

BACnet Protocol Implementation Conformance Statement

This document contains the BACnet Protocol Implementation Conformance Statement (PICS) and BACnet® Interoperability Building Blocks (BIBBs) for the Sontay Smart Sensor as required by the American National Standards Institute/ American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ANSI/ASHRAE) Standard 135-2016, BACnet protocol. BACnet interoperability building blocks are collections of one or more BACnet services. This document includes a listing of the BIBBs currently supported by this device.

The Sontay Smart Sensor is a native BACnet-Application Specific Controller (B-ASC) with BACnet MS/TP capabilities.

BACnet Standardized Device Profile (Annex L)

	BACnet Operator Workstation (B-OWS)
	BACnet Building Controller (B-BC)
	BACnet Advanced Application Controller (B-AAC)
x	BACnet Application Specific Controller (B-ASC)
	BACnet Smart Sensor (B-SS)
	BACnet Smart Actuator (B-SA)

BACnet Interoperability Building Blocks (BIBBs) (Annex K)

The table below lists all the BIBBs that are required for the BACnet Application Specific Controller (B-ASC) profile. The BIBBs that are not required for B-ASC Profile but supported in this product are also listed.

Application Services (B-ASC)	BIBB
Data Sharing - Read Property - B	DS-RP-B
Data Sharing - Write Property - B	DS-WP-B
Device Management - Dynamic Device Binding - B	DM-DDB-B
Device Management - Dynamic Object Binding - B	DM-DOB-B
Device Management - Device Communication Control - B	DM-DCC-B
Data Sharing - Read Property Multiple - B	DS-RPM-B
Device Management - Reinitialize Device - B	DM-RD-B

Standard Device Binding Methods Supported

The table below lists all the standard Device Binding methods supported by this device.

	Send Who-Is, receive I-Am (BIBB DM-DDB-A)
X	Receive Who-Is, send I-Am (BIBB DM-DDB-B)
	Send Who-Has, receive I-Have (BIBB DM-DOB-A)
X	Receive Who-Has, send I-Have (BIBB DM-DOB-B)
	Manual configuration of recipient device's network number and MAC address
	None of the above

BACnet Object Tables

Depending on the options required at the time of ordering, not all the BACnet objects referred to in this section may be visible or discoverable.

1) Analogue Inputs

Object Name	Type & Instance	Value R/W?	Description	Range	Visibility
RH&T Temperature	AI-0	R	Current Temperature	See MSV-1	If RH & T enabled in config
RH Value	AI-1	R	Current RH	0-100%	
CO2 Value	AI-2	R	Current CO2	See MSV-7	If CO2 enabled in config
CO Value	AI-3	R	Current CO	0-500ppm	If CO enabled in config
AQ Value	AI-4	R	Current Air Quality	0-50,000ppb or 0-500(index)	If AQ enabled in config
AI1 Value	AI-5	R	Current Analog Input 1	0-10.0V	If IO1 enabled in config
AI2 Value	AI-6	R	Current Analog Input 2	0-10.0V	If IO2 enabled in config
Thermistor Value	AI-7	R	Current Thermistor Temperature	See MSV-1	If thermistor enabled in config
NOx Value	AI-8	R	Current NOx Index	0-500 (index)	If NOx enabled in config
PM2.5 Value	AI-9	R	Current PM2.5 Concentration	0-1000µg/m ³	If PM2.5 enabled in config
PM1 Value	AI-10	R	Estimated PM1 Concentration	0-1000µg/m ³	If PM2.5 enabled in config
PM10 Value	AI-11	R	Estimated PM10 Concentration	0-1000µg/m ³	If PM2.5 enabled in config
Ambient Light Level	AI-12	R	Current Ambient Light Reading	0-65,535 lx	If LED/AL enabled in config

2) Analogue Outputs

Object Name	Type & Instance	Value R/W?	Description	Range	Visibility
Analog Output 1	AO-0	R/W	Dependent on MSV-2	0-10.0Vdc	Only if IO1 is enabled in config
Analog Output 2	AO-1	R/W	Dependent on MSV-3	0-10.0Vdc	Only if IO2 is enabled in config

