



**GREYSTONE**  
ENERGY SYSTEMS INC

# PM Series

## Particulate Matter Transmitter

### **SETUP GUIDE BACnet® COMMUNICATION**



## BACnet Protocol

The device parameters must be set before connection to the network and will ensure that each device has a unique MAC address and Device Instance for startup. On startup, the MAC address is appended to the Device Object : Vendor Identifier to create the unique Device Instance (Device Object : Object Identifier). Once connected to a network, the Device Object : Object Identifier can be written to any unique value via BACnet and then the MAC address will no longer be appended to the value. All parameters are saved in memory. The Setup Menu and LCD are used to set the BACnet MAC device address (0-127) and the baud rate. The factory defaults are address 3 and 9600 baud. Menu operation is described in detail in the Operation section.

The sensor operates as a slave. It will not communicate unless a master is connected to the network and sends a request for information, then the slave will answer. If the device does not communicate properly, first check that the communication wires are not reversed. Then check that the slave address has a unique setting for the network segment it is connected to. Ensure the device object name and object identifier are unique on the entire BACnet network, not just on the MS/TP sub-net. Both of these properties are writable.

Ensure the application software is not set to poll the devices too frequently. For example, if the software is polling the devices every 500 mS, the network could be heavily congested with the network traffic and may not operate reliably. A slower polling rate such as 5 to 10 seconds will usually produce better results on a typical network segment.

Use care when setting the MS/TP MAC address and the device object Max\_Master property since both can have a significant effect on the network efficiency. Some MAC address and Max\_Master combinations will operate more efficiently than others. MAC addresses should be selected sequentially, starting at the lowest possible value. For example, on a five node segment, the MAC addresses should be set to 1, 2, 3, 4 and 5. In this case, if the Max\_Master property value is left at the 127 default, then there will be a lot of wasted time on the network polling for masters that are not present. In this example, the five sensor nodes should be set such that Max\_Master is equal to 5. The Max\_Master value initially defaults to 127 so that any master can be found when the device first starts.

The device has BACnet objects to identify the device, read the sensor value, configure the alarms, etc. There are seven standard supported BACnet objects as shown below.

Object Type	Object Identifier	Object Name	Description	Default
Device	381003	PM 003		
Analog Input	AI 1	PM1.0 Particulate Mass	0 to 1000 $\mu\text{g}/\text{m}^3$	
	AI 2	PM2.5 Particulate Mass	0 to 1000 $\mu\text{g}/\text{m}^3$	
	AI 3	PM4.0 Particulate Mass	0 to 1000 $\mu\text{g}/\text{m}^3$	
	AI 4	PM10 Particulates Mass	0 to 1000 $\mu\text{g}/\text{m}^3$	
Analog Value	AV 1	Analog Output Scale	500 to 1000 $\mu\text{g}/\text{m}^3$ , Resolution = 100	1000 $\mu\text{g}/\text{m}^3$
	AV 2	PM Alarm Setpoint	50 to 900 $\mu\text{g}/\text{m}^3$ , Resolution = 10	150 $\mu\text{g}/\text{m}^3$
	AV 3	PM Alarm Hysteresis	10 to 40 $\mu\text{g}/\text{m}^3$ , Resolution = 5	20 $\mu\text{g}/\text{m}^3$
	AV 4	PM Alarm Delay	0 to 10 minutes, Resolution = 1	0 minutes
Binary Value	BV 1	Display Format	0 = AQI, 1 = $\mu\text{g}/\text{m}^3$	1
	BV 2	PM Alarm Test	0 = Normal, 1 = Test	0
	BV 3	Analog Output Direction	0 = Direct, 1 = Reverse	0
Binary Input	BI 1	PM Alarm Status	0 = Normal, 1 = Alarm	0
Multi-state Value	MSV 1	LCD Backlight	1 = Auto, 2 = Off, 3 = On	1
	MSV 2	PM Output	1 = PM1.0, 2 = PM2.5, 3 = PM4.0, 4 = PM10	4
Multi-state Input	MSI 1	AQI Status	1 = Good, 2 = Moderate, 3 = Poor	1

The Device BACnet objects allow configuration of the device. Device object properties are shown below.

