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

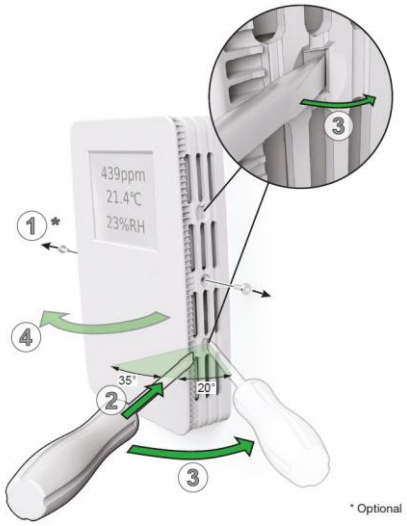


Figure 1

Download of software UIP

senseair.com

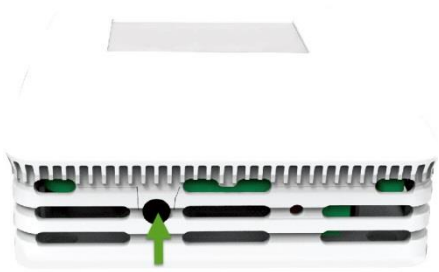
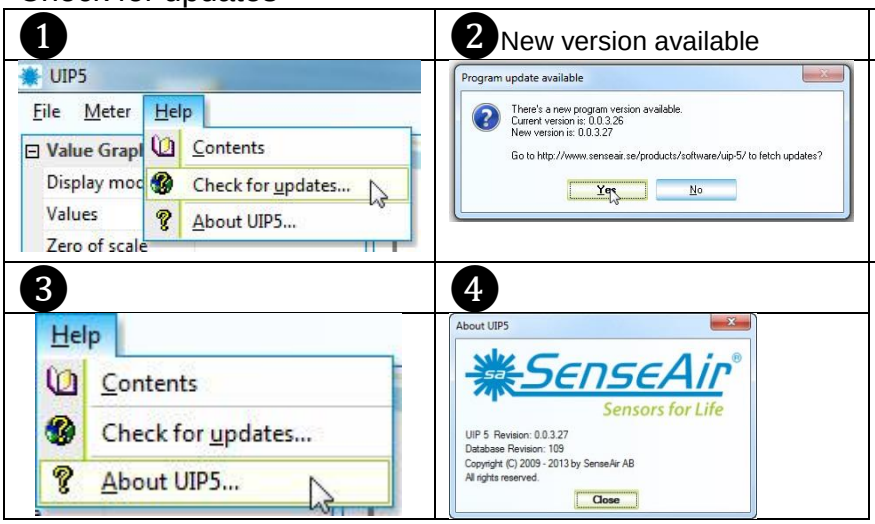


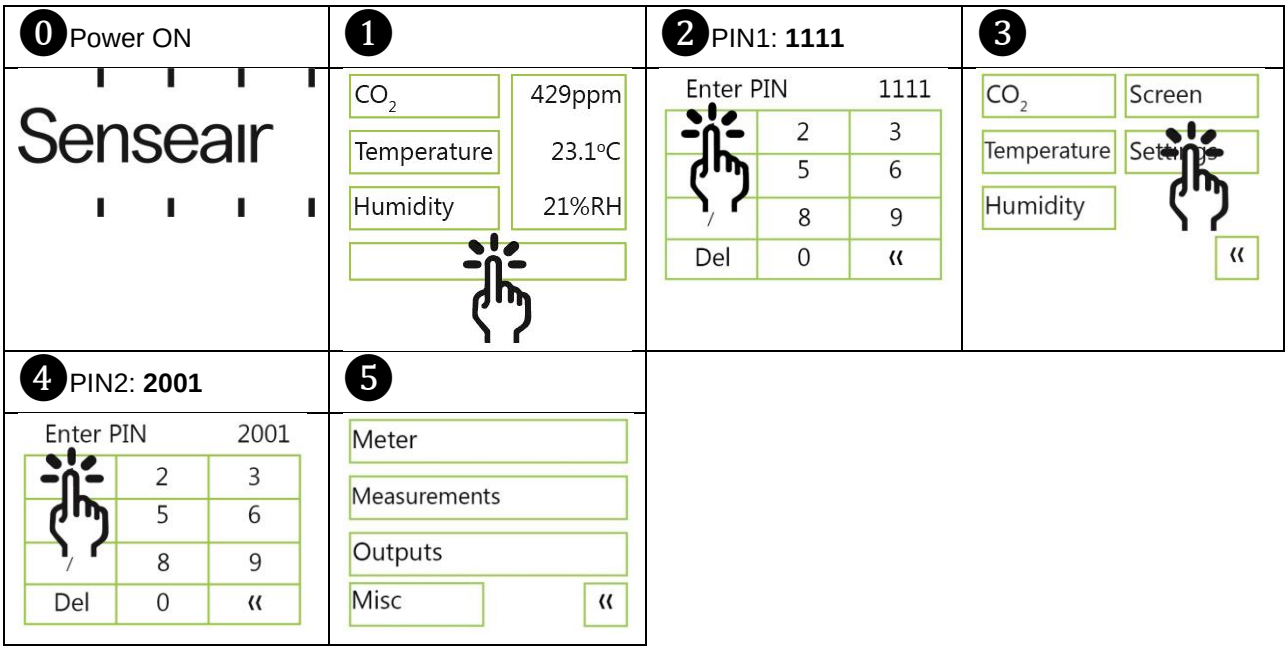
Figure 2: Connection to PC via phone jack
Connect Interface cable USB – 3.5mm Art.No.:00-0-0070

Check for updates



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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)

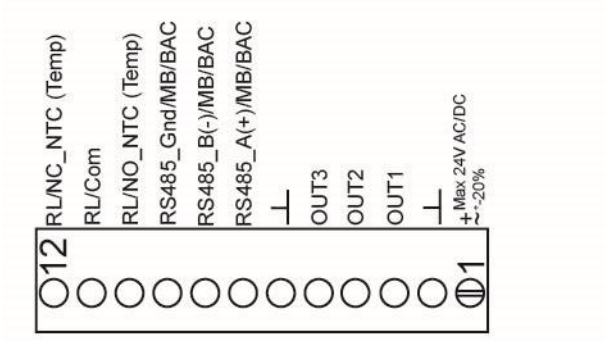


Figure3: Screw Terminal

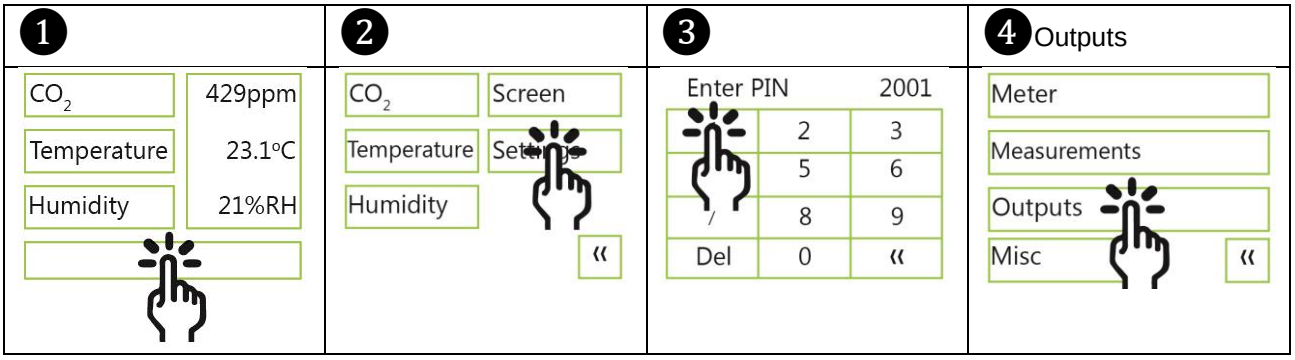
Connect the sensor to PC with the connect interface cable USB – 3.5mm Art.No.: 00-0-0070

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.

