



# LENNOX® CORE™ UNIT CONTROLLER BACNET SETUP GUIDE

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## Table of Contents

<b>1. BACnet Quick Start</b> .....2	2.1. CORE Unit Controller BACnet MS/TP Interface Specifications and Default Settings.....3	<b>6. Troubleshooting</b> .....8
1.1. Network Connections.....2	2.2. Configuring BACnet MS/TP.....4	<b>7. Object Definitions</b> .....16
1.2. General.....2	2.3. Additional Configuration Steps.....4	7.1. Analog Output.....16
1.3. Pairing Lennox® CORE Service App to CORE Unit Controller.....2	2.4. BACnet MS/TP Cabling.....4	7.2. Analog Input.....17
1.4. Enabling the CORE Unit Controller BACnet Interface.....2	2.5. Connections for BACnet MS/TP.....4	7.3. Analog Value.....19
1.5. Integrating the CORE Unit Controller into a BAS System (Single-Zone):.....2	2.6. BACnet MS/TP Network Bus Termination.....5	7.4. Character String Values.....20
1.5.1. Common Integration Guidelines...2	2.7. General BACnet MS/TP Guidelines.....5	7.5. Multi-State Values.....20
1.5.2. Lennox Recommended Objects for Writing Generic Applications.....2	<b>3. Network Setup for BACnet IP</b> .....5	<b>8. Room Sensor Set Points</b> .....21
1.5.3. Lennox Recommended Objects for Reading Unit Status...3	3.1. CORE Unit Controller BACnet IP Interface Specifications and Default Settings.....5	<b>9. Application Details</b> .....22
1.6. Integrating the CORE Unit Controller into a BAS System (Multi-Zone VAV).....3	3.2. CORE Unit Controller BACnet® IP Cabling.....6	9.1. Application Modes Specific To Remote Thermostat Operation.....24
1.6.1. Common Integration Guidelines:..3	3.3. Connections for BACnet IP.....6	9.2. Object IDs.....25
1.6.2. Lennox recommends writing the following objects for generic applications:.....3	3.4. Configuring BACnet IP.....6	9.2.1. Analog Outputs (AO).....25
1.6.3. Lennox Recommends Objects for Reading Unit Status...3	3.5. General BACnet IP Guidelines.....6	9.2.2. Analog Inputs (AI).....34
<b>2. Network Setup for BACnet MS/TP</b> .....3	<b>4. Control and Backup Sensor Modes</b> .....6	9.2.3. Analog Values.....44
	4.1. Control Mode Options.....6	<b>Appendix A — Blower Operations and Effective Occupancy</b> .....47
	4.1.1. Monitor Only.....6	<b>Appendix B — BACnet® Protocol Implementation Conformance (PIC) Statement</b> .....50
	4.1.2. Room Sensor.....6	
	4.1.3. Network Thermostat.....6	
	4.2. Backup Sensor Modes.....6	
	<b>5. Controller Defaults and Time-outs</b> .....7	

## WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a licensed professional HVAC installer (or equivalent) or service agency

## 1. BACnet Quick Start

This section demonstrates a simple integration with the Lennox® CORE Unit Controller using BACnet MS/TP and BACnet IP (BIP). The contents of this document indicates all available points and functionalities.

**NOTE:** *The CORE Unit Controller may be referred to as unit controller throughout this instruction from the point on.*

### 1.1. Network Connections

- This guide assumes that you are using network sensor values. To use local sensors, wire each sensor appropriately to the CORE Unit Controller, and configure it appropriately.
- BACnet IP (BIP) to CORE Unit Controller Ethernet connection requires CAT5 or CAT6 cable.

### 1.2. General

This document is provided to assist in the integration of the CORE Unit Controller to the building automation system.

- This BACnet interface does not require any Lennox proprietary software or interface in order for the BACnet interface to function with the unit control system.
- The unit control BACnet Interface allows communication between the CORE Unit Controller and a BACnet MS/TP or IP network. Both MS/TP and BACnet IP (BIP) Interfaces are available directly on via the CORE Unit Controller.
- The unit BACnet® interface has been developed to communicate with building automation systems that support the BACnet Application Specific Controller (B-ASC) device profile.
- CORE Unit Controller BACnet® interface is certified to ANSI/ASHRAE 135-2008 and is BTL Listed.

### 1.3. Pairing Lennox® CORE Service App to CORE Unit Controller

- The mobile application is compatible with the CORE Unit Controller.
- The mobile application can discover the CORE Unit Controller if within 50 feet of the mobile device being used.
- The mobile application will list the units by signal strength.
- The unit friendly name is displayed.
- Select the desired unit from the discovery list. The four digit code desired on the unit will show the code listed in the discovery list.

- Once the unit has been selected, connection should be established to your device within 10 seconds.
- Information displayed once pairing is completed will be RTU name, model number, serial number and firmware version.

### 1.4. Enabling the CORE Unit Controller BACnet Interface

To enable the BACnet interface, use the CORE Service App and go to RTU MENU > SETUP > INSTALL to run the setup wizard. When Configuration ID 1 appears on the screen, configure position 5 as B. This will enable the BACnet® interface.

### 1.5. Integrating the CORE Unit Controller into a BAS System (Single-Zone):

This section discusses how to use the commissioned and wired the CORE Unit Controller in a single zone network discharge air operation. For use in a multi-zone, see "3. Network Setup for BACnet IP" on page 5.

#### 1.5.1. Common Integration Guidelines

This device does not support Change of Value (COV)

#### 1.5.2. Lennox Recommended Objects for Writing Generic Applications

- AO102 (Outdoor Air Min Pos Control)
- AO104 (Occupancy Scheduler Control)
- AO108 (Space Dehumidification set point)
- AO109 (Temperature Set point - abs)
- AO111 (IAQ 1 Network Input)
- AO112 (Humidity Network Input)
- AO113 (Space Temperature Input)

#### How to use these objects:

- Write to the Network Inputs (AO111-113) every 2 minutes
- Write to the Set points (AO108 and AO109) every 7 minutes
- Write to AO104 when occupancy changes
- Write to AO102 to enable a greater minimum position' This is not an override and will not necessarily close a damper opening.

### 1.5.3. Lennox Recommended Objects for Reading Unit Status

- AI232 (Unit Status)
- AI239 (Space Temperature)
- AI240 (Discharge Air Temperature)
- AI244 (Outside Air Damper)
- AI250 (Supply Fan Status)
- AI252 (Space Temperature Set Point (Effective))
- AI253 (Current Error Code)
- AI274 (Space CO2 Sensor (Effective))
- AI276 (Space Humidity (Effective))
- AI278 (Dehumidification Set Point (Effective))
- AI281 (Return Air Temperature)
- MSV310 (Current Operating Mode)

#### How to use these objects:

These objects are read-only, use them for monitoring, unit graphics, and checking unit statuses.

### 1.6. Integrating the CORE Unit Controller into a BAS System (Multi-Zone VAV)

This section discusses how to integrate the CORE Unit Controller into a BAS VAV (Multi-zone) configuration. It assumes you have integrated zone boxes and individual zone sensors appropriately.

#### 1.6.1. Common Integration Guidelines:

- Device Max\_Master = 127
- This device does not support Change of Value (COV)

#### 1.6.2. Lennox recommends writing the following objects for generic applications:

- AO102 (Outdoor Air Min Pos Control)
- AO104 (Occupancy Scheduler Control)
- AO125 (Discharge Air Cooling Set point)
- AO126 (Discharge Air Heating Set point)

#### How to use these objects:

The set points will provide additional operating setpoints for MZVAV logic and

allow staging of compressors, heater, and fan, to meet the discharge temp and static set points.

### 1.6.3. Lennox Recommends Objects for Reading Unit Status

- AI232 (Unit Status)
- AI238 (Duct Static Pressure)
- AI240 (Discharge Air Temperature)
- AI244 (Outside Air Damper)
- AI250 (Supply Fan Status)
- AI253 (Current Error Code)
- AI281 (Return Air Temperature)
- MSV310 (Current Operating Mode)

#### How to use these objects:

These objects are read-only, use them for monitoring, unit graphics, and checking unit statuses.

## 2. Network Setup for BACnet MS/TP

### 2.1. CORE Unit Controller BACnet MS/TP Interface Specifications and Default Settings

Table 1. CORE Unit Controller BACnet Interface Specifications and Default Settings

Environment	
Operating temperature range	-40F to 155F
Storage temperature range	-40F to 185F
RH	10-95% RH non-condensing
Field Connections	
BACnet® MS/TP	See "Appendix B — BACnet® Protocol Implementation Conformance (PIC) Statement" on page 51.
Transceiver	RS-485
Connector	Three-position terminal block (+ G -)
Baud Rate	Selectable 9.6, 19.2, 38.4, 76.8K

**Table 1. CORE Unit Controller BACnet Interface Specifications and Default Settings**

Cable Type	Twisted pair w/shield, 22AWG min. Belden type 88761 or 8761. Lennox 27M19, 94L63 or 68M25
Max. Cable Length	4000 ft. repeater is required for longer lengths.
Bus Termination	120 ohm resistor on last interface in chain.
Default Values	
device Max_Master	127
device Max_Info_Frames	1
device Object_Identifier	MAC address
device Object_Name	"Lennox_M4_" + MAC address for MSTP or last octet of IP address for BIP
RTU Location	"RTU Location"
device Description	"Lennox RTU HVAC Controller"
baud rate	38.4k
recommended update rate	At least once every 12 minutes
communication time-out	15 minutes

## 2.2. Configuring BACnet MS/TP

Utilizing the CORE Service App, go to **RTU MENU > SETUP > NETWORK INTEGRATION**:

- Choose **BACnet MS/TP**.
- Set the **BACnet MAC Address** unique for each CORE Unit Controller on the network.
- Set the **Device Instance** to the default (should be equal to the MAC Address) with the CORE service application. The device instance can also be setup through AO105.
- 'Set the **BAUD Rate** to your applicable network rate. The Lennox default BAUD is 38.4 kbps.'

## 2.3. Additional Configuration Steps

- Select **Next** and select **Room Sensor** as the control mode. For Multi-Zone VAV.
- Select **CO2 Sensor Source** as Network and select **Next**.

- Select **Relative Humidity Source** as Network and select **Next**.
- Select **Temperature Sensor Source** as Network and select **Next**.
- Choose the **Occupied Blower Mode** as **Auto-Cycle** and select **Next**. Choose **On-Continuous** as necessary
- Select the **Backup Mode** as **Return Air Backup** and Select **Next**.
- Set the **Occupied** and **Unoccupied Backup Set points** as necessary and select **Next**.

## 2.4. BACnet MS/TP Cabling

The CORE Unit Controller BACnet® interface is compatible with MS/TP EIA-485 daisy-chain networks communicating at 9.6, 19.2, 38.4, and 76.8 kbps.

Connect the BACnet® MS/TP network cable to the CORE Unit Controller BACnet® interface.

It is compatible with twisted pair, shielded 22 AWG minimum cable such as Belden 8761, 88761 and Lennox catalog numbers 27M19, 94L63 or 68M25.

A maximum of 32 CORE Unit Controller BACnet® interfaces can be included per network segment. Up to 127 units can be connected per network segment by using repeater for every 32 devices.

The network cable should be routed using best practices to avoid induced noise. Do not route alongside high voltage wiring or in proximity to high-voltage or high-frequency devices, such as ignition controls and variable frequency drives. The BACnet MS/TP recommended maximum total bus length (without repeater) of 4000 ft. (1219m) applies to this device.

The guidelines provided were established with setting the baud rate no higher than 9.6K. When using higher baud rates we recommend that no more than 20 Lennox BACnet units and 30 devices per router. Since CORE Unit Controller BACnet interface provides access to many objects, Lennox does not recommend use of repeaters in any BACnet network because of the amplified noise they tend to propagate on the network.

