



Integration Guide

# Symbio® 210 Programmable Controller

For Variable-Air-Volume (VAV) Boxes

## 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.



# Introduction

## 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.

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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.

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## 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-including industry replacements for CFCs and HCFCs such as saturated or unsaturated HFCs and HCFCs.

## 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 electrical codes. Failure to follow code could result in death or serious injury.**

**⚠ 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 Labeling 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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## Overview

The Symbio® 210 is a programmable controller. Programming is done through the Tracer Graphical Programming software or through configuration with Tracer TU. The Symbio 210 controller is primarily designed for VAV box control.

The intent of this guide is to provide BACnet integration information when the controller ships with factory downloaded programs or is programmed using the VAV equipment configuration in Tracer TU. In addition, this controller can be configured from the factory for the following application programs: Space Temperature Control (STC), Ventilation Flow Control (VFC), and Flow Tracking Control (FTC). For more details on these applications, refer to the *Symbio® 210 Programmable VAV Box Controller Installation, Operation, and Maintenance Manual* (BAS-SVX084\*-EN).

This guide provides the following:

- A brief overview of the BACnet protocol
- An explanation of the Symbio 210 device rotary switches
- Connecting to Tracer TU and configuring controller settings
- Data point configuration property definitions
- Tables listing object data points
- Additional resources

**Note:** *Users of this guide should have basic knowledge of the BACnet protocol. For more detailed information about this protocol, visit the organization's web site at, [www.bacnetinternational.org](http://www.bacnetinternational.org). In addition, there are other helpful documents to reference when using this integration guide listed in "Additional Resources," p. 25.*

## BACnet Protocol

The Building Automation and Control Network (BACnet) protocol is a standard that allows building automation systems or components from different manufacturers to share information and control functions. BACnet provides building owners the capability to connect various types of building control systems or subsystems together for many uses. In addition, multiple vendors can use this protocol to share information for monitoring and supervisory control between systems and devices in a multi-vendor interconnected system.

The BACnet protocol identifies standard objects (data points) called BACnet objects. Each object has a defined list of properties that provide information about that object. BACnet also defines a number of standard application services that are used to access data and manipulate these objects and provides a client/server communication between devices. For more information on BACnet protocol, refer to "[Additional Resources](#)," p. 25.

### BACnet Testing Laboratory (BTL) Certification

Symbio 210 supports the BACnet communication protocol and has been designed to meet the requirements of the Building Controller (BC) profile. For more details, refer to the BTL web site at [www.bacnetassociation.org](http://www.bacnetassociation.org).

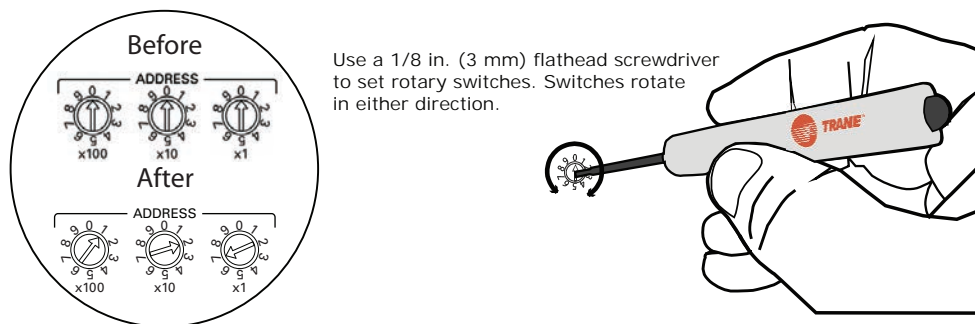
# Rotary Switches

This section provides information about Symbio 210 rotary switches. For troubleshooting, refer to the *Symbio® 210 Programmable Variable-Air-Volume (VAV) Box Controller Installation, Operation, and Maintenance Manual (BAS-SVX084\*-EN)*.

There are three rotary switches on the front of the controllers that are used to define a three-digit address when they are installed on a BACnet communications network. The three-digit address setting is used as both the BACnet MAC address and the BACnet device ID.

