

# ExactLogic BACnet Communicating Thermostat

## EXL01622 Sequence Datasheet

Fan Coil with 3-speed fan and modulating heating/cooling



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DataSheet Rev 1.20.001/4.6  
October 9, 2023

## Operating Sequence

### Standard Occupied

During normal occupied operation the display will show the current room temperature. The first press of either right pair of keys will show the current room setpoint. Additional presses will adjust the setpoint up or down by 0.5 degrees. The thermostat keypad will time out after 5 seconds without a key press, and the display will switch back to displaying the room temperature.

The left pair of keys allows for the adjustment of the fan speed. The current mode is shown with the first key press; additional key presses will show the adjustment to the mode. AV-62 is used to select the number of fan speeds, and AV-63 will show what speed the fan is currently set to. Refer to the table below for the values of AV-62 (Fan Mode Status) and AV-63 (Fan Speed Status)

| AV-62 | Mode           |
|-------|----------------|
| 0     | AUTO Only      |
| 1     | AUTO-ON        |
| 2     | OFF-AUTO-ON    |
| 3     | OFF-1-2-AUTO   |
| 4     | OFF-1-2-3-AUTO |

| AV-63 | Fan Speed   |
|-------|-------------|
| 0     | OFF         |
| 1     | Fan Speed 1 |
| 2     | Fan Speed 2 |
| 3     | Fan Speed 3 |
| 4     | AUTO        |
| 5     | ON          |

### Fan Speeds

The thermostat is capable of controlling 3 stages of fan speeds. The user can select a constant fan speed or let the thermostat control the increasing or decreasing of the fan speeds. When a constant fan speed is selected, the thermostats will stay in that mode until changed by the user.

When the fan speed is in AUTO, the thermostat will increase or decrease that fan speed depending on the heating or cooling signal. There is an enable setpoint for each fan speed, LO is AV-46, MED is AV-47, HI is AV-48. When the heating or cooling signal is above the fan speed setpoint the corresponding fan speed will turn on. The fan speed will decrease when the heating or cooling signal is 5% below its enable setpoint.

### Internal/External Thermistor Control

The thermostat control sequence can use the internal thermistor or an external thermistor connected to AI-2. Setting BV-67 to OFF (default) the thermostat will use the internal thermistor. Setting BV-67 to ON the control sequence will use the external thermistor.

The current controlling temperature is located at AV-20. This value will be displayed on the LCD of the thermostat and should be used on any workstation displays.

## Control Sequence – Heat / Cool

There are two operational modes that can be selected via BV-60. When BV-60 is OFF the heating or cooling mode for the modulating outputs heating (AO-0) and cooling (AO-1) will be controlled by the thermostat heating / cooling demand. When BV-60 is ON the heating and cooling will be controlled by the discharge air temperature (AI-3).

The staged Heat / Cool output at BO-3 is controlled by the configuration see table 1 below:

### Net Heat / Cool Mode

BO-3 will turn ON for heating when BV-62 is set to OFF (Net BV-61 Control) and BV-61 is ON and the heating signal (AV-8 Heat Signal %) is above AV-38 (Stage 1 Htg % enable). BO-3 will turn ON for cooling when BV-62 is set to OFF (Net BV-61 Control) and BV-61 is OFF and the cooling signal (AV-9 Cool Signal %) is above AV-39 (Stage 1 Clg % enable).

### Heat / Cool Mode = BV-1 (H/C Mode)

BO-3 will turn ON for heating when BV-62 is set to ON (BV-1 Control) and the heating signal (AV-8 Heat Signal %) is above AV-38 (Stage 1 Htg % enable). BO-3 will turn ON for cooling when BV-62 is set to ON (BV-1 Control) and the cooling signal (AV-9 Cool Signal %) is above AV-39 (Stage 1 Clg % enable).

### BV-1 (H/C Mode) – Thermostat Heating / Cooling Demand

When AV-41 is set to 1 BV-1 will be in the heating mode when the heating signal (AV-8 Heat Signal %) exceeds the cooling signal (AV-9 Cool Signal %).

### BV-1 (H/C Mode) – Pipe Temperature

When AV-41 is set to 2 BV-1 will be in the heating mode (1) when the pipe temperature (AI-4 Pipe Temperature) exceeds the room temperature (AV-20 Room Temp) by 10°F.

When AV-41 is set to 2 BV-1 will be in the cooling mode (0) when the pipe temperature (AI-4 Pipe Temperature) is below the room temperature (AV-20 Room Temp) by 10°F.

When the pipe temperature (AI-4 Pipe Temperature) is between the heating and cooling setpoints the valve will open when the heating signal (AV-8 Heat Signal %) is above AV-38 (Stage 1 Htg % enable) or the cooling signal (AV-9 Cool Signal %) is above AV-39 (Stage 1 Clg % enable).

### BV-1 (H/C Mode) – Network Controlled

When AV-41 is set to 3 and BV-50 (Net-Heat(1)Cool(0)) is ON the valve will open when the heating signal (AV-8 Heat Signal %) is above AV-38 (Stage 1 Htg % enable). or when BV-50 (Net-Heat(1)Cool(0)) is OFF the valve will open when the cooling signal (AV-9 Cool Signal %) is above AV-39 (Stage 1 Clg % enable).

