



GREYSTONE
ENERGY SYSTEMS INC

UP Series

Ultra Low Pressure Transducer

SETUP GUIDE BACnet® COMMUNICATION



BACnet Object List

Object Type	Dynamically Creatable	Dynamically Deletable	Object Identifier	Object Name
Device	No	No	381003	Ultra Low Pressure 003
Analog Input	No	No	AI 1	Pressure Sensor Value
Analog Value	No	No	AV 1 AV 2 AV 3 AV 4 AV 5 AV 6	Pressure Averaging Time Alarm High Limit Alarm Low Limit Alarm On Delay Alarm Off Delay Backlight Mode
Binary Value	No	No	BV 1 BV 2 BV 3 BV 4	Alarm Enable Alarm Test Pressure Units Auto Zero
Binary Input	No	No	BI 1 BI 2 BI 3	Alarm Status Low Alarm Status High Alarm Status

BACnet Device object allows configuration of the UPB device. Device object properties are shown below.

Property	Default Value	Property Data Type	Access
Object Identifier	381003	BACnetObjectIdentifier(numeric)	Read / Write
Object Name	Ultra Low Pressure 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	UPB	CharacterString	Read
Firmware Revision	1.0	CharacterString	Read
Application Software Version	V1.0	CharacterString	Read
Location	150 English Dr, Moncton, NB	CharacterString (32)	Read / Write
Description	Greystone UPB 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
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 "Ultra Low Pressure 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 as set by the menu 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 Binary bit string = {00000000 00001011 01000000 00000000 01100000 0}
Protocol_Object_Types_Supported	Analog_Input, Analog_Value, Binary_Input, Binary_Value, Device Binary bit string = {10110100 10000000 00000000 00000000 00000000 00000000 00000000}
Object_List	((Device, Instance 3), (Analog Input, Instance 1), (Analog Value, Instance 1)(Analog Value, Instance 6) (Binary Value, Instance 1) (Binary Value, Instance 4), (Binary Input, Instance 1).....(Binary Input, Instance 3)
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. Value is saved. Can be modified from 1 to 127.
Database_Revision	Value is 0 to 255.

The analog input BACnet object allows reading of current pressure sensor value. AI object properties are shown below.

Analog input object Pressure Sensor Value (Present_Value is current sensor reading in the current units.)

Property	Default Value	Property Data Type	Access
Object Identifier	AI1 (Analog Input 1)	BACnetObjectIdentifier	Read
Object Name	Pressure Sensor Value	CharacterString (32)	Read
Object Type	ANALOG_INPUT (0)	BACnetObjectType	Read
Present Value	current reading	Real	Read
Description	Pressure Value in Pa or "wc	CharacterString (32)	Read
Device Type	Ultra Low Pressure Sensor	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	Pascals (53) or "wc (58)	BACnetEngineeringUnits	Read
Property List		BACnetArray	Read

The six analog value BACnet objects allow configuration of the alarms, etc. AV object properties are shown below.

Analog value object Pressure Averaging Time (Present_Value defaults to 5 seconds. Can be set from 1 to 60 seconds. Resolution is 1 sec)

Property	Default Value	Property Data Type	Access
Object Identifier	AV1 (Analog Value 1)	BACnetObjectIdentifier	Read
Object Name	Pressure Averaging Time	CharacterString (32)	Read
Object Type	ANALOG_VALUE (2)	BACnetObjectType	Read
Present Value	5	Real	Read / Write
Description	Pressure Averaging Time (1-60 seconds)	CharacterString (32)	Read
Status Flags	{false, false, false, false} (0000)	BACnetStatusFlags	Read
Event State	NORMAL (0)	BACnetEventState	Read
Out of Service	FALSE (0)	Boolean	Read
Units	Seconds (73)	BACnetEngineeringUnits	Read
Property List		BACnetArray	Read

Analog value object Alarm High Limit (Present_Value defaults to (range x 75%)).

Property	Default Value	Property Data Type	Access
Object Identifier	AV2 (Analog Value 2)	BACnetObjectIdentifier	Read
Object Name	Alarm High Limit	CharacterString (32)	Read
Object Type	ANALOG_VALUE (2)	BACnetObjectType	Read
Present Value	0.5 (for example)	Real	Read / Write
Description	Alarm High Limit in Pa or "wc	CharacterString (32)	Read
Status Flags	{false, false, false, false} (0000) or (1100) if no relay	BACnetStatusFlags	Read
Event State	NORMAL (0) or FAULT (1) if no relay	BACnetEventState	Read
Out of Service	FALSE (0)	Boolean	Read
Units	Pascals (53) or "wc (58)	BACnetEngineeringUnits	Read
Property List		BACnetArray	Read

Analog value object Alarm Low Limit (Present_Value defaults to (range x 25%)).