**Note:** All devices are MSTP masters with valid MAC addresses of 001 to 127 for BACnet.

**Figure 1. Setting rotary switches**



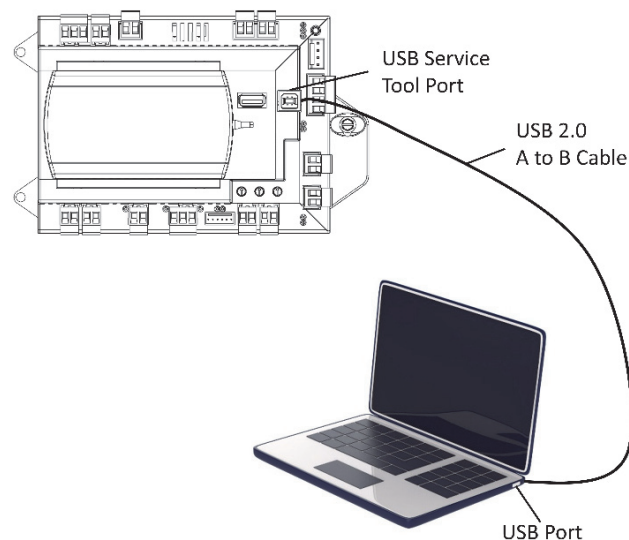
**Important:** Each controller on the BACnet/MSTP link must have a unique rotary switch setting. Otherwise, communication problems will occur.

# Using Symbio UI to Configure Settings

Symbio UI is a built-in web-based user interface that is used for basic setup and configuration of the Symbio 210. This interface replaces the need to use the BACnet Setup Tool to configure BACnet protocol settings and allows users to select BAS or local for the source on many sensors and setpoints on the equipment.

## Connecting to Symbio UI

1. Connect a laptop to the USB service tool port using a USB 2.0 A to B cable. Symbio UI can only be accessed over USB connection.
2. Open a web browser and connect to <http://198.80.18.1> to access Symbio UI.



## Configuring BAS Control Selection

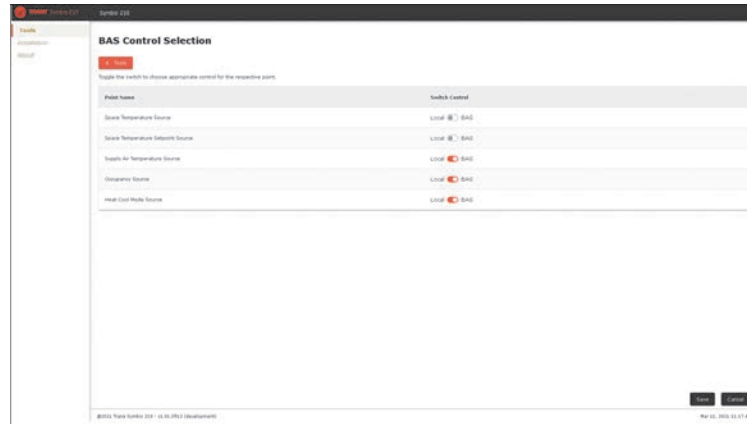
Symbio UI allows users to select which sensors and setpoints use values communicated over the Building Automation System (BAS) vs using the local sensor. This can be selected for a varying number of sensors and setpoints depending on how the equipment is configured.

### WARNING

1. With Symbio UI open in a web browser navigate to the **Tools** menu on the left-hand navigation.
2. In the **Tools** menu select **BAS Control Selection** to open the selection tool.
3. In the **BAS Control Selection** tool use the toggle to select from BAS or Local as the source of information for the selected sensor or setpoint.
4. Select **Save** button in bottom right to save changes.

