



**GREYSTONE**  
ENERGY SYSTEMS INC



## **DPRC SERIES**

Room Dewpoint Transmitter

Setup Guide for BACnet<sup>®</sup> Communication



## BACnet

OBJECT TYPE	DYNAMICALLY CREATABLE	DYNAMICALLY DELETABLE	OBJECT IDENTIFIER	OBJECT NAME
Device	No	No	381001	DP 001
Analog Input	No	No	AI 1 AI 2 AI 3 AI 4 AI 5	Temperature Relative Humidity Dewpoint Temperature Wet Bulb Temperature Enthalpy
Analog Value	No	No	AV 1 AV 2 AV 3 AV 4 AV 5	Temperature Offset RH Offset Atmospheric Pressure Altitude Display Mode
Binary Value	No	No	BV 1 BV 2	Temperature Unit Enthalpy Unit

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

PROPERTY	DEFAULT VALUE	PROPERTY DATA TYPE	ACCESS
Object Identifier	381001	BACnetObjectIdentifier(numeric)	Read / Write
Object Name	DP 001	CharacterString (32)	Read / Write
Object Type	DEVICE (8)	BACnetObjectType	Read
System Statu	OPERATIONAL (0)	BACnetDeviceStatus	Read
Vendor Name	Greystone Energy Systems	CharacterString	Read
Vendor Identifier	381	Unsigned16	Read
Model Name	DP	CharacterString	Read
Firmware Revision	1.2	CharacterString	Read
Application Software Version	V1.0	CharacterString	Read
Location	150 English Dr, Moncton, NB	CharacterString (32)	Read / Write
Description	Greystone Dewpoint Sensor	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 381001, where 381 is the vendor ID and 001 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 "DP 001" where DP is the device model name and 001 is the default network address. Can be written with a new string of maximum length of 32 characters and the value is saved. The "001" 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, writeProperty, deviceCommunicationControl, who-Has, who-Is Binary bit string = {00000000 00001001 01000000 00000000 01100000 0}
Protocol Object Types Supported	Analog_Input, Analog_Value, Binary_Value, Device Binary bit string = {10100100 10000000 00000000 00000000 00000000 00000000 00000000}
Object List	((Device, Instance 1), (Analog Input, Instance 1), (Analog Input, Instance 2), (Analog Input, Instance 3), (Analog Input, Instance 4), (Analog Input, Instance 5), (Analog Value, Instance 1), (Analog Value, Instance 2), (Analog Value, Instance 3), (Analog Value, Instance 4), (Analog Value, Instance 5), (Binary Value, Instance 1), (Binary Value, Instance 2))
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 objects allow reading of sensor values. Analog input object properties are shown below.

**Analog Input Object Temperature** (Present Value = temperature sensor reading in °F or °C, resolution = 0.1°, range = -30-50 °C or -22-122 °F)

PROPERTY	DEFAULT VALUE	PROPERTY DATA TYPE	ACCESS
Object Identifier	AI1 (Analog Input 1)	BACnetObjectIdentifier	Read
Object Name	Temperature	CharacterString (32)	Read
Object Type	ANALOG_INPUT (0)	BACnetObjectType	Read
Present Value	current reading	Real	Read
Description	Temperature	CharacterString (32)	Read
Device Type	Temperature 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	degrees-Celsius (62) or degrees-Fahrenheit (64)	BACnetEngineeringUnits	Read
Property List		BACnetArray	Read

**Analog Input Object  
Relative Humidity**

(Present Value = RH sensor reading in %RH, resolution is 0.1%, range = 0-100 %RH)

PROPERTY	DEFAULT VALUE	PROPERTY DATA TYPE	ACCESS
Object Identifier	AI2 (Analog Input 2)	BACnetObjectIdentifier	Read
Object Name	Relative Humidity	CharacterString (32)	Read
Object Type	ANALOG_INPUT (0)	BACnetObjectType	Read
Present Value	current reading	Real	Read
Description	Relative Humidity	CharacterString (32)	Read
Device Type	RH 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	Percent-relative-humidity (29)	BACnetEngineeringUnits	Read
Property List		BACnetArray	Read

