



## Sensors

- **22DTH-..6..**  
Duct sensor humidity / temperature
- **22UTH-..60X**  
Outdoor sensor humidity / temperature
- **22DTM-..6**  
Duct sensor CO2 / humidity / temperature
- **22ADP-..6..**  
Differential pressure sensor

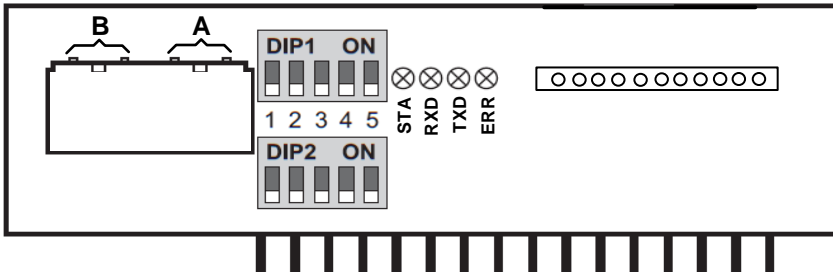
## Contents

1. Operating elements for addressing and parametrization ..... 2
2. Protocol Implementation Conformance Statement - PICS ... 3
3. BACnet Objects Description..... 5

1. Operating elements for addressing and parametrization

1.1 RS-485 module

In addition to the basic board, each BACnet sensor is equipped with a RS-485 module. The BACnet communication lines A (D +) and B (D -) are connected to the module. Furthermore, on the two DIP switches, the MAC address of the BACnet sensor can be selected and the communication parameters can be set.



1.2 Functions of DIP switch 1 and DIP switch 2

DIP switch **DIP1** (switch 1 - 5) is used to set the MAC address together with switch DIP2 (switch 4 & 5) binary coded in a range of 1...127 (address 0 is reserved and can't be set).

DIP switch **DIP2** (switch 1,2,3) is used to parametrize termination (120 Ω) and baud rate.

All DIP switches are factory set to the OFF position.

1 2 3 4 5

**DIP1 ON**

MAC address

1 2 3 4 5

**DIP2 ON**

1 2 3 4 5

**DIP2 ON**

1 = Termination 120 Ω  
2, 3 = Baud rate  
4, 5 = MAC address

2 <sup>0</sup> (1)	2 <sup>1</sup> (2)	2 <sup>2</sup> (4)	2 <sup>3</sup> (8)	2 <sup>4</sup> (16)	2 <sup>5</sup> (32)	2 <sup>6</sup> (64)	Address
1 DIP1	2 DIP1	3 DIP1	4 DIP1	5 DIP1	4 DIP2	5 DIP2	<b>Address</b>
OFF	OFF	OFF	OFF	OFF	OFF	OFF	<b>0</b>
ON	OFF	OFF	OFF	OFF	OFF	OFF	<b>1</b>
OFF	ON	OFF	OFF	OFF	OFF	OFF	<b>2</b>
ON	ON	OFF	OFF	OFF	OFF	OFF	<b>3</b>
OFF	OFF	ON	OFF	OFF	OFF	OFF	<b>4</b>
ON	OFF	ON	OFF	OFF	OFF	OFF	<b>5</b>
OFF	ON	ON	OFF	OFF	OFF	OFF	<b>6</b>
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
ON	ON	ON	ON	ON	ON	ON	<b>127</b>

1 DIP2	2 DIP2	3 DIP2	Function
OFF			Termination <b>OFF</b>
ON			Termination <b>ON</b>
	OFF	OFF	Baud rate <b>9'600</b>
	ON	OFF	Baud rate <b>19'200</b>
	OFF	ON	Baud rate <b>38'400</b>
	ON	ON	Baud rate <b>76'800</b>

1.3 LED Functions

The four LEDs on the RS-485 module show the actual operating status of the RS-485 module.

- STA During normal operation the LED is flashing.  
green LED is turned ON during sensor initialization after Power ON of the device.
- RXD LED is turned ON if bus telegrams are received by the RS-485 module.  
orange
- TXD LED is turned ON if bus telegrams are sent by the RS-485 module.  
orange
- ERR LED is turned ON in case of a faulty bus configuration or in case of internal errors.  
red

## 2. Protocol Implementation Conformance Statement - PICS

<b>General information</b>	<b>Date:</b>	02.08.2022
	<b>Vendor Name:</b>	BELIMO Automation AG
	<b>Vendor ID:</b>	423
	<b>Product Name:</b>	Sensor
	<b>Product Model number:</b>	22DTM-16 22DTM-56 22DTH-16M 22DTH-56M 22UTH-160X 22UTH-560X 22ADP-164 22ADP-164L 22ADP-56Q 22ADP-56QB 22ADP-564L 22ADP-566L
	<b>Application Software Version:</b>	2.3
	<b>Firmware Revision:</b>	2.3
	<b>BACnet Protocol Revision:</b>	1.14
	<b>Product Description:</b>	Sensor device with BACnet MS/TP RS-485 Interface
	<b>BACnet Standard Device Profile:</b>	BACnet Smart sensor (B-SS)
	<b>BACnet Interoperability Building Blocks supported:</b>	Data sharing - ReadProperty-B (DS-RP-B) Data sharing - ReadPropertyMultiple-B (DS-RPM-B) Data sharing - WriteProperty-B (DS-WP-B) Data sharing – COV Unsubscribed-B (DS-COVU-B) Device Management - DynamicDeviceBinding-B (DM-DDB-B) Device Management - DynamicObjectBinding-B (DM-DOB-B) Device Management - DeviceCommunicationControl-B (DM-DCC-B)
	<b>Segmentation Capability:</b>	No
	<b>Data Link Layer Options:</b>	MS/TP Master, Baud rates 9'600, 19'200, 38'400, 76'800 Max. 32 nodes (without repeater)
	<b>Device Address Binding:</b>	No static device binding supported
	<b>Networking Options:</b>	None
	<b>Character Sets Supported:</b>	UTF-8

Depending on the sensor type and the version, not all the measured values and configuration parameters listed in this document are available. The values available for the respective sensor, can be taken from the respective sensor data sheet, or via the "Out of Service" flag of the corresponding object via BACnet.