## Using Symbio UI to Configure Settings

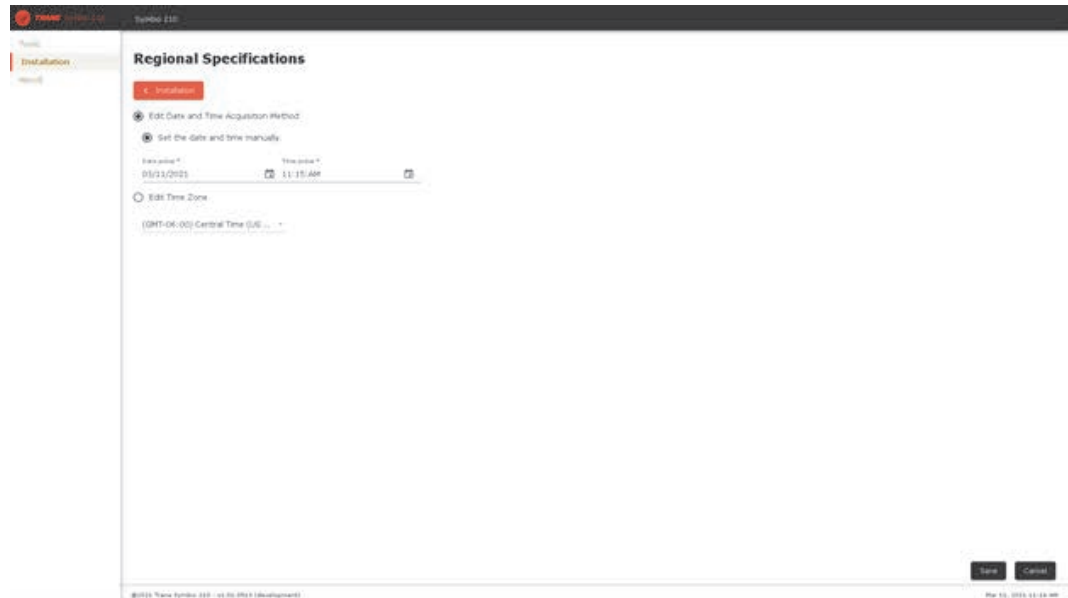
Figure 2. BAS Control Selection



## Configuring Regional Specifications

Symbio UI allows users to set the date, time and time zone. IP based controllers will also have the ability to configure NTP server for time synchronization.

1. In Symbio UI, navigate to the **Installation** menu on the left-hand navigation.
2. Select **Regional Specifications**.
3. Select **Edit** to change the settings.
4. Fill in the date, time and time zone for the controller.
5. Select **Save** button in bottom right to save changes.



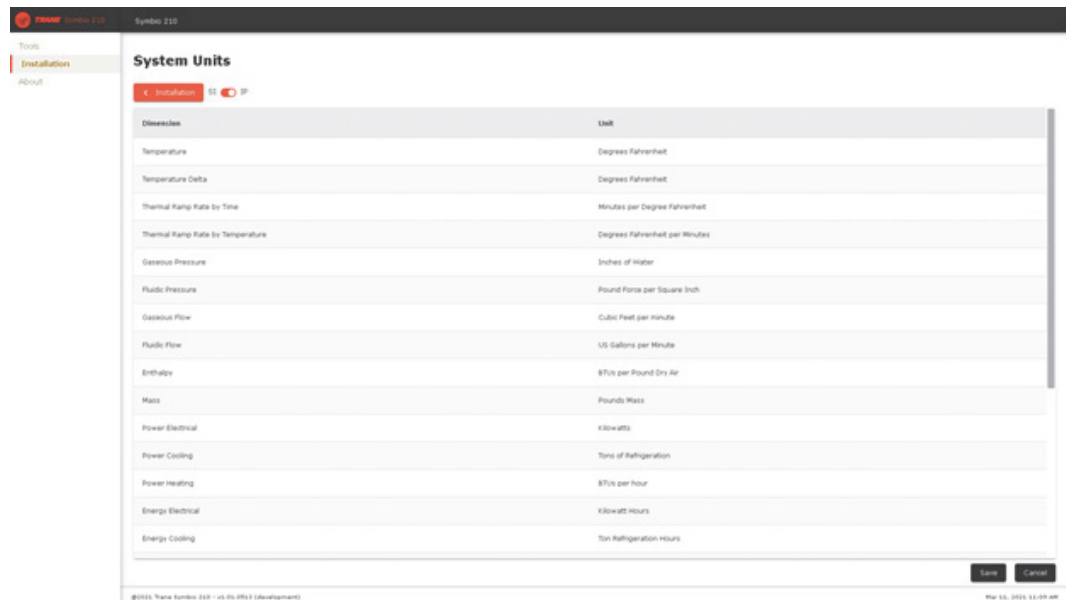


### Configuring System Units

Symbio UI allows users to set the desired System Units of the controller. This will change the unit communicated over BACnet. Making changes to System Units will restart the controller and equipment will be inoperable for a brief period of time.

