Introduction

The purpose of this document is to review all the relevant settings and objects associated with the operation of the BACnet protocol as implemented on the Telaire Ventostat 8000 series CO$_2$/RH/Temperature transmitter. The document will go over all the relevant setting in order to facilitate communication, and includes details of each software object that is supported by the sensor. The reader is assumed to be familiar with the structure of the BACnet protocol per ASHRAE Standard 135.

IMPORTANT: *All information in this document is subject to change before the final release of this product.*

MAC Address

The MAC address is selected by using the left most 7 DIP switches found at the top of the unit. The 8th DIP switch selects the Baud rate.

The switches are designed such that in the up position (ON) they produce a "1" and in the down position (OFF) they produce a "0". The least significant bit position is on the left.

The bit position weighting is as follows;

(SW1 * 1) + (SW2 * 2) + (SW3 * 4) + (SW4 * 8) + (SW5 * 16) + (SW6 * 32) + (SW7 * 64)

Where SWn = 1 if the switch is up (ON) and SWn = 0 if the switch is down (OFF).

The table below shows some examples.

DIP Switch Position								BACnet Address
SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	
OFF	OFF	OFF	OFF	OFF	OFF	OFF	-	0
ON	OFF	OFF	OFF	OFF	OFF	OFF	-	1
ON	ON	OFF	OFF	OFF	OFF	OFF	-	3
…	…	…	…	…	…	…	-	…
OFF	OFF	ON	ON	OFF	OFF	OFF	-	12
ON	ON	ON	ON	ON	ON	ON	-	127

When the unit is first powered up the MAC address will be displayed for a few seconds before measurement data is displayed.

See AV-8 for changing the MAC address over the BACnet interface.

Baud Rate

The right most DIP switch selects one of two possible baud rates. If the DIP switch is up (ON) then the baud rate will be 38.4 kBd. If the DIP switch is down (OFF) the baud rate will be 9.6 kBd.

When the unit is first powered up the baud rate will be displayed for a few seconds before measurement data is displayed.

See AV-7 for changing the baud rate over the BACnet interface.

Supported Character Sets

ANSI X3.4 (a.k.a. US-ASCII) is the only supported character set.

BACnet Objects

The unit has the following objects.

Object Type	Object Identifier	Object Name	Units
Device	568007[1]	Telaire BACnet Transmitter	Na
Analog Inputs	AI-1 AI-2 AI-3 AI-4	CO2 ppm Relative Humidity Temperature Thermistor temperature	PPM % °F / °C [2] °F / °C [2]
Analog Values	AV-1 AV-2 AV-3 AV-4 AV-5 AV-6 AV-7 AV-8	Temperature offset RH offset Relay set point Relay hysteresis Elevation Single point ppm Baud rate MAC address	°C [3] % ppm ppm feet [4] ppm bps [5] -
Binary Inputs	BI-1	Relay state	-
Binary Values	BV-1 BV-2 BV-3 BV-4	Temperature units ABC logic state ABC logic reset CO2 calibration	- - - -

Notes:

1. *The Object Identifier Value is a concatenation of the Vendor Identification number (i.e., 568) and the MAC address, as read from the hardware DIP switches. This is an example where the MAC address is 7.*

2. *The temperature units displayed or read from the unit are dependent on product options programmed during manufacture.*

3. *Temperature offset is always represented in degree Celsius regardless of the product options (i.e., temperature representation in degree Fahrenheit or degree Celsius).*

4. *Elevation is always in feet.*

5. *Bits-per-second. 38.4 kBd would be represented as 38400.0.*

Device Object

The device object properties are detailed below.

