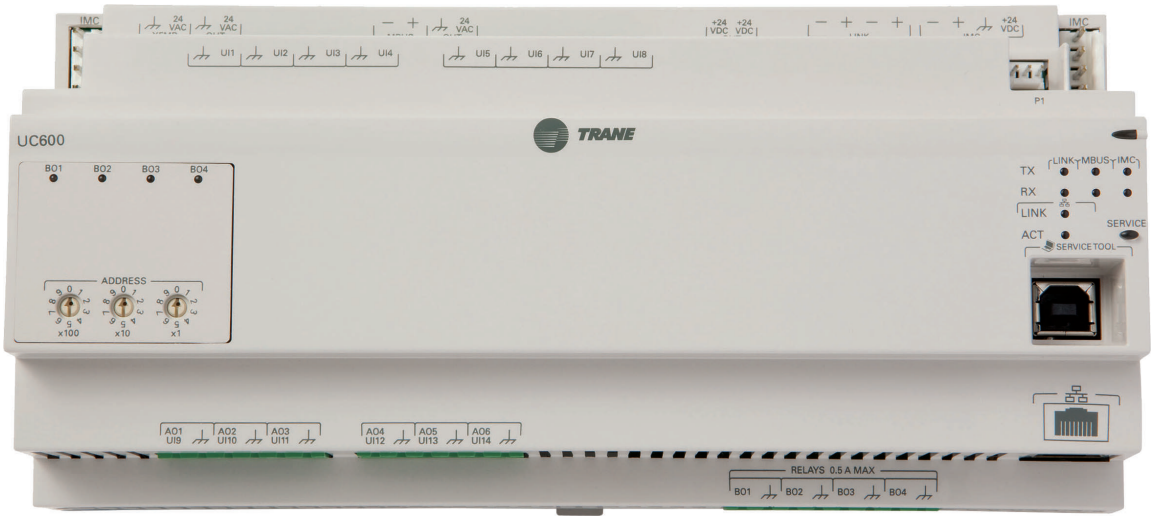
Integration Guide

Horizon Tracer® UC600 Programming V12



⚠ SAFETY WARNING

Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.

January 2025

OAU-SVP002A-EN

Introduction

Read this manual thoroughly before operating or servicing this unit.

Warnings, Cautions, and Notices

Safety advisories appear throughout this manual as required. Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

The three types of advisories are defined as follows:

⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices.
NOTICE	Indicates a situation that could result in equipment or property-damage only accidents.

Important Environmental Concerns

Scientific research has shown that certain man-made chemicals can affect the earth's naturally occurring stratospheric ozone layer when released to the atmosphere. In particular, several of the identified chemicals that may affect the ozone layer are refrigerants that contain Chlorine, Fluorine and Carbon (CFCs) and those containing Hydrogen, Chlorine, Fluorine and Carbon (HCFCs). Not all refrigerants containing these compounds have the same potential impact to the environment. Trane advocates the responsible handling of all refrigerants.

Important Responsible Refrigerant Practices

Trane believes that responsible refrigerant practices are important to the environment, our customers, and the air conditioning industry. All technicians who handle refrigerants must be certified according to local rules. For the USA, the Federal Clean Air Act (Section 608) sets forth the requirements for handling, reclaiming, recovering and recycling of certain refrigerants and the equipment that is used in these service procedures. In addition, some states or municipalities may have additional requirements that must also be adhered to for responsible management of refrigerants. Know the applicable laws and follow them.

⚠ WARNING

Proper Field Wiring and Grounding Required!

Failure to follow code could result in death or serious injury.

All field wiring MUST be performed by qualified personnel. Improperly installed and grounded field wiring poses FIRE and ELECTROCUTION hazards. To avoid these hazards, you MUST follow requirements for field wiring installation and grounding as described in NEC and your local/state/national electrical codes.

⚠ WARNING

Personal Protective Equipment (PPE) Required!

Failure to wear proper PPE for the job being undertaken could result in death or serious injury. Technicians, in order to protect themselves from potential electrical, mechanical, and chemical hazards, MUST follow precautions in this manual and on the tags, stickers, and labels, as well as the instructions below:

- **Before installing/servicing this unit, technicians MUST put on all PPE required for the work being undertaken (Examples; cut resistant gloves/sleeves, butyl gloves, safety glasses, hard hat/bump cap, fall protection, electrical PPE and arc flash clothing). ALWAYS refer to appropriate Safety Data Sheets (SDS) and OSHA guidelines for proper PPE.**
- **When working with or around hazardous chemicals, ALWAYS refer to the appropriate SDS and OSHA/GHS (Global Harmonized System of Classification and Labelling of Chemicals) guidelines for information on allowable personal exposure levels, proper respiratory protection and handling instructions.**
- **If there is a risk of energized electrical contact, arc, or flash, technicians MUST put on all PPE in accordance with OSHA, NFPA 70E, or other country-specific requirements for arc flash protection, PRIOR to servicing the unit. NEVER PERFORM ANY SWITCHING, DISCONNECTING, OR VOLTAGE TESTING WITHOUT PROPER ELECTRICAL PPE AND ARC FLASH CLOTHING. ENSURE ELECTRICAL METERS AND EQUIPMENT ARE PROPERLY RATED FOR INTENDED VOLTAGE.**

⚠ WARNING

Follow EHS Policies!

Failure to follow instructions below could result in death or serious injury.

- **All Trane personnel must follow the company's Environmental, Health and Safety (EHS) policies when performing work such as hot work, electrical, fall protection, lockout/tagout, refrigerant handling, etc. Where local regulations are more stringent than these policies, those regulations supersede these policies.**
- **Non-Trane personnel should always follow local regulations.**

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Introduction

Description

This manual details the integration of Trane Horizon Outdoor Air Units Tracer® UC600 unit controller to a building automation system (BAS).

The supported Trane Horizon Outdoor Air Units include:

- OABD, OABE, OABF
- OADG
- OAGD
- OAKD, OAKE, OAKF
- OAND, OANE, OANF
- OANG

The Tracer UC600 unit controller communicates via BACnet® MS/TP or BACnet IP network protocols. This document is intended for use by individuals familiar with BACnet system integrations.

Horizon Program Revision

This document applies only to Trane Horizon Outdoor Air Units (OAU) with revision 12* programming built approximately June 2023 to date. Before proceeding, verify the program revision via one of the methods described below.

- Check the equipment nameplate for full model description and confirm it matches one of the applicable digits:

Table 1. Verify program revision in model number

Horizon OAU	Model Number Digit(s)	Description	Example Model Number Digit Location
OAB*, OAGD, OAK*, OAN*	30	4 - v12.0	OANE360A3-B1C1A0EK-A1K00AD0005001B000A0
		5 - v12.1	
OADG, OANG	63, 64	AK - v12.0	OANG080C3-DAC10JM00-R1AN00001-81A000030-A00C03A00-AA1A000A0-00AK00000
		AK - v12.1	

- Check the Program Control Type multi-state value, detailed below:

Table 2. BACnet point verification of program revision

BACnet ID	Object Name	Multi-State Setting
MV-13	Program Control Type	1 = Space Control v12.X.X
		2 = Discharge Control v12.X.X
		3 = Single Zone VAV v12.X.X
		4 = Multi Zone VAV v12.X.X

Note: *If there is no program version listed in MV-13, check MV-18 for confirmation.*

- If the Trane Horizon OAU is equipped with a TD7 display, the program revision can be confirmed via the home screen.

Figure 1. TD7 display verification of program revision

Note: *If the unit does not have revision 12 programming, this will be blank.*

Reference Documents

Table 3. Reference documents

Document	Literature Number
Air-Fi® Wireless Communications Interface Installation Instructions	BAS-SVN038*-EN
Air-Fi® Wireless System Installation, Operation, and Maintenance manual	BAS-SVX40*-EN
Air-Fi® Wireless Network Design Installation, Operation, and Maintenance manual	BAS-SVX55*-EN
Tracer Expansion Module Installation, Operation and Maintenance manual	BAS-SVX46*-EN
Tracer UC600 Programmable Controller Installation, Operation and Maintenance manual	BAS-SVX45*-EN
BACnet MS/TP Wiring and Link Performance Best Practices and Troubleshooting Guide	BAS-SVX51*-EN
Tracer® UC600 Controller Protocol Implementation Conformance Statement (PICS)	BAS-PRG010*-EN
Tracer TU Service Tool Getting Started Guide	BAS-SVU046*-EN
Horizon™ Outdoor Air Unit Installation, Operation and Maintenance manual	OAU-SVX008*-EN

UC600 Programmable Controller Overview

Air-Fi Wireless Communications Interface (WCI) Support

Trane Horizon units can use Trane Air-Fi™ and wireless communication devices. Wireless sensors can be used for space temperature, humidity, CO_2, and occupancy sensors. Refer to Trane Air-Fi literature and Tracer UC600 Programmable Controller Installation, Operation, and Maintenance manual (BAS-SVX45*-EN) for specific instructions on installation.

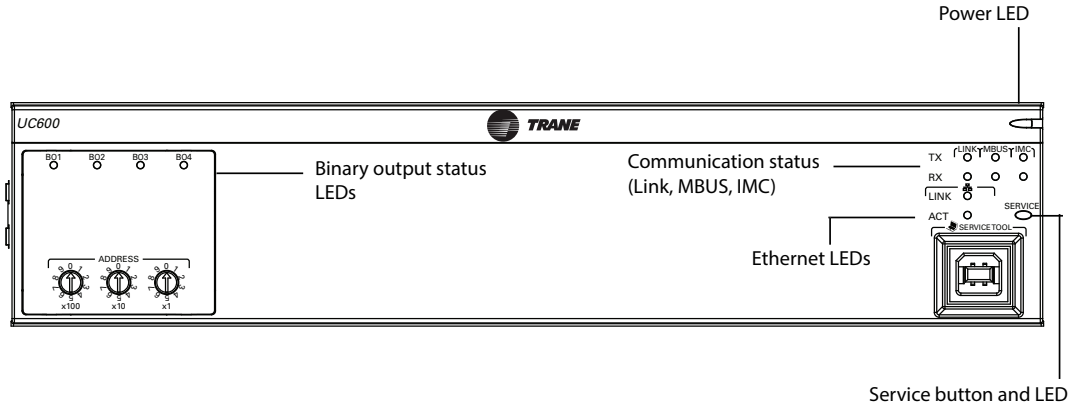
Expansion Module Requirements

If additional input or output points are needed, the XM30, XM32, XM70, and XM90 expansion modules can be used. The UC600 controller will support up to 120 combined I/O terminations. See the Tracer Expansion Module Installation, Operation, and Maintenance manual (BAS-SVX46*-EN) for application and installation information.

Location of LEDs

Light emitting diodes (LEDs) indicate the operation and communication status of the controller. For detailed information about wiring communication links, refer to the BACnet® MS/TP Wiring and Link Performance Best Practices and Troubleshooting Guide (BAS-SVX51*-EN).

Figure 2. Tracer® UC600 LEDs



Hardware Terminations

The Tracer® UC600 accepts nearly all common IO types. For detailed information on device connections, refer to the Tracer UC600 Programmable Controller Installation, Operation and Maintenance manual (BAS-SVX45*-EN).

Additional Options for Order

Table 4. Additional ordering options available for the Tracer UC600

Option	Ordering Number
Tracer TD7 operator display	X13651571010
TD7 sealed ethernet cable (for wet environments)	X19070632020
TD7 display portable carry case	X18210613010
TD7 mounting bracket (flat surface, fixed position)	X05010511010
Tracer XM30 expansion module	X13651537010

Table 4. Additional ordering options available for the Tracer UC600 (continued)

Option	Ordering Number
Tracer XM32 expansion module	X13651563010
Tracer XM70 expansion module	X13651568010
Tracer XM90 expansion module	X13651673010

Setting Addresses Using Rotary Switches

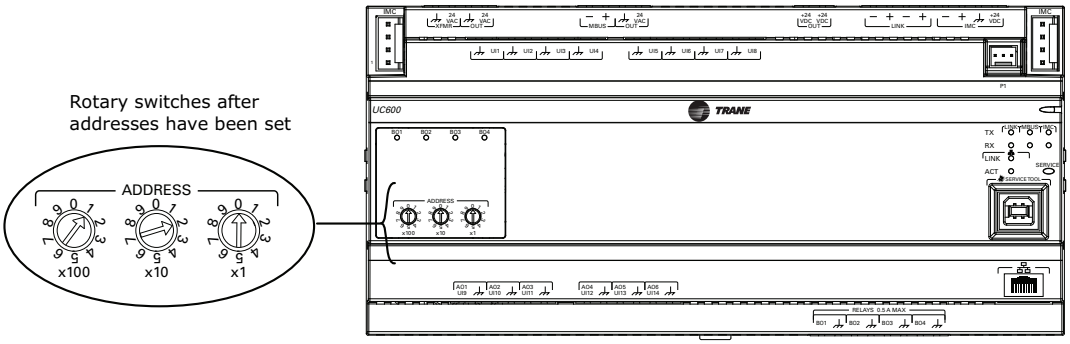
There are three rotary switches on the front of the Tracer® UC600 for the purpose of defining a three-digit address when it is installed on a BACnet® communications network. The three-digit address setting is used as both the rotary switch value and the BACnet device ID.

For Trane BACnet MS/TP systems, the rotary switch value must be between 1 and 127. Although "0,0,0," is a valid BACnet address, Trane reserves this address for the Tracer SC+ controller. For non-Trane systems, see "Rotary Dial Address Settings for Non-Trane Front-End Systems," p. 10. All device addresses on the BACnet MS/TP link must be unique.

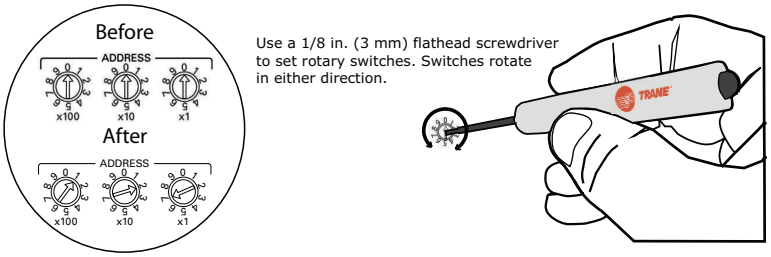
- Before powering up Tracer UC600, set the rotary switch value as shown in Figure 3, p. 9.
- If the Tracer UC600 was previously powered up, do the following if you wish to make changes:
  - Make the preferred changes to the rotary switch value as illustrated in Figure 3, p. 9.
  - Power down the Tracer UC600; when re-powered the new rotary switch value should be active.
- For controllers that are connected through BACnet/IP, or wireless via ZigBee®, valid unit controller rotary switch values can range from 001 to 999.

  Note: *Valid rotary switch values used with the Tracer UC600 are 001 to 120 for BACnet MS/TP.*

Figure 3. Setting rotary switch values on UC600



Important: *Each Tracer UC600 device on the BACnet link must have a unique rotary switch value, otherwise communication problems will occur.*



Rotary Dial Address Settings for Non-Trane Front-End Systems

For non-Trane front-end systems, the Max Manager value must be greater than the unique address settings from the rotary dials. Although 999 is possible from the dials, the maximum allowed number by BACnet is 127.

The Max Manager is not adjustable in front-end systems. For example, if the rotary dial value is 101 and the front-end system has a Max Manager value of 100, the device will not be discovered. Many systems have a minimum BACnet device ID value. Confirm that the device ID is greater than this value.

Use the Trane BACnet Setup Tool available for download to set the BACnet device ID. This can be found via web browser by searching “Trane BACnet Setup Tool” and installing the software on your laptop. For additional information on using the setup tool, see the “Using the BACnet Setup Tool,” p. 61.

Setting the BACnet Device Baud Rate for BACnet MS/TP Communication Protocol

The BACnet® baud rate refers to the speed at which data is transmitted on a BACnet MS/TP network. The baud rate for all devices on a BACnet MS/TP network must all be identical for communication to be possible. The default baud rate for Trane Horizon Outdoor Air Units is 76.8 kbs. Trane Horizon Outdoor Air Units do not specify parity and stop bit configuration. If parity and stop bit must be set on a non-Trane system, use the BACnet standard of no parity and 1 stop bit.

To set the baud rate using Tracer TU, navigate to the Controller Settings tab and select **Protocol** from the drop-down menu.

To set the baud rate without Tracer TU, use the Trane BACnet Setup Tool. See “Using the BACnet Setup Tool,” p. 61.

Setting the BACnet Device ID

The BACnet® device ID uniquely identifies each BACnet device. It can range from 0 to 4194303. Device IDs cannot be shared among devices on the same network. Each Tracer UC600 operates as a device and requires its own device ID, which defaults to the rotary switch value settings.

There are three ways that the BACnet device ID can be set on the Tracer UC600:

- After powering up Tracer UC600 for the first time, the Tracer UC600 device ID will match the rotary switch value.
- When installing a Tracer UC600 on a Tracer SC, the Tracer SC will assign the BACnet device ID based on the Tracer SC rotary address, the link number on which it is installed, and the Tracer UC600 rotary switch value. For example, the Tracer SC will create a BACnet device ID of 101030 under the following conditions:
  - The rotary dials on Tracer UC600 are set to 30 (0,3,0), which is also known as the rotary switch address.
  - The Tracer SC rotary switch value is “0,1,0”.
  - The Tracer UC600 is installed on link 1.
- Soft set the BACnet device ID by using the Tracer TU service tool or the Tracer BACnet Setup tool.

  Important: *The Tracer UC600 BACnet device ID defaults to the value of the rotary switches if the BACnet device ID has not been soft set. If a device ID has been soft set, the rotary switches are no longer representative of the BACnet device ID.*

  When integrating Tracer UC600 with third party vendors refer to Tracer® UC600 Controller Protocol Implementation Conformance Statement (PICS), (BAS-PRG010-EN).*

Device ID Assignment for BACnet MS/TP Devices

Each unit controller must have a unique BACnet® device ID. Tracer® SC automates the process by calculating a unique device ID for each unit controller and then saving the device ID to memory in each device.

BACnet MS/TP device IDs are calculated using the following three sets of values:

- The Tracer SC rotary switch value (1 to 419)
- The Tracer SC BACnet MS/TP link number (1 to 2)

- The unit controller rotary switch value (1 to 127)

The three values are joined together to form the BACnet device ID for the unit controller as shown in the following table.

Table 5. Example device ID for BACnet MS/TP devices

Tracer SC rotary switch value (21)	0	2	1				
Tracer SC BACnet MS/TP link number (1)	1						
Unit controller rotary switch value (38)	0	3	8				
BACnet Device ID: 211038	0	2	1	1	0	3	8

Device ID Assignment for BACnet IP Devices

Each unit controller must have a unique BACnet™ device ID. Tracer SC/SC+ automates the device ID assignment process for Trane unit controllers by calculating a unique device ID for each unit controller and then saving the device ID to memory in each device.

For devices communicating over BACnet IP, Tracer SC/SC+ calculates the device ID using the BACnet network number defined for Ethernet port 1 and the unit controller rotary switch value. The Tracer SC/SC+ rotary switch value is not used in the device ID calculation for IP devices.

BACnet IP device IDs are calculated using the following two sets of values:

- The BACnet network number for Ethernet 1. (This number can be changed by the user).
  - Tracer SC defaults the BACnet IP network number as 1, and under most circumstances it is not changed.
- The unit controller rotary switch value (1 to 999). The Tracer SC/SC+ rotary address is not used to calculate BACnet IP device IDs.

The following table shows this process using a Tracer UC600 unit controller.

Table 6. Example device ID for BACnet IP device

BACnet network number Eth port 1 (1)	1				
Unit controller rotary switch value (42)	0	4	2		
Note: When using BACnet IP connection, the unit cannot also be equipped with a Trane TD7 Display as they both require use of the same UC600 port.	0	1	0	4	2

Note: *When using BACnet IP connection, the unit cannot also be equipped with a Trane TD7 Display as they both require use of the same UC600 port.*

Device ID Assignment for Wireless Devices

For devices connecting over a wireless network, Tracer SC calculates the device ID using the BACnet® network number and the rotary switch value of the wireless device.

The example in the following table illustrates this process.

Table 7. Example BACnet device ID for wireless device

BACnet network number of Tracer SC wireless network (13)	1	3			
Wireless unit controller rotary switch value (001)	0	0	1		
Wireless unit controller Device ID set by the Tracer SC (app): 13001	1	3	0	0	1

Tug Test for Terminal Connectors

If using terminal connectors for wiring the controller:

1. Strip the wires to expose 1/4 in. (7 mm) of bare wire.

2. Insert each wire into a terminal connector and tighten the terminal screw.
3. A tug test is recommended after tightening terminal screws to confirm that all wires are secure.