Table 1

| Mode                                                                                            | BV-60 | AV-62 | BV-62 | BV-61 | AV-41  | BV-50 | BV-54 |
|-------------------------------------------------------------------------------------------------|-------|-------|-------|-------|--------|-------|-------|
| DAT Control (typically used with modulating 4 pipe system)                                      | ON    |       |       |       |        |       |       |
| Fan Auto Modulation Only                                                                        |       | 0     |       |       |        |       |       |
| Fan Modulation Selectable (Off-1-2-3-Auto)                                                      |       | 4     |       |       |        |       |       |
| Staged Heat or Cool Output Mode for BO-3 set by Net BV-61                                       |       |       | OFF   | H=ON  |        |       |       |
| Staged Heat or Cool Output Mode for BO-3 set by HC Mode – BV-1                                  |       |       | ON    |       |        |       |       |
| Wild Coil – No control valve, fan will shut off when zone is at temp.                           |       |       |       |       |        |       | ON    |
| HC Mode – BV-1 set by Stat HC demand (typically 4 pipe)                                         |       |       |       |       | 1-Stat |       |       |
| HC Mode – BV-1 set by Pipe Temp (typically 2 pipe) stand alone                                  |       |       |       |       | 2-Pipe |       |       |
| HC Mode – BV-1 set by Net BV-50 (Net-Heat(1)Cool(0)) (typically 2 pipe) BACnet Networked System |       |       |       |       | 3-Net  | H=ON  |       |

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## Space Temperature Mode

When occupied, the thermostat will maintain its occupied setpoint. The deadband is controlled by the cooling/heating offset (default 1 degree)

## Discharge Temperature Mode

In this mode the thermostat will modulate the analog outputs to maintain the discharge air setpoint based on the current fan speed. Once the heating or cooling signal is above its respective stage 1 enable setpoint, the discharge air PI control will begin to modulate the analog outputs. The setpoints to control the discharge air for heating and cooling are AV-49 through AV-54.

The discharge air modulating signal can be limited by using the Heat Max/Min % and the Cool Max/Min %. The points are AV-55 through AV-58. The purpose of these points is to limit the heating and cooling. The Min and Max are defaulted to 0% and 100% respectively.

## Lighting or Damper Control

When the thermostat is in the occupied mode BO-4 will turn ON for use with lighting or an Outside Air Damper. Output BO-4 will stay on for a period based on the seconds entered in AV-40. The purpose for this delay is to keep the Output ON for an additional amount of time to prevent the Output from cycling with the motion option.

## Motion for Occupancy

The occupancy can be controlled by an external occupancy input connected to BI-5 or the optional internal motion sensor.

## Energy Saving Mode

Energy Saving Mode is used to reduce the fan speed and shut off cooling by using an external door or window switch connected to BI-4. When the input relay/switch is closed, the unit operated normally. When the input relay/switch is open the fan speed is commanded to low and the cooling is shut off. This mode is enabled by turning BV-53 to ACTIVE.

## *Standard Unoccupied*

During unoccupied operation the thermostat will continue to display the room temperature. When in an unoccupied state pressing one of the right pair of keys will display a message indicating the thermostat is in night mode, preventing the setpoint from being adjusted. To adjust the room setpoint when unoccupied the thermostat must be set to night override.

## Control Sequence

When in the unoccupied mode, the room will be controlled by the unoccupied cooling/heating setpoints. The fan and cooling/heating stages will operate the same as the occupied control sequence.

## Night Override

Set the night override by pressing one of the left pair of keys. The display will switch to allow the user to set the night override time. Additional presses of the keys will adjust the time up or down by 0.5 hour increments. The night override can be increased up to the override limit set at AV-73, the default is 5 hours. When the thermostat is in night override, the first press of one of the left pair of keys will display the override time remaining. Additional key presses will add/subtract 0.5 hours to the time that was remaining. When the timer reaches zero the thermostat will return to the unoccupied mode. In the night override mode, the right pair of keys can be used to adjust the room setpoint. The thermostat keypad will time out after 5 seconds without a key press, and the display will switch back to displaying the room temperature.

The thermostat can be set to night override by writing a value to AV-74 through BACnet. The value can not exceed the night override limit set at AV-73. If the night override time is set higher than the limit, the night override timer will be set the limit. The night override limit default is 5 hours.

If the thermostat is commanded to the occupied mode while in night override, the override timer will be cleared to zero and the thermostat will enter the occupied mode.

## Control Sequence

When the thermostat is in the override mode, the room will be controlled by the occupied cooling/heating setpoints. The fan and cooling/heating stages will operate the same as the occupied control sequence.

Note: There is no fan control in the override mode. The fan will run in the AUTO mode.

## Vacancy

If a room is known to be vacant, vacant setpoints can be used to override the unoccupied setpoints. By setting BV-70 to active, a room will be controlled by the vacant cooling/heating setpoints (AV-64/65).

## Motion/Humidity Option Card

The Motion/Humidity Option Card can be used for Motion Only, Humidity Only, or Motion/Humidity together. In order to use the Motion Sensor (either stand alone or with Humidity), BV-64 must be set to ACTIVE. The Humidity Sensor can be enabled by setting AV-31 to 4. These settings will automatically provide the required voltage to power the sensors. The motion sensor status will show on BI-1. Once the motion sensor does not sense motion, the delay at AV-81 is used to delay the ACTIVE to INACTIVE command to the Scheduled Occupied command at BO-5, priority array entry 10. The Humidity value is shown on AI-1. The Humidity Sensor will automatically be scaled by setting AV-31 to 4.