Property	Property Data Type	Default Value	Access
Object_Identifier	BACnetObject Identifier	Device, 568007 [1]	RW
Object_Name	CharacterString (32)	See [2] below	RW
Object_Type	BACnetObject-Type	device (8)	RO
System_Status	BACnetDevice Status	operational (0)	RO
Vendor_Name	CharacterString	"Telaire Products"	RO
Vendor_Identifier	Unsigned16	568	RO
Model_Name	CharacterString	"Ventostat T8000 Series"	RO
Firmware_Revision	CharacterString	"1.0"	RO
Application_Software_Version	CharacterString	nnn, yyyy/mm/dd	RO
Location	CharacterString (32)	"Default Location"	RW
Description	CharacterString (32)	"Telaire BACnet Transmitter"	RW
Protocol_Version	Unsigned	1	RO
Protocol_Revision	Unsigned	10	RO
Protocol_Services_Supported	BACnetServices-Supported	See [3] below	RO
Protocol_Object_Types_Supported	BACnetObject-TypesSupported	See [4] below	RO
Object_List	BACnetAR-RAY[N] of BACnet ObjectIdentifier	See [5] below	RO
Max_APDU_Length_Accepted	Unsigned	128	RO
Segmentation_Supported	BACnetSegmentation	no-segmentation (3)	RO
APDU_Timeout	Unsigned	6000	RW
Number_Of_APDU_Retries	Unsigned	3	RW
Max_Master	Unsigned	127 [6]	RW
Max_Info_Frames	Unsigned	1	RO
Device_Address_Binding	List of BACnet AddressBinding	Empty	RO
Database_Revision	Unsigned	0	RO

1. *The default Object_Identifier is the Vendor_Identifier (i.e., 568) appended with the MAC address read by the firmware when the device first powers up.*

2. *The default Object_Name from the factory is "Ventostat T8000 Series 7" where the appended digit is the MAC address read by the firmware when the device first powers up.*

3. *Protocol_Services_Supported: readProperty (12), readPropertyMultiple (14), writeProperty (15), deviceCommunicationControl (17), reinitializeDevice (20), who-Has (33), who-Is (34)*

4. *Protocol_Object_Types_Supported: analog-input (0), analog-value (2), binary-input (3), binary-value (5), device (8)*

5. *Object_List: ((Device, 568007), (Analog Input, 1), (Analog Input, 2), (Analog Input, 3), (Analog Input, 4), (Analog Value, 1), (Analog Value, 2), (Analog Value, 3), (Analog Value, 4), (Analog Value, 5),*

(Analog Value, 6), (Analog Value, 7), (Analog Value, 8), (Binary Input, 1), (Binary Value, 1), (Binary Value, 2), (Binary Value, 3), (Binary Value, 4))

6. *The Max_Master property cannot be set to lower than the current MAC address setting.*

Analog Input Objects

There are 4 Analog Input Objects:

- AI-1 CO_2 Level (ppm)
- AI-2   Relative Humidity (%)
- AI-3   Temperature (°C or °F)
- AI-4   Thermistor temperature (°C or °F)

AI-2 and AI-3 measurements are made using the ChipCap2 sensor, which is an optional component.

AI-1 CO_2 Level

This is the CO_2 concentration in parts-per-million (ppm). The Reliability and Status_Flags properties reflect the validity of the measurement.

Property	Property Data Type	Default Value	Access
Object_Identifier	BACnetObjectIdentifier	analog-input,1	RO
Object_Name	CharacterString	"AI-1"	RO
Object_Type	BACnetObjectType	analog-input (0)	RO
Present_Value	REAL	0-20000 [3]	RO
Description	CharacterString	"CO2 Level"	RO
Status_Flags	BACnetStatusFlags	{F,F,F,F} [1]	RO
Event_State	BACnetEventState	normal (0)	RO
Reliability	BACnetReliability	no-fault-detected (0) [1]	RO
Out_Of_Service	BOOLEAN	FALSE	RO
Units	BACNetEngineeringUnits	parts-per-million (96)	RO

AI-2 Relative Humidity

This is the relative humidity measurement from the ChipCap2 humidity and temperature sensor (if installed). The Reliability and Status_Flags properties reflect the validity of the measurement.