3) Analogue Values

Object Name	Type & Instance	Value R/W?	Description	Range	Visibility
Setpoint Value	AV-0	R	Current Setpoint	See AV-1 & AV-2	If Setpoint enabled in config
Low Setpoint Limit	AV-1	R/W	Low limit for setpoint range		If Setpoint enabled in config
High Setpoint Limit	AV-2	R/W	High limit for setpoint range		If Setpoint enabled in config
Temperature Offset	AV-3	R/W	Offset for current temperature(s)	°C: -10.0 – 10.0 °C °F: -18.0 – 18.0 °F	If a temperature sensor is enabled in config
Temperature Output High Range	AV-4	R/W	High limit for temperature range	°C: +40.0 to +110.0 °F: +104.0 to +230.0	If a temperature sensor is enabled in config
Temperature Output Low Range	AV-5	R/W	Low limit for temperature range	°C: -20.0 to +40.0 °F: -4.0 to +104.0	If a temperature sensor is enabled in config
RH Offset	AV-6	R/W	Offset for current RH	-10.0 to +10.0 %	If RH&T enabled in config
MAC Address	AV-7	R/W	MAC Address	0 – 127	Always
Device Instance	AV-8	R/W	Device Instance		Always
LED “Good” Level	AV-9	R/W	LED “Good” (Green) Threshold		If LED enabled in config
LED “Fair” Level	AV-10	R/W	LED “Fair” (Yellow) Threshold		If LED enabled in config
LED “Bad” Level	AV-11	R/W	LED “Bad” (Red) Threshold		If LED enabled in config

3) Analogue Values (continued)

Object Name	Type & Instance	Value R/W?	Description	Range	Visibility
Fan Speed	AV-12	R/W	Current Fan Speed	0 – 100%	If Fan Speed enabled in config
Ambient Light Threshold	AV-13	R/W	Trafficlight Dimming Threshold	0 – 65,535 lx	If LED/AL enabled in config
AO1 Fallback Value	AV-14	R/W	Value of Output 1 if the network comms fail	0 – 100%	If IO1 is enabled in config
AO2 Fallback Value	AV-15	R/W	Value of Output 2 if the network comms fail	0 – 100%	If IO2 is enabled in config

Note: When the LED is set to be control by 'Network'

4) Binary Values

Object Name	Type & Instance	Value R/W?	Description	Range	Visibility
CO2 ABC Logic State	BV-0	R/W	CO2 ABC Logic State	0: Off 1: On	If CO2 enabled in config
CO2 ABC Logic Reset	BV-1	R/W	CO2 ABC Logic Reset	0: Off 1: On	If CO2 enabled in config
Manual CO2 Calibration	BV-2	R/W	Manual CO2 Calibration	0: Off 1: On	If CO2 enabled in config
Temperature Units	BV-3	R/W	Temperature Units	0: °C 1: °F	If a temperature sensor is enabled in config
IO1 Mode	BV-4	R/W	IO1 Mode	0: Output, 1: Input	If IO1 is enabled in config
IO2 Mode	BV-5	R/W	IO2 Mode	0: Output, 1: Input	If IO2 is enabled in config
CO2 Range	BV-6	R/W	CO2 Range	0: 0 – 2000ppm 1: 0 – 5000 ppm	If CO2 enabled in config

5) Multi-State Values

Object Name	Type & Instance	Value R/W?	Description	Range	Visibility
LED Source	MSV-0	R/W	Data source for Traffic Light	1: Temperature 2: RH 3: CO2 4: SP 5: PM2.5 6: IAQ 7: NOx 8: CO 9: Network	If LED is enabled in config
Temperature Range	MSV-1	R/W	Temperature Measurement Range	1: -10 to +40C 2: 0 to 40C 3: -10 to +60C 4: -10 to +110C 5: -20 to +50C 6: User Defined, see AV-3 and AV-4	If a temperature sensor is enabled in config
AO1 Output Type	MSV-2	R/W	AO1 Output Type	1: Temperature 2: RH 3: CO2 4: SP 5: IAQ 6: NOx 7: CO 8: Thermistor 9: Network 10: Fan Speed 11: PM2.5	Only if IO1 option is enabled
AO2 Output Type	MSV-3	R/W	AO2 Output Type	See MSV-2	Only if IO2 option is enabled

