



LENNOX® CORE UNIT CONTROLLER BACNET SETUP GUIDE

508112-02
05/2026
Supersedes 03/2026

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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.



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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. BACnet Network Connections Types

- BACnet IP (BIP) to CORE Unit Controller Ethernet connection requires CAT5 or CAT6 cable.
- BACnet MS/TP to CORE Unit Controller Ethernet connection requires twisted pair with shield, 22AWG min. Belden type 88761 or 8761 cable. Lennox 27M19, 94L63 or 68M25

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 the CORE Unit Controller.

NOTE: *See M4 Unit Controller (A55) and Expansion Port Locations in the Lennox® CORE Control System (Unit Controller) Application Guide for port locations on 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.

1.3. Lennox® CORE Service App Features

- 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 using the Lennox® CORE Mobile Service App:

1. Connect to the CORE controller and navigate to the **RTU Menu**.
2. Select **Network Integration**.
3. Choose **Network Setup Wizard** (beneath Network Setup) to proceed. All CORE controllers are BACnet IP/MSTP ready and only require the proper BACnet network setup for operation.

NOTE: *Refer to CORE Service App Menu Selection Overview, Install Menu Structure, and BACnet MS/TP Menu Structure in the Lennox® CORE Control System (Unit Controller) Application Guide.*

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 Common BACnet IP” on page 6.

1.5.1. Common Integration Guidelines

For firmware version 9.01.0144 and later, *Change of Value* (CoV) functionality is available. Any firmware prior to version 9.01.0144 will not support CoV. See “Object Definitions” on page 17 for details on objects that support CoV.

1.5.2. Examples of Basic Optional Objects

Lennox recommends the following objects for writing generic applications:

- AO102 (Outdoor Air Min Pos Control)
- AO104 (Occupancy Scheduler Control)
- AO108 (Space Dehumidification Setpoint)
- AV130 - AV133 (Occ/Unocc Heat/Cool Setpoints)
- AO111 (IAQ 1 Network Input)
- AO112 (Humidity Network Input)
- AO113 (Space Temperature Input)

NOTE: *AO objects do not support CoV.*

How to use these objects:

- Write to the Network Inputs (AO111-113) every 2 minutes
- Write to the Setpoints (AO108 and AO109) every 7 minutes
- 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. 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 Setpoint (Effective))
- AI253 (Current Error Code)
- AI274 (Space CO2 Sensor (Effective))
- AI276 (Space Humidity (Effective))
- AI278 (Dehumidification Setpoint (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. Examples of Basic Optional Objects

Lennox recommends the following objects for writing generic applications:

- AO102 (Outdoor Air Min Pos Control)
- AO104 (Occupancy Scheduler Control)
- AO113 (Space Temperature Input)
- AO125 (Discharge Air Cooling Setpoint)
- AO126 (Discharge Air Heating Setpoint)
- AV130 (Heating Occupied Setpoint)
- AV131 (Cooling Occupied Setpoint)
- AV132 (Heating Unoccupied Setpoint)
- AV133 (Cooling Unoccupied Setpoint)

How to use these objects:

The setpoints will provide additional operating setpoints for MZVAV logic and allow staging of compressors, heater, and fan, to meet the discharge temp and static setpoints.

1.6.3. Recommended 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 Common 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 | -40°F to 155°F |
| Storage temperature range | -40°F to 185°F |
| RH | 10-95% RH non-condensing |
| Field Connections | |
| Transceiver | RS-485 |
| Connector | Three-position terminal block (+ G -) |
| Baud Rate | Selectable 9.6, 19.2, 38.4, 76.8K |
| 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 | |
| Maximum number of addresses on a BACnet IP segment | 254 |
| 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

To configure BACnet MS/TP via the CORE Service App:

1. Go to **RTU MENU > NETWORK INTEGRATION > NETWORK SETUP WIZARD**:
2. Choose **BACnet MS/TP**.
3. Set the **BACnet MAC Address** (the address should be unique for each CORE Unit Controller on the network).
4. Set the **Device Instance** per the Facility Controls Contractor. The Device Instance must be different for every RTU. It is recommended to set each device instance to match the MAC address. The default setting is 2 or the S-Bus address.
5. Set the **BAUD Rate** to your applicable network rate. The Lennox default BAUD is 38.4 kbps.

NOTE: Refer to **BACnet MS/TP Menu Structure in the Lennox® CORE Control System (Unit Controller) Application Guide** for further guidance.

2.3. Additional Configuration Steps

For Single and Multi-Zone Applications:

1. Select **Next** and select **Room Sensor** as the control mode.
2. Select **CO2 Sensor Source** as Network; select **Next**.
3. Select **Relative Humidity Source** as Network; select **Next**.
4. Select **Temperature Sensor Source** as Network; select **Next**.
5. Choose the **Occupied Blower Mode** as **Auto-Cycle**; select **Next**. Choose **On-Continuous** as necessary
6. Select the **Backup Mode** as **Return Air Backup**; select **Next**.
7. Set the **Occupied** and **Unoccupied Backup Setpoints** as necessary; 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 to the CORE Controller.
2. Do not adjust the the BACnet plug unless the interface is at the end of a daisy-chained configuration. Check with the Controls Contractor to determine the end of line requirements.

NOTE: Lennox suggests end of line termination resistors of 120 ohms at the beginning and end of the BACnet MS/TP network.

Upon powering up the CORE Unit Controller, the BACnet interface must be configured. To configure the CORE Unit Controller BACnet MS/TP Interface:

1. Install the CORE Service App on your mobile device.
2. Pair to the CORE Unit Controller.
3. 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.

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. Terminate all MS/TP network segment ends per control provider instructions

These guidelines 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 Common 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 | -40°F to 155°F |
| Storage temperature range | -40°F to 185°F |
| RH | 10-95% RH non-condensing |
| Field Connections | |
| Transceiver | 10/100MBPS |
| Connector | RJ-45 |
| Cable Type | CAT-5 |
| Max. Cable Length | 100 Meters (Between Segments) |
| Bus Termination | Surge protection recommended |
| Default Values | |
| UDP Port | BACnet UDP port is non-configurable and is always set to default 0xBAC0 i.e. 47808 |
| BACnet IP Device ID | By default will be the last octet of the W4 IP address unless set by user using BACnet interface. Range 1 to 4194302. |
| 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.

NOTE: BACnet/IP will work with BACnet Broadcast Management Devices (BBMD) within same Ethernet network subnet.

NOTE: Please ensure that "Ping" service is enabled on the Ethernet router for BACnet/IP operation.

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

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

1. Launch the Lennox® CORE Service App.
2. Go to **RTU MENU > NETWORK INTEGRATION > NETWORK SETUP WIZARD** and run the setup wizard.

To configure the CORE Unit Controller BACnet IP Interface

1. Connect to the CORE Unit Controller with your mobile device (phone or tablet).
2. Go to **RTU MENU > NETWORK INTEGRATION > NETWORK SETUP WIZARD** and select **BACnet IP**.
3. Follow the prompts on the screen to complete BACnet setup.