Property	Property Data Type	Default Value	Access
Object_Identifier	BACnetObjectIdentifier	analog-input,2	RO
Object_Name	CharacterString	"AI-2"	RO
Object_Type	BACnetObjectType	analog-input (0)	RO
Present_Value	REAL	0-100	RO
Description	CharacterString	"Relative Humidity"	RO
Status_Flags	BACnetStatusFlags	{F,F,F,F} [1]	RO
Event_State	BACnetEventState	normal (0)	RO
Reliability	BACnetReliability	no-fault-detected (0) [1]	RO
Out_Of_Service	BOOLEAN	FALSE	RO
Units	BACNetEngineeringUnits	percent (98)	RO

AI-3 Temperature

This is the temperature measurement from the ChipCap2 humidity and temperature sensor (if installed). The Reliability and Status_Flags properties reflect the validity of the measurement.

Property	Property Data Type	Default Value	Access
Object_Identifier	BACnetObjectIdentifier	analog-input,3	RO
Object_Name	CharacterString	"AI-3"	RO
Object_Type	BACnetObjectType	analog-input (0)	RO
Present_Value	REAL	32.0 – 120.0 °F [2]	RO
Description	CharacterString	"Temperature"	RO
Status_Flags	BACnetStatusFlags	{F,F,F,F} [1]	RO
Event_State	BACnetEventState	normal (0)	RO
Reliability	BACnetReliability	no-fault-detected (0) [1]	RO
Out_Of_Service	BOOLEAN	FALSE	RO
Units	BACnetEngineeringUnits	degrees-Fahrenheit (64) [2]	RO

AI-4 Thermistor Temperature

This is the on-board thermistor measurement as digitized by the controller (12-bits). The Reliability and Status_Flags properties reflect the validity of the measurement.

Property	Property Data Type	Default Value	Access
Object_Identifier	BACnetObjectIdentifier	analog-input,4	RO
Object_Name	CharacterString	"AI-4"	RO
Object_Type	BACnetObjectType	analog-input (0)	RO
Present_Value	REAL	32.0 – 120.0 °F [2]	RO
Description	CharacterString	"Thermistor"	RO
Status_Flags	BACnetStatusFlags	{F,F,F,F} [1]	RO
Event_State	BACnetEventState	normal (0)	RO
Reliability	BACnetReliability	no-fault-detected (0) [1]	RO
Out_Of_Service	BOOLEAN	FALSE	RO
Units	BACnetEngineeringUnits	degrees-Fahrenheit (64) [2]	RO

Notes:
1. *The Status_Flags property and Reliability property reflect the state of the sensor. If the sensor goes bad (consistently reads zero over a long enough period of time) the Reliability property is set to RELIABILITY_NO_OUTPUT (6) and the FAULT status flag is set to TRUE (i.e., {F,T,F,F}).*
2. *Temperature Units depend on settings programmed at the factory and/or the value set by BV-1 (Temperature Units). Units can be changed at any time and do not require a device reset. Temperature can be represented in either Fahrenheit or Celsius.*
3. *0-20000 ppm is a nominal range. The actual range, and the accuracy outside the calibrated range, depends on the specific CO2 sensor installed.*

Analog Value Objects

There are 8 Analog Value Objects;

- AV-1   Temperature offset (°C)
- AV-2   RH offset (%)
- AV-3   Relay set point (ppm)
- AV-4   Relay hysteresis (ppm)
- AV-5   Elevation (feet)
- AV-6   Single point ppm (ppm)
- AV-7   Baud rate
- AV-8   MAC address

All Present_Value properties are read-writable but not commandable. There are no Priority_Array or Relinquish_Default properties present. Out_Of_Service is not writable.