## Disabling of the Splash, Setup Menu, or Field Service Mode

When the thermostat is installed in a public location there may be times when the setup of the thermostat will need to be disabled to prevent tenants from changing the configuration while still giving them access to change the setpoints and control after hours modes. The following points have been added to allow this:

- BV-57 = Setting ACTIVE will disable the "EXACTLOGIC" splash display after key presses
- BV-58 = Setting ACTIVE will disable access to the Setup Menu where the Network/MAC/Baud Rate/etc are set
- BV-59 = Setting ACTIVE will disable access to the Field Service Mode where Time/Schedule/Setpoints/etc are set

## Installation

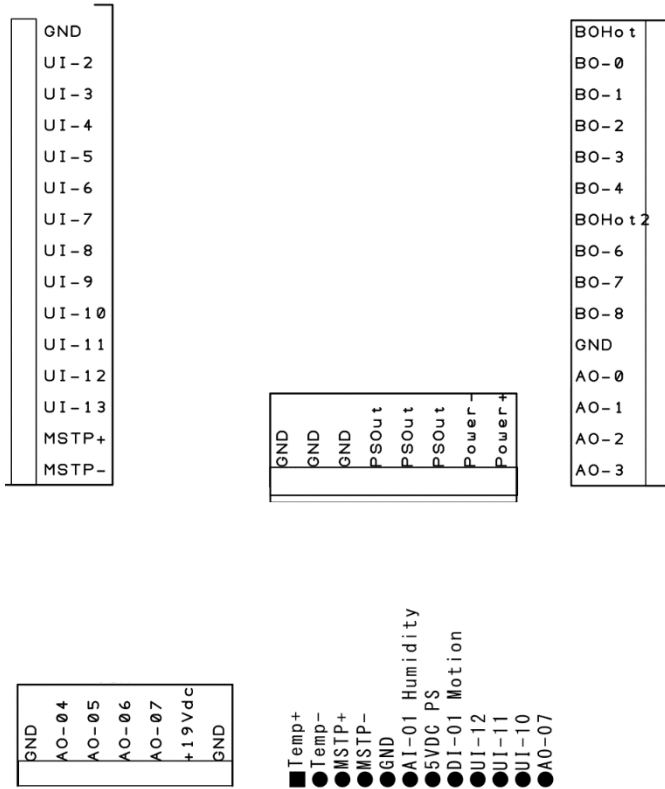


Fig. 4

\*Note: Thermostat Common Relay point (BO Hot) usually 24VAC/DC or R

\*Note: AI-2 through AI-5 and BI-2 through BI-5 are wired to UI-2 through UI-5. Each universal Input can only be used as an AI or a BI

GND ..... Neutral/Ground  
 UI-2..... Universal Input 2  
 UI-3..... Universal Input 3  
 UI-4..... Universal Input 4  
 UI-5..... Universal Input 5  
 UI-6..... Universal Input 6  
 UI-7..... Universal Input 7  
 UI-8..... Universal Input 8  
 UI-9..... Universal Input 9  
 UI-10 ..... Universal Input 10  
 UI-11 ..... Universal Input 11  
 UI-12 ..... Universal Input 12  
 UI-13 ..... Universal Input 13  
 MSTP + ..... Network Line Positive  
 MSTP - ..... Network Line Negative

BO Hot ..... 24VAC/DC Input for Relays 1-5\*  
 BO-0..... Relay 1 Output, 24VAC/DC  
 BO-1..... Relay 2 Output, 24VAC/DC  
 BO-2..... Relay 3 Output, 24VAC/DC  
 BO-3..... Relay 4 Output, 24VAC/DC  
 BO-4..... Relay 5 Output, 24VAC/DC  
 BO Hot 2 ..... 24VAC/DC Input for Relays 7-9\*  
 BO-6..... Relay 7 Output, 24VAC/DC  
 BO-7..... Relay 8 Output, 24VAC/DC  
 BO-8..... Relay 9 Output, 24VAC/DC  
 GND ..... Neutral/Ground  
 AO-0..... Analog Output 0, 0-10V  
 AO-1..... Analog Output 1, 0-10V  
 AO-2..... Analog Output 2, 0-10V  
 AO-3..... Analog Output 3, 0-10V

GND ..... Neutral/Ground  
 GND ..... Neutral/Ground  
 GND ..... Neutral/Ground  
 PSOut..... 24VAC/DC Hot  
 PSOut..... 24VAC/DC Hot  
 PSOut..... 24VAC/DC Hot  
 Power - ..... Neutral/Ground  
 Power + ..... 24VAC/DC Hot

GND ..... Neutral/Ground  
 AO-04..... Analog Output 4, 0-10V  
 AO-05..... Analog Output 5, 0-10V  
 AO-06..... Analog Output 6, 0-10V  
 AO-07 ..... Analog Output 7, 0-10V  
 +19Vdc..... 19V DC  
 GND ..... Neutral/Ground



## Output Wiring

| Output/Label | Heat / Cool Mode                       |
|--------------|----------------------------------------|
| BO0          | Fan Speed 1                            |
| BO1          | Fan Speed 2                            |
| BO2          | Fan Speed 3                            |
| BO3          | Heating Stage 1 or Cooling Stage 1     |
| BO4          | Lighting or Outside Air Damper Control |
| AO0          | Heating 0-10 Vdc 0-100%                |
| AO1          | Cooling 0-10 Vdc 0-100%                |

## Reserved BACnet Points

The following are points reserved by the thermostat for operation.