Data Link Layer Options

X	MS/TP master (Clause 9), baud rate(s):	9.6k, 19.2k, 38.4k, 76.8k
X	MS/TP slave (Clause 9), baud rate(s):	9.6k, 19.2k, 38.4k, 76.8k

Device Address Bing Character Sets Supported

	Static device binding supported for MS/TP Slaves and other devices
X	ANSI X3.4 / UTF-8
	IBM/Microsoft DBCS
	ISO 8859-1
	ISO 10646 (UCS-2)
	ISO 10646 (ICS-4)
	JIS C 6226

Modbus Register Table

Register Number	Register Address	Description	Notes	R/W	NV?
40001	40000	ModBus Address	MB=21 (15h); LB=1-247 (1h-F7h)	R	Y
40002	40001	ModBus Baud Rate	Factor: 0.01, No units, 9600, 19200, 38400 (default), 57600	R	Y
40003	40002	Prod Name 1_2	ASCII Chars: MB Name (0); LB Name (1)	RW	Y
40004	40003	Prod Name 3_4	ASCII Chars: MB Name (2); LB Name (4)	RW	Y
40005	40004	Prod Name 5_6	ASCII Chars: MB Name (5); LB Name (6)	RW	Y
40006	40005	Prod Name 7_8	ASCII Chars: MB Name (7); LB Name (8)	RW	Y
40007	40006	System Status	Type: Bit String, Factor: 1, No units	R	Y
40008	40007	System Status 2	Type: Bit String, Factor: 1, No units	R	Y
40009	40008	CO2	Type: uINT, Factor 1, Units: ppm, Range: See 40034, Resolution: 0	R	N
40010	40009	CO	Type: uINT, Factor 1, Units: ppm, Range: 0 - 500ppm, Resolution: 0	R	N
40011	40010	IAQ	Type: uINT, Factor 1, Units: ppb, Range: 0 - 1000, Resolution: 0	R	N
40012	40011	RH	Type: uINT, Factor 10, Units: %RH, Range: 5.0 - 100 %RH, Resolution: 1	R	N
40013	40012	Temperature (RH&T)	Type: sINT, Factor 100, Units: See 40053, Range: -10-100.0°C, Resolution: 1	R	N
40014	40013	Analogue Input 1	Type: uINT, Factor 10, Units: Volts, Range: 0-10.0V, Resolution: 1	R	N
40015	40014	Analogue Input 2	Type: uINT, Factor 10, Units: Volts, Range: 0-10.0V, Resolution: 1	R	N
40016	40015	Ambient Light Level	Type: uINT, Factor 1, Units: Lux, Range 0 - 65535 lx, Resolution 1	R	N
40019	40018	Fan Speed	Type: uINT, Factor 1, Units: %, Range 0 - 100, Resolution: 0	RW	N
40021	40020	Analogue Output 1 Type	Type: uINT, Factor 1, Resolution: 1 0: Temperature 1: RH, 2: CO2, 3: SP, 4: IAQ, 5: NOx, 6: CO, 7: Thermistor, 8: Fan Speed, 9: Network, 10: Fan Speed, 11: PM2.5, Resolution: 0	RW	Y
40022	40021	Analogue Output 2 Type	Type: uINT, Factor 1, Resolution: 1 0: Temperature 1: RH, 2: CO2, 3: SP, 4: IAQ, 5: NOx, 6: CO, 7: Thermistor, 8: Fan Speed, 9: Network, 10: Fan Speed, 11: PM2.5, Resolution: 0	RW	Y
40024	40023	Analogue Output 1 Status	Type: uINT, Factor 10, Units: Volts, Range: 0 - 10.0, Resolution: 1 (see 40021)	RW	N
40025	40024	Analogue Output 2 Status	Type: uINT, Factor 10, Units: Volts, Range: 0 - 10.0, Resolution: 1 (see 40022)	RW	N
40027	40026	Temperature Offset	Type: sINT, Factor 100, Units: °C/°F, Range: +5.00, Resolution: 1	RW	Y
40028	40027	RH Offset	Type: sINT, Factor 100, Units: %RH, Range: +5.00, Resolution: 1	RW	Y
40029	40028	Setpoint	Type: sINT, Factor 100, Units: °C/°F, Range: -100°C/°F, Resolution: 1	RW	Y
40030	40029	Setpoint Low Limit	Type: sINT, Factor 100, Units: °C/°F, Range: -100°C/°F, Resolution: 1	RW	Y
40031	40030	Setpoint High Limit	Type: sINT, Factor 100, Units: °C/°F, Range: -100°C/°F, Resolution: 1	RW	Y
40032	40031	Temperature Low Limit	Type: sINT, Factor 100, Units: °C/°F, Range: 27 - 100°C/°F, Resolution: 1	RW	Y
40033	40032	Temperature Hi Limit	Type: sINT, Factor 100, Units: °C/°F, Range: 27 - 100°C/°F, Resolution: 1	RW	Y
40034	40033	CO2 Range	Type: uINT, Factor 1, Units: PPM, Range: 0: 0-2000ppm; 1: 0-5000ppm Resolution: 0	RW	Y