NOTE: Refer to **BACnet IP Menu Structure** in the Lennox® CORE Control System (Unit Controller) Application Guide for further guidance.

NOTE: All configurable network addresses must be assigned by your Integrator or IT Team.

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 subnet. 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>

3.6. BACnet IP Troubleshooting

- Verify that the IP address subnet is the same on both device and BACnet client computer.
- Verify that the default gateway is same for both device and BACnet client computer.
- Verify that ping is working between device and BACnet client computer.
- Verify that User Datagram Protocol (UDP) broadcast (Who-Is and I-Am) packets are being exchanged. Try capturing BACnet packets on the BACnet client computer.
- Verify Windows Firewall or/and anti-virus program running on the BACnet client computer (for example, Window Defender) are configured to allow UDP packets.

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 setpoints 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 setpoints (AO109, AV130 - AV133) and occupancy state (AO104). Room temperature is monitored and compared to the appropriate room temperature setpoints. 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 setpoints 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 setpoints 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 Setpoints (AO109, AV130-133)

Lennox recommends that the above points (if used) are updated every 2 minutes to ensure a retry is possible within the 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 |
|---|---|
| MSTP | |
| BACnet communication transmit and receive LEDs flash back and forth rapidly. | 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"> • Check BACnet network connections. • Make sure BACnet network is commissioned. • Make sure each unit has a unique MAC address in the range of 0 to 127. • Verify same baud rate on all devices. |
| GREEN only | ON BACNET NETWORK NO SEND/RECEIVE = Action - none |
| YELLOW only | NOT ON NETWORK - 1. Check BACnet network connections. |
| BIP | |
| <ul style="list-style-type: none"> • Check whether the 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. • Verify default gateway is correctly configured for BIP. | |

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"> • Two for MSTP • Last octet of IP address for BIP NOTE: Values can be changed using the CORE Service App | 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

NOTE: Lennox proprietary objects are obsolete and are maintained solely for backward compatibility. They are expected to be fully removed in a future release. Accordingly, these objects shall not be used in any new BACnet installations going forward.

| 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. | * | * | * | * | | | |

Table 5. Lennox Proprietary Objects

NOTE: Lennox proprietary objects are obsolete and are maintained solely for backward compatibility. They are expected to be fully removed in a future release. Accordingly, these objects shall not be used in any new BACnet installations going forward.

| Property | Description | Device Objects | | | | | | |
|--------------------------------------|---|----------------|---------|--------|------------|-----------|---------------|-------------|
| | | Compressor | Heating | Blower | Economizer | Space Air | Discharge Air | Outdoor Air |
| 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. | * | * | * | * | | | |
| 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_Setpoint | Object_Duct_Static_Pressure_Setpoint is a Read Only (RO) property that represents the Duct Static Pressure Setpoint of Discharge Air, measured in inches of water column (range: 0, 5). | | | | | * | | |

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

NOTE: Lennox proprietary objects are obsolete and are maintained solely for backward compatibility. They are expected to be fully removed in a future release. Accordingly, these objects shall not be used in any new BACnet installations going forward.

| 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). |
| 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)

NOTE: Lennox proprietary objects are obsolete and are maintained solely for backward compatibility. They are expected to be fully removed in a future release. Accordingly, these objects shall not be used in any new BACnet installations going forward.

| 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. |

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

NOTE: Lennox proprietary objects are obsolete and are maintained solely for backward compatibility. They are expected to be fully removed in a future release. Accordingly, these objects shall not be used in any new BACnet installations going forward.

| Property | Property ID | Data type and range | Access | Description |
|---------------------------|-------------|----------------------------------|-----------|--|
| 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)

NOTE: Lennox proprietary objects are obsolete and are maintained solely for backward compatibility. They are expected to be fully removed in a future release. Accordingly, these objects shall not be used in any new BACnet installations going forward.

| 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. |

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

NOTE: Lennox proprietary objects are obsolete and are maintained solely for backward compatibility. They are expected to be fully removed in a future release. Accordingly, these objects shall not be used in any new BACnet installations going forward.

| Property | Property ID | Data type and range | Access | Description |
|------------------------------|-------------|--|-----------|---|
| 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"> • 1-Gas • 2-Electric • 3-Heat Pump mode | Read Only | Indicates the source of power used for heating (range: 0, 255). |

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

NOTE: Lennox proprietary objects are obsolete and are maintained solely for backward compatibility. They are expected to be fully removed in a future release. Accordingly, these objects shall not be used in any new BACnet installations going forward.

| 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. |
| 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. |

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

NOTE: Lennox proprietary objects are obsolete and are maintained solely for backward compatibility. They are expected to be fully removed in a future release. Accordingly, these objects shall not be used in any new BACnet installations going forward.

| Property | Property ID | Data type and range | Access | Description |
|---|-------------|---------------------------------|-----------|---|
| 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. This setpoint used to determine if Outdoor Air is Suitable (OAS) for free cooling. It will be either the temperature setpoint or temperature offset for a 'T' type economizer, enthalpy setpoint for an 'S' type single enthalpy economizer, or enthalpy offset for a 'D' type dual enthalpy economizer. |

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

NOTE: Lennox proprietary objects are obsolete and are maintained solely for backward compatibility. They are expected to be fully removed in a future release. Accordingly, these objects shall not be used in any new BACnet installations going forward.

| 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_Setpoint | 535 | Integer: Values are 0 - 5 (inches of water column) | Read Only | Represents the Duct Static Pressure Setpoint 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)

NOTE: Lennox proprietary objects are obsolete and are maintained solely for backward compatibility. They are expected to be fully removed in a future release. Accordingly, these objects shall not be used in any new BACnet installations going forward.

| 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_Setpoint | 535 | Integer: Values are 0 - 5 (inches of water column) | Read Only | Represents the Duct Static Pressure Setpoint 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)

| 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_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_Setpoint | 535 | Integer: Values are 0 - 5 (inches of water column) | Read Only | Represents the Duct Static Pressure Setpoint 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 setpoint in the CORE Unit Controller is written to by some S-Bus device.