## Protocol Implementation Conformance Statement – PICS (continued)

## Object processing

Object type	Optional properties	Writeable properties
Analog Input [AI]	COV Increment Description	COV Increment
Analog Value [AV]	Description	Present_Value
Device	Description Max Master Max Info Frames	Description

The specified maximum length of writable strings in the Device Object are based on single byte characters and support up to 32 characters.

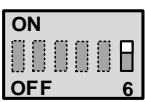
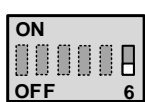
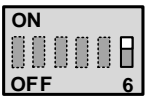
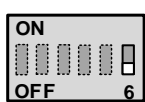
### 3. BACnet objects description

Depending on the device type or version, not all measured values or configuration parameters listed in this document are available. Which values are available for your device can be found in the relevant device data sheet, or via the "Out of Service" flag of the corresponding object via BACnet.

#### 3.1 Sensor values


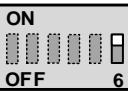
Via the objects analog inputs AI [0] ... AI [11] the various sensor measuring values can be read out.

→ Selection of unitary system SI or Imperial see description of object analog value AV [38].

Object type / Instance	Description	COV Increment	Values	Relinquish Default	Access
Device [x]	<b>Device Object</b>		-	-	R
AI [0]	<b>Value temperature</b> SI in °C and Imperial in °F	0...250 °C [0...480 °F]	-50 °C ... +250 °C [-30 °F ... +480 °F]	-	R
AI [1]	<b>Value relative humidity</b> in % RH	0...100 %	0...100% RH	-	R
AI [2]	<b>Value absolute humidity</b> SI in g/m <sup>3</sup> and Imperial in gr/ft <sup>3</sup>	0...80 g/m <sup>3</sup> [0...35 gr/ft]	0...80 g/m <sup>3</sup> [0...35 gr/ft]	-	R
AI [3]	<b>Value enthalpy</b> SI in kJ/kg and Imperial in BTU/lb	0...85 kJ/kg [0...40 BTU/lb]	0...85 KJ/kg [0...40 BTU/lb]	-	R
AI [4]	<b>Value dew point</b> SI in °C and Imperial in °F	0...80 °C [0...200 °F]	-20 °C ... +80 °C [0 °F ... +200 °F]	-	R
AI [5]	<b>Value CO2</b> in ppm	0 ... 5000 ppm	0...5000 ppm	-	R
AI [6]	<b>Value VOC</b> in %	0 ... 100 %	0...100 %	-	R
AI [7]	<b>Value CO2 VOC Mix</b> in %	0 ... 100 %	0...100 %	-	R
AI [8]	<b>Differential pressure 1</b> <small>cfm</small> Selection <b>Pa</b> (SI) via 6 <sup>th</sup> DIP switch (OFF) of sensor main board 22ADP  <small>Inch WC (Imperial)</small> <small>m<sup>3</sup>/s</small> <small>m<sup>3</sup>/h</small> Selection <b>inchWC</b> (Imperial) via 6 <sup>th</sup> DIP switch (ON) of sensor main board 22ADP <b>S1</b>	0 ... 7000 Pa [0 ... 28 inWC]	According to measuring range 22ADP (DIP switch)	-	R
AI [9]	<b>Volumetric flow 1</b> <small>cfm</small> Selection <b>m<sup>3</sup>/h</b> (SI) via 6 <sup>th</sup> DIP switch (OFF) of sensor main board 22ADP  <small>Inch WC (Imperial)</small> <small>m<sup>3</sup>/s</small> <small>m<sup>3</sup>/h</small> If object analog value AV [41] is set to 0 or 1 a value in m <sup>3</sup> /h is shown. If object analog value AV [41] is set to 2 a value in m <sup>3</sup> /s is shown. Selection <b>cfm</b> (Imperial) via 6 <sup>th</sup> DIP switch (ON) of sensor main board 22ADP <b>S1</b>	0...999'999 m <sup>3</sup> /s 0...999'999 m <sup>3</sup> /h [0...999'999 cfm]	0...999'999 m <sup>3</sup> /s 0...999'999 m <sup>3</sup> /h [0...999'999 cfm]	-	R
AI [10]	<b>Differential pressure 2</b> <small>cfm</small> (@dual ADP only) Selection <b>Pa</b> (SI) via 6 <sup>th</sup> DIP switch (OFF) of sensor main board 22ADP  <small>Inch WC (Imperial)</small> <small>m<sup>3</sup>/s</small> <small>m<sup>3</sup>/h</small> Selection <b>inchWC</b> (Imperial) via 6 <sup>th</sup> DIP switch (ON) of sensor main board 22ADP <b>S2</b>	0 ... 7000 Pa [0 ... 28 inWC]	According to measuring range 22ADP (DIP switch)	-	R
AI [11]	<b>Volumetric flow 2</b> <small>cfm</small> (@dual ADP only) Selection <b>m<sup>3</sup>/h</b> (SI) via 6 <sup>th</sup> DIP switch (OFF) of sensor main board 22ADP  <small>Inch WC (Imperial)</small> <small>m<sup>3</sup>/s</small> <small>m<sup>3</sup>/h</small> If object analog value AV [41] is set to 0 or 1 a value in m <sup>3</sup> /h is shown. If object analog value AV [41] is set to 2 a value in m <sup>3</sup> /s is shown. Selection <b>cfm</b> (Imperial) via 6 <sup>th</sup> DIP switch (ON) of sensor main board 22ADP <b>S2</b>	0...999'999 m <sup>3</sup> /s 0...999'999 m <sup>3</sup> /h [0...999'999 cfm]	0...999'999 m <sup>3</sup> /s 0...999'999 m <sup>3</sup> /h [0...999'999 cfm]	-	R

### 3.2 Offset and correction values

Via the objects analog outputs AV [0] ... AV [5] offset and correction values for the individual measuring values can be defined.  
 → Selection of unitary system SI or Imperial see description of object analog value AV [38].