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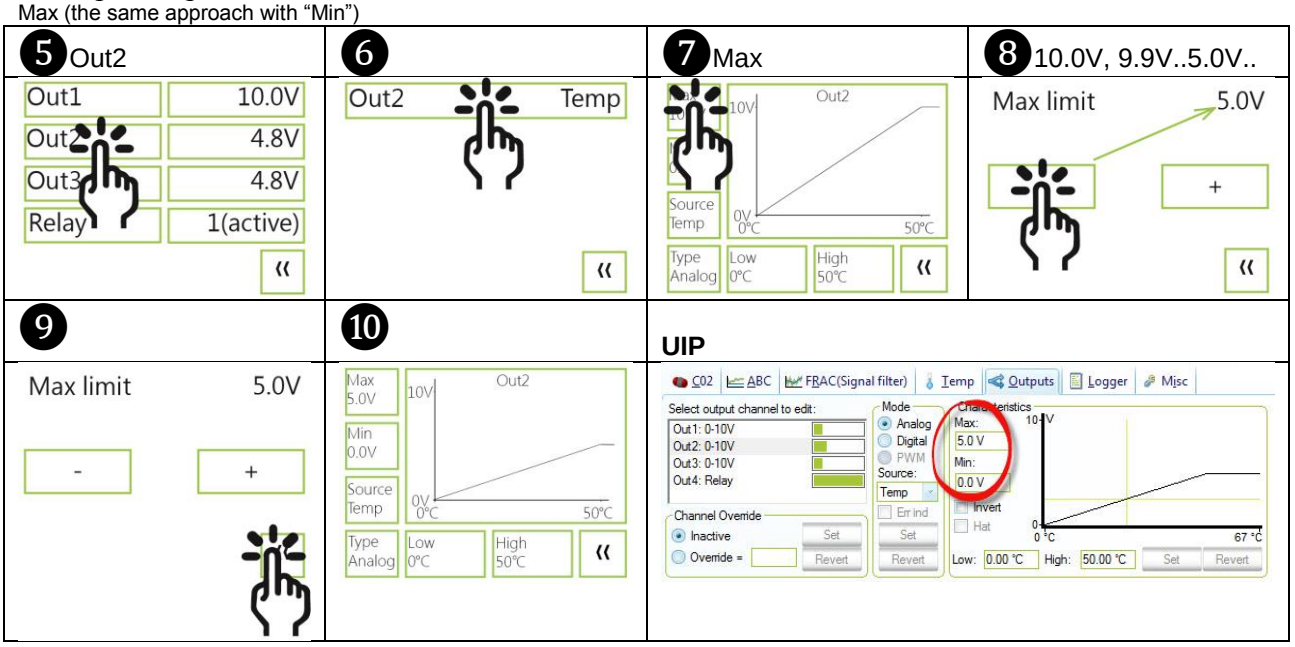
Outputs

Out1/Out2/Out3



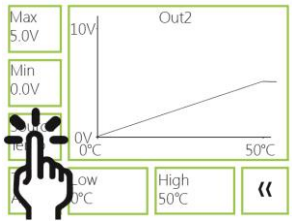
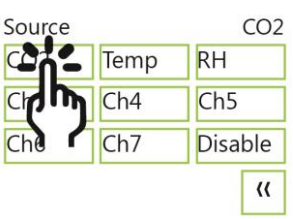
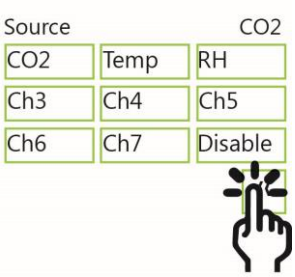
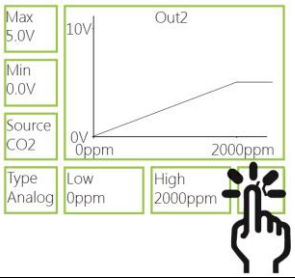
Voltage range

Max (the same approach with “Min”)

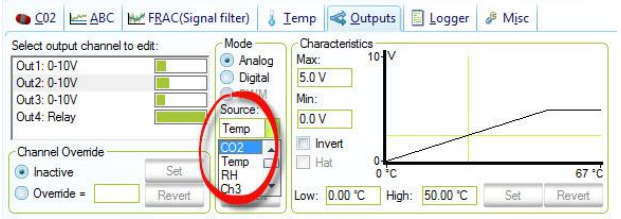


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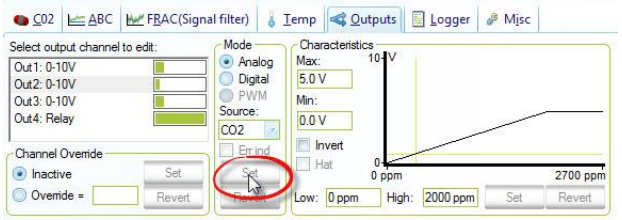
Select source

7 Source	8	9	10
			

UIP 1 Source CO_2 selected



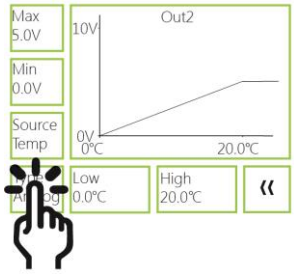
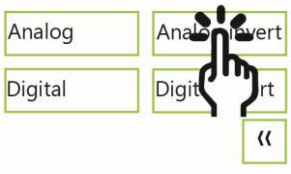
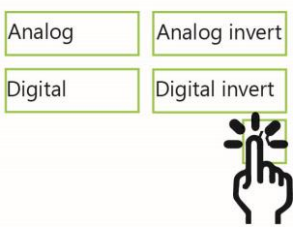
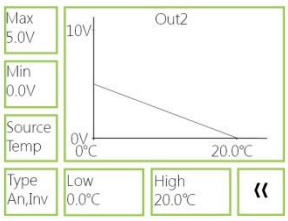
2 Set (Save)



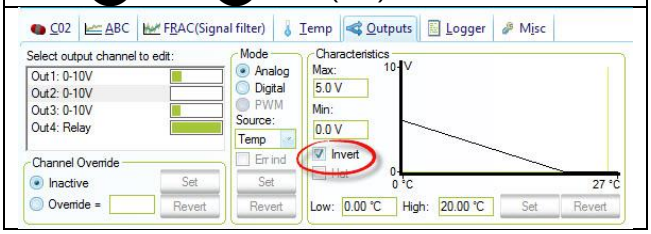
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Types

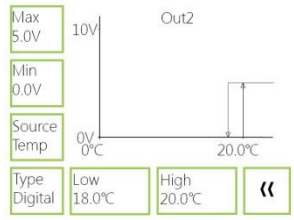
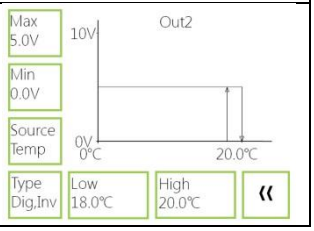
Analogue/Analogue Invert

7 Analogue	8	9	10 Analogue invert
			

UIP5 1 Invert 2 Save (Set)

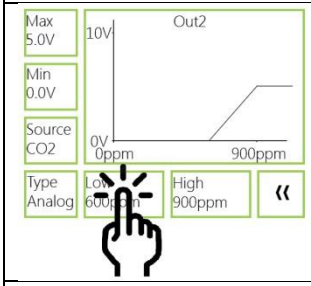
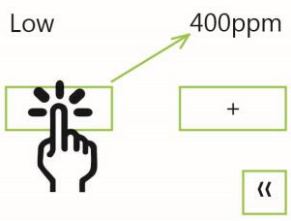
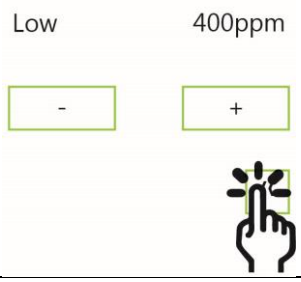
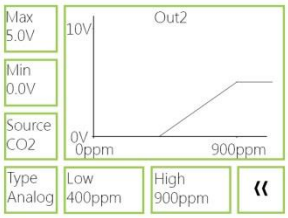


Digital/Digital Invert

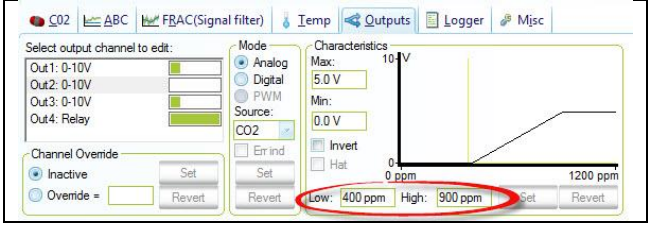
10 Digital	10 Digital Invert
	

Measure range settings

Low (the same approach with ”High”)