Table 13. Analog Output (AO) Objects List

| Object ID | Object Name | Units | Min. Value | Max. Value | Valid Values within Range | CoV♦ | CoV Increment † |
|-----------|-------------------------------------|--------------|------------|------------|---|------|-----------------|
| 101 | Application Mode Control* | None | 0 | 255 | 0, 1,3,6,9,208,209,216,217,218, 219, 220, 221, 222, 224, 225, 226, 227, 228, 229, 230, 232, 233, 234, 236, 254, 255 | N/A | N/A |
| 102 | Outdoor Air Min Pos Control | Percent | 0 | 255 | all | N/A | N/A |
| 103 | Occupancy Override Control | None | 0 | 255 | all | N/A | N/A |
| 104 | Occupancy Scheduler Control | None | 0 | 255 | all | N/A | N/A |
| 105 | BACnet Device Instance | None | 1 | 4194302 | all | N/A | N/A |
| 107 | Occupancy Sensor Input | None | 0 | 255 | all | N/A | N/A |
| 108 | Space Dehumidification Setpoint | Percent | 0 | 100 | all | N/A | N/A |
| 109 | Temperature Setpoint (abs) | Deg. F | 36.25 | 100 | all | N/A | N/A |
| 110 | Temperature Setpoint Offset | Deg. F | -32 | 31.75 | all | N/A | N/A |
| 111 | IAQ 1 Network Input | PPM | 300 | 2000 | all | N/A | N/A |
| 112 | Humidity Network Input | Percent | 0 | 100 | all | N/A | N/A |
| 113 | Space Temperature Input | Deg. F | 36.25 | 100 | all | N/A | N/A |
| 114 | Emergency Override Control | None | 0 | 255 | all | N/A | N/A |
| 115 | Compressor Enable Control | Percent | 0 | 255 | all | N/A | N/A |
| 117 | Primary Heat Enable Control | Percent | 0 | 255 | all | N/A | N/A |
| 119 | Auxiliary Heat Enable Control | Percent | 0 | 255 | all | N/A | N/A |
| 123 | Duct Static Setpoint | In. of water | 0 | 5 | all | N/A | N/A |
| 124 | Building Static Setpoint | In. of water | -0.5 | 0.5 | all | N/A | N/A |
| 125 | Discharge Air Cooling Setpoint | Deg. F | 40 | 100 | -9,40-100* | N/A | N/A |
| 126 | Discharge Air Heating Setpoint | Deg. F | 60 | 140 | -9,60-140* | N/A | N/A |
| 127 | Supply Fan Capacity Input | Percent | 33 | 255 | all* | N/A | N/A |
| 128 | Exhaust Fan Capacity Input | Percent | 33 | 255 | all | N/A | N/A |
| 129 | Set Economizer Outdoor Air Suitable | None | 0 | 255 | all | N/A | N/A |

* See "Application Details" on page 25 for limitations on data ranges.

♦ CoV - "Available" indicates this functionality is supported for Analog Output Objects. When these objects are subscribed and values are changed, the CORE Unit Controller will issue a notification to the subscriber.

† CoV Increment - "N/A" (not available) indicates this property is not supported for the object.

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 | CoV♦ | CoV Increment † |
|-----------|----------------------------------|---------|----------------|-----------|-----------------|
| 198 | Mac Address | None | 0 - 127 | N/A | N/A |
| 199 | IMC Address | None | 1-31 | N/A | N/A |
| 200 | IMC Version[4] | None | 0, 46, 48 - 57 | N/A | N/A |
| 201 | IMC Version[5] | None | 0, 46, 48 - 57 | N/A | N/A |
| 202 | IMC Version[6] | None | 0, 46, 48 - 57 | N/A | N/A |
| 203 | IMC Version[7] | None | 0, 46, 48 - 57 | N/A | N/A |
| 204 | IMC Version[8] | None | 0, 46, 48 - 57 | N/A | N/A |
| 205 | IMC Version[9] | None | 0, 46, 48 - 57 | N/A | N/A |
| 206 | IMC Version[10] | None | 0, 46, 48 - 57 | N/A | N/A |
| 207 | IMC Version[11] | None | 0, 46, 48 - 57 | N/A | N/A |
| 208 | IMC Version[12] | None | 0, 46, 48 - 57 | N/A | N/A |
| 209 | IMC Version[13] | None | 0, 46, 48 - 57 | N/A | N/A |
| 210 | IMC Version[14] | None | 0, 46, 48 - 57 | N/A | N/A |
| 231 | Unit ID | None | 0 - 255 | N/A | N/A |
| 232 | Unit Status | None | 0 - 255 | Available | Available |
| 239 | Space Temperature | Deg. F | 63.75 - 100.00 | Available | Available |
| 240 | Discharge Air Temperature | Deg. F | -8.7 – 164.4 | Available | Available |
| 241 | Effective Occupancy | None | 0 - 2 | Available | Available |
| 242 | Local Outside Air Temperature | Deg. F | -30.6 – 131.6 | Available | Available |
| 243 | Local Space Temperature | Deg. F | 63.75 – 100.00 | Available | Available |
| 244 | Outside Air Damper | Percent | 0 - 100, 255 | Available | Available |
| 245 | Heat Primary | Percent | 0 – 100 | Available | Available |
| 246 | Heat Secondary | Percent | 0 – 100 | Available | Available |
| 247 | Cool Primary | Percent | 0 – 100 | Available | Available |
| 248 | Economizer Enabled | None | 0, 1, 255 | Available | Available |
| 250 | Supply Fan Status | Percent | 0 - 100 | Available | Available |
| 252 | Space Temperature Setpoint (Eff) | Deg. F | 40.0 – 95.0 | Available | Available |

♦ CoV - "Available" indicates this functionality is supported for Analog Output Objects. When these objects are subscribed and values are changed, the CORE Unit Controller will issue a notification to the subscriber.

† CoV Increment - "N/A" (not available) indicates this property is not supported for the object.

Table 14. Analog Input (AI) Objects List

| Object ID | Object Name | Units | Data Range | CoV♦ | CoV Increment † |
|---|---------------------------------|-------------------|--------------|-----------|-----------------|
| 253 | Current Error | | | | |
| 254 | Error Pointer | | | | |
| 255 | Most recent Error 1 | | | | |
| 256 | Most recent Error 2 | | | | |
| 257 | Most recent Error 3 | | | | |
| 258 | Most recent Error 4 | | | | |
| 259 | Most recent Error 5 | | | | |
| 260 | Most recent Error 6 | | | | |
| 261 | Most recent Error 7 | | | | |
| 262 | Most recent Error 8 | | | | |
| 263 | Most recent Error 9 | | | | |
| 264 | Most recent Error 10 | | | | |
| These legacy alarm reporting objects are obsolete. These obsolete objects are replaced with the new CSV 302 object, which lists the same alarm list information. All new BACnet installations should use the new CSV 302 object instead of the obsolete legacy objects for retrieving alarming information. | | | | | |
| 273 | IAQ 2 Effective Value | Volt | 0 - 10 | Available | Available |
| 274 | Space CO2 Sensor (Eff) | Parts-per-million | 0 - 2000 | Available | Available |
| 275 | Space CO2 Sensor (Local) | Parts-per-million | 0 - 2000 | Available | Available |
| 276 | Space Humidity (Eff) | Percent | 0 - 100 | Available | Available |
| 277 | Space Humidity (Local) | Percent | 0 - 100 | Available | Available |
| 278 | Dehumidification Setpoint (Eff) | Percent | 0 - 100 | Available | Available |
| 279 | Dehumidification Status | None | 0 - 2 | Available | Available |
| 281 | Return Air Temperature | Deg. F | -8.7 – 164.4 | Available | Available |
| 282 | Building Static Pressure | Inches-of-water | -0.5 - 0.5 | Available | Available |
| 283 | Duct Static Pressure | Inches-of-water | 0 – 5.00 | Available | Available |
| 285 | Exhaust Fan Status | Percent | 0 - 100 | Available | Available |
| 290 | Filter Efficiency | No Unit | 1-1 - 100 | Available | Available |
| 293 | Modulating Compressor Demand | No Unit | 1-1 - 100 | Available | Available |

* 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.

