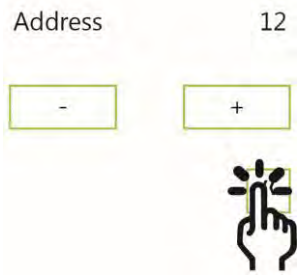

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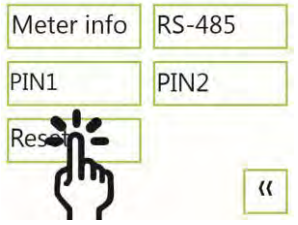

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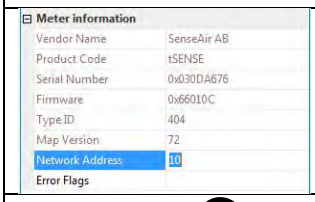

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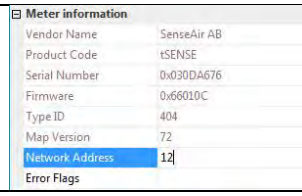
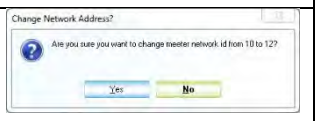
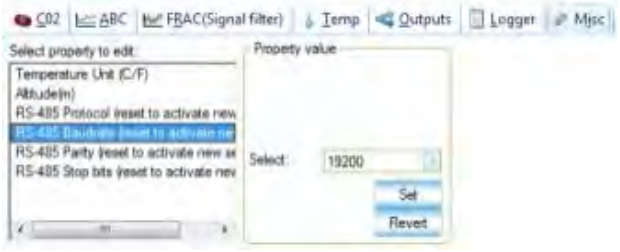


3



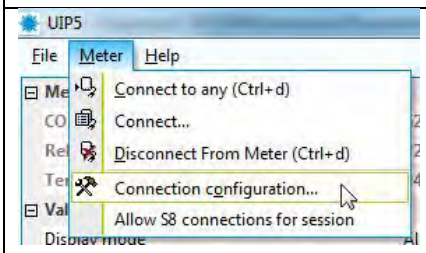
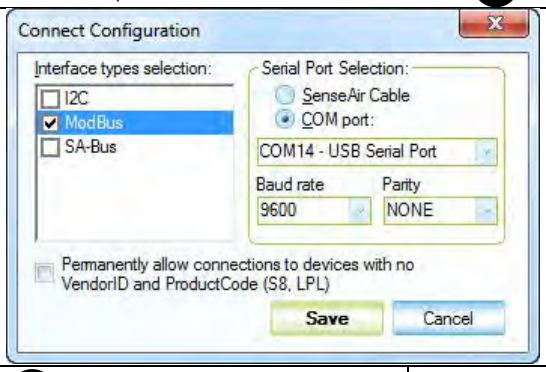
UIP Baud rate **1** Misc



2

3

Connection configurations

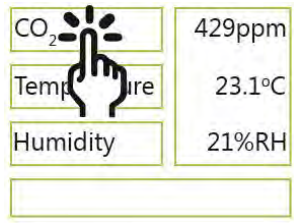
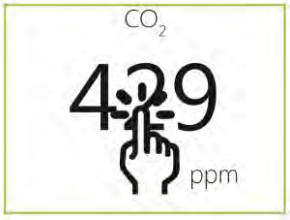
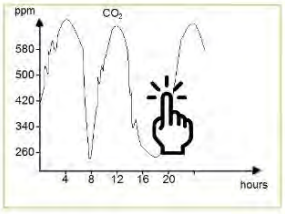
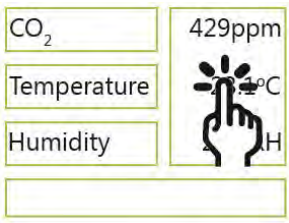
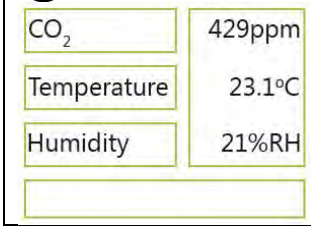
1	2 ModBus 3 Choose SenseAir Cable if bought from SenseAir, otherwise choose COM Port 4 Save
	
5 Lower right corner of screen	6
	

NOTE!
UIP baud rate ≠ RS-485 baud rate if tSENSE (Disp) is connected *via phone jack* (see fig. 2).
UIP baud rate = RS-485 baud rate if tSENSE (Disp) is connected *via screw terminal* (see fig. 3).

RS-485 Protocol parameter 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. Change communication settings via UIP requires Reset (Power OFF – Power ON) to be executed.

Measured values

CO_2/Temperature/Humidity

1	2	3	4
			
5	6	7	8
			
9			
			

Display settings

Limits

CO_2/(Temperature)/(Humidity)

CO_2 Yellow/Red limit (Temp./Humidity, the same approach as for CO_2 limit settings)