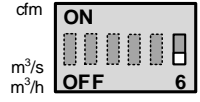
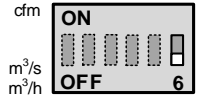
Object type / Instance	Description	Values	Relinquish Default	Access
AV [0]	<b>Offset temperature</b> SI in °C and Imperial in °F	-3 °C ... +3 °C [-6 °F ... +6 °F]	-	R/W
AV [1]	<b>Offset relative humidity</b> in %	-5% RH ... +5% RH	-	R/W
AV [2]	<b>Offset CO2</b> in ppm	-150 ppm ... +150 ppm	-	R/W
AV [3]	<b>Offset VOC</b> in %	-15 % ... +15 %	-	R/W
AV [4]	<p><b>Offset Differential pressure 1</b> <small>cfm</small>  <small>Inch WC (Imperial)</small></p> <p>Selection <b>Pa</b> (SI) via 6<sup>th</sup> DIP switch (OFF) of sensor main board 22ADP <small>m³/s</small> <small>m³/h</small> <b>S1</b> <small>Pa (SI)</small></p> <p>Selection <b>inchWC</b> (Imperial) via 6<sup>th</sup> DIP switch (ON) of sensor main board 22ADP</p> <p>The values for inchWC are given in 1000ths.          For example, to set the value 0.01 inchWC, 10 (1000*0.01 inchWC) must be written.</p>	-50 Pa ... +50 Pa [-0.2 inchWC ... +0.2 inchWC]	-	R/W
AV [5]	<p><b>Offset Differential pressure 2</b> <small>cfm</small>  <small>Inch WC (Imperial)</small></p> <p>Selection <b>Pa</b> (SI) via 6<sup>th</sup> DIP switch (OFF) of sensor main board 22ADP <small>m³/s</small> <small>m³/h</small> <b>S2</b> <small>Pa (SI)</small></p> <p>Selection <b>inchWC</b> (Imperial) via 6<sup>th</sup> DIP switch (ON) of sensor main board 22ADP</p> <p>The values for inchWC are given in 1000ths.          For example, to set the value 0.01 inchWC, 10 (1000*0.01 inchWC) must be written.</p>	-50 Pa ... +50 Pa [-0.2 inchWC ... +0.2 inchWC]	-	R/W

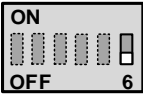
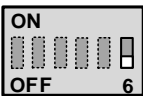
**3.3 Upper /- lower limit of measuring values**

Via the objects analog outputs AV [6] ... AV [25] upper –/ lower limits of measuring values can be set in a certain range.

Furthermore the scaling of the two analogue 0 - 10 Volt outputs of the sensor are defined via these objects analog outputs.

→ Selection of unitary system SI or Imperial see description of object analog value AV [38].

Object type / Instance	Description	Values	Relinquish Default	A c c e s s
AV [6]	<b>Lower limit temperature</b> SI in °C and Imperial in °F	-50 °C ... +250 °C [-30 °F ... +480 °F]	-	RW
AV [7]	<b>Upper limit temperature</b> SI in °C and Imperial in °F	-50 °C ... +250 °C [-30 °F ... +480 °F]	-	R/W
AV [8]	<b>Lower limit relative humidity</b> in %	0...100% RH	-	R/W
AV [9]	<b>Upper limit relative humidity</b> in %	0...100% RH	-	R/W
AV [10]	<b>Lower limit absolute humidity</b> in SI in g/m <sup>3</sup> and Imperial in gr/ft <sup>3</sup>	0...80 g/m <sup>3</sup> [0...35 gr/ft]	-	R/W
AV [11]	<b>Upper limit absolute humidity</b> SI in g/m <sup>3</sup> and Imperial in gr/ft <sup>3</sup>	0...80 g/m <sup>3</sup> [0...35 gr/ft]	-	R/W
AV [12]	<b>Lower limit enthalpy</b> SI in kJ/kg and Imperial in BTU/lb	0...85 KJ/kg [0...40 BTU/lb]	-	R/W
AV [13]	<b>Upper limit enthalpy</b> SI in kJ/kg and Imperial in BTU/lb	0.85 KJ/kg [0...40 BTU/lb]	-	R/W
AV [14]	<b>Lower limit dew point</b> SI in °C and Imperial in °F	-20 °C ... +80 °C [0 °F ... +200 °F]	-	R/W
AV [15]	<b>Upper limit dew point</b> SI in °C and Imperial in °F	-20 °C ... +80 °C [0 °F ... +200 °F]	-	R/W
AV [16]	<b>Lower limit CO2</b> in ppm	0...5000 ppm	-	R/W
AV [17]	<b>Upper limit CO2</b> in ppm	0...5000 ppm	-	R/W
AV [18]	<b>Lower limit VOC</b> in %	0...100 %	-	R/W
AV [19]	<b>Upper limit VOC</b> in %	0...100 %	-	R/W
AV [20]	<b>Lower limit CO2 VOC Mix</b> in %	0...100 %	-	R/W
AV [21]	<b>Upper limit CO2 VOC Mix</b> in %	0...100 %	-	R/W
AV [22]	<p><b>Lower limit volumetric flow 1</b> Selection m<sup>3</sup>/h (SI) via 6<sup>th</sup> DIP switch (OFF) of sensor main board 22ADP.</p>  <p>If object analog value AV [41] is set to 0 or 1 a value in m<sup>3</sup>/h is shown. If object analog value AV [41] is set to 2 a value in m<sup>3</sup>/s is shown.</p> <p>Selection <b>cfm</b> (Imperial) via 6<sup>th</sup> DIP switch (ON) of sensor main board 22ADP</p>	<p>0...999'999 m<sup>3</sup>/s 0...999'999 m<sup>3</sup>/h [0...999'999 cfm]</p>	-	R/W
AV [23]	<p><b>Upper limit volumetric flow 1</b> Selection m<sup>3</sup>/h (SI) via 6<sup>th</sup> DIP switch (OFF) of sensor main board 22ADP.</p>  <p>If object analog value AV [41] is set to 0 or 1 a value in m<sup>3</sup>/h is shown. If object analog value AV [41] is set to 2 a value in m<sup>3</sup>/s is shown.</p> <p>Selection <b>cfm</b> (Imperial) via 6<sup>th</sup> DIP switch (ON) of sensor main board 22ADP</p>	<p>0...999'999 m<sup>3</sup>/s 0...999'999 m<sup>3</sup>/h [0...999'999 cfm]</p>	-	R/W

