

smartIAQ GridSet Pro/Hub-4 Pro BACnet Points List

Product: smartIAQ Hub-4 Pro

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Applies to: Firmware 1.1.0 and later

Overview

This document is the authoritative reference to the BACnet objects that the Hub-4 Pro exposes over MS/TP. Each connected device port exposes up to 39 BACnet objects. The gateway creates them when a device first reports on a port, based on the capability flags of the device. Points with no capability gate exist for every connected device. Points with a gate exist only if the device reports that sensor or actuator.

Instance numbers follow the pattern `<port> * 1000 + <offset>`. For example, Port 1 Zone Temp is AI:1001 and Port 2 Zone Temp is AI:2001.

Object names follow the pattern `Port <N> <Suffix>`, for example "Port 1 Zone Temp".

Instance Ranges by Port

Port	Instance Range
1	1001 to 1061
2	2001 to 2061
3	3001 to 3061
4	4001 to 4061

Gateway Settings Points

Three Analog Value points belong to the gateway itself, not to a port. Firmware 1.2.0 added them, so firmware before 1.2.0 does not have them. They exist from power-up and hold the MS/TP link settings. A `Present_Value` write is checked, saved to flash at once, and applied at the next restart. A read returns the saved value.

Instance	Type	Name	Units	Writable	COV Increment	Valid values	Default
1	AV	Gateway MS/TP MAC	—	Yes	1	Whole number 1 to 127, unique on the segment, ≤ Max_Master	1
2	AV	Gateway MS/TP Baud	—	Yes	1	9600, 19200, 38400, 57600, 76800, or 115200	38400

Instance	Type	Name	Units	Writable	COV Increment	Valid values	Default
3	AV	Gateway Max_Master	—	Yes	1	Whole number 1 to 127, at least the MAC	127

A fraction, a value outside the range, a baud that is not one of the six rates, or a MAC above Max_Master returns `value-out-of-range`. See the the Installation and Commissioning Guide, section 2.3.

Point Groups

Offsets	Group	Notes
1 to 12	Air quality sensors	Read-only. Only the sensors that the device reports appear.
20 to 25	Filter health	Always present. Alarm on Filter Critical (BI x025) for a maintenance work order.
31 to 39	Fan control	A Fan CFM Setpoint write switches the device to manual. Write 1 (Auto) to Fan Mode Command to return.
37, 38	Motor status	Present only with a motor controller. A motor fault is cleared locally at the device, not over BACnet.
40 to 49	Occupancy	Zone Occupied fuses CO2, light, and the human presence radar. The per-source setpoints follow.
50	Ionizer	Present only with an ionizer.
60, 61	Device status	Device Online is the first point to check. A drop in Device Uptime shows a device reboot.

Points

Offset	Type	Name	Units	Writable	COV Increment	Capability Gate	States / Text
1	AI	Zone Temp	°C	No	0.5 °C	temp_sensor	—
2	AI	Humidity	%RH	No	1.0 %RH	humidity_sensor	—
3	AI	CO2	ppm	No	25 ppm	co2_sensor	—
4	AI	PM2.5	µg/m³	No	5.0 µg/m³	particulate_sensor	—
5	AI	VOC	µg/m³	No	10 µg/m³	voc_sensor	—
6	AI	NOx	index	No	5 pts	voc_sensor	—
7	AI	HCHO	µg/m³	No	1.0 µg/m³	hcho_sensor	—
8	AI	Pressure	hPa	No	1.0 hPa	pressure_sensor	—
9	AI	Lux	lux	No	50 lux	light_sensor	—

Offset	Type	Name	Units	Writable	COV Increment	Capability Gate	States / Text
10	AI	PM1.0	µg/m ³	No	5.0 µg/m ³	particulate_sensor	—
11	AI	PM4.0	µg/m ³	No	5.0 µg/m ³	particulate_sensor	—
12	AI	PM10	µg/m ³	No	5.0 µg/m ³	particulate_sensor	—
20	AI	Filter Life	%	No	1.0 %	—	—
21	AI	Filter Hours Left	hours	No	10 hours	—	—
22	MSV	Filter Limiter	—	No	any change	—	1=None, 2=Time, 3=TVOC, 4=HCHO
23	MSV	Filter Confidence	—	No	any change	—	1=Low, 2=Medium, 3=High
24	BI	Filter Warning	—	No	any change	—	Active=Warning, Inactive=Normal
25	BI	Filter Critical	—	No	any change	—	Active=Critical, Inactive=Normal
31	AI	Fan CFM	CFM	No	10 CFM	—	—
32	MSV	Fan Mode	—	No	any change	—	1=Auto, 2=Manual
34	AV	Fan CFM Setpoint	CFM	Yes	5 CFM	—	—
35	BI	Fan Inhibited	—	No	any change	—	Active=Inhibited, Inactive=Normal
36	MSV	Fan Mode Command	—	Yes	any change	—	1=Auto, 2=Manual
37	MSV	Motor Run State	—	No	any change	motor	1=Running, 2=Stopped
38	MSV	Motor Fault	—	No	any change	motor	1=None, 2=Fault
39	AI	Fan Applied Duty	%	No	5.0 %	—	—
40	BI	Zone Occupied	—	No	any change	—	Active=Occupied, Inactive=Unoccupied
41	AV	CO2 Occ Threshold	ppm	Yes	50 ppm	co2_sensor	—
42	BV	CO2 Demand Enable	—	Yes	any change	co2_sensor	Active=Enabled, Inactive=Disabled