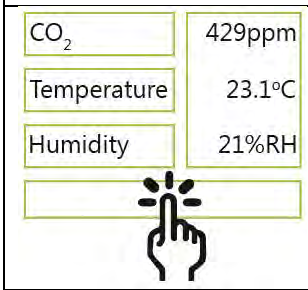
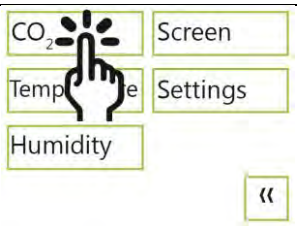
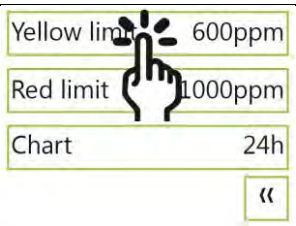
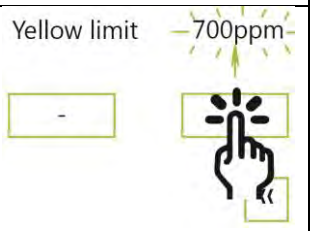
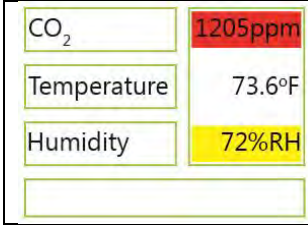
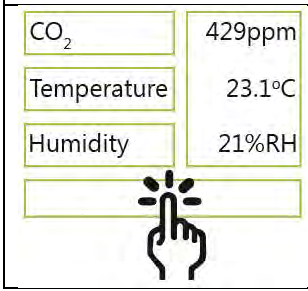
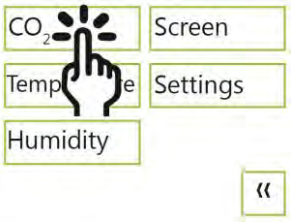
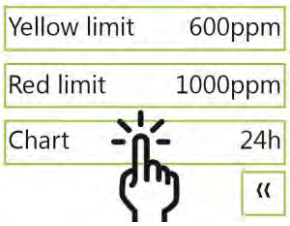
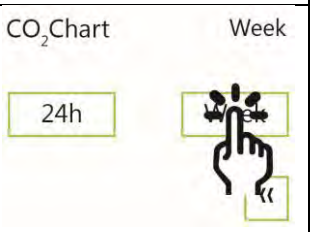
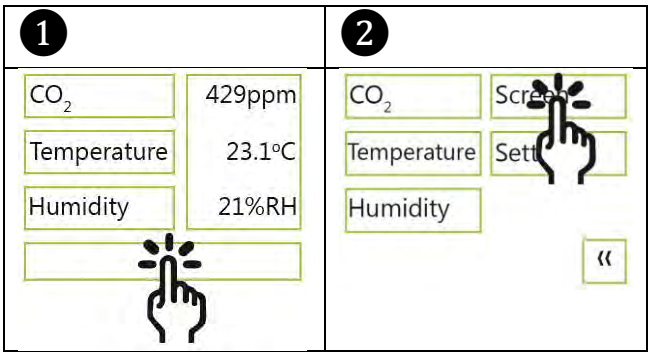
1	2	3	4 100,200…700ppm
			
CO_2 red limit 1000ppm RH yellow limit 70%RH	CO_2 red limit 1000ppm	RH yellow limit 70%RH	
			