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

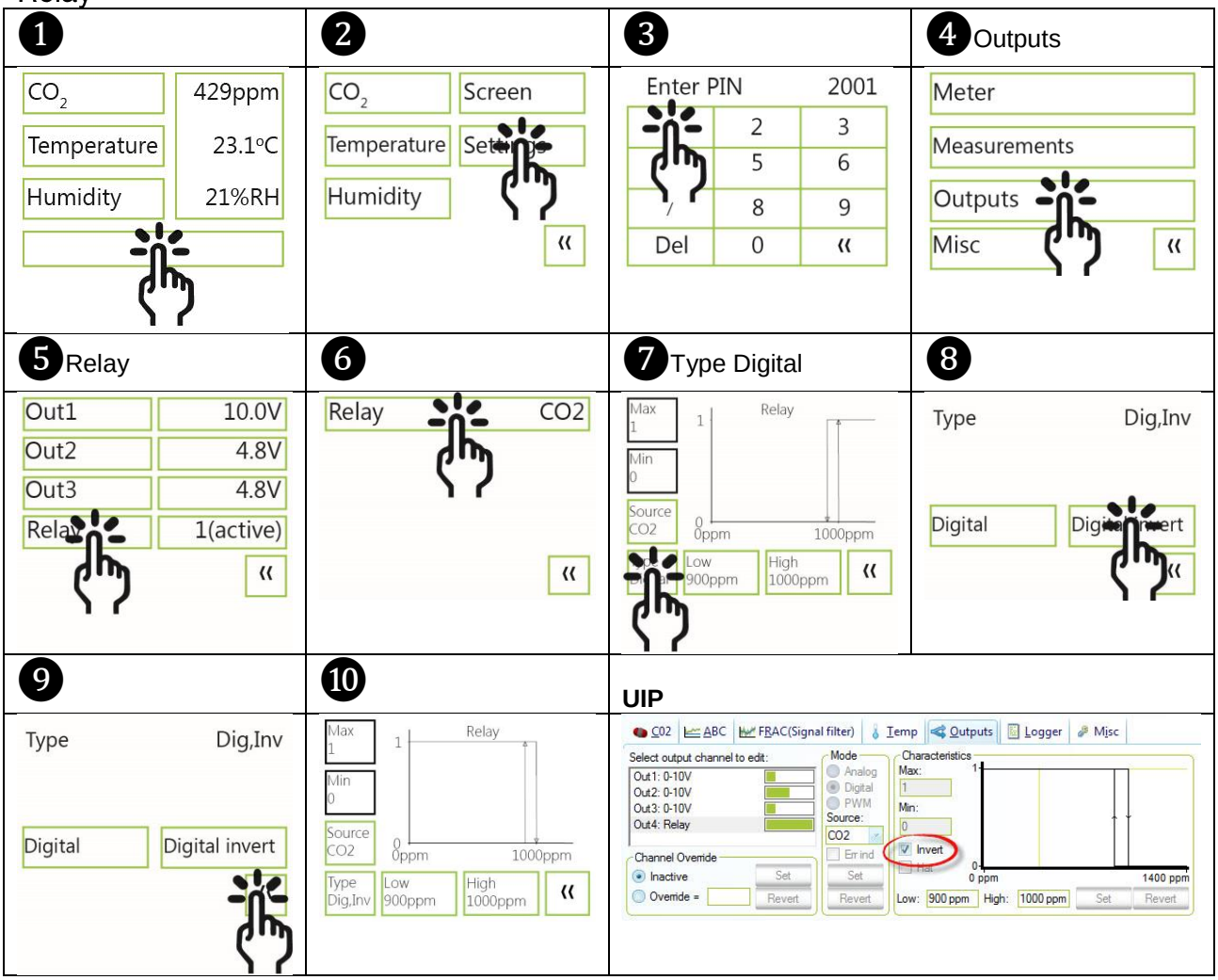
UIP



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Outputs

Relay

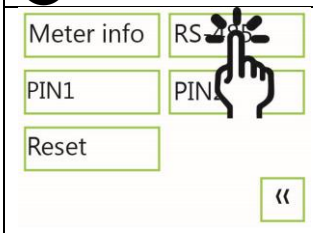


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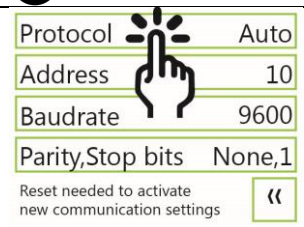
Communication settings

Protocol

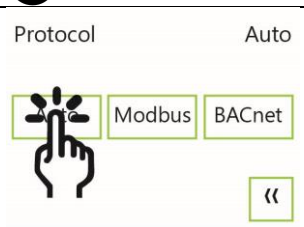
5 RS-485



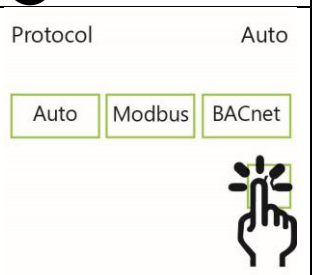
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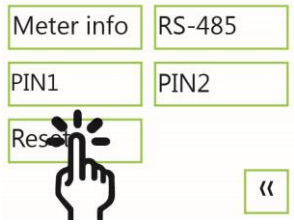
7 **NOTE!**



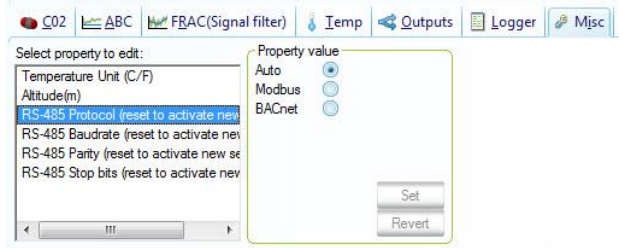
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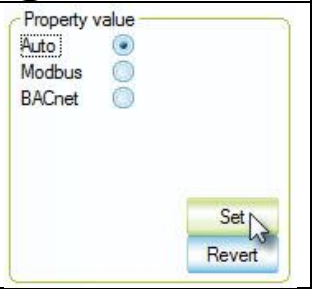
9 **NOTE!**



UIP **1**

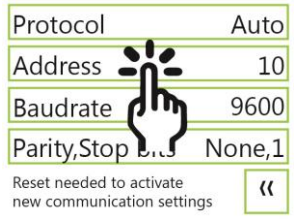


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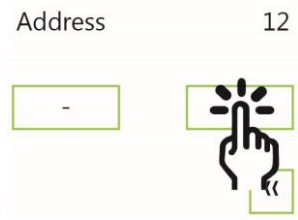


Address/Baud rate

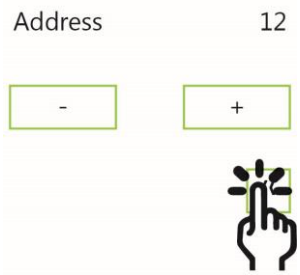
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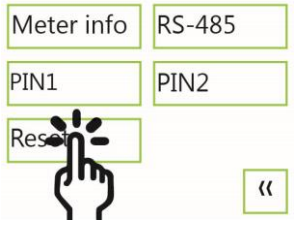
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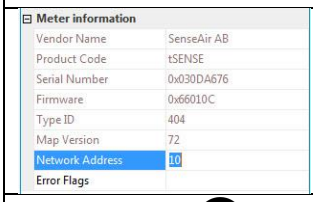
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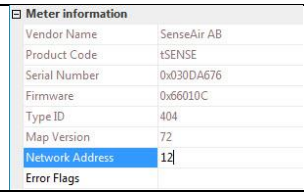
9 **NOTE!**



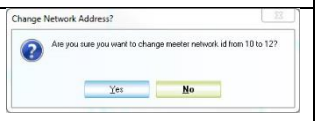
UIP Address **1**



2



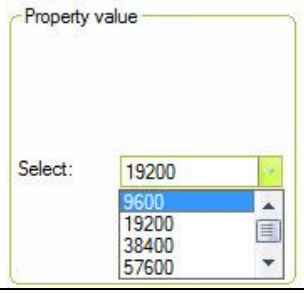
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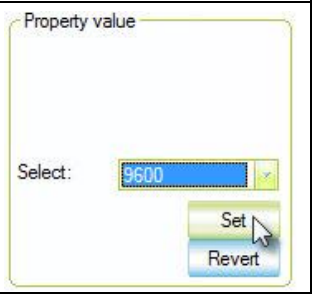
UIP Baud rate **1** Misc