***The BACnet Device object***

Property	Default Value	Property Data Type	Access
Object Identifier	381003	BACnetObjectIdentifier(numeric)	Read / Write
Object Name	PM 003	CharacterString (32)	Read / Write
Object Type	DEVICE (8)	BACnetObjectType	Read
System Status	OPERATIONAL (0)	BACnetDeviceStatus	Read
Vendor Name	Greystone Energy Systems	CharacterString	Read
Vendor Identifier	381	Unsigned16	Read
Model Name	PM100	CharacterString	Read
Firmware Revision	1.0	CharacterString	Read
Application Software Version	V1.0	CharacterString	Read
Location	150 English Drive, Moncton, NB	CharacterString (32)	Read / Write
Description	Particulate Monitor	CharacterString (32)	Read / Write
Protocol Version	1	Unsigned	Read
Protocol Revision	14	Unsigned	Read
Protocol Services Supported	See description below	BACnetServicesSupported	Read
Protocol Object Types Supported	See description below	BACnetObjectTypesSupported	Read
Object List	See description below	BACnetArray	Read
Maximum APDU Length Accepted	50, B'0000'	Unsigned	Read
Segmentation Supported	NO_SEGMENTATION (3)	BACnetSegmentation	Read
APDU Timeout	6,000	Unsigned	Read / Write
Number of APDU Retries	3	Unsigned	Read / Write
Max Master	127	Unsigned	Read / Write
Max Info Frames	1	Unsigned	Read
Device Address Binding	Empty	BACnetAddressBinding	Read
Database Revision	0	Unsigned	Read
Active_COV_Subscriptions	Empty	ListOfBACnetCOVSubscriptions	Read
Property List		BACnetArray	Read

- Object Identifier** Initial default number is 381003, where 381 is the vendor ID and 003 is the default network MAC address. When the MAC address is initially changed the value is updated and saved. For example, if the MAC address is set to 50 via the menu for startup, then the device instance will be set to 381050. This property is also writable via BACnet. If the Device:Object\_Identifier is written to via BACnet then the MAC address is no longer appended to the vendor ID to create this value.
- Object Name** Initial string is “PM 003” where 003 is the default network address. Can be written with a new string of maximum length of 32 characters and the value is saved. The “003” is the MAC address and is automatically changed if the MAC address is changed. Once written to via BACnet, the MAC address no longer gets appended to the value.
- Protocol Services Supported** readProperty, readPropertyMultiple, writeProperty, deviceCommunicationControl, who-Has, who-Is, subscribeCOV, subscribeCOVProperty  
Binary bit string = {00000100 00001011 01000000 00000000 01100010 0}
- Protocol Object Types Supported** Analog\_Input, Analog\_Value, Binary\_Value, Binary\_Input, Device, Multi-State\_Value, Multi-State\_Input  
Binary bit string = {10100100 10000100 00010000 00000000 00000000 00000000 00000000}
- Object List** ((Device, Instance 1), (AI1..AI4), (AV1..AV4), (BV1..BV4), (BI 1), (MSV1...MV2), (MSI1))
- APDU Timeout** Value is 6,000. Can be modified from 1 to 10,000.
- Number Of APDU Retries** Value is 3. Can be modified from 1 to 10.
- Max Master** Value is 127. Can be modified from 1 to 127.
- Database Revision** Value is 0 to 255.

The Analog Input BACnet objects allow reading of sensor values. Analog input object properties are shown below.