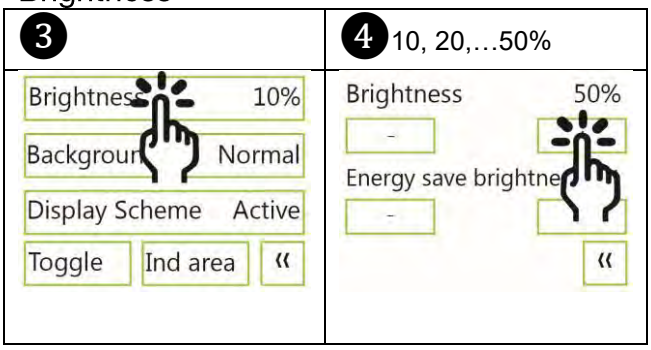
Chart 24h/Week

1	2	3	4
			

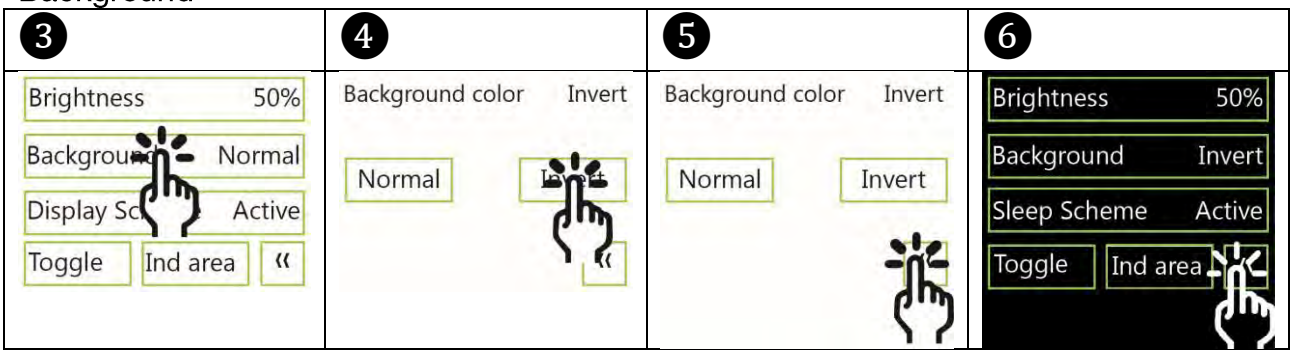
Screen settings



Brightness

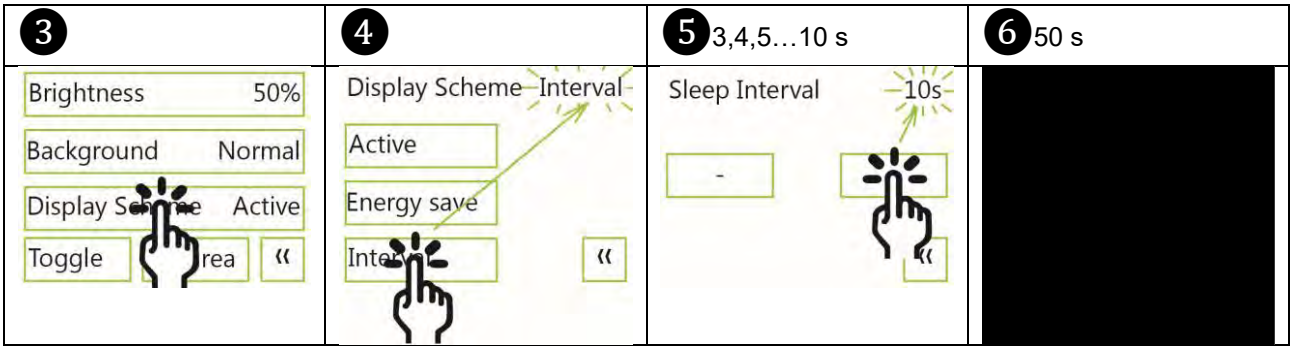


Background



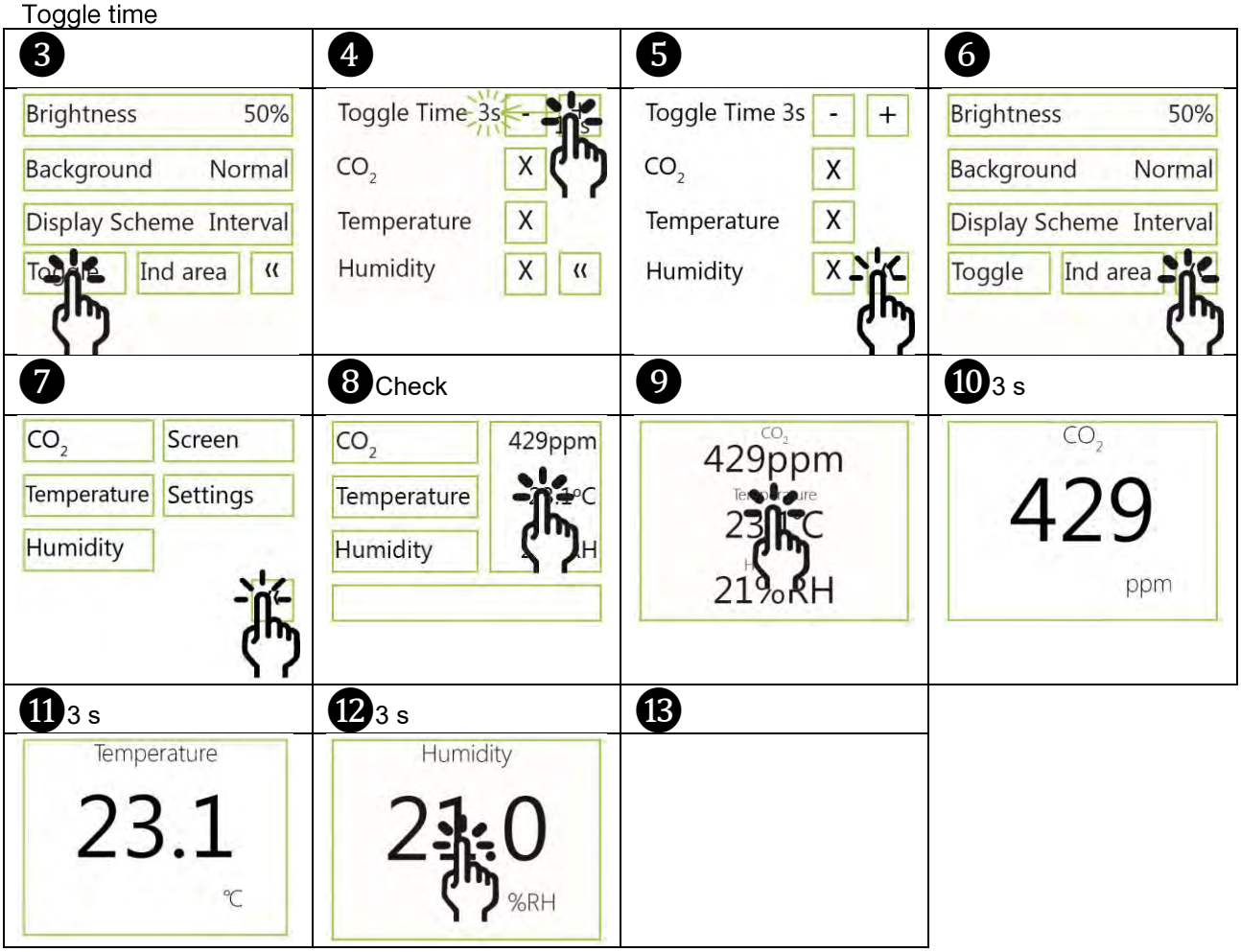
Screensaver, Time setting

Interval

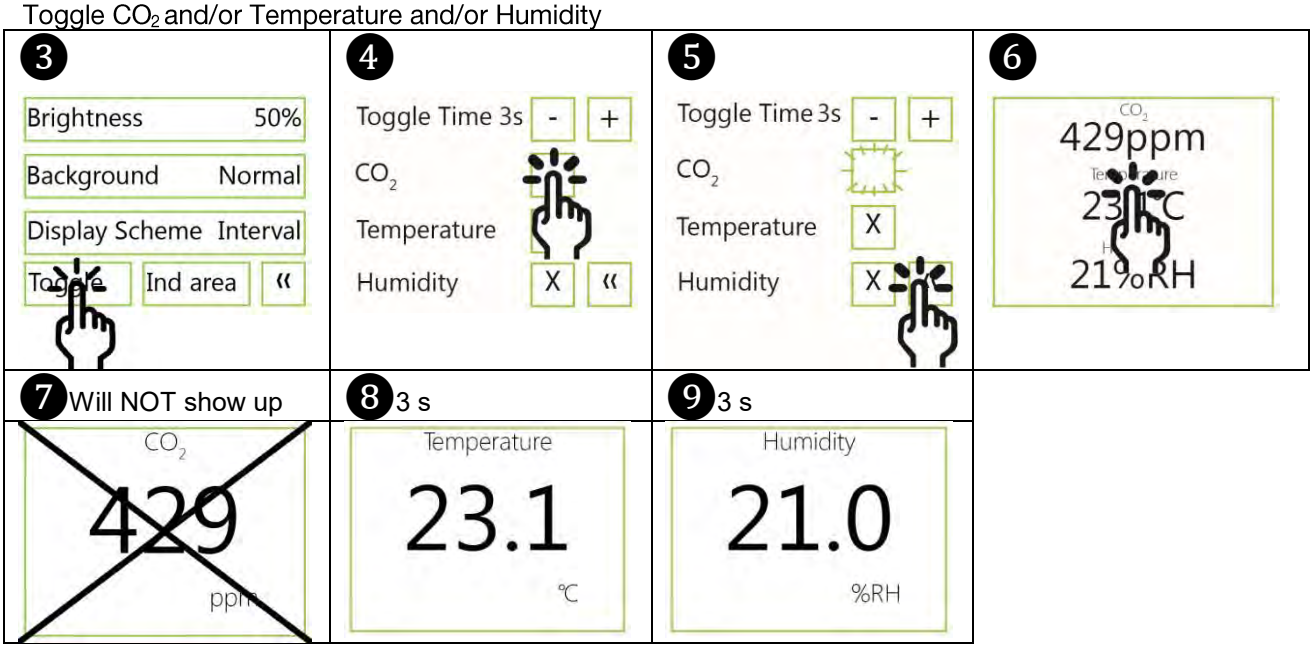


Toggle (Time and CO_2 and/or Temperature and/or Humidity)