### Analog Inputs

| Instance | Object Name        | Description                                          | Read/Write | Default  |
|----------|--------------------|------------------------------------------------------|------------|----------|
| AI-0     | Room Temp          | Reading of the internal thermistor in counts. 0-1024 | R          | variable |
| AI-1     | Humidity           | Reading from the Humidity sensor add-on card         | R          | variable |
| AI-2     | Ext. Room Temp     | Optional external room temperature input             | R          | variable |
| AI-3     | Discharge Air Temp | Optional discharge air sensor for sequence control   | R          | variable |
| AI-4     | Pipe Temperature   | Pipe Temperature (typical for 2 pipe systems)        | R          | variable |
| AI-5     |                    | Reading of the external input 5 in counts. 0-1024    | R          | variable |

### Analog Outputs

| Instance | Object Name | Description                         | Read/Write | Default |
|----------|-------------|-------------------------------------|------------|---------|
| AO-0     | Heat        | 0-10V output for control of heating | R/W        | 0.0     |
| AO-1     | Cool        | 0-10V output for control of cooling | R/W        | 0.0     |
| AO-2     |             | Variable 0-14VDC, 150mA output      | R/W        | 0.0     |

### Analog Values

| Instance | Object Name       | Description                                                                                                                                                      | Read/Write | Default |
|----------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------|
| AV-0     | Mode of Operation | The mode that the thermostat is currently in.<br>0 = Heat Mode<br>1 = Cool Mode<br>2 = Idle<br>3 = Afterhours<br>4 = Unoccupied Idle<br>5 = Unoccupied Heat Mode | R          | 4       |

|       |                   |                                                                                                                                                                                                    |   |               |
|-------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---------------|
|       |                   | 6 = Unoccupied Cool Mode                                                                                                                                                                           |   |               |
| AV-1  |                   |                                                                                                                                                                                                    |   |               |
| AV-2  |                   |                                                                                                                                                                                                    |   |               |
| AV-3  |                   |                                                                                                                                                                                                    |   |               |
| AV-4  | Current Htg SP    | The setpoint that controls heating. If the room temperature goes below this setpoint the thermostat will enter heating mode.                                                                       | R | 60.0°F/16°C   |
| AV-5  | Current Clg SP    | The setpoint that controls cooling. If the room temperature goes above this setpoint the thermostat will enter cooling mode.                                                                       | R | 80.0°F/27°C   |
| AV-6  | Heating SP        | The setpoint used for heating during occupied mode. This setpoint is calculated by AV-66 (Current SP) – AV-70 (Heating Offset)                                                                     | R | 72.0°F/22.5°C |
| AV-7  | Cooling SP        | The setpoint used for cooling during occupied mode. This setpoint is calculated by AV-66 (Current SP) + AV-69 (Cooling Offset)                                                                     | R | 74.0°F/23.5°C |
| AV-8  | Heat Signal (%)   | Current heating signal as a percent                                                                                                                                                                | R | 0%            |
| AV-9  | Cool Signal (%)   | Current cooling signal as a percent                                                                                                                                                                | R | 0%            |
| AV-10 |                   |                                                                                                                                                                                                    |   |               |
| AV-11 |                   |                                                                                                                                                                                                    |   |               |
| AV-12 |                   |                                                                                                                                                                                                    |   |               |
| AV-13 |                   |                                                                                                                                                                                                    |   |               |
| AV-14 |                   |                                                                                                                                                                                                    |   |               |
| AV-15 |                   |                                                                                                                                                                                                    |   |               |
| AV-16 |                   |                                                                                                                                                                                                    |   |               |
| AV-17 |                   |                                                                                                                                                                                                    |   |               |
| AV-18 | DAT Kp            | The current Kp used for discharge air PI Controller                                                                                                                                                | R | 0             |
| AV-19 | DAT Ki            | The current Ki used for discharge air PI Controller                                                                                                                                                | R | 0             |
| AV-20 | Room Temp         | Selected from either AI-0 or AI-2. BV-67 is used for selection. This is the value displayed on the LCD of the thermostat and should be used to display the temperature on any workstation display. | R | variable      |
| AV-21 | Discharge Air SP  | Current Discharge Air setpoint                                                                                                                                                                     | R | 65.0°F/18.0°C |
| AV-22 | DAT Lo Fan        | Discharge Air setpoint for Lo Fan Speed. Dependent on heating or cooling mode.                                                                                                                     | R | 65.0°F/18.0°C |
| AV-23 | DAT Med Fan       | Discharge Air setpoint for Med Fan Speed. Dependent on heating or cooling mode.                                                                                                                    | R | 60.0°F/15.0°C |
| AV-24 | DAT Hi Fan        | Discharge Air setpoint for Hi Fan Speed. Dependent on heating or cooling mode.                                                                                                                     | R | 55.0°F/13.0°C |
| AV-25 |                   |                                                                                                                                                                                                    |   |               |
| AV-26 | Cooling Deviation | Number of degrees that the room temperature is away from the cooling setpoint                                                                                                                      | R | variable      |
| AV-27 | Heating Deviation | Number of degrees that the room temperature is away from the heating setpoint                                                                                                                      | R | variable      |
| AV-28 | Deviation from SP | Number of degrees that the room temperature is away from the room setpoint                                                                                                                         | R | variable      |
| AV-29 | Zone Scan         | Numerical representation of the thermostats mode. 100 = full heat, -100 = full cool                                                                                                                | R | 0             |
| AV-30 | AI-0 Setup        | Parameter used to set the input type.<br>0 = counts<br>1 = temperature                                                                                                                             | R | 1             |