1. A value of -1 indicates that a filter efficiency sensor is not installed or the reading is unavailable.

♦ CoV - "Available" indicates this functionality is supported for Analog Input Objects. When these objects are subscribed and values are changed, the CORE Unit Controller will issue a notification to the subscriber.

† CoV Increment - "N/A" (not available) indicates this property is not supported for the object.

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 | CoV♦ | CoV Increment † |
|-----------|--|---------|------------|------------|---------------------------|---|-----------|-----------------|
| 1 | Baud Rate Setting | None | 9600 | 76800 | 9600, 19200, 38400, 76800 | Only used for BACnet MS/TP configurations. | N/A | N/A |
| 130 | Heating Occupied Setpoint | Deg. F | 40 | 95 | all | For occupied and unoccupied setpoints considered separately, the heating setpoint must be lower than the cooling setpoint by at least the auto-changeover dead-band value set in CORE Unit Controller P153 (default 3°F). | Available | Available |
| 131 | Cooling Occupied Setpoint | Deg. F | 40 | 95 | all | | | |
| 132 | Heating Unoccupied Setpoint | Deg. F | 40 | 95 | all | | | |
| 133 | Cooling Unoccupied Setpoint | Deg. F | 40 | 95 | all | | | |
| 142 | IAQ Setpoint Start Open | PPM | 0 | 2000 | all | This object's value must be less than Object ID 143. | Available | Available |
| 143 | IAQ Setpoint Full Open | PPM | 0 | 2000 | all | This value must be greater than Object ID 142. | Available | Available |
| 144 | Free Cooling Temperature Sensible Setpoint | Deg. F | 40 | 75 | all | Unit must be configured for Dual Sensible Free Cooling. | Available | Available |
| 145 | Free Cooling Temperature Offset Setpoint | Deg. F | 0 | 40 | all | Unit must be configured for single sensible free cooling. | Available | Available |
| 146 | Free Cooling Enthalpy Setpoint | mA | 10 | 19 | all | Unit must be configured for single Enthalpy free cooling. | Available | Available |
| 147 | Free Cooling Enthalpy Offset Setpoint | mA | 1 | 5 | all | Allows Configuration of the Enthalpy Offset for Free Cooling. | Available | Available |
| 148 | After Hours Override Delay Setpoint | Minutes | 0 | 480 | all | Allows a custom override delay timer. | Available | Available |
| 149 | Heat Pump Dual Fuel Balance Point | Deg. F | -20 | 65 | all | Dual Fuel Balance setpoint for switching to gas heat from mechanical compressor heating below this value. Default value following reset is local | Available | Available |
| 150 | Heat Pump Compressor Lockout Low Setpoint | Deg. F | -50 | 0 | all | Low Ambient Heating Compressor Lockout Temperature Low setpoint for locking out mechanical compressor heating below this value. Default value following reset is local. | Available | Available |

Table 15. Analog Value (AV) Objects List

| Object ID | Object Name | Units | Min. Value | Max. Value | Valid Values within Range | Note | CoV♦ | CoV Increment † |
|-----------|--|--------|------------|------------|---------------------------|--|-----------|-----------------|
| 151 | Heat Pump Compressor Lockout High Setpoint | Deg. F | -50 | 0 | all | Low Ambient Heating Compressor Lockout Temperature High setpoint for re-enabling mechanical compressor heating above this value. Default value following reset is local. | Available | Available |

♦ CoV - "Available" indicates this functionality is supported for Analog Value Objects. When these objects are subscribed and values are changed, the CORE Unit Controller will issue a notification to the subscriber.

† CoV Increment - "N/A" (not available) indicates this property is not supported for the object.

7.4. Character String Values

Optional Properties Supported: None
 Optional Writable Properties: Present_Value

Table 16. Character String Values (CSV) Objects List

| Object ID | Object Name | Units | Valid Values within Range | CoV♦ | CoV Increment † |
|-----------|--------------------------|--------|---|-----------|-----------------|
| 300 | Unit Model String | String | String with unit model number. | N/A | N/A |
| 301 | Board Firmware Version | String | String with firmware version. Format of FW Version is XX.YY.ZZZZ. | N/A | N/A |
| 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. | Available | N/A |
| 303 | Unit Subcooling | String | Provides the unit circuit subcooling values for the unit. -9: Not Available 0 - 100: Subcooling for the circuit referenced. | Available | N/A |
| 304 | Unit Superheat | String | Provides the unit circuit Superheat values for the unit. -9: Not Available 0 - 100: Superheat for the circuit referenced. | Available | N/A |
| 305 | Compressor Runtime Hours | String | Provides the unit compressor runtime values for the unit. -1: Not Available (Does not have this compressor) 0 - XXXXXX: Hours the compressor has run. | Available | N/A |

♦ CoV - “Available” indicates this functionality is supported for Character String Values Objects. When these objects are subscribed and values are changed, the CORE Unit Controller will issue a notification to the subscriber.

† CoV Increment - “N/A” (not available) indicates this property is not supported for the object.