1. With Symbio UI open in a web browser, navigate to the **Installation** menu on the left-hand navigation.
2. In the **Installation** menu, select **System Units**.
3. In the **System Units** window, use the toggle at the top of the page to switch between Inch-Pound (IP) and System International (SI) units.
4. Select **Save** button in bottom right to save changes. Saving changes will restart the controller and equipment will be inoperable for a brief period of time.

**Note:** It may not be possible to change the System Units because TGP2 programs exist that could not be converted. Tracer TU must be used to rectify this issue.



### Configuring Identification and Communications

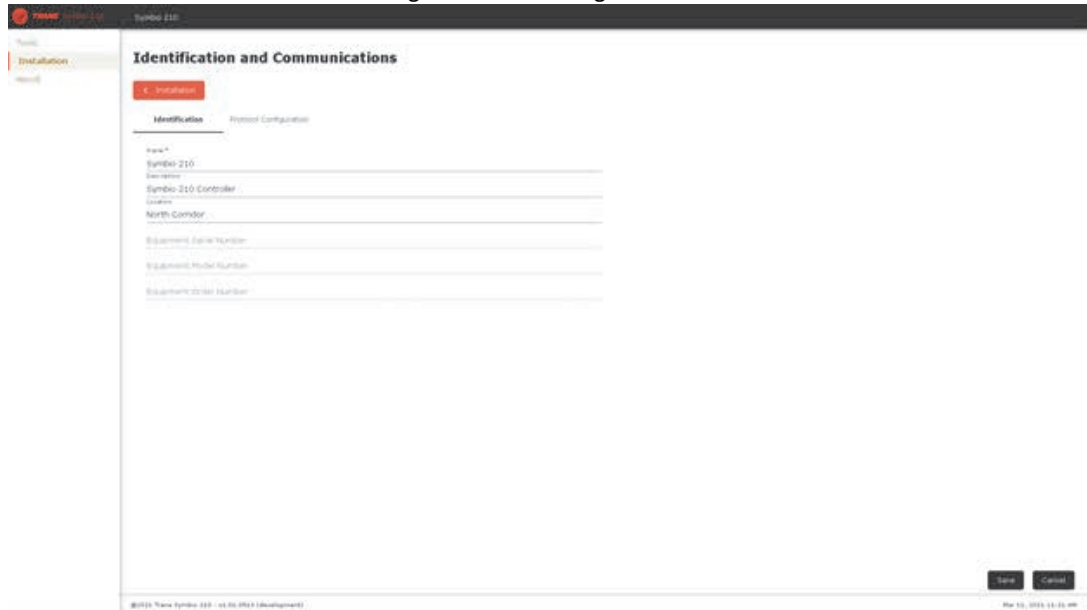
Symbio UI allows users to set the Name, Description, and Location of the controller as well as the communication protocol and associated settings.

#### Identification Settings:

1. With Symbio UI open in a web browser, navigate to the **Installation** menu on the left-hand navigation.
2. In the **Installation** menu, select **Identification and Communications**.
3. In the **Identification and Communications** window, select the **Identification** tab.
4. Use the **Edit** button at the top of the page to change the Name, Description, and Location fields.