IMPORTANT: *A number of these properties (AV-5 and AV-6) are directly communicating with the CO_2 sensor. This sensor, at its discretion, can ignore communications, typically when doing measurements and calculations. If a read or a write to the Present_Value property was successful, then the Reliability property will reflect this (i.e., no-fault-detected). If the read or write was unsuccessful then the Reliability, Event_State and Status_Flags properties will all reflect this situation. A successful read or write clears the error.*

A special case is if the CO_2 sensor is in a calibration cycle. See comments in the section *BV-4 CO2 Calibration*.

AV-1 Temperature Offset

The Present_Value property is added to the temperature measurement. This affects both the temperature measured by the Relative Humidity/ Temperature sensor (if installed) and the thermistor. The value is stored in non-volatile memory and persists until changed.

IMPORTANT: *The number is required to be in degree Celsius regardless of the current setting of Binary Value 1 (see BV-1, Temperature Units)*

The change is not reflected until the next measurement cycle (5-15s).

Property	Property Data Type	Default Value	Access
Object_Identifier	BACnetObjectIdentifier	analog-value,1	RO
Object_Name	CharacterString	"AV-1"	RO
Object_Type	BACnetObjectType	analog-value (2)	RO
Present_Value	REAL	0.0	RW
Description	CharacterString	"Temperature Offset"	RO
Status_Flags	BACnetStatusFlags	{F,F,F,F}	RO
Event_State	BACnetEventState	normal (0)	RO
Reliability	BACnetReliability	no-fault-detected (0)	RO
Out_Of_Service	BOOLEAN	FALSE	RO
Units	BACnetEngineeringUnits	degrees-celsius (62) [1]	RO

AV-2 RH Offset

The Present_Value is added to the relative humidity measurement. The value is stored in non-volatile memory and persists until changed.

Property	Property Data Type	Default Value	Access
Object_Identifier	BACnetObjectIdentifier	analog-value,2	RO
Object_Name	CharacterString	"AV-2"	RO
Object_Type	BACnetObjectType	analog-value (2)	RO
Present_Value	REAL	0.0	RW
Description	CharacterString	"Relative Humidity Offset"	RO
Status_Flags	BACnetStatusFlags	{F,F,F,F}	RO
Event_State	BACnetEventState	normal (0)	RO
Reliability	BACnetReliability	no-fault-detected (0)	RO
Out_Of_Service	BOOLEAN	FALSE	RO
Units	BACnetEngineeringUnits	percent (98)	RO

AV-3 Relay Set Point

Note: *This option only affects the operation of the device if the relay is installed.*

The Present_Value property is the value compared against the current CO_2 measurement. If the CO_2 measurement is greater than the relay set point plus the relay hysteresis (see AV-4), then the relay will be energized. If the CO_2 measurement is less than the relay set point minus the relay hysteresis, then the relay will be de-energized. See *BI-1, Relay output*, for a detailed explanation.

The value is stored in non-volatile memory and persists until changed.

Property	Property Data Type	Default Value	Access
Object_Identifier	BACnetObjectIdentifier	analog-value,3	RO
Object_Name	CharacterString	"AV-3"	RO
Object_Type	BACnetObjectType	analog-value (2)	RO
Present_Value	REAL	1000.0	RW
Description	CharacterString	"Relay Set Point"	RO
Status_Flags	BACnetStatusFlags	{F,F,F,F}	RO
Event_State	BACnetEventState	normal (0)	RO
Reliability	BACnetReliability	no-fault-detected (0)	RO
Out_Of_Service	BOOLEAN	FALSE	RO
Units	BACnetEngineeringUnits	parts-per-million (96)	RO

AV-4 Relay Hysteresis

Note: *This option only affects the operation of the device if the relay is installed.*

See *AV-3, Relay Set Point,* for an explanation of the relay set point and hysteresis values.

The value is stored in non-volatile memory and persists until changed.