Toggle time

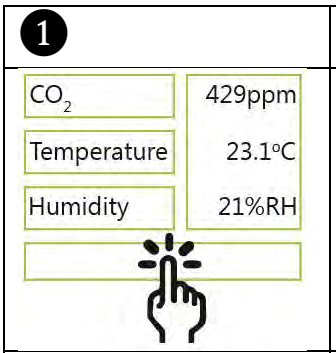


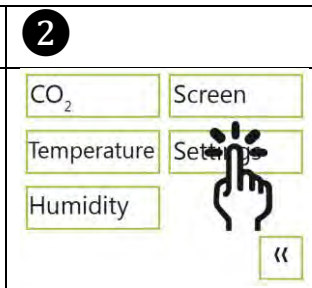
Toggle CO_2 and/or Temperature and/or Humidity

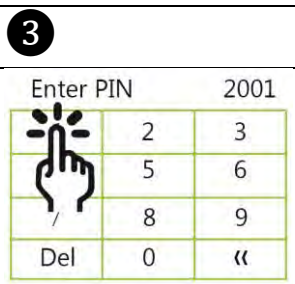


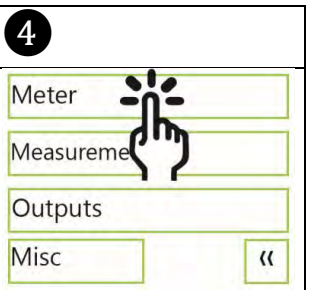
Meter settings

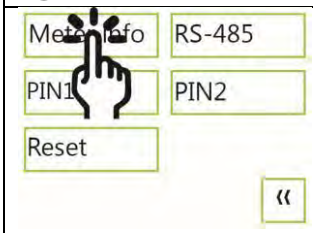
Meter information

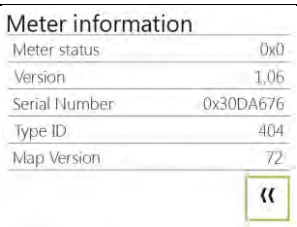




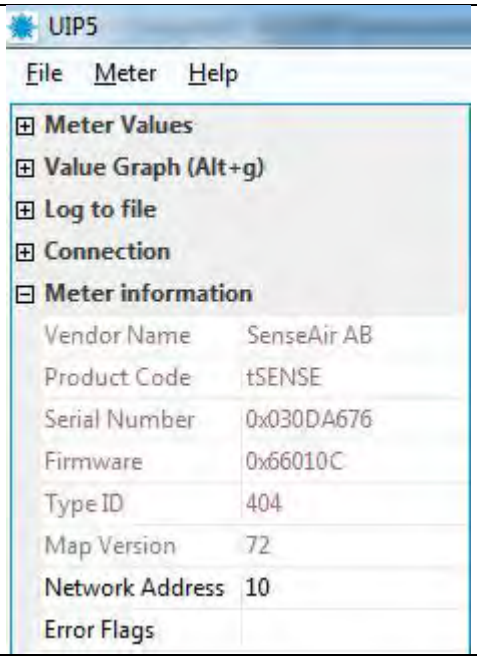




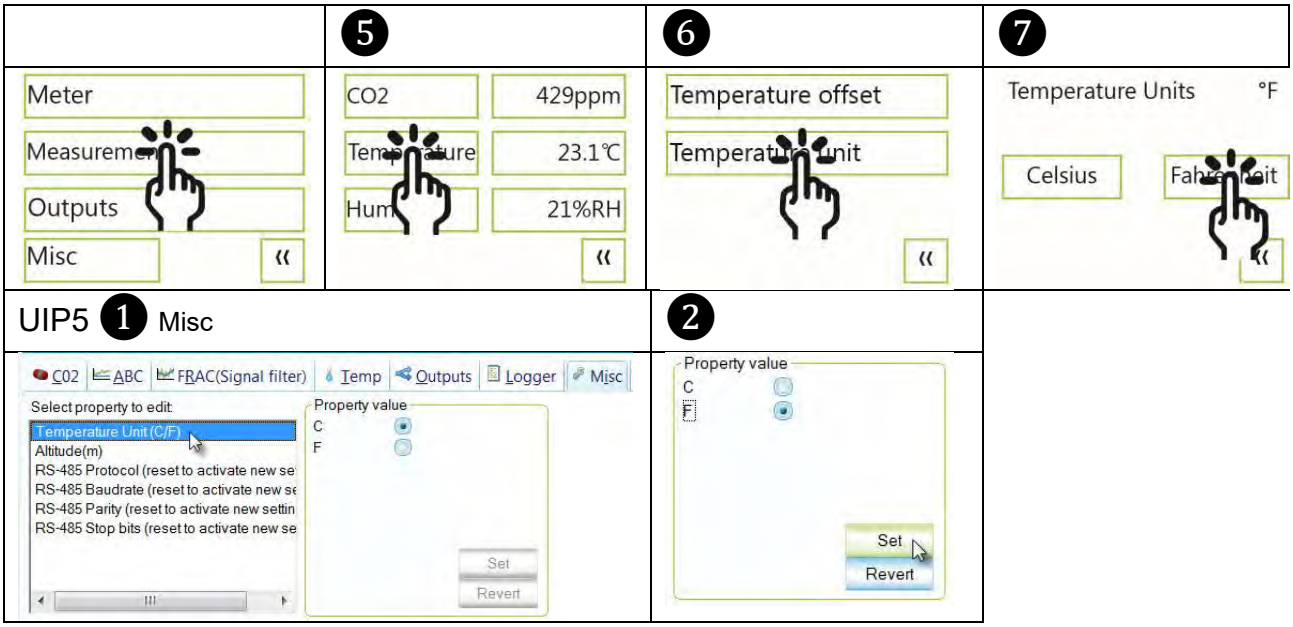




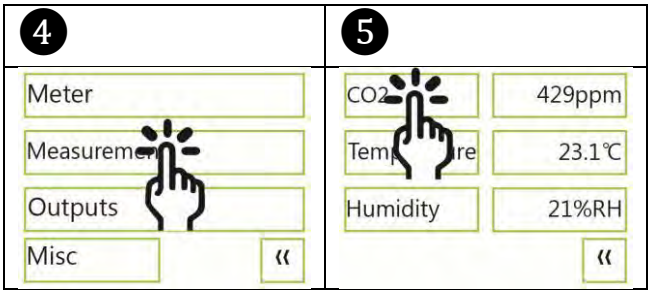