Register Number	Register Address	Description	Notes	R/W	NV?
40043	40042	LED Good Level	Type: uINT, Factor 1, Units: See 40046, Range: 0 - 5000, Resolution: 0	RW	Y
40044	40043	LED Fair Level	Type: uINT, Factor 1, Units: See 40046, Range: 0 - 5000, Resolution: 0	RW	Y
40045	40044	LED Bad Level	Type: uINT, Factor 1, Units: See 40046, Range: 0 - 5000, Resolution: 0	RW	Y
40046	40045	LED Source	Type: uINT, Factor 1, Units: No Units, 0: Temperature 1: RH, 2: CO2, 3: SP, 4: PM2.5, 5: IAQ, 6: NOx, 7: CO, 8: Network	RW	Y
40047	40046	Temperature Range	Type: uINT, Factor 1, Units: No Units, 0: 0 to 40, 1: -10 to 40, 2: -10 to 60, 3: -10 to 110, 4: -20 to 50, 5: see 40032 & 40033	RW	Y
40053	40052	Temperature Units	Type: Bit String, Factor 1, No Units, 0: °C; 1: °F	RW	Y
40056	40055	CO2 ABC Logic State	Type: Bit String, Factor 1, No Units, 0: ABC OFF; 1: ABC ON	RW	Y
40057	40056	CO2 ABC Logic Reset	Type: Bit String, Factor 1, No Units, 0: ABC Reset OFF; 1: ABC Reset ON	RW	N
40058	40057	Manual CO2 ABC Calibration	Type: Bit String, Factor 1, No Units, 0: Manual ABC Disabled; 1: Manual ABC Enabled	RW	N
40059	40058	Analogue Output 1 Fallback Value	Type: uINT, Factor 10, Units: Volts, Range: 0 - 10.0, Resolution: 1	RW	Y
40060	40059	Analogue Output 2 Fallback Value	Type: uINT, Factor 10, Units: Volts, Range: 0 - 10.0, Resolution: 1	RW	Y
40067	40066	Thermistor Temperature	Type: sINT, Factor 100, Units: See 40053, Range: -10 - 100.0°C, Resolution: 1	R	N
40091	40090	NOx Index	Type: uINT, Factor 1, Units No Units, Range 0 - 500, Resolution: 0	R	N
40092	40091	PM2.5 Concentration	Type: uINT, Factor 1, Units µg/m³, Range 0 - 1000, Resolution: 0	R	N
40093	40092	PM10 Estimation	Type: uINT, Factor 1, Units µg/m³, Range 0 - 1000, Resolution: 0	R	N
40094	40093	PM1 Estimation	Type: uINT, Factor 1, Units µg/m³, Range 0 - 1000, Resolution: 0	R	N
40095	40094	IO1 Operating Mode	Type: uINT, Factor 1, Units: No Units, 0: Output, 1: Input	RW	Y
40096	40095	IO1 Operating Mode	Type: uINT, Factor 1, Units: No Units, 0: Output, 1: Input	RW	Y
40097	40096	Ambient Light Threshold	Type: uINT, Factor 1, Units: Lux, Range 0 - 65535 lx, Resolution 1	RW	Y

Whilst every effort has been made to ensure the accuracy of this specification, Sontay cannot accept responsibility for damage, injury, loss or expense resulting from errors or omissions. In the interest of technical improvement, this specification may be altered without notice.