2

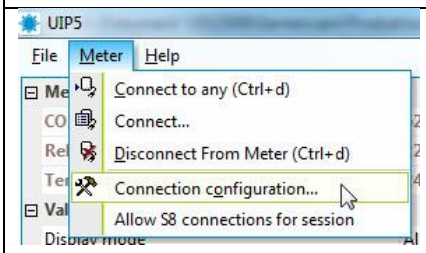
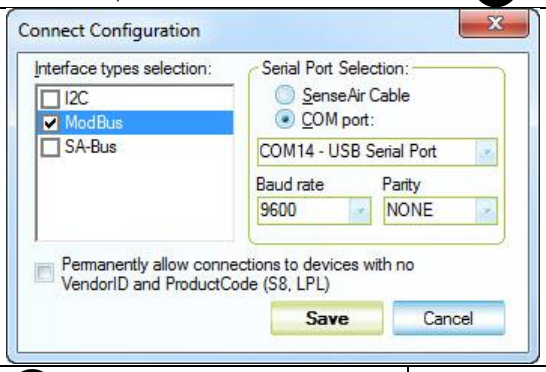


3



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Connection configurations

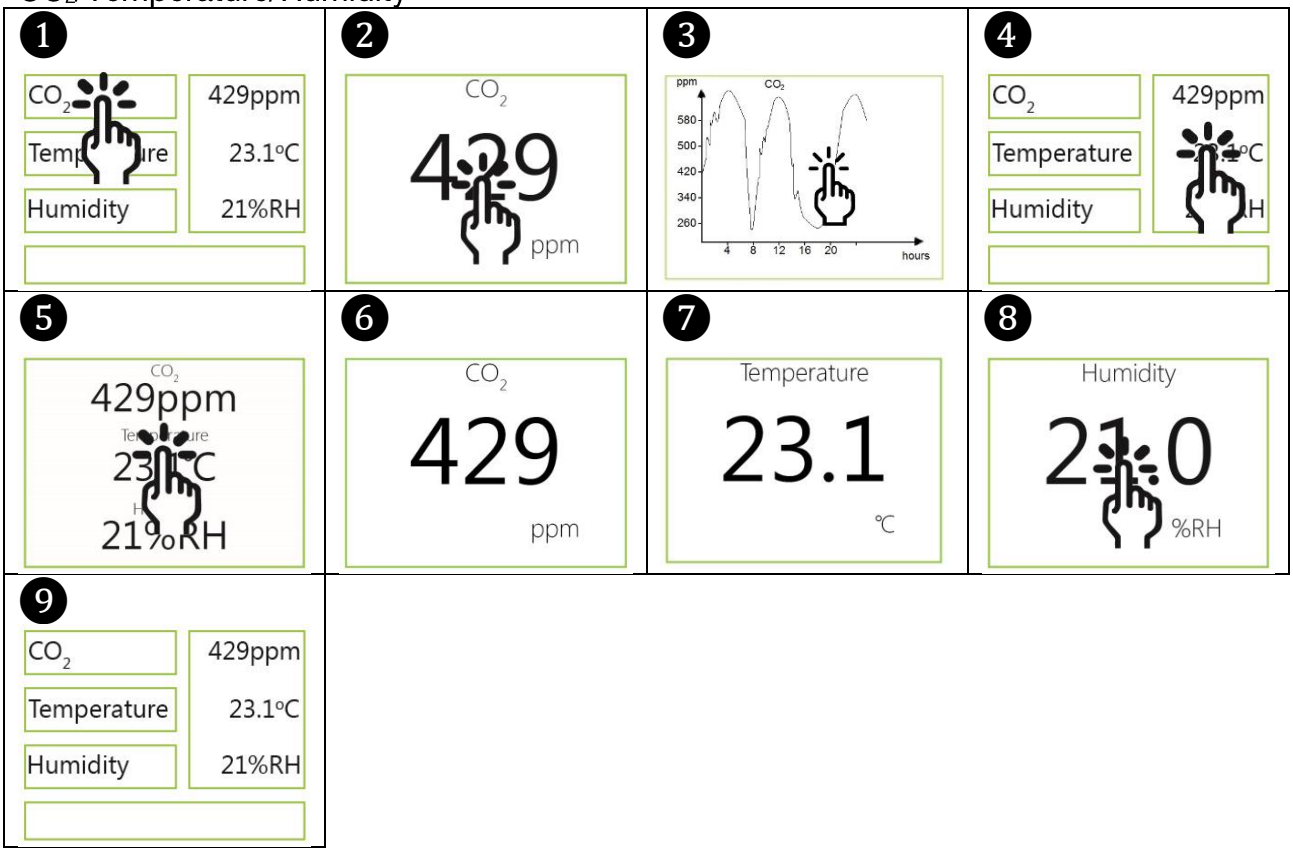
1	2 ModBus 3 Choose SenseAir Cable if bought from SenseAir, otherwise choose COM Port 4 Save
	
5 Lower right corner of screen	6
	

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



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Display settings

Limits

CO_2/(Temperature)/(Humidity)

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

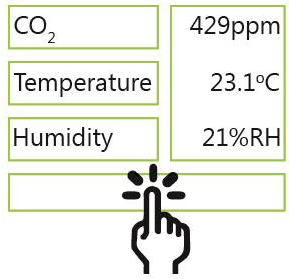
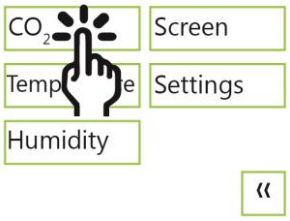
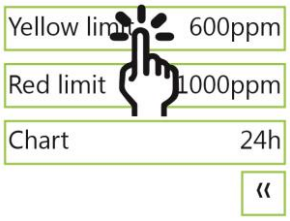
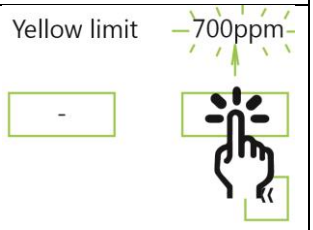
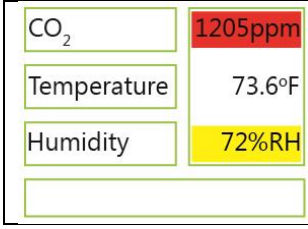
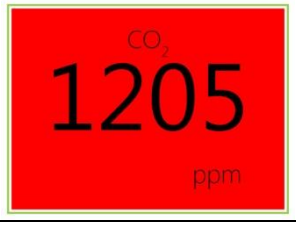
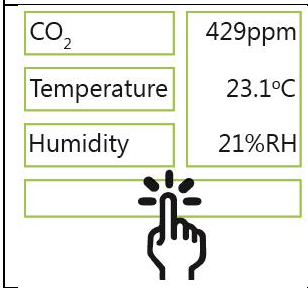
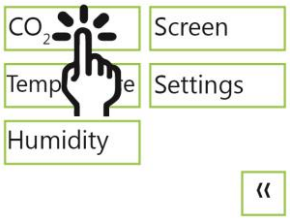
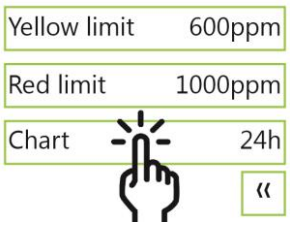
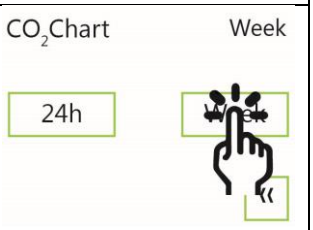
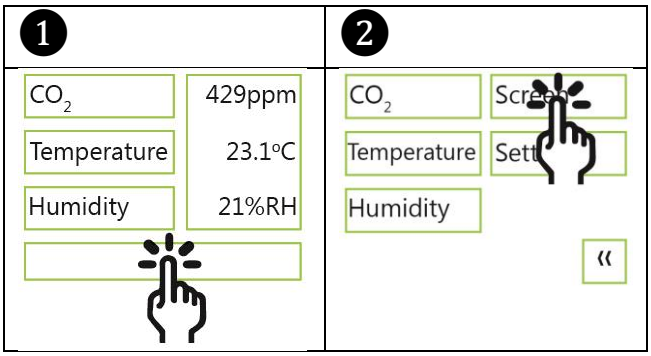
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CO_2 red limit 1000ppm RH yellow limit 70%RH	CO_2 red limit 1000ppm	RH yellow limit 70%RH	
			