## 2.5. Connections for BACnet MS/TP

1. Connect the BACnet SmartWire connector.
2. No adjustment is necessary to the BACnet plug unless the interface is at the end of a daisy-chained configuration. In that case, it is recommended to place a 120 ohm resistor across the + and - terminals.
3. Upon powering up the CORE Unit Controller, the BACnet interface will need to be configured. .
4. To configure the CORE Unit Controller BACnet MS/TP Interface, install the CORE Service App on your mobile device and pair to the CORE Unit

Controller. See the CORE Unit Controller Setup Guide for instructions on how to pair your mobile device to the CORE Unit Controller.

## 2.6. BACnet MS/TP Network Bus Termination

When the CORE Unit Controller BACnet® Interface is at the end of a daisy chain, connect a 120 ohm resistor across the + and - terminals. Every BACnet® MS/TP chain should have a termination at each end of the chain (exactly two terminations).

### **IMPORTANT**

A qualified systems integrator with adequate training and experience is required to integrate and commission the CORE Unit Controller BACnet Interface into a third party BACnet building automation system. A BACnet configuration software tool is required to commission the BACnet network.

## 2.7. General BACnet MS/TP Guidelines

1. Set all BACnet® devices on an MS/TP network to consecutive MAC addresses, starting at 1, so that there are no gaps between MAC address values.
2. Set Max\_Master device property on all devices to match the largest MAC address on the network. Note, this could be larger than existing network to allow for adding devices to the network without the need to adjust the Max\_Master property in the future. (Contact Lennox Technical Support for more detailed information).
3. Use ReadPropertyMultiple service instead of Read Property service when reading multiple analog inputs or values.
4. Do not exceed the maximum recommended length (1200 M / 4000 ft.) for any MS/TP segment.
5. All MS/TP network segment ends should be terminated per control provider instructions.
6. To minimize communication compatibility problems, BACnet gateways or BACnet devices that are NOT BTL listed should be avoided.
7. The guidelines provided were established with setting the baud rate no higher than 9.6K. When using higher baud rates we recommend that no more than 20 Lennox BACnet units and 30 devices per router. Since the CORE Unit Controller BACnet units provides access to many objects, Lennox does not recommend use of repeaters in any BACnet network because of the amplified noise they tend to propagate on the network.

## 3. Network Setup for BACnet IP

### 3.1. CORE Unit Controller BACnet IP Interface Specifications and Default Settings

**Table 2. CORE Unit Controller BACnet® IP Interface Specifications and Default Settings**

Environment	
Operating temperature range	-40F to 155F
Storage temperature range	-40F to 185F
RH	10-95% RH non-condensing
Field Connections	
BACnet® IP	See "Appendix B — BACnet® Protocol Implementation Conformance (PIC) Statement" on page 51.
Transceiver	10/100MBPS
Connector	RJ-45
Cable Type	CAT-5
Max. Cable Length	100 Meters (Between Segments)
Bus Termination	Surge protection recommended
Default Values	
device Max_Master	127
device Max_Info_Frames	1
device Object_Identifier	Last octet of IP address
device Object_Name	"Lennox_M4_" + MAC address
device Location	"RTU Location"
device Description	"Lennox RTU HVAC Controller"
UDP Port Address	Default 0xBAC0
recommended update rate	At least every 12 minutes

### 3.2. CORE Unit Controller BACnet® IP Cabling

- The CORE Unit Controller BACnet IP Interface is a set of two RJ-45 plugs connected by an IP switch.
- The network cable should be routed using best practices to avoid induced noise. Do not route alongside high voltage wiring or in proximity to high-voltage or high-frequency devices, such as ignition controls and variable frequency drives. Surge protection is recommended at the CORE Unit Controller level.

### 3.3. Connections for BACnet IP

Connect a CAT5E or CAT6 cable to one of the RJ-45 ports (1 or 2) of the unit controller.

### 3.4. Configuring BACnet IP

Upon powering up the CORE Unit Controller, the CORE Unit Controller BACnet IP interface will need to be enabled and configured. Use the following procedures to complete both tasks:

1. Use the CORE Service app to enable the CORE Unit Controller BACnet interface, go to **RTU MENU > SETUP > INSTALL** and run the setup wizard. When **Configuration ID 1** appears on the screen, configure position 5 as **B**. This will enable the BACnet® interface.
2. To configure the CORE Unit Controller BACnet IP Interface, connect to the CORE Unit Controller with your mobile device (phone or tablet).
3. Once connected to the CORE Unit Controller, go to **RTU MENU > SETUP > NETWORK INTEGRATION** and select **BACnet IP**. Follow the prompts on screen to complete BACnet setup.

### 3.5. General BACnet IP Guidelines

Go to the following address for more information:

<http://www.bacnet.org/Tutorial/BACnetIP/index.htm>

A BACnet/IP network can be composed of more than one IP subnet.

- Generally UDP broadcast packets are stopped by routers from transmitting to another sub net. In such scenario BACnet Broadcast Management Device (BBMD) devices are to be used. Otherwise BIP will not work.
- For details refer: <http://www.bacnet.org/Tutorial/BACnetIP/sld007.html>

## 4. Control and Backup Sensor Modes

### 4.1. Control Mode Options

There are three Primary Control Modes available on the CORE Unit Controller. The primary control mode can be set using the Network Setup Wizard on the CORE Service app.

#### 4.1.1. Monitor Only

The unit is under control from another device such as a thermostat or local sensor. The CORE Unit Controller will not respond to set points or application mode demands related to heating/cooling sent over the network. Use this mode if you only wish to monitor the operation of the RTU.

#### 4.1.2. Room Sensor

In this mode, the rooftop unit is controlled by room temperature set points (AO109, AV130 - AV133) and occupancy state (AO104). Room temperature is monitored and compared to the appropriate room temperature set points. Room temperature can be provided by local sensor or network value (AO113). Control for Humidity and Ventilation (Co2) is also supported. This is the recommended mode for control via BACnet.

#### 4.1.3. Network Thermostat

In this mode, the rooftop unit is controlled by network demands for heating/cooling in the form of application mode commands (AO101). This mode assumes a network thermostat sending remote demands AO101 values 208, 209 and 224 - 236. This mode is not recommended.

### 4.2. Backup Sensor Modes

Under certain conditions such as sensor failure, the CORE Unit Controller will go into one of the backup modes of operation as described in the CORE Unit Controller setup guide.

When backup sensor mode is entered, a code 93 will be broadcast over BACnet as well as displayed at the controller display. Backup mode options available are:

- **Return Air Temperature** - Unit will use the pre-configured backup set points and the local RAT sensor to heat / cool
- **Thermostat** - Unit will run off a local thermostat. The CORE Unit Controller will require a reset to move back to primary operation in this mode.
- **Room Sensor**- Unit will use local sensors and pre-configured set points to run. This mode is only available when Network Thermostat is selected as the Primary Control Mode.
- **None** - Unit will cease to operate until the primary control mode can be restored.

## 5. Controller Defaults and Time-outs

The CORE Unit Controller does not store commands after a reset. Commands will need to be resent after every reset.

The CORE Unit Controller device must be written to at least every 15 minutes, or it will consider the network to be offline.

The following points (if used) MUST be updated at least every 5 minutes:

- Network Space Temperature (AO113)
- Network Space Humidity
- Network Space CO2
- Network Thermostat Demands (AO101)
- Network Occupancy (AO104)
- Network Set points (AO109, AV130-133)

Lennox recommends that the above points (if used) are updated every 2 minutes to ensure that a retry is possible in the given 5 minute window.

Change of Value (COV) is not supported on the CORE Unit Controller interface.

## 6. Troubleshooting

Use table 2 as a guide once the BACnet network is set up and operating.

**Table 3. BACNet Communication Check (MSTP and IP)**

LED	Action
<b>MSTP</b>	
BACnet communication transmit and receive LEDs flash.	None. Indicates normal communication.
BACnet communication LEDs are off or intermittently go off for periods of 1 second or longer.	<ul style="list-style-type: none"> <li>• Check BACnet network connections.</li> <li>• Make sure BACnet network is commissioned.</li> <li>• Make sure each unit has a unique MAC address in the range of 0 to 127.</li> <li>• Verify same baud rate on all devices.</li> </ul>
GREEN only	ON BACNET NETWORK NO SEND/RECEIVE = Action - none
YELLOW only	NOT ON NETWORK - 1. Check BACnet network connections.
<b>BIP</b>	
Check for UDP port number is unique for the device.	
Is standard ping working between devices	
Device assigned with IP address , which does not have any conflict.	

Control following a connection failure depends on where the failure occurs, and which input device has been used.

**Table 4. Device Objects and Property Ranges**

Property name	Property Value	Data type	Access
Description	"Lennox RTU HVAC Controller"	Char String	RW
Object_Identifier*	The default identifier is: <ul style="list-style-type: none"> <li>• Two for MSTP</li> <li>• Last octet of IP address for BIP</li> </ul> <i><b>NOTE:</b> Values can be changed using the CORE Service App</i>	Integer (1-4194302)	RW
Object_Name	Lennox_CORE_2 (default value)	Char String (32 char. max.)	RW
Vendor name	Lennox	Char String	R
Model name	"W4 CORE"	Char String	RW
Firmware revision	Firmware version dependent	Char String	R
Application software revision	Firmware version dependent	Char String	R
Location	Location	Char String (32 char. max.)	RW
Vendor identifier	255	Integer	R



**Table 4. Device Objects and Property Ranges**

Property name	Property Value	Data type	Access
Max APDU length accepted	Max length is: • 480 for MS/TP • 1476 for BIP	Integer	R
Max Master	127	Integer (1-127)	RW
Segmentation supported	FALSE	Boolean	R
Max Info frames	1	Integer (1-65535)	RW
Unit serial number	Factory set	Integer	R

\* The default Object\_Identifier is the MSTP MAC address which is set locally. To set it to a different value, it must be changed by the front end software.

**NOTE:** The Lennox CORE Unit Controller BACnet interface does not support COV (Change of Value).

**Table 5. Lennox Proprietary Objects**

Property	Description	Device Objects						
		Compressor	Heating	Blower	Economizer	Space Air	Discharge Air	Outdoor Air
Object_Identifier	Object_Identifier is a Read Only (RO) property, used to identify the Object and it is unique within Lennox BACnet Device.	●	●	●	●	●	●	●
Object_Name	Object_Name is a Read Only (RO) property use to name the Object and is unique within the BACnet Device. The minimum length of the string is one character.	●	●	●	●	●	●	●
Object_Type	Object_Type is a Read Only (RO) property and is one of the following: OBJECT_LNX_COMPRESSOR, OBJECT_LNX_HEATING, OBJECT_LNX_BLOWER, OBJECT_LNX_ECONOMIZER, OBJECT_LNX_INDOOR_AIR, OBJECT_LNX_DISCHARGE_AIR, OBJECT_LNX_OUTDOOR_AIR.	●	●	●	●	●	●	●
Out_Of_Service	Out_Of_Service is a Read Only (RO) property that indicates whether the physical component that the object represents is in service or not.	●	●	●	●			
Lennox_Object_Installed	Lennox_Object_Installed is a Read Only (RO) property that indicates whether the physical component that the object represents is installed in the RTU or not. Unless the value of this property is TRUE, all other properties of the Compressor, Heat Stage, or Economizer object instance are invalid.	●	●		●			
Lennox_Object_Running	Lennox_Object_Running is a Read Only (RO) property that indicates that the component is not running if the value is zero and that the component is running if a value greater than zero (range: 0, 100). Components capable of reporting values of more granular detail, i.e. all the integer values in the range of 0 – 100, as percent capacity utilization, then that value is reported by this property. Other components will only show ON or OFF.	●	●	●	●			
Lennox_Object_Run_Time	Lennox_Object_Run_Time is a Read Only (RO) property that indicates in minutes the time the corresponding component has been running (range: 0, 4294967295). Internally the time that the compressor has been running is stored into EEPROM once every hour. Therefore, in the event power turns off, the value returned when power turns back on will be the last stored value. This can result in a loss of run-time value up to an hour for each power cycle event.	●	●	●	●			