Property	Default Value	Property Data Type	Access
Object Identifier	AV3 (Analog Value 3)	BACnetObjectIdentifier	Read
Object Name	Alarm Low Limit	CharacterString (32)	Read
Object Type	ANALOG_VALUE (2)	BACnetObjectType	Read
Present Value	-0.5 (for example)	Real	Read / Write
Description	Alarm Low Limit in Pa or "wc	CharacterString (32)	Read
Status Flags	{ false, false, false, false } (0000) or (1100) if no relay	BACnetStatusFlags	Read
Event State	NORMAL (0) or FAULT (1) if no relay	BACnetEventState	Read
Out of Service	FALSE (0)	Boolean	Read
Units	Pascals (53) or "wc (58)	BACnetEngineeringUnits	Read
Property List		BACnetArray	Read

Analog value object Alarm On Delay (Present_Value defaults to 5 seconds. Can be set from 1 to 600 seconds).

Property	Default Value	Property Data Type	Access
Object Identifier	AV4 (Analog Value 4)	BACnetObjectIdentifier	Read
Object Name	Alarm On Delay	CharacterString (32)	Read
Object Type	ANALOG_VALUE (2)	BACnetObjectType	Read
Present Value	5	Real	Read / Write
Description	Alarm On Delay (1-600 sec)	CharacterString (32)	Read
Status Flags	{ false, false, false, false } (0000) or (1100) if no relay	BACnetStatusFlags	Read
Event State	NORMAL (0) or FAULT (1) if no relay	BACnetEventState	Read
Out of Service	FALSE (0)	Boolean	Read
Units	Seconds (73)	BACnetEngineeringUnits	Read
Property List		BACnetArray	Read

Analog value object Alarm Off Delay (Present_Value defaults to 5 seconds. Can be set from 1 to 600 seconds).

Property	Default Value	Property Data Type	Access
Object Identifier	AV5 (Analog Value 5)	BACnetObjectIdentifier	Read
Object Name	Alarm Off Delay	CharacterString (32)	Read
Object Type	ANALOG_VALUE (2)	BACnetObjectType	Read
Present Value	5	Real	Read / Write
Description	Alarm Off Delay (1-600 sec)	CharacterString (32)	Read
Status Flags	{ false, false, false, false } (0000) or (1100) if no relay	BACnetStatusFlags	Read
Event State	NORMAL (0) or FAULT (1) if no relay	BACnetEventState	Read
Out of Service	FALSE (0)	Boolean	Read
Units	Seconds (73)	BACnetEngineeringUnits	Read
Property List		BACnetArray	Read

Analog value object Backlight Mode (Present_Value defaults to 2 = Auto. Can be set to 0 = Off or 1 = On).

Property	Default Value	Property Data Type	Access
Object Identifier	AV6 (Analog Value 6)	BACnetObjectIdentifier	Read
Object Name	Backlight Mode	CharacterString (32)	Read
Object Type	ANALOG_VALUE (2)	BACnetObjectType	Read
Present Value	2	Real	Read / Write
Description	0=Off, 1=On, 2=Auto	CharacterString (32)	Read
Status Flags	{ false, false, false, false } (0000)	BACnetStatusFlags	Read
Event State	NORMAL (0)	BACnetEventState	Read
Out of Service	FALSE (0)	Boolean	Read
Units	no-units (95)	BACnetEngineeringUnits	Read
Property List		BACnetArray	Read

The 4 binary value BACnet objects allow device parameter setting. Binary value object properties are shown below.

Binary value object Alarm Enable (Present_Value is normally 1, set to 0 to disable the alarm functions)

Property	Default Value	Property Data Type	Access
Object Identifier	BV1 (Binary Value 1)	BACnetObjectIdentifier	Read
Object Name	Alarm Enable	CharacterString (32)	Read
Object Type	BINARY_VALUE (5)	BACnetObjectType	Read
Present Value	ACTIVE (1)	BACnetBinaryPV	Read / Write
Description	0 = Alarm Disable, 1 = Alarm Enable	CharacterString (32)	Read
Status Flags	{false, false, false, false} (0000) or (1100) if no relay	BACnetStatusFlags	Read
Event State	NORMAL (0) or FAULT (1) if no relay	BACnetEventState	Read
Reliability	NO_FAULT_DETECTED (0) or NO_SENSOR (1)	BACnetReliability	Read
Out of Service	FALSE (0)	Boolean	Read
Property List		BACnetArray	Read

Binary value object Alarm Test (Present_Value is normally 0, set to 1 to test the alarm functions)

Property	Default Value	Property Data Type	Access
Object Identifier	BV2 (Binary Value 2)	BACnetObjectIdentifier	Read
Object Name	Alarm Test	CharacterString (32)	Read
Object Type	BINARY_VALUE (5)	BACnetObjectType	Read
Present Value	INACTIVE (0)	BACnetBinaryPV	Read / Write
Description	0 = Normal Operation, 1 = Alarm Test	CharacterString (32)	Read
Status Flags	{false, false, false, false} (0000) or (1100) if no relay	BACnetStatusFlags	Read
Event State	NORMAL (0) or FAULT (1) if no relay	BACnetEventState	Read
Reliability	NO_FAULT_DETECTED (0) or NO_SENSOR (1)	BACnetReliability	Read
Out of Service	FALSE (0)	Boolean	Read
Property List		BACnetArray	Read

Note BV2 must be manually set back to 0 after the alarm test. Note that to test the alarm, BV1 must be set to 1 = Alarm Enable.