|       |                      |                                                                                                               |     |               |
|-------|----------------------|---------------------------------------------------------------------------------------------------------------|-----|---------------|
|       |                      | 2 = 4-20mA<br>3 = 0-5V<br>4 = 0-10V<br>5 = pulse                                                              |     |               |
| AV-31 | AI-1 Setup           | See AV-30                                                                                                     | R   | 0             |
| AV-32 | AI-2 Setup           | See AV-30                                                                                                     | R   | 1             |
| AV-33 | AI-3 Setup           | See AV-30                                                                                                     | R   | 1             |
| AV-34 | AI-4 Setup           | See AV-30                                                                                                     | R   | 1             |
| AV-35 | AI-5 Setup           | See AV-30                                                                                                     | R   | 0             |
| AV-36 | DAT H/C Kp           | Kp used for the discharge air PI Controller when there is positive fan status                                 | R/W | 1.0           |
| AV-37 | DAT H/C Ki           | Ki used for the discharge air PI Controller when there is positive fan status                                 | R/W | 1.0           |
| AV-38 | Stage 1 Htg% Enable  | The percentage of heating signal required to turn on the stage 1 heating digital output                       | R/W | 10%           |
| AV-39 | Stage 1 Clg% Enable  | The percentage of cooling signal required to turn on the stage 1 cooling digital output                       | R/W | 10%           |
| AV-40 | Unocc BO-4 Delay     | The amount of time to keep BO-4 ON after occupancy input shows the room unoccupied.                           | R/W | 900 sec       |
| AV-41 | Heat/Cool Mode(1-3)  | Chooses how the H/C Mode is set 1=Tstat Demand, 2=Pipe Temperature, 3=Net                                     | R/W | 1             |
| AV-42 | AO-0 Max Output      | Used to scale the analog output. This is the maximum voltage the AO will output. (i.e. 0-5V valve or damper)  | R/W | 100% (10V)    |
| AV-43 | AO-0 Min Output      | Used to scale the analog output. This is the minimum voltage the AO will output. (i.e. 2-10V valve or damper) | R/W | 0V            |
| AV-44 | AO-1 Max Output      | Used to scale the analog output. This is the maximum voltage the AO will output. (i.e. 0-5V valve or damper)  | R/W | 100% (10V)    |
| AV-45 | AO-1 Min Output      | Used to scale the analog output. This is the minimum voltage the AO will output. (i.e. 2-10V valve or damper) | R/W | 0V            |
| AV-46 | Lo Fan Enable SP     | To start low fan speed the heating or cooling signal needs to be high than this setpoint                      | R/W | 10%           |
| AV-47 | Med Fan Enable SP    | To start medium fan speed the heating or cooling signal needs to be high than this setpoint                   | R/W | 40%           |
| AV-48 | Hi Fan Enable SP     | To start high fan speed the heating or cooling signal needs to be high than this setpoint                     | R/W | 70%           |
| AV-49 | DAT Heat SP, Lo Fan  | The discharge air setpoint for low fan speed when in the heating mode                                         | R/W | 85.0°F/30.0°C |
| AV-50 | DAT Cool SP, Lo Fan  | The discharge air setpoint for low fan speed when in the cooling mode                                         | R/W | 65.0°F/18.0°C |
| AV-51 | DAT Heat SP, Med Fan | The discharge air setpoint for medium fan speed when in the heating mode                                      | R/W | 90.0°F/32.0°C |
| AV-52 | DAT Cool SP, Med Fan | The discharge air setpoint for medium fan speed when in the cooling mode                                      | R/W | 60.0°F/15.0°C |
| AV-53 | DAT Heat SP, Hi Fan  | The discharge air setpoint for high fan speed when in the heating mode                                        | R/W | 95.0°F/35.0°C |
| AV-54 | DAT Cool SP, Hi Fan  | The discharge air setpoint for high fan speed when in the cooling mode                                        | R/W | 55.0°F/13.0°C |

|        |                      |                                                                                                                                                                                                    |     |               |
|--------|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|---------------|
| AV-55  | Max Heating %        | The maximum heating signal the analog heating output will control too. Useful when a space is over heating                                                                                         | R/W | 100%          |
| AV-56  | Min Heating %        | The minimum heating signal the analog heating output will control too.                                                                                                                             | R/W | 0%            |
| AV -57 | Max Cooling %        | The maximum cooling signal the analog cooling output will control too. Useful when a space is over cooling                                                                                         | R/W | 100%          |
| AV-58  | Min Cooling %        | The minimum cooling signal the analog cooling output will control too.                                                                                                                             | R/W | 0%            |
| AV-59  | Ave Time Base        | Factor used to average the room temperature. A small number will allow the room temperature to change faster over time. A large number will cause the room temperature to change slower over time. | R   | 100           |
| AV-60  | Calibration Offset   | The calibration offset for the internal thermistor.                                                                                                                                                | R   | variable      |
| AV-61  | Space Alarm Offset   | This offset +/- the Current Cooling/Heating SP is used to determine if the space is too warm/cold, and set an alarm if necessary.                                                                  | R/W | 5.0°F         |
| AV-62  | # of Fan Speeds      | Select the number of fan speeds for a multispeed fan.<br>0 = Auto Only<br>1 = AUTO - ON<br>2 = Off - AUTO - ON<br>3 = Off-1-2-AUTO<br>4 = Off-1-2-3-AUTO                                           | R/W | 4             |
| AV-63  | Current Fan Speed    | The fan speed the thermostat is currently running.<br>0 = OFF<br>1 = Fan Speed 1<br>2 = Fan Speed 2<br>3 = Fan Speed 3<br>4 = AUTO<br>5 = ON                                                       | R   | 4             |
| AV-64  | Vacant Clg SP        | Used in Hotel Mode. When a room is known vacant, the setpoint can be set below the unoccupied setpoint.                                                                                            | R/W | 85.0°F        |
| AV-65  | Vacant Htg SP        | Used in Hotel Mode. When a room is known vacant, the setpoint can be set below the unoccupied setpoint.                                                                                            | R/W | 55.0°F        |
| AV-66  | Room Setpoint        | The occupied room setpoint                                                                                                                                                                         | R/W | 73.0°F/23.0°C |
| AV-67  | Occupied SP Hi Limit | The maximum occupied room setpoint allowed.                                                                                                                                                        | R/W | 85.0°F/30.0°C |
| AV-68  | Occupied SP Lo Limit | The minimum occupied room setpoint allowed                                                                                                                                                         | R/W | 55.0°F/13.0°C |
| AV-69  | Clg Offset           | The offset from Room Setpoint used to calculate the Occupied Cooling SP                                                                                                                            | R/W | 1.0°F/0.5°C   |
| AV-70  | Htg Offset           | The offset from Room Setpoint used to calculate the Occupied Heating SP                                                                                                                            | R/W | 1.0°F/0.5°C   |
| AV-71  | Unoccupied Clg SP    | The cooling setpoint used when the thermostat is unoccupied.                                                                                                                                       | R/W | 80.0°F/27.0°C |
| AV-72  | Unoccupied Htg SP    | The heating setpoint used when the thermostat is unoccupied.                                                                                                                                       | R/W | 60.0°F/16.0°C |