**Table 5. Lennox Proprietary Objects**

Property	Description	Device Objects					
		Compressor	Heating	Blower	Economizer	Space Air	Discharge Air Outdoor Air
Lennox_Object_Min_Cycle_Time	Lennox_Object_Min_Cycle_Time is a Read Only (RO) property that indicates in seconds the minimum time the corresponding component must run in any given cycle (range: 0, 4294967295). This prevents short cycles to help protect the component. (This property does not apply to Electric Heat Stage components.)	●	●				
Lennox_Object_Cycle_Count	Lennox_Object_Cycle_Count is a Read Only (RO) property that indicates the number of cycles the corresponding component has been running (range: 0, 4294967295).	●	●	●	●		
Lennox_Object_Error	Lennox_Object_Error is a Read Only (RO) property that reports any error code the corresponding component may have encountered (range: 0, 255). A value of 0 means no error while any non-zero value represent an error.	●	●	●	●		
Lennox_Object_Heat_Type	Lennox_Object_Heat_Type is a Read Only (RO) property that indicates the source of power used to run the component (range: 0, 255). The interpreted values are: 1-Gas; 2-Electric; 3-Heat Pump mode.		●				
Object_Temperature	Object_Temperature is a Read Write (RW) property that Indicates the temperature. The units of measurement for this property are Degrees Fahrenheit.					●	●
Object_Relative_Humidity	Object_Relative_Humidity is a Read Write (RW) property that represents relative humidity of space air, measured as a percentage.					●	
Object_CO2_Level	Object_CO2_Level is a Read Write (RW) property that indicates the CO2 levels in the space air, measured in PPM.					●	
Object_Duct_Static_Pressure_Set point	Object_Duct_Static_Pressure_Set point is a Read Only (RO) property that represents the Duct Static Pressure Set point of Discharge Air, measured in inches of water column (range: 0, 5).					●	

**Table 6. Lennox Proprietary Objects - Compressor (Object ID: 136)**

Property	Property ID	Data type and range	Access	Description
Object_Identifier	75	Integer (0-4194302)	Read Only	Numeric code that identifies the object (unique within Lennox BACnet Device).
Object_Name	77	Character string of 1 character (min.) to 32 characters (max.)	Read Only	Identifies the Object and is unique within the BACnet Device.
Object_Type	79	136 (OBJECT_LNX_COMPRESSOR)	Read Only	Indicates membership in a particular object type class.
Out_Of_Service	81	TRUE or FALSE	Read Only	Indicates whether the compressor is in service or not.
Lennox_Object_Installed	513	TRUE or FALSE	Read Only	Indicates whether the compressor is installed or not. Unless the value of this property is TRUE, all other properties of the Compressor object instance are invalid.
Lennox_Object_Running	514	Integer (0 - 100)	Read Only	Indicates that the compressor is not running if the value is zero and that the compressor is running if a value greater than zero (range: 0, 100).

**Table 6. Lennox Proprietary Objects - Compressor (Object ID: 136)**

Property	Property ID	Data type and range	Access	Description
Lennox_Object_Run_Time	515	Integer (0 - 4294967295) minutes	Read Only	Indicates the time the compressor has been running. Internally, the time that the compressor has been running is stored into EEPROM once every hour. Therefore, in the event power turns off, the value returned when power turns back on will be the last stored value. This can result in a loss of run-time value up to an hour for each power cycle event.
Lennox_Object_Min_Cycle_Time	516	Integer (0 - 4294967295) seconds	Read Only	Indicates the minimum time the compressor must run in any given cycle. This prevents short cycles to help protect the compressor.
Lennox_Object_Cycle_Count	517	Integer (0 - 4294967295) cycles	Read Only	Indicates the number of cycles the compressor has been running.
Lennox_Object_Error	518	Integer (0 - 255)	Read Only	Reports any error code the compressor may have encountered. A value of 0 means no error while any non-zero value represent an error.

**Table 7. Lennox Proprietary Objects - Blower (Object ID: 129)**

Property	Property ID	Data type and range	Access	Description
Object_Identifier	75	Integer (0-4194302)	Read Only	Numeric code that identifies the object (unique within Lennox BACnet Device)
Object_Name	77	Character string of 1 character (min.) to 32 characters (max.)	Read Only	Identifies the Object and is unique within the BACnet Device.
Object_Type	79	129 (OBJECT_LNX_BLOWER)	Read Only	Indicates membership in a particular object type class.
Out_Of_Service	81	TRUE or FALSE	Read Only	Indicates whether the blower is in service or not.
Lennox_Object_Installed:	513	TRUE or FALSE	Read Only	Indicates whether the economizer is installed or not. Unless the value of this property is TRUE, all other properties of the economizer object instance are invalid.
Lennox_Object_Running	514	Integer (0 - 100)	Read Only	Indicates that the blower is not running if the value is zero and that the blower is running if a value greater than zero (range: 0, 100 or possible values).
Lennox_Object_Run_Time	515	Integer (0 - 4294967295) minutes	Read Only	Indicates the time the blower has been running. Internally, the time that the blower has been running is stored into EEPROM once every hour. Therefore, in the event power turns off, the value returned when power turns back on will be the last stored value. This can result in a loss of run-time value up to an hour for each power cycle event.
Lennox_Object_Cycle_Count	517	Integer (0 - 4294967295) cycles	Read Only	Indicates the number of cycles the blower has been running
Lennox_Object_Error	518	Integer (0 - 255)	Read Only	Reports any error code the blower may have encountered. A value of 0 means no error while any non-zero value represent an error.

**Table 8. Lennox Proprietary Objects - Heating (Object ID 130)**

Property	Property ID	Data type and range	Access	Description
Object_Identifier	75	Integer (0-4194302)	Read Only	Numeric code that identifies the object (unique within Lennox BACnet Device).
Object_Name	77	Character string of 1 character (min.) to 32 characters (max.)	Read Only	Identifies the Object and is unique within the BACnet Device.
Object_Type	79	130 (OBJECT_LNX_HEATING)	Read Only	Indicates membership in a particular object type class.
Out_Of_Service	81	TRUE or FALSE	Read Only	Indicates whether the heating device is in service or not.
Lennox_Object_Installed	513	TRUE or FALSE	Read Only	Indicates whether the heating device is installed or not. Unless the value of this property is TRUE, all other properties of the heating object instance are invalid.
Lennox_Object_Running	514	Integer (0 - 100)	Read Only	Indicates that heating is not running if the value is zero and that heating is running if a value greater than zero (range: 0, 100 or possible values).
Lennox_Object_Run_Time	515	Integer (0 - 4294967295) minutes	Read Only	Indicates the time heating has been running. Internally, the time that heating has been running is stored into EEPROM once every hour. Therefore, in the event power turns off, the value returned when power turns back on will be the last stored value. This can result in a loss of run-time value up to an hour for each power cycle event.
Lennox_Object_Min_Cycle_Time	516	Integer (0 - 4294967295) seconds	Read Only	Indicates the minimum time heating must run in any given cycle. This prevents short cycles to help protect the compressor (This property does not apply to Electric Heat Stage components).
Lennox_Object_Cycle_Count	517	Integer (0 - 4294967295) cycles	Read Only	Indicates the number of cycles heating has been running.
Lennox_Object_Error	518	Integer (0 - 255)	Read Only	Reports any error code heating may have encountered. A value of 0 means no error while any non-zero value represent an error.
Lennox_Object_HeatType	533	Integer: Values are: <ul style="list-style-type: none"> <li>• 1-Gas</li> <li>• 2-Electric</li> <li>• 3-Heat Pump mode</li> </ul>	Read Only	Indicates the source of power used for heating (range: 0, 255).

**Table 9. Lennox Proprietary Objects - Economizer (Object ID: 131)**

Property	Property ID	Data type and range	Access	Description
Object_Identifier	75	Integer (0-4194302)	Read Only	Numeric code that identifies the object (unique within Lennox BACnet Device).
Object_Name	77	Character string of 1 character (min.) to 32 characters (max.)	Read Only	Identifies the Object and is unique within the BACnet Device.
Object_Type	79	131 (OBJECT_LNX_ECONOMIZER)	Read Only	Indicates membership in a particular object type class.
Out_Of_Service	81	TRUE or FALSE	Read Only	Indicates whether the economizer is in service or not.

**Table 9. Lennox Proprietary Objects - Economizer (Object ID: 131)**

Property	Property ID	Data type and range	Access	Description
Lennox_Object_Installed	513	TRUE or FALSE	Read Only	Indicates whether the economizer is installed or not. Unless the value of this property is TRUE, all other properties of the economizer object instance are invalid.
Lennox_Object_Running	514	Integer (0 - 100)	Read Only	Indicates that the economizer is not running if the value is zero and that the economizer is running if a value greater than zero (range: 0, 100 or possible values).
Lennox_Object_Run_Time	515	Integer (0 - 4294967295) minutes	Read Only	Indicates the time the economizer has been running. Internally, the time that the economizer has been running is stored into EEPROM once every hour. Therefore, in the event power turns off, the value returned when power turns back on will be the last stored value. This can result in a loss of run-time value up to an hour for each power cycle event.
Lennox_Object_Cycle_Count	517	Integer (0 - 4294967295) cycles	Read Only	Indicates the number of cycles the economizer has been running.
Lennox_Object_Error	518	Integer (0 - 255)	Read Only	Reports any error code the compressor may have encountered. A value of 0 means no error while any non-zero value represent an error.
Lennox_Object_ECON_FREE_COOL_RUN_TIME	530	0 - 4294967295 minutes	Read Only	Indicates the runtime of Free Cooling
Lennox_Object_ECON_FREE_COOL_CYCLE_COUNT	531	0 - 4294967295 cycles	Read Only	Indicates the amount of cycles that have occurred on Free Cooling.
Lennox_Object_PROP_ECON_FREE_COOL_SET_POINT	532	0 - 70 Degrees Fahrenheit	Read Only	Indicates the Free Cooling setpoint Supply Air temperature for the economizer.

**Table 10. Lennox Proprietary Objects - Discharge Air (Object ID: 133)**

Property	Property ID	Data type and range	Access	Description
Object_Identifier	75	Integer (0-4194302)	Read Only	Numeric code that identifies the object (unique within Lennox BACnet Device)
Object_Name	77	Character string of 1 character (min.) to 32 characters (max.)	Read Only	Identifies the Object and is unique within the BACnet Device.
Object_Type	79	133 (OBJECT_LNX_DISCHARGE_AIR)	Read Only	Indicates membership in a particular object type class.
Object_Temperature	534	Real: Degrees Fahrenheit (-8.75 to 164.45)	Read Only	Indicates the temperature of the discharge air.
Object_Duct_Static_Pressure_Set point	535	Integer: Values are 0 - 5 (inches of water column)	Read Only	Represents the Duct Static Pressure Set point of discharge air.
Object_Relative_Humidity	536	Real: Values are 0 to 100 (%RH)	Read Write	Represents relative humidity of space air.
Object_CO2_Level	537	Real: Values are 300 to 2000 (PPM)	Read Write	Indicates the CO2 levels in the space air.

**Table 11. Lennox Proprietary Objects - Space Air (Object ID: 133)**

Property	Property ID	Data type and range	Access	Description
Object_Identifier	75	Integer (0-4194302)	Read Only	Numeric code that identifies the object (unique within Lennox BACnet Device)
Object_Name	77	Character string of 1 character (min.) to 32 characters (max.)	Read Only	Identifies the Object and is unique within the BACnet Device.
Object_Type	79	133 (OBJECT_LNX_INDOOR_AIR)	Read Only	Indicates membership in a particular object type class.
Object_Temperature	534	Real: Degrees Fahrenheit (36.25 to 100)	Read Write	Indicates the temperature of the space air.
Object_Duct_Static_Pressure_Set point	535	Integer: Values are 0 - 5 (inches of water column)	Read Only	Represents the Duct Static Pressure Set point of discharge air.
Object_Relative_Humidity	536	Real: Values are 0 to 100 (%RH)	Read Write	Represents relative humidity of space air.
Object_CO2_Level	537	Real: Values are 300 to 2000 (PPM)	Read Write	Indicates the CO2 levels in the space air.