Binary value object Pressure Units (Present_Value is normally 0 for "wc pressure units, set to 1 for Pa units)

Property	Default Value	Property Data Type	Access
Object Identifier	BV3 (Binary Value 3)	BACnetObjectIdentifier	Read
Object Name	Pressure Units	CharacterString (32)	Read
Object Type	BINARY_VALUE (5)	BACnetObjectType	Read
Present Value	INACTIVE (0)	BACnetBinaryPV	Read / Write
Description	0 = "wc, 1 = Pa	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

Binary value object Auto Zero (Present_Value is normally 0, set to 1 to perform a sensor zero calibration)

Property	Default Value	Property Data Type	Access
Object Identifier	BV4 (Binary Value 4)	BACnetObjectIdentifier	Read
Object Name	Auto Zero	CharacterString (32)	Read
Object Type	BINARY_VALUE (5)	BACnetObjectType	Read
Present Value	INACTIVE (0)	BACnetBinaryPV	Read / Write
Description	0 = Normal, 1 = Perform zero cal	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

Note BV4 will reset to 0 after a few seconds. The device must be in the normal mode to have an effect. The zero tolerance is $\pm 7.5\%$ F.S. (-0.15 "wc to 0.15 "wc for the ± 1 "wc range, for example).

The 3 binary input BACnet objects indicates the alarm status.

Binary input object Alarm Status (Present_Value is normally 0, will change to 1 if any alarm is present)

Property	Default Value	Property Data Type	Access
Object Identifier	BI1 (Binary Input 1)	BACnetObjectIdentifier	Read
Object Name	Alarm Status	CharacterString (32)	Read
Object Type	BINARY_INPUT (3)	BACnetObjectType	Read
Present Value	INACTIVE (0)	BACnetBinaryPV	Read
Description	Alarm Status	CharacterString (32)	Read
Device Type	0 = No Alarm, 1 = Pressure Alarm	CharacterString (32)	Read
Status Flags	{false, false, false, false} (0000) or (1100) if no relay	BACnetStatusFlags	Read
Event State	NORMAL (0) or FAULT (1) if no relay	BACnetEventState	Read
Reliability	NO_FAULT_DETECTED (0) or NO_SENSOR (1)	BACnetReliability	Read
Out of Service	FALSE (0)	Boolean	Read
Polarity	NORMAL (0)	BACnetPolarity	Read
Property List		BACnetArray	Read

Binary input object Low Alarm Status (Present_Value is normally 0, will change to 1 if a low pressure alarm is present)

Property	Default Value	Property Data Type	Access
Object Identifier	BI2 (Binary Input 2)	BACnetObjectIdentifier	Read
Object Name	Low Alarm Status	CharacterString (32)	Read
Object Type	BINARY_INPUT (3)	BACnetObjectType	Read
Present Value	INACTIVE (0)	BACnetBinaryPV	Read
Description	Low Alarm Status	CharacterString (32)	Read
Device Type	0 = No Low Alarm, 1 = Low Alarm	CharacterString (32)	Read
Status Flags	{false, false, false, false} (0000) or (1100) if no relay	BACnetStatusFlags	Read
Event State	NORMAL (0) or FAULT (1) if no relay	BACnetEventState	Read
Reliability	NO_FAULT_DETECTED (0) or NO_SENSOR (1)	BACnetReliability	Read
Out of Service	FALSE (0)	Boolean	Read
Polarity	NORMAL (0)	BACnetPolarity	Read
Property List		BACnetArray	Read

Binary input object High Alarm Status (Present_Value is normally 0, will change to 1 if a high pressure alarm is present)

Property	Default Value	Property Data Type	Access
Object Identifier	BI3 (Binary Input 3)	BACnetObjectIdentifier	Read
Object Name	High Alarm Status	CharacterString (32)	Read
Object Type	BINARY_INPUT (3)	BACnetObjectType	Read
Present Value	INACTIVE (0)	BACnetBinaryPV	Read
Description	High Alarm Status	CharacterString (32)	Read
Device Type	0 = No High Alarm, 1 = High Alarm	CharacterString (32)	Read
Status Flags	{false, false, false, false} (0000) or (1100) if no relay	BACnetStatusFlags	Read
Event State	NORMAL (0) or FAULT (1) if no relay	BACnetEventState	Read
Reliability	NO_FAULT_DETECTED (0) or NO_SENSOR (1)	BACnetReliability	Read
Out of Service	FALSE (0)	Boolean	Read
Polarity	NORMAL (0)	BACnetPolarity	Read
Property List		BACnetArray	Read