|        |                     |                                                                                                                                                     |     |          |
|--------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-----|----------|
| AV-73  | After Hours Limit   | The maximum hours the thermostat is allowed to run during afterhours time. Setting this will set the thermostat to occupied operation. (0-99.9 hrs) | R/W | 5.0 hrs  |
| AV-74  | After Hours Timer   | The current amount of afterhours time left.                                                                                                         | R   | 0.0 hrs  |
| AV-75  | Descriptors Enabled | This point is reserved for internal thermostat use and its value cannot be changed                                                                  | R   | 0        |
| AV-76  | Unocc Fan Speed     | When the thermostat enters the Unoccupied mode the fan speed will be set to this value 0-5 (see AV-63)                                              | R/W | 4        |
| AV-77  |                     |                                                                                                                                                     | R   | 0        |
| AV-78  |                     |                                                                                                                                                     | R   | 0        |
| AV-79  |                     |                                                                                                                                                     | R   | 0        |
| AV-80  |                     |                                                                                                                                                     | R   | 0        |
| AV-81  | Motion OFF Delay    | The amount of time to delay the ON->OFF transition of the motion sensor occupied command after no motion is detected                                | R/W | 900 sec  |
| AV-82  | Setpoint Inc/Dec    | This is the amount of adjustment that is provided for each key press of the setpoint adjustment.                                                    | R/W | .5       |
| AV-83  | Splash Descriptor   |                                                                                                                                                     | R/W | 0        |
| AV-84  |                     |                                                                                                                                                     |     |          |
| AV-100 | Analog Value 100    | <b>Internal thermister display descriptor.</b> The present value is automatically transferred. The AV description holds the descriptor to display.  | R   | variable |
| AV-101 | Analog Value 101    | Display descriptor. Transfer the value to display to the present value. The AV description holds the descriptor to display.                         | R/W |          |
| AV-102 | Analog Value 102    | Display descriptor. Transfer the value to display to the present value. The AV description holds the descriptor to display                          | R/W |          |
| AV-103 | Analog Value 103    | Display descriptor. Transfer the value to display to the present value. The AV description holds the descriptor to display                          | R/W |          |
| AV-104 | Analog Value 104    | Display descriptor. Transfer the value to display to the present value. The AV description holds the descriptor to display                          | R/W |          |
| AV-105 | Analog Value 105    | Display descriptor. Transfer the value to display to the present value. The AV description holds the descriptor to display                          | R/W |          |
| AV-106 | Analog Value 106    | Display descriptor. Transfer the value to display to the present value. The AV description holds the descriptor to display                          | R/W |          |
| AV-107 | Analog Value 107    | Display descriptor. Transfer the value to display to the present value. The AV description holds the descriptor to display                          | R/W |          |
| AV-108 | Analog Value 108    | Display descriptor. Transfer the value to display to the present value. The AV description holds the descriptor to display                          | R/W |          |
| AV-109 | Analog Value 109    | Display descriptor. Transfer the value to display to the present value. The AV description holds the descriptor to display                          | R/W |          |

|        |                  |                                                                                                                                               |     |  |
|--------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----|--|
| AV-110 | Analog Value 110 | Display descriptor. Transfer the value to display to the present value. The AV description holds the descriptor to display                    | R/W |  |
| AV-111 | Analog Value 111 | Display descriptor. Transfer the value to display to the present value. The AV description holds the descriptor to display                    | R/W |  |
| AV-112 | Analog Value 112 | <b>Outside Air Display descriptor.</b> Transfer the value to display to the present value. The AV description holds the descriptor to display | R/W |  |

## Binary Inputs

| Instance | Object Name         | Description                                      | Read/Write | Default |
|----------|---------------------|--------------------------------------------------|------------|---------|
| BI-0     | Binary Input 00     |                                                  | R          |         |
| BI-1     | Motion              | Motion sensor status from the add-on card        | R          |         |
| BI-2     | Binary Input 02     |                                                  | R          |         |
| BI-3     | Binary Input 03     |                                                  | R          |         |
| BI-4     | Outside Door Switch | Optional door switch used for Energy Saving Mode | R          |         |
| BI-5     | Opt. Occupied Relay | Optional occupancy relay input                   | R          |         |

## Binary Outputs

| Instance | Object Name                | Description                                                               | Read/Write | Default |
|----------|----------------------------|---------------------------------------------------------------------------|------------|---------|
| BO-0     | Fan Speed Lo               | Digital output for fan speed 1                                            | R/W        | OFF     |
| BO-1     | Fan Speed Med              | Digital output for fan speed 2                                            | R/W        | OFF     |
| BO-2     | Fan Speed Hi               | Digital output for fan speed 3                                            | R/W        | OFF     |
| BO-3     | Stage 1 H/C                | Digital output for stage 1 heat or cool.                                  | R/W        | OFF     |
| BO-4     | Lighting or Damper Control | Digital output for lighting or Outside Air Damper control.                | R/W        | OFF     |
| BO-5     | Scheduled Occupied         | Logical point only. Used for scheduling purposes. INACTIVE is unoccupied. | R/W        | OFF     |