Chart 24h/Week

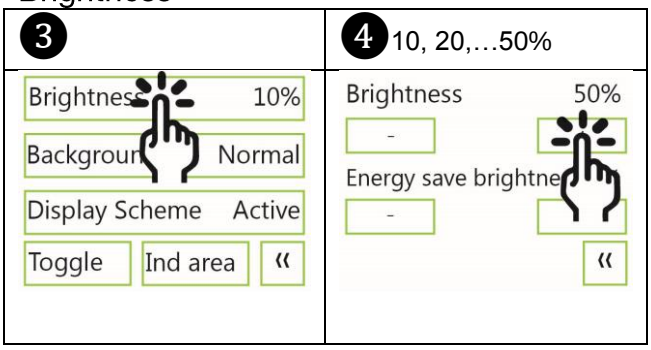
1	2	3	4
			

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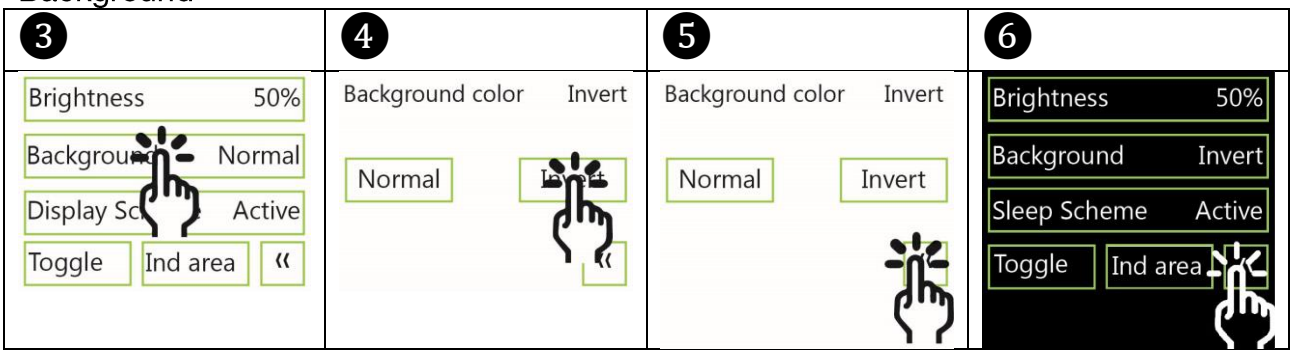
Screen settings



Brightness

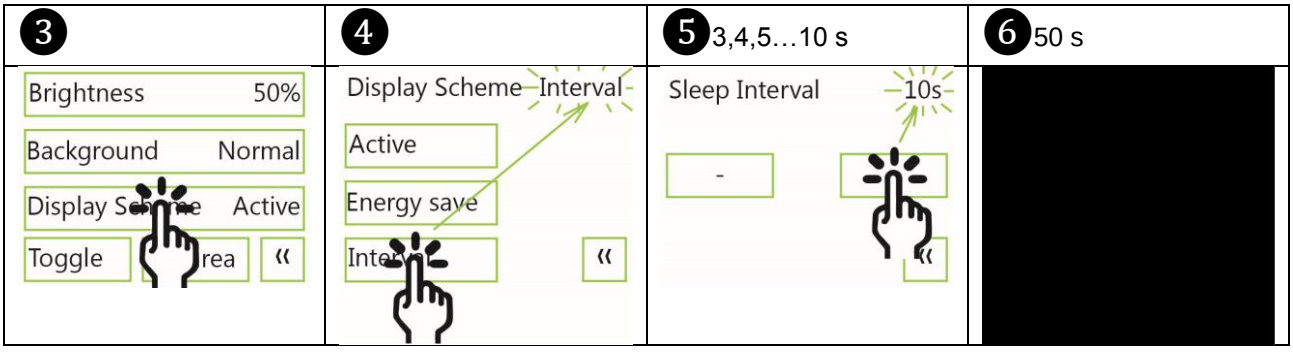


Background



Screensaver, Time setting

Interval



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BACnet on tSENSE

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1. Revision information

Table 1: Document revisions

Rev.	Date:	Author	Status
1.00	Feb 21, 2014	LN/EN	
1.01	May 15, 2014	CB	Appendix B added
1.02	May 05, 2015	LN	3.1 Protocol services supported "Who-Has/I-Have" added
3	Dec 08, 2015	LN/EN	

2. General

The purpose of this document is to describe implemented BACnet functionality and available BACnet objects on tSENSE. The reader of this document is assumed to have basic knowledge about the BACnet protocol. Information about BACnet can be found at www.bacnet.org.

3. BACnet protocol services and object types supported

This chapter describes protocol services and object types implemented on tSENSE.

3.1. Protocol services supported

Read property
The read property service is used to read the value of one object property. All object properties are readable.

Read property multiple
Works as "Read property" but makes it possible to read several properties in one request.

Write property
It is possible to change some properties by using "Write property". It is only possible to write one object property at a time. Properties that can be written are marked "RW" (Read/Write) in the Object descriptions. When writing "Present Value" to AI, AV, BI and BV objects, OOS has to be set to "true" for the object, otherwise the sensor will not accept the "write" command. OOS is always writable for these objects.

Device Communication Control (DCC)
The DCC service makes it possible for other devices to stop the sensor from responding to requests sent to it (no password needed). The sensor will only respond to "DCC enable communication" and "Reinitialize device" after receiving DCC disable. If the "Time duration" parameter (unit minutes) is present in the DCC disable request, the sensor will return to normal operation when the timeout expires. If the "Time duration" parameter is absent the sensor can be returned to its normal state by sending "DCC enable" or "Reinitialize device" to it.

Reinitialize Device
By sending "Reinitialize Device" with the parameter "COLD START", or "WARM START", the sensor will reboot itself. No password is needed for the reinitialize service.

Who-Is/I-Am
The "Who-Is" service can be used to identify devices connected to the network. When the sensor receives "Who-Is", it will answer with "I-Am". At start-up the sensor will also send "I-Am" to notice other devices that it has been connected to the network.

Who-Has/I-Have
If the sensor receives a "Who-Has" request with an Object Name or Object Identifier that matches one of its existing objects, the sensor will respond with a "I-Have" request. For example if the sensor receives a "Who-Has analog-input_1" request it will answer "I-Have, device_xxxxxx, analog-input_1".

3.2. Object types supported

The sensor supports following object types: Analog Input (AI), Analog Value (AV), Binary Input (BI), Binary Value (BV) and Device. Table below gives an overview of available objects.

The numbers in parenthesis in column BACnet Engineering Units correspond to the BACnet official unit list.

BACnet Objects Table

Object Type	Object Name	Description	Range	BACnet Engineering Units	Default
Device		SenseAir BACnet transmitter	0 - 4194302		
Analog Inputs	AI-1	CO2	0 - 3000	parts-per-million (96)	
	AI-2	Temperature	0 - 50	degrees-Celsius (62)	
	AI-3	Relative Humidity	0 - 100	percent-relative-humidity (29)	
	AI-4	CO2 output voltage	0 - 10	volts (5)	
	AI-5	Temp output voltage	0 - 10	volts (5)	
	AI-6	RH output voltage	0 - 10	volts (5)	
Analog Values	AV-1	MAC address	0 - 127	No units	10
	AV-2	Baud rate	9600 - 115200	No units	9600
	AV-3	ABC period	0 - 65535	hours (71)	180
	AV-4	Reserved			
	AV-5	Temperature offset	-50 to +50	degrees-Celsius (62)	0
	AV-6	RH offset	-100 to +100	percent-relative-humidity (29)	0
	AV-7	Relay setpoint	0 - 3000	parts-per-million (96)	900
	AV-8	Relay hysteresis	0 - 3000	parts-per-million (96)	100
	AV-9	CO2 output setpoint	0 - 3000	parts-per-million (96)	0
	AV-10	CO2 output pband	1 - 3000	parts-per-million (96)	2000
	AV-11	CO2 output min	0 - 10	volts (5)	0
	AV-12	CO2 output max	0 - 10	volts (5)	10
	AV-13	Temp output setpoint	0 - 50	degrees-Celsius (62)	0
	AV-14	Temp output pband	0.01 - 50	degrees-Celsius (62)	50
	AV-15	Temp output min	0 - 10	volts (5)	0
	AV-16	Temp output max	0 -10	volts (5)	10
	AV-17	RH output setpoint	0 - 100	percent-relative-humidity (29)	0
	AV-18	RH output pband	0.01 - 100	percent-relative-humidity (29)	100
	AV-19	RH output min	0 - 10	volts (5)	0
	AV-20	RH output max	0 - 10	volts (5)	10
Binary Inputs	BI-1	Relay state	0/1	OFF/ON	
Binary Values	BV-1	ABC state	0/1	OFF/ON	

All objects are described in detail in chapter 4.