Property	Property Data Type	Default Value	Access
Object_Identifier	BACnetObjectIdentifier	analog-value,4	RO
Object_Name	CharacterString	"AV-4"	RO
Object_Type	BACnetObjectType	analog-value (2)	RO
Present_Value	REAL	80.0	RW
Description	CharacterString	"Relay Hysteresis"	RO
Status_Flags	BACnetStatusFlags	{F,F,F,F}	RO
Event_State	BACnetEventState	normal (0)	RO
Reliability	BACnetReliability	no-fault-detected (0)	RO
Out_Of_Service	BOOLEAN	FALSE	RO
Units	BACnetEngineeringUnits	parts-per-million (96)	RO

AV-5 Elevation

This property directly communicates with the CO_2 sensor and is subject to the disclosure at the beginning of this section.

A read of the Present_Value property returns the cached elevation property that is stored in the CO_2 sensor.

A write to the Present_Value property attempts to update the elevation parameter that is stored in the CO_2 sensor. A Write_Property service request will always return an ACK if the input value is within range (0-65535), regardless if the write was successful or not. The reliability property reflects the success or failure of the last attempt to update the internal CO_2 sensor parameter. A successful read or write updates the cached elevation property.

Property	Property Data Type	Default Value	Access
Object_Identifier	BACnetObjectIdentifier	analog-value,4	RO
Object_Name	CharacterString	"AV-5"	RO
Object_Type	BACnetObjectType	analog-value (2)	RO
Present_Value	REAL	0.0 [4]	RW
Description	CharacterString	"Elevation"	RO
Status_Flags	BACnetStatusFlags	{F,F,F,F} [5]	RO
Event_State	BACnetEventState	normal (0) [5]	RO
Reliability	BACnetReliability	no-fault-detected (0) [5]	RO
Out_Of_Service	BOOLEAN	FALSE	RO
Units	BACnetEngineeringUnits	feet (33)	RO

AV-6 Single Point ppm

This property directly communicates with the CO_2 sensor and is subject to the disclosure at the beginning of this section.

A read of the Present_Value property returns the cached single-point gas ppm property that is stored in the CO_2 sensor.

A write to the Present_Value property attempts to update the single-point gas ppm parameter that is stored in the CO_2 sensor. A Write_Property service request will always return an ACK if the input value is within range (0-65535), regardless if the write was successful or not. The reliability property reflects the success or failure of the last attempt to update the internal CO_2 sensor parameter. A successful read or write updates the cached single-point gas ppm property.

Property	Property Data Type	Default Value	Access
Object_Identifier	BACnetObjectIdentifier	analog-value,4	RO
Object_Name	CharacterString	"AV-6"	RO
Object_Type	BACnetObjectType	analog-value (2)	RO
Present_Value	REAL	500.0 [4]	RW
Description	CharacterString	"Single Point PPM"	RO
Status_Flags	BACnetStatusFlags	{F,F,F,F} [5]	RO
Event_State	BACnetEventState	normal (0) [5]	RO
Reliability	BACnetReliability	no-fault-detected (0) [5]	RO
Out_Of_Service	BOOLEAN	FALSE	RO
Units	BACnetEngineeringUnits	parts-per-million (96)	RO

AV-7 Baud Rate

Reading the Present_Value property will determine the current baud rate setting.

Writing the Present_Value property will change the baud rate setting and the value stored will take precedence over the hardware switch setting. The value is stored in non-volatile memory and persists until changed.

After a write to the Present_Value property, the new baud rate will not take effect until the device is rebooted (i.e., power cycled) or reinitialized (WARMSTART).

Property	Property Data Type	Default Value	Access
Object_Identifier	BACnetObjectIdentifier	analog-value,4	RO
Object_Name	CharacterString	"AV-7"	RO
Object_Type	BACnetObjectType	analog-value (2)	RO
Present_Value	REAL	38400.0 [2]	RW
Description	CharacterString	"Baud Rate"	RO
Status_Flags	BACnetStatusFlags	{F,F,F,F}	RO
Event_State	BACnetEventState	normal (0)	RO
Reliability	BACnetReliability	no-fault-detected (0)	RO
Out_Of_Service	BOOLEAN	FALSE	RO
Units	BACnetEngineeringUnits	no-units (95)	RO

AV-8 MAC Address

Reading the Present_Value property will determine the current MAC address setting.