**Table 12. Lennox Proprietary Objects - Outdoor Air (Object ID: 133)**

<b>Property</b>	<b>Property ID</b>	<b>Data type and range</b>	<b>Access</b>	<b>Description</b>
Object_Identifier	75	Integer (0-4194302)	Read Only	Numeric code that identifies the object (unique within Lennox BACnet Device)
Object_Name	77	Character string of 1 character (min.) to 32 characters (max.)	Read Only	Identifies the Object and is unique within the BACnet Device.
Object_Type	79	133 (OBJECT_LNX_OUTDOOR_AIR)	Read Only	Indicates membership in a particular object type class.
Object_Temperature	534	Real: Degrees Fahrenheit (-30.62 to 131.56)	Read Write	Indicates the temperature of the outdoor air.
Object_Duct_Static_Pressure_Set point	535	Integer: Values are 0 - 5 (inches of water column)	Read Only	Represents the Duct Static Pressure Set point of discharge air.
Object_Relative_Humidity	536	Real: Values are 0 to 100 (%RH)	Read Write	Represents relative humidity of space air.
Object_CO2_Level	537	Real: Values are 300 to 2000 (PPM)	Read Write	Indicates the CO2 levels in the space air.

## 7. Object Definitions

### 7.1. Analog Output

Optional Properties Supported: Min\_Pres\_Value, Max\_Pres\_Value

Optional Writable Properties: Out\_Of\_Service

Analog output object's Overridden status flag set if the equivalent set point in the CORE Unit Controller is written to by some Sbus device.

**Table 13. Analog Output (AO) Objects List**

Object ID	Object Name	Units	Min. Value	Max. Value	Valid Values within Range
101	Application Mode Control	None	0	255	0,1,3,6,9,208,209,216,217,218,224-254,255*
102	Outdoor Air Min Pos Control	Percent	0	255	all
103	Occupancy Override Control	None	0	255	all
104	Occupancy Scheduler Control	None	0	255	all
105	BACnet Device Instance	None	1	4194304	all
107	Occupancy Sensor Input	None	0	255	all
108	Space Dehumidification Set point	Percent	0	100	all
109	Temperature Set point (abs)	Deg. F	36.25	100	all
110	Temperature Set point Offset	Deg. F	-32	31.75	all
111	IAQ 1 Network Input	PPM	300 - 2000	300 - 2000	all
112	Humidity Network Input	Percent	0	100	all
113	Space Temperature Input	Deg. F	36.25	100	all
114	Emergency Override Control	None	0	255	all
115	Compressor Enable Control	None	0	255	all
117	Primary Heat Enable Control	None	0	255	all
119	Auxiliary Heat Enable Control	None	0	255	all
123	Duct Static Set point	In. of water	0	5	all
124	Building Static Set point	In. of water	-0.5	0.5	all
125	Discharge Air Cooling Set point	Deg. F	40	100	-9,40-100*
126	Discharge Air Heating Set point	Deg. F	60	140	-9,60-140*
127	Supply Fan Capacity Input	Percent	33	255	all*
128	Exhaust Fan Capacity Input	Percent	33	255	all
129	Set Economizer Outdoor Air Suitable	None	0	255	all

\* see Application Details section for limitations on data ranges.



## 7.2. Analog Input

Optional Properties Supported:

None

Optional Writable Properties:

Out\_Of\_Service (AI239 - AI252, AI274 - AI285 only)

**Table 14. Analog Input (AI) Objects List**

Object ID	Object Name	Units	Data Range
198	Mac Address	None	0 - 127
199	IMC Address	None	1-31
231	Unit ID	None	0 - 127
232	Unit Status	None	0 - 255
239	Space Temperature	Deg. F	63.75 - 100.00
240	Discharge Air Temperature	Deg. F	-8.7 – 164.4
241	Effective Occupancy	None	0 - 2
242	Local Outside Air Temperature	Deg. F	-30.6 – 131.6
243	Local Space Temperature	Deg. F	63.75 – 100.00
244	Outside Air Damper	Percent	0 - 100, 255
245	Heat Primary	Percent	0 – 100
246	Heat Secondary	Percent	0 – 100
247	Cool Primary	Percent	0 – 100
248	Economizer Enabled	No Unit	0, 1, 255
250	Supply Fan Status	Percent	0 - 100
252	Space Temperature Set Point (Eff)	Deg. F	40.0 – 95.0
253	Current Error	None	0 - 255
254	Error Pointer	None	0 – 83
255	Most recent Error 1	None	1 - 255
256	Most recent Error 2	None	1 - 255
257	Most recent Error 3	None	1 - 255
258	Most recent Error 4	None	1 - 255
259	Most recent Error 5	None	1 - 255
260	Most recent Error 6	None	1 - 255
261	Most recent Error 7	None	1 - 255
262	Most recent Error 8	None	1 - 255

**Table 14. Analog Input (AI) Objects List**

Object ID	Object Name	Units	Data Range
263	Most recent Error 9	None	1 - 255
264	Most recent Error 10	None	1 - 255
273	IAQ 2 Effective Value	PPM	0 - 2000
274	Space CO2 Sensor (Eff)	Parts-per-million	0 - 2000
275	Space CO2 Sensor (Local)	Parts-per-million	0 - 2000
276	Space Humidity (Eff)	Percent	0 - 100
277	Space Humidity (Local)	Percent	0 - 100
278	Dehumidification Set Point (Eff)	Percent	0 - 100
279	Dehumidification Status	None	0 - 2
281	Return Air Temperature	Deg. F	-8.7 – 164.4
282	Building Static Pressure	No Unit	-0.5 - 0.5
283	Duct Static Pressure	No Unit	0 – 5.00
285	Exhaust Fan Status	Percent	0 - 100
286	Supply airflow status	CFM	0 - 480 cfm/ton**
287	Blower motor speed	RPM	0 - 1500
288	Blower motor torque	Percent	0 - 100
289	Outdoor airflow	CFM	0 - 480 cfm/ton**
<p>* Not recommended for new installations; legacy support only  ** Multiply the tonnage of the RTU with the value in CFM/ton to derive the value in CFM units.</p>			

### 7.3. Analog Value

Optional Properties Supported:

None

Optional Writable Properties:

Present\_Value

**Table 15. Analog Value (AV) Objects List**

Object ID	Object Name	Units	Min. Value	Max. Value	Valid Values within Range	Note
1	Baud Rate Setting	None	9600	76800	9600, 19200, 38400, 76800	Only used for BACnet MS/TP configurations.
130	Heating Occupied Set point	Deg. F	40	95	all	For occupied and unoccupied set points considered separately, the heating set point must be lower than the cooling set point by at least the auto-changeover dead-band value set in CORE Unit Controller P153 (default 3°F).
131	Cooling Occupied Set point	Deg. F	40	95	all	
132	Heating Unoccupied Set point	Deg. F	40	95	all	
133	Cooling Unoccupied Set point	Deg. F	40	95	all	
134	Supply airflow Low Speed Target	CFM	Legacy Object. Not applicable to the CORE Unit Controller at this time.			
135	Supply airflow High Speed Target	CFM				
136	Supply airflow Medium Low Speed Target	CFM				
137	Supply airflow Medium High Speed Target	CFM				
138	Supply airflow Heat Mode Target	CFM				
139	Ventilation airflow Target	CFM				
140	Smoke airflow Target	CFM				
141	Outdoor airflow target	CFM				
142	IAQ Set point Start Open	PPM	0	2000	all	This object's value must be less than Object ID 143.
143	IAQ Set point Full Open	PPM	0	2000	all	This value must be greater than Object ID 142.
144	Free Cooling Sensible Setpoint	Deg. F	40	75	all	Unit must be configured for Dual Sensible Free Cooling.
145	Free Cooling Sensible Offset	Deg. F	0	40	all	Unit must be configured for single sensible free cooling.
146	Free Cooling Enthalpy Setpoint	mA	10	19	all	Unit must be configured for single Enthalpy free cooling.
147	Free Cooling Enthalpy Offset Setpoint	mA	1	5	all	Allows Configuration of the Enthalpy Offset for Free Cooling.
148	After Hours Override Delay Set point	Minutes	0	480	all	Allows a custom override delay timer.

## 7.4. Character String Values

Optional Properties Supported: NONE  
 Optional Writable Properties: Present\_Value

**Table 16. Character String (CS) Values Objects List**

Object ID	Object Name	Units	Valid Values within Range
300	Unit Model String	String	All
301	Board Firmware Version	String	All
302	Alarm Log	String	All Valid Alarm Values. Display string is a “,” (comma) separated alarm codes. Last entry in the list is most recent error and first one is oldest.

## 7.5. Multi-State Values

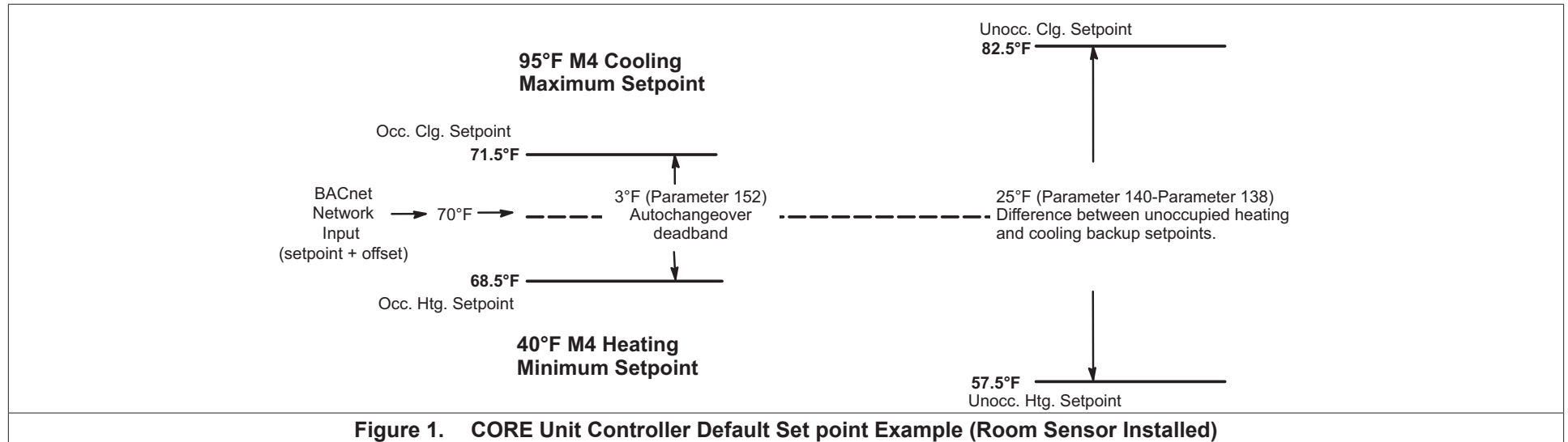
Optional Properties Supported: NONE  
 Optional Writable Properties: Present\_Value

**Table 17. Multi-State (MS) Value Objects List**

Object ID	Object Name	Units	Valid Values
310	Mode of Operation	Multi-state value	1 : wired thermostat 2 : remote thermostat 3 : discharge air control 4 : room sensor operation 5 : unit has gone into backup operation
311	Remote Handset Connection	Multi-state value	1: No Handset Connected 2: Handset Connected
312	Unit Status	Multi-state value	0 : HVAC idle. 1 : HVAC heat. 2 : HVAC morning warmup. 3 : HVAC cool. 5 : HVAC pre-cool. 6 : HVAC off. 7 : HVAC test. 8 : HVAC emergency heat. 9 : HVAC fan only. 12 : HVAC max heat. 14 : HVAC dehumidification. 129 : HVAC fresh air heating. 131 : HVAC fresh air cooling.