4. BACnet objects

Description of the sensors BACnet objects.

Device Object

Property	Property data type	Comment/Default value	Read/ Write
Object Identifier	BACnetObjectIdentifier	Default = 669010, default Object Identifier number is Vendor Identifier number x 1000 + MAC address. Changing MAC will also change Object Identifier number. After writing desired Object Identifier number to the sensor, the Object Identifier will no longer be based on Vendor Id and MAC address.	RW
Object Name	CharacterString	Default “tSENSE 10”: default Object Name is “tSENSE” followed by sensors MAC address. When changing MAC address, Object Name will also change. After writing an Object Name the MAC address will no longer be part of the Object Name.	RW[1]
Object Type	BACnetObjectType	Device (8)	RO
System Status	BACnetDeviceStatus	Operational (0)	RO
Vendor Name	CharacterString	“SenseAir”	RO
Vendor Identifier	Unsigned16	669	RO
Model Name	CharacterString	“tSENSE”	RO
Firmware Revision	CharacterString	X.XX (Appears on the display when the power is turned ON)	RO
Application Software Version	CharacterString	“1.0”	RO
Location	CharacterString	“Default Location”	RW[1]
Description	CharacterString	“SenseAir BACnet transmitter”	RW[1]
Protocol Version	Unsigned	1	RO
Protocol Revision	Unsigned	12	RO
Protocol Services Supported	BACnetServicesSupported	RP, RPM, WP, DCC, RD, WHO_IS, WHO_HAS	RO
Protocol Object Types Supported	BACnetObjectTypesSupported	AI, AV, BI, BV, DEVICE	RO
Object List	BACnet ARRAY[N] of BACnetObjectIdentifier		RO
Max APDU Length Accepted	Unsigned	480	RO
Segmentation Supported	BACnetSegmentation	No-segmentation (3)	RO
APDU Timeout	Unsigned	3000	RO
Number Of APDU Retries	Unsigned	3	RO
Max Master	Unsigned	127	RW
Max Info Frames	Unsigned	1	RO
Device Address Binding	List of BACnetAddressBinding	Empty	RO

[1] Length of character strings must be less than 32 bytes

Database Revision	Unsigned	0	RO

Analog inputs

AI-1 CO_2

Property	Property data type	Comment/Default value	Read/ Write
Object Identifier	BACnetObjectIdentifier	analog-input, 1	RO
Object Name	CharacterString	“AI-1”	RO
Object Type	BACnetObjectType	analog-input (0)	RO
Present Value	REAL	0 - 2000	RW
Description	CharacterString	“CO2”	RO
Status Flags	BACnetStatusFlags	FFFF	RO
Event State	BACnetEventState	normal	RO
Reliability	BACnetReliability	no-fault-detected(0)	RO
Out Of Service	BOOLEAN	FALSE	RW
Units	BACnetEngineeringUnits	parts-per-million (96)	RO

AI-2 Temperature

Property	Property data type	Comment/Default value	Read/ Write
Object Identifier	BACnetObjectIdentifier	analog-input, 2	RO
Object Name	CharacterString	“AI-2”	RO
Object Type	BACnetObjectType	analog-input (0)	RO
Present Value	REAL	0.0 - 50	RW
Description	CharacterString	“Temperature”	RO
Status Flags	BACnetStatusFlags	FFFF	RO
Event State	BACnetEventState	normal	RO
Reliability	BACnetReliability	no-fault-detected(0)	RO
Out Of Service	BOOLEAN	FALSE	RW
Units	BACnetEngineeringUnits	degrees-Celsius (62)	RO

AI-3 Relative Humidity

Property	Property data type	Comment/Default value	Read/ Write
Object Identifier	BACnetObjectIdentifier	analog-input, 3	RO
Object Name	CharacterString	“AI-3”	RO
Object Type	BACnetObjectType	analog-input (0)	RO
Present Value	REAL	0.0 - 100.0	RW
Description	CharacterString	“Relative Humidity”	RO
Status Flags	BACnetStatusFlags	FFFF	RO
Event State	BACnetEventState	normal	RO
Reliability	BACnetReliability	no-fault-detected(0)	RO
Out Of Service	BOOLEAN	FALSE	RW
Units	BACnetEngineeringUnits	percent-relative-humidity (29)	RO

AI-4 Out1 (CO2 output)

Property	Property data type	Comment/Default value	Read/ Write
Object Identifier	BACnetObjectIdentifier	analog-input, 4	RO
Object Name	CharacterString	“AI-4”	RO
Object Type	BACnetObjectType	analog-input (0)	RO
Present Value	REAL	0.0 – 10V	RW
Description	Character String	“CO2 out voltage”	RO
Status Flags	BACnetStatusFlags	FFFF	RO
Event State	BACnetEventState	normal	RO
Reliability	BACnetReliability	no-fault-detected(0)	RO
Out Of Service	BOOLEAN	FALSE	RW
Units	BACnetEngineeringUnits	volts (5)	RO

AI-5 Out2 (Temp output)

Property	Property data type	Comment/Default value	Read/ Write
Object Identifier	BACnetObjectIdentifier	analog-input, 5	RO
Object Name	CharacterString	“AI-5”	RO
Object Type	BACnetObjectType	analog-input (0)	RO
Present Value	REAL	0.0 - 10V	RW
Description	CharacterString	“Temp out voltage”	RO
Status Flags	BACnetStatusFlags	FFFF	RO
Event State	BACnetEvent State	normal	RO
Reliability	BACnetReliability	no-fault-detected(0)	RO
Out Of Service	BOOLEAN	FALSE	RW
Units	BACnetEngineeringUnits	Volts (5)	RO

AI-6 Out3 (RH output)

Property	Property data type	Comment/Default value	Read/ Write
Object Identifier	BACnetObjectIdentifier	analog-input, 6	RO
Object Name	CharacterString	“AI-6”	RO
Object Type	BACnetObjectType	analog-input (0)	RO
Present Value	REAL	0.0 - 10V	RW
Description	CharacterString	“RH out voltage”	RO
Status Flags	BACnetStatusFlags	FFFF	RO
Event State	BACnetEventState	normal	RO
Reliability	BACnetReliability	no-fault-detected (0)	RO
Out Of Service	BOOLEAN	FALSE	RW
Units	BACnetEngineeringUnits	volts (5)	RO

Analog values

AV-1 MAC address

Property	Property data type	Comment/Default value	Read/ Write
Object Identifier	BACnet ObjectIdentifier	analog-value, 1	RO
Object Name	CharacterString	“AV-1”	RO
Object Type	BACnetObjectType	analog-value (2)	RO
Present Value	REAL	Default = 10, range 0 - 127, address 0 is usually used by the BACnet router.	RW
Description	CharacterString	“MAC address”	RO
Status Flags	BACnetStatusFlags	FFFF	RO
Event State	BACnetEventState	normal (0)	RO
Out Of Service	BOOLEAN	FALSE	RW
Units	BACnetEngineeringUnits	no-units (95)	RO

AV-2 Baud

Property	Property data type	Comment/Default value	Read/ Write
Object Identifier	BACnetObjectIdentifier	analog-value, 2	RO
Object Name	CharacterString	“AV-2”	RO
Object Type	BACnetObjectType	analog-value (2)	RO
Present Value	REAL	Default = 9600 When writing baud only values 9600, 19200, 38400, 57600, 76800 and 115200 are accepted.	RW
Description	CharacterString	“Baud rate”	RO
Status Flags	BACnetStatusFlags	FFFF	RO
Event State	BACnetEventState	normal (0)	RO
Out Of Service	BOOLEAN	FALSE	RW
Units	BACnetEngineeringUnits	no-units (95)	RO