**Analog Input Object: AI1 PM1.0 Particulate Mass**

Property	Default Value	Property Data Type	Access
Object Identifier	AI1	BACnetObjectIdentifier	Read
Object Name	PM1.0 Concentration	CharacterString (32)	Read
Object Type	ANALOG_INPUT (0)	BACnetObjectType	Read
Present Value	See description below	Real	Read
Description	0 to 1000 µg/m <sup>3</sup>	CharacterString (32)	Read
Device Type	PM1.0 Sensor	CharacterString (32)	Read
Status Flags	{false, false, false, false} (0000) or (1100) if no sensor	BACnetStatusFlags	Read
Event State	NORMAL (0) or FAULT (1) if no sensor	BACnetEventState	Read
Reliability	NO_FAULT_DETECTED (0) or NO_SENSOR (1)	BACnetReliability	Read
Out of Service	FALSE (0)	Boolean	Read
Units	micro-grams-per-cubic-meter (219)	BACnetEngineeringUnits	Read
COV Increment	50	Real	Read
Property List		BACnetArray	Read

AI1 represents the PM1.0 concentration value reported from the PM sensor.

Rules Enforced:  $0 \mu\text{g}/\text{m}^3 \leq \text{Present Value} \leq 1000 \mu\text{g}/\text{m}^3$ , Resolution =  $1 \mu\text{g}/\text{m}^3$

**Analog Input Object: AI2 PM2.5 Particulate Mass**

Property	Default Value	Property Data Type	Access
Object Identifier	AI2	BACnetObjectIdentifier	Read
Object Name	PM2.5 Concentration	CharacterString (32)	Read
Object Type	ANALOG_INPUT (0)	BACnetObjectType	Read
Present Value	See description below	Real	Read
Description	0 to 1000 µg/m <sup>3</sup>	CharacterString (32)	Read
Device Type	PM2.5 Sensor	CharacterString (32)	Read
Status Flags	{false, false, false, false} (0000) or (1100) if no sensor	BACnetStatusFlags	Read
Event State	NORMAL (0) or FAULT (1) if no sensor	BACnetEventState	Read
Reliability	NO_FAULT_DETECTED (0) or NO_SENSOR (1)	BACnetReliability	Read
Out of Service	FALSE (0)	Boolean	Read
Units	micro-grams-per-cubic-meter (219)	BACnetEngineeringUnits	Read
COV Increment	50	Real	Read
Property List		BACnetArray	Read

AI2 represents the PM2.5 concentration value reported from the PM sensor.

Rules Enforced:  $0 \mu\text{g}/\text{m}^3 \leq \text{Present Value} \leq 1000 \mu\text{g}/\text{m}^3$ , Resolution =  $1 \mu\text{g}/\text{m}^3$

**Analog Input Object: AI3 PM4.0 Particulate Mass**

Property	Default Value	Property Data Type	Access
Object Identifier	AI3	BACnetObjectIdentifier	Read
Object Name	PM4.0 Concentration	CharacterString (32)	Read
Object Type	ANALOG_INPUT (0)	BACnetObjectType	Read
Present Value	See description below	Real	Read
Description	0 to 1000 $\mu\text{g}/\text{m}^3$	CharacterString (32)	Read
Device Type	PM4.0 Sensor	CharacterString (32)	Read
Status Flags	{false, false, false, false} (0000) or (1100) if no sensor	BACnetStatusFlags	Read
Event State	NORMAL (0) or FAULT (1) if no sensor	BACnetEventState	Read
Reliability	NO_FAULT_DETECTED (0) or NO_SENSOR (1)	BACnetReliability	Read
Out of Service	FALSE (0)	Boolean	Read
Units	micro-grams-per-cubic-meter (219)	BACnetEngineeringUnits	Read
COV Increment	50	Real	Read
Property List		BACnetArray	Read

AI3 represents the PM4.0 concentration value reported from the PM sensor.

Rules Enforced:  $0 \mu\text{g}/\text{m}^3 \leq \text{Present Value} \leq 1000 \mu\text{g}/\text{m}^3$ , Resolution =  $1 \mu\text{g}/\text{m}^3$