## 8. Room Sensor Set Points

- The CORE Unit Controller typically uses four set points and the zone temperature to operate the unit when a zone sensor is installed.
- When using the AO:109 single set point input, the CORE Unit Controller will use the zone temperature set point and Parameter 152 to determine the heat / cool set point in the occupied mode. During the unoccupied mode, the CORE Unit Controller will use the zone temperature set point and the difference between Parameter 140 and Parameter 138.
- See “Figure 1. CORE Unit Controller Default Set point Example (Room Sensor Installed)” for an example of set points when the CORE Unit Controller is operating using parameter default values.
- As an alternative, the individual set points AV:130-133 may be used. The CORE Unit Controller uses whatever were the last set points received, whether from AO:109-110, or AV:130-133.



## 9. Application Details

Object Name: **Application Mode Control**  
 Object Type: AO (Analog Output)  
 Object ID: 101  
 Object Units: (95) No\_Units

Value = (See tables below). Set the application mode input to Value.

The CORE Unit Controller can be set locally during commissioning to operate in either of two modes: remote zone sensor control mode (with local or remote zone sensor), or remote thermostat control mode. Several application mode command values are recognized by either room sensor mode, while some can only be used when the CORE Unit Controller is in the remote thermostat control mode.

**Table 18. Common Application Mode Values**

Value	Mode	Description
0 \$00	AUTO	Heating or cooling. Default after reset.
1 \$01	HEAT	Heating only.
3 \$03	COOL	Cooling only.
6 \$06	OFF	Unit off.
9 \$09	FAN ONLY	No heating or cooling allowed.
255 \$FF	NUL	Same as AUTO.
208 \$D0	FAN AUTO	Main fan (blower) auto. Default after reset.
209 \$D1	FAN ON	Main fan (blower) on.
216 \$D8	EXHAUST AUTO	Power exhaust fan auto. Default after reset.
217 \$D9	EXHAUST1 ON	First stage power exhaust fan on.
218 \$DA	EXHAUST1 OFF	1st stage power exhaust fan off.
219 \$DB	EXHAUST2 ON	2nd stage power exhaust fan on.
220 \$DC	EXHAUST2 OFF	2nd stage power exhaust fan off.
221 \$DD	EXHAUST ON	Both stages of power exhaust fan on.
222 \$DE	EXHAUST OFF	Both stages of power exhaust fan off.
254 \$FE	RESET	Force controller reset.
233 \$E9	DEHUM	Full Dehumidification (D)
234 \$EA	DEHUM + COO	Cool + Dehumidification

- The four command groups (0-9), (208-209), (216-222), and (224-236, see below) are independent of each other. Selecting a command from one group does not affect any previously sent command from another group. Except for OFF and RESET, which also set FAN AUTO, EXHAUST AUTO, and heat/cool demand IDLE.
- AUTO is the default application mode input. When in a remote zone sensor mode, AUTO allows the CORE Unit Controller to generate heating and cooling demands based on zone temperature and zone temperature set point. Auxiliary functions such as dehumidification or emergency override (i.e. smoke mode) will still operate as needed. Also the blower and exhaust fan functions operate.
- HEAT and COOL allow the servicing of only heating or cooling demands. These set a mode only, and do not generate a demand.
- Application mode OFF is a unit-disable state, causing the controller to become idle, and clearing all outputs and timers. All outputs are kept off while application mode is OFF. Since this is a complete unit-disable command, it should not be used to turn off heating and cooling demands as part of remote thermostat operation - use 224 IDLE for that purpose. See below.
- Application mode FAN ONLY disables heating and cooling operation. No effect on fan operation. Return to normal operation with AUTO, HEAT, or COOL.
- Application modes FAN ON and FAN AUTO are used to turn on the main unit fan (blower), or return it to automatic operation.
- Application modes for EXHAUST ON are used to turn on/off a power exhaust fan, or to return it to automatic operation. The CORE Unit Controller may delay up to 30 seconds before responding to an exhaust command. These commands apply to single-, two-, and variable-speed power exhausts. A variable-speed exhaust is enabled here, while the speed is adjusted using AO:128, the Exhaust Fan Capacity Input.
- Application mode RESET causes the system to reset itself and go through the controller start-up and initialization routines. This takes about 8 seconds in an CORE Unit Controller, during which time the analog and digital inputs are settling to correct values. The controller will return to AUTO operation.
- AUTO and EXHAUST AUTO are the defaults after reset.
- Fan mode operation will default to CORE Unit Controller Parameter 154 unless FAN AUTO or FAN ON are written to.

## 9.1. Application Modes Specific To Remote Thermostat Operation

These values are only recognized if the CORE Unit Controller is placed in a remote thermostat mode of operation (set locally during commissioning).

**Table 19. Remote Thermostat Mode**

Value	Mode	Y2	Y1	W2	W1	D	Description
224 \$E0	IDLE	0	0	0	0	0	Heat / Cool off. Default after reset.
228 \$E4	COOL1	0	1	0	0	0	Cool 1.
232 \$E8	COOL2	1	0	0	0	0	Cool 2.
236 \$EC	COOL3	1	1	0	0	0	Cool 3. Full cooling.
225 \$E1	HEAT1	0	0	0	1	0	Heat 1.
226 \$E2	HEAT2	0	0	1	0	0	Heat 2.
227 \$E3	HEAT3	0	0	1	1	0	Heat 3. Full heating.
229 \$E5	REHEAT LO	0	1	0	1	0	Supermarket Reheat (lo)
230 \$E6	REHEAT HI	0	1	1	1	0	Supermarket Reheat (hi)
233 \$E9	DEHUM	0	0	0	0	1	Full Dehumidification (D)
234 \$EA	DEHUM + COO	0	1	0	0	1	Cool + Dehumidification

- For all \$Ex values the fan runs if it is already on, otherwise the fan turns on after a fan on-delay. For \$E0 the fan turns off after a fan off-delay.
- COOL2 and COOL3 are equivalent unless 3-stage cooling has been selected locally at the controller during commissioning.
- HEAT2 and HEAT3 are equivalent except in heat pump equipment types, when HEAT2 acts as “emergency heat”, running auxiliary strip heat and turning off the compressor(s). So in a heat pump, normal heating is commanded using HEAT1 or HEAT3. REHEAT LO and REHEAT HI can only be used if Supermarket Reheat is enabled for the CORE Unit Controller using Parameter 105.
- If a mode not defined in the above list is sent, then the application mode is not changed.
- When an CORE Unit Controller is commissioned for BACnet® gateway remote thermostat operation, it will wait for 5 minutes following start-up to receive application mode data. The CORE Unit Controller will remain in AUTO mode until data is received, or until the 5 minute period has expired.
- If 5 minutes passes without data being received, then the CORE Unit Controller will enter the backup mode of operation (set locally during commissioning).
- It is recommended that the application mode data be updated at intervals of no more than two minutes to be sure that a single missed-data event will not constitute an application mode data failure. Any application mode data will serve as a valid update; either common or remote thermostat values.
- If application mode data appears while the CORE Unit Controller is in a backup mode, then the CORE Unit Controller will reset and normal operation will resume.



## 9.2. Object IDs

### 9.2.1. Analog Outputs (AO)

**Table 20. Object ID 102**

Object Name:	Outdoor Air Min Pos Control
Object Type:	AO
Object Units:	(98) Percent
Value:	0 - 255
Details:	<p>0 -100: Set the minimum position of the outdoor air economizer damper; % open.</p> <p>101 - 255: Relinquish to local control. Min damper position depends on the setting in CORE Unit Controller Parameter 132: Parameter 132 =101: Min damper position set by Parameter 132.</p> <p>The minimum damper position is only effective when the system is occupied and the main blower is running. Otherwise the damper remains closed. Default value following reset is 101 (local).</p> <p>Using AO102 to set the minimum position overrides the CORE Unit Controllers ability to offer two minimum positions based on the indoor blower motor speed.</p>

**Table 21. Object ID 103**

Object Name:	Occupancy Override Control
Object Type:	AO
Object Units:	(95) No_Units
Value:	0 - 255
Details:	<p>0: space occupied</p> <p>1: space unoccupied</p> <p>2: refresh space occupied timer defined at local controller</p> <p>3-255: auto; clear timer and return to occupancy scheduler state</p> <p>Default value following reset is 255 (auto).</p> <p>For "Effective Occupancy" see Appendix B for further details.</p>

**Table 22. Object ID 104**

Object Name:	Occupancy Scheduler Control
Object Type:	AO
Object Units:	(95) No_Units
Value:	0 - 255
Details:	<p>0:       space occupied</p> <p>1-255:   space unoccupied</p> <p>Default value following reset is determined by Parameter 223.</p> <p>Once a value for AO:104 is received, the Parameter 223 value is ignored.</p> <p>For "Effective Occupancy" see Appendix B for further details.</p>

**Table 23. Object ID 105**

Object Name:	BACnet Device Instance
Object Type:	AO
Object Units:	(95) No_Units
Value:	0 - 4194304
Details:	. Device ID, it must be unique in the BACnet network. For MS/TP , 2 is the default value and for BIP it is last octet of the IP address.

**Table 24. Object ID 107**

Object Name:	Occupancy Sensor Input
Object Type:	AO
Object Units:	(95) No_Units
Value:	0 - 255
Details:	<p>0:       occupancy sensor indicates space occupied</p> <p>1:       occupancy sensor indicates space unoccupied</p> <p>2-255:   auto; return to occupancy scheduler state</p> <p>Default value following reset is 255 (auto).</p> <p>For "Effective Occupancy" see Appendix B for further details.</p>

**Table 25. Object ID 108**

Object Name:	Space Dehumidification Setpoint
Object Type:	AO
Object Units:	(99) Percent
Value:	0 - 100
Details:	<p>0-100: % relative humidity set point</p> <p>Dehumidification begins when the effective space relative humidity rises to this set point value. The default following reset is local control. Once an executive controller has sent a set point for AO:108, there is no way to return to the local set point except by controller reset.</p> <p>Dehumidification ends when the effective space relative humidity falls below this set point value minus a dehumidification dead-band that is typically 3%. The dead-band value is set locally during commissioning.</p>

**Table 26. Object ID 109**

Object Name:	Temperature Set point (abs)
Object Type:	AO
Object Units:	(64) Degrees-Fahrenheit
Value:	36.25 – 100.00°F, in 0.25°F increments
Details:	<p>The single-point temperature set point (abs) (including offset; see below) is converted locally to occupied and unoccupied heating and cooling set points. The occupied and unoccupied heating and cooling set points are computed to be centered (if possible) on the effective single-point set point. This is done while preserving the occupied and unoccupied dead-bands, as well as any local restrictions on minimum or maximum values. The default following reset is 70°F, but local values are used for the heating and cooling (occupied and unoccupied) set points until a value is received for AO:109.</p> <p>As an alternative method of establishing set points, the individual set points AV:130-133 may be used. The CORE Unit Controller uses whatever were the last set points received, whether from AO:109-110, or AV:130-133.</p> <p>The occupied heat/cool auto-changeover dead-band value is set locally during commissioning.</p> <p>The unoccupied heat/cool auto-changeover dead-band value is set locally during commissioning by adjusting the backup unoccupied heating and cooling set points. The difference between these set points will be used as the unoccupied heat/cool auto-changeover dead-band value.</p>

**Table 27. Object ID 110**

Object Name:	Temperature Set point Offset
Object Type:	AO
Object Units:	(64) Degrees-Fahrenheit
Value:	-32.00 – 31.75°F, in 0.25°F increments
Details:	A signed value added to the temperature set point (abs) value to provide an effective temperature set point. See above regarding dead-bands and limits. The default following reset is 0.