## Using Symbio UI to Configure Settings

5. Select **Save** button in bottom right to save changes.



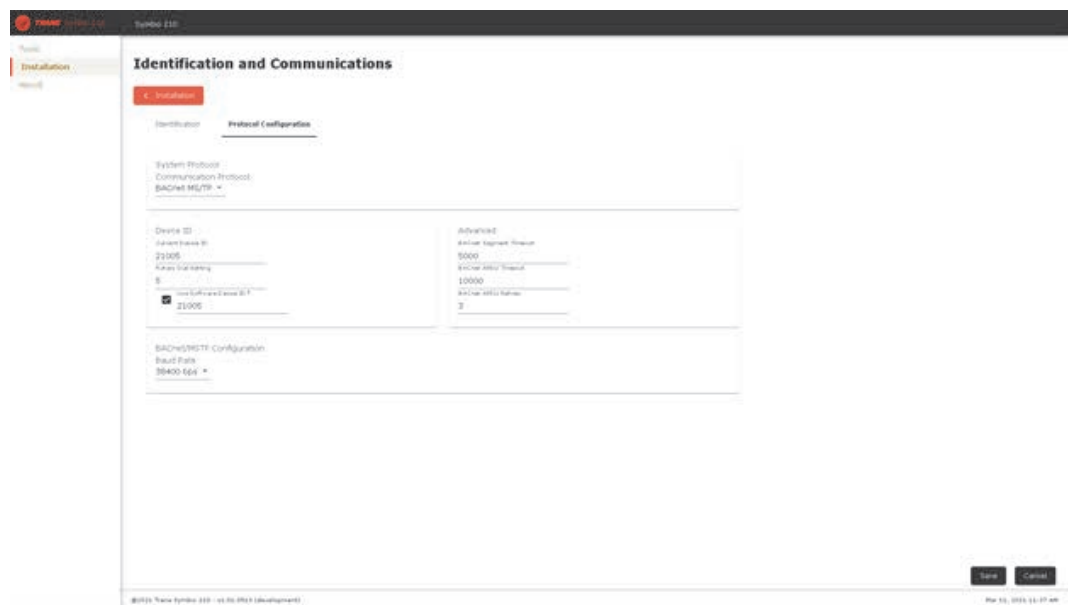
The screenshot shows the Symbio UI interface for configuring a Symbio 210. The left-hand navigation menu has 'Installation' selected. The main window title is 'Identification and Communications'. There are two tabs: 'Identification' (active) and 'Protocol Configuration'. The 'Identification' tab contains several input fields for identifying the device:

- Area\*
- Symbio 210
- Equipment
- Symbio 210 Controller
- Location
- North Corridor
- Equipment Serial Number
- Equipment Model Number
- Equipment Order Number

At the bottom right of the window, there are 'Save' and 'Cancel' buttons. The footer shows '©2023 Trane Symbio 210 - 01.00.000 (development)' and 'Mar 10, 2023, 11:25 AM'.

### Protocol Settings:

1. With Symbio UI open in a web browser, navigate to the **Installation** menu on the left-hand navigation.
2. In the **Installation** menu, select **Identification and Communications**.
3. In the **Identification and Communications** window, select the **Protocol Configuration** tab.
4. Use the **Edit** button at the top of the page to change Protocol Settings.
5. Click **Save** in bottom right to save changes. Saving changes will restart the controller and equipment will be inoperable for a brief period of time.



The screenshot shows the Symbio UI interface for configuring a Symbio 210, specifically the 'Protocol Configuration' tab. The left-hand navigation menu has 'Installation' selected. The main window title is 'Identification and Communications'. There are two tabs: 'Identification' and 'Protocol Configuration' (active). The 'Protocol Configuration' tab contains several input fields for configuring the system:

- System Protocol: Communication Protocol, BACnet MS/TP
- Device ID:
 

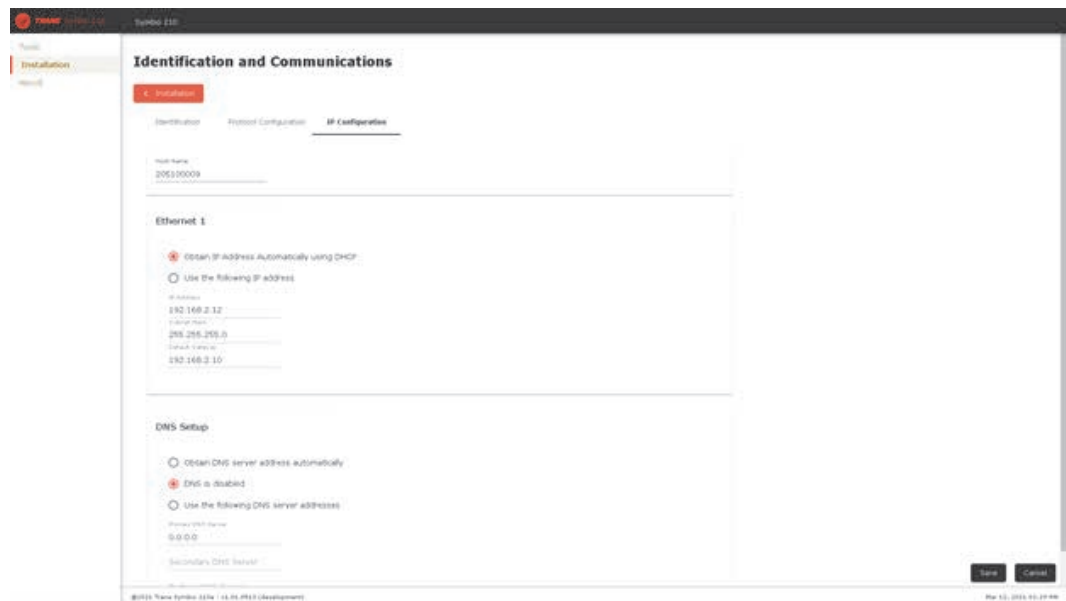
Address Range ID	21000	Advanced	Address Segment Address	0000
Frame Scheduling	5	Device ID	0000	10000
Use Software Device ID	<input checked="" type="checkbox"/>	Address Range	0000	3
- BACnet/MS/TP Configuration:
 