**Analog Input Object: AI4PM10 Particulate Mass**

Property	Default Value	Property Data Type	Access
Object Identifier	AI4	BACnetObjectIdentifier	Read
Object Name	PM10 Concentration	CharacterString (32)	Read
Object Type	ANALOG_INPUT (0)	BACnetObjectType	Read
Present Value	See description below	Real	Read
Description	0 to 1000 $\mu\text{g}/\text{m}^3$	CharacterString (32)	Read
Device Type	PM10 Sensor	CharacterString (32)	Read
Status Flags	{false, false, false, false} (0000) or (1100) if no sensor	BACnetStatusFlags	Read
Event State	NORMAL (0) or FAULT (1) if no sensor	BACnetEventState	Read
Reliability	NO_FAULT_DETECTED (0) or NO_SENSOR (1)	BACnetReliability	Read
Out of Service	FALSE (0)	Boolean	Read
Units	micro-grams-per-cubic-meter (219)	BACnetEngineeringUnits	Read
COV Increment	50	Real	Read
Property List		BACnetArray	Read

AI4 represents the PM10 concentration value reported from the PM sensor.

Rules Enforced:  $0 \mu\text{g}/\text{m}^3 \leq \text{Present Value} \leq 1000 \mu\text{g}/\text{m}^3$ , Resolution =  $1 \mu\text{g}/\text{m}^3$

The Analog Value BACnet objects allow configuration of the output scale and setpoint. AV object properties are shown below.

**Analog Value Object: AV1 Analog Output Scale**

Property	Default Value	Property Data Type	Access
Object Identifier	AV1	BACnetObjectIdentifier	Read
Object Name	Analog Output Scale	CharacterString (32)	Read
Object Type	ANALOG_VALUE (2)	BACnetObjectType	Read
Present Value	1000	Real	Read/Write
Description	500 to 1000 µg/m <sup>3</sup>	CharacterString (32)	Read
Status Flags	{false, false, false, false} (0000)	BACnetStatusFlags	Read
Event State	NORMAL (0)	BACnetEventState	Read
Reliability	NO_FAULT_DETECTED (0)	BACnetReliability	Read
Out of Service	FALSE (0)	Boolean	Read
Units	micro-grams-per-cubic-meter (219)	BACnetEngineeringUnits	Read
Property List		BACnetArray	Read

Used to set the scale that the analog output signal represents. For example, the default scale means 4-20 mA = 0-1000 µg/m<sup>3</sup>. If the scale is changed to 500, then 4-20 mA = 0-500 µg/m<sup>3</sup>.

Present Value defaults to 1000 µg/m<sup>3</sup>.

Rules Enforced: 500 µg/m<sup>3</sup> <= Present Value <= 1000 µg/m<sup>3</sup>, Resolution = 100 µg/m<sup>3</sup>

**Analog Value Object: AV2 PM Alarm Setpoint**

Property	Default Value	Property Data Type	Access
Object Identifier	AV2	BACnetObjectIdentifier	Read
Object Name	PM Alarm Setpoint	CharacterString (32)	Read
Object Type	ANALOG_VALUE (2)	BACnetObjectType	Read
Present Value	150	Real	Read/Write
Description	50 to 900 µg/m <sup>3</sup>	CharacterString (32)	Read
Status Flags	{false, false, false, false} (0000)	BACnetStatusFlags	Read
Event State	NORMAL (0)	BACnetEventState	Read
Reliability	NO_FAULT_DETECTED (0)	BACnetReliability	Read
Out of Service	FALSE (0)	Boolean	Read
Units	micro-grams-per-cubic-meter (219)	BACnetEngineeringUnits	Read
Property List		BACnetArray	Read

Used to set the desired PM alarm setpoint.

Present Value defaults to 150 µg/m<sup>3</sup>.

Rules Enforced: 50 µg/m<sup>3</sup> <= Present Value <= 900 µg/m<sup>3</sup>, Resolution = 10 µg/m<sup>3</sup>

**Analog Value Object: AV3 PM Alarm Hysteresis**

Property	Default Value	Property Data Type	Access
Object Identifier	AV3	BACnetObjectIdentifier	Read
Object Name	PM Alarm Hysteresis	CharacterString (32)	Read
Object Type	ANALOG_VALUE (2)	BACnetObjectType	Read
Present Value	20	Real	Read/Write
Description	10 to 40 µg/m <sup>3</sup>	CharacterString (32)	Read
Status Flags	{false, false, false, false} (0000)	BACnetStatusFlags	Read
Event State	NORMAL (0)	BACnetEventState	Read
Reliability	NO_FAULT_DETECTED (0)	BACnetReliability	Read
Out of Service	FALSE (0)	Boolean	Read
Units	micro-grams-per-cubic-meter (219)	BACnetEngineeringUnits	Read
Property List		BACnetArray	Read

Used to set the desired PM alarm hysteresis.