7.5. Multi-State Values

Optional Properties Supported: None
 Optional Writable Properties: Present_Value

Table 17. Multi-State Value (MSV) Objects List

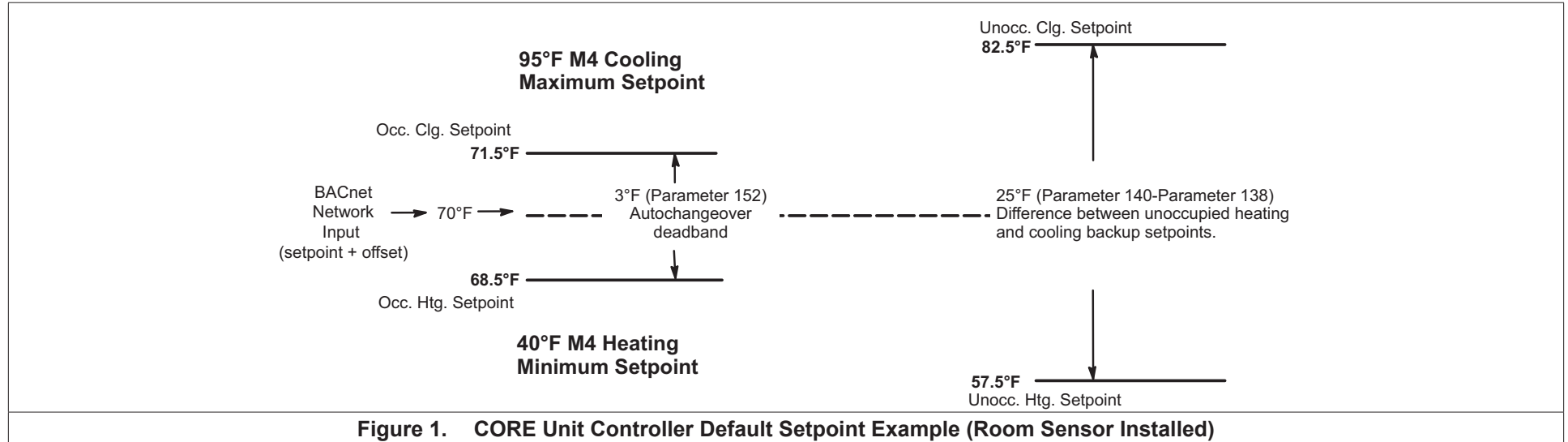
| Object ID | Object Name | Units | Valid Values | CoV♦ | CoV Increment † |
|-----------|---------------------------|-------------------|---|-----------|-----------------|
| 310 | Mode of Operation | Multi-state value | 1 : wired thermostat 2 : remote thermostat 3 : discharge air control 4 : room sensor operation 5 : unit has gone into backup operation | Available | N/A |
| 311 | Remote Handset Connection | Multi-state value | 1: No Handset Connected 2: Handset Connected | Available | N/A |
| 312 | RTU Status | Multi-state value | 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 30 – HVAC idle 31 – HVAC fresh air heating 32 – HVAC fresh air cooling 33 – HVAC defrost compressor 1 34 – HVAC defrost compressor 2 35 – HVAC defrost compressor 1 & 2 | Available | N/A |

♦ CoV - "Available" indicates this functionality is supported for Multi-State Value Objects. When these objects are subscribed and state values are changed, the CORE Unit Controller will issue a notification to the subscriber.

† CoV Increment - "N/A" (not available) indicates this property is not supported for the object.

8. Room Sensor Setpoints

- The CORE Unit Controller typically uses four setpoints and the zone temperature to operate the unit when a zone sensor is installed.
- When using the AO:109 single setpoint input, the CORE Unit Controller will use the zone temperature setpoint and Parameter 152 to determine the heat / cool setpoint in the occupied mode. During the unoccupied mode, the CORE Unit Controller will use the zone temperature setpoint and the difference between Parameter 140 and Parameter 138.
- See “Figure 1. CORE Unit Controller Default Setpoint Example (Room Sensor Installed)” for an example of setpoints when the CORE Unit Controller is operating using parameter default values.
- As an alternative, the individual setpoints AV:130-133 may be used. The CORE Unit Controller uses whatever were the last setpoints 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. AUTO is the default application mode after RTU comes out of reset/power cycle. |
| 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 | Default after reset. Blower is controlled by CORE as configured in Parameter 154. |
| 209 \$D1 | FAN ON | Blower On. CORE disregards configuration set in Parameter 154. |
| 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. |

- 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 setpoint. 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. |
| 233 \$E9 | DEHUM | 0 | 0 | 0 | 0 | 1 | Dehum |
| 234 \$EA | DHUM + COOL | 0 | 1 | 0 | 0 | 1 | Dehum + Cool |
| 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) |

- For all \$E(x) 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 five 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 five 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 101

| | |
|---------------|---|
| Object Name: | Application Mode Control |
| Object Type: | AO (Analog Output) |
| Object Units: | (95) No_Units |
| Value: | 0, 1,3,6,9,208,209,216,217,218, 219, 220, 221, 222, 224, 225, 226, 227, 228, 229, 230, 232, 233, 234, 236, 254, 255 |
| Details: | See "Application Details" on page 25 and "Application Modes Specific To Remote Thermostat Operation" on page 27. |

Table 21. Object ID 102

| | |
|---------------|---|
| Object Name: | Outdoor Air Min Pos Control |
| Object Type: | AO (Analog Output) |
| 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:</p> <p style="padding-left: 40px;">Parameter 132 = 101: Min damper position set by Parameter 132.</p> <p>A value written to AO102 will take priority over any locally set damper positions. A minimum damper position, either locally set or set via AO102, is only valid when the unit is occupied and the blower is operating. The damper will be closed if the unit is not occupied and the blower is not operating. The default value after reset is the locally configured value.</p> |

Table 22. Object ID 103

| | |
|---------------|--|
| Object Name: | Occupancy Override Control |
| Object Type: | AO (Analog Output) |
| 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> |

Table 23. Object ID 104

| | |
|---------------|---|
| Object Name: | Occupancy Scheduler Control |
| Object Type: | AO (Analog Output) |
| Object Units: | (95) No_Units |
| Value: | 0 - 255 |
| Details: | 0: space occupied 1-255: space unoccupied Default value following reset is determined by Parameter 225. Once a value for AO:104 is received, the Parameter 225 value is ignored. |

Table 24. Object ID 105

| | |
|---------------|---|
| Object Name: | BACnet Device Instance |
| Object Type: | AO (Analog Output) |
| Object Units: | (95) No_Units |
| Value: | 1 - 4194302 |
| Details: | Device ID, it must be unique in the BACnet network. For MS/TP , 2 is the default value. |

Table 25. Object ID 107

| | |
|---------------|--|
| Object Name: | Occupancy Sensor Input |
| Object Type: | AO (Analog Output) |
| Object Units: | (95) No_Units |
| Value: | 0 - 255 |
| Details: | 0: occupancy sensor indicates space occupied 1: occupancy sensor indicates space unoccupied 2-255: auto; return to occupancy scheduler state Default value following reset is 255 (auto). |

Table 26. Object ID 108

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

Table 27. Object ID 109

| | |
|---------------|---|
| Object Name: | Temperature Setpoint (abs) |
| Object Type: | AO (Analog Output) |
| Object Units: | (64) Degrees-Fahrenheit |
| Value: | 36.25 – 100.00°F, in 0.25°F increments |
| Details: | <p>The single-point temperature setpoint (abs) (including offset; see below) is converted locally to occupied and unoccupied heating and cooling setpoints. The occupied and unoccupied heating and cooling setpoints are computed to be centered (if possible) on the effective single-point setpoint. 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) setpoints until a value is received for AO:109.</p> <p>As an alternative method of establishing setpoints, the individual setpoints AV:130-133 may be used. The CORE Unit Controller uses whatever were the last setpoints 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 setpoints. The difference between these setpoints will be used as the unoccupied heat/cool auto-changeover dead-band value.</p> |