Baud Rate	38400 56k
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At the bottom right of the window, there are 'Save' and 'Cancel' buttons. The footer shows '©2023 Trane Symbio 210 - 01.00.000 (development)' and 'Mar 10, 2023, 11:27 AM'.

### IP Settings:

1. With Symbio UI open in a web browser, navigate to the **Installation** menu on the left-hand navigation.
2. In the **Installation** menu, select **Identification and Communications**.
3. In the **Identification and Communications** window, select the **IP Configuration** tab.
4. Use the **Edit** button at the top of the page to change Protocol Settings.
5. Click **Save** in bottom right to save changes. Saving changes will restart the controller and equipment will be inoperable for a brief period of time.



## Object and Diagnostic Data Points

For quick reference, the following tables are listed and sorted two different ways. [Table 1](#) through [Table 8](#) are listed by input/output type and sorted by object type. For easy reference, [Table 9, p. 18](#) lists all object types provided in the tables 3 through 10 and is sorted by object name. In addition, this table provides specific configurations that apply to each point shown under the last five columns. Refer to the footnote at the end of this table for information related to the entries in these columns.

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

**Table 1. Analog inputs**

Object Type	Object Name	Units of Measure	Minimum Maximum	Description
AI1	Space Temperature Local	Temperature (°F or °C)	15°C (59°F) 50°C (122°F)	Temperature sensor in the space.
AI2	Space Temperature Setpoint Local	Temperature (°F or °C)	10°C (50°F) 29.4°C (84.92°F)	Zone sensor thumbwheel.



## Object and Diagnostic Data Points

**Table 1. Analog inputs (continued)**

Object Type	Object Name	Units of Measure	Minimum Maximum	Description
AI3	Pressure 1	Gaseous Pressure (in H <sub>2</sub> O, in Hg, mm H <sub>2</sub> O, mm Hg, Pa, kPa)	0 pascals 498 pascals	<ul style="list-style-type: none"> <li>Pressure across the flow ring.</li> <li>120% flow indicates 2 in H<sub>2</sub>O (498 pascals) across flow ring.</li> </ul>
AI4	Discharge Air Temperature	Temperature (°F or °C)	-40°C (-40°F) 100°C (212°F)	Discharge air temperature sensor wire to the controller.
AI5	Supply Air Temperature Local	Temperature (°F or °C)	-40°C (-40°F) 100°C (212°F)	Supply air temperature sensor wired to the controller.
AI6	Actual Air Valve Position	Percentage (%)		Valve position on % open.
AI7	Actual Reheat Position	Percentage (%)		Reheat valve position in % open.
AI8	Space CO <sub>2</sub> Concentration Local	Parts-per-million	0 ppm 5,000 ppm	Space CO <sub>2</sub> concentration in ppm.
AI9	Air Valve 1 Stroke Time	None	60,000 milliseconds 570,000 milliseconds	Air valve stroke time in milliseconds (100-millisecond resolution).
AI10	Minimum Actuator Time	None	100 milliseconds 1,000 milliseconds	<ul style="list-style-type: none"> <li>Air valve minimum actuator time 100-millisecond increments.</li> <li>Minimum 500 milliseconds.</li> </ul>
AI11	Water Valve Maximum Stroke Time	None	60 milliseconds 240 milliseconds	This is used for remote or local modulating water heat valve. In milliseconds.
AI12	Water Valve Minimum Actuator Time	None	100 milliseconds 1,000 milliseconds	Water valve minimum actuator time 100-millisecond increments.