**Table 28. Object ID 111**

Object Name:	IAQ 1 Network Input
Object Type:	AO
Object Units:	(96) PPM
Value:	300 - 2000
Details:	A network value for the space IAQ 1 (CO <sub>2</sub> Sensor) input. If configured correctly, the CORE Unit Controller will utilize this value as the effective CO <sub>2</sub> value for Demand Control Ventilation. It is recommended that network data be updated at intervals of no more than 2 minutes to be sure that a single missed-data event will not constitute a data update failure. If data appears after a sensor failure is processed, it will be treated as an intermittent sensor. Normal operation will resume.

**Table 29. Object ID 112**

Object Name:	Humidity Network Input
Object Type:	AO
Object Units:	(98) Percent
Value:	0 - 100
Details:	A network value for the space humidity input. If configured correctly, the CORE Unit Controller will utilize this value as the effective Humidity value for dehumidification. It is recommended that network data be updated at intervals of no more than 2 minutes to be sure that a single missed-data event will not constitute a data update failure. If data appears after a sensor failure is processed, it will be treated as an intermittent sensor. Normal operation will resume.

**Table 30. Object ID 113**

Object Name:	Space Temperature Input
Object Type:	AO
Object Units:	(64) Degrees-Fahrenheit
Value:	36.25 – 100.00°F, in 0.25°F increments
Details:	<p>A network value for the space temperature. Heating and cooling demands are generated based on the space temperature Input, and the Temperature Set point (abs) and Temperature Set point Offset values. The default following reset is 72.5°F.</p> <ul style="list-style-type: none"> <li>• When a CORE Unit Controller is commissioned for BACnet® gateway remote room sensor operation, it will wait for 5 minutes following start-up to receive space temperature data. The CORE Unit Controller will remain in a no-run mode until data is received, or until the 5 minute period has expired.</li> <li>• If 5 minutes passes without data being received, then the CORE Unit Controller begins to use local data for the space temperature. If a local sensor is connected then it will be used. If not, then a failed-sensor error is recorded and the CORE Unit Controller will enter the backup mode of operation (set locally during commissioning).</li> <li>• It is recommended that network data be updated at intervals of no more than 2 minutes to be sure that a single missed-data event will not constitute a data update failure.</li> <li>• If data appears after a sensor failure is processed, it will be treated as an intermittent sensor. Normal operation will resume. If the CORE Unit Controller is in a backup mode, then it will reset before resuming.</li> </ul>

**Table 31. Object ID 114**

Object Name:	Emergency Override Control			
Object Type:	AO			
Object Units:	(95) No_Units			
Value:	0 - 255			
Details:	Set the emergency mode defined by value, decoded as:			
		Supply	Exhaust	Outdoor
	Value Mode	Fan	Fan	Damper
0	NORMAL	auto	auto	auto
1	PRESSURIZE	on	off	open
2	DEPRESSURIZE	off	on (speed)	closed
3	PURGE	on	on (speed)	open
4	SHUTDOWN	off	off	closed
5	FIRE			
6	DEPRESSURIZE	off	on (pressure)	closed
7	PURGE	on	on (pressure)	open
>7	NUL (normal)	auto	auto	auto
	<ul style="list-style-type: none"> <li>• auto - normal operation</li> <li>• (speed) - exhaust fan runs at speed pre-selected at equipment</li> <li>• (pressure) - exhaust fan runs to maintain building press set point; local or remote</li> </ul>			
	Mode 5, FIRE, is a locally defined operation (set at commissioning). For units without VFD exhaust fans, modes 6-7 are the same as 2-3. The default following reset is 0 (NORMAL).			

**Table 32. Object ID 115**

Object Name:	Compressor Enable Control																														
Object Type:	AO																														
Object Units:	(98) Percent																														
Value:	0 - 255																														
Details:	<p>0: output disabled</p> <p>1-100: output limited to 1 – 100% of maximum</p> <p>101-255: maximum output permitted</p> <p>The following table shows the value where the indicated compressor stage is disabled, for equipment having the indicated maximum number of compressor stages:</p> <table border="1"> <thead> <tr> <th>Maximum Stages</th> <th colspan="4">Stage Disabled When Value &lt; x</th> </tr> <tr> <th></th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> </tr> </thead> <tbody> <tr> <td>1</td> <td colspan="4">Value &lt;40%*</td> </tr> <tr> <td>2</td> <td>Value &lt; 33</td> <td colspan="3">Value &lt; 66</td> </tr> <tr> <td>3</td> <td>Value &lt; 25</td> <td>Value &lt; 50</td> <td colspan="2">Value &lt; 75</td> </tr> <tr> <td>4</td> <td>Value &lt; 20</td> <td>Value &lt; 40</td> <td>Value &lt; 60</td> <td>Value &lt; 80</td> </tr> </tbody> </table> <p>Free cooling using an economizer with outdoor air is not considered a stage. Only compressors are considered to be stages. All compressors installed are included, however they are being used; sensible cooling, condenser reheat (latent cooling), or heat pump heating. The default following reset is 100%.</p> <p>Disabled stages are re-enabled at the above values plus 3% hysteresis.</p> <p>Ultra-High Efficiency 3 - 6 ton units behave as a single stage unit with respect to AO115. A value less than 50 disables compressor operation. A value greater than or equal to 53 enables compressor operation. Compressor speed is determined locally.</p> <p>*For 3 - 6 ton (LGM/LCM) units, values of less than 40% will disable the compressor. Values between 40 and 100 will limit the max compressor Hz to the written % of max Hz.</p>	Maximum Stages	Stage Disabled When Value < x					1	2	3	4	1	Value <40%*				2	Value < 33	Value < 66			3	Value < 25	Value < 50	Value < 75		4	Value < 20	Value < 40	Value < 60	Value < 80
Maximum Stages	Stage Disabled When Value < x																														
	1	2	3	4																											
1	Value <40%*																														
2	Value < 33	Value < 66																													
3	Value < 25	Value < 50	Value < 75																												
4	Value < 20	Value < 40	Value < 60	Value < 80																											

**Table 33. Object ID 117**

Object Name:	Primary Heat Enable Control
Object Type:	AO
Object Units:	(98) Percent
Value:	0 - 255
Details:	<p>0: output disabled</p> <p>1-100: output limited to 1 – 100% of maximum</p> <p>101-255: maximum output permitted</p> <p>The table shown above for Compressor Enable Control can also be applied here to the Primary Heat Enable Control. It shows the value where the indicated primary heating stage is disabled, for equipment having the indicated maximum number of primary heating stages. The default following reset is 100%.</p>

**Table 34. Object ID 119**

Object Name:	Auxiliary Heat Enable Control
Object Type:	AO
Object Units:	(98) Percent
Value:	0 - 255
Details:	Legacy Object. Not applicable to the CORE Unit Controller at this time.

**Table 35. Object ID 123**

Object Name:	Duct Static Set point
Object Type:	AO
Object Units:	(58) Inches-of-water
Value:	0.0 - 5.0 inW
Details:	<p>The set point for control of duct static pressure, in inches of water column. The main blower speed or bypass damper setting is varied to maintain this value. The set point can be selected from the range of 0.0 to 5.0 inches of water column. The default following reset is local control. Once an executive controller has sent a set point for AO:123, there is no way to return to the local set point except by controller reset.</p> <p>AO123 is supported by:</p> <p>Units with CAV (with bypass damper) blower.</p> <p>Multi-Zone VAV Configured Units</p>

**Table 36. Object ID 124**

Object Name:	Building Static Set point
Object Type:	AO
Object Units:	(58) Inches-of-water
Value:	-0.5 - 0.5 inWC
Details:	Legacy Object. Not applicable to the CORE Unit Controller at this time.

**Table 37. Object ID 125**

Object Name:	Discharge Air Cooling Set point
Object Type:	AO
Object Units:	(64) Degrees-Fahrenheit
Value:	40 - 100°F, and -9°F
Details:	<p>The set point for control of discharge (or supply) air temperature during cooling. When the controller is in the correct mode of operation, sending this set point will cause cooling components to cycle, or vary their output, in order to maintain this temperature in the leaving air stream. The set point can be selected from the range of 40°F to 100°F. Selecting a value of -9°F causes the control to revert to the use of its locally programmed set point. Default value following reset is -9 (local).</p> <p>This Object will control the setpoint in both Discharge Air Control Cooling (DACC) and Single-Zone Variable Air Volume (SZVAV) Standard Cooling.</p>

**Table 38. Object ID 126**

Object Name:	Discharge Air Heating Set point
Object Type:	AO
Object Units:	(64) Degrees-Fahrenheit
Value:	60 - 140°F, and -9°F
Details:	<p>The setpoint for control of discharge (or supply) air temperature during heating. When the controller is in the correct mode of operation, sending this setpoint will cause heating components to cycle, or vary their output, in order to maintain this temperature in the leaving air stream. The setpoint can be selected from the range of 60°F to 140°F. Selecting a value of -9°F causes the control to revert to the use of its locally programmed setpoint. Default value following reset is -9 (local).</p> <p>This Object will control the setpoint only in Discharge Air Control Heating (DACH) operation.</p>

**Table 39. Object ID 127**

Object Name:	Supply Fan Capacity Input
Object Type:	AO
Object Units:	(98) Percent
Value:	33 - 255
Details:	<p>33 - 100: Set the supply fan capacity as a % of maximum speed.  101 - 255: Relinquish to local control. Supply fan capacity depends on CORE Unit Controller parameter values.</p> <p>Supply fan capacity is only effective when the main blower is running. Minimum value is limited by parameter 28 (if heating) or parameter 27 (if cooling/ventilation/smoke).</p> <p>Use of this object is not recommended while the unit is in a discharge control mode of operation (cooling or DACH).</p>

**Table 40. Object ID 128**

Object Name:	Exhaust Fan Capacity Input
Object Type:	AO
Object Units:	(98) Percent
Value:	33 - 255
Details:	Legacy Object. Not applicable to the CORE Unit Controller at this time.



**Table 41. Object ID 129**

Object Name:	Set Economizer Outdoor Air Suitable
Object Type:	AO
Object Units:	(98) Percent
Value:	0 - 255
Details:	<p>0: Economizer disable 1: Economizer enable &gt;1: Economizer to auto</p> <p>When outdoor air is determined to be suitable for free cooling, the economizer feature will operate (if installed) on a first stage cooling call to use outdoor air instead of mechanical cooling. AO:129 is used to allow an executive controller to set the state of outdoor air suitability (OAS). It can be enabled, disabled, or left for the local controller to determine.</p> <p>BACnet control of the economizer requires the CORE Unit Controller is configured for Economizer temperature Mode. Run the CORE Unit Controller install wizard to verify that Configuration ID 1, position 2 is set to T for Temperature. Default value following reset is 255 (auto).</p>

## 9.2.2. Analog Inputs (AI)

**Table 42. Object ID 198**

Object Name:	MAC Address
Object Type:	AI
Object Units:	(98) Percent
Value:	0 - 127
Details:	Selectable BACnet MAC address. By default, this value equals the S-Bus address.

**Table 43. Object ID 199**

Object Name:	IMC Address
Object Type:	AI
Object Units:	(95) No_Units
Value:	1 - 31
Details:	Selectable S-Bus address (1-31). This address is used for L Connection network.