UC600 Startup and Power Check

1. Verify that the 24 Vac connector and the chassis ground are properly wired.
2. Set a unique and valid address for each device.
3. The BACnet Device ID is set by combining the Tracer SC+ rotary switch address, link number and UC600 rotary switch address, or soft-set through Tracer TU. A unique MAC address is required and set by the rotary address switches of the UC600. Valid rotary switch settings are "001" through "127".

   Important: *A duplicate address or a "000" address will cause communication problems on a BACnet link. The Tracer SC/SC+ will not discover all devices on the link and the installation process will fail after discovery.*

   Note: *The default baud rate is 76.8 kbs.*
4. Remove the lockout/tagout from the line voltage power to the electrical cabinet.
5. Apply power to the UC600.

   When communication between devices occurs, the transmitting (TX) and receiving (RX) LEDs blink. The following table describes the Tracer UC600 LED activity and indicators.

Table 8. UC600 LED Activity and Indicators

Power LED	**Indicates...**
Solid Green	Normal operation.
Blinking Red	Alarm or fault is present.
Solid Red	Low voltage or malfunction.
Sequence on Power-up*:* Illuminates red, then flashes green, then solid green.	
Service LED	**Indicates...**
Solid Green	LED has been pressed and remains on until powered down.
Blinking Green	Controller is not accessing application software.
Not illuminated	Normal operation.
Sequence on power-up: Does not illuminate during power-up.	

BACnet MS/TP Link Wiring

BACnet MS/TP link wiring must be field-supplied and installed in compliance with the National Electrical Code and local codes. In addition, the wire must be of the following type:
low-capacitance, 18-gauge, stranded, tinned-copper, shielded, twisted-pair.

Important: *BACnet links are polarity sensitive; consistent wiring polarity must be maintained between devices.*

For more details on this topic, refer to the BACnet MS/TP Wiring and Link Performance Best Practices and Troubleshooting Guide (BAS-SVX51-EN).*

Note: *A maximum of 20 UC600 controllers are allowed per Tracer SC (10 per MSTP link).*

Figure 4. UC600 link location

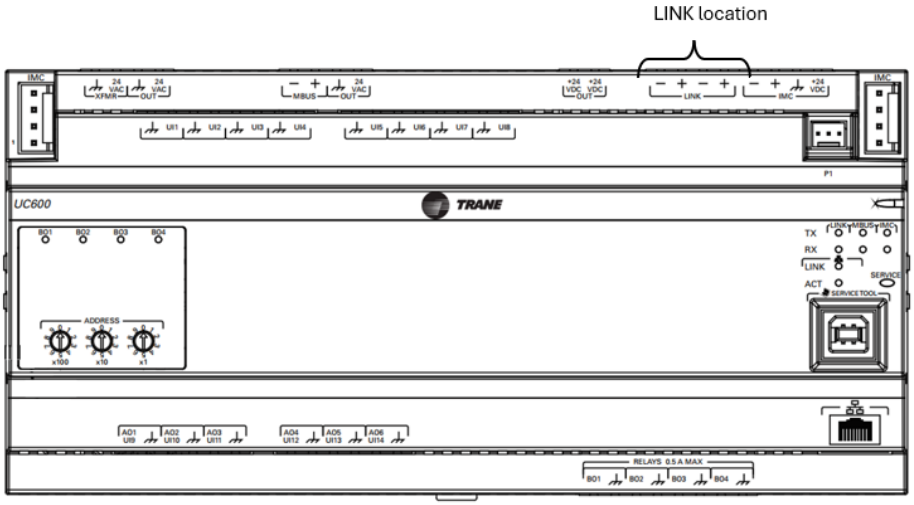
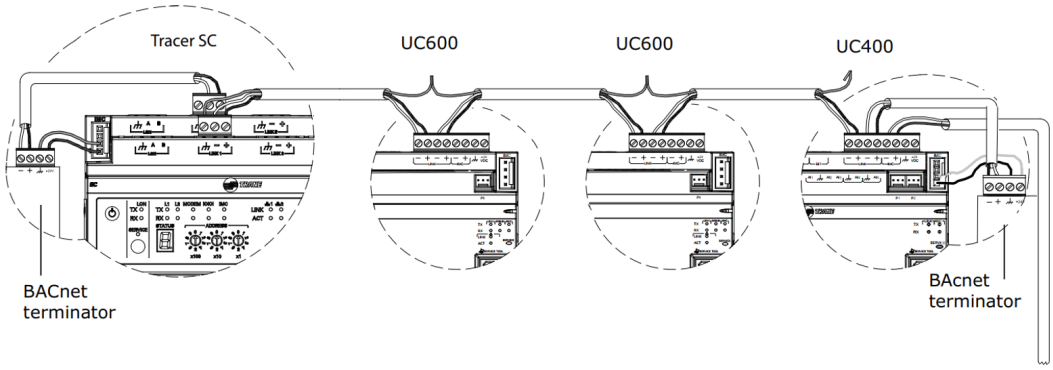


Figure 5. BACnet link wiring



BACnet/IP Wiring

Tracer® UC600 versions 5.0 or higher firmware supports BACnet®/IP over an Ethernet network. The controller requires a Cat5 Ethernet cable and an RJ-45 plug connector. See Tracer UC600 Programmable Controller Installation, Operation and Maintenance manual (BAS-SVX45*-EN) for more information.

Wiring Inputs and Outputs

Wiring and configuration for Tracer UC600 inputs and outputs is described in this section. Refer to the following table for a complete list of device connections and descriptions of each type.

NOTICE

Equipment Damage!

Failure to follow instructions below could result in damage to the controller, power transformer, or input/output devices due to inadvertent connections to power circuits.

Remove power to the controller before making input/output connections.

All input/output wiring for the Tracer UC600 must meet the following requirements:

- All wiring must be in accordance with the National Electrical Code and local codes.
- Do *NOT* run input/output wires in the same wire bundle with AC-power wires.

- Use only 18–22 AWG (1.02 mm to 0.65 mm diameter), stranded, tinned-copper, shielded, twisted-pair wire.
- Binary output wiring must not exceed 1,000 ft. (300 m).
- Binary input and 0–20 mA input wiring must not exceed 1,000 ft. (300 m).
- Analog and 24 Vdc output wiring distances are dependent on the specifications of the receiving unit. Use shielding for analog and 24 Vdc outputs.
- Thermistor input and 0–10 Vdc input or output wiring must not exceed 300 ft. (100 m).

Table 9. Tracer UC600 input/output wiring requirements

Type	Inputs	Outputs
Binary	1,000 ft (300 m)	1,000 ft (300 m)
0–20 mA	1,000 ft (300 m)	1,000 ft (300 m)
0–10 Vdc	300 ft (100 m)	300 ft (100 m)
Thermistor/Resistive	300 ft (100 m)	Not applicable

Table 10. Horizon OAU hardware devices

Analog Device	Type	Range
Discharge Air Temperature Sensor	10K Type 2	-40 to 140F
Duct Static Pressure Sensor	Voltage (0-10VDC)	0-2”WC
Exhaust Fan Piezo Pressure Sensor	Voltage (0-10VDC)	0-25”WC
Exhaust Leaving Temperature Sensor	10K Type 2	-40 to 140F
Indoor Coil Leaving Air Temperature Sensor	10K Type 2	-40 to 140F
Liquid Line Pressure Sensor	Current (4-20mA)	0-500PSI 0-667PSI[a]
Outdoor Air Damper Position Feedback	Voltage (0-10VDC)	0-100%
Outdoor Air Flow Monitoring (Greentrol)	Voltage (0-10VDC)	0-25000CFM
Outdoor Air Relative Humidity Sensor	Current (4-20mA)	0-100%
Outdoor Air Temperature Sensor	10K Type 2	-40 to 140F
Preheat Leaving Temperature Sensor	10K Type 2	-40 to 140F
Return Air Humidity Sensor	Current (4-20mA)	0-100%
Return Air Temperature Sensor	10K Type 2	-40 to 140F
Return Static Pressure Sensor	Voltage (0-10VDC)	0-2”WC
Space Humidity Sensor	Current (4-20mA)	0-100%
Space Temperature Sensor	10K Type 2	32-122F
Space Temperature Setpoint Thumbwheel (Trane)	1K	45-90F
Split Exhaust-Return Pressure Differential Sensor	Voltage (0-10VDC)	0-2”WC
Suction Line Pressure Sensor	0.5-4.5VDC	0-150PSI 0-290PSI[a]
Supply Fan Piezo Pressure Sensor	Voltage (0-10VDC)	0-2”WC

[a] Applies to R-454B refrigerant units, V12.1 programming or later.

Table 11. Binary devices

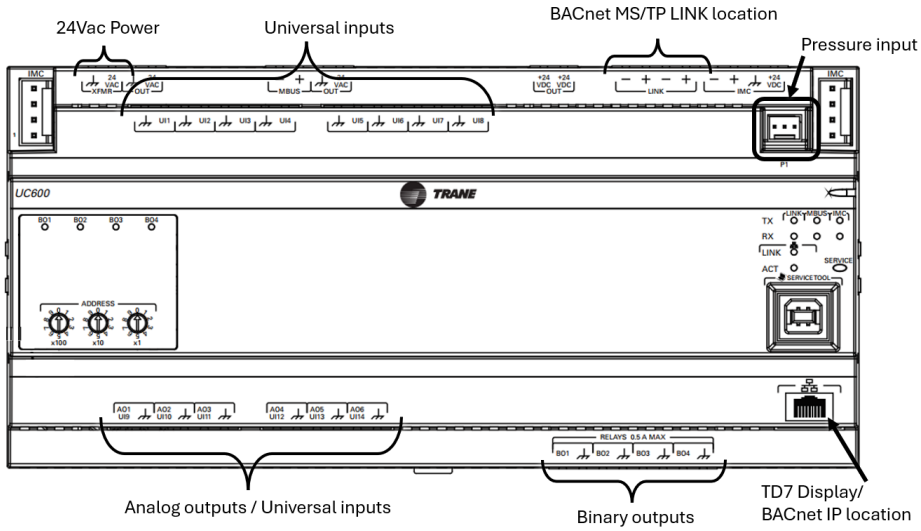
Binary Device	Output
Fan Status Switch	N.O.
Filter Status Switch	N.O.
Damper End Switch	N.O.
Phase Monitor Status	N.O.
ERV Rotation Status	N.O.
Compressor Status	N.O.
Heat Status	N.O.
Freezestat Sensor	N.O.

Note: *All binary devices are dry contacts.*

Table 12. Suggested field-installed devices

CO2 Sensor, Duct mount	SEN01092
CO2 Sensor, Wall mount	SEN01087

Figure 6. UC600 connections



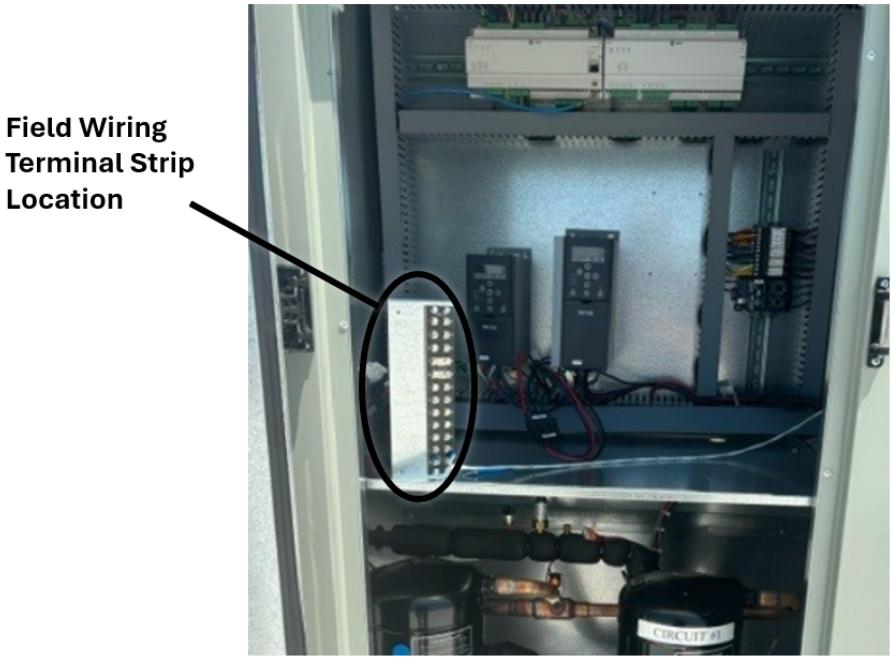
Providing Low-voltage Power for Inputs/Outputs

Any non-factory provided devices need to have a field-provided power source.

Wiring Trane Zone Sensors

The figures below show the location of the field wiring terminal strip within the unit and the termination points of a Trane zone sensor on the terminal strip.

Figure 7. Horizon unit terminal strip location within unit

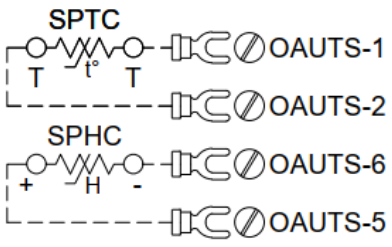


1. Connect the shield to a common terminal at the terminal board device.

Note: *Do not use the shield as the common connection. For 3-wire applications, use a 3-conductor cable with shield and for 2-wire applications, use a 2-conductor cable with separate shield.*

2. Connect the zone sensor wires to any available input (UI, UIO) terminals. Use the following figure as an example.
3. Use the Tracer TU service tool to configure the analog input that references the corresponding hardware termination.

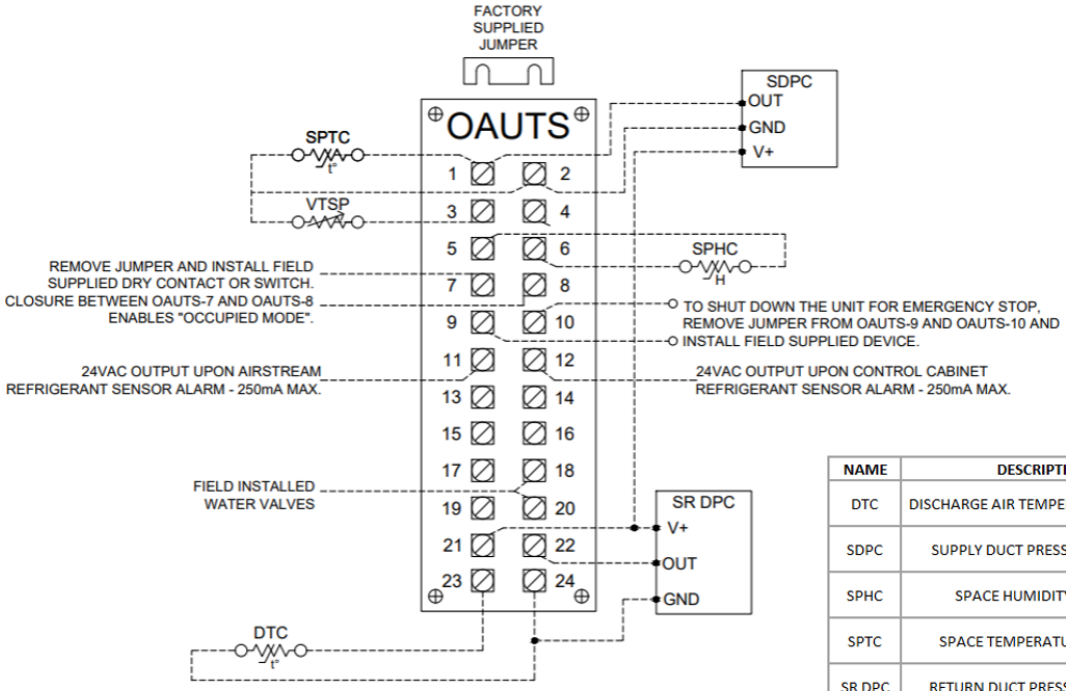
Figure 8. Zone sensor termination locations on Horizon unit terminal strip



SPACE SENSOR WIRING

TERMINAL		SENSOR
OAUTS-1	-	T
OAUTS-2	-	T
OAUTS-5	-	+
OAUTS-6	-	-

Figure 9. Horizon Outdoor Air Unit terminal strip



NAME	DESCRIPTION	PART #
DTC	DISCHARGE AIR TEMPERATURE SENSOR	VELSEN-0021 TE-DFG-B1244-00
SDPC	SUPPLY DUCT PRESSURE SENSOR	VELCON-0976 BA/ZPM-SR-ST-D
SPHC	SPACE HUMIDITY SENSOR	VELSEN-0024 BAYSENS036A
SPTC	SPACE TEMPERATURE SENSOR	VELSEN-0024 BAYSENS036A
SR DPC	RETURN DUCT PRESSURE SENSOR	VELCON-0976 BA/ZPM-SR-ST-D
VTSP	THUMBWHEEL POTENTIOMETER	VELSEN-0049 BAYSENS074A

Troubleshooting

The section provides troubleshooting solutions for problems that sometimes occur with the Tracer UC600.

Communication Problems

Problem: Tracer UC600 is not communicating with Tracer SC, but can communicate with Tracer TU using a direct USB connection.

Possible cause: The “Soft Set Device ID” check box was unchecked after the Tracer UC600 was installed onto the Tracer SC.

Possible solution: Reinstall the Tracer UC600 device onto the Tracer SC.

- Verify that the Tracer UC600 device ID is set to the rotary address, which is found in TracerTU/ controller/controller settings/protocol.
- Log on to Tracer SC and navigate to the **Devices** page; select the Tracer UC600 device from the list, then select **replace** from the actions button.

Alternative cause: The baud rate changed in the controller settings.

Solution: In Tracer TU, open the Controller Settings page. Set the baud rate to match the baud rate on the Tracer SC MS/TP link.

Alternate Cause: The rotary switch is not set properly or another device on the same MS/TP link is set to the same rotary address.

Solution: Verify that the rotary address is correct. If not, change the address and cycle power. If the device was previously installed in the Tracer SC, the device may need to be "replaced" from the Tracer SC **Devices** page.

Alternate Solution: If the device is set to the proper rotary address, then another device(s) could be using the same rotary address on the MS/TP link.

- Power down the Tracer UC600 and discover the link with Tracer SC to see if a duplicate device is present.
- Change address of duplicate device, then reapply power the Tracer UC600. If previously installed, the device may need to be replaced in the Tracer SC.

Note: *If communication is lost, the value will remain at the previously written to values. The only exception being if there is a power loss within a short period of time following a change in value.*

LED Indicators and Troubleshooting

Table 13. LED activity, indicators, and troubleshooting tips

LED type	LED activity	Indicates...	Troubleshooting/Notes
Power	Solid green	Normal operation	*Sequence on power-up:* Illuminates red, then flashes green, then solid green.
	Solid red	Low voltage or malfunction	
	Blinking red	Alarm or fault is present (**see note*)	
Communication (Link, MBUS, IMC)	TX (transmit) blinks green	Normal operation; blinks at a fixed rate when transferring data to other devices on the link	TX LED: Regardless of connectivity, the TX will blink as it searches for devices to communicate with.
	RX (receive) blinks yellow	Normal operation; blinks at a fixed rate when receiving data from other devices on the link	
	RX on solid (yellow)	Reverse polarity is present	
	LED not illuminated	The controller is not detecting communication	• Cycle the power to reestablish communication. • Verify that the controller is capable of communicating with other devices on the link. • Check polarity and baud rate.

Table 13. LED activity, indicators, and troubleshooting tips (continued)

LED type	LED activity	Indicates...	Troubleshooting/Notes
Service	Solid green	LED has been pressed and remains on until powered down (does not affect normal operation)	
	LED not illuminated	Normal operation	
Binary outputs (BO1 through BO4)	Solid yellow	Relay coil energized	
	LED not illuminated	Relay coil de-energized or No command	
Ethernet	LINK on solid (green)	Valid Ethernet connection	
	ACT flickers (yellow)	Data transmission and reception	

Note: *Points that are in an alarm state when the notification type is configured as "alarm" will cause the power LED to flash red. If the notification type of a point is configured as "event," the power LED will not flash when the point is in an alarm state. Modbus® is not supported at this time.*

Sensor Troubleshooting

The UC600 is a 24VAC programmable controller device powered within the Horizon OAU. For details on troubleshooting specific sensor types, refer to the Tracer UC600 Programmable Controller Installation, Operation and Maintenance manual (BAS-SVX45*-EN).