Table 28. Object ID 110

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

Table 29. Object ID 111

| | |
|---------------|---|
| Object Name: | IAQ 1 Network Input |
| Object Type: | AO (Analog Output) |
| Object Units: | (96) PPM |
| Value: | 300 - 2000 |
| Details: | A network value for the space IAQ 1 (CO ₂ Sensor) input. If configured correctly, the CORE Unit Controller will utilize this value as the effective CO ₂ 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 30. Object ID 112

| | |
|---------------|--|
| Object Name: | Humidity Network Input |
| Object Type: | AO (Analog Output) |
| 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 31. Object ID 113

| | |
|---------------|---|
| Object Name: | Space Temperature Input |
| Object Type: | AO (Analog Output) |
| 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 Setpoint (abs) and Temperature Setpoint Offset values. The default following reset is 72.5°F.</p> <ul style="list-style-type: none"> • 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. • 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). • 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. If the CORE Unit Controller is in a backup mode, then it will reset before resuming. |

Table 32. Object ID 114

| | | | | |
|---------------|--|------------|---------------|---------------|
| Object Name: | Emergency Override Control | | | |
| Object Type: | AO (Analog Output) | | | |
| Object Units: | (95) No_Units | | | |
| Value: | 0 - 255 | | | |
| Details: | Set the emergency mode defined by value, decoded as: | | | |
| | | Supply | Exhaust | Outdoor |
| | <u>Value Mode</u> | <u>Fan</u> | <u>Fan</u> | <u>Damper</u> |
| 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"> • (auto) - normal operation • (speed) - exhaust fan runs at speed pre-selected at equipment • (pressure) - exhaust fan runs to maintain building press setpoint; local or remote | | | |
| | 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 33. Object ID 115

| Object Name: | Compressor Enable Control | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------------|---|------------|------------|------------|--------------------------|----------------------------------|--|--|--|---------|---------|---------|---------|---|------------|--|--|--|---|------------|------------|--|--|---|------------|------------|------------|--|---|------------|------------|------------|------------|---------------------------|--|-------|------------|---------|----------|-----------|-------------------------------|
| Object Type: | AO | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Object Units: | (98) Percent | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Value: | 0 - 255 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Details: | <p>0: output disabled 1-100: output limited to 1 – 100% of maximum 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 rowspan="2">Number of Stages on Unit</th> <th colspan="4">Stage is Disabled when Value < X</th> </tr> <tr> <th>Stage 1</th> <th>Stage 2</th> <th>Stage 3</th> <th>Stage 4</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Value < 50</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>Value < 33</td> <td>Value < 66</td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>Value < 25</td> <td>Value < 50</td> <td>Value < 75</td> <td></td> </tr> <tr> <td>4</td> <td>Value < 20</td> <td>Value < 40</td> <td>Value < 60</td> <td>Value < 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 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> <table border="1"> <thead> <tr> <th colspan="2">3 - 6 Ton (LGM/LCM) Units</th> </tr> </thead> <tbody> <tr> <td>Value</td> <td>Compressor</td> </tr> <tr> <td>0 - 40%</td> <td>Disabled</td> </tr> <tr> <td>40 - 100%</td> <td>Max Hz limited to given value</td> </tr> </tbody> </table> | | | | Number of Stages on Unit | Stage is Disabled when Value < X | | | | Stage 1 | Stage 2 | Stage 3 | Stage 4 | 1 | Value < 50 | | | | 2 | Value < 33 | Value < 66 | | | 3 | Value < 25 | Value < 50 | Value < 75 | | 4 | Value < 20 | Value < 40 | Value < 60 | Value < 80 | 3 - 6 Ton (LGM/LCM) Units | | Value | Compressor | 0 - 40% | Disabled | 40 - 100% | Max Hz limited to given value |
| Number of Stages on Unit | Stage is Disabled when Value < X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Stage 1 | Stage 2 | Stage 3 | Stage 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Value < 50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Value < 33 | Value < 66 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Value < 25 | Value < 50 | Value < 75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Value < 20 | Value < 40 | Value < 60 | Value < 80 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 - 6 Ton (LGM/LCM) Units | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Value | Compressor | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 - 40% | Disabled | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 - 100% | Max Hz limited to given value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Table 34. Object ID 117

| | |
|---------------|--|
| Object Name: | Primary Heat Enable Control |
| Object Type: | AO (Analog Output) |
| Object Units: | (98) Percent |
| Value: | 0 - 255 |
| Details: | <p>0: output disabled 1-100: output limited to 1 – 100% of maximum 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 35. Object ID 119

| | |
|---------------|---|
| Object Name: | Auxiliary Heat Enable Control |
| Object Type: | AO (Analog Output) |
| Object Units: | (98) Percent |
| Value: | 0 - 255 |
| Details: | <p>0: output disabled 1-100: output limited to 1 – 100% of maximum 101-255: maximum output permitted</p> <p>It shows the value where the indicated auxiliary heating stage is disabled, for equipment having the indicated maximum number of auxiliary heating stages. The default following reset is 100%.</p> |

Table 36. Object ID 123

| | |
|---------------|---|
| Object Name: | Duct Static Setpoint |
| Object Type: | AO (Analog Output) |
| Object Units: | (58) Inches-of-water |
| Value: | 0.0 - 5.0 inWC |
| Details: | <p>The setpoint 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 setpoint 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 setpoint for AO:123, there is no way to return to the local setpoint except by controller reset.</p> <p>AO123 is supported by:</p> <ul style="list-style-type: none"> • Units with CAV (with bypass damper) blower • Multi-Zone VAV Configured Units |

Table 37. Object ID 124

| | |
|---------------|---|
| Object Name: | Building Static Setpoint |
| Object Type: | AO (Analog Output) |
| Object Units: | (58) Inches-of-water |
| Value: | -0.5 - 0.5 inWC |
| Details: | <p>The setpoint for control of building static pressure, in inches of water column for power exhaust operation with building pressure control. The exhaust blower is cycled or, if a VFD is used, its speed is varied to maintain this value.</p> <p>For VFD power exhaust operation with a 2-stage power exhaust, the first stage is enabled based on the AO124 setpoint and stage two will be enabled based on the Exhaust Fan Stage 2 Pressure Setpoint (parameter 221) in the CORE controller.</p> <p>For details on power exhaust staging, refer to the Power Exhaust Operations section in the Lennox® CORE Control System (Unit Controller) Application Guide.</p> <p>The setpoint can be selected from the range of -0.5 to +0.5 inches of water column. The default following reset is local control. Once an executive controller has sent a setpoint for AO:124, there is no way to return to the local setpoint except by controller reset.</p> |

Table 38. Object ID 125

| | |
|---------------|---|
| Object Name: | Discharge Air Cooling Setpoint |
| Object Type: | AO (Analog Output) |
| Object Units: | (64) Degrees-Fahrenheit |
| Value: | 40 - 100°F, and -9°F |
| Details: | <p>The setpoint for control of discharge (or supply) air temperature during cooling. When the controller is in the correct mode of operation, sending this setpoint will cause cooling 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 40°F to 100°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 in both Discharge Air Control Cooling (DACC) and Single-Zone Variable Air Volume (SZVAV) Standard Cooling.</p> |