UIP



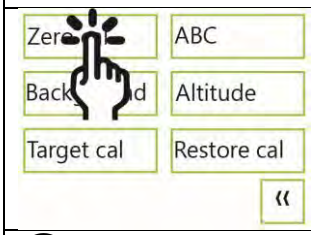
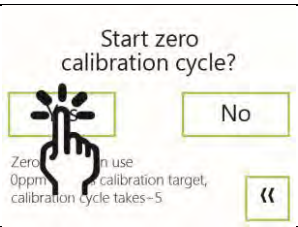
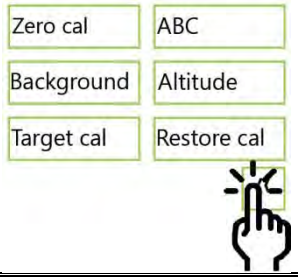
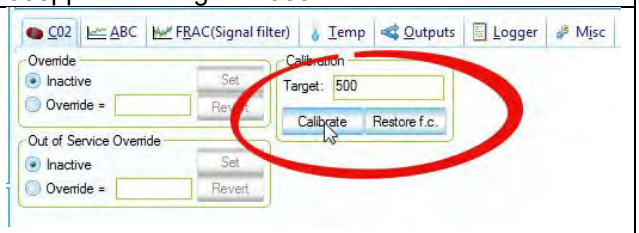
Temperature unit (°C/°F)

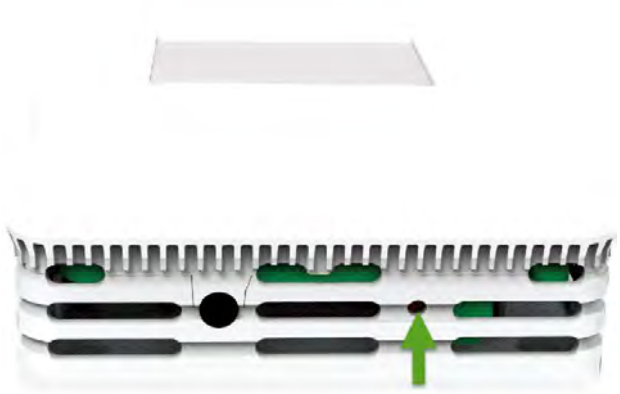


Calibration options CO_2



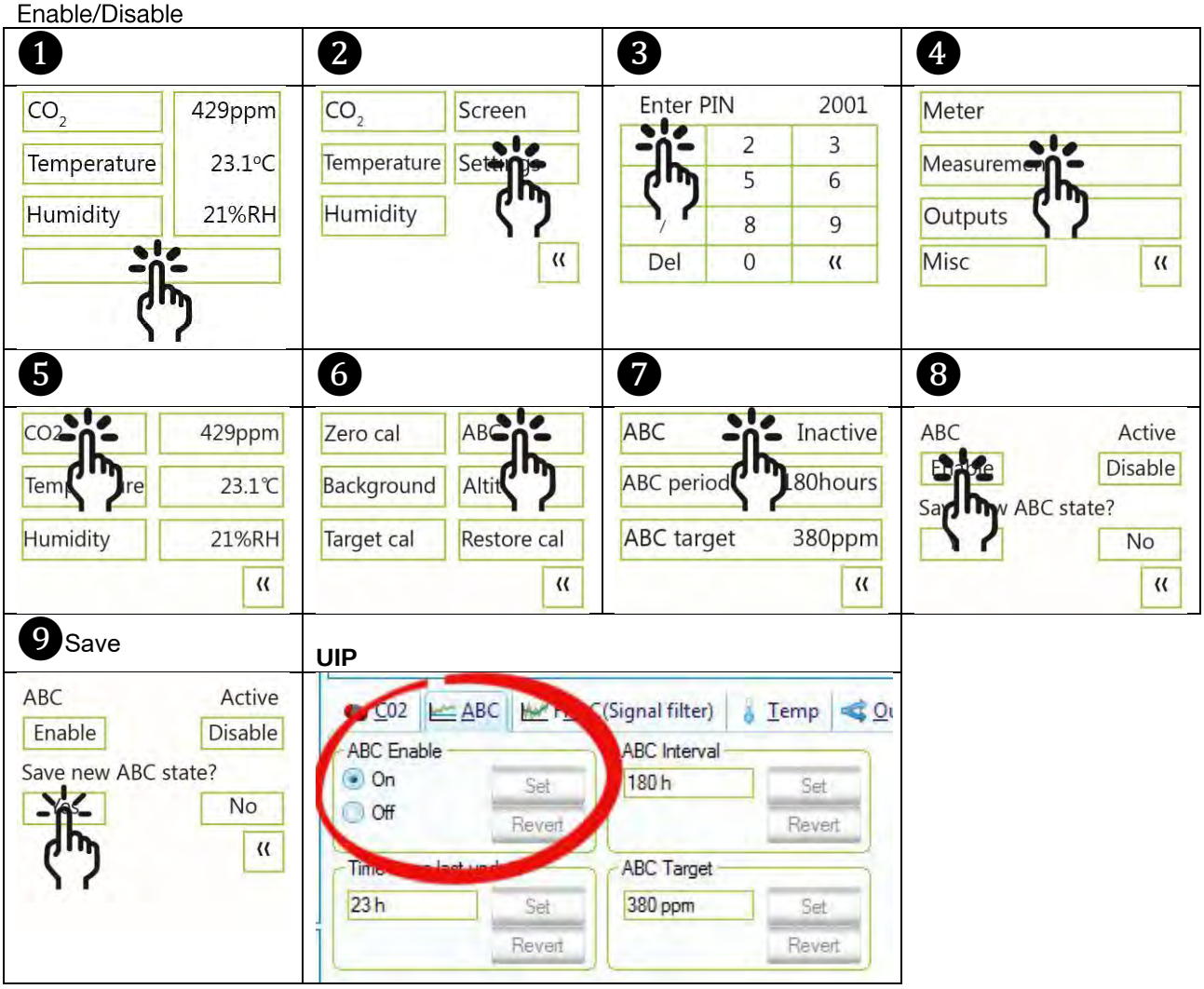
Zero cal/Background/Target cal

6	7	8	9
			
10	11	**UIP**: If reference meter shows e.g. CO_2-value 500ppm set Target to 500	
Zero calibration succeeded			