Present Value defaults to 20 µg/m<sup>3</sup>.

Rules Enforced: 10 µg/m<sup>3</sup> <= Present Value <= 40 µg/m<sup>3</sup>, Resolution = 5 µg/m<sup>3</sup>

**Analog Value Object: AV4 PM Alarm Delay**

Property	Default Value	Property Data Type	Access
Object Identifier	AV4	BACnetObjectIdentifier	Read
Object Name	PM Alarm Delay	CharacterString (32)	Read
Object Type	ANALOG_VALUE (2)	BACnetObjectType	Read
Present Value	0	Real	Read/Write
Description	0 to 10 Minutes	CharacterString (32)	Read
Status Flags	{false, false, false, false} (0000)	BACnetStatusFlags	Read
Event State	NORMAL (0)	BACnetEventState	Read
Reliability	NO_FAULT_DETECTED (0)	BACnetReliability	Read
Out of Service	FALSE (0)	Boolean	Read
Units	Minutes (72)	BACnetEngineeringUnits	Read
Property List		BACnetArray	Read

Used to set the desired PM alarm time delay.

Present Value defaults to 0 minutes (no delay).

Rules Enforced: 0 minutes <= Present Value <= 10 minutes, Resolution = 1 minute

The binary value BACnet objects allow configuration of the device and status indication. Binary value object properties are shown below.

**Binary Value Object: BV1 Display Format**

Property	Default Value	Property Data Type	Access
Object Identifier	BV1	BACnetObjectIdentifier	Read
Object Name	Display Format	CharacterString (32)	Read
Object Type	BINARY_VALUE (5)	BACnetObjectType	Read
Present Value	ACTIVE (1)	BACnetBinaryPV	Read / Write
Description	AQI (0) or $\mu\text{g}/\text{m}^3$ (1)	CharacterString (32)	Read
Status Flags	{false, false, false, false} (0000)	BACnetStatusFlags	Read
Event State	NORMAL (0)	BACnetEventState	Read
Reliability	NO_FAULT_DETECTED (0)	BACnetReliability	Read
Out of Service	FALSE (0)	Boolean	Read
Property List		BACnetArray	Read

This object is used to control what information is displayed on the LCD during normal operation. The default value is 1 to display the mass concentration in  $\mu\text{g}/\text{m}^3$ . Changing the value to 0 will cause the LCD to display the AQI (Air Quality Index) as 0-500 AQI and also the Good, Moderate or Poor designation.

**Binary Value Object: BV2 PM Alarm Test**

Property	Default Value	Property Data Type	Access
Object Identifier	BV2	BACnetObjectIdentifier	Read
Object Name	PM Alarm Test	CharacterString (32)	Read
Object Type	BINARY_VALUE (5)	BACnetObjectType	Read
Present Value	INACTIVE (0)	BACnetBinaryPV	Read / Write
Description	Normal (0) or Test (1)	CharacterString (32)	Read
Status Flags	{false, false, false, false} (0000)	BACnetStatusFlags	Read
Event State	NORMAL (0)	BACnetEventState	Read
Reliability	NO_FAULT_DETECTED (0)	BACnetReliability	Read
Out of Service	FALSE (0)	Boolean	Read
Property List		BACnetArray	Read

This object manually controls the PM Alarm Status. The default is Normal (0). If the value is set to Test (1), then a PM Alarm is forced and PM Alarm Status will get set to 1. This function is useful for testing the PM alarm but must be manually set back to 0 after the test. The PM Alarm Status will immediately reset to 0.