## Binary Values

| Instance | Object Name          | Description                                                                                    | Read/Write | Default |
|----------|----------------------|------------------------------------------------------------------------------------------------|------------|---------|
| BV-0     | Bad Room Sensor      | Alarm for a bad internal thermister                                                            | R          | OFF     |
| BV-1     | H/C Mode             | Sequence point to show analog heating or cooling.<br>OFF = Cooling ON = Heat                   | R          | OFF     |
| BV-2     | Pipe Temp H(1)C(0)   | Pipe Temp Status On when there is hot water in the pipe.                                       |            |         |
| BV-3     |                      |                                                                                                |            |         |
| BV-4     |                      |                                                                                                |            |         |
| BV-5     | Bad Discharge Sensor | Alarm for a bad discharge air sensor                                                           | R          | OFF     |
| BV-6     |                      |                                                                                                |            |         |
| BV-7     |                      |                                                                                                |            |         |
| BV-8     |                      |                                                                                                |            |         |
| BV-9     | Space Alarm Delay    | Delay used to prevent a space alarm after receiving an occupied command. The delay is 7200 sec | R          | OFF     |
| BV-10    | Program Status       | Used to determine if the sequence was loaded correctly on a BACnet Restore or power up.        | R          | OFF     |
| BV-11    |                      |                                                                                                |            |         |
| BV-12    | Energy Saving Mode   | Status of the Energy Saving Mode. ACTIVE equals Mode ON                                        | R          | OFF     |
| BV-13    |                      |                                                                                                |            |         |
| BV-14    | Fan Status           | One of the fan speeds is active                                                                | R          | OFF     |

|       |                      |                                                                                                                                                 |     |     |
|-------|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|
| BV-15 | Lo Fan Request       | Request to turn on fan speed 1                                                                                                                  | R   | OFF |
| BV-16 | Med Fan Request      | Request to turn on fan speed 2                                                                                                                  | R   | OFF |
| BV-17 | Hi Fan Request       | Request to turn on fan speed 3                                                                                                                  | R   | OFF |
| BV-18 |                      |                                                                                                                                                 |     |     |
| BV-19 |                      |                                                                                                                                                 |     |     |
| BV-20 |                      |                                                                                                                                                 |     |     |
| BV-21 |                      |                                                                                                                                                 |     |     |
| BV-22 | Too Warm Status      | Status of the Too Warm Alarm before checking the Space Alarm Delay                                                                              | R   | OFF |
| BV-23 | Too Cool Status      | Status of the Too Warm Alarm before checking the Space Alarm Delay                                                                              | R   | OFF |
| BV-24 | Space To Warm Alarm  | The space temperature has been below the Room Set point (AV-90) – Space Alarm Offset (AV-82) for at least 7200 seconds.                         | R   | OFF |
| BV-25 | Space To Cool Alarm  | The space temperature has been above the Room Set point (AV-90) + Space Alarm Offset (AV-82) for at least 7200 seconds.                         | R   | OFF |
| BV-26 | Stage 1 Heat Request | Status of stage 1 heating request                                                                                                               | R   | OFF |
| BV-27 |                      |                                                                                                                                                 |     |     |
| BV-28 | Stage 1 Cool Request | Status of stage 1 cooling request                                                                                                               | R   | OFF |
| BV-29 |                      |                                                                                                                                                 |     |     |
| BV-30 | Fan Speed in AUTO    | Used to determine if the thermostat is set for fan speed AUTO                                                                                   | R   | ON  |
| BV-31 | User Fan Speed Lo    | Used to determine if the user has put the thermostat in low fan speed from the keypad.                                                          | R   | OFF |
| BV-32 | User Fan Speed Med   | Used to determine if the user has put the thermostat in medium fan speed from the keypad.                                                       | R   | OFF |
| BV-33 | User Fan Speed Hi    | Used to determine if the user has put the thermostat in high fan speed from the keypad.                                                         | R   | OFF |
| BV-34 |                      |                                                                                                                                                 |     |     |
| BV-35 |                      |                                                                                                                                                 |     |     |
| BV-36 | Heat Fan Interlock   | Used in discharge air mode to interlock the analog heating output with fan status.                                                              | R   | OFF |
| BV-37 | Cool Fan Interlock   | Used in discharge air mode to interlock the analog cooling output with fan status.                                                              | R   | OFF |
| BV-38 | DAT Mode Interlock   | Used to pass the discharge air modulation signal or the room temperature modulation signal to the analog output.                                | R   | OFF |
| BV-39 |                      |                                                                                                                                                 |     |     |
| BV-40 | Occupied Status      | The status of this point indicates the thermostats occupancy settings. ON when the thermostat is in Occupied Setpoint Mode or After Hours Mode. | R   | OFF |
| BV-41 | Opt. Start Warmup    | A Warmup command has been sent to the thermostat. When ON the thermostat will switch to occupied settings.                                      | R/W | OFF |
| BV-42 | Opt. Start Cooldown  | A Cooldown command has been sent to the thermostat. When ON the thermostat will switch to occupied settings.                                    | R/W | OFF |