Writing the Present_Value property will change the current MAC address and the value store will take precedence over the hardware switch setting. The value is stored in non-volatile memory and persists until changed.

The change is immediate. There is no need to reinitialize the device.

Property	Property Data Type	Default Value	Access
Object_Identifier	BACnetObjectIdentifier	analog-value,4	RO
Object_Name	CharacterString	"AV-8"	RO
Object_Type	BACnetObjectType	analog-value (2)	RO
Present_Value	REAL	127.0 [3]	RW
Description	CharacterString	"MAC Address"	RO
Status_Flags	BACnetStatusFlags	{F,F,F,F}	RO
Event_State	BACnetEventState	normal (0)	RO
Reliability	BACnetReliability	no-fault-detected (0)	RO
Out_Of_Service	BOOLEAN	FALSE	RO
Units	BACnetEngineeringUnits	no-units (95)	RO

Notes:

1. *Temperature offset will always be in degrees Celsius regardless of the units in which the temperature properties are represented.*

2. *This is the default setting from the factory. Factory settings are 9.6 kBd and 38.4 kBd with hardware switch settings. If the baud rate is changed through a BACnet Write Property request then those settings take precedence over the hardware settings. Allowable baud rate settings through the BACnet interface are; 9600, 19200, 38400 and 76800 Bd.*

3. *This is the default setting from the factory. Factory settings are 0 to 127 with the hardware switch settings. If the MAC address is changed through a BACnet Write Property request then those settings take precedence over the hardware settings. Addresses 0 to 127 are valid for master nodes.*

4. *This is the default value from the factory. It can be changed through the BACnet interface.*

5. *Status_Flags, Event_State and Reliability properties all depend on successful communications with the CO_2 sensor.*

Binary Input Objects

There is 1 Binary Input Object;:

- BI-1   Relay output

BI-1 Relay Output

IMPORTANT: *The relay is an optional feature. The following description requires that the relay is installed and the functionality that controls the relay be programmed at the factory.*

This object reflects the state of the on board relay. The relay is controlled by the Relay set point (AV-3) and Relay hysteresis (AV-4) objects.

The relay has 3 terminals; common, normally open (NO) and normally closed (NC).

When the CO2 Level (AI-1) Present_Value property is less than the Relay set point (AV-3) minus the Relay hysteresis (AV-4), the relay is deactivated and the NO terminal is disconnected from the common terminal and the NC terminal is connected to the common terminal. In this state the Present_Value property of BI-1 indicates inactive (0).

When the CO2 Level (AI-1) Present_Value property is greater than the Relay set point (AV-3) plus the Relay hysteresis (AV-4), the relay is activated and the NO terminal is connected to the common terminal and the NC terminal is disconnected from the common terminal. In this state the Present_Value of property of BI-1 indicates active (1).

Assuming the relay is installed, the Out_Of_Service property is writable and if changed to TRUE the Present_Value property is decoupled from the algorithms that control it. In this case, writing Present_Value to active (1) energizes the relay and setting it to inactive (0) de-energizes the relay. Polarity has no effect when Out_Of_Service is TRUE.