Building Automation System (BAS) Unit Control

Trane Horizon units are a highly configurable product with many controls that are enabled and disabled to meet the needs of an individual site. This section is a guide to determine what points are available and how to interact with the equipment to achieve the desired results.

Each Horizon unit is manufactured with a UC600 as the main unit controller, and uses a combination of expansion modules (for example, XM90 or XM32)and other independent controllers (RTRM, Digital Scroll Controller).

The BAS system controls the UC600 by changing specific values when the following conditions are all true:

- Point is in Service (by default, BAS points are out of service and need to be put in service to be used).
- Point is not in a Failed or Faulted condition.
- Point is written to at a priority level of 15 or 16.

Typical Naming Conventions for Trane Horizon

BACnet point names within the UC600 for Trane Horizon units follow a standard convention to help identify the purpose of each individual point. In some scenarios, point names may deviate to align with other Trane naming conventions. These conventions are primarily recognized by the final 1-3 words of a given name, which indicates how they should be used. In some cases, it may not be the final words, such as Compressor Speed Command Circuit 1, which the Speed Command indicates that it's an analog output but ends with Circuit 1 to indicate which circuit it references. The table below contains a list of common naming conventions and how they interact with the controller.

The main control drivers of the controller are the points ending with Active and Setpoint Active. The Active values are arbitrated throughout the program.

Table 14. Typical naming conventions for UC600 point names

Convention	Example	Description
…Local	Space Temperature Local	Generic description for all inputs into the controller (primarily hardwired inputs but may be BACnet or wireless inputs). These can refer to both analog and binary inputs.
…Active	Space Temperature Active	Generic description for analog values that are read-only that are strictly controlled by the controller and are often the final value after an arbitration decision within the controller. This can refer to all types of measurements and values.
…Command	Heating Output Command	Generic description for an output from the controller, either binary or analog. When used on a component that has both an analog and a binary component, there will be additional descriptors, such as speed, position, or start stop to indicate that it's the analog or binary.
…Speed Command	Supply Fan Speed Command	Analog output that is used to control a speed or capacity for a specific component. Exception: Inducer High Speed Command is a binary output.
…Position Command	Outdoor Air Damper Position Command	Analog output that sets a position for a component, typically used with modulating dampers.
…Start Stop Command	Exhaust Fan Start Stop Command	Outputs that turn components off/on that typically also have an analog command, such as supply/exhaust fan.
…Open Close Command	Damper Open Close Command	Binary output that sets an open/close command for a component, typically used for 2-position dampers.
…Setpoint Active	Discharge Air Temperature Setpoint Active	Similar to points ending with Active, these are just for setpoints that have been arbitrated through other settings in the controller. As described earlier, they are read-only.
…Setpoint	Dehumidification Temperature Setpoint	An adjustable setpoint that may be part of an arbitration that goes to the active setpoint.
…BAS	Discharge Air Temperature Setpoint BAS	A writeable point typically used by the BAS to replace or add to existing hardware or setpoints. Could be a sensor input or a setpoint that replaces a dual setpoint configuration.
Request	Heat Cool Mode Request	A controllable point that's used before an arbitration to the actively used point.
Other	Heat Control P-Gain	Several other common point names are also used and may or may not follow an exact convention.

Typical Reference Points to Determine Configuration

These are the typical points used to determine how the unit is configured, what features are installed, and how the unit will operate.

Table 15. BACnet points for unit configuration

BACnet ID	Object Name	Min/Max	When the Point is Used	Description	Read/ Write
AV-13	Supply Air Flow Min Setpoint - Heating	0–25000 cfm	All Primary Heat	Setpoint low limit used for supply fan during heating mode (not heat pump).	Read
AV-44	Heating Capacity Primary Status Active	0–100%	Primary Heat	Primary heating source capacity.	Read
AV-52	Cooling Capacity Status Active	0–100%	All Cooling Types	Active total capacity of the cooling circuit.	Read
AV-59	Supply Air Flow Min Setpoint - Cooling	0–25000 cfm	All	Setpoint low Limit used for supply fan during cooling or heat pump operation.	Read
AV-80	Hot Gas Reheat Capacity Status Active	0–100%	All HGRH	Actively used analog capacity for the hot gas reheat.	Read
AV-85	Cabinet Tonnage	0–80 tons	All	Normal gross cooling capacity of cabinet on refrigerant tonnage.	Read
MV-08	Equipment Type		All	1 = Standard DX 2 = ASHP 3 = WSHP 4 = No Cooling 5 = Chilled Water	Read
MV-09	Heat Type		Heat Installed	1 = No Heat 2 = Indirect Fire Gas Heat 3 = Electric Heat 4 = Other 5 = Direct Fire Gas Heat 6 = Hot Water/ Steam 7 = Simultaneous Heat Pump	Read
MV-10	Supply Fan Wheel Size		All	Factory set supply fan wheel size.	Read
MV-11	Exhaust Fan Control Type		Powered Exhaust	1 = Space Static Pressure 2 = Return Duct Static 3 = Constant Volume 4 = Constant Speed 5 = Exhaust Fan Tracking Offset 6 = Not Installed	Read
MV-12	Exhaust Fan Wheel Size		Powered Exhaust	Factory set exhaust fan wheel size.	Read
MV-13	Program Control Type		All	1 = Space Control 2 = Discharge Control 3 = Single Zone VAV 4 = Multi Zone VAV	Read
MV-16	Economizer Decision Method		Modulating Dampers	1 = Absolute Temperature 2 = Comparative Temperature 3 = Absolute Enthalpy 4 = Comparative Enthalpy 5 = Disabled	Read
MV-22	Cabinet Size		All	1 = OAB 2 = OAD 3 = OAG 4 = OAK 5 = OAN Rev 5 6 = OAN Rev 6	Read
MV-25	Supply Fan Control Type		All	1 = Constant Volume (cfm) 2 = Constant Speed 3 = Duct Static Pressure 4 = Single Zone VAV 5 = Space Static Pressure	Read

Table 15. BACnet points for unit configuration (continued)

BACnet ID	Object Name	Min/Max	When the Point is Used	Description		Read/ Write
MV-26	Energy Wheel Status Active		Energy Recovery Wheel	1 = Not installed 2 = Manually Disabled 3 = Disabled 4 = Part Capacity	5 = Full Capacity 6 = Frost Avoidance 7 = Econ Stop Jog 8 = Rotation Fault	Read
MV-27	Control Package		All	1 = Standard	2 = Critical (Lab)	Read
MV-28	Entering Air Conditions Status Active		All	1 = 100% Outdoor Air (No ERV) 2 = Mixed Air or ERV Conditioned Air	3 = 100% Return Air	Read
MV-38	Reheat Sources Active		HGRH or Hot Water; Electric by ETO only	1 = None 2 = HGRH 3 = HGRH & Hot Water	4 = HGRH & Electric 5 = Hot Water 6 = Electric	Read

Note: *There are two configurations for space or discharge air temperature setpoints: single setpoint or dual setpoint. This document assumes Space Temperature Setpoint BAS is used in place of Occupied Cooling Setpoint and Occupied Heating Setpoint. And assumes Discharge Air Temperature Setpoint BAS is used in place of Discharge Air Heating Setpoint and Discharge Air Cooling Setpoint.*

For clarifications, refer to Space Temp Setpoint Source Active (MV-07) for Space Control and Single Zone VAV, or Discharge Setpoint Source Active (MV-05) for Discharge Air Control and Multi-Zone VAV.

Operating Mode Status Active

Operating Mode Status Active is the source used to determine how the unit is currently operating. It contains all modes of operation the unit has.

Table 16. Read-only status of unit operating mode

BACnet ID	Point Description	Description	
MV-44	Operating Mode Status Active	1 = Lockout - Manual Reset 2 = Lockout - Auto Reset 3 = Auto Stop 4 = BAS Control 5 = Unocc Dormant (Off) 6 = Unocc Cooling 7 = Unocc Heating 8 = Unocc Dehum 9 = Morning Cooldown	10 = Morning Warmup 11 = Fan Only 12 = Free Cooling 13 = Economized Cooling 14 = Cooling 15 = Economized Dehum 16 = Dehumidification 17 = Heating

Table 17. Translated values between Operating Mode Status MV and Heat Cool Mode Status MV

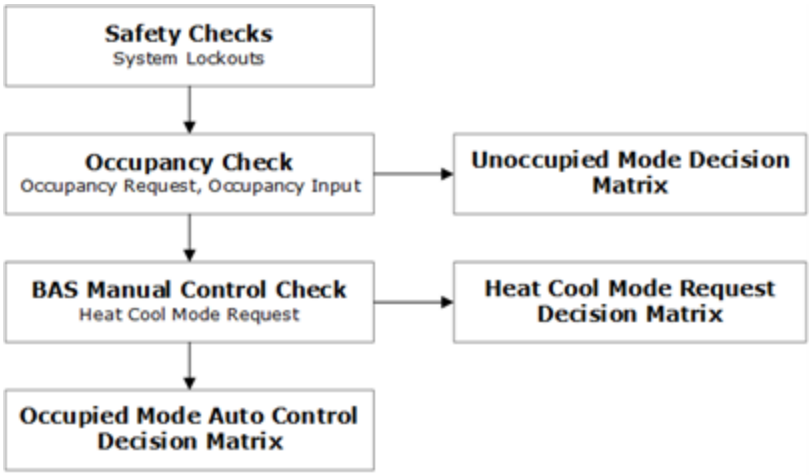
Operating Mode Status	Heat Cool Mode Status
[1] Lockout - Manual Reset	[7] Off
[2] Lockout - Auto Reset	[7] Off

Table 17. Translated values between Operating Mode Status MV and Heat Cool Mode Status MV (continued)

Operating Mode Status	Heat Cool Mode Status
[3] Auto Stop	[7] Off
[4] BAS Control	[1] Auto
[5] Unocc Stand-By	[5] Unoccupied
[6] Unocc Cooling	[6] Pre-Cool
[7] Unocc Heating	[3] Morning Warmup
[8] Unocc Dehum	[6] Pre-Cool
[9] Morning Cooldown	[6] Pre-Cool
[10] Morning Warmup	[3] Morning Warmup
[11] Fan Only	[10] Fan Only
[12] Free Cooling	[11] Free Cool
[13] Economized Cooling	[14] Economizer
[14] Cooling	[4] Cooling
[15] Economized Dehum	[15] Dehumidification
[16] Dehumidification	[15] Dehumidification
[17] Heating	[2] Heating
[18] Econ w/ Heat	[14] Economizer

Figure 10, p. 23 contains the high-level decision tree to determine the Operating Mode Status Active. The following sections describe each decision matrix and what drives the operating mode, but some modes are restricted based on whether it's in unoccupied or occupied operation. The unit must not be in system lockout before entering other modes of operation.

Figure 10. Decision tree to determine Operating Mode Status Active



Unoccupied Operation Decisions

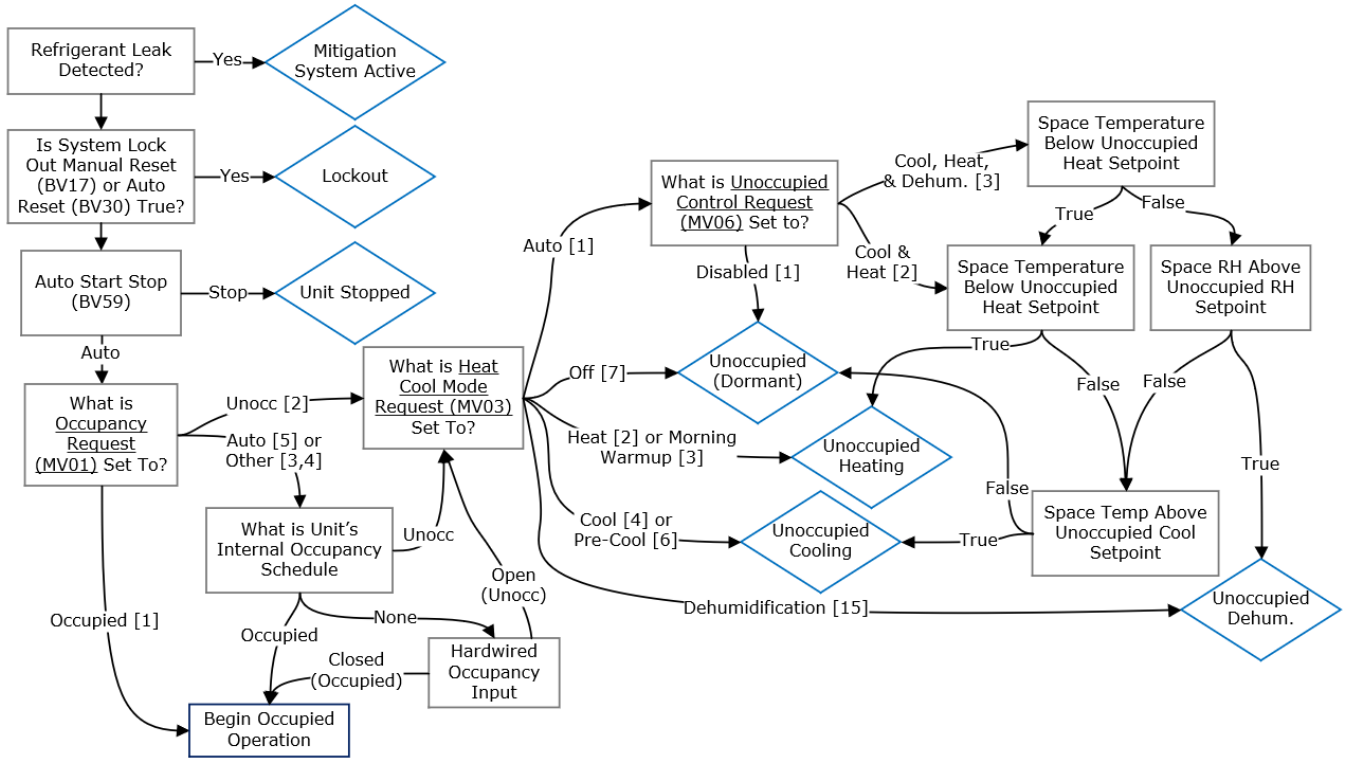
Using the values in Table 18, p. 24, the controller determines Operating Mode Status Active based on the decision matrix shown in Figure 11, p. 25. System Lockout safeties and Auto Start/Stop must be satisfied first before the unit can begin operating.

Table 18. Typical points for unoccupied operation

BACnet ID	Point Description	Read/Write	Description	
MV-01	Occupancy Request	Write	1 = Occupied 2 = Unoccupied 3 = Occupied Bypass	4 = Occupied Standby 5 = Auto
MV-02	Occupancy Status Active	Read	1 = Occupied 2 = Unoccupied 3 = Occupied Bypass	4 = Occupied Standby 5 = Unknown
MV-06	Unoccupied Control Request	Write	1 = Disabled 2 = Cool & Heat	3 = Cool, Heat, & Dehum
MV-45	Unoccupied Mode Status Active	Read	1 = Occupied 2 = Unocc Stand-by 3 = Unocc Cooling Mode 4 = Unocc Dehumid Mode	5 = Unocc Heating Mode 6 = Morning Warm-Up 7 = Pre-Cool
BI-04	Occupancy Input	Read	Dry contact input for Occupancy Status. Wired to field wiring terminal strip OAUTS-7 & 8. To use MV-01, keep factory installed jumper in place.	
AV-07	Space Humidity Active	Read	Actively used space relative humidity.	
AV-23	Space Temperature Active	Read	Actively used space temperature.	
AV-26	Unoccupied Cooling Enable Setpoint	Write	Space Cooling Setpoint used in Unoccupied Cooling Mode when Space Temperature is above Setpoint.	
AV-27	Unoccupied Heating Enable Setpoint	Write	Space Heating Setpoint used in Unoccupied Heating Mode when Space Temperature is below Setpoint.	
AV-28	Unoccupied Humidity Enable Setpoint	Write	Setpoint used to enables Unoccupied Dehumidification Mode when Space Humidity is above Setpoint.	

Note: *Unoccupied heating and cooling: space temperature is required via BAS or hardwired sensor.*
Unoccupied dehum: space humidity is required via BAS or hardwired sensor.

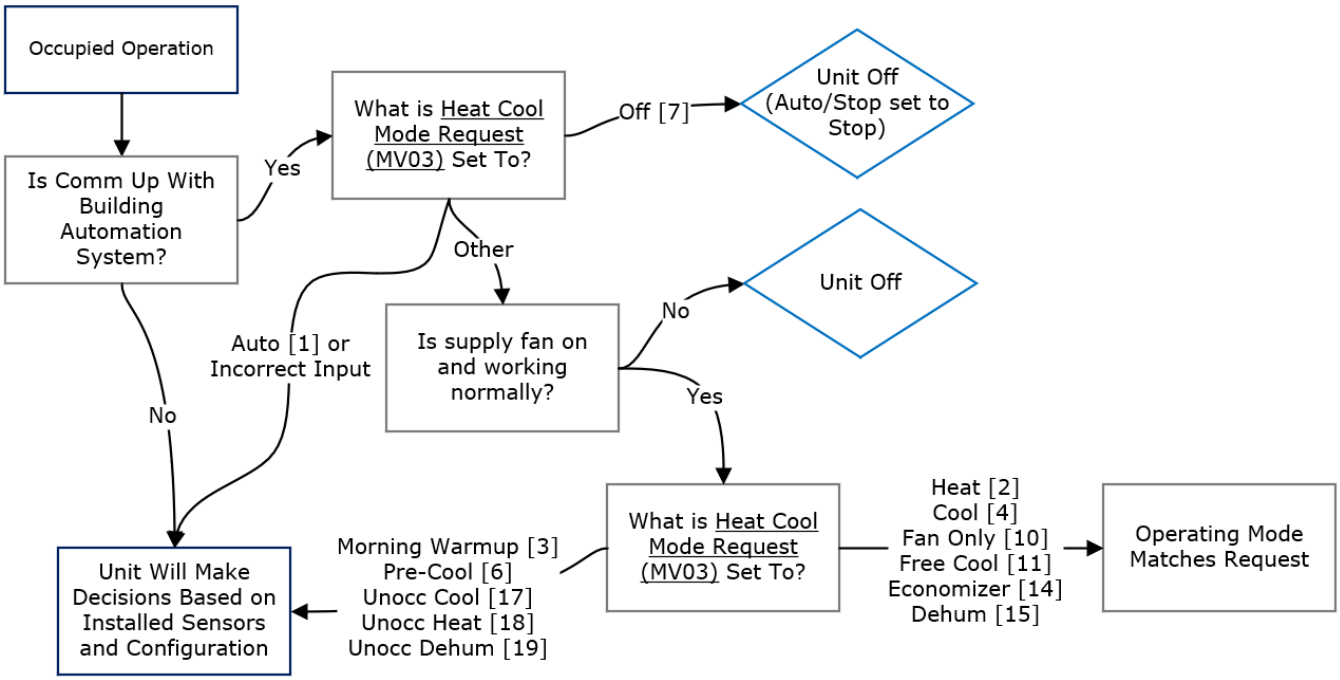
Figure 11. Unoccupied decision matrix



Occupied Operation

During occupied operation, morning warmup, precool, unoccupied heating, cooling, and dehumidification are not accepted inputs. To use these functions, set the unit to unoccupied mode first.