Table 39. Object ID 126

| | |
|---------------|--|
| Object Name: | Discharge Air Heating Setpoint |
| Object Type: | AO (Analog Output) |
| 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 40. Object ID 127

| | |
|---------------|---|
| Object Name: | Supply Fan Capacity Input |
| Object Type: | AO (Analog Output) |
| Object Units: | (98) Percent |
| Value: | 33 - 255 |
| Details: | <p>33 - 100: Set the supply fan capacity as a % of maximum speed.</p> <p>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 41. Object ID 128

| | |
|---------------|---|
| Object Name: | Exhaust Fan Capacity Input |
| Object Type: | AO (Analog Output) |
| Object Units: | (98) Percent |
| Value: | 33 - 255 |
| Details: | Exhaust fan capacity is only effective when the exhaust fan is running. Default value following reset is 255 (local). |

Table 42. Object ID 129

| | |
|---------------|---|
| Object Name: | Set Economizer Outdoor Air Suitable |
| Object Type: | AO (Analog Output) |
| Object Units: | (95) No_Units |
| Value: | 0 - 255 |
| Details: | <p>0: Economizer disable</p> <p>1: Economizer enable</p> <p>>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 43. Object ID 198

| | |
|---------------|--|
| Object Name: | MAC Address |
| Object Type: | AI (Analog Input) |
| Object Units: | (95) No_Units |
| Value: | 0 - 127 |
| Details: | Selectable BACnet MAC address. By default, this value equals the L Connection address. |

Table 44. Object ID 199

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

Table 45. Object ID 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210

| | |
|---------------|--|
| Object Name: | IMC Version[04], IMC Version[05],..., IMC Version[14] |
| Object Type: | AI (Analog Input) |
| Object Units: | (95) No_Units |
| Value: | 0, 46, 48 - 57 |
| Details: | <p>0: end of string 46: "." 48: "0" ... 57: "9"</p> <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 11 characters, including null i.e. (XX.YY.ZZZZ + null)</p> <p>NOTE: <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> |

Table 46. Object ID 231

| | |
|---------------|--|
| Object Name: | Unit ID |
| Object Type: | AI (Analog Input) |
| Object Units: | (95) No_Units |
| Value: | 0 - 255 |
| Details: | <p>48-63: gas heat, electric cool</p> <p>64-79: electric heat, electric cool</p> <p>80-95: electric heat pump, with or without electric resistive heat</p> |

Table 47. Object ID 232

| | |
|---------------|--|
| Object Name: | Unit Status |
| Object Type: | AI (Analog Input) |
| Object Units: | (95) No_Units |
| Value: | 0 - 255 |
| Details: | <p>0 – HVAC idle</p> <p>1 – HVAC heat</p> <p>2 – HVAC morning warmup</p> <p>3 – HVAC cool</p> <p>5 – HVAC pre-cool</p> <p>6 – HVAC off</p> <p>7 – HVAC test</p> <p>8 – HVAC emergency heat</p> <p>9 – HVAC fan only</p> <p>12 – HVAC max heat</p> <p>14 – HVAC dehumidification</p> <p>129 – HVAC fresh air heating</p> <p>131 – HVAC fresh air cooling</p> <p>177 – HVAC defrost compressor 1 & 2</p> <p>145 – HVAC defrost compressor 1</p> <p>161 – HVAC defrost compressor 2</p> |

Table 48. Object ID 239

| | |
|---------------|---|
| Object Name: | Space Temperature |
| Object Type: | AI (Analog Input) |
| Object Units: | (64) Degrees-Fahrenheit |
| Value: | 63.75 – 100.00 °F, in 0.25 °F 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 49. Object ID 240

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

Table 50. Object ID 241

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

Table 51. Object ID 242

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

Table 52. Object ID 243

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

Table 53. Object ID 244

| | |
|---------------|--|
| Object Name: | Outside Air Damper |
| Object Type: | AI (Analog Input) |
| Object Units: | (98) Percent |
| Value: | 0 – 100, 255 |
| Details: | <p>0 - 100: Outdoor air damper position. Percent-open. 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 54. Object ID 245

| | |
|---------------|--|
| Object Name: | Heat Primary |
| Object Type: | AI (Analog Input) |
| 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 55. Object ID 246

| | |
|---------------|---|
| Object Name: | Heat Secondary |
| Object Type: | AI (Analog Input) |
| Object Units: | (98) Percent |
| Value: | 0 – 100 |
| Details: | 0 - 100: Current level of the secondary heating capacity. This is auxiliary (electric resistance “strip”) heat in a heat pump. Whether it is on in addition to the primary heat (compressor), or as emergency heat while the compressor is locked-out. |

Table 56. Object ID 247

| | |
|---------------|--|
| Object Name: | Cool Primary |
| Object Type: | AI (Analog Input) |
| 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 57. Object ID 248

| | |
|---------------|--|
| Object Name: | Economizer Enabled |
| Object Type: | AI (Analog Input) |
| Object Units: | (95) No_Unit |
| Value: | 0 – 1, 255 |
| Details: | 0: Economizer is disabled. 1: Economizer is enabled (outdoor air is suitable for free cooling). 255: No economizer. 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. |

Table 58. Object ID 250

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

Table 59. Object ID 252

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

Table 60. Object ID 253

| | |
|---------------|---|
| Object Name: | Current Error |
| Object Type: | AI (Analog Input) |
| Object Units: | (95) No_Units |
| Value: | 0 - 1024 0: If no alarm is active. |
| Details: | <p>NOTE: Use CSV 302 for all new installations.</p> <ul style="list-style-type: none"> • 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” will be equal. Refer to the CORE Unit Controller Setup Guide for alarm code descriptions. • CoV and CoV increment is available for this object. |

Table 61. Object ID 254

| | |
|---------------|---|
| Object Name: | Error Pointer |
| Object Type: | AI (Analog Input) |
| Object Units: | (95) No_Units |
| Value: | 0 - 1024 |
| Details: | <p>NOTE: Use CSV 302 for all new installations.</p> <p>Provide total number of Active alarms present in the RTU at the time of read.</p> |

Table 62. 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 (Analog Input) |
| Object Units: | (95) No_Units |
| Value: | 0 - 1024 0: If no alarm is active. |
| Details: | NOTE: Use CSV 302 for all new installations. <ul style="list-style-type: none"> • These are the ten most recently occurring diagnostic codes; “Most recent Error 1” is the most recent. • 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. • 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”. • Refer to the CORE Unit Controller setup guide for alarm code descriptions. • Refer to object CSV 302 for the alarm log condensed into one object. This object is maintained for legacy support. |

Table 63. Object ID 273

| | |
|---------------|---|
| Object Name: | IAQ 2 Effective Value |
| Object Type: | AI (Analog Input) |
| Object Units: | (5) Volts |
| Value: | 0 - 10 |
| Details: | This is the actual value being used by the CORE Unit Controller and is the value measured at the CORE Unit Controller.. |