**Analog Input Object  
Dewpoint Temperature**

(Present Value = dewpoint temperature calculation in °F or °C, resolution = 0.1°, range = -30-50 °C or -22-122 °F)

PROPERTY	DEFAULT VALUE	PROPERTY DATA TYPE	ACCESS
Object Identifier	AI3 (Analog Input 3)	BACnetObjectIdentifier	Read
Object Name	Dewpoint Temperature	CharacterString (32)	Read
Object Type	ANALOG_INPUT (0)	BACnetObjectType	Read
Present Value	current reading	Real	Read
Description	Dewpoint Temperature	CharacterString (32)	Read
Device Type	Dewpoint Temperature 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	degrees-Celsius (62) or degrees-Fahrenheit (64)	BACnetEngineeringUnits	Read
Property List		BACnetArray	Read

**Analog Input Object  
Wet Bulb Temperature**

(Present Value = wet bulb temperature calculation in °F or °C, resolution = 0.1°, range = -30-50 °C or -22-122 °F)

PROPERTY	DEFAULT VALUE	PROPERTY DATA TYPE	ACCESS
Object Identifier	AI4 (Analog Input 4)	BACnetObjectIdentifier	Read
Object Name	Wet Bulb Temperature	CharacterString (32)	Read
Object Type	ANALOG_INPUT (0)	BACnetObjectType	Read
Present Value	current reading	Real	Read
Description	Wet Bulb Temperature	CharacterString (32)	Read
Device Type	Wet Bulb Temperature 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	degrees-Celsius (62) or degrees-Fahrenheit (64)	BACnetEngineeringUnits	Read
Property List		BACnetArray	Read

**Analog Input Object  
Enthalpy**

(Present Value = enthalpy calculation in J/kg or BTU/lb, resolution = 1, range = 0-340 kJ/k or 0-146 BTU/lb)

PROPERTY	DEFAULT VALUE	PROPERTY DATA TYPE	ACCESS
Object Identifier	AI5 (Analog Input 5)	BACnetObjectIdentifier	Read
Object Name	Enthalpy	CharacterString (32)	Read
Object Type	ANALOG_INPUT (0)	BACnetObjectType	Read
Present Value	current reading	Real	Read
Description	Enthalpy	CharacterString (32)	Read
Device Type	Enthalpy 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	kilojoules-per-kilogram-dry-air (149) or btus-per-pound-dry-air (24)	BACnetEngineeringUnits	Read
Property List		BACnetArray	Read

The analog value BACnet objects allow sensor calibration and parameter selection. Analog value object properties are shown below.

**Analog Value Object  
Temperature Offset**

(Present Value defaults to 0 for no offset. Can be set from -10 to +10 D°F or -5.0 to +5.0 D°C)  
(Units depend on the device units, either °C or °F), (°C resolution = 0.5, °F resolution = 1)

PROPERTY	DEFAULT VALUE	PROPERTY DATA TYPE	ACCESS
Object Identifier	AV1 (Analog Value 1)	BACnetObjectIdentifier	Read
Object Name	Temperature Offset	CharacterString (32)	Read
Object Type	ANALOG_VALUE (2)	BACnetObjectType	Read
Present Value	0	Real	Read / Write
Description	Temperature Offset	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	delta-degrees-Fahrenheit (120) or D°C (121)	BACnetEngineeringUnits	Read
Property List		BACnetArray	Read

**Analog Value Object  
RH Offset**

(Present Value defaults to 0 for no offset. Can be set from -10 to +10 %RH, resolution = 1)

PROPERTY	DEFAULT VALUE	PROPERTY DATA TYPE	ACCESS
Object Identifier	AV2 (Analog Value 2)	BACnetObjectIdentifier	Read
Object Name	RH Offset	CharacterString (32)	Read
Object Type	ANALOG_VALUE (2)	BACnetObjectType	Read
Present Value	0	Real	Read / Write
Description	RH Offset	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	percent-relative-humidity (29)	BACnetEngineeringUnits	Read
Property List		BACnetArray	Read

**Analog Value Object Atmospheric Pressure** (Present Value = 1013 hectopascals. Can be set from 812 to 1013 hPa, resolution = 1 hPa)  
(Atmospheric pressure is directly linked with Altitude)