Figure 12. Occupied operation when using Heat Cool Mode Request



Typical Setpoints Based on Configuration and Uses

Space Control

Table 19. BACnet points for space control program type

BAC-net ID	Object Name	Min/ Max	Factory Default	When the Point is Used	Description	Read/Write
AI-01	Space Temperature Local	40–95°F	72°F	Program Control Type: Space Control or Single Zone VAV	Factory provided, field installed space temperature sensor, wired to OAUTS-1 & -2 (SPTC).	Read
AI-02	Space Humidity Local	0–100%		Program Control Type: Space Control or Single Zone VAV	Factory provided, field installed space humidity sensor, wired to OAUTS-5 & -6 (SPHC).	Read
AI-20	Space Temperature Setpoint Local	50–85°F		Thumbwheel or Hardwired Setpoint	Factory provided, field installed thumbwheel input wired to OAUTS-3 (VTSP).	Read
AV-01	Occupied Cooling Setpoint	55–85°F	72°F	Space Control or Single Zone VAV	Space cooling setpoint used in Occupied Mode.	Write
AV-02	Occupied Heating Setpoint	55–85°F	70°F	Space Control or Single Zone VAV	Space heating setpoint used in Occupied Mode.	Write
AV-20	Space Temperature BAS	40–95°F		Space Control or Single Zone VAV	Communicated space temperature. Takes priority over hardwired input when put In Service.	Write
AV-23	Space Temperature Active	40–95°F		Space Control or Single Zone VAV	Actively used space temperature.	Read
AV-25	Space Temperature Setpoint BAS	62–80°F		Space Control or Single Zone VAV	Communicated Space Temperature Setpoint. Over/Writes Occupied Cooling and Heating Setpoints. Factory defaulted is Out of Service. Place point In Service to use.	Write
AV-26	Unoccupied Cooling Enable Setpoint	60–90°F	80°F	Space Control, Single Zone VAV, ETO, or Field Enabled	Space Cooling Setpoint used in Unoccupied Cooling Mode when Space Temperature is above Setpoint.	Write
AV-27	Unoccupied Heating Enable Setpoint	45–90°F	65°F	Space Control, Single Zone VAV, ETO, or Field Enabled	Space Heating Setpoint used in Unoccupied Heating Mode when Space Temperature is below Setpoint.	Write
AV-28	Unoccupied Humidity Enable Setpoint	49–100%	60%	Space Control, Single Zone VAV, ETO, or Field Enabled	Setpoint used to enables Unoccupied Dehumidification Mode when Space Humidity is above Setpoint.	Write
AV-34	Space Dewpoint Calculated Setpoint Active	35–80°F		Space Control or Single Zone VAV	Calculated setpoint using Space Temperature Setpoint Active and Space Humidity Setpoint. Puts the unit into dehumidification.	Read
AV-35	Space Dewpoint Active	-500–482°F		Space Control or Single Zone VAV	Actively used space dewpoint.	Read
AV-37	Space Temperature Setpoint Active	45–95°F		Space Control or Single Zone VAV	Actively used space temperature setpoint from Space Temperature Setpoint BAS, or from Occupied Cooling or Heating Setpoint based on mode.	Read
AV-87	Space Dehumidification Setpoint	30-80%	45%	Space Control or Single Zone VAV	Temperature Setpoint used to calculate Space Dewpoint Setpoint for Dehumidification Mode.	Write
MV-07	Space Temp Setpoint Source Active			Space Control or Single Zone VAV	1 = Occupied Heating Setpoint 2 = Occupied Cooling Setpoint 3 = Thumbwheel (Temp Setpoint Local) 4 = Space Temperature Setpoint BAS 5 = Not Used	Read
MV-13	Program Control Type			Space Control	1 = Space Control	Read

Table 19. BACnet points for space control program type (continued)

BAC-net ID	Object Name	Min/ Max	Factory Default	When the Point is Used	Description		Read/Write
MV-43	Space Control Room Size		2	Space Control	This setpoint adjusts the frequency at which heating, cooling, and dehumidification modes are cycled based on space conditions.	1 = Small 2 = Medium 3 = Large	Read

Single Zone VAV Control

Table 20. BACnet points for single zone VAV control program type

BACnet ID	Object Name	Min/ Max	Factory Default	When the Point is Used	Description	Read/Write
AI-01	Space Temperature Local	40–95°F		Program Control Type: Space Control or Single Zone VAV	Factory provided, field installed space temperature sensor, wired to OAUTS-1 & -2 (SPTC).	Read
AI-02	Space Humidity Local	0–100%		Program Control Type: Space Control or Single Zone VAV	Factory provided, field installed space humidity sensor, wired to OAUTS-5 & -6 (SPHC).	Read
AV-01	Occupied Cooling Setpoint	55–85°F	72°F	Space Control or Single Zone VAV	Space cooling setpoint used in Occupied Mode.	Write
AV-02	Occupied Heating Setpoint	55–85°F	70°F	Space Control or Single Zone VAV	Space heating setpoint used in Occupied Mode.	Write
AV-20	Space Temperature BAS	40–95°F		Space Control or Single Zone VAV	Communicated space temperature. Takes priority over hardwired input when put In Service.	Write
AV-23	Space Temperature Active	40–95°F		Space Control or Single Zone VAV	Actively used space temperature.	Read
AV-25	Space Temperature Setpoint BAS	62–80°F		Space Control or Single Zone VAV	Communicated Space Temperature Setpoint. Over/Writes Occupied Cooling and Heating Setpoints. Factory defaulted is Out of Service. Place point In Service to use.	Write
AV-26	Unoccupied Cooling Enable Setpoint	60–90°F	80°F	Space Control, Single Zone VAV, ETO, or Field Enabled	Space Cooling Setpoint used in Unoccupied Cooling Mode when Space Temperature is above Setpoint.	Write
AV-27	Unoccupied Heating Enable Setpoint	45–90°F	65°F	Space Control, Single Zone VAV, ETO, or Field Enabled	Space Heating Setpoint used in Unoccupied Heating Mode when Space Temperature is below Setpoint.	Write
AV-28	Unoccupied Humidity Enable Setpoint	49–100%	60%	Space Control, Single Zone VAV, ETO, or Field Enabled	Setpoint used to enables Unoccupied Dehumidification Mode when Space Humidity is above Setpoint.	Write
AV-29	Ventilation Deadband Low Setpoint	0–25°F	0°F	All	Deadband for low limit ventilation setpoint. Space/SZVAV - subtracted from space temperature setpoint active. Discharge/MZVAV – subtracted from discharge temperature setpoint active.	Write
AV-33	Ventilation Deadband High Setpoint	0–25°F	0°F	All	Deadband for high limit ventilation setpoint. Space/SZVAV - added to space temperature setpoint active. Discharge/MZVAV – added to discharge temperature setpoint active.	Write
AV-34	Space Dewpoint Calculated Setpoint Active	35–80°F		Space Control or Single Zone VAV	Calculated setpoint using Space Temperature Setpoint Active and Space Humidity Setpoint. Puts the unit into dehumidification.	Read

Table 20. BACnet points for single zone VAV control program type (continued)

BACnet ID	Object Name	Min/ Max	Factory Default	When the Point is Used	Description	Read/Write
AV-35	Space Dewpoint Active	-500–482°F		Space Control or Single Zone VAV	Actively used space dewpoint.	Read
AV-37	Space Temperature Setpoint Active	45–95°F		Space Control or Single Zone VAV	Actively used space temperature setpoint from Space Temperature Setpoint BAS, or from Occupied Cooling or Heating Setpoint based on mode.	Read
AV-74	Supply Air Flow Min Setpoint Active	0–25000 cfm		VAV (Single or Multi Zone)	Actively used setpoint. Controlled by program from minimum setpoints for heating and cooling mode.	Read
AV-87	Space Dehumidification Setpoint	30-80%	45%	Space Control or Single Zone VAV	Temperature Setpoint used to calculate Space Dewpoint Setpoint for Dehumidification Mode.	Write
MV-07	Space Temp Setpoint Source Active			Space Control or Single Zone VAV	1 = Occupied Heating Setpoint 2 = Occupied Cooling Setpoint 3 = Thumbwheel (Temp Setpoint Local) 4 = Space Temperature Setpoint BAS 5 = Not Used	Read
MV-13	Program Control Type			Single Zone VAV	3 = Single Zone VAV	Read

Discharge Air Control

Table 21. BACnet points for discharge control program type

BACnet ID	Object Name	Min/ Max	Factory Default	When the Point is Used	Description	Read/Write
AV-10	Outdoor Air Dewpoint Enable Setpoint	45–100° F	55°F	Discharge Control or Multi Zone VAV	Setpoint used to put the unit into dehumidification. When the Outdoor Air Dewpoint is above this setpoint, the unit will be locked into Dehumidification Mode (takes priority over Cooling Mode).	Write
AV-29	Ventilation Deadband Low Setpoint	0–25°F	0°F	All	Deadband for low limit ventilation setpoint. Space/SZVAV - subtracted from space temperature setpoint active. Discharge/MZVAV – subtracted from discharge temperature setpoint active.	Write
AV-30	Discharge Air Cooling Setpoint	30–125° F	60°F	Discharge Control or Multi Zone VAV	Discharge air setpoint during Cooling and Dehumidification Mode for Discharge Air Control or Multi Zone VAV Control (MV-13). Only used if Discharge Air Temperature Setpoint BAS is set to Out of Service.	Write
AV-32	Discharge Air Heating Setpoint	30–125° F	65°F	Discharge Control or Multi Zone VAV	Discharge air setpoint during Heating Mode.	Write
AV-33	Ventilation Deadband High Setpoint	0–25°F	0°F	All	Deadband for high limit ventilation setpoint. Space/SZVAV - added to space temperature setpoint active. Discharge/MZVAV – added to discharge temperature setpoint active.	Write
AV-66	Discharge Air Temperature Setpoint Active	35–125° F		Discharge Control or Multi Zone VAV	Actively used discharge air temperature setpoint. For Space Control and Single Zone VAV this is reset within the program.	Read

Table 21. BACnet points for discharge control program type (continued)

BACnet ID	Object Name	Min/ Max	Factory Default	When the Point is Used	Description	Read/Write
AV-67	Discharge Air Temperature Setpoint BAS	35–125° F		Discharge Control or Multi Zone VAV	Communicated Discharge Air Temperature Setpoint during Heating, Cooling, and Dehumidification Mode. Factory default Out of Service. When put In Service it replaces Discharge Air Cooling and Heating Setpoints.	Write
MV-13	Program Control Type			Discharge Control	2 = Discharge Control	Read

Multi Zone VAV Control

Table 22. BACnet points for multi-zone VAV control program type

BACnet ID	Object Name	Min/ Max	Factory Default	When the Point is Used	Description	Read/Write
AI-23	Duct Static Pressure Local	0–2 in H_2O		Program Control Type: Multi Zone VAV, ETO, or Field Enabled Duct Static Control	Factory provided, field installed supply duct static transducer landed on field wiring terminal strip OAUTS-1 & -2 (SDPC).	Read
AV-30	Discharge Air Cooling Setpoint	30–125° F	60°F	Discharge Control or Multi Zone VAV	Discharge air setpoint during Cooling and Dehumidification Mode for Discharge Air Control or Multi Zone VAV Control (MV-13). Only used if Discharge Air Temperature Setpoint BAS is set to Out of Service.	Write
AV-32	Discharge Air Heating Setpoint	30–125° F	65°F	Discharge Control or Multi Zone VAV	Discharge air setpoint during Heating Mode.	Write
AV-46	Duct Static Pressure Setpoint	0.25–1.75 in H_2O	1.5 in H_2O	Multi Zone VAV, ETO, or Field Enabled	Setpoint used to control supply fan to static pressure whenever supply fan control is set to duct static.	Write
AV-64	Duct Static Pressure BAS	-6–6 in H_2O		Multi Zone VAV, ETO, or Field Enabled	Communicated duct static pressure. Factory defaulted Out of Service. When put In Service it takes priority over hardwired input.	Write
AV-65	Duct Static Pressure Active	-6–6 in H_2O		Multi Zone VAV, ETO, or Field Enabled	Actively used duct static pressure.	Read
AV-66	Discharge Air Temperature Setpoint Active	35–125° F		Discharge Control or Multi Zone VAV	Actively used discharge air temperature setpoint. For Space Control and Single Zone VAV this is reset within the program.	Read
AV-67	Discharge Air Temperature Setpoint BAS	35–125° F		Discharge Control or Multi Zone VAV	Communicated Discharge Air Temperature Setpoint during Heating, Cooling, and Dehumidification Mode. Factory default Out of Service. When put In Service it replaces Discharge Air Cooling and Heating Setpoints.	Write
MV-13	Program Control Type			Multi Zone VAV	4 = Multi Zone VAV	Read

Supply Fan

Table 23. BACnet points for supply fan control

BACnet ID	Object Name	Min/ Max	Factory Default	When the Point is Used	Description	Read/Write
AI-03	Supply Fan Piezo Pressure Local	0–25 in H_2O		Air Flow Monitoring on Supply Fan	Hardwired input from factory installed piezo differential pressure sensor (SPZ).	Read
AI-23	Duct Static Pressure Local	0–2 in H_2O		Program Control Type: Multi Zone VAV, ETO, or Field Enabled Duct Static Control	Factory provided, field installed supply duct static transducer landed on field wiring terminal strip OAUTS-1 & -2 (SDPC).	Read
AO-02	Supply Fan Speed Command	0–100%		All Units	Supply fan speed output.	Read

Table 23. BACnet points for supply fan control (continued)

BACnet ID	Object Name	Min/ Max	Factory Default	When the Point is Used	Description	Read/Write
AV-13	Supply Air Flow Min Setpoint - Heating	0–25000 cfm		All Primary Heat	Setpoint used for supply fan during heating mode (not heat pump).	Read
AV-17	Supply Fan Speed Setpoint - Constant Speed	25–100%		Units w/o Air Flow Monitoring	Setpoint used when MV-25 Supply Fan Control Type is set to Constant Speed to control the Supply Fan to a Constant Speed Setpoint.	Write
AV-22	Supply Air Flow Setpoint Active	0–25000 cfm		Air Flow Monitoring on Supply Fan	Setpoint Active used to control the supply fan for constant volume, or maximum limit for VAV units.	Read
AV-39	Supply Air Flow Setpoint	0–Submit-tal Max		All Supply Air Flow Monitoring	Setpoint used when MV-25 Supply Fan Control Type is set to Constant Volume to control the Supply Fan to a Constant Volume CFM Setpoint.	Write
AV-41	Supply Air Flow Active	0–26000 cfm		Air Flow Monitoring on Supply Fan	Actively used supply airflow. Calculated using the supply fan piezo pressure.	Read
AV-46	Duct Static Pressure Setpoint	0.25–1.75 in H_2O	1.5 in H_2O	Multi Zone VAV, ETO, or Field Enabled	Setpoint used to control supply fan to static pressure whenever supply fan control is set to duct static.	Write
AV-56	Space Static Pressure Setpoint	-1.004-1.004 in H_2O	0.01 in H_2O	ETO or Field Enabled	Setpoint is used when MV-25 Supply Fan Control Type is set to Space Static Pressure to control the Supply Fan to a Space Pressure Setpoint OR when MV-11 Exhaust Fan Control Type is set to Space Static Pressure to control the Exhaust Fan to a Space Pressure Setpoint.	Write
AV-59	Supply Air Flow Min Setpoint - Cooling	0–25000 cfm		All	Setpoint used for supply fan during cooling or heat pump operation.	Read
AV-74	Supply Air Flow Min Setpoint Active	0–25000 cfm		VAV (Single or Multi Zone)	Actively used setpoint. Controlled by program from minimum setpoints for heating and cooling mode.	Read
BI-01	Supply Fan Status			All	Status of the supply fan using a differential pressure switch. 0=Not Proven 1=Proven	Read
BO-01	Supply Fan Start Stop Command			All	Enable for supply fan. 0=Off 1= On	Read
BV-01	Diagnostic: Supply Fan Failure				Manual reset. Occurs when the supply fan is commanded on but the proving switch does not close after two minutes. 0=Normal 1=Fail	Read
BV-25	Diagnostic: Supply Fan Control Request Configuration				Auto reset. Occurs when the Supply Fan Control Request is selected without the correct Program Control Request, sensors or setpoints. 0=Normal 1=Alarm	Read
MV-10	Supply Fan Wheel Size			All	Factory set supply fan wheel size.	Read

Table 23. BACnet points for supply fan control (continued)

BACnet ID	Object Name	Min/ Max	Factory Default	When the Point is Used	Description	Read/Write
MV-24	Supply Fan Control Source Active			All	1 = Supply Air Flow Setpoint 2 = Supply Fan Speed Setpoint 3 = Duct Static Pressure Setpoint 4 = Space Temp (SZVAV) 5 = Space Static Pressure Setpoint 6 = Unoccupied Full Flow 7 = Unoccupied Dormant 8 = System Lockout	Read
MV-25	Supply Fan Control Type			All	1 = Constant Volume (cfm) 2 = Constant Speed 3 = Duct Static Pressure 4 = Single Zone VAV 5 = Space Static Pressure	Read

Exhaust Fan

Table 24. BACnet Points for exhaust fan control

BACnet ID	Object Name	Min/ Max	Factory Default	When the Point is Used	Description	Read/Write
AI-04	Return Static Pressure Local	0–2 in H_2O		Powered Exhaust w/ Modulating OA/RA Dampers	Factory provided, field installed return air duct static sensor used to control exhaust fan (SRDPC).	Read
AI-09	Exhaust Fan Piezo Pressure Local	0–25 in H_2O		Air Flow Monitoring on Exhaust	Factory installed sensor installed on exhaust piezo tap for exhaust air flow monitoring (EPZ).	Read
AI-13	Exhaust Leaving Temperature Local	-40–130°F		Energy Recovery Wheel	Factory installed temperature sensor located between energy recovery wheel and exhaust fan (EXTC).	Read
AI-24	Split Exhaust-Return Pressure Differential Local	0-1 in H_2O		Dual/Split Exhaust and Return Paths	Factory installed pressure transducer measuring across the split exhaust/return paths, used to control the exhaust fan minimum to prevent air infiltration from the exhaust.	Read
AO-04	Exhaust Fan Speed Command	0–100%		Powered Exhaust	Exhaust fan speed output.	Read
AV-03	Return Static Pressure Setpoint	-10–10 in H_2O		Powered Exhaust w/ Modulating Dampers	Setpoint used when MV-11 Exhaust Fan Control Type is set to Return Duct Static to control the Exhaust fan to a Return Duct Static Setpoint.	Write
AV-12	Exhaust Fan Tracking Offset Setpoint	0–100%	90%	Powered Exhaust with Modulating Dampers	Setpoint used when MV-11 Exhaust Fan Control Type is set to Exhaust Fan Tracking Offset to control the Exhaust Fan to offset of the Supply Fan.	Write
AV-40	Exhaust Fan Speed Setpoint - Constant Speed	0–100%	80%	Powered Exhaust without Air Flow Monitoring	Setpoint used when MV-11 Exhaust Fan Control Type is set to Constant Speed to control the Exhaust fan to a Constant Speed Setpoint.	Write
AV-54	Exhaust Fan Air Flow Active	0–26000 cfm		Piezo Ring on Exhaust Fan	Actively used exhaust airflow. Calculated using the supply fan piezo pressure.	Read

Table 24. BACnet Points for exhaust fan control (continued)

BACnet ID	Object Name	Min/ Max	Factory Default	When the Point is Used	Description	Read/Write
AV-56	Space Static Pressure Setpoint	-1.004-1.004 in H_2O	0.01in H_2O	ETO or Field Enabled	Setpoint is used when MV-25 Supply Fan Control Type is set to Space Static Pressure to control the Supply Fan to a Space Pressure Setpoint OR when MV-11 Exhaust Fan Control Type is set to Space Static Pressure to control the Exhaust Fan to a Space Pressure Setpoint.	Write
AV-57	Exhaust Fan Air Flow Setpoint	0–25000 cfm		Powered Exhaust with Air Flow Monitoring & MV-11 enabled	Setpoint used when MV-11 Exhaust Fan Control Type is set to Constant Volume to control the Exhaust fan to a Constant Volume CFM Setpoint.	Write
BI-07	Exhaust Damper End Switch			Actuated Exhaust Dampers (Isolation Dampers)	End switch for isolation dampers for the exhaust fan. 0=Not Proven 1=Proven	Read
BI-14	Exhaust Fan Status			Powered Exhaust Fan	Status of the exhaust fan using a differential pressure switch. 0=Not Proven 1=Proven	Read
BO-09	Exhaust Damper Open Close Command			Isolation (Actuated) Dampers on Exhaust Fan	Output to open isolation dampers located on exhaust fan. 0=Off 1=On	Read
BO-10	Exhaust Fan Start Stop Command			Exhaust Fan(s)	Enable for exhaust fan. 0=Off 1=On	Read
BO-18	Split Exhaust-Return Damper Open Close Command			Split Exhaust and Return Air Paths	Output to open damper located between split exhaust and return air paths. 0=Closed 1=Open	Read
BV-02	Diagnostic: Exhaust Fan Control Request Configuration				Auto reset. Occurs when exhaust fan control hardware is not in service or fail/ fault while the exhaust fan control is constant volume. 0=Normal 1=Alarm	Read
BV-24	Diagnostic: Exhaust Fan Failure				Auto reset. Occurs when there is a call for exhaust fan but there is no status for three minutes. 0=Normal 1=Fail	Read
MV-11	Exhaust Fan Control Type			Powered Exhaust	1 = Space Static Pressure 2 = Return Duct Static 3 = Constant Volume 4 = Constant Speed 5 = Exhaust Fan Tracking Offset 6 = Not Installed	Read
MV-12	Exhaust Fan Wheel Size			Powered Exhaust	Factory set exhaust fan wheel size.	Read
MV-17	Exhaust Fan Control Source Active			Powered Exhaust	Refer to MV-11, Exhaust Fan Control Type	Read