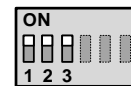
Object type / Instance	Description	Values	Relinquish Default	A c c e s s
AV [24]	<p><b>Lower limit volumetric flow 2</b> (@dual ADP only)</p> <p>Selection <b>m<sup>3</sup>/h</b> (SI) via <b>cfm</b> 6<sup>th</sup> DIP switch (OFF) of sensor main board 22ADP.</p>  <p><b>Pa (SI)</b> S2</p> <p>If object analog value AV [41] is set to 0 or 1 a value in m<sup>3</sup>/h is shown. If object analog value AV [41] is set to 2 a value in m<sup>3</sup>/s is shown.</p> <p>Selection <b>cfm</b> (Imperial) via 6<sup>th</sup> DIP switch (ON) of sensor main board 22ADP</p>	<p>0...999'999 m<sup>3</sup>/s                      0...999'999 m<sup>3</sup>/h                      [0...999'999 cfm]</p>	-	R/W
AV [25]	<p><b>Upper limit volumetric flow 2</b> (@dual ADP only)</p> <p>Selection <b>m<sup>3</sup>/h</b> (SI) via <b>cfm</b> 6<sup>th</sup> DIP switch (OFF) of sensor main board 22ADP.</p>  <p><b>Pa (SI)</b> S2</p> <p>If object analog value AV [41] is set to 0 or 1 a value in m<sup>3</sup>/h is shown. If object analog value AV [41] is set to 2 a value in m<sup>3</sup>/s is shown.</p> <p>Selection <b>cfm</b> (Imperial) via 6<sup>th</sup> DIP switch (ON) of sensor main board 22ADP</p>	<p>0...999'999 m<sup>3</sup>/s                      0...999'999 m<sup>3</sup>/h                      [0...999'999 cfm]</p>	-	R/W

**Limit differential pressure 1+2**

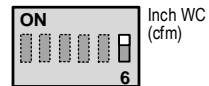
Pressure range can be set with DIP switch 1-3 of sensor main board 22ADP. For the specific values, please refer to the product data sheet of the respective device.

Selection of **Pa** (SI) via 6<sup>th</sup> DIP switch (OFF) of sensor main board 22ADP.

S1 + S2



Selection **InchWC** (Imperial) via 6<sup>th</sup> DIP switch (ON) of sensor main board 22ADP.





**3.4 Selection of sensor channels of measuring values**

Via objects analog outputs AV [26] ... AV [37] the individual measured values can be assigned to channels. This can be used to assign the two analog outputs to the corresponding measured value (channel # 1 = AOU1, channel # 2 = AOU2). In addition, 4 fields of the LCD display (optional) can be assigned to measured values by using the corresponding channel #.