**Table 44. Object ID 200, 201, 202, 203, 204, 205, 206 and 207**

Object Name:	IMC Version[04], IMC Version[05], IMC Version[11]											
Object Type:	AI											
Object Units:	(95) No_Units											
Value:	0, 46, 48 - 57											
Details:	<table> <tr> <td>0:</td> <td>end of string</td> </tr> <tr> <td>46:</td> <td>“.”</td> </tr> <tr> <td>48:</td> <td>“0”</td> </tr> <tr> <td>...</td> <td></td> </tr> <tr> <td>57:</td> <td>“g”</td> </tr> </table> <p>Each value is the ASCII code of a character in the CORE Unit Controller version number. The version number is found in a null-terminated string, most-significant-character first, beginning in IMC Version[04]. Maximum length is 8 chars, including null.</p> <p><b>NOTE:</b> <i>Not recommended for new installations. Read device object property Application_Software_Version instead. For BACnet version read device object property Firmware_Revision.</i></p>		0:	end of string	46:	“.”	48:	“0”	...		57:	“g”
0:	end of string											
46:	“.”											
48:	“0”											
...												
57:	“g”											

**Table 45. Object ID 231**

Object Name:	Unit ID
Object Type:	AI
Object Units:	(95) No_Units
Value:	0 - 255
Details:	48-63: gas heat, electric cool 64-79: electric heat, electric cool

**Table 46. Object ID 232**

Object Name:	Unit Status																																							
Object Type:	AI																																							
Object Units:	(95) No_Units																																							
Value:	0 - 255																																							
Details:	<table> <tr><td>0</td><td>–</td><td>HVAC idle.</td></tr> <tr><td>1</td><td>–</td><td>HVAC heat.</td></tr> <tr><td>2</td><td>–</td><td>HVAC morning warm-up.</td></tr> <tr><td>3</td><td>–</td><td>HVAC cool.</td></tr> <tr><td>5</td><td>–</td><td>HVAC pre-cool.</td></tr> <tr><td>6</td><td>–</td><td>HVAC off.</td></tr> <tr><td>7</td><td>–</td><td>HVAC test.</td></tr> <tr><td>8</td><td>–</td><td>HVAC emergency heat.</td></tr> <tr><td>9</td><td>–</td><td>HVAC fan only.</td></tr> <tr><td>12</td><td>–</td><td>HVAC max heat.</td></tr> <tr><td>14</td><td>–</td><td>HVAC dehumidification.</td></tr> <tr><td>129</td><td>–</td><td>HVAC fresh air heating.</td></tr> <tr><td>131</td><td>–</td><td>HVAC fresh air cooling.</td></tr> </table>	0	–	HVAC idle.	1	–	HVAC heat.	2	–	HVAC morning warm-up.	3	–	HVAC cool.	5	–	HVAC pre-cool.	6	–	HVAC off.	7	–	HVAC test.	8	–	HVAC emergency heat.	9	–	HVAC fan only.	12	–	HVAC max heat.	14	–	HVAC dehumidification.	129	–	HVAC fresh air heating.	131	–	HVAC fresh air cooling.
0	–	HVAC idle.																																						
1	–	HVAC heat.																																						
2	–	HVAC morning warm-up.																																						
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9	–	HVAC fan only.																																						
12	–	HVAC max heat.																																						
14	–	HVAC dehumidification.																																						
129	–	HVAC fresh air heating.																																						
131	–	HVAC fresh air cooling.																																						

**Table 47. Object ID 239**

Object Name:	Space Temperature
Object Type:	AI
Object Units:	(64) Degrees-Fahrenheit
Value:	63.75 – 100.00 degF, in 0.25 degF increments
Details:	Space temperature from local CORE Unit Controller sensor, or from Space Temperature Input.  This is the actual value being used by the CORE Unit Controller. Its source is either a locally wired temperature sensor (see “Local Space Temperature) or the network input (see Space Temperature Input).

**Table 48. Object ID 240**

Object Name:	Discharge Air Temperature
Object Type:	AI
Object Units:	(64) Degrees-Fahrenheit
Value:	-8.7 – 164.4 degF, in 0.7 degF increments
Details:	Discharge air temperature measurement from the local sensor.

**Table 49. Object ID 241**

Object Name:	Effective Occupancy
Object Type:	AI
Object Units:	(95) No_Units
Value:	0 - 2
Details:	0: space occupied 1: space unoccupied  The occupancy override timer is established locally for each controller during system commissioning.  The Effective Occupancy depends on the Occupancy Scheduler Control, the Occupancy Override Control, and the “Occupancy Sensor Input. For “Effective Occupancy” see Appendix B for further details.  The local CORE Unit Controller occupied input is ignored when a BACnet® interface is used.

**Table 50. Object ID 242**

Object Name:	Local Outside Air Temperature
Object Type:	AI
Object Units:	(64) Degrees-Fahrenheit
Value:	-30.6 – 131.6 degF, in 0.6 degF increments
Details:	Outdoor air temperature measurement from the local sensor.

**Table 51. Object ID 243**

Object Name:	Local Space Temperature
Object Type:	AI
Object Units:	(64) Degrees-Fahrenheit
Value:	63.75 – 100.00 degF, in 0.25 degF increments
Details:	Space temperature from the local temperature sensor.

**Table 52. Object ID 244**

Object Name:	Outdoor Air Damper
Object Type:	AI
Object Units:	(98) Percent
Value:	0 – 100, 255
Details:	<p>0 - 100: Outdoor air damper position. Percent-open.</p> <p>255: No damper.</p> <p>This is a measure of the feedback voltage from the damper motor. The 2-10V feedback signal is converted to 0-100% open damper position provided by AI:244. There is frequently some offset between the indicated damper position given by AI:244 and the physical damper position.</p>

**Table 53. Object ID 245**

Object Name:	Heat Primary
Object Type:	AI
Object Units:	(98) Percent
Value:	0 – 100
Details:	<p>0 - 100: Current level of the primary heating capacity.</p> <p>This is based on the number of gas stages operating in a gas/electric unit, or compressors operating in a heat pump, or electric resistance stages operating in an electric/electric unit.</p>

**Table 54. Object ID 246**

Object Name:	Heat Secondary
Object Type:	AI
Object Units:	(98) Percent
Value:	0 – 100
Details:	Legacy Object. Not applicable to the unit controller at this time.

**Table 55. Object ID 247**

Object Name:	Cool Primary
Object Type:	AI
Object Units:	(98) Percent
Value:	0 – 100
Details:	0 - 100: Current level of the primary cooling capacity. This is based on the number of compressors operating. There is no secondary cooling.

**Table 56. Object ID 248**

Object Name:	Economizer Enabled
Object Type:	AI
Object Units:	(95) No_Unit
Value:	0 – 1, 255
Details:	<p>0: Economizer is disabled.</p> <p>1: Economizer is enabled (outdoor air is suitable for free cooling).</p> <p>255: No economizer.</p> <p>The enabled state only indicates that the CORE Unit Controller has determined that the outdoor air is suitable for free cooling. The unit is actually executing free cooling operation if "Economizer Enabled" is 1, and "Unit Status" is 3, 5, or 131.</p>

**Table 57. Object ID 250**

Object Name:	Supply Fan Status
Object Type:	AI
Object Units:	(98) Percent
Value:	0 – 100
Details:	<p>0: Supply fan off.</p> <p>1: Supply fan on (single-speed fan).</p> <p>2 - 100: Supply fan on (variable-speed fan; percent of full speed).</p>

**Table 58. Object ID 252**

Object Name:	Space Temperature Setpt (Eff)
Object Type:	AI
Object Units:	(64) Degrees-Fahrenheit
Value:	40.0 – 95.0°F, in 0.25°F increments
Details:	<p>The effective space temperature set point, which depends on:</p> <ul style="list-style-type: none"> <li>• Current “Temperature Set point (abs)”,</li> <li>• Current “Temperature Set point Offset”,</li> <li>• Current “Effective Occupancy”,</li> </ul> <p>Most recent heating or cooling demand indicated by “Unit Status”, any local set point adjustment, and heating and cooling dead-bands and differentials set at system commissioning</p>

**Table 59. Object ID 253**

Object Name:	Current Error
Object Type:	AI
Object Units:	(95) No_Units
Value:	0 - 255
Details:	This is the code for the currently occurring alarm condition, if any. If no alarm is currently in progress, then the value is 0. If the value is not zero, then “Current Error” and “Most Recent Error 1” (see below) will be equal. Refer to the CORE Unit Controller Setup Guide for alarm code descriptions.

**Table 60. Object ID 254**

Object Name:	Error Pointer
Object Type:	AI
Object Units:	(95) No_Units
Value:	0 - 83
Details:	<p>This value points to the next available alarm code location. It runs from 0 to 83, and then rolls-over to 0. Tracking this value and using the ten-most-recent-error-codes (see below) allows an application to determine when new errors are logged by the CORE Unit Controller, what those errors are, and if any errors have been missed due to network delays or for any other reason.</p> <p>To correct for an error in some early versions, if the reported value is in the range of 164-247 then it is necessary to subtract it from 247 in order to get the 0-83 value described above.</p>

**Table 61. Object ID 255, 256, 257, 258, 259, 260, 261, 262, 263 and 264**

Object Name:	Most recent Error 1, Most recent Error 2 Most recent Error 10
Object Type:	AI
Object Units:	(95) No_Units
Value:	0 - 255
Details:	<ul style="list-style-type: none"> <li>• These are the ten most recently occurring diagnostic codes; "Most recent Error 1" is the most recent.</li> <li>• This is a first-in first-out buffer. Error codes are stored as they occur, and no filtering is done with respect to duplication or error code severity or priority.</li> <li>• When another error code is logged at "Most recent Error 1", the value in "Most recent Error 10" is lost, being replaced by "Most recent Error 9".</li> <li>• Refer to the CORE Unit Controller setup guide for alarm code descriptions.</li> <li>• Refer to object CSV 302 for the alarm log condensed into one object. This object is maintained for legacy support.</li> </ul>

**Table 62. Object ID 273**

Object Name:	IAQ 2 Effective Value
Object Type:	AI
Object Units:	(96) Parts-per-million
Value:	0 - 2000
Details:	<p>0 - 6: no sensor</p> <p>7 - 1992: valid CO<sub>2</sub> measurement</p> <p>1993 - 2000: sensor error</p> <p>This is the actual value being used by the CORE Unit Controller and is the value measured at the CORE Unit Controller..</p>

**Table 63. Object ID 274**

Object Name:	Space CO2 Sensor (Eff)
Object Type:	AI
Object Units:	(96) Parts-per-million
Value:	0 - 2000
Details:	<p>0 - 6: no sensor</p> <p>7 - 1992: valid CO<sub>2</sub> measurement</p> <p>1993 - 2000: sensor error</p> <p>This is the effective CO<sub>2</sub> (IAQ1) measurement being used by the CORE Unit Controller based on it's configuration. See AI275 and AO111 for the sources of this measurement.</p>



**Table 64. Object ID 275**

Object Name:	Space CO2 Sensor (Local)
Object Type:	AI
Object Units:	(96) Parts-per-million
Value:	0 - 2000
Details:	0 - 6: no sensor 7 - 1992: valid CO <sub>2</sub> measurement 1993 - 2000: sensor error This is the current value of the local sensor (if attached) to the CORE Unit Controller's SmartWire terminals.

**Table 65. Object ID 276**

Object Name:	Space Humidity (Eff)
Object Type:	AI
Object Units:	(98) Percent
Value:	0 - 100
Details:	0: no sensor 1 - 99: valid relative humidity measurement 100: sensor error This is the effective humidity measurement being used by the CORE Unit Controller based on it's configuration. See AI277 and AO112 for the sources of this measurement.

**Table 66. Object ID 277**

Object Name:	Space Humidity (Local)
Object Type:	AI
Object Units:	(98) Percent
Value:	0 - 100
Details:	0: no sensor 1 - 99: valid relative humidity measurement 100: sensor error This is the current value of the local sensor (if attached) to the CORE Unit Controller's SmartWire terminals.

**Table 67. Object ID 278**

Object Name:	Dehumidification Set Point (Eff)
Object Type:	AI
Object Units:	(98) Percent
Value:	0 - 100
Details:	Relative humidity set point for dehumidification operation. Deadband is set locally during commissioning.

**Table 68. Object ID 279**

Object Name:	Dehumidification Status
Object Type:	AI
Object Units:	(95) No_Units
Value:	0 - 2
Details:	No dehumidification installed. 1: Dehumidification installed but not running. 2: Dehumidification installed and running.

**Table 69. Object ID 281**

Object Name:	Return Air Temperature
Object Type:	AI
Object Units:	(64) Degrees-Fahrenheit
Value:	-8.7 – 164.4°F, in 0.7°F increments
Details:	Unit return air temperature measurement from an attached CORE Unit Controller sensor.