Offset	Type	Name	Units	Writable	COV Increment	Capability Gate	States / Text
43	AV	CO2 Demand Low Setpoint	ppm	Yes	50 ppm	co2_sensor	—
44	AV	CO2 Demand High Setpoint	ppm	Yes	50 ppm	co2_sensor	—
45	BV	Light Occupancy Enable	—	Yes	any change	light_sensor	Active=Enabled, Inactive=Disabled
46	AV	Light Occupancy Low Setpoint	lux	Yes	5 lux	light_sensor	—
47	AV	Light Occupancy High Setpoint	lux	Yes	5 lux	light_sensor	—
48	BV	HPS Enable	—	Yes	any change	hps_sensor	Active=Enabled, Inactive=Disabled
49	AV	HPS Sensitivity	—	Yes	1	hps_sensor	1 to 10, default 5
50	BV	Ionizer Enable	—	Yes	any change	ionizer	Active=Enabled, Inactive=Disabled
60	BI	Device Online	—	No	any change	—	Active=Online, Inactive=Offline
61	AI	Device Uptime	seconds	No	3600 sec	—	—

COV (Change of Value) Behavior

All objects support COV subscriptions through the SubscribeCOV service. The COV behavior depends on the object type:

- **AI/AV objects:** The gateway sends a notification when the present value changes by more than the COV increment listed above. A BMS can write `COV_Increment` to change the threshold of an AI or AV.
- **BI/BV/MSV objects:** The gateway sends a notification on any state change.
- **All objects:** A change in `Status_Flags` also triggers a notification, even if the present value has not changed. One example is a reliability change to `COMMUNICATION_FAILURE`.

The subscription table holds 128 entries from up to 16 subscriber addresses. Available memory limits the practical count to about 50 subscriptions when all four ports are populated. The Hub-4 Pro rejects a further SubscribeCOV with the error `no-space-to-add-list-element`.

Reliability Mapping

Condition	Reliability Value	Affected Objects
Normal operation	NO_FAULT_DETECTED	All
Port inactive or fault	COMMUNICATION_FAILURE	All except Device Online
Sensor stale	COMMUNICATION_FAILURE	Sensor AIs (offsets 1 to 12)
Sensor installed but returning <code>null</code> or omitting its value	UNRELIABLE_OTHER	Sensor AIs (offsets 1 to 12), after one stale-data window (3 s by default)
Sensor absent or capability not present	NO_SENSOR	Sensor AIs (offsets 1 to 12)
Motor fault	UNRELIABLE_OTHER	Fan-related objects (CFM, Mode, Mode Command, Inhibited, CFM Setpoint, Applied Duty)
HPS radar stream interrupted while HPS is enabled	UNRELIABLE_OTHER	HPS Enable (BV x048) and Zone Occupied (BI x040)

`Device Online` normally reports `NO_FAULT_DETECTED` whenever the port is reachable. A rare exception is a partial BACnet object creation failure inside the gateway. In that case `Device Online` remains Active, but its `Reliability` becomes `UNRELIABLE_OTHER`.

If a device stays silent for about 10 seconds after its port enters FAILED, the gateway deletes all objects for that port and increments `Database_Revision`. It creates them again at the next discovery.

Writable Objects

Writable objects accept BACnet WriteProperty and send the value to the connected device:

Object	Write Behavior
Fan CFM Setpoint (AV:x034)	Sets the target airflow in CFM
Fan Mode Command (MSV:x036)	1=Auto, 2=Manual
CO2 Occ Threshold (AV:x041)	Sets the configured CO2 occupancy threshold of the device
CO2 Demand Enable (BV:x042)	Includes CO2 as an input to the clean-air demand fan algorithm
CO2 Demand Low Setpoint (AV:x043)	CO2 ppm where clean-air demand starts to increase
CO2 Demand High Setpoint (AV:x044)	CO2 ppm where clean-air demand reaches its maximum contribution
Light Occupancy Enable (BV:x045)	Includes the light level as an occupancy source
Light Occupancy Low Setpoint (AV:x046)	Lux threshold used to exit the occupied state
Light Occupancy High Setpoint (AV:x047)	Lux threshold used to enter the occupied state
HPS Enable (BV:x048)	Includes the human presence sensor as an occupancy source
HPS Sensitivity (AV:x049)	Radar detection sensitivity, whole number 1 to 10

Object	Write Behavior
Ionizer Enable (BV:x050)	Active=Enable, Inactive=Disable
Gateway MS/TP MAC (AV:1)	Saves the MS/TP MAC of the Hub-4 Pro. Applied at the next restart
Gateway MS/TP Baud (AV:2)	Saves the MS/TP baud of the Hub-4 Pro. Applied at the next restart
Gateway Max_Master (AV:3)	Saves the Max_Master of the Hub-4 Pro. Applied at the next restart

After the gateway accepts a write, the writable object keeps the BMS value until the device confirms it. The gateway does not overwrite that value with the reported value of the device while the write is in transit.

Validation rules. An invalid write returns `value-out-of-range` :

- Fan CFM Setpoint accepts 0 to 10000 CFM.
- CO2 Occ Threshold accepts 200 to 10000 ppm.
- CO2 Demand Low Setpoint must be strictly less than CO2 Demand High Setpoint.
- Light Occupancy Low Setpoint must be less than or equal to Light Occupancy High Setpoint.
- HPS Sensitivity accepts whole numbers from 1 to 10.

The gateway reads the CO2, light occupancy, and HPS points from the device parameter store during discovery and refreshes them after successful writes.

Read-only points accept a `Present_Value` write only while `Out_Of_Service` is TRUE. Use this for BMS testing only. The value does not reach the device.