Property	Default Value	Property Data Type	Access
Object Identifier	AV3 (Analog Value 3)	BACnetObjectIdentifier	Read
Object Name	Atmospheric Pressure	CharacterString (32)	Read
Object Type	ANALOG_VALUE (2)	BACnetObjectType	Read
Present Value	1013	Real	Read / Write
Description	Atmospheric Pressure	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	hectopascals (hPa) (133)	BACnetEngineeringUnits	Read
Property List		BACnetArray	Read

**Analog Value Object Altitude** (Present Value defaults to 0 feet. Can be set from 0 to 6000 feet, resolution = 1 ft)  
(Altitude is directly linked with Atmospheric pressure)

Property	Default Value	Property Data Type	Access
Object Identifier	AV4 (Analog Value 4)	BACnetObjectIdentifier	Read
Object Name	Altitude	CharacterString (32)	Read
Object Type	ANALOG_VALUE (2)	BACnetObjectType	Read
Present Value	0	Real	Read / Write
Description	Altitude	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	feet (33)	BACnetEngineeringUnits	Read
Property List		BACnetArray	Read

**Analog Value Object Display Mode** (Present Value defaults to 1. Can be changed to control what is displayed on the LCD)

Property	Default Value	Property Data Type	Access
Object Identifier	AV5 (Analog Value 5)	BACnetObjectIdentifier	Read
Object Name	Display Mode	CharacterString (32)	Read
Object Type	ANALOG_VALUE (2)	BACnetObjectType	Read
Present Value	0	Real	Read / Write
Description	Display Mode	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

\* Notes This object controls the information that is displayed on the LCD in the normal operating mode.  
The available settings are: 0 = no display (menu will still display if key pressed)

- 1 = Temperature
- 2 = Dewpoint temperature
- 3 = Wet Bulb temperature
- 4 = Enthalpy
- 5 = Temperature plus dewpoint toggle every 5 seconds
- 6 = Temperature plus wet bulb toggle
- 7 = Temperature plus enthalpy toggle
- 8 = Dewpoint plus wet bulb toggle
- 9 = Dewpoint plus enthalpy toggle
- 10 = Wet bulb plus enthalpy toggle

The binary value BACnet object allows configuration of the device. Binary value object properties are shown below.

**Binary Value Object** (Present Value defaults to 0 (INACTIVE) for Celsius. Can be set to 1 (ACTIVE) for Fahrenheit)  
**Temperature Units**

Property	Default Value	Property Data Type	Access
Object Identifier	BV1 (Binary Value 1)	BACnetObjectIdentifier	Read
Object Name	Temperature Units	CharacterString (32)	Read
Object Type	BINARY_VALUE (5)	BACnetObjectType	Read
Present Value	INACTIVE (0)	BACnetBinaryPV	Read / Write
Description	Celsius (0) or Fahrenheit (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

**Binary Value Object** (Present Value defaults to 0 (INACTIVE) for kJ/kg. Can be set to 1 (ACTIVE) for BTU/lb)  
**Enthalpy Units**

Property	Default Value	Property Data Type	Access
Binary Value Object	(Present Value defaults to 0 (INACTIVE) for kJ/kg. Can be set to 1 (ACTIVE) for BTU/lb)		
Object Identifier	BV2 (Binary Value 2)	BACnetObjectIdentifier	Read
Object Name	Enthalpy Units	CharacterString (32)	Read
Object Type	BINARY_VALUE (5)	BACnetObjectType	Read
Present Value	INACTIVE (0)	BACnetBinaryPV	Read / Write
Description	kJ/kg (0) or BTU/lb (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

## BACnet Protocol Implementation Conformance Statement (PICS)

**Date :** Feb 21, 2017  
**Vendor Name :** Greystone Energy Systems  
**Product Name :** Dewpoint Sensor - Room  
**Product Model Number :** DPRCB  
**Application Software Version :** 1.0  
**Firmware Revision :** 1.4  
**BACnet Protocol Revision :** 14

**Product Description :** The Greystone Dewpoint Sensors are smart duct or OSA sensors with native BACnet MS/TP protocol for network communication. They measure room temperature, dewpoint temperature, wet bulb temperature, RH and enthalpy 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-WP-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	Present_Value
Binary Value	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)