Default Settings		Object type / Instance	Description	Relinquish Default	Access																					
<b>Channel temperature</b>	<b>Default value channel #</b>	AV [26]	<p><b>Selection channel #</b>  <b>Valid values 1, 2, 3 or 4</b>                      The channels with channel #1 and #2 are output both via BACnet objects analog inputs AI [0] ... AI [9] and via the analog outputs AOU1 and AOU2.</p> <p><b>4 fields of the LCD display</b> (optional) can be assigned to measured values by using the corresponding channel #.</p> <p>Unused channels are set to zero.</p> <p>Assignment LCD fields to channel #</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>field 1 (channel 1)</td> <td>field 2 (channel 2)</td> </tr> <tr> <td>field 3 (channel 3)</td> <td>field 4 (channel 4)</td> </tr> </table> <p>Example                      22DTM-..Sensors</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>CO2</td> <td>ppm</td> <td>Temp</td> <td>°C</td> </tr> <tr> <td></td> <td>1278</td> <td></td> <td>23.7</td> </tr> <tr> <td>rH</td> <td>%</td> <td></td> <td></td> </tr> <tr> <td></td> <td>63</td> <td></td> <td></td> </tr> </table>	field 1 (channel 1)	field 2 (channel 2)	field 3 (channel 3)	field 4 (channel 4)	CO2	ppm	Temp	°C		1278		23.7	rH	%				63			-	R/W	
field 1 (channel 1)	field 2 (channel 2)																									
field 3 (channel 3)	field 4 (channel 4)																									
CO2	ppm			Temp	°C																					
	1278				23.7																					
rH	%																									
	63																									
Sensor 22DTH-..6..	<b>2 (AOU2)</b>																									
Sensor 22UTH-..60X	<b>2 (AOU2)</b>																									
Sensor 22DTM-..6	<b>2 (AOU2)</b>																									
Sensor 22ADP-..6..	0																									
<b>Channel relative humidity</b>	<b>Default value channel #</b>	AV [27]		<p><b>Selection channel #</b>  <b>Valid values 1, 2, 3 or 4</b>                      The channels with channel #1 and #2 are output both via BACnet objects analog inputs AI [0] ... AI [9] and via the analog outputs AOU1 and AOU2.</p> <p><b>4 fields of the LCD display</b> (optional) can be assigned to measured values by using the corresponding channel #.</p> <p>Unused channels are set to zero.</p> <p>Assignment LCD fields to channel #</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>field 1 (channel 1)</td> <td>field 2 (channel 2)</td> </tr> <tr> <td>field 3 (channel 3)</td> <td>field 4 (channel 4)</td> </tr> </table> <p>Example                      22DTM-..Sensors</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>CO2</td> <td>ppm</td> <td>Temp</td> <td>°C</td> </tr> <tr> <td></td> <td>1278</td> <td></td> <td>23.7</td> </tr> <tr> <td>rH</td> <td>%</td> <td></td> <td></td> </tr> <tr> <td></td> <td>63</td> <td></td> <td></td> </tr> </table>	field 1 (channel 1)	field 2 (channel 2)	field 3 (channel 3)	field 4 (channel 4)	CO2	ppm	Temp	°C		1278		23.7	rH	%				63			-	R/W
field 1 (channel 1)	field 2 (channel 2)																									
field 3 (channel 3)	field 4 (channel 4)																									
CO2	ppm				Temp	°C																				
	1278				23.7																					
rH	%																									
	63																									
Sensor 22DTH-..6..	<b>1 (AOU1)</b>																									
Sensor 22UTH-..60X	<b>1 (AOU1)</b>																									
Sensor 22DTM-..6	<b>3</b>																									
Sensor 22ADP-..6..	0																									
<b>Channel absolute humidity</b>	<b>Default value channel #</b>	AV [28]	<p><b>Selection channel #</b>  <b>Valid values 1, 2, 3 or 4</b>                      The channels with channel #1 and #2 are output both via BACnet objects analog inputs AI [0] ... AI [9] and via the analog outputs AOU1 and AOU2.</p> <p><b>4 fields of the LCD display</b> (optional) can be assigned to measured values by using the corresponding channel #.</p> <p>Unused channels are set to zero.</p> <p>Assignment LCD fields to channel #</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>field 1 (channel 1)</td> <td>field 2 (channel 2)</td> </tr> <tr> <td>field 3 (channel 3)</td> <td>field 4 (channel 4)</td> </tr> </table> <p>Example                      22DTM-..Sensors</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>CO2</td> <td>ppm</td> <td>Temp</td> <td>°C</td> </tr> <tr> <td></td> <td>1278</td> <td></td> <td>23.7</td> </tr> <tr> <td>rH</td> <td>%</td> <td></td> <td></td> </tr> <tr> <td></td> <td>63</td> <td></td> <td></td> </tr> </table>		field 1 (channel 1)	field 2 (channel 2)	field 3 (channel 3)	field 4 (channel 4)	CO2	ppm	Temp	°C		1278		23.7	rH	%				63			-	R/W
field 1 (channel 1)	field 2 (channel 2)																									
field 3 (channel 3)	field 4 (channel 4)																									
CO2	ppm				Temp	°C																				
	1278				23.7																					
rH	%																									
	63																									
Sensor 22DTH-..6..	0																									
Sensor 22UTH-..60X	0																									
Sensor 22DTM-..6	0																									
Sensor 22ADP-..6..	0																									
<b>Channel enthalpy</b>	<b>Default value channel #</b>	AV [29]		<p><b>Selection channel #</b>  <b>Valid values 1, 2, 3 or 4</b>                      The channels with channel #1 and #2 are output both via BACnet objects analog inputs AI [0] ... AI [9] and via the analog outputs AOU1 and AOU2.</p> <p><b>4 fields of the LCD display</b> (optional) can be assigned to measured values by using the corresponding channel #.</p> <p>Unused channels are set to zero.</p> <p>Assignment LCD fields to channel #</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>field 1 (channel 1)</td> <td>field 2 (channel 2)</td> </tr> <tr> <td>field 3 (channel 3)</td> <td>field 4 (channel 4)</td> </tr> </table> <p>Example                      22DTM-..Sensors</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>CO2</td> <td>ppm</td> <td>Temp</td> <td>°C</td> </tr> <tr> <td></td> <td>1278</td> <td></td> <td>23.7</td> </tr> <tr> <td>rH</td> <td>%</td> <td></td> <td></td> </tr> <tr> <td></td> <td>63</td> <td></td> <td></td> </tr> </table>	field 1 (channel 1)	field 2 (channel 2)	field 3 (channel 3)	field 4 (channel 4)	CO2	ppm	Temp	°C		1278		23.7	rH	%				63			-	R/W
field 1 (channel 1)	field 2 (channel 2)																									
field 3 (channel 3)	field 4 (channel 4)																									
CO2	ppm				Temp	°C																				
	1278				23.7																					
rH	%																									
	63																									
Sensor 22DTH-..6..	0																									
Sensor 22UTH-..60X	0																									
Sensor 22DTM-..6	0																									
Sensor 22ADP-..6..	0																									
<b>Channel dew point</b>	<b>Default value channel #</b>	AV [30]	<p><b>Selection channel #</b>  <b>Valid values 1, 2, 3 or 4</b>                      The channels with channel #1 and #2 are output both via BACnet objects analog inputs AI [0] ... AI [9] and via the analog outputs AOU1 and AOU2.</p> <p><b>4 fields of the LCD display</b> (optional) can be assigned to measured values by using the corresponding channel #.</p> <p>Unused channels are set to zero.</p> <p>Assignment LCD fields to channel #</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>field 1 (channel 1)</td> <td>field 2 (channel 2)</td> </tr> <tr> <td>field 3 (channel 3)</td> <td>field 4 (channel 4)</td> </tr> </table> <p>Example                      22DTM-..Sensors</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>CO2</td> <td>ppm</td> <td>Temp</td> <td>°C</td> </tr> <tr> <td></td> <td>1278</td> <td></td> <td>23.7</td> </tr> <tr> <td>rH</td> <td>%</td> <td></td> <td></td> </tr> <tr> <td></td> <td>63</td> <td></td> <td></td> </tr> </table>		field 1 (channel 1)	field 2 (channel 2)	field 3 (channel 3)	field 4 (channel 4)	CO2	ppm	Temp	°C		1278		23.7	rH	%				63			-	R/W
field 1 (channel 1)	field 2 (channel 2)																									
field 3 (channel 3)	field 4 (channel 4)																									
CO2	ppm				Temp	°C																				
	1278				23.7																					
rH	%																									
	63																									
Sensor 22DTH-..6..	0																									
Sensor 22UTH-..60X	0																									
Sensor 22DTM-..6	0																									
Sensor 22ADP-..6..	0																									
<b>Channel CO2</b>	<b>Default value channel #</b>	AV [31]		<p><b>Selection channel #</b>  <b>Valid values 1, 2, 3 or 4</b>                      The channels with channel #1 and #2 are output both via BACnet objects analog inputs AI [0] ... AI [9] and via the analog outputs AOU1 and AOU2.</p> <p><b>4 fields of the LCD display</b> (optional) can be assigned to measured values by using the corresponding channel #.</p> <p>Unused channels are set to zero.</p> <p>Assignment LCD fields to channel #</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>field 1 (channel 1)</td> <td>field 2 (channel 2)</td> </tr> <tr> <td>field 3 (channel 3)</td> <td>field 4 (channel 4)</td> </tr> </table> <p>Example                      22DTM-..Sensors</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>CO2</td> <td>ppm</td> <td>Temp</td> <td>°C</td> </tr> <tr> <td></td> <td>1278</td> <td></td> <td>23.7</td> </tr> <tr> <td>rH</td> <td>%</td> <td></td> <td></td> </tr> <tr> <td></td> <td>63</td> <td></td> <td></td> </tr> </table>	field 1 (channel 1)	field 2 (channel 2)	field 3 (channel 3)	field 4 (channel 4)	CO2	ppm	Temp	°C		1278		23.7	rH	%				63			-	R/W
field 1 (channel 1)	field 2 (channel 2)																									
field 3 (channel 3)	field 4 (channel 4)																									
CO2	ppm				Temp	°C																				
	1278				23.7																					
rH	%																									
	63																									
Sensor 22DTH-..6..	0																									
Sensor 22UTH-..60X	0																									
Sensor 22DTM-..6	<b>1 (AOU1)</b>																									
Sensor 22ADP-..6..	0																									
<b>Channel VOC</b>	<b>Default value channel #</b>	AV [32]	<p><b>Selection channel #</b>  <b>Valid values 1, 2, 3 or 4</b>                      The channels with channel #1 and #2 are output both via BACnet objects analog inputs AI [0] ... AI [9] and via the analog outputs AOU1 and AOU2.</p> <p><b>4 fields of the LCD display</b> (optional) can be assigned to measured values by using the corresponding channel #.</p> <p>Unused channels are set to zero.</p> <p>Assignment LCD fields to channel #</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>field 1 (channel 1)</td> <td>field 2 (channel 2)</td> </tr> <tr> <td>field 3 (channel 3)</td> <td>field 4 (channel 4)</td> </tr> </table> <p>Example                      22DTM-..Sensors</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>CO2</td> <td>ppm</td> <td>Temp</td> <td>°C</td> </tr> <tr> <td></td> <td>1278</td> <td></td> <td>23.7</td> </tr> <tr> <td>rH</td> <td>%</td> <td></td> <td></td> </tr> <tr> <td></td> <td>63</td> <td></td> <td></td> </tr> </table>		field 1 (channel 1)	field 2 (channel 2)	field 3 (channel 3)	field 4 (channel 4)	CO2	ppm	Temp	°C		1278		23.7	rH	%				63			-	R/W
field 1 (channel 1)	field 2 (channel 2)																									
field 3 (channel 3)	field 4 (channel 4)																									
CO2	ppm				Temp	°C																				
	1278				23.7																					
rH	%																									
	63																									
Sensor 22DTH-..6..	0																									
Sensor 22UTH-..60X	0																									
Sensor 22DTM-..6	0																									
Sensor 22ADP-..6..	0																									
<b>Channel CO2 VOC Mix</b>	<b>Default value channel #</b>	AV [33]		<p><b>Selection channel #</b>  <b>Valid values 1, 2, 3 or 4</b>                      The channels with channel #1 and #2 are output both via BACnet objects analog inputs AI [0] ... AI [9] and via the analog outputs AOU1 and AOU2.</p> <p><b>4 fields of the LCD display</b> (optional) can be assigned to measured values by using the corresponding channel #.</p> <p>Unused channels are set to zero.</p> <p>Assignment LCD fields to channel #</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>field 1 (channel 1)</td> <td>field 2 (channel 2)</td> </tr> <tr> <td>field 3 (channel 3)</td> <td>field 4 (channel 4)</td> </tr> </table> <p>Example                      22DTM-..Sensors</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>CO2</td> <td>ppm</td> <td>Temp</td> <td>°C</td> </tr> <tr> <td></td> <td>1278</td> <td></td> <td>23.7</td> </tr> <tr> <td>rH</td> <td>%</td> <td></td> <td></td> </tr> <tr> <td></td> <td>63</td> <td></td> <td></td> </tr> </table>	field 1 (channel 1)	field 2 (channel 2)	field 3 (channel 3)	field 4 (channel 4)	CO2	ppm	Temp	°C		1278		23.7	rH	%				63			-	R/W
field 1 (channel 1)	field 2 (channel 2)																									
field 3 (channel 3)	field 4 (channel 4)																									
CO2	ppm				Temp	°C																				
	1278				23.7																					
rH	%																									
	63																									
Sensor 22DTH-..6..	0																									
Sensor 22UTH-..60X	0																									
Sensor 22DTM-..6	0																									
Sensor 22ADP-..6..	0																									
<b>Channel differential pressure 1</b>	<b>Default value channel #</b>	AV [34]	<p><b>Selection channel #</b>  <b>Valid values 1, 2, 3 or 4</b>                      The channels with channel #1 and #2 are output both via BACnet objects analog inputs AI [0] ... AI [9] and via the analog outputs AOU1 and AOU2.</p> <p><b>4 fields of the LCD display</b> (optional) can be assigned to measured values by using the corresponding channel #.</p> <p>Unused channels are set to zero.</p> <p>Assignment LCD fields to channel #</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>field 1 (channel 1)</td> <td>field 2 (channel 2)</td> </tr> <tr> <td>field 3 (channel 3)</td> <td>field 4 (channel 4)</td> </tr> </table> <p>Example                      22DTM-..Sensors</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>CO2</td> <td>ppm</td> <td>Temp</td> <td>°C</td> </tr> <tr> <td></td> <td>1278</td> <td></td> <td>23.7</td> </tr> <tr> <td>rH</td> <td>%</td> <td></td> <td></td> </tr> <tr> <td></td> <td>63</td> <td></td> <td></td> </tr> </table>		field 1 (channel 1)	field 2 (channel 2)	field 3 (channel 3)	field 4 (channel 4)	CO2	ppm	Temp	°C		1278		23.7	rH	%				63			-	R/W
field 1 (channel 1)	field 2 (channel 2)																									
field 3 (channel 3)	field 4 (channel 4)																									
CO2	ppm				Temp	°C																				
	1278				23.7																					
rH	%																									
	63																									
Sensor 22DTH-..6..	0																									
Sensor 22UTH-..60X	0																									
Sensor 22DTM-..6	0																									
Sensor 22ADP-..6..	<b>1 (AOU1)</b>																									
Sensor 22ADP-..6.. (dual ADP)	<b>1 (AOU1)</b>																									
<b>Channel volumetric flow 1</b>	<b>Default value channel #</b>	AV [35]		<p><b>Selection channel #</b>  <b>Valid values 1, 2, 3 or 4</b>                      The channels with channel #1 and #2 are output both via BACnet objects analog inputs AI [0] ... AI [9] and via the analog outputs AOU1 and AOU2.</p> <p><b>4 fields of the LCD display</b> (optional) can be assigned to measured values by using the corresponding channel #.</p> <p>Unused channels are set to zero.</p> <p>Assignment LCD fields to channel #</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>field 1 (channel 1)</td> <td>field 2 (channel 2)</td> </tr> <tr> <td>field 3 (channel 3)</td> <td>field 4 (channel 4)</td> </tr> </table> <p>Example                      22DTM-..Sensors</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>CO2</td> <td>ppm</td> <td>Temp</td> <td>°C</td> </tr> <tr> <td></td> <td>1278</td> <td></td> <td>23.7</td> </tr> <tr> <td>rH</td> <td>%</td> <td></td> <td></td> </tr> <tr> <td></td> <td>63</td> <td></td> <td></td> </tr> </table>	field 1 (channel 1)	field 2 (channel 2)	field 3 (channel 3)	field 4 (channel 4)	CO2	ppm	Temp	°C		1278		23.7	rH	%				63			-	R/W
field 1 (channel 1)	field 2 (channel 2)																									
field 3 (channel 3)	field 4 (channel 4)																									
CO2	ppm		Temp		°C																					
	1278				23.7																					
rH	%																									
	63																									
Sensor 22DTH-..6..	0																									
Sensor 22UTH-..60X	0																									
Sensor 22DTM-..6	0																									
Sensor 22ADP-..6..	<b>2 (AOU2)</b>																									
Sensor 22ADP-..6.. (dual ADP)	<b>3</b>																									