**Binary Value Object: BV3 Analog Output Direction**

Property	Default Value	Property Data Type	Access
Object Identifier	BV3	BACnetObjectIdentifier	Read
Object Name	Analog Output Direction	CharacterString (32)	Read
Object Type	BINARY_VALUE (5)	BACnetObjectType	Read
Present Value	INACTIVE (0)	BACnetBinaryPV	Read / Write
Description	Direct (0) or Reverse (1)	CharacterString (32)	Read
Status Flags	{false, false, false, false} (0000)	BACnetStatusFlags	Read
Event State	NORMAL (0)	BACnetEventState	Read
Reliability	NO_FAULT_DETECTED (0)	BACnetReliability	Read
Out of Service	FALSE (0)	Boolean	Read
Property List		BACnetArray	Read

This object controls the analog output signal direction. The default is Direct (0) which means the output signal is 0-1000  $\mu\text{g}/\text{m}^3 = 4\text{-}20 \text{ mA} = 0\text{-}5 \text{ Vdc} = 0\text{-}10 \text{ Vdc}$ . If the value is set to Reverse (1), then the output signal is 0-1000  $\mu\text{g}/\text{m}^3 = 20\text{-}4 \text{ mA} = 5\text{-}0 \text{ Vdc} = 10\text{-}0 \text{ Vdc}$ . This function is useful if a reverse acting signal is required.

The binary input BACnet object indicates alarm status. Binary input object properties are shown below.

**Binary Input Object: BII PM Alarm Status**

Property	Default Value	Property Data Type	Access
Object Identifier	BII	BACnetObjectIdentifier	Read
Object Name	PM Alarm Status	CharacterString (32)	Read
Object Type	BINARY_INPUT (3)	BACnetObjectType	Read
Present Value	INACTIVE (0)	BACnetBinaryPV	Read
Description	Normal (0) or Alarm (1)	CharacterString (32)	Read
Device Type	Indicates PM Alarm Status	CharacterString (32)	Read
Status Flags	{false, false, false, false} (0000)	BACnetStatusFlags	Read
Event State	NORMAL (0)	BACnetEventState	Read
Reliability	NO_FAULT_DETECTED (0)	BACnetReliability	Read
Out of Service	FALSE (0)	Boolean	Read
Polarity	NORMAL (0)	BACnetPolarity	Read
Property List		BACnetArray	Read

This object holds the PM Alarm Status. The default is Normal (0). Will change to Alarm (1) if the mass concentration value exceeds the PM Alarm Setpoint AND the PM Alarm Delay time has expired. The PM Alarm Status will automatically reset to 0 when the mass concentration reduces below the PM Alarm Setpoint - PM Alarm Hysteresis value.

The multi-state value BACnet object allows configuration of the device. Multi-state value object properties are shown below.

***Multi-state Value Object: MSV1 LCD Backlight***

Property	Default Value	Property Data Type	Access
Object Identifier	MSV1	BACnetObjectIdentifier	Read
Object Name	LCD Backlight	CharacterString (32)	Read
Object Type	MULTISTATE_VALUE (19 )	BACnetObjectType	Read
Present Value	See Description Below	Unsigned	Read / Write
Description	1 = Auto, 2 = Off, 3 = On	CharacterString (32)	Read
Status Flags	{ false, false, false, false } (0000)	BACnetStatusFlags	Read
Event State	NORMAL (0)	BACnetEventState	Read
Reliability	NO_FAULT_DETECTED (0)	BACnetReliability	Read
Out of Service	FALSE (0)	Boolean	Read
Number of States	3	Unsigned	Read
Property List		BACnetArray	Read

This object sets the LCD backlight operating mode. The default value is Auto (1).