**Table 2. Analog output**

Object Type	Object Name	Units of Measure	Minimum Maximum	Description
AO1	Air Valve Drive Command	Percentage (%)		Value of AO is the requested % open. <b>Note:</b> Refer to Actual Air Valve Position.
AO2	Supply Fan Speed	Percentage (%)		Supply fan in percent. For single-speed fans (0% = OFF, 100% = ON).
AO3	Heating Valve Command	Percentage (%)		Modulating reheat valve. This is the requested position in percent. <b>Note:</b> Refer to Heating Capacity Secondary for actual water valve position.

## Object and Diagnostic Data Points

**Table 3. Analog value**

Object Type	Object Name	Units of Measure	Minimum Maximum	Description
AV2	Air Flow Minimum Setpoint Active	Gaseous Pressure (in H <sub>2</sub> O, in Hg, mm H <sub>2</sub> O, mm Hg, Pa, kPa)		Air Flow Minimum Setpoint Active.
AV8	Air Flow Nominal Status	Gaseous Pressure (in H <sub>2</sub> O, in Hg, mm H <sub>2</sub> O, mm Hg, Pa, kPa)	0 L/s 10,000 L/s	Nominal airflow set by configurator based on the unit size selected.
AV9	Reheat Enable Point	Temperature (°F or °C)	10°C (50°F) 100°C (212°F)	Reheat Enable Point.
AV10	Auto Changeover Point	Temperature (°F or °C)	10°C (50°F) 100°C (212°F)	Auto Changeover Point.
AV12	Heat Output Secondary Status	Percentage (%)		Percent output value (not the same as capacity in all cases). <ul style="list-style-type: none"> <li>For modulating this is the valve position.</li> <li>For PWM, this is the capacity.</li> <li>For Staged, are the discrete values for each stage (for example, 2 stage is 0%, 50%, 100% or 3 stage is 0%, 33%, 66%, 100%).</li> </ul>
AV13	Air Flow Setpoint Active	Gaseous Flow (cfm, L/s, L/min, m <sup>3</sup> /s, m <sup>3</sup> /min, m <sup>3</sup> /hr)		Air Flow Setpoint Active.
AV14	Space Temperature BAS	Temperature (°F or °C)	-15°C (5°F) 50°C (122°F)	Space temperature communicated from BAS. If used, the Tracer SC will write to this point once every 15 minutes, but <b>ONLY</b> if this point is put into Service. If the point is in service, but not written to every 15 minutes the controller will put the point into fault status. Factory default is <i>Out of Service</i> . To use this point, put <i>Into Service</i> .
AV15	Air Flow Override Percent	None	0% 100%	Air Flow Override Percent.
AV16	Discharge Air Temperature Setpoint BAS	Temperature (°F or °C)	-7.22°C (19.00°F) 21.11°C (69.99°F)	<ul style="list-style-type: none"> <li><b>Only</b> for VFC configuration.</li> <li>Discharge air temp setpoint communicated from BAS.</li> <li>Factory default is <i>Out of Service</i>. To use this point, put <i>Into Service</i>.</li> </ul>
AV18	Air Flow Gain	None	0.000 2.000	Default setting is 1.0 and can be edited based on the results of an air balancing test.
AV19	Air Flow Measurement Offset	Percentage (%)	-50.000% 50.000%	Set when air balancing.
AV20	Discharge Air Flow	Gaseous Flow (cfm, L/s, L/min, m <sup>3</sup> /s, m <sup>3</sup> /min, m <sup>3</sup> /hr)		Pressure sensor 1 value converted to flow.
AV21	Outdoor Air Low Limit	Temperature (°F or °C)	-6.66°C (20.12°F) 7.22°C (44.99°F)	VFC freeze protection.
AV22	Space CO <sub>2</sub> Concentration BAS	Parts-per-million	0 ppm 5,000 ppm	Space CO <sub>2</sub> concentration communicated from the BAS in ppm. If used, the system will write to this point once every 15 minutes. Otherwise, the controller will put the point into fault status. Factory default is <i>Out of Service</i> . To use this point, put <i>Into Service</i> .
AV23	Unoccupied Cooling Setpoint	Temperature (°F or °C)	4.44°C (20.12°F) 46.11°C (114.99°F)	Unoccupied Cooling Setpoint.
AV24	Unoccupied Heating Setpoint	Temperature (°F or °C)	4.44°C (20.12°F) 46.11°C (114.99°F)	Unoccupied Heating Setpoint.
AV25	Air Flow Setpoint BAS	Gaseous Flow (cfm, L/s, L/min, m <sup>3</sup> /s, m <sup>3</sup> /min, m <sup>3</sup> /hr)	0 L/s 65,534 L/s	Communicated airflow setpoint used for flow tracking units.
AV26	Air Flow Offset	Gaseous Flow (cfm, L/s, L/min, m <sup>3</sup> /s, m <sup>3</sup> /min, m <sup>3</sup> /hr)	-10,000 L/s 10,000 L/s	Flow set point of Flow Tracking box relative to supply air VAV box.
AV27	Space Temperature Setpoint BAS	Temperature (°F or °C)	-10°C (14°F) 35°C (95°F)	Communicated setpoint. Factory default is <i>Out of Service</i> . To use this point, put <i>Into Service</i> . If used with a Tracer SC, the SC will place the point <i>In Service</i> during installation.
AV28	Space Temperature Setpoint Active	Temperature (°F or °C)	-5.6°C (21.92°F) 56.1°C (132.98°F)	Space temperature setpoint being used by algorithm.