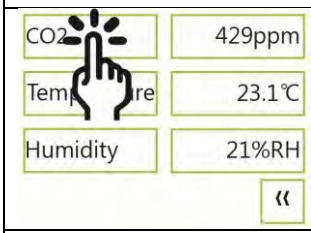
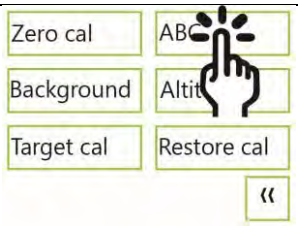
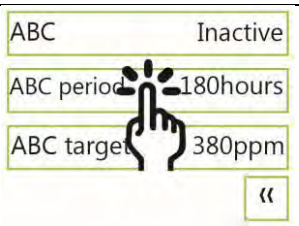
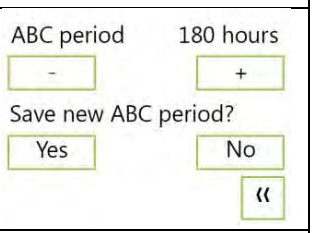
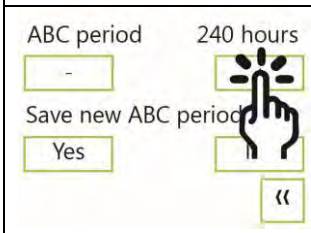
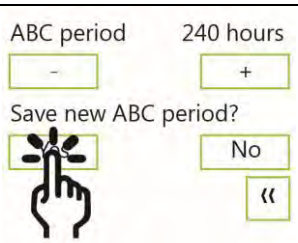
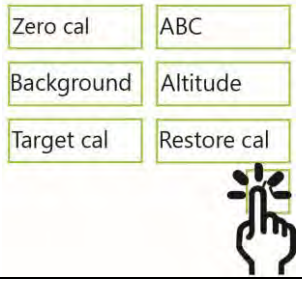
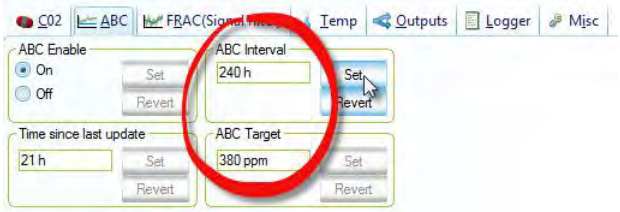
Background calibration button 1 Press for 15s, until…	2 Green LED blinks twice
	

ABC

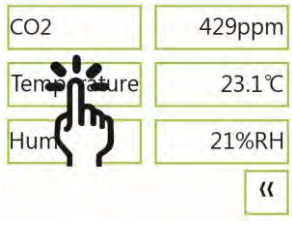
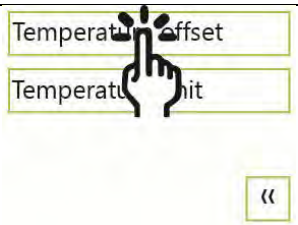
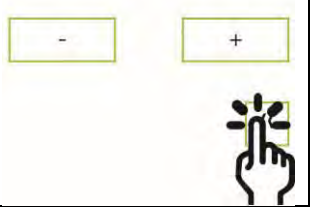
Enable/Disable