Dehumidification

Table 25. BACnet points for dehumidification control

BACnet ID	Object Name	Min/ Max	Factory Default	When the Point is Used	Description	Read/ Writer
AV-05	Dehumidification Temperature Active	-58–482°F		All Cooling Types	Temperature reading for dehumidification. I. E. indoor coil leaving temperature.	Read
AV-10	Outdoor Air Dewpoint Enable Setpoint	45–100° F	55°F	Discharge Control or Multi Zone VAV	Setpoint used to put the unit into dehumidification. When the Outdoor Air Dewpoint is above this setpoint, the unit will be locked into Dehumidification Mode (takes priority over Cooling Mode).	Write
AV-14	Dehumidification Temperature Setpoint	40–57°F	48°F	All Cooling Types	Setpoint used during dehumidification for Discharge Air Control and Multi Zone VAV Control (MV-13).	Write
AV-28	Unoccupied Humidity Enable Setpoint	49–100%	60%	Space Control, Single Zone VAV, ETO, or Field Enabled	Setpoint used to enable Unoccupied Dehumidification Mode when Space Humidity is above Setpoint.	Write
AV-69	Return Dewpoint Dehum Enable Setpoint	0–100°F		ETO or Field Enabled	Dehumidification Enable used when MV-29 is set to Return Dewpoint Dehumidification to enable Dehumidification Mode when the Return Air Dewpoint rises above Setpoint.	Write
AV-77	Dehumidification Temperature Setpoint Active	38–75°F		All Cooling Types	Actively used setpoint during dehumidification.	Read
AV-83	Return Humidity Dehum Enable Setpoint	0–100%		ETO or Field Enabled	Setpoint is used when MV-29 is set to Return Humidity Dehumidification to enable Dehumidification Mode when the Return Air Humidity rises above Setpoint.	Write
AV-87	Space Dehumidification Setpoint	30-80%	45%	Space Control or Single Zone VAV	Temperature Setpoint used to calculate Space Dewpoint Setpoint for Dehumidification Mode.	Write
MV-03	Heat Cool Mode Request			15 = Dehumidify	Set a request for the unit to operate for Dehumidification Mode if conditions are met. It requieres cooling components operation.	Write
MV-29	Return Dehumidification Control Type		1	ETO or Field Enabled	1 = Disabled 2 = Return Dewpoint Dehum Enable Setpoint 3 = Return Humidity Dehum Enable Setpoint	Read
MV-30	Space Dehumidification Control Type		2	Space Control or Single Zone VAV	1 = Disabled 2 = Calculated Space Dewpoint Setpoint 3 = Space Dehumidification Setpoint	Read
MV-31	Outdoor Dehumidification Control Type			All	1 = Disabled 2 = Outdoor Air Dewpoint Enable Setpoint	Read
MV-44	Operating Mode Status Active			All	8 = Unocc Dehum 15 = Economized Dehum 16 = Dehumidification	Read

Heating

Table 26. BACnet points for heating control

BACnet ID	Object Name	Min/ Max	Factory Default	When the Point is Used	Description	Read/Write
AO-01	Hot Gas Reheat Valve Command	0–100%		Hot Gas Reheat	Analog hot gas reheat output. Refer to AV-80 for active hot gas reheat capacity.	Read
AO-11	Heating Output Command	0–100%		Primary Heater (Gas, Electric, Hot Water)	Analog heating output command. Modulating burner only for Gas Heat.	Read
AV-02	Occupied Heating Setpoint	55–85°F	70°F	Space Control or Single Zone VAV	Space heating setpoint used in Occupied Mode.	Write
AV-06	Outdoor Air Heating Enable Setpoint Active	-58–482°F		All any form of Primary Heat	Active setpoint from outside air temperature to allow heating mode.	Read
AV-27	Unoccupied Heating Enable Setpoint	45–90°F	65°F	Space Control, Single Zone VAV, ETO, or Field Enabled	Space Heating Setpoint used in Unoccupied Heating Mode when Space Temperature is below Setpoint.	Write
AV-32	Discharge Air Heating Setpoint	30–125°F	65°F	Discharge Control or Multi Zone VAV	Discharge air setpoint during Heating Mode.	Write
AV-44	Heating Capacity Primary Status Active	0–100%		Primary Heat	Primary heating source capacity.	Read
AV-80	Hot Gas Reheat Capacity Status Active	0–100%		All HGRH	Actively used analog capacity for the hot gas reheat.	Read
AV-93	Outdoor Air Heating Enable Setpoint Request	-1–100°F		All	Setpoint temperature used when the Outdoor Air Temperature is below this setpoint, the unit will be locked into Heating Mode. Set to -1°F to ignore outdoor air conditions for determining Heat Mode.	Write
BI-06	Heat On Off Status Local			Gas as Primary Heat	Auto Reset (4 hours). Occurs when there is a call for heat but the heat status relay is not energized. The heat is cycled three times and then locked out for four hours before retrying. 0=Off 1=On	Read
BO-03	Heat 1 Command			Primary Heat (Any Type)	Enable for stage 1 of the primary heater. 0=Off 1=On	Read
BO-07	Heat 2 Command			Gas Heat and Split Manifold Burner	Enable for stage 2 heat. 0=Off 1=On	Read
BO-08	Heat 3 Command			Gas Heat and Three Stages of Heat	Enable for stage 3 heat. 0=Off 1=On	Read
MV-03	Heat Cool Mode Request			2 = Heat	Set a request for the unit to operate for Heating Mode if conditions are met. It requires heating components operation. See MV-09 Heat Type.	Write
MV-09	Heat Type			Heat Installed	1 = No Heat; 2 = Indirect Fire Gas Heat; 3 = Electric Heat; 4 = Other; 5 = Direct Fire Gas Heat; 6 = Hot Water/ Steam; 7 = Simultaneous Heat Pump	Read

Table 26. BACnet points for heating control (continued)

BACnet ID	Object Name	Min/ Max	Factory Default	When the Point is Used	Description	Read/Write
MV-44	Operating Mode Status Active			All	7 = Unocc Heating 10 = Morning Warmup 17 = Heating	Read

Cooling

Table 27. BACnet points for cooling control

BACnet ID	Object Name	Min/ Max	Factory Default	When the Point is Used	Description	Read/Write
AI-15	Indoor Coil Leaving Air Temperature Local	-40–160°F		DX / Chilled Water Cooling	Factory installed temperature sensor located between the cooling and the hot gas reheat coils (ICTC).	Read
AO-07	Condenser Fan Speed Command	0–100%		DX Cooling except for Water Source Heat Pump	Analog condenser fan speed command.	Read
AV-01	Occupied Cooling Setpoint	55–85°F	72°F	Space Control or Single Zone VAV	Space cooling setpoint used in Occupied Mode.	Write
AV-21	Compressor Cooling Ambient Lockout Setpoint	0–75°F	35°F	w/ Compressors	Adjustable setpoint used to lock out mechanical cooling while outdoor air temperature is below this setpoint.	Write
AV-52	Cooling Capacity Status Active	0–100%		All Cooling Types	Active total capacity of the cooling circuit.	Read
AV-59	Supply Air Flow Min Setpoint - Cooling	0–25000 cfm		All	Setpoint used for supply fan during cooling or heat pump operation.	Read
BV-39	Condenser Fan Pre-Start			All Standard DX Cooling and Air Source Heat Pumps	Enables condenser fan motors prior to call for compressors to reduce occurrences of head pressure drops on initial start. 0=Off 1=On	Read
BV-62	Compressor Cooling Allowed			DX Equipment	Used on all cooling compressor operations in Cooling mode. 0=Not Allowed 1=Allowed	Read
BV-64	Compressor Low Ambient Lockout Active			DX Cooling or Heat Pumps	Status indicating that the unit is calling for cooling but the compressors are locked out due to low ambient temperature. 0= Inactive 1= Active	Read
MV-03	Heat Cool Mode Request			4 = Cool	Set a request for the unit to operate for Cooling Mode if conditions are met. It requieres cooling components operation. See MV-08 Equipment Type.	Write
MV-08	Equipment Type			All	1 = Standard DX 2 = ASHP 3 = WSHP 4 = No Cooling 5 = Chilled Water	Read
MV-33	Compressor Count			All w/ Cooling	5=0. Otherwise, equal to compressor quantity.	Read
MV-39	Compressor Sequencing			All w/ Cooling	1 = 1-2-3-4 2 = 1-3-2-4	Read

Table 27. BACnet points for cooling control (continued)

BACnet ID	Object Name	Min/ Max	Factory Default	When the Point is Used	Description		Read/Write
MV-44	Operating Mode Status Active			All	6 = Unocc Cooling 8 = Unocc Dehum 9 = Morning Cooldown	13 = Economized Cooling 14 = Cooling	Read

Heatpump

Table 28. BACnet points for heatpump control

BACnet ID	Object Name	Min/ Max	Factory Default	When the Point is Used	Description		Read/ Write
AV-04	Heat Pump Disable Temperature Setpoint	0–60°F	10°F	Heat Pumps	Setpoint used to disable heat pump operation when outdoor air temperature is below setpoint.		Write
AV-18	Compressor Heating Capacity Status Active	0–100%		Heat Pumps	Feedback on the heat pump heating capacity.		Read
BO-16	Reversing Valve Command Circuit 1			Heat Pumps	Output used to switch between heat pump and cooling on circuit 1.	0=Heating 1=Cooling	Read
BO-17	Reversing Valve Command Circuit 2			Heat Pumps with Two Circuits	Output used to switch between heat pump and cooling on circuit 2.	0=Heating 1=Cooling	Read
BV-04	Heat Pump Defrost Mode			Heat Pumps	Defrost status for outdoor coil.	0=Off 1=On	Read
BV-31	Diagnostic: Reversing Valve Fault				Manual and Auto Reset. Occurs when unit is in cooling mode and indoor coil temperature is greater than setpoint by 20°F for five minutes. Requires Alarm Reset or call for heating mode.	0=Normal 1=Fail	Read
BV-61	Compressor Heating Allowed			Heat Pumps	Used in heat pump operations for when the unit is in Heating mode.	0=Not Allowed 1=Allowed	Read
MV-40	Heat Pump Availability Status Active			Heat Pumps	1 = Not Installed/Available 2 = Heat Pump Only 3 = Lockout - Pre Heat Fallback	4 = Ambient Lockout 5 = Simultaneous Operation 6 = Max Defrost Attempts	Read
MV-41	Heat Pump Defrost Mode Status			Heat Pumps	1 = Not ASHP 2 = Disabled 3 = Demand Defrost	4 = Defrost Fault 5 = Oil Boost 6 = Low Suction	Read

Air Balance and Startup Settings

Table 29. BACnet points for economizer control

BACnet ID	Object Name	Min/ Max	Factory Default	When the Point is Used	Description	Read/ Write
AI-06	Return Air Temperature Local	-40–135°F		Modulating OA/RA Dampers	Factory installed temperature sensor located in the return air path (RTC).	Read
AI-07	Outdoor Air Damper Position Status Local	0-100%		Modulating OA/RA Dampers	Hardwired input that provides feedback status from the actuator located on the outdoor air damper (OAD).	Read
AI-14	Return Air Humidity Local	0–100%		Modulating OA/RA Dampers	Factory installed humidity sensor located in the return air path (RRHC).	Read
AO-05	Outdoor Air Damper Position Command	0–100%		Modulating OA/RA Dampers	Position command for outdoor air damper. Return air damper position is inverse to this output.	Read
AV-47	Outdoor Damper Max Position Setpoint	0–100%		Modulating Dampers	Setpoint used to limit the outdoor air damper position during all operation. Typically adjusted during air balance.	Write
AV-48	Outdoor Damper Min Position Setpoint	0–100%		Modulating Dampers	Setpoint used to limit the outdoor air damper position during all operation. Typically adjusted during air balance. Factory set at an estimate based on submittal data.	Write
AV-55	Economizer Outdoor Air Enable Setpoint	0–120°F	60°F	All Modulating Damper (s)	Setpoint is used when MV-16 Economizer Decision Method is Absolute Temperature.	Write
AV-63	Economizer Outdoor Air Enthalpy Enable Setpoint	0–100 BTU/lb	28°F	Used if MV-16 enabled	Setpoint is used when MV-16 Economizer Decision Method is configured as Absolute Enthalpy.	Write
BV-09	Economizer Mode			Economizer Decision Method (MV-16) Not Set to Disabled (5)	Operation status of the economizer functions. 0=Not Econ. 1=Econ.	Read
BV-44	Free Cooling Mode			Economizer Decision Method (MV-16) Not Set to Disabled (5)	Status for free cooling mode, using outdoor air temperature to maintain setpoint. 0=Off 1=On	Read
BV-46	Diagnostic: Not Economizing When It Should Be Economizing				Auto reset. Occurs when the unit is in economizer mode and the outdoor air damper feedback status is greater than 20% lower than the output. 0=Normal 1=Fail	Read
BV-48	Diagnostic: Damper Not Modulating				Auto reset. Occurs when the outdoor air damper position feedback is more than 20% off from the output. 0=Normal 1=Fail	Read
BV-49	Diagnostic: Econ Mixed Air Low Limit Active				Auto reset. Low temperature limit of the active mixed air during economized mode. 0=Normal 1=Active	Read
MV-03	Heat Cool Mode Request			All	1 = Auto 2 = Heat 3 = Morning Warm-up 4 = Cool 6 = Pre-Cool 7 = Off 10 = Fan Only 11 = Free Cool 14 = Economizer 15 = Dehumidify 17 = Unocc Cool 18 = Unocc Heat 19 = Unocc Dehum	Write

Table 29. BACnet points for economizer control (continued)

BACnet ID	Object Name	Min/ Max	Factory Default	When the Point is Used	Description	Read/ Write
MV-16	Economizer Decision Method			Modulating Dampers	1 = Absolute Temperature 2 = Comparative Temperature 3 = Absolute Enthalpy 4 = Comparative Enthalpy 5 = Disabled	Read
MV-32	Outdoor Damper Control Source Active			All	1 = Closed 2 = Econ split exhaust/ return 3 = Econ Free Cooling 4 = Econ Min Damper Setpoint 5 = Econ Max Damper Setpoint 6= Outdoor Air Flow Setpoint 7= Demand Control Ventilation Setpoint 8= Open (2-position) 9= Not installed	Read
MV-44	Operating Mode Status Active			All	12 = Free Cooling 13 = Economized Cooling 15 = Economized Dehum	Read

Energy Recovery

Table 30. BACnet points for Energy Recovery control

BACnet ID	Object Name	Min/ Max	When the Point is Used	Description	Read/ Write
AI-13	Exhaust Leaving Temperature Local	-40–130°F	Energy Recovery Wheel	Factory installed temperature sensor located between energy recovery wheel and exhaust fan (EXTC).	Read
AO-06	Energy Recovery Outdoor Bypass Command	0–100%	Energy Recovery Wheel	Analog output for modulating outdoor air bypass on the energy recovery wheel.	Read
AO-10	Energy Recovery Wheel Speed Command	0–100%	Energy Recovery Wheel w/ VFD	Analog output to control energy recovery wheel speed.	Read
AO-13	Energy Recovery Exhaust Bypass Command	0–100%	Energy Recovery Wheel	Analog output for modulating exhaust air bypass on the energy recovery wheel.	Read
BI-11	Energy Wheel RA Filter Status Local		Energy Recovery Wheel	Auto Reset. Notification when differential pressure switch closes (adj. range) for the filters before ERV on return air side. 0=Clean 1=Clogged	Read
BI-12	Energy Wheel OA Filter Status Local		Energy Recovery Wheel w/o Electric Pre-Heater	Auto Reset. Notification when differential pressure switch closes (adj. range) for the filters before ERV on outdoor air side. 0=Clean 1=Clogged	Read
BI-15	Energy Wheel Rotation Status Local		Rotation Sensor on Energy Recovery Wheel	Status of the energy recovery wheel using a proximity sensor. 0=Not Proven 1=Proven	Read
BO-15	Energy Recovery Wheel Start Stop Command		Energy Recovery Wheel	Enable for energy recovery wheel. 0=Off 1=On	Read

Table 30. BACnet points for Energy Recovery control (continued)

BACnet ID	Object Name	Min/ Max	When the Point is Used	Description	Read/ Write
BV-20	Diagnostic: Energy Wheel OA Filter Status			0=Normal 1=Clogged	Read
BV-21	Diagnostic: Energy Wheel RA Filter Status			0=Normal 1=Clogged	Read
BV-41	Energy Recovery Frost Avoidance Status		Energy Recovery Wheel	Status indicating when actively bypassing or slowing down energy recovery wheel to prevent frost accumulation during low outdoor air temperatures. 0=Normal 1=Active	Read
BV-60	Diagnostic: Energy Recovery Wheel Rotation Failure			0=Normal 1=Fail	Read
MV-26	Energy Wheel Status Active		Energy Recovery Wheel	1 = Not installed 2 = Manually Disabled 3 = Disabled 4 = Part Capacity 5 = Full Capacity 6 = Frost Avoidance 7 = Econ Stop Jog 8 = Rotation Fault	Read

Setpoint References to Multi-State Values

Table 31. BACnet points for configurable multi-state values

BACnet ID	Object Name	When Point is Used	Multi-State Setting	Related Adjustable Setpoints	Measured/Arbitrated Values
MV-16	Economizer Decision Method	All	1 = Absolute Temperature	Economizer Outdoor Air Enable Setpoint (AV-55)	Outdoor Air Temperature Active
			2 = Comparative Temperature	N/A (Compares to outdoor air temperature)	Outdoor Air Temperature Active &
					Return Air Temperature Active
			3 = Absolute Enthalpy	Economizer Outdoor Air Enthalpy Enable Setpoint (63)	Outdoor Air Enthalpy (Calculated)
			4 = Comparative Enthalpy	N/A (Compares to outdoor air enthalpy)	Outdoor Air Enthalpy (Calculated) &
					Return Air Enthalpy (Calculated)
			5 = Disabled	N/A (Economizer Disabled)	N/A
MV-11	Exhaust Fan Control Type	All	1 = Space Static Pressure	Space Static Pressure Setpoint (AV-56)	Space Static Pressure Active
			2 = Return Duct Static	Return Duct Static Pressure Setpoint (AV-3)	Return Duct Static Pressure Active
			3 = Constant Volume	Exhaust Air Flow Setpoint ((AV-57)	Exhaust Air Flow Active
			4 = Constant Speed	Exhaust Fan Speed Command (AV-40)	N/A (Single Speed)
			5 = Exhaust Fan Tracking Offset	Exhaust Fan Tracking Offset Setpoint (AV12)	Supply Fan Speed Command
			6 = Not Installed	No exhaust fan installed.	N/A

Table 31. BACnet points for configurable multi-state values (continued)