Property	Property Data Type	Default Value	Access
Object_Identifier	BACnetObjectIdentifier	binary-input,1	RO
Object_Name	CharacterString	"BI-1"	RO
Object_Type	BACnetObjectType	binary-input (3)	RO
Present_Value	BACnetBinaryPV	inactive (0)	RW
Description	CharacterString	"Relay output"	RO
Status_Flags	BACnetStatusFlags	{F,F,F,F}	RO
Event_State	BACnetEventState	normal (0)	RO
Out_Of_Service	BOOLEAN	FALSE	RW
Polarity	BACnetPolarity	normal (0)	RW

Binary Value Objects

There are 4 Binary Value Objects;

- BV-1   Temperature units
- BV-2   ABC logic state
- BV-3   ABC logic reset
- BV-4   CO2 calibration

All Present_Value properties are read-writable but not commandable. There are no Priority_Array or Relinquish_Default properties present. Out_Of_Service is not writable.

IMPORTANT: *A number of these properties (BV-2, BV-3 and BV-4) are directly communicating with the CO_2 sensor. This sensor, at its discretion, can ignore communications; typically when doing measurements and calculations. If a read or a write to the Present_Value property is successful, then the Reliability property will reflect that (i.e., no-fault-detected). If the read or write was unsuccessful, then the Reliability, Event_State and Status_Flags properties will all reflect this situation. A successful read or write clears the error.*

A special case is if the CO_2 sensor is in a calibration cycle. See comments in the section *BV-4 CO_2 Calibration.*

BV-1 Temperature Units

Setting the Present_Value property to active (1) causes temperatures to be rendered in Fahrenheit units. Setting the Present_Value property to inactive (0) causes temperatures to be rendered in Celsius units.

This affects both the LCD display (if installed) and the network readings from AI-3 (Temperature) and AI-4 (Thermistor temperature). The Present_Value (i.e., temperature) and Units properties read from AI-3 and AI-4 will be updated on the next measurement cycle (5-15s).

Because this object is not associated with the CO_2 sensor, there are no communications issues and Reliability will always return no-fault-detected (0).

Property	Property Data Type	Default Value	Access
Object_Identifier	BACnetObjectIdentifier	binary-value,1	RO
Object_Name	CharacterString	BV-1	RO
Object_Type	BACnetObjectType	binary-value (5)	RO
Present_Value	BACnetBinaryPV	inactive (0) [1]	RW
Description	CharacterString	"Temperature Units"	RO
Status_Flags	BACnetStatusFlags	{F,F,F,F}	RO
Event_State	BACnetEventState	normal (0)	RO
Reliability	BACnetReliability	no-fault-detected (0) [2]	RO
Out_Of_Service	BOOLEAN	FALSE	RO

BV-2 ABC Logic State

This property directly communicates with the CO_2 sensor and is subject to the disclosure at the beginning of this section.

Reading the Present_Value property as active (1) is interpreted as ABC logic being ON. Reading the Present_Value property as inactive (0) is interpreted as ABC logic being OFF.

Writing the Present_Value property as active (1) will turn the ABC Logic ON. Writing the Present_Value property as inactive (0) will turn the ABC Logic OFF.

Property	Property Data Type	Default Value	Access
Object_Identifier	BACnetObjectIdentifier	binary-value,2	RO
Object_Name	CharacterString	BV-2	RO
Object_Type	BACnetObjectType	binary-value (5)	RO
Present_Value	BACnetBinaryPV	inactive (0)	RW
Description	CharacterString	"ABC Logic State"	RO
Status_Flags	BACnetStatusFlags	{F,F,F,F} [2]	RO
Event_State	BACnetEventState	normal (0) [2]	RO
Reliability	BACnetReliability	no-fault-detected (0) [2]	RO
Out_Of_Service	BOOLEAN	FALSE	RO

BV-3 ABC Logic Reset

This property directly communicates with the CO_2 sensor and is subject to the disclosure at the beginning of this section.

Reading the Present_Value property will always return inactive (0). Writing inactive (0) to the Present_Value property has no effect.

Writing active (1) to the Present_Value property will reset the ABC logic cumulative data to its startup state and turn ABC Logic ON.