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|       |                   |                                                                                                                  |   |     |
|-------|-------------------|------------------------------------------------------------------------------------------------------------------|---|-----|
| BV-43 | Occ Setpoint Mode | The thermostat has been commanded occupied via BO-5, or a Warmup/Cooldown command has been sent via BV-41/BV-42. | R | OFF |
|-------|-------------------|------------------------------------------------------------------------------------------------------------------|---|-----|

|       |                           |                                                                                                                                                                  |     |     |
|-------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|
| BV-44 | After Hours Mode          | The thermostat has been set to afterhours mode. When ON the thermostat will switch to occupied settings.                                                         | R   | OFF |
| BV-45 | Fan Start Delay           | On when the fan is on after 30 seconds                                                                                                                           | R   | ON  |
| BV-46 | Motion Active             | Internal Motion Sensor is Active and setting the zone to the occupied mode with the lights on.                                                                   |     |     |
| BV-47 |                           |                                                                                                                                                                  |     |     |
| BV-48 |                           |                                                                                                                                                                  |     |     |
| BV-49 | Update Descriptors        | When ON descriptor changes are sent to the thermostats LCD, this point will auto reset to OFF.                                                                   | R/W | OFF |
| BV-50 | Net-Heat(1)<br>Cool(0)    | This control will set the Heat (1) / Cool (0) mode of the Fan and Analog Outputs from a Network command.                                                         | R/W | OFF |
| BV-51 | BI for Occupancy          | ON = BI-5 will be used to indicate zone occupancy<br>OFF = BI-5 is not used for occupancy                                                                        | R/W | OFF |
| BV-52 |                           |                                                                                                                                                                  |     |     |
| BV-53 | Enable Energy Saving Mode | Set to ACTIVE to turn Energy Saving Mode ON                                                                                                                      | R/W | OFF |
| BV-54 | Wild Coil                 | Wild Coil control when on the Fan will shut off when the space temperature is satisfied                                                                          | R/W | OFF |
| BV-55 |                           |                                                                                                                                                                  |     |     |
| BV-56 |                           |                                                                                                                                                                  |     |     |
| BV-57 | Disable Splash            | When ACTIVE, the "EXACTLOGIC" splash will not show after key presses                                                                                             | R/W | OFF |
| BV-58 | Disable Setup Menu        | When ACTIVE, there will be no access to the Setup Menu where the Network/MAC/Baud Rate is set                                                                    | R/W | OFF |
| BV-59 | Disable FSM Menu          | When ACTIVE, there will be not access to the Field Service Mode where the Time/Schedule/Point Access is set                                                      | R/W | OFF |
| BV-60 | Discharge Air Mode        | Used to select if the thermostat will control space to setpoint based off discharge air.<br>ON = Discharge Air Mode<br>OFF = Room Temperature Mode               | R/W | OFF |
| BV-61 | HC OutMode H(1)<br>C(0)   | When BV-62 is off. This control will set the staged heat (1) or cool (0) mode which turns BO-3 on for Heating or Cooling                                         | R/W | OFF |
| BV-62 | HC Out=<br>BV61(0)BV1(1)  | When this control is off BO-3 output mode will follow BV-61 when this control is on BO-3 will follow BV-1 (H/C Mode)                                             | R/W | OFF |
| BV-63 |                           |                                                                                                                                                                  |     |     |
| BV-64 | Enable Motion             | When ACTIVE, the power to the Motion add-on card is set to the proper voltage                                                                                    | R/W | OFF |
| BV-65 |                           |                                                                                                                                                                  |     |     |
| BV-66 |                           |                                                                                                                                                                  |     |     |
| BV-67 | Room Temp Select          | When OFF, the internal thermistor is selected for the control sequence. When ON, an external thermistor attached to AI-1 is selected for control of the sequence | R/W | OFF |
| BV-68 | Backlight Off/On          | When ON the LCD backlight will remain on.                                                                                                                        | R/W | OFF |
| BV-69 |                           |                                                                                                                                                                  |     |     |

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|-------|--------------------|-----------------------------------------------------------------------------------|-----|-----|
| BV-70 | Room Vacant Status | When ON the thermostat will run on Vacant Heating/Cooling setpoints, AV-88/AV-89. | R/W | OFF |
|-------|--------------------|-----------------------------------------------------------------------------------|-----|-----|

|        |                  |                                                                                                                                 |     |     |
|--------|------------------|---------------------------------------------------------------------------------------------------------------------------------|-----|-----|
| BV-71  | C/F              | Sets the thermostat to display temperatures in Celsius or Fahrenheit. This point is set through the setup menu. ON = F, OFF = C | R   | ON  |
| BV-72  |                  |                                                                                                                                 |     |     |
| BV-73  | Ventilate Room   | Used to recirculate the air in a room that may have been unoccupied for a period of time. This will set the Fan to Lo Speed.    | R/W | OFF |
| BV-74  | Hotel Mode       | This point is reserved for internal thermostat use and its value cannot be changed                                              | R   | OFF |
| BV-100 | Binary Value 100 | Enable internal thermistor descriptor                                                                                           | R/W | ON  |
| BV-101 | Binary Value 101 | Enable descriptor                                                                                                               | R/W | OFF |
| BV-102 | Binary Value 102 | Enable descriptor                                                                                                               | R/W | OFF |
| BV-103 | Binary Value 103 | Enable descriptor                                                                                                               | R/W | OFF |
| BV-104 | Binary Value 104 | Enable descriptor                                                                                                               | R/W | OFF |
| BV-105 | Binary Value 105 | Enable descriptor                                                                                                               | R/W | OFF |
| BV-106 | Binary Value 106 | Enable descriptor                                                                                                               | R/W | OFF |
| BV-107 | Binary Value 107 | Enable descriptor                                                                                                               | R/W | OFF |
| BV-108 | Binary Value 108 | Enable descriptor                                                                                                               | R/W | OFF |
| BV-109 | Binary Value 109 | Enable descriptor                                                                                                               | R/W | OFF |
| BV-110 | Binary Value 110 | Enable descriptor                                                                                                               | R/W | OFF |
| BV-111 | Binary Value 111 | Enable descriptor                                                                                                               | R/W | OFF |
| BV-112 | Binary Value 112 | Enable outside air descriptor                                                                                                   | R/W | OFF |