Channel differential pressure 2	Default value channel #																
Sensor 22DTH-..6..	0	AV [36]	Assignment LCD fields to channel #	Dual ADP	-	R/W											
Sensor 22UTH-..60X	0																
Sensor 22DTM-..6	0																
Sensor 22ADP-..6..	0																
Sensor 22ADP-..6.. (dual ADP)	<b>2 (AOU2)</b>																
Channel volumetric flow 2	Default value channel #	AV [37]	<table border="1"> <tr> <td>field 1 (channel 1)</td> <td>field 3 (channel 3)</td> </tr> <tr> <td>field 2 (channel 2)</td> <td>field 4 (channel 4)</td> </tr> </table> <table border="1"> <tr> <td>dp</td> <td>Flow</td> </tr> <tr> <td>Pa</td> <td>m<sup>3</sup>/h</td> </tr> <tr> <td>dp</td> <td>Flow</td> </tr> <tr> <td>Pa</td> <td>m<sup>3</sup>/h</td> </tr> </table>	field 1 (channel 1)	field 3 (channel 3)	field 2 (channel 2)	field 4 (channel 4)	dp	Flow	Pa	m <sup>3</sup> /h	dp	Flow	Pa	m <sup>3</sup> /h	-	R/W
field 1 (channel 1)	field 3 (channel 3)																
field 2 (channel 2)	field 4 (channel 4)																
dp	Flow																
Pa	m <sup>3</sup> /h																
dp	Flow																
Pa	m <sup>3</sup> /h																
Sensor 22DTH-..6..	0																
Sensor 22UTH-..60X	0																
Sensor 22DTM-..6	0																
Sensor 22ADP-..6..	0																
Sensor 22ADP-..6.. (dual ADP)	<b>4</b>																

