



smartIAQ® BACnet Integration Guide



Overview:

All smartIAQ units that are configured for BAS/BMS integration use Modbus RTU protocol by default.

For BAS/BMS systems operating on a BACnet protocol, smartIAQ units can be provided with a Gateway that provides translation between the two protocols.

The gateway covered in this document is the Babel Buster BB3-3101. This gateway enables communication between the smartIAQ Modbus RTU device and BACnet MS/TP networks over RS-485 serial connections (see diagram later for connection details).

This specification defines the BACnet objects that have been pre-programmed into the gateway to correspond to the Modbus points list embedded in the smartIAQ native protocol. Once the gateway is wired into the smartIAQ and connected to the network, a simple 'Who-Is' service request should find the gateway. Following device discovery, a 'ReadProperty' service request of the 'Object_List' will reveal all of the BACnet Objects on the gateway. These BACnet objects are outlined in this specification.

Register Maps:

Analogue Inputs - Read Only

Object Identifier	Object Name	Description	Units
AI-1	CO2 Level	Carbon Dioxide Level	ppm
AI-2	TVOC Level	Total Volatile Organic Compound Level	µg/m3
AI-3	NOx Level	Nitrogen Oxides Level	Index
AI-4	HCHO Level	Formaldehyde Level	µg/m3
AI-5	PM (WA)	Population Weighted Average Concentration of Particulate Matter	µg/m3
AI-6	PM 1.0 Concentration	Particulate Matter Concentration under 1.0 micrometer in diameter	µg/m3
AI-7	PM 2.5 Concentration	Particulate Matter Concentration under 2.5 micrometer in diameter	µg/m3
AI-8	PM 4.0 Concentration	Particulate Matter Concentration under 4.0 micrometer in diameter	µg/m3

Analogue Inputs Continued:

Object Identifier	Object Name	Description	Units
AI-9	PM 10.0 Concentration	Particulate Matter Concentration under 10.0 micrometer in diameter	µg/m ³
AI-10	Air Temperature	Ambient Temperature	°F
AI-11	Relative Humidity	Percentage Relative Humidity	%RH
AI-12	CO ₂ Threshold Readback	Carbon Dioxide Threshold Readback	ppm
AI-13	Fan Speed Percentage	Current Fan Speed %	%
AI-14	Filter Life Remaining	Filter Life Remaining	%
AI-15	Runtime Seconds Low	Runtime seconds (low byte)	Seconds
AI-16	Runtime Seconds High	Runtime seconds (high byte)	Seconds
AI-17	Error Code Low	Error Code (low byte)	-
AI-18	Error Code High	Error Code (high byte)	-

Analogue Values - Read/Write:

Object Identifier	Object Name	Description	Units	Range	Notes
AV-1	Fan Speed	Fan Speed Setpoint	%	0-100	
AV-2	CO ₂ Threshold Setpoint	Carbon Dioxide Occupancy Threshold	ppm	400-5000	
AV-3	Unit ID	Device Address	1-247	1-127	Write then 'Apply Configuration' = 1
AV-4	Baud Rate		0-4	0-4	0=9600, 1=19200, 2=38400, 3=57600, 4=115200, Write then 'Apply Configuration' = 1

Binary Inputs - Read Only:

Object Identifier	Object Name	Description	Units
BI-1	System Active Status	Status of Unit (Active/Inactive)	0=Inactive, 1=Active
BI-2	Fault Present	A Fault is present in system	0=No Fault, 1=Fault Present
BI-3	Air Quality Alert	Air Quality Alert has been triggered	0=Normal, 1=Air Quality Alert
BI-4	HCHO Alert	Formaldehyde Alert has been triggered	0=Normal, 1=HCHO Alert
BI-5	Refresh Response Active	Status of Refresh Response (Active/Inactive)	0=Inactive, 1=Active
BI-6	Filter Warning	Status of filter	0=OK, 1=Replace Filter
BI-7	Occupied CO2	Occupancy Status of area of concern for the system	0=Unoccupied, 1=Occupied

Binary Values - Read/Write:

Object Identifier	Object Name	Description	Notes
BV-1	Inhibit Device	Inhibit to prevent system from operating	0=Off, 1=On
BV-2	System Reset	Reset System	0=Normal, 1=Reset
BV-3	Filter Reset	Reset filter health after filter replacement	0=Normal, 1=Reset
BV-4	Manual Mode	Set system to manual mode (required for setting and maintaining a desired speed)	0=Auto, 1=Manual
BV-5	Apply Configuration	Apply selected Baud Rate or Unit ID	0=Normal, 1=Apply
BV-6	Ionizer Enable	Ionizer On/Off	0=Off, 1=On
BV-7	Eco Mode Enable	Eco Mode On/Off	0=Off, 1=On

Error Bits:

BIT #	Description	Possible Cause
0	No Error	-
1	Fan Fault	Check Fan obstruction/connection
2	Sesnor Communication Error	Check sensor connection
3	Sensor Array 1 Error	Maintenance/Replace Sensor
4	CO2 Sensor Error	Maintenance/Replace Sensor
5	HCHO Sensor Error	Maintenance/Replace Sensor
6	Communication Error	Check Connections/Reset System
7	EEPROM Error	Factory Reset man be required
8	Unknown Error	Factory Reset man be required

Misc:

Auto Mode Operation

- **Fan Control:** Speed is automatically adjusted based on air quality
- **Manual Settings:** Fan Speed settings are ignored

Eco Mode Operation

- **Fan Operation:** Automatically reduces fan speed
- **Energy Management:** System optimizes for energy efficiency when CO2/Occupancy is 'Low'

Recommended Polling Intervals:

- **Status Registers:** 5 Seconds
- **Sensor Readings:** 5 Seconds
- **Configuration Values:** 30 Seconds
- **Error Status:** 5 Seconds