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

5	6	7	8
			
9	**10** 180, 181, 240hours	**11** Save	**12**
			
13	**14**	**UIP**	
ABC period set to 240 hours			

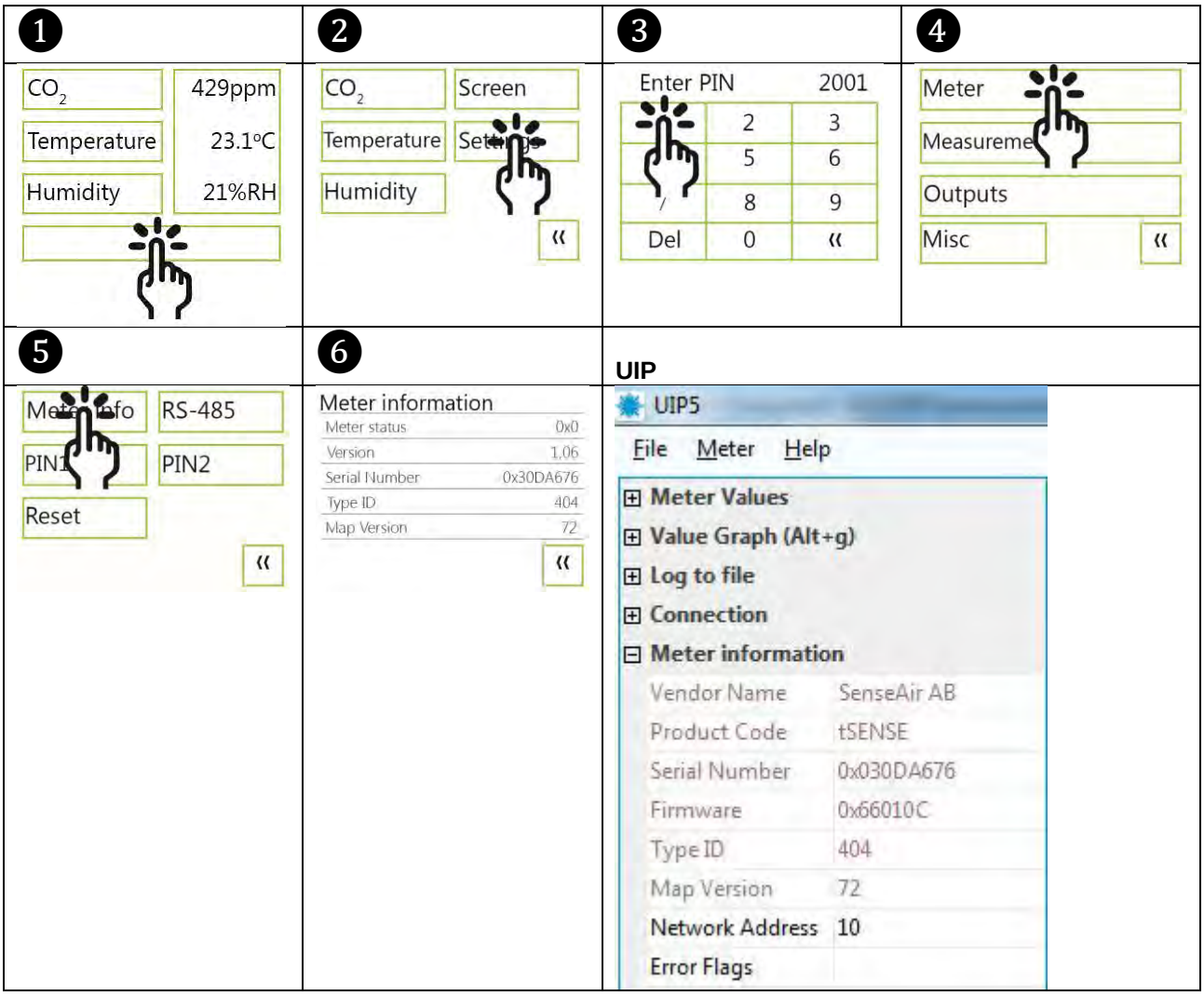
Temperature/Humidity Offset

5	6	7 0.0..-0.1…-2.5°C	
			

Automatic system test

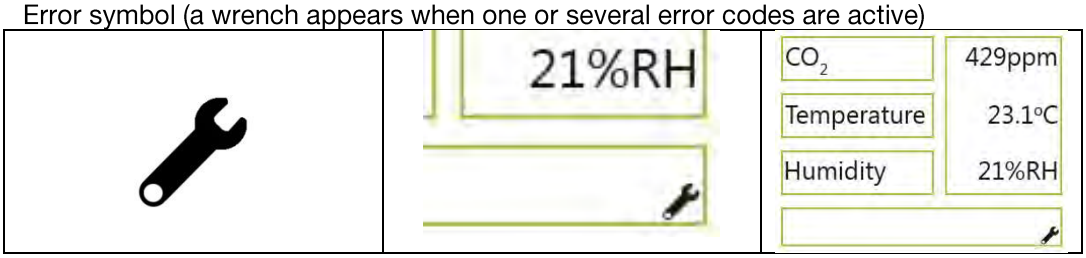
A full system test is executed automatically at every power-up. Sensor probes are checked constantly during operation against failure by checking valid dynamic measurement ranges.

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 the display at “Meter status” and in software UIP (version 5 or higher).



Error codes and action plans

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



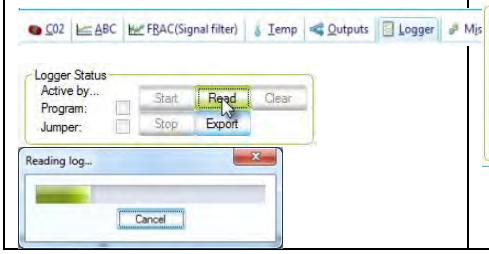
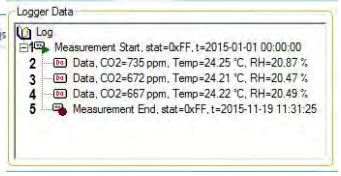
Bit #	Error code	Error description	Suggested action
0	CO_2 sensor Com. error	No ability to communicate with CO2 sensor module.	Try to restart sensor by power OFF - power ON. Contact local distributor.
1	CO_2 sensor CO_2 measure error	CO_2 measurement error.	Try Background calibration ("Calibration options CO_2" p.16). Contact local distributor. *See Note 1!*
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 1. Any probe is out of range. It occurs during over exposure of CO2 sensor, in which case the error code will automatically reset when the measurement values return to normal. It could also indicate the need of zero point calibration. If the CO2 readings are normal, and still the error code remains, the temperature 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).

Alternative 1

❶ Start to Read Log Data from sensor	❷ Records for compability between UIP and other sensor types. **NOTE!** Sensor has no timer.	
		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

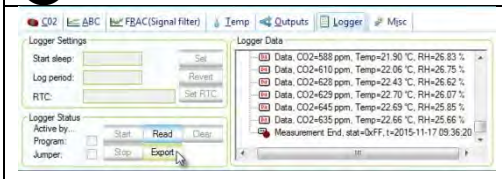
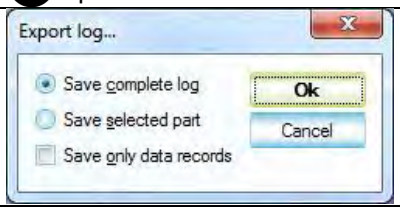
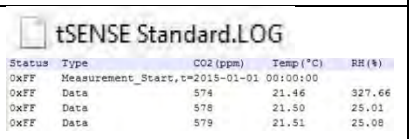
NOTE!

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.