BACnet ID	Object Name	When Point is Used	Multi-State Setting	Related Adjustable Setpoints	Measured/Arbitrated Values
MV-31	Outdoor Dehumidification Control Type	All	1 = Disabled	Dehumidification based on OA disabled.	N/A
			2 = Outdoor Air Dewpoint Enable Setpoint	Outdoor Air Dewpoint Enable Setpoint (AV-10)	Outdoor Air Dewpoint Active
MV-13	Program Control Type	All	1 = Space Control	Refer to sequence of operation.	N/A
			2 = Discharge Control	Refer to sequence of operation.	N/A
			3 = Single Zone VAV	Refer to sequence of operation.	N/A
			4 = Multi Zone VAV	Refer to sequence of operation.	N/A
MV-29	Return Dehumidification Control Type	ETO or Field Enabled	1 = Disabled	Dehumidification based on RA disabled.	N/A
			2 = Return Dewpoint Dehum Enable Setpoint	Return Dewpoint Dehum Enable Setpoint (AV-69)	Return Air Dewpoint Active
			3 = Return Humidity Dehum Enable Setpoint	Return Humidity Dehum Enable Setpoint (AV-83)	Return Air Humidity Local
MV-43	Space Control Room Size	Space Control	1 = Small; 2 = Medium; 3 = Large	This setpoint adjusts the frequency at which heating, cooling, and dehumidification modes are cycled based on space conditions.	N/A
MV-30	Space Dehumidification Control Type	Space Control or Single Zone VAV	1 = Disabled	Dehumidification based on space disabled.	N/A
			2 = Calculated Space Dewpoint Setpoint	Space Dehumidification Setpoint + Space Temperature Setpoint BAS	Space Dewpoint Active
				= Calculated Space Dewpoint Setpoint	
			3 = Space Dehumidification Setpoint	Space Dehumidification Setpoint (AV-87)	Space Humidity Active
MV-25	Supply Fan Control Type	All	1 = Constant Volume (cfm)	Supply Air Flow Setpoint (AV-39)	Supply Air Flow Active
			2 = Constant Speed	Supply Fan Speed Setpoint (AV-17)	N/A (Single Speed)
			3 = Duct Static Pressure	Duct Static Pressure Setpoint (AV-46)	Duct Static Pressure Active
			4 = Single Zone VAV	Space Temperature Setpoint BAS (AV-25)	Space Temperature Active
			5 = Space Static Pressure	Space Static Pressure Setpoint (AV-56)	Space Static Pressure Active
MV-06	Unoccupied Control Request	w/ Space Conditions: Factory enables on Space or Single Zone VAV; Field enabled requires space sensor	1 = Disabled	Disabled	N/A
			2 = Cool & Heat	Unoccupied Heating Setpoint (AV-27),	Space Temperature Active
				Unoccupied Cooling Setpoint (AV26)	
			3 = Cool, Heat, & Dehum	Unoccupied Heating Setpoint (AV-27),	Space Temperature Active,
				Unoccupied Cooling Setpoint (AV-26),	Space Humidity Active
				Unoccupied Dehumidification Setpoint (AV-28)	

Unit Diagnostics and Alarms

Table 32. BACnet points for diagnostics and alarms

BACnet ID	Object Name	Description		Read/Write
BI-02	Emergency Stop	Auto Reset. Shuts the unit down.	0=Normal 1=ESTOP	Read
BI-03	Indoor Coil Filter Status Local	Auto Reset. Notification when differential pressure switch closes (adj. range) for the filters in front of the indoor coil.	0=Clean 1=Clogged	Read
BI-04	Occupancy Input	Dry contact input for Occupancy Status. Wired to field wiring terminal strip OAUTS-7 & 8. To use MV-01 keep factory installed jumper in place.	0=Unocc. 1=Occupied	Read
BI-05	Damper End Switch Status Local	End switch for two position damper.	0=Not Proven 1=Proven	Read
BI-08	Phase Monitor Status Local	Operation status of the phase monitor. Notification when phase monitor is tripped.	0=Tripped 1=Normal	Write
BI-10	Condensate Detection Input	Auto Reset.	0=Normal 1=In Alarm	Read
BI-11	Energy Wheel RA Filter Status Local	Auto Reset. Notification when differential pressure switch closes (adj. range) for the filters before ERV on return air side.	0=Clean 1=Clogged	Read
BI-12	Energy Wheel OA Filter Status Local	Auto Reset. Notification when differential pressure switch closes (adj. range) for the filters before ERV on outdoor air side.	0=Clean 1=Clogged	Read
BI-16	Hot Water Freezestat Local	Manual Reset. Shuts the unit down.	0=Normal 1=Freezing	Read
BV-01	Diagnostic: Supply Fan Failure	Manual Reset. Occurs when the supply fan is commanded on but the proving switch does not close after two minutes.	0=Normal 1=Fail	Read
BV-02	Diagnostic: Exhaust Fan Control Request Configuration	Auto Reset. Occurs when exhaust fan control hardware is not in service or fail/fault while the exhaust fan control is constant volume.	0=Normal 1=Alarm	Read
BV-03	Diagnostic: Damper End Switch	Auto Reset. Occurs when there is a call for the two-position damper but the end switch has no made for 180 seconds.	0=Normal 1=Fail	Read
BV-06	Diagnostic: Heat Fail Unit Lockout	Manual Reset. Occurs when there is a call for heat but the heat status relay is not energized. The heat is cycled three times and then locked out.	0=Normal 1=Lockout	Read
BV-07	Diagnostic: Liquid Pressure Source Failure Circuit 1	Auto Reset. Occurs when the liquid pressure transducer on the refrigeration circuit 1 (LLPC1) falls outside of range.	0=Normal 1=Fail	Read
BV-08	Diagnostic: Fire Shutdown	Auto Reset. Diagnostic from BAS communication. Unit resets once this returns to normal.	0=Normal 1=Alarm	Write
BV-10	Diagnostic: Low Discharge Air Temp Lockout	Manual Reset. Occurs when the discharge air temperature is below 35°F for five minutes, or ten minutes during heat pump defrost mode.	0=Normal 1=Fail	Read
BV-11	Diagnostic: Space Temperature Source Failure	Auto Reset. Occurs when the space temperature active falls outside of range.	0=Normal 1=Fail	Read
BV-13	Diagnostic: Outdoor Air Temperature Source Failure	Auto Reset. Occurs when the outdoor air temperature active falls outside of range.	0=Normal 1=Fail	Read

Table 32. BACnet points for diagnostics and alarms (continued)

BACnet ID	Object Name	Description		Read/Write
BV-14	Diagnostic: Outdoor Air Humidity Source Failure	Auto Reset. Occurs when the outdoor air humidity active falls outside of range.	0=Normal 1=Fail	Read
BV-15	Diagnostic: High Discharge Air Temp Lockout	Manual Reset. Occurs when the discharge air temperature is above 130°F for five minutes.	0=Normal 1=Fail	Read
BV-17	System Lockout - Manual Reset	Generic diagnostic accompanying diagnostics that require manual reset.	0=Normal 1=Lockout	Read
BV-18	Diagnostic: Program Control Request Configuration	Auto Reset. Occurs when Program Control Request is selected without the correct Supply Fan Control Request, sensors, or setpoints.	0=Normal 1=Alarm	Read
BV-19	Diagnostic: Space Humidity Source Failure	Auto Reset. Occurs when the space humidity active falls outside of range.	0=Normal 1=Fail	Read
BV-20	Diagnostic: Energy Wheel OA Filter Status	Auto Reset. Occurs when differential pressure switch closes (adj. range) for the filters in front of the outside air path for ERV units.	0=Normal 1=Clogged	Read
BV-21	Diagnostic: Energy Wheel RA Filter Status	Auto Reset. Occurs when differential pressure switch closes (adj. range) for the filters in front of the exhaust path for ERV units.	0=Normal 1=Clogged	Read
BV-22	Diagnostic: Compressor Heat or Cool Fail Unit Lockout	Manual Reset. Occurs when there is a compressor run failure and the discharge air temperature is 5°F from setpoint, or the dehumidification temperature is 5°F during dehumidification.	0=Normal 1=Fail	Read
BV-24	Diagnostic: Exhaust Fan Failure	Auto Reset. Occurs when there is a call for exhaust fan but there is no status for three minutes.	0=Normal 1=Fail	Read
BV-25	Diagnostic: Supply Fan Control Request Configuration	Auto Reset. Occurs when Supply Fan Control Request is selected without the correct Program Control Request, sensors, or setpoints.	0=Normal 1=Alarm	Read
BV-26	Diagnostic: Indoor Coil Filter Status	Auto Reset. Occurs when differential pressure switch closes (adj. range) for the filters in front of the indoor coil.	0=Normal 1=Clogged	Read
BV-28	Diagnostic: Condensate Overflow Unit Lockout	Auto Reset. Occurs when the condensate switch is open and the discharge air temperature is 5°F from setpoint, or the dehumidification temperature is 5°F during dehumidification. Shuts down entire unit until 5 minutes after the condensate switch closes.	0=Normal 1=Fail	Read
BV-29	Diagnostic: Suction Pressure Source Fail Circuit 2	Auto Reset. Occurs when circuit 2 is running and the suction pressure transducer reads below 90PSI (cooling) or 55PSI (heat pump) for two minutes.	0=Normal 1=Fail	Read
BV-30	System Lockout - Auto Reset	Generic diagnostic accompanying diagnostics that auto reset.	0=Normal 1=Lockout	Read
BV-31	Diagnostic: Reversing Valve Fault	Manual and Auto Reset. Occurs when unit is in cooling mode and indoor coil temperature is greater than setpoint by 20°F for five minutes. Requires Alarm Reset or call for heating mode.	0=Normal 1=Fail	Read
BV-33	Diagnostic: Outdoor Coil Water Safety Circuit Open	Auto Reset. Occurs when the supply fan is running and the outdoor coil water safety circuit is open.	0=Normal 1=Fail	Read
BV-35	Diagnostic: Compressor 1 Proving Status	Manual or Auto Reset. Occurs when there is a call for a compressor without a run status for eight minutes. Auto resets after three hours, or compressor run command is overridden ON.	0=Normal 1=Fail	Read
BV-36	Diagnostic: Duct Static Pressure Source Failure	Auto Reset. Occurs when the supply duct static pressure transducer reading falls outside of range.	0=Normal 1=Fail	Read

Table 32. BACnet points for diagnostics and alarms (continued)

BACnet ID	Object Name	Description		Read/Write
BV-37	Diagnostic: Liquid Pressure Source Failure Circuit 2	Auto Reset. Occurs when the liquid pressure transducer on the refrigeration circuit 2 (LLPC2) falls outside of range.	0=Normal 1=Fail	Read
BV-38	Diagnostic: Suction Pressure Source Fail Circuit 1	Auto Reset. Occurs when circuit 1 is running and the suction pressure transducer reads below 90PSI (cooling) or 55PSI (heat pump) for two minutes.	0=Normal 1=Fail	Read
BV-41	Energy Recovery Frost Avoidance Status	Status indicating when actively bypassing or slowing down energy recovery wheel to prevent frost accumulation.	0=Normal 1=Active	Read
BV-42	Diagnostic: Heat Failure	Auto Reset (4 hours). Occurs when there is a call for heat but the heat status relay is not energized. The heat is cycled three times and then locked out for four hours before retrying.	0=Normal 1=Fail	Read
BV-46	Diagnostic: Not Economizing When It Should Be Economizing	Auto Reset. Occurs when the unit is in economizer mode and the outdoor air damper feedback status is greater than 20% lower than the output.	0=Normal 1=Fail	Read
BV-48	Diagnostic: Damper Not Modulating	Auto Reset. Occurs when the outdoor air damper position feedback is more than 20% off than the output.	0=Normal 1=Fail	Read
BV-49	Diagnostic: Econ Mixed Air Low Limit Active	Auto Reset. Low temperature limit of the active mix air during economized mode.	0=Normal 1=Active	Read
BV-50	Diagnostic: Space CO_2 Source Failure	Auto Reset. Occurs when the space CO2 reading falls outside of range.	0=Normal 1=Fail	Read
BV-52	Diagnostic: Compressor 2 Proving Status	Manual or Auto Reset. Occurs when there is a call for a compressor without a run status for eight minutes. Auto resets after three hours, or compressor run command is overridden ON.	0=Normal 1=Fail	Read
BV-53	Diagnostic: Compressor 3 Proving Status	Manual or Auto Reset. Occurs when there is a call for a compressor without a run status for eight minutes. Auto resets after three hours, or compressor run command is overridden ON.	0=Normal 1=Fail	Read
BV-54	Diagnostic: Compressor 4 Proving Status	Manual or Auto Reset. Occurs when there is a call for a compressor without a run status for eight minutes. Auto resets after three hours, or compressor run command is overridden ON.	0=Normal 1=Fail	Read
BV-55	Diagnostic: Space Static Pressure Source Failure	Auto Reset. Occurs when the space pressure transducers falls outside of range.	0=Normal 1=Fail	Read
BV-60	Diagnostic: Energy Recovery Wheel Rotation Failure	Auto Reset. Occurs when there is a call for the ERV but rotation was not detected for five minutes.	0=Normal 1=Fail	Read
BV-64	Compressor Low Ambient Lockout Active	Status indicating that the unit is calling for cooling but the compressors are locked out due to low ambient temperature.	0=Active 1=Not Active	Read
BV-65[a]	Diagnostic: Refrigerant Leak Detected - Airstream	Auto Reset. Occurs when 454B levels reach 12% of the Lower Flammability Limit in the supply airstream.	0=Normal 1=Alarm	Read
BV-66[a]	Diagnostic-Refrigerant Leak Detected – Control Cabinet	Auto Reset. Occurs when 454B levels reach 12% of the Lower Flammability Limit in the controls cabinet.	0=Normal 1=Alarm	Read

[a] Applies to R–454B refrigerant units, V12.1 programming or later.

Note: *System Lockout-Manual Reset requires BV-16 Alarm Reset to be set to Reset (1) to clear alarm.*

Complete Horizon OAU BACnet Points List

For quick reference the table below contains a complete listing of the Points used with Horizon units. The data is sorted alphabetically by Object Name.

Note: *Not all points are available to the user. The available points are defined and dependent on the type of equipment and options.*

Table 33. Read-only analog inputs (typically hardwired)

BACnet ID	Object Name	Range	Read/ Write	When the Point is Used:	Description
AI-11	Discharge Air Temperature Local	-40–150°F	Read	All Units	Factory provided, field installed discharge air temperature sensor landed on field wiring terminal strip OAUTS-23 & -24 (DTC).
AI-23	Duct Static Pressure Local	0–2 in H_2O	Read	Program Control Type: Multi Zone VAV, ETO, or Field Enabled Duct Static Control	Factory provided, field installed supply duct static transducer landed on field wiring terminal strip OAUTS-1 & -2 (SDPC).
AI-09	Exhaust Fan Piezo Pressure Local	0–25 in H_2O	Read	Air Flow Monitoring on Exhaust	Factory installed sensor installed on exhaust piezo tap for exhaust air flow monitoring (EPZ).
AI-13	Exhaust Leaving Temperature Local	-40–130°F	Read	Energy Recovery Wheel	Factory installed temperature sensor located between energy recovery wheel and exhaust fan (EXTC).
AI-15	Indoor Coil Leaving Air Temperature Local	-40–160°F	Read	DX / Chilled Water Cooling	Factory installed temperature sensor located between the cooling and the hot gas reheat coils (ICTC).
AI-18	Liquid Line Pressure Circuit 1 Local	0–500 psi	Read	All Units w/ DX Cooling	Factory installed pressure transducer on the circuit 1 liquid line (LLPC1).
AI-19	Liquid Line Pressure Circuit 2 Local	0–500 psi	Read	DX Cooling w/ Two Refrigerant Circuits	Factory installed pressure transducer on the circuit 2 liquid line (LLPC2).
AI-07	Outdoor Air Damper Position Status Local	0-100%	Read	Modulating OA/RA Dampers	Hardwired input that provides feedback status from the actuator located on the outdoor air damper (OAD).
AI-10	Outdoor Air Flow Local	0-25,000 cfm	Read	Outdoor Air Flow Monitoring	Factory installed outdoor air flow monitoring input from the flow station using velocity probes installed in the inlet (AMS).
AI-22	Outdoor Air Relative Humidity Local	0–100%	Read	All units w/ Outdoor Air Damper	Factory installed humidity sensor reading outdoor air (ORHC).
AI-21	Outdoor Air Temperature Local	-40–130°F	Read	All Units w/ Outdoor Air Damper	Factory installed temperature sensor reading outdoor air (OTC).
AI-25	Preheat Leaving Temperature Local	-58–350°F	Read	Electric Pre-Heater	Factory installed temperature sensor located immediately downstream of the pre-heater (PHTC).
AI-14	Return Air Humidity Local	0–100%	Read	Modulating OA/RA Dampers	Factory installed humidity sensor located in the return air path (RRHC).
AI-06	Return Air Temperature Local	-40–135°F	Read	Modulating OA/RA Dampers	Factory installed temperature sensor located in the return air path (RTC).
AI-04	Return Static Pressure Local	0–2 in H_2O	Read	Powered Exhaust w/ Modulating OA/RA Dampers	Factory provided, field installed return air duct static sensor used to control exhaust fan (SRDPC).
AI-08	Space CO_2 Concentration Local	50-2000 ppm	Read	ETO or Field Enabled	Input from field installed CO_2 sensor, typically field provided.
AI-02	Space Humidity Local	0–100%	Read	Program Control Type: Space Control or Single Zone VAV	Factory provided, field installed space humidity sensor, wired to OAUTS-5 & -6 (SPHC).
AI-12	Space Static Pressure Local	-0.5–0.5 in H_2O	Read	ETO or Field Enabled	Input from field installed transducer measuring space pressure, typically field provided.
AI-01	Space Temperature Local	40–95°F	Read	Program Control Type: Space Control or Single Zone VAV	Factory provided, field installed space temperature sensor, wired to OAUTS-1 & -2 (SPTC).

Table 33. Read-only analog inputs (typically hardwired) (continued)

BACnet ID	Object Name	Range	Read/ Write	When the Point is Used:	Description
AI-20	Space Temperature Setpoint Local	50–85°F	Read	Thumbwheel or Hardwired Setpoint	Factory provided, field installed thumbwheel input wired to OAUTS-3 (VTSP).
AI-24	Split Exhaust-Return Pressure Differential Local	0-1 in H_2O	Read	Dual/Split Exhaust and Return Paths	Factory installed pressure transducer measuring across the split exhaust/return paths, used to control the exhaust fan minimum to prevent air infiltration from the exhaust.
AI-28	Suction Line Pressure Circuit 1 Local	0–150 psi	Read	All Units w/ DX Cooling	Factory installed pressure transducer on the circuit 1 suction line (SLPC1).
AI-16	Suction Line Pressure Circuit 2 Local	0–150 psi	Read	Two-Circuit w/ Air Source Heat Pump or Dual Digital Scroll	Factory installed pressure transducer on the circuit 2 suction line (SLPC2).
AI-03	Supply Fan Piezo Pressure Local	0–25 in H_2O	Read	Air Flow Monitoring on Supply Fan	Hardwired input from factory installed piezo differential pressure sensor (SPZ).

Table 34. Read-only analog outputs

BAC-net ID	Object Name	Min / Max	Read / Write	When the Point is Used:	Description
AO-09	Chilled Water Valve Command	0–100%	Read	Cooling Type: Chilled Water	Analog chilled water actuator valve output command.
AO-03	Compressor Speed Command Circuit 1	0–100%	Read	Digital Scroll or Variable Speed Compressor on Circuit 1	Speed/unload control for circuit 1 digital scroll or variable speed compressor.
AO-08	Compressor Speed Command Circuit 2	0–100%	Read	Digital Scroll or Variable Speed as First Compressor on Circuit 2	Speed/unload control for circuit 2 digital scroll or variable speed compressor.
AO-07	Condenser Fan Speed Command	0–100%	Read	DX Cooling except for Water Source Heat Pump	Analog condenser fan speed command.
AO-13	Energy Recovery Exhaust Bypass Command	0–100%	Read	Energy Recovery Wheel	Analog output for modulating exhaust air bypass on the energy recovery wheel.
AO-06	Energy Recovery Outdoor Bypass Command	0–100%	Read	Energy Recovery Wheel	Analog output for modulating outdoor air bypass on the energy recovery wheel.
AO-10	Energy Recovery Wheel Speed Command	0–100%	Read	Energy Recovery Wheel w/ VFD	Analog output to control energy recovery wheel speed.
AO-04	Exhaust Fan Speed Command	0–100%	Read	Powered Exhaust	Exhaust fan speed output.
AO-11	Heating Output Command	0–100%	Read	Primary Heater (Gas, Electric, Hot Water)	Analog heating output command. Modulating burner only for Gas Heat.
AO-01	Hot Gas Reheat Valve Command	0–100%	Read	Hot Gas Reheat	Analog hot gas reheat output. Refer to AV-80 for active hot gas reheat capacity.
AO-05	Outdoor Air Damper Position Command	0–100%	Read	Modulating OA/RA Dampers	Position command for outdoor air damper. Return air damper position is inverse to this output.
AO-14	Outdoor Coil Water Valve Command Circuit 1	0–100%	Read	Water Source Heat Pump	Analog condenser water actuator valve output command for Circuit 1.
AO-15	Outdoor Coil Water Valve Command Circuit 2	0–100%	Read	Two-Circuit Water Source Heat Pump	Analog condenser water actuator valve output command for Circuit 2.
AO-02	Supply Fan Speed Command	0–100%	Read	All Units	Supply fan speed output.