MSV1 State	Description
1	Auto - the backlight only lights during startup and during User Menu operation
2	Off - the backlight is disabled and never lights
3	On - the backlight is always on (highest power consumption)

***Multi-state Value Object: MSV2 PM OUTPUT***

Property	Default Value	Property Data Type	Access
Object Identifier	MSV2	BACnetObjectIdentifier	Read
Object Name	PM Output	CharacterString (32)	Read
Object Type	MULTISTATE_VALUE (19 )	BACnetObjectType	Read
Present Value	See Description Below	Unsigned	Read / Write
Description	1 = PM1.0, 2 = PM2.5,3= PM4.0, 4= PM10	CharacterString (32)	Read
Status Flags	{ false, false, false, false } (0000)	BACnetStatusFlags	Read
Event State	NORMAL (0)	BACnetEventState	Read
Reliability	NO_FAULT_DETECTED (0)	BACnetReliability	Read
Out of Service	FALSE (0)	Boolean	Read
Number of States	4	Unsigned	Read
Property List		BACnetArray	Read

This object sets output to one of the PM ranges available.

MSV2 State	Description
1	PM1.0
2	PM2.5
3	PM4.0
4	PM10

The multi-state input BACnet object holds the AQI status value. Multi-state input object properties are shown below.

**Multi-state Input Object: MSII AQI Status**

Property	Default Value	Property Data Type	Access
Object Identifier	MSII	BACnetObjectIdentifier	Read
Object Name	AQI Status	CharacterString (32)	Read
Object Type	MULTISTATE_INPUT (13)	BACnetObjectType	Read
Present Value	See Description Below	Unsigned	Read
Description	1=Good, 2=Moderate, 3=Poor	CharacterString (32)	Read
Status Flags	{false, false, false, false} (0000) or (1100) if no sensor	BACnetStatusFlags	Read
Event State	NORMAL (0) or FAULT (1) if no sensor	BACnetEventState	Read
Reliability	NO_FAULT_DETECTED (0) or NO_SENSOR (1)	BACnetReliability	Read
Out of Service	FALSE (0)	Boolean	Read
Number of States	3	Unsigned	Read
Property List		BACnetArray	Read

This object holds the AQI (Air Quality Index) status.

MSII State	Description
1	Good - 0 to 50 µg/m <sup>3</sup>
2	Moderate - 51 to 150 µg/m <sup>3</sup>
3	Poor - 151 to 1000 µg/m <sup>3</sup>

**BACnet Protocol Implementation Conformance Statement (PICS)**

**Date :** May 2, 2019  
**Vendor Name :** Greystone Energy Systems  
**Product Name :** Particulate Sensor - Room  
**Product Model Number :** PMRMCxxxx, PMDTxxx, PMOSxxx  
**Application Software Version :** 1.0  
**Firmware Revision :** 1.0  
**BACnet Protocol Revision :** 14

**Product Description :** The Greystone Particulate Sensor is a smart sensor with native BACnet MS/TP protocol for network communication. It measures PM1.0, 2.5, 4.0 and PM10 particulate levels and reports values back to a building automation system (BAS). The device features an LCD to display measured values and for setup.

**BACnet Standardized Device Profile (Annex L) :** BACnet Application Specific Controller (B-ASC)

**BACnet Interoperability Building Blocks Supported (Annex K) :**

DS-RP-B, DS-RPM-B, DS-WP-B, DS-COV-B, DS-COVP-B, DM-DDB-B, DM-DOB-B, DM-DCC-B

**Segmentation Capability :** Not supported

**Standard Object Types Supported :**

Object Type	Dynamically Creatable	Dynamically Deletable	Optional Properties Supported	Writable Properties
Device	No	No	Location, Description, Max_Master, Max_Info_Frames	Object_Identifier, Object_Name, Location, Description, APDU_Timeout, Max_Master, Number_Of_APDU_Retries
Analog Input	No	No	Description, Reliability, Device_Type	
Analog Value	No	No	Description, Reliability	Present_Value
Binary Value	No	No	Description, Reliability	Present_Value
Binary Input	No	No	Description, Reliability, Device_Type	
Multi-State Value	No	No	Description, Reliability	Present_Value
Multi-State Input	No	No	Description, Reliability	Present_Value

**Data Link Layer Options :** MS/TP master (Clause 9),  
 Baud rates : 9600, 19200, 38400, 57600, 76800, 115200

**Device Address Binding :** Not supported

**Networking Options :** None

**Character Set Supported :** ISO 10646 (UTF-8)