**Table 70. Object ID 282**

Object Name:	Building Static Pressure
Object Type:	AI
Object Units:	No Unit
Value:	-0.500 – 0.500 inWC, in 0.004 inWC increments
Details:	Building (space) static pressure measurement from and attached CORE Unit Controller sensor.

**Table 71. Object ID 283**

Object Name:	Duct Static Pressure
Object Type:	AI
Object Units:	No Unit
Value:	0.00 – 5.00 inWC, in 0.02 inWC increments
Details:	Duct (supply) static pressure measurement from an attached CORE Unit Controller sensor.

**Table 72. Object ID 285**

Object Name:	Exhaust Fan Status
Object Type:	AI
Object Units:	(98) Percent
Value:	0 - 100
Details:	0: Exhaust fan off. 1: Exhaust stage 1 on. 2: Exhaust stage 2 on. 33-100: Exhaust variable speed %on. 255: No exhaust.

**Table 73. Object ID 286**

Object Name:	Supply Airflow Status
Object Type:	AI
Object Units:	(84) Cubic Feet per Minute
Value:	0 – 480 cfm/ton
Details:	Legacy Object. Not applicable to the CORE Unit Controller at this time.

**Table 74. Object ID 287**

Object Name:	Blower Motor Speed
Object Type:	AI
Object Units:	(104) Revolutions per Minute
Value:	0 – 1500 RPM
Details:	Legacy Object. Not applicable to the CORE Unit Controller at this time.

**Table 75. Object ID 288**

Object Name:	Blower Motor Torque
Object Type:	AI
Object Units:	(98) Percent
Value:	0, 20 – 100
Details:	Legacy Object. Not applicable to the CORE Unit Controller at this time.

**Table 76. Object ID 289**

Object Name:	Outdoor Airflow
Object Type:	AI
Object Units:	(84) Cubic Feet per Minute
Value:	0 – 480 cfm/ton
Details:	Legacy Object. Not applicable to the CORE Unit Controller at this time.

### 9.2.3. Analog Values

**Table 77. Object ID 1**

Object Name:	Baud Rate Setting
Object Type:	AV (Analog Value)
Object Units:	(95) No Units
Value:	9600, 19200, 38400, 76800
Details:	Baud rate change only takes affect after the CORE Unit Controller resets. Only applicable when setup for MS/TP operation. Default value following reset is 38400, but this can be changed at the unit. See the CORE Unit Controller setup guide for details.

**Table 78. Object ID 130**

Object Name:	Heating Occupied Set point
Object Type:	AV (Analog Value)
Object Units:	(64) Degrees-Fahrenheit
Value:	40 - 95
Details:	<p>Occupied heating set point. Default value following reset is local (P 137).</p> <p>As an alternative method of establishing set points, the single set point AO:109 and offset AO:110 may be used. The CORE Unit Controller uses whatever were the last set points received, whether from AO:109-110, or AV:130-133.</p> <p>To be considered in range the values for AV:130, 131, 132, and 133 must be in the range 40-95, and the heating set point must be less than the corresponding (occupied or unoccupied) cooling set point by at least the auto-changeover dead-band value set in the CORE Unit Controller Parameter 152 (default 3°F, 2-10°F range). If any of these condition is are violated, BACnet will return an out of range message. The AVs 130-133 can be used instead of the single set point and offset AO:109 and AO:110.</p>

**Table 79. Object ID 131**

Object Name:	Cooling Occupied Set point
Object Type:	AV (Analog Value)
Object Units:	(64) Degrees-Fahrenheit
Value:	40 - 95
Details:	Occupied cooling set point. Default value following reset is local (Parameter 139). See description for AV:130 for details on valid range.

**Table 80. Object ID 132**

Object Name:	Heating Unoccupied Set point
Object Type:	AV (Analog Value)
Object Units:	(64) Degrees-Fahrenheit
Value:	40 - 95
Details:	Unoccupied heating set point. Default value following reset is local (Parameter 138). See description for AV:130 for details on valid range.

**Table 81. Object ID 133**

Object Name:	Cooling Unoccupied Set point
Object Type:	AV (Analog Value)
Object Units:	(64) Degrees-Fahrenheit
Value:	40 - 95
Details:	Unoccupied cooling set point. Default value following reset is local (Parameter 140). See description for AV:130 for details on valid range.

**Table 82. Object ID 134**

Object Name:	Supply Airflow Low Speed Target
Object Type:	AV (Analog Value)
Object Units:	(84) Cubic Feet per Minute
Details:	Legacy Object. Not applicable to the CORE Unit Controller at this time.

**Table 83. Object ID 135**

Object Name:	Supply Airflow High Speed Target
Object Type:	AV (Analog Value)
Object Units:	(84) Cubic Feet per Minute
Details:	Legacy Object. Not applicable to the CORE Unit Controller at this time.

**Table 84. Object ID 136**

Object Name:	Supply Airflow Medium Low Speed Target
Object Type:	AV (Analog Value)
Object Units:	(84) Cubic Feet per Minute
Details:	This object will set the default of Supply airflow Medium Low Speed Target (parameter 16) following a reset.

**Table 85. Object ID 137**

Object Name:	Supply Airflow Medium High Speed Target
Object Type:	AV (Analog Value)
Object Units:	(84) Cubic Feet per Minute
Details:	This object will set the default of Supply airflow Medium High Speed Target (parameter 15) following a reset.

**Table 86. Object ID 138**

Object Name:	Supply Airflow Heat Mode Target
Object Type:	AV (Analog Value)
Object Units:	(84) Cubic Feet per Minute
Details:	Legacy Object. Not applicable to the CORE Unit Controller at this time.

**Table 87. Object ID 139**

Object Name:	Ventilation Airflow Target
Object Type:	AV (Analog Value)
Object Units:	(84) Cubic Feet per Minute
Details:	Legacy Object. Not applicable to the CORE Unit Controller at this time.

**Table 88. Object ID 140**

Object Name:	Smoke Airflow Target
Object Type:	AV (Analog Value)
Object Units:	(84) Cubic Feet per Minute
Details:	Legacy Object. Not applicable to the CORE Unit Controller at this time.

**Table 89. Object ID 141**

Object Name:	Outdoor Airflow Target
Object Type:	AV (Analog Value)
Object Units:	(84) Cubic Feet per Minute
Details:	Legacy Object. Not applicable to the CORE Unit Controller at this time.

**Table 90. Object ID 142**

Object Name:	IAQ Set Point Start Open
Object Type:	AV (Analog Value)
Object Units:	(84) Cubic Feet per Minute
Details:	The object's value must be less than Object ID 143

**Table 91. Object ID 143**

Object Name:	IAQ Set Point Full Open
Object Type:	AV (Analog Value)
Object Units:	(84) Cubic Feet per Minute
Details:	This value must be greater than Object ID 142.

**Table 92. Object ID 144**

Object Name:	Free Cooling Sensible Setpoint
Object Type:	AV (Analog Value)
Object Units:	(64) Degrees-Fahrenheit
Details:	Unit must e configured for Dual Sensible Free Cooling.

**Table 93. Object ID 145**

Object Name:	Free Cooling Sensible Offset
Object Type:	AV (Analog Value)
Object Units:	(64) Degrees-Fahrenheit
Value:	0 - 40
Details:	Unit must be configured for single sensible free cooling.

**Table 94. Object ID 146**

Object Name:	Free Cooling Enthalpy Setpoint
Object Type:	AV (Analog Value)
Object Units:	(2) mA
Value:	10 - 19
Details:	Unit must be configured for single sensible free cooling.

**Table 95. Object ID 147**

Object Name:	Free Cooling Enthalpy Offset Setpoint
Object Type:	AV (Analog Value)
Object Units:	(2) mA
Value:	1 - 5
Details:	Allows configuration of the Enthalpy Offset for Free Cooling

**Table 96. Object ID 148**

Object Name:	After Hours Override Delay Set
Object Type:	AV (Analog Value)
Object Units:	(72) Minutes
Value:	0 - 460
Details:	Allows a custom override delay timer.

## Appendix A — Blower Operations and Effective Occupancy

This section describes how BACnet® occupancy signals are combined to produce effective occupancy.

The blower runs to service heat and cool demands, regardless of the space occupancy. However when there is no heating or cooling demand there are options for how the blower should operate in conjunction with occupancy signals to keep the space ventilated, or the air stirred.

1. **California Energy Commission Title 24** - The legacy option settings for **OCC Blower Mode** are **AUTO CYCLES** or **ON-CONTINUOUS 1**. These settings govern whether the blower runs continuously when the space is considered occupied, or cycles on/off with the heating and cooling demand. To comply with the California Energy Commission Title 24 standard there are two additional values for OCC Blower Mode which are ON-CONTINUOUS 2 and ON-CONTINUOUS 3.

**Table 97. Blower Operation Description**

OCC Blower Mode	Description
AUTO CYCLES	Blower cycles on/off with demand. (Legacy usage.)
ON-CONTINUOUS 1	Blower runs when either the occupancy sensor or schedule, or both, indicates occupied. (Legacy usage.)
ON-CONTINUOUS 2	Blower runs when both the occupancy sensor and schedule indicate occupied.
ON-CONTINUOUS 3	The same as option 2, but blower runs for 30 minutes and is off for 90 minutes when schedule is occupied but the occupancy sensor is not occupied.

### 2. Menu Setup Procedure Method for OCC Blower Mode

These blower control options are handled by the OCC Blower Mode. These setting can be changed using the following menu path:

Go to **SETUP > NETWORK INTEGRATION > NETWORK = BACNET > BACNET MAC ADDRESS > BACNET BAUD RATE > CONTROL MODE = ROOM SENSOR >**(additional prompts concerning network configuration and sensor types will be asked) **CONTROL MODE = ROOM SENSOR > ROOM SENSOR OCC BLOWER MODE =** (see table 14)



**Table 98. BACnet Occupancy Points**

Mode	BACnet	Value
Manual	Occupancy Override Control AO 103	0: space occupied
		1: space unoccupied
		2: refresh space occupied override timer
		3255: auto; clear timer and return to scheduler
Schedule	Occupancy Scheduler Control AO 104	0: space occupied
		1255: space unoccupied
Sensor	Occupancy Sensor Input AO 107	0: space occupied
		1: space unoccupied
		2255: auto; return to occupancy scheduler state
Effective Occupancy	Effective Occupancy AI 241	0: space occupied
		1: space unoccupied
		2: space occupied (timed override)

**Table 16. Blower Operation Description**

Blower Operation	Description
On	Blower runs continuously.
Cycles	Blower cycles on/off with demand.
Cycles w/Stir	Blower cycles on/off with demand; during off cycle blower is on 30 minutes of 120.

**Table 17. Blower Operation Schedule**

Manual	Schedule	Sensor	Effective Occupancy	OCC BLOWER MODE	Blower Operation
0, 2	n/a	n/a	OCCUPIED	AUTO-CYCLES	Cycles
				ON-CONTINUOUS 1	On
				ON-CONTINUOUS 2	On
				ON-CONTINUOUS 3	On
1	n/a	n/a	UNOCCUPIED	AUTO-CYCLES	Cycles
				ON-CONTINUOUS 1	Cycles
				ON-CONTINUOUS 2	Cycles
				ON-CONTINUOUS 3	Cycles
3255	0	0, 2-225	OCCUPIED	AUTO-CYCLES	Cycles
				ON-CONTINUOUS 1	On
				ON-CONTINUOUS 2	On
				ON-CONTINUOUS 3	On
3255	0	1	OCCUPIED	AUTO-CYCLES	Cycles
				ON-CONTINUOUS 1	On
				ON-CONTINUOUS 2	Cycles
				ON-CONTINUOUS 3	Cycles w/Stir
3255	1255	n/a	UNOCCUPIED	AUTO-CYCLES	Cycles
				ON-CONTINUOUS 1	Cycles
				ON-CONTINUOUS 2	Cycles
				ON-CONTINUOUS 3	Cycles

**Appendix B — BACnet® Protocol Implementation Conformance (PIC) Statement**