Table 35. BACnet points for analog values (read/write)

BAC-net ID	Object Name	Min/Max	Factory Default	Read/ Write	When the Point is Used	Description
AV-85	Cabinet Tonnage	0–80 tons	-	Read	All	Normal gross cooling capacity of cabinet on refrigerant tonnage .
AV-51	Compressor Control P-Gain	0.5-12	-	Write	w/ Compressors	P-gain used to control compressor.
AV-21	Compressor Cooling Ambient Lockout Setpoint	0–75°F	35F	Write	w/ Compressors	Adjustable setpoint used to lock out mechanical cooling while outdoor air temperature is below this setpoint.
AV-18	Compressor Heating Capacity Status Active	0–100%	-	Read	Heat Pumps	Feedback on the heat pump heating capacity.
AV-86	Compressor Modulating Capacity	0–100%	-	Read	Digital Scroll or Variable Speed Compressors	Feedback on the compressor modulating capacity.
AV-91	Compressor Stage Down Delay Remaining		-	Read	w/ Compressors	Amount of delay remaining before the next compressor stage can disengaged.
AV-90	Compressor Stage Up Delay Remaining		-	Read	w/ Compressors	Amount of delay remaining before the next compressor stage can engaged.
AV-88	Condenser Fan P-Gain	0.5-2	0.5	Write	w/ Compressors. Air Cooled Condensor	P-gain used to control Condenser Fan.
AV-52	Cooling Capacity Status Active	0–100%	-	Read	All Cooling Types	Active total capacity of the cooling circuit.
AV-19	Damper Control P-Gain	0.5-8	4	Read	All Modulating Damper(s)	P-gain used to control damper (s).
AV-05	Dehumidification Temperature Active	-58–482° F	-	Read	All Cooling Types	Temperature reading for dehumidification. I. E. indoor coil leaving temperature.
AV-14	Dehumidification Temperature Setpoint	40–57°F	48°F	Write	All Cooling Types	Setpoint used during dehumidification for Discharge Air Control and Multi Zone VAV Control (MV-13).
AV-77	Dehumidification Temperature Setpoint Active	38–75°F	-	Read	All Cooling Types	Actively used setpoint during dehumidification.
AV-30	Discharge Air Cooling Setpoint	30–125°F	60°F	Write	Discharge Control or Multi Zone VAV	Discharge air setpoint during Cooling and Dehumidification Mode for Discharge Air Control or Multi Zone VAV Control (MV-13). Only used if Discharge Air Temperature Setpoint BAS is set to Out of Service.
AV-32	Discharge Air Heating Setpoint	30–125°F	65°F	Write	Discharge Control or Multi Zone VAV	Discharge air setpoint during Heating Mode.
AV-84	Discharge Air Temperature Active	-40–150° F	-	Read	All	Actively used value for discharge air temperature.
AV-66	Discharge Air Temperature Setpoint Active	35–125°F	-	Read	Discharge Control or Multi Zone VAV	Actively used discharge air temperature setpoint. For Space Control and Single Zone VAV this is reset within the program.

Table 35. BACnet points for analog values (read/write) (continued)

BAC-net ID	Object Name	Min/Max	Factory Default	Read/ Write	When the Point is Used	Description
AV-67	Discharge Air Temperature Setpoint BAS	35–125°F	-	Write	Discharge Control or Multi Zone VAV	Communicated Discharge Air Temperature Setpoint during Heating, Cooling, and Dehumidification Mode. Factory default Out of Service. When put In Service it replaces Discharge Air Cooling and Heating Setpoints.
AV-45	Discharge Air Temperature Setpoint Maximum	65–125°F	100°F	Write	All	Setpoint is used to limit the maximum discharge air temperature.
AV-43	Discharge Air Temperature Setpoint Minimum	35–70°F	50°F	Write	All	Setpoint is used to limit the minimum discharge air temperature.
AV-65	Duct Static Pressure Active	-6–6 in H_2O	-	Read	Multi Zone VAV, ETO, or Field Enabled	Actively used duct static pressure.
AV-64	Duct Static Pressure BAS	-6–6 in H_2O	-	Write	Multi Zone VAV, ETO, or Field Enabled	Communicated duct static pressure. Factory defaulted Out of Service. When put In Service it takes priority over hardwired input.
AV-46	Duct Static Pressure Setpoint	0.25–1.75 in H_2O	1.5 in H_2O	Write	Multi Zone VAV, ETO, or Field Enabled	Setpoint used to control supply fan to static pressure whenever supply fan control is set to duct static.
AV-55	Economizer Outdoor Air Enable Setpoint	0–120°F	60°F	Write	All Modulating Damper(s)	Setpoint is used when MV-16 Economizer Decision Method is Absolute Temperature.
AV-63	Economizer Outdoor Air Enthalpy Enable Setpoint	0–100 BTU/lb	28°F	Write	Used if MV-16 enabled	Setpoint is used when MV-16 Economizer Decision Method is configured as Absolute Enthalpy.
AV-54	Exhaust Fan Air Flow Active	0–26000 cfm	-	Read	Piezo Ring on Exhaust Fan	Actively used exhaust airflow. Calculated using the supply fan piezo pressure.
AV-57	Exhaust Fan Air Flow Setpoint	0–25000 cfm	-	Write	Powered Exhaust with Air Flow Monitoring & MV-11 enabled	Setpoint used when MV-11 Exhaust Fan Control Type is set to Constant Volume to control the Exhaust fan to a Constant Volume CFM Setpoint.
AV-40	Exhaust Fan Speed Setpoint - Constant Speed	0–100%	80%	Write	Powered Exhaust without Air Flow Monitoring	Setpoint used when MV-11 Exhaust Fan Control Type is set to Constant Speed to control the Exhaust fan to a Constant Speed Setpoint.
AV-12	Exhaust Fan Tracking Offset Setpoint	0–100%	90%	Write	Powered Exhaust with Modulating Dampers	Setpoint used when MV-11 Exhaust Fan Control Type is set to Exhaust Fan Tracking Offset to control the Exhaust Fan to offset of the Supply Fan.
AV-89	Frost Avoidance Setpoint Active	-58–482° F	-	Read	Lab Control ASHP (ETO)	Active Setpoint used to prevent frost build up on outdoor coil.
AV-44	Heating Capacity Primary Status Active	0–100%	-	Read	Primary Heat	Primary heating source capacity.

Table 35. BACnet points for analog values (read/write) (continued)

BAC-net ID	Object Name	Min/Max	Factory Default	Read/ Write	When the Point is Used	Description
AV-61	Heat Control P-Gain	0.5-6	1.5	Write	Primary Heat	P-gain used to control primary heat.
AV-92	Heat Cool Switch Delay Time Remaining	0-120 minutes	-	Read	All	Time remaining when the unit has determined a need to switch modes of operation but has a time delay to prevent cycling.
AV-04	Heat Pump Disable Temperature Setpoint	0–60°F	10°F	Write	Heat Pumps	Setpoint used to disable heat pump operation when outdoor air temperature is below setpoint.
AV-80	Hot Gas Reheat Capacity Status Active	0–100%	-	Read	All HGRH	Actively used analog capacity for the hot gas reheat.
AV-60	Mixed Air Temperature Active	-140	-	Read	All Modulating Damper(s)	Calculated mixed air temperature using outdoor and return air temperatures and damper position.
AV-01	Occupied Cooling Setpoint	55–85°F	72°F	Write	Space Control or Single Zone VAV	Space cooling setpoint used in Occupied Mode.
AV-02	Occupied Heating Setpoint	55–85°F	70°F	Write	Space Control or Single Zone VAV	Space heating setpoint used in Occupied Mode.
AV-16	Occupied Offset	0.5–18 Δ° F	-	Read/ Write	All	Offset used to switch between modes of operation. The Occupied Offset is half the difference between AV-01 and AV-02 setpoints. *If the cooling setpoint is below the heating setpoint or AV-25 is used, or if a hardwired setpoint (thumbwheel) is used, the Occupied Offset defaults to 1° F.
AV-11	Outdoor Air Dewpoint Active	-10–150° F	-	Read	All	Dewpoint of the outdoor air. This point is calculated within the program.
AV-10	Outdoor Air Dewpoint Enable Setpoint	45–100°F	-	Write	Discharge Control or Multi Zone VAV	Setpoint used to put the unit into dehumidification. When the Outdoor Air Dewpoint is above this setpoint, the unit will be locked into Dehumidification Mode. (takes priority over Cooling Mode).
AV-68	Outdoor Air Enthalpy Active		-	Read	All	Actively used outdoor air enthalpy.
AV-38	Outdoor Air Flow Active	0–25000 cfm	-	Read	Outdoor Air Flow Monitoring	Actively used outside air flow.
AV-71	Outdoor Air Flow Setpoint	0–25000 cfm	-	Write	Outdoor Air Flow Monitoring	Setpoint used to modulate the OA dampers when the unit is equipped with outdoor Airflow Monitoring Station (AMS) and modulating OA/RA dampers.
AV-06	Outdoor Air Heating Enable Setpoint Active	-58–482° F	-	Read	All any form of Primary Heat	Active setpoint from outside air temperature to allow heating mode.

Table 35. BACnet points for analog values (read/write) (continued)

BAC-net ID	Object Name	Min/Max	Factory Default	Read/ Write	When the Point is Used	Description
AV-93	Outdoor Air Heating Enable Setpoint Request	-1–100°F	-	Write	All	Setpoint temperature used when the Outdoor Air Temperature is below this setpoint, the unit will be locked into Heating Mode. Set to -1°F to ignore outdoor air conditions for determining Heat Mode.
AV-82	Outdoor Air Humidity Active	0–100%	-	Read	All	Actively used outdoor air relative humidity.
AV-81	Outdoor Air Humidity BAS	0–100%	-	Write	All	Optional communicated outdoor air relative humidity.
AV-76	Outdoor Air Temperature Active	-100–200°F	-	Read	All	Actively used outdoor air temperature.
AV-75	Outdoor Air Temperature BAS	-40–135° F	-	Write	All	Optional communicated outdoor air temperature.
AV-47	Outdoor Damper Max Position Setpoint	0–100%	-	Write	Modulating Dampers	Setpoint used to limit the outdoor air damper position during all operation. Typically adjusted during air balance.
AV-48	Outdoor Damper Min Position Setpoint	0–100%	-	Write	Modulating Dampers	Setpoint used to limit the outdoor air damper position during all operation. Typically adjusted during air balance. Factory set at an estimate based on submittal data.
AV-36	Return Air Dewpoint Active	-500-482° F	-	Read	Modulating Dampers	Actively used return dewpoint.
AV-72	Return Air Enthalpy Active		-	Read	Modulating Dampers	Actively used outdoor air enthalpy.
AV-69	Return Dewpoint Dehum Enable Setpoint	0–100°F	-	Write	ETO or Field Enabled	Dehumidification enable used when MV-29 is set to Return Dewpoint Dehumidification to enable Dehumidification Mode when the Return Air Dewpoint rises above Setpoint.
AV-83	Return Humidity Dehum Enable Setpoint	0–100%	-	Write	ETO or Field Enabled	Setpoint is used when MV-29 is set to Return Humidity Dehumidification to enable Dehumidification Mode when the Return Air Humidity rises above Setpoint.
AV-03	Return Static Pressure Setpoint	-10–10 in H_2O	-	Write	Powered Exhaust w/ Modulating Dampers	Setpoint used when MV-11 Exhaust Fan Control Type is set to Return Duct Static to control the Exhaust fan to a Return Duct Static Setpoint.
AV-78	Saturated Suction Temp Circuit 1 Active	-58–482° F	-	Read	w/ Compressors	Actively used saturated refrigerant temperature from circuit 1 suction line.
AV-79	Saturated Suction Temp Circuit 2 Active	-58–482° F	-	Read	Variable Speed or Digital Scroll as first compressor on Circuit 2	Actively used saturated refrigerant temperature from circuit 2 suction line.
AV-50	Space CO_2 Concentration Setpoint	0–2000 ppm	750 ppm	Write	CO_2 sensor installed	Setpoint used to control the outdoor air damper.
AV-62	Space CO_2 Concentration Active	0–2000 ppm	-	Read	CO_2 sensor installed	Actively used space CO_2 conditions.

Table 35. BACnet points for analog values (read/write) (continued)

BAC-net ID	Object Name	Min/Max	Factory Default	Read/ Write	When the Point is Used	Description
AV-42	Space CO_2 Concentration BAS	1-2000 ppm	-	Write	CO_2 sensor installed	Communicated space CO_2 conditions.
AV-87	Space Dehumidification Setpoint	30-80%	45%	Write	Space Control or Single Zone VAV	Temperature Setpoint used to calculate Space Dewpoint Setpoint for Dehumidification Mode.
AV-35	Space Dewpoint Active	-500–482°F	-	Read	Space Control or Single Zone VAV	Actively used space dewpoint.
AV-34	Space Dewpoint Calculated Setpoint Active	35–80°F	-	Read	Space Control or Single Zone VAV	Calculated setpoint using Space Temperature Setpoint Active and Space Humidity Setpoint. Puts the unit into dehumidification.
AV-07	Space Humidity Active	0–100%	-	Read	Space Humidity Sensor Installed	Actively used space relative humidity.
AV-08	Space Humidity BAS	0–100%	-	Write	All	Communicated space relative humidity. Takes priority over hardwired input when put In Service.
AV-70	Space Static Pressure Active	-1.004-1.004 in H_2O	-	Read	ETO or Field Enabled	Actively used space static pressure control.
AV-73	Space Static Pressure BAS	-1.004-1.004 in H_2O	-	Write	ETO or Field Enabled	BAS used space static pressure control. OveR/Writes Space Static Pressure Local. Factory defaulted Out of Service. Place point In Service to use.
AV-56	Space Static Pressure Setpoint	-1.004-1.004 in H_2O	0.01 in H_2O	Write	ETO or Field Enabled	Setpoint is used when MV-25 Supply Fan Control Type is set to Space Static Pressure to control the Supply Fan to a Space Pressure Setpoint OR when MV-11 Exhaust Fan Control Type is set to Space Static Pressure to control the Exhaust Fan to a Space Pressure Setpoint.
AV-23	Space Temperature Active	40–95°F	-	Read	Space Control or Single Zone VAV	Actively used space temperature.
AV-20	Space Temperature BAS	40–95°F	-	Write	Space Control or Single Zone VAV	Communicated space temperature. Takes priority over hardwired input when put In Service.
AV-37	Space Temperature Setpoint Active	45–95°F	-	Read	Space Control or Single Zone VAV	Actively used space temperature setpoint from Space Temperature Setpoint BAS, or from Occupied Cooling or Heating Setpoint based on mode.
AV-25	Space Temperature Setpoint BAS	62–80°F	-	Write	Space Control or Single Zone VAV	Communicated Space Temperature Setpoint. OveR/Writes Occupied Cooling and Heating Setpoints. Factory defaulted is Out of Service. Place point In Service to use.
AV-41	Supply Air Flow Active	0–26000 cfm	-	Read	Air Flow Monitoring on Supply Fan	Actively used supply airflow. Calculated using the supply fan piezo pressure.

Table 35. BACnet points for analog values (read/write) (continued)

BAC-net ID	Object Name	Min/Max	Factory Default	Read/ Write	When the Point is Used	Description
AV-59	Supply Air Flow Min Setpoint - Cooling	0–25000 cfm	-	Read	All	Setpoint used for supply fan during cooling or heat pump operation.
AV-13	Supply Air Flow Min Setpoint - Heating	0–25000 cfm	-	Read	All Primary Heat	Setpoint used for supply fan during heating mode (not heat pump).
AV-74	Supply Air Flow Min Setpoint Active	0–25000 cfm	-	Read	VAV (Single or Multi Zone)	Actively used setpoint. Controlled by program from minimum setpoints for heating and cooling mode.
AV-39	Supply Air Flow Setpoint	0–Submittal Max	-	Write	All Supply Air Flow Monitoring	Setpoint used when MV-25 Supply Fan Control Type is set to Constant Volume to control the Supply Fan to a Constant Volume CFM Setpoint.
AV-22	Supply Air Flow Setpoint Active	0–25000 cfm	-	Read	Air Flow Monitoring on Supply Fan	Setpoint Active used to control the supply fan for constant volume, or maximum limit for VAV units.
AV-17	Supply Fan Speed Setpoint - Constant Speed	25–100%	-	Write	Units w/o Air Flow Monitoring	Setpoint used when MV-25 Supply Fan Control Type is set to Constant Speed to control the Supply Fan to a Constant Speed Setpoint.
AV-26	Unoccupied Cooling Enable Setpoint	60–90°F	80°F	Write	Space Control, Single Zone VAV, ETO, or Field Enabled	Space Cooling Setpoint used in Unoccupied Cooling Mode when Space Temperature is above Setpoint.
AV-27	Unoccupied Heating Enable Setpoint	45–90°F	65°F	Write	Space Control, Single Zone VAV, ETO, or Field Enabled	Space Heating Setpoint used in Unoccupied Heating Mode when Space Temperature is below Setpoint.
AV-28	Unoccupied Humidity Enable Setpoint	49–100%	60%	Write	Space Control, Single Zone VAV, ETO, or Field Enabled	Setpoint used to enables Unoccupied Dehumidification Mode when Space Humidity is above Setpoint.
AV-33	Ventilation Deadband High Setpoint	0–25°F	0°F	Write	All	Deadband for high limit ventilation setpoint.
						Space/SZVAV - added to space temperature setpoint active.
						Discharge/MZVAV – added to discharge temperature setpoint active.
AV-29	Ventilation Deadband Low Setpoint	0–25°F	0°F	Write	All	Deadband for low limit ventilation setpoint.
						Space/SZVAV - subtracted from space temperature setpoint active.
						Discharge/MZVAV – subtracted from discharge temperature setpoint active.

Table 35. BACnet points for analog values (read/write) (continued)

BAC-net ID	Object Name	Min/Max	Factory Default	Read/ Write	When the Point is Used	Description
AV-24	Ventilation Setpoint High Active	-58–482° F	-	Read	All	High temperature setpoint for outdoor air temperature active to allowed ventilation mode.
AV-49	Ventilation Setpoint Low Active	-58–482° F	-	Read	All	Low temperature setpoint for outdoor air temperature active to allowed ventilation mode.

Table 36. BACnet points for read-only binary inputs

BAC-net ID	Object Name	Values	Read / Write	When the Point is Used:	Description
BI-17	Compressor 1 Status Local	0=Not Proven 1= Proven	Read	1+ Compressors	Feedback run status hardwired through compressor 1 contactor. This input is wired to NO on the compressor's auxiliary contactor. Inactive = Open = Cmpr Off Active = Closed = Cmpr On
BI-23	Compressor 1 VFD Status Local	0=Alarm 1= Normal	Read	Variable Speed Compressor	Compressor alarm status input from VFD.
BI-18	Compressor 2 Status Local	0=Not Proven 1= Proven	Read	2+ Compressors	Feedback run status hardwired through compressor 2 contactor. This input is wired to NO on the compressor's auxiliary contactor. Inactive = Open = Cmpr Off Active = Closed = Cmpr On
BI-19	Compressor 3 Status Local	0=Not Proven 1= Proven	Read	3+ Compressors	Feedback run status hardwired through compressor 3 contactor. This input is wired to NO on the compressor's auxiliary contactor. Inactive = Open = Cmpr Off Active = Closed = Cmpr On
BI-20	Compressor 4 Status Local	0=Not Proven 1= Proven	Read	4+ Compressors	Feedback run status hardwired through compressor 4 contactor. This input is wired to NO on the compressor's auxiliary contactor. Inactive = Open = Cmpr Off Active = Closed = Cmpr On
BI-10	Condensate Detection Input	0= Normal 1=In Alarm	Read	Condensate Overflow Switch	Auto Reset.
BI-05	Damper End Switch Status Local	0=Not Proven 1= Proven	Read	100% OA w/o Return Air Damper	End switch for two position damper.
BI-02	Emergency Stop	0= Normal 1= ESTOP	Read	All	Auto Reset. Shuts the unit down.
BI-12	Energy Wheel OA Filter Status Local	0=Clean 1= Clogged	Read	Energy Recovery Wheel w/o Electric Pre-Heater	Auto Reset. Notification when differential pressure switch closes (adj. range) for the filters before ERV on outdoor air side.
BI-11	Energy Wheel RA Filter Status Local	0=Clean 1= Clogged	Read	Energy Recovery Wheel	Auto Reset. Notification when differential presssure switch closes (adj. range) for the filters before ERV on return air side.
BI-15	Energy Wheel Rotation Status Local	0=Not Proven 1= Proven	Read	Rotation Sensor on Energy Recovery Wheel	Status of the energy recovery wheel using a proximity sensor.