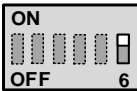
**Channel Selection # Valid values 1, 2, 3 or 4**

The channels with channel #1 and #2 are output both via BACnet and via the analog outputs AOU1 and AOU2.

**4 fields of the LCD display** (optional) can be assigned to measured values by using the corresponding channel #.

**3.5 Sensor configuration**

Via objects analog outputs AV [38] ... AV [44] the required unitary system (SI or Imperial) can be selected and further Sensor parameters can be chosen.

Object type / Instance	Description	Values	Relinquish Default	Access	
AV [38]	<b>Selection of the unitary system (SI or Imperial)</b> Note: For sensors with differential pressure / volumetric flow (22ADP), this value is only readable and is instead set via the 6 <sup>th</sup> DIP switch (ON = Imperial / OFF = SI) <div style="display: flex; align-items: center; margin-top: 10px;"> <div style="margin-right: 10px;">                         cfm m<sup>3</sup>/s m<sup>3</sup>/h                     </div> <div style="border: 1px solid black; padding: 2px; text-align: center;">                         ON                            OFF                     </div> <div style="margin-left: 10px;">                         Inch WC (Imperial) Pa (SI)                     </div> </div>	1 = SI	-	R/W	
		2 = Imperial			
AV [39]	<b>Height above sea level</b> Input always in in m and not in ft	1... 5000 m 330 (default)	-	R/W	
AV [40]	<b>Input k-factor volumetric flow 1</b> according to manufacturer's (without unit)	scaling factor: 0.1 Input: 3 ... 50'000 15'000 (default) k-value: 0.3 ... 5000	-	R/W	
AV [41]	<b>Selection off the fan manufacturer 1</b> , volumetric flow (The fan model has influence on the formula to calculate the volumetric flow)	Rosenberg Comefri Gebhart Nicotra	0 (default)	-	R/W
		Ziehl-Abegg EBM-Papst AIR-CONCEPTS	1		
		Fläkt-Woods	2		
AV [42]	<b>Input k-factor volumetric flow 2</b> (@dual ADP only) according to manufacturer's (without unit)	scaling factor: 0.1 Input: 3 ... 50'000 15'000 (default) k-value: 0.3 ... 5000	-	R/W	
AV [43]	<b>Selection off the fan manufacturer 2</b> (@dual ADP only), volumetric flow (The fan model has influence on the formula to calculate the volumetric flow)	Rosenberg Comefri Gebhart Nicotra	0 (default)	-	R/W
		Ziehl-Abegg EBM-Papst AIR-CONCEPTS	1		
		Fläkt-Woods	2		
AV [44]	<b>Response time for volumetric flow 1</b>	4...30 s	-	R/W	
AV [45]	<b>Response time for volumetric flow 2</b> (@dual ADP only)	4...30 s	-	R/W	
AV [85]	<b>Zeroing differential pressure 1</b>	0 = No zeroing	-	R/W	
		1 = Start zeroing			
AV [86]	<b>Zeroing differential pressure 2</b> (@dual ADP only)	0 = No zeroing	-	R/W	
		1 = Start zeroing			