AV-3 ABC period

Property	Property data type	Comment/Default value	Read/ Write
Object Identifier	BACnetObjectIdentifier	analog-value, 3	RO
Object Name	CharacterString	“AV-3”	RO
Object Type	BACnetObjectType	analog-value (2)	RO
Present Value	REAL	180	RW
Description	CharacterString	“ABC period”	RO
Status Flags	BACnetStatusFlags	FFFF	RO
Event State	BACnetEventState	normal (0)	RO
Out Of Service	BOOLEAN	FALSE	RW
Units	BACnetEngineeringUnits	hours (71)	RO

AV-4 Reserved

AV-5 Temp offset

Property	Property data type	Comment/Default value	Read/ Write
Object Identifier	BACnetObjectIdentifier	analog-value, 5	RO
Object Name	CharacterString	“AV-5”	RO
Object Type	BACnetObjectType	analog-value (2)	RO
Present Value	REAL	0	RW
Description	CharacterString	“Temp offset”	RO
Status Flags	BACnetStatusFlags	FFFF	RO
Event State	BACnetEventState	normal (0)	RO
Out Of Service	BOOLEAN	FALSE	RW
Units	BACnetEngineeringUnits	degrees-Celsius (62)	RO

AV-6 RH offset

Property	Property data type	Comment/Default value	Read/ Write
Object Identifier	BACnetObjectIdentifier	analog-value, 6	RO
Object Name	CharacterString	“AV-6”	RO
Object Type	BACnetObjectType	analog-value (2)	RO
Present Value	REAL	0	RW
Description	CharacterString	“RH offset”	RO
Status Flags	BACnetStatusFlags	FFFF	RO
Event State	BACnetEventState	normal (0)	RO
Out Of Service	BOOLEAN	FALSE	RW
Units	BACnetEngineeringUnits	percent-relative-humidity (29)	RO

AV-7 Relay CO2 setpoint

Property	Property data type	Comment/Default value	Read/ Write
Object Identifier	BACnetObjectIdentifier	analog-value, 7	RO
Object Name	CharacterString	“AV-7”	RO
Object Type	BACnetObjectType	analog-value (2)	RO
Present Value	REAL	900	RW
Description	CharacterString	“Relay CO2 setpoint”	RO
Status Flags	BACnetStatusFlags	FFFF	RO
Event State	BACnetEventState	normal (0)	RO
Out Of Service	BOOLEAN	FALSE	RW
Units	BACnetEngineeringUnits	parts-per-million (96)	RO

AV-8 Relay CO2 hysteresis

Property	Property data type	Comment/Default value	Read/ Write
Object Identifier	BACnetObjectIdentifier	analog-value, 8	RO
Object Name	CharacterString	“AV-8”	RO
Object Type	BACnetObjectType	analog-value (2)	RO
Present Value	REAL	100	RW
Description	CharacterString	“Relay CO2 hysteresis”	RO
Status Flags	BACnetStatusFlags	FFFF	RO
Event State	BACnetEventState	normal (0)	RO
Out Of Service	BOOLEAN	FALSE	RW
Units	BACnetEngineeringUnits	parts-per-million (96)	RO

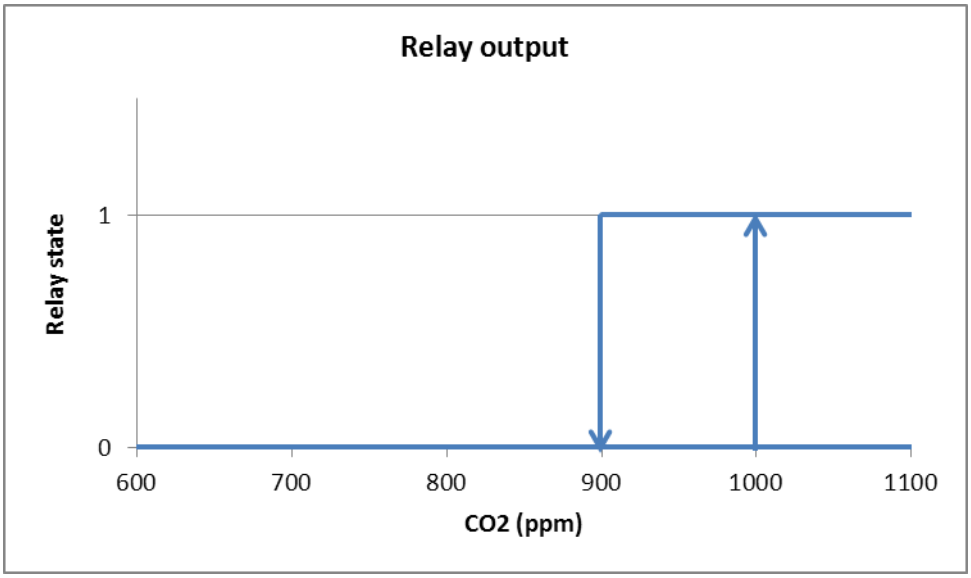


Figure 1, Relay output configured with setpoint = 900 and hysteresis = 100

AV-9 CO2 output RDB (regulator deadband)

Property	Property data type	Comment/Default value	Read/ Write
Object Identifier	BACnetObjectIdentifier	analog-value, 9	RO
Object Name	CharacterString	“AV-9”	RO
Object Type	BACnetObjectType	analog-value (2)	RO
Present Value	REAL	0	RW
Description	CharacterString	“CO2 output setpoint”	RO
Status Flags	BACnetStatusFlags	FFFF	RO
Event State	BACnetEventState	normal (0)	RO
Out Of Service	BOOLEAN	FALSE	RW
Units	BACnetEngineeringUnits	parts-per-million (96)	RO

AV-10 CO2 output PRC (proportional regulator gain constant)

Property	Property data type	Comment/Default value	Read/ Write
Object Identifier	BACnetObjectIdentifier	analog-value, 10	RO
Object Name	CharacterString	“AV-10”	RO
Object Type	BACnetObjectType	analog-value (2)	RO
Present Value	REAL	2000	RW
Description	CharacterString	“CO2 output prop gain”	RO
Status Flags	BACnetStatusFlags	FFFF	RO
Event State	BACnetEventState	normal (0)	RO
Out Of Service	BOOLEAN	FALSE	RW
Units	BACnetEngineeringUnits	parts-per-million (96)	RO

AV-11 CO2 output min voltage

Property	Property data type	Comment/Default value	Read/ Write
Object Identifier	BACnetObjectIdentifier	analog-value, 11	RO
Object Name	CharacterString	“AV-11”	RO
Object Type	BACnetObjectType	analog-value (2)	RO
Present Value	REAL	0	RW
Description	CharacterString	“CO2 output min voltage”	RO
Status Flags	BACnetStatusFlags	FFFF	RO
Event State	BACnetEventState	normal (0)	RO
Out Of Service	BOOLEAN	FALSE	RW
Units	BACnetEngineeringUnits	volts (5)	RO

AV-12 CO2 output max voltage

Property	Property data type	Comment/Default value	Read/ Write
Object Identifier	BACnetObjectIdentifier	analog-value, 12	RO
Object Name	CharacterString	“AV-12”	RO
Object Type	BACnetObjectType	analog-value (2)	RO
Present Value	REAL	10.0	RW
Description	CharacterString	“CO2 output max voltage”	RO
Status Flags	BACnetStatusFlags	FFFF	RO
Event State	BACnetEventState	normal (0)	RO
Out Of Service	BOOLEAN	FALSE	RW
Units	BACnetEngineeringUnits	volts (5)	RO