Table 64. Object ID 274

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

Table 65. Object ID 275

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

Table 66. Object ID 276

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

Table 67. Object ID 277

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

Table 68. Object ID 278

| | |
|---------------|--|
| Object Name: | Dehumidification Setpoint (Eff) |
| Object Type: | AI (Analog Input) |
| Object Units: | (98) Percent |
| Value: | 0 - 100 |
| Details: | <p>Relative humidity setpoint for dehumidification operation.</p> <p>Deadband is set locally during commissioning.</p> |

Table 69. Object ID 279

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

Table 70. Object ID 281

| | |
|---------------|---|
| Object Name: | Return Air Temperature |
| Object Type: | AI (Analog Input) |
| 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 71. Object ID 282

| | |
|---------------|---|
| Object Name: | Building Static Pressure |
| Object Type: | AI (Analog Input) |
| Object Units: | (58) Inches-of-water |
| 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 72. Object ID 283

| | |
|---------------|---|
| Object Name: | Duct Static Pressure |
| Object Type: | AI (Analog Input) |
| Object Units: | (58) Inches-of-water |
| 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 73. Object ID 285

| | |
|---------------|---|
| Object Name: | Exhaust Fan Status |
| Object Type: | AI (Analog Input) |
| 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 74. Object ID 293

| | |
|---------------|---|
| Object Name: | Modulating Compressor Demand |
| Object Type: | AI (Analog Input) |
| Object Units: | (95) No_Units |
| Value: | -1 to 100 |
| Details: | 0-100 indicates current operating percentage for Model L equipment. Exception: 092 model numbers with AI247 @ 100%; this AI293 will be 68%, which indicates equipment is at max cooling. |

9.2.3. Analog Values (AV)

Table 75. Object ID 1

| | |
|---------------|---|
| Object Name: | Baud Rate Setting |
| Object Type: | AV (Analog Value) |
| Object Units: | (95) No Units |
| Value: | 9600, 19200, 38400, 76800 |
| Details: | Only applicable when setup for MS/TP operation. Default value following reset/power cycle is 38400, but this can be changed by other means, see the CORE Unit Controller setup guide for details. |

Table 76. Object ID 130

| | |
|---------------|---|
| Object Name: | Heating Occupied Setpoint |
| Object Type: | AV (Analog Value) |
| Object Units: | (64) Degrees-Fahrenheit |
| Value: | 40 - 95 |
| Details: | <p>Occupied heating setpoint. Default value following reset is local.</p> <p>As an alternative method of establishing setpoints, the single setpoint AO:109 and offset AO:110 may be used. The CORE Unit Controller uses whatever were the last setpoints 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 setpoint must be less than the corresponding (occupied or unoccupied) cooling setpoint 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 setpoint and offset AO:109 and AO:110.</p> |

Table 77. Object ID 131

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

Table 78. Object ID 132

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

Table 79. Object ID 133

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

Table 80. Object ID 142

| | |
|---------------|---|
| Object Name: | IAQ Setpoint Start Open |
| Object Type: | AV (Analog Value) |
| Object Units: | (96) PPM |
| Value: | 0 - 2000 |
| Details: | IAQ Setpoint for start open behavior for DCV Operation. |

Table 81. Object ID 143

| | |
|---------------|--------------------------------------|
| Object Name: | IAQ Setpoint Full Open |
| Object Type: | AV (Analog Value) |
| Object Units: | (96) PPM |
| Value: | 0 - 2000 |
| Details: | IAQ Setpoint for full open behavior. |

Table 82. Object ID 144

| | |
|---------------|---|
| Object Name: | Free Cooling Temperature Sensible Setpoint |
| Object Type: | AV (Analog Value) |
| Object Units: | (64) Degrees-Fahrenheit |
| Value: | 40 - 75 |
| Details: | Economizer free cooling setpoint for temperature sensible setpoint operation. |

Table 83. Object ID 145

| | |
|---------------|---|
| Object Name: | Free Cooling Temperature Offset Setpoint |
| Object Type: | AV (Analog Value) |
| Object Units: | (64) Degrees-Fahrenheit |
| Value: | 0 - 40 |
| Details: | Economizer free cooling offset setpoint for temperature offset operation. |

Table 84. Object ID 146

| | |
|---------------|---|
| Object Name: | Free Cooling Enthalpy Setpoint |
| Object Type: | AV (Analog Value) |
| Object Units: | (2) mA |
| Value: | 10 - 19 |
| Details: | Economizer free cooling setpoint for single enthalpy operation. |

Table 85. Object ID 147

| | |
|---------------|---|
| Object Name: | Free Cooling Enthalpy Offset Setpoint |
| Object Type: | AV (Analog Value) |
| Object Units: | (2) mA |
| Value: | 1 - 5 |
| Details: | Economizer free cooling setpoint for dual enthalpy operation. |

Table 86. Object ID 148

| | |
|---------------|--|
| Object Name: | After Hours Override Delay Set |
| Object Type: | AV (Analog Value) |
| Object Units: | (72) Minutes |
| Value: | 0 - 480 |
| Details: | After hours delay setpoint. Used in override conditions. |

Table 87. Object ID 149

| | |
|---------------|---|
| Object Name: | Heat Pump Dual Fuel Balance Point |
| Object Type: | AV (Analog Value) |
| Object Units: | (64) Degrees - Fahrenheit |
| Value: | -20 - 65 |
| Details: | Dual Fuel Balance setpoint for switching to gas heat from mechanical compressor heating below this value. Default value following reset is local. |

Table 88. Object ID 150

| | |
|---------------|---|
| Object Name: | Heat Pump Compressor Lockout Low Setpoint |
| Object Type: | AV (Analog Value) |
| Object Units: | (64) Degrees - Fahrenheit |
| Value: | -50 - 0 |
| Details: | Low Ambient Heating Compressor Lockout Temperature Low setpoint for locking out mechanical compressor heating below this value. Default value following reset is local. |

Table 89. Object ID 151

| | |
|---------------|--|
| Object Name: | Heat Pump Compressor Lockout High Setpoint |
| Object Type: | AV (Analog Value) |
| Object Units: | (64) Degrees - Fahrenheit |
| Value: | -50 - 0 |
| Details: | Low Ambient Heating Compressor Lockout Temperature High setpoint for re-enabling mechanical compressor heating above this value. Default value following reset is local. |

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 90. 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 settings can be changed using the following menu path:

Go to **RTU MENU > NETWORK INTEGRATION > NETWORK SETUP WIZARD > 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. Analog Input (AI) Objects List” on page 18)

NOTE: Refer to **CORE Service App Menu Selection Overview, Install Menu Structure, and BACnet MS/TP Menu Structure in the Lennox® CORE Control System (Unit Controller) Application Guide** for further guidance.

Table 91. 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 92. 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 93. 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 |