**Equations of Manufacturers**

Each manufacturer has its own Equation, k factor range and unit of Equation (see tables). By selecting a manufacturer AV [41] / AV [43] and corresponding plant-specific k factor AV [40] / AV [42] correct settings for each manufacturer will be automatically in use.

Manufacturer	Equation	k factor range	Unit
Fläkt's Woods	$q = \frac{1}{k} \cdot \sqrt{\Delta P}$	0.3...99	m <sup>3</sup> /s
Rosenberg	$q = k \cdot \sqrt{\frac{2 \cdot \Delta P}{\rho}}$	37...800	m <sup>3</sup> /h
Nicotra-Gebhardt	$q = C_{PFN} \cdot \sqrt{\frac{2 \cdot \Delta P}{\rho}}$	10...1500	m <sup>3</sup> /h

Manufacturer	Equation	k factor range	Unit
Ziehl-Abegg	$q = k \cdot \sqrt{\Delta P}$	10...1500	m <sup>3</sup> /h
Comefri	$q = k \cdot \sqrt{\frac{2 \cdot \Delta P}{\rho}}$	10...2000	m <sup>3</sup> /h
EBM - Papst	$q = k \cdot \sqrt{\Delta P}$	10...1500	m <sup>3</sup> /h
Gebhardt	$q = k \cdot \sqrt{\frac{2 \cdot \Delta P}{\rho}}$	50...4700	m <sup>3</sup> /h

Note: If the unitary system is set to Imperial the output is shown in objects analog input AI [9] in cfm

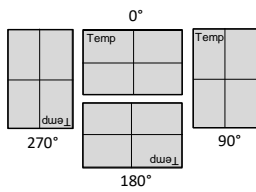


### 3.6 General device information

Via objects analog outputs AV [46] ... AV [51] general device information can be read out or can be written.

Object type / Instance	Description	Values	Relinquish Default	Access
AV [46]	<b>Offset device ID</b> Valid range: 0...4194175 Device ID = Offset device ID + MAC address	-	-	R/W
AV [47]	<b>Unconfirmed COV</b>	0 = disabled 1 = enabled	-	R/W
AV [48]	<b>Minimum output voltage</b> in volt [V]	0 ...10 V	-	R/W
AV [49]	<b>Operating hours</b> [h]	uint32_t (0...4294967295)	-	R
AV [50]	<b>Set a maintenance time in hours</b> [h] after which sensor shall be checked (After countdown time has expired a new countdown value in hours [h] has to be set.	uint32_t (0...999'999 h)	-	R/W
AV [51]	<b>Set a visual inspection time</b> in hours [h] after which sensor shall be checked (After countdown time has expired a new countdown value in hours [h] has to be set.	uint32_t (0... 999'999 h)	-	R/W

### 3.7 LCD display configuration

Via objects analog outputs AV [52] ... AV [67] display parameters of the optional LCD can be adjusted and the values to be displayed can be specified.

Object type / Instance	Description	Values	Relinquish Default	Access
AV [52]	<b>Enable LCD</b>	0 = disabled 1 = enabled	-	R/W
AV [53]	<b>Brightness LCD</b>	0...100 %	-	R/W
AV [54]	<b>Rotation LCD</b> 	0 = 0° 1 = 90° 2 = 180° 3 = 270°	-	R/W
AV [55]	<b>Enable LCD traffic light function</b>	0 = disabled 1 = enabled	-	R/W
AV [56]	<b>Enable symbol maintenance on LCD</b> If the countdown time (set value of AV [50]) has expired the symbol will be shown on the LCD display. 	0 = disabled 1 = enabled	-	R/W
AV [57]	<b>Enable symbol inspection time on LCD</b> If the countdown time (set value of AV [51]) has expired the symbol will be shown on the LCD display. 	0 = disabled 1 = enabled	-	R/W
AV [58]	<b>Enable LCD channel 1</b>	0 = disabled 1 = enabled	-	R/W
AV [59]	<b>Enable LCD channel 2</b>	0 = disabled 1 = enabled	-	R/W
AV [60]	<b>Enable LCD channel 3</b>	0 = disabled 1 = enabled	-	R/W
AV [61]	<b>Enable LCD channel 4</b>	0 = disabled 1 = enabled	-	R/W
AV [62]	<b>Channel assignment for traffic light function.</b> Input AV [26] to AV [35] (example: channel temperature AV [26])	-	-	R/W
AV [63]	<b>Traffic light function color range 1</b> Definition of color of LCD back lightning	0 = off 1 = green 2 = yellow	-	R/W
AV [64]	<b>Traffic light function color range 2</b> Definition of color of LCD back lightning	3 = red 4 = blue	-	R/W
AV [65]	<b>Traffic light function color range 3</b> Definition of color of LCD back lightning	5 = magenta 6 = cyan 7 = white	-	R/W
AV [66]	<b>Setting for threshold (range 1 → 2) for color change of LCD back lightning.</b> The value input is done in the basic unit based on the value of objects analog inputs AI [0] ... AI [9]	-	-	R/W
AV [67]	<b>Setting for threshold (range 2 → 3) for color change of LCD back lightning.</b> The value input is done in the basic unit based on the value of objects analog inputs AI [0] ... AI [9]	-	-	R/W