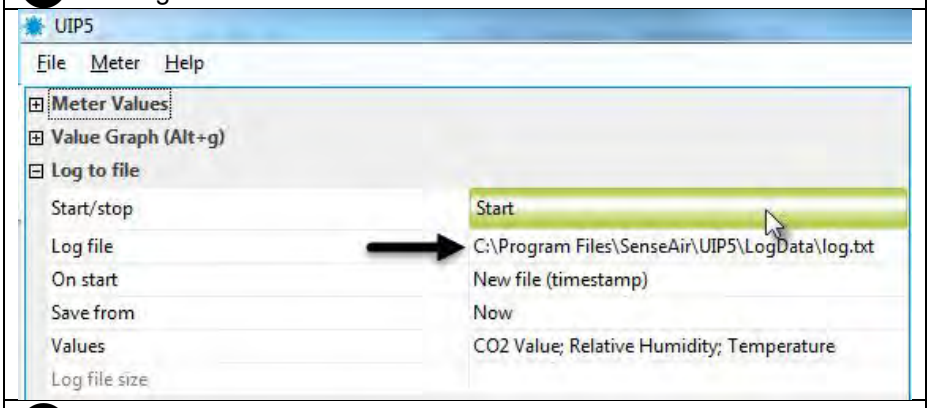
Export Logger Data

❶	❷ Options	
		

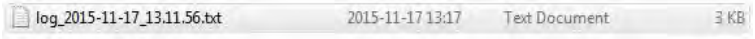
Alternative 2

Log to file

1. Start log to file on PC



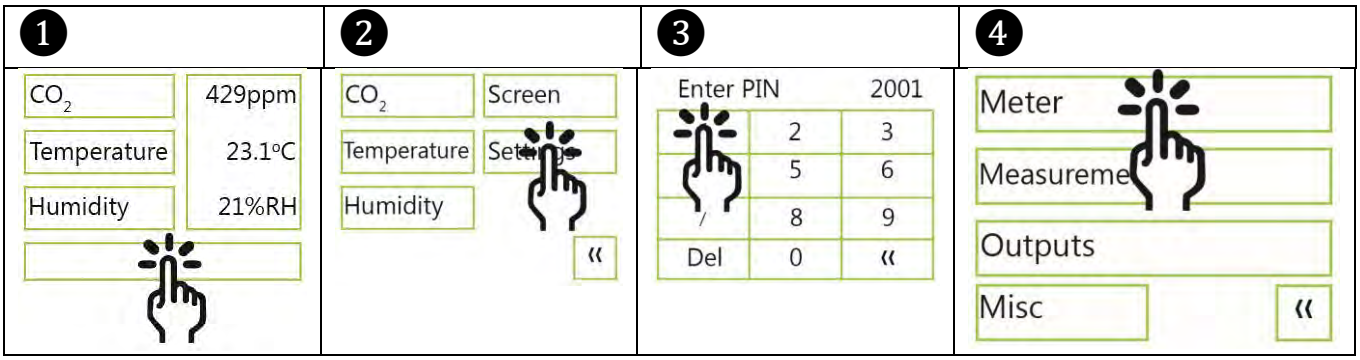
2.



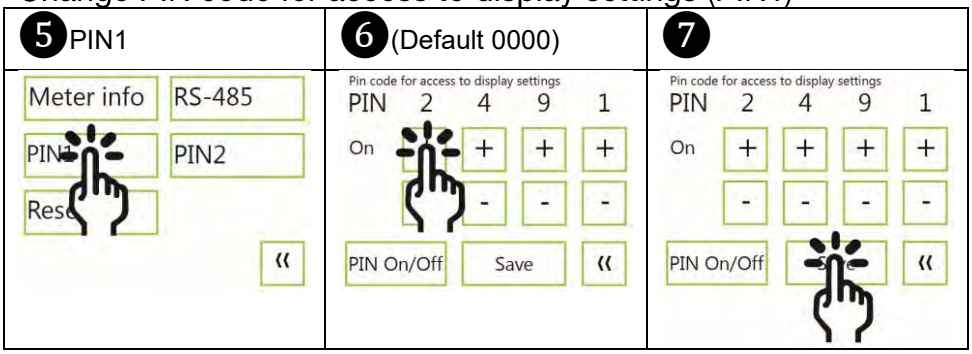
3.

```
Time      Offset ÄmsÅ          CO2 Value ÄppmÅ     Relative Humidity Ä%Å
          Temperature ÄºCÅ
2015-11-17 13:11:58  9149974    685.00    24.36     24.36
2015-11-17 13:12:03  9154919    685.00    24.31     24.36
```

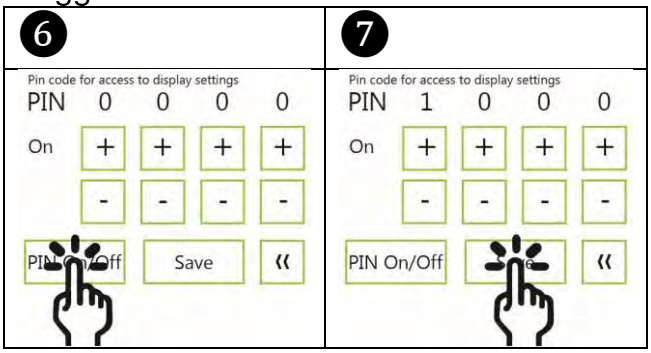
PIN codes



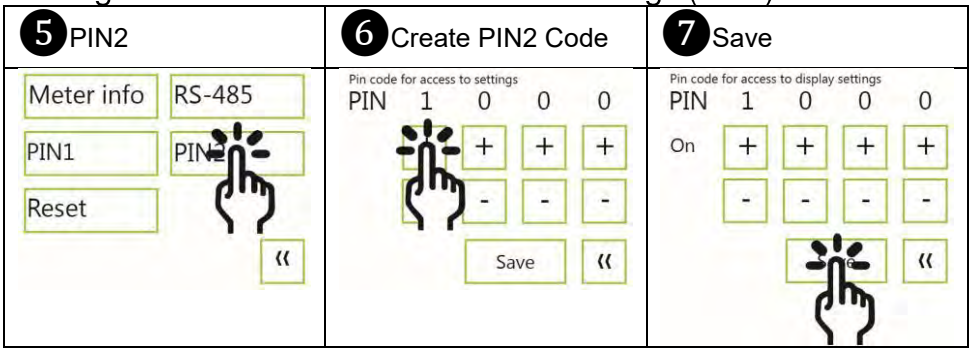
Change PIN code for access to display settings (PIN1)



Toggle PIN1 On/Off



Change PIN code for access to meter settings (PIN2)



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 CO_2 calibrations, unless some special situations have occurred.

Cleaning (exterior only):
Use mild detergent (no harsh chemicals) and wipe dry with a dry cloth.

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.

CE

www.senseair.com.