Table 36. BACnet points for read-only binary inputs (continued)

BAC-net ID	Object Name	Values	Read / Write	When the Point is Used:	Description
BI-07	Exhaust Damper End Switch	0=Not Proven 1= Proven	Read	Actuated Exhaust Dampers (Isolation Dampers)	End switch for isolation dampers for the exhaust fan.
BI-14	Exhaust Fan Status	0=Not Proven 1= Proven	Read	Powered Exhaust Fan	Status of the exhaust fan using a differential pressure switch.
BI-06	Heat On Off Status Local	0=Off 1=On	Read	Gas as Primary Heat	Auto Reset (4 hours). Occurs when there is a call for heat but the heat status relay is not energized. The heat is cycled three times and then locked out for four hours before retrying.
BI-16	Hot Water Freezestat Local	0= Normal 1= Freezing	Read	Hot Water Coil	Manual Reset. Shuts the unit down.
BI-03	Indoor Coil Filter Status Local	0=Clean 1= Clogged	Read	All	Auto Reset. Notification when differential pressure switch closes (adj. range) for the filters in front of the indoor coil.
BI-04	Occupancy Input	0= Unocc. 1= Occu-pied	Read	All	Dry contact input for Occupancy Status. Wired to field wiring terminal strip OAUTS-7 & 8. To use MV-01, keep factory installed jumper in place.
BI-09	Outdoor Coil Water Safety Circuit Local	0=Open 1= Closed	Read	Water Source Heat Pump	Safety circuit for WSHP outdoor water coil. Includes flow switch and low temperature switches on each circuit.
BI-08	Phase Monitor Status Local	0= Normal 1= Tripped	Read	All	Operation status of the phase monitor. Notification when phase monitor is tripped.
BI-24[a]	Refrigerant Leak Detection System Input-Airstream	0=Alarm 1= Normal	Read	All DX units	Reads the state of the 454B refrigerant detection sensors input in the ducted airstream. Sensors are Normally Closed when POWERED and in NORMAL state. Sensors are all wired in series. Sensors stay in alarm for an additional 5 minutes after sensor alarm clears.
BI-25[a]	Refrigerant Leak Detection System Input-Control Cabinet	0=Alarm 1= Normal	Read	All DX units	Reads the state of the 454B refrigerant detection sensors input in the control cabinet. Sensors are Normally Closed when POWERED and in NORMAL state. Sensors are all wired in series. Sensors stay in alarm for an additional 5 minutes after sensor alarm clears.
BI-01	Supply Fan Status	0=Not Proven 1= Proven	Read	All	Status of the supply fan using a differential pressure switch.

[a] Applies to R-454B refrigerant units, V12.1 programming or later.

Table 37. BACnet points for binary outputs

BAC-net ID	Object Name	Values	Read/Write	When the Point is Used:	Description
BO-11	Compressor 1 Command	0=Off 1=On	Read	1+ Compressors	Enable for compressor 1.
BO-12	Compressor 2 Command	0=Off 1=On	Read	2+ Compressors	Enable for compressor 2.
BO-05	Compressor 3 Command	0=Off 1=On	Read	3+ Compressors	Enable for compressor 3.

Table 37. BACnet points for binary outputs (continued)

BAC-net ID	Object Name	Values	Read/Write	When the Point is Used:	Description
BO-06	Compressor 4 Command	0=Off 1=On	Read	4+ Compressors	Enable for compressor 4.
BO-19	Condenser Fan 4 Start Stop Command	0=Off 1=On	Read	40-80T OANG (OAN Rev 6) Cabinet	Enable for condenser fan 4.
BO-21	Condenser Fan 5 Start Stop Command	0=Off 1=On	Read	55-80T OANG (OAN Rev 6) Cabinet	Enable for condenser fan 5.
BO-14	Condenser Fan VFD Start Stop Command	0=Off 1=On	Read	Standard DX Cooling or Air Source Heat Pump	Enable for condenser fan(s).
BO-02	Damper Open Close Command	0=Closed 1=Open	Read	All	Enable for two position damper.
BO-15	Energy Recovery Wheel Start Stop Command	0=Off 1=On	Read	Energy Recovery Wheel	Enable for energy recovery wheel.
BO-09	Exhaust Damper Open Close Command	0=Off 1=On	Read	Isolation (Actuated) Dampers on Exhaust Fan	Output to open isolation dampers located on exhaust fan.
BO-10	Exhaust Fan Start Stop Command	0=Off 1=On	Read	Exhaust Fan(s)	Enable for exhaust fan.
BO-03	Heat 1 Command	0=Off 1=On	Read	Primary Heat (Any Type)	Enable for stage 1 of the primary heater.
BO-07	Heat 2 Command	0=Off 1=On	Read	Gas Heat and Split Manifold Burner	Enable for stage 2 heat.
BO-08	Heat 3 Command	0=Off 1=On	Read	Gas Heat and Three Stages of Heat	Enable for stage 3 heat.
BO-04	Inducer High Speed Command	0=Off 1=On	Read	Gas as Primary Heat	Output to switch stage 1 inducer fan from low to high speed.
BO-13	Pre-Heat Enable	0=Off 1=On	Read	Pre-Heat	Enable for electric pre-heat located in front of energy recovery wheel.
BO-16	Reversing Valve Command Circuit 1	0=Heating 1=Cooling	Read	Heat Pumps	Output used to switch between heat pump and cooling on circuit 1.
BO-17	Reversing Valve Command Circuit 2	0=Heating 1=Cooling	Read	Heat Pumps with Two Circuits	Output used to switch between heat pump and cooling on circuit 2.
BO-18	Split Exhaust-Return Damper Open Close Command	0=Closed 1=Open	Read	Split Exhaust and Return Air Paths	Output to open damper located between split exhaust and return air paths.
BO-01	Supply Fan Start Stop Command	0=Off 1= On	Read	All	Enable for supply fan.

Table 38. BACnet points for binary values (read/write)

BAC-net ID	Object Name	Min/Max	Read/Write	When Point is Used:	Description
BV-16	Alarm Reset	0=Normal 1=Reset	Write	All	Used to reset all manual reset diagnostics. Auto-reset diagnostics do not require an Alarm Reset.
BV-59	AUTO/STOP	0=AUTO 1=STOP	Write	All	Manual Release. Manual Stop for user interface to stop the unit operations.
BV-62	Compressor Cooling Allowed	0=Not Allowed 1=Allowed	Read	DX Equipment	Used on all cooling compressor operations in Cooling mode.
BV-61	Compressor Heating Allowed	0=Not Allowed 1=Allowed	Read	Heat Pumps	Used in heat pump operations for when the unit is in Heating mode.
BV-64	Compressor Low Ambient Lockout Active	0= Inactive 1= Active	Read	DX Cooling or Heat Pumps	Status indicating that the unit is calling for cooling but the compressors are locked out due to low ambient temperature.
BV-39	Condenser Fan Pre-Start	0=Off 1=On	Read	All Standard DX Cooling and Air Source Heat Pumps	Enables condenser fan motors prior to call for compressors to reduce occurrence of head pressure drops on initial start.
BV-09	Economizer Mode	0=Not Econ. 1=Econ.	Read	Economizer Decision Method (MV-16) Not Set to Disabled (5)	Operation status of the economizer functions.
BV-41	Energy Recovery Frost Avoidance Status	0=Normal 1=Active	Read	Energy Recovery Wheel	Status indicating when actively bypassing or slowing down energy recovery wheel to prevent frost accumulation during low outdoor air temperatures.
BV-44	Free Cooling Mode	0=Off 1=On	Read	Economizer Decision Method (MV-16) Not Set to Disabled (5)	Status for free cooling mode, using outdoor air temperature to maintain setpoint.
BV-04	Heat Pump Defrost Mode	0=Off 1=On	Read	Heat Pumps	Defrost status for outdoor coil.
BV-05	Hot Gas Reheat Purge Mode	0=Off 1=On	Read	Hot Gas Reheat	Bumps the Circuit 1 Digital Scroll signal to 100% and cycles HGRH valve for oil return.
BV-23	Interlock	0=Off 1=On	Read	All	Occurs when primary heater or compressors are on to lock supply fan on.
BV-32	Oil Boost Cycle Circuit 1	0=Of1=On	Read	All Digital Scroll or Variable Speed Compressors on 1st Circuit	Bumps the Circuit 1 Digital Scroll signal to 100% for oil return.

Table 38. BACnet points for binary values (read/write) (continued)

BAC-net ID	Object Name	Min/Max	Read/Write	When Point is Used:	Description
BV-68	Refrigerant Leak Mitigation Active	0=Inactive 1=Alarm	Read	DX Cooling or Heat Pumps	Goes true when refrigerant is detected in either Ducted Airstream OR Control Cabinet and mitigation is currently taking effect. See Horizon™ Outdoor Air Unit Installation, Operation and Maintenance manual (OAU-SVX008*-EN) for complete mitigation sequence. Can be passed to BAS system.
BV-12	Safety Check	0=Failed 1=Passed	Read	All	Check for safe operating conditions before allowing the unit to enable other functions.
BV-30	System Lockout - Auto Reset	0=Normal 1=Lockout	Read	All	Generic diagnostic accompanying diagnostics that auto reset.
BV-17	System Lockout - Manual Reset	0=Normal 1=Lockout	Read	All	Generic diagnostic accompanying diagnostics that require manual reset.
BV-43	Ventilation Mode	0=Disabled 1=Enabled	Read	All	Status for ventilation mode, locking out heating and cooling.

Table 39. BACnet points for multi-state values

BAC-net ID	Object Name	Read/Write	When Point is Used:	States	
MV-22	Cabinet Size	Read	All	1 = OAB 2 = OAD 3 = OAG	4 = OAK 5 = OAN Rev 5 6 = OAN Rev 6
MV-14	Circuit 1 Status	Read	w/ Circuit 1	1 = Off 2 = Partial Capacity	3 = Full Capacity
MV-15	Circuit 2 Status	Read	w/ Circuit 2	1 = Off 2 = Partial Capacity	3 = Full Capacity
MV-19	Compressor 1 Status Active	Read	1+ Compr	1 = Not Installed 2 = Manual Lockout 3 = Disabled 4 = Disabled, Min Off	5 = Disabled, Proving Fault 6 = Enabled, Not Proven 7 = Enabled, Min On 8 = Enabled
MV-20	Compressor 2 Status Active	Read	2+ Compr	Refer to MV-19, Compressor 1 Status Active	
MV-21	Compressor 3 Status Active	Read	3+ Compr	Refer to MV-19, Compressor 1 Status Active	
MV-23	Compressor 4 Status Active	Read	4+ Compr	Refer to MV-19, Compressor 1 Status Active	

Table 39. BACnet points for multi-state values (continued)

BAC-net ID	Object Name	Read/Write	When Point is Used:	States	
MV-36	Compressor Arrangement Circuit 1	Read	All	1 = None 2 = Single Fixed 3 = Single Digital 4 = Single Variable	5 = Reserved for Future Use 6 = Tandem Fixed Speed 7 = Tandem Digital 8 = Tandem Variable
MV-37	Compressor Arrangement Circuit 2	Read	All	Refer to MV-36, Compressor Arrangement Circuit 1	
MV-33	Compressor Count	Read	All w/ Cooling	5=0. Otherwise, equal to compressor quantity.	
MV-39	Compressor Sequencing	Read	All w/ Cooling	1 = 1-2-3-4	2 = 1-3-2-4
MV-27	Control Package	Read	All	1 = Standard	2 = Critical (Lab)
MV-47	Damper Configuration	Read	All: Damper Configuration of Unit	1=OA/RA Modulating 2=OA/RA 2-Position 3=OA Modulating/No Return	4=OA 2-Position/No Return 5=RA 2-Position/No OA 6=100% RA (no damper)/No OA
MV-05	Discharge Setpoint Source Active	Read	All	1 = Discharge Air Cooling Setpoint 2 = Discharge Air Heating Setpoint	3 = Discharge Air Temp Setpoint BAS 4 = Reset for Space Comfort Control
MV-16	Economizer Decision Method	Read	Modulating Dampers	1 = Absolute Temperature 2 = Comparative Temperature 3 = Absolute Enthalpy	4 = Comparative Enthalpy 5 = Disabled
MV-26	Energy Wheel Status Active	Read	Energy Recovery Wheel	1 = Not installed 2 = Manually Disabled 3 = Disabled 4 = Part Capacity	5 = Full Capacity 6 = Frost Avoidance 7 = Econ Stop Jog 8 = Rotation Fault
MV-28	Entering Air Conditions Status Active	Read	All	1 = 100% Outdoor Air (No ERV) 2 = Mixed Air or ERV Conditioned Air	3 = 100% Return Air
MV-08	Equipment Type	Read	All	1 = Standard DX 2 = ASHP 3 = WSHP	4 = No Cooling 5 = Chilled Water
MV-17	Exhaust Fan Control Source Active	Read	Powered Exhaust	Refer to MV-11, Exhaust Fan Control Type	
MV-11	Exhaust Fan Control Type	Read	Powered Exhaust	1 = Space Static Pressure 2 = Return Duct Static 3 = Constant Volume	4 = Constant Speed 5 = Exhaust Fan Tracking Offset 6 = Not Installed
MV-12	Exhaust Fan Wheel Size	Read	Powered Exhaust	Factory set exhaust fan wheel size.	

Table 39. BACnet points for multi-state values (continued)

BAC-net ID	Object Name	Read/Write	When Point is Used:	States	
MV-03	Heat Cool Mode Request	Write	All	1 = Auto 2 = Heat 3 = Morning Warm-up 4 = Cool 6 = Pre-Cool 7 = Off 10 = Fan Only	11 = Free Cool 14 = Economizer 15 = Dehumidify 17 = Unocc Cool 18 = Unocc Heat 19 = Unocc Dehum
MV-04	Heat Cool Mode Status	Read	All	1 = Auto 2 = Heat 3 = Morning Warm-up 4 = Cool 6 = Pre-Cool 7 = Off 10 = Fan Only	11 = Free Cool 14 = Economizer 15 = Dehumidify 17 = Unocc Cool 18 = Unocc Heat 19 = Unocc Dehum
MV-40	Heat Pump Availability Status Active	Read	Heat Pumps	1 = Not Installed/ Available 2 = Heat Pump Only 3 = Lockout - Pre Heat Fallback	4 = Ambient Lockout 5 = Simultaneous Operation 6 = Max Defrost Attempts
MV-41	Heat Pump Defrost Mode Status	Read	Heat Pumps	1 = Not ASHP 2 = Disabled 3 = Demand Defrost	4 = Defrost Fault 5 = Oil Boost 6 = Low Suction
MV-09	Heat Type	Read	Heat Installed	1 = No Heat 2 = Indirect Fire Gas Heat 3 = Electric Heat 4 = Other	5 = Direct Fire Gas Heat 6 = Hot Water/ Steam 7 = Simultaneous Heat Pump
MV-01	Occupancy Request	Write	All	1 = Occupied 2 = Unoccupied 3 = Occupied Bypass	4 = Occupied Standby 5 = Auto
MV-02	Occupancy Status Active	Read	All	1 = Occupied 2 = Unoccupied 3 = Occupied Bypass	4 = Occupied Standby 5 = Unknown

Table 39. BACnet points for multi-state values (continued)

BAC-net ID	Object Name	Read/Write	When Point is Used:	States	
MV-44	Operating Mode Status Active	Read	All	1 = Lockout - Manual Reset 2 = Lockout - Auto Reset 3 = Auto Stop 4 = BAS Control 5 = Unocc Dormant (Off) 6 = Unocc Cooling 7 = Unocc Heating 8 = Unocc Dehum 9 = Morning Cooldown	10 = Morning Warmup 11 = Fan Only 12 = Free Cooling 13 = Economized Cooling 14 = Cooling 15 = Economized Dehum 16 = Dehumidification 17 = Heating
MV-32	Outdoor Damper Control Source Active	Read	All	1 = Closed 2 = Econ split exhaust/ return 3 = Econ Free Cooling 4 = Econ Min Damper Setpoint 5 = Econ Max Damper Setpoint	6= Outdoor Air Flow Setpoint 7= Demand Control Ventilation Setpoint 8= Open (2-position) 9= Not installed
MV-31	Outdoor Dehumidification Control Type	Read	All	1 = Disabled 2 = Outdoor Air Dewpoint Enable Setpoint	
MV-13	Program Control Type	Read	All	1 = Space Control 2 = Discharge Control	3 = Single Zone VAV 4 = Multi Zone VAV
MV-46	Refrigerant Type	Read	All	0=Not Used 7=410A 17=454B	
MV-38	Reheat Sources Active	Read	HGRH or Hot Water; Electric by ETO only	1 = None 2 = HGRH 3 = HGRH & Hot Water	4 = HGRH & Electric 5 = Hot Water 6 = Electric
MV-29	Return Dehumidification Control Type	Read	ETO or Field Enabled	1 = Disabled 2 = Return Dewpoint Dehum Enable Setpoint 3 = Return Humidity Dehum Enable Setpoint	
MV-43	Space Control Room Size	Read	Space Control	1 = Small 2 = Medium 3 = Large	
MV-30	Space Dehumidification Control Type	Read	Program Control Type: Space Control or Single Zone VAV	1 = Disabled 2 = Calculated Space Dewpoint Setpoint	3 = Space Dehumidification Setpoint

Table 39. BACnet points for multi-state values (continued)

BAC-net ID	Object Name	Read/Write	When Point is Used:	States	
MV-07	Space Temp Setpoint Source Active	Read	Program Control Type: Space Control or Single Zone VAV	1 = Occupied Heating Setpoint 2 = Occupied Cooling Setpoint 3 = Thumbwheel (Temp Setpoint Local)	4 = Space Temperature Setpoint BAS 5 = Not Used
MV-24	Supply Fan Control Source Active	Read	All	1 = Supply Air Flow Setpoint 2 = Supply Fan Speed Setpoint 3 = Duct Static Pressure Setpoint 4 = Space Temp (SZVAV)	5 = Space Static Pressure Setpoint 6 = Unoccupied Full Flow 7 = Unoccupied Dormant 8 = System Lockout
MV-25	Supply Fan Control Type	Read	All	1 = Constant Volume (cfm) 2 = Constant Speed 3 = Duct Static Pressure	4 = Single Zone VAV 5 = Space Static Pressure
MV-10	Supply Fan Wheel Size	Read	All	Factory set supply fan size.	
MV-06	Unoccupied Control Request	Write	w/ Space Conditions: Factory enables on Space or Single Zone VAV; Field enabled requires space sensor	1 = Disabled 2 = Cool & Heat 3 = Cool, Heat, & Dehum	
MV-45	Unoccupied Mode Status Active	Read	All	1 = Occupied 2 = Unocc Stand-by 3 = Unocc Cooling Mode 4 = Unocc Dehumid Mode	5 = Unocc Heating Mode 6 = Morning Warm-Up 7 = Pre-Cool

Appendix

Using the BACnet Setup Tool

Connection

To connect to the UC600:

1. Connect the universal serial bus (USB-A to USA-B) cable between the laptop and the UC600 or to an equipment control panel USB port that is connected to the controller.
2. Click either the BACnet®Setup Tool desktop icon or from the Start menu navigate to All Programs/ Trane/Tracer® BACnet Setup Tool and select BACnet Setup Tool. The setup tool splash screen displays briefly, followed by the Connect dialog box.
3. Select Direct Connection (USB cable), if it is not already selected.
4. Click **Connect** and the Unit Summary page displays after successful connection.

Configuration

From the Unit Summary page:

1. Enter a meaningful name for the controller.
2. Expand **Controller Units** to display its contents.
3. Select the preferred units of measure for data communicated across the BACnet® link.
4. Click **Protocol** to display its contents.
5. Select the preferred **Baud Rate** in the drop-down list.
6. If the software Device ID is required, check **Use Software Device ID** and enter a BACnet Device ID.
7. Click **Save**.
8. Cycle power to the device to have the new values take effect.

Identifying K-Factor for Supply and Exhaust Fans

Use the table below to identify the appropriate K-Factor for airflow measuring based on wheel size.

Table 40. Supply-exhaust fan K factor

Supply/Exhaust Fan Wheel Size	Fan K-Factor
10"	766.4
12"	1211.2
14"	1606.9
16"	2074.6
18"	2302.5
18" x 2	4605
20"	3106
20" x 2	6212
22"	3945.4
22" x 2	7890.8
25"	4952.8
25" x 2	9905.6
355	1221.8
355 x 2	2443.6

Table 40. Supply-exhaust fan K factor (continued)

Supply/Exhaust Fan Wheel Size	Fan K-Factor
450	1736.9
450 x 2	3473.7

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