Property	Property Data Type	Default Value	Access
Object_Identifier	BACnetObjectIdentifier	binary-value,3	RO
Object_Name	CharacterString	BV-3	RO
Object_Type	BACnetObjectType	binary-value (5)	RO
Present_Value	BACnetBinaryPV	inactive (0)	RW
Description	CharacterString	"ABC Logic Reset"	RO
Status_Flags	BACnetStatusFlags	{F,F,F,F} [2]	RO
Event_State	BACnetEventState	normal (0) [2]	RO
Reliability	BACnetReliability	no-fault-detected (0) [2]	RO
Out_Of_Service	BOOLEAN	FALSE	RO

BV-4 CO_2 Calibration

This property directly communicates with the CO_2 sensor and is subject to the disclosure at the beginning of this section.

Reading the Present_Value property will return active (1) when the CO_2 sensor is in calibration mode and return inactive (0) when the sensor is in normal operating mode.

Writing active (1) to the Present_Value property will start the single-point calibration routine. Before writing to the Present_Value property the Single-point ppm (see AV-6) should be set to the known value of the gas flowing to the CO_2 sensor. Writing inactive (0) to the Present_Value property has no effect.

If the CO_2 sensor fails to respond to the calibration request the Reliability property will be set to UNRELIABLE_OTHER. This condition will persist until a new calibration is successfully completed or the device is reset.

IMPORTANT: *Calibration can take several minutes and once started cannot be stopped. During this time the CO_2 sensor is effectively off line. Attempts to read properties of the sensor (e.g., AV-5, AV-6, BV-2 and BV-3) will result in stale values. Attempts to write properties will be ignored – without affecting the Reliability, Event_State and Status_Flags.*

Property	Property Data Type	Default Value	Access
Object_Identifier	BACnetObjectIdentifier	binary-value,4	RO
Object_Name	CharacterString	BV-4	RO
Object_Type	BACnetObjectType	binary-value (5)	RO
Present_Value	BACnetBinaryPV	inactive (0)	RW
Description	CharacterString	"CO2 Calibration"	RO
Status_Flags	BACnetStatusFlags	{F,F,F,F} [2]	RO
Event_State	BACnetEventState	normal (0) [2]	RO
Reliability	BACnetReliability	no-fault-detected (0) [2]	RO
Out_Of_Service	BOOLEAN	FALSE	RO

Notes:

1. *Reading this property depends on the current temperature unit display setting.*

2. *Status_Flags, Event_State and Reliability properties all depend on successful communications with the CO_2 sensor. See individual object description for details.*

Device Communication Control Service

This service allows a client to stop the device from responding to all incoming APDU's, either for a specified amount of time (in minutes) or indefinitely. This is accomplished by sending a DeviceCommunicationControl service request with the Time Duration parameter set to the desired duration in minutes (or omitted if the duration is indefinite), the Enable/Disable parameter set to DISABLE and the Password parameter set to the current password. The default password is "telaire" and is case sensitive.

Passwords must be between 1 and 20 characters.

The device can be returned to a normal working state by;

- Sending a DeviceCommunicationControl service request with the Enable/Disable parameter set to ENABLE, or

- Sending a ReinitializeDevice service request, with the Reinitialized State of Device set to either COLDSTART or WARMSTART, or

- Power cycling the device

Please note the caution, described in the Reinitialize Device section, if reinitializing the device with the COLDSTART parameter.

Reinitialize Device

The ReinitializeDevice service is available and performs two (2) distinct functions. Note that this service requires a password and the service will be denied if the password is absent or incorrect. The default password is "telaire" and is case sensitive.

Backup and restore features are not available.

Warm Start

A WARMSTART reboots the device and the device reads and responds to any updated information in the persistent storage (e.g., EEPROM). The most visible use for this is to reboot the device after changing the BAUD rate (See AV-7).

Cold Start

A COLDSTART not only reboots the device but reinitializes the persistent storage (e.g., EEPROM) to its original factory values. All updates previously entered that conflict with default values will be lost. **USE WITH CAUTION**.

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