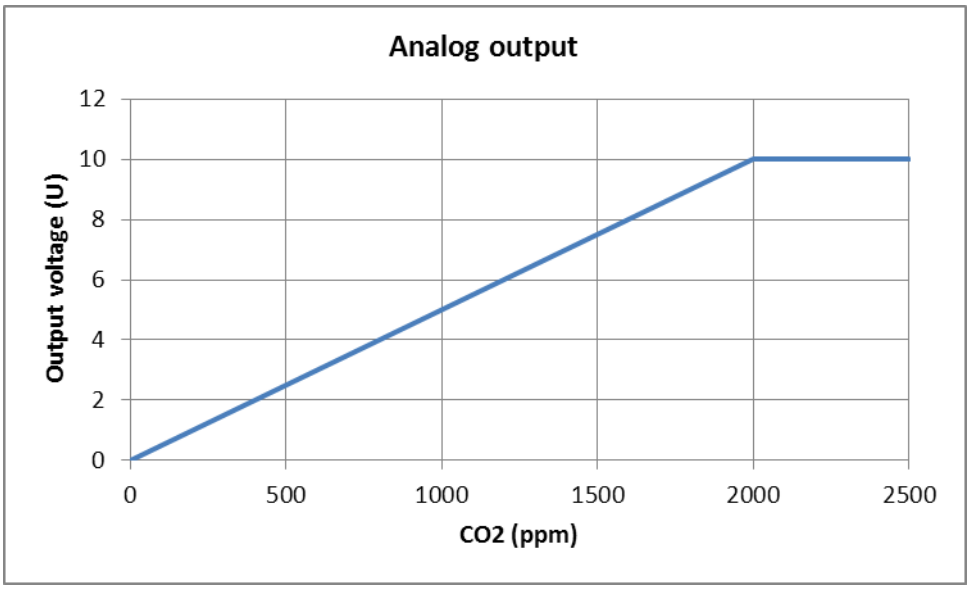


Figure 2, Out1 configured with RDB = 0, PRC = 2000, min voltage = 0 and max voltage = 10

AV-13 Temperature output RDB

Property	Property data type	Comment/Default value	Read/ Write
Object Identifier	BACnetObjectIdentifier	analog-value, 13	RO
Object Name	CharacterString	“AV-13”	RO
Object Type	BACnetObjectType	analog-value (2)	RO
Present Value	REAL	0	RW
Description	CharacterString	“Temp output setpoint”	RO
Status Flags	BACnetStatusFlags	FFFF	RO
Event State	BACnetEventState	normal (0)	RO
Out Of Service	BOOLEAN	FALSE	RW
Units	BACnetEngineeringUnits	degrees-Celsius (62)	RO

AV-14 Temperature output PRC

Property	Property data type	Comment/Default value	Read/ Write
Object Identifier	BACnetObjectIdentifier	analog-value, 14	RO
Object Name	CharacterString	“AV-14”	RO
Object Type	BACnetObjectType	analog-value (2)	RO
Present Value	REAL	50	RW
Description	CharacterString	“Temp output prop gain”	RO
Status Flags	BACnetStatusFlags	FFFF	RO
Event State	BACnetEventState	normal (0)	RO
Out Of Service	BOOLEAN	FALSE	RW
Units	BACnetEngineeringUnits	degrees-Celsius (62)	RO

AV-15 Temperature output min voltage

Property	Property data type	Comment/Default value	Read/ Write
Object Identifier	BACnetObjectIdentifier	analog-value, 15	RO
Object Name	CharacterString	“AV-15”	RO
Object Type	BACnetObjectType	analog-value (2)	RO
Present Value	REAL	0	RW
Description	CharacterString	“Temp output min voltage”	RO
Status Flags	BACnetStatusFlags	FFFF	RO
Event State	BACnetEventState	normal (0)	RO
Out Of Service	BOOLEAN	FALSE	RW
Units	BACnetEngineeringUnits	volts (5)	RO

AV-16 Temperature output max voltage

Property	Property data type	Comment/Default value	Read/ Write
Object Identifier	BACnetObjectIdentifier	analog-value, 16	RO
Object Name	CharacterString	“AV-16”	RO
Object Type	BACnetObjectType	analog-value (2)	RO
Present Value	REAL	10.0	RW
Description	CharacterString	“Temp output max voltage”	RO
Status Flags	BACnetStatusFlags	FFFF	RO
Event State	BACnetEventState	normal (0)	RO
Out Of Service	BOOLEAN	FALSE	RW
Units	BACnetEngineeringUnits	volts (5)	RO

AV-17 RH output RDB

Property	Property data type	Comment/Default value	Read/ Write
Object Identifier	BACnetObjectIdentifier	analog-value, 17	RO
Object Name	CharacterString	“AV-17”	RO
Object Type	BACnetObjectType	analog-value (2)	RO
Present Value	REAL	0.0	RW
Description	CharacterString	“RH output setpoint”	RO
Status Flags	BACnetStatusFlags	FFFF	RO
Event State	BACnetEventState	normal (0)	RO
Out Of Service	BOOLEAN	FALSE	RW
Units	BACnetEngineeringUnits	percent-relative-humidity (29)	RO

AV-18 RH output PRC

Property	Property data type	Comment/Default value	Read/ Write
Object Identifier	BACnetObjectIdentifier	analog-value, 18	RO
Object Name	CharacterString	“AV-18”	RO
Object Type	BACnetObjectType	analog-value (2)	RO
Present Value	REAL	50.0	RW
Description	CharacterString	“RH output prop gain”	RO
Status Flags	BACnetStatusFlags	FFFF	RO
Event State	BACnetEventState	normal (0)	RO
Out Of Service	BOOLEAN	FALSE	RW
Units	BACnetEngineeringUnits	percent-relative-humidity (29)	RO

AV-19 RH min voltage

Property	Property data type	Comment/Default value	Read/ Write
Object Identifier	BACnetObjectIdentifier	analog-value, 19	RO
Object Name	CharacterString	“AV-19”	RO
Object Type	BACnetObjectType	analog-value (2)	RO
Present Value	REAL	0.0	RW
Description	CharacterString	“RH output min voltage”	RO
Status Flags	BACnetStatusFlags	FFFF	RO
Event State	BACnetEventState	normal (0)	RO
Out Of Service	BOOLEAN	FALSE	RW
Units	BACnetEngineeringUnits	volts (5)	RO

AV-20 RH max voltage

Property	Property data type	Comment/Default value	Read/ Write
Object Identifier	BACnetObjectIdentifier	analog-value, 20	RO
Object Name	CharacterString	“AV-20”	RO
Object Type	BACnetObjectType	analog-value (2)	RO
Present Value	REAL	10.0	RW
Description	CharacterString	“RH output max voltage”	RO
Status Flags	BACnetStatusFlags	FFFF	RO
Event State	BACnetEventState	normal (0)	RO
Out Of Service	BOOLEAN	FALSE	RW
Units	BACnetEngineeringUnits	volts (5)	RO

Binary input

BI-1 Relay state

Property	Property data type	Comment/Default value	Read/ Write
Object Identifier	BACnetObjectIdentifier	binary-input, 1	RO
Object Name	CharacterString	“BI-1”	RO
Object Type	BACnetObjectType	binary-input (3)	RO
Present Value	BACnetBinaryPV	See figure 1	RW
Description	CharacterString	“Relay CO2 output”	RO
Status Flags	BACnetStatusFlags	FFFF	RO
Event State	BACnetEventState	normal (0)	RO
Out Of Service	BOOLEAN	FALSE	RW
Polarity	BACnetPolarity	normal (0)	RO

Binary values

BV-1 ABC state (on/off)

Property	Property data type	Comment/Default value	Read/ Write
Object Identifier	BACnetObjectIdentifier	binary-value, 1	RO
Object Name	CharacterString	“BV-1”	RO
Object Type	BACnetObjectType	binary-value (5)	RO
Present Value	BACnetBinaryPV	active (1)	RW
Description	CharacterString	“ABC state”	RO
Status Flags	BACnetStatusFlags	FFFF	RO
Event State	BACnetEventState	normal (0)	RO
Out Of Service	BOOLEAN	FALSE	RW

Appendix A: Conformance statement

Vendor Name:	SenseAir
Product Name:	tSENSE
Product Model Number: -	070-8-XXXX
BACnet Protocol Version:	1
BACnet Protocol Revision:	12
Product description:	CO_2, Temperature and Humidity sensor
BACnet Standardized Device Profile:	BACnet Application Specific Controller (B-ASC)
BACnet Interoperability Building Blocks Supported:	DS-RP-B, DS-RPM-B, DS-WP-B, DM-DDB-B, DM-DOB-B, DM-DCC- B, DM-RD-B
Standard Object Type Supported:	Analog Input (AI), Analog Value (AV), Binary Input (BI), Binary Value (BV) and Device
Data Link Layer Options:	MS/TP master, baud rates: 9600, 19200, 38400, 57600, 76800, 115200
Character Sets Supported:	ANSI X3.4

Appendix B: Application examples

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