## Object and Diagnostic Data Points

**Table 3. Analog value (continued)**

Object Type	Object Name	Units of Measure	Minimum Maximum	Description
AV29	Supply Air Temperature BAS	Temperature (°F or °C)	0°C (32°F) 100°C (212°F)	Supply air temperature communicated from BAS. Factory default is <i>Out of Service</i> . To use this point, put <i>Into Service</i> . If used with a Tracer SC, the SC will place the point <i>In Service</i> during installation.
AV30	Occupied Offset	Temperature Delta (°F or °C)	4.44°C (20.12°F) 46.11°C (114.99°F)	Setpoint offset used during occupied mode.
AV31	Air Flow Setpoint Minimum Local Heat	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)	0 L/s 10,000 L/s	Reheat minimum used when local heat is <b>On</b> .
AV33	Occupied Bypass Time	None	0 minutes 240 minutes	The number of minutes the unit will stay in occupied bypass after initiated by time override button.
AV34	Standby Offset	Temperature Delta (°F or °C)	4.44°C (20.12°F) 46.11°C (114.99°F)	Setpoint offset used during occupied standby mode.
AV35	Ventilation Setpoint Active	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)		Ventilation Setpoint Active.
AV36	Ventilation Ratio	Percentage (%)		0%–100%. Percentage indicates the required ratio or outdoor air-to-primary air needed to meet zone ventilation requirements.
AV37	Space Temp Setpoint Default	Temperature (°F or °C)	4.44°C (20.12°F) 46.11°C (114.99°F)	Default space temperature setpoint stored in the controller and set by service tool.
AV38	Ventilation Setpoint Local	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)	0 L/s 10,000 L/s	Ventilation Setpoint Local.
AV39	Discharge Air Temp Setpoint Local	Temperature (°F or °C)	-7.22°C (19.00°F) 21.11°C 69.99°F)	<ul style="list-style-type: none"> <li>• <b>Only</b> for VFC configuration.</li> <li>• Discharge air temp setpoint from wired sensor.</li> </ul>
AV40	Space CO2 Limit	Parts-per-million	0 ppm 2,000 ppm	Point where CO <sub>2</sub> demand ventilation ends in ppm.
AV41	Space CO2 Low Limit	Parts-per-million	0 ppm 2,000 ppm	Point where CO <sub>2</sub> demand ventilation begins in ppm.
AV42	Air Flow Setpoint Minimum	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)	0 L/s 10,000 L/s	Air Flow Setpoint Minimum.
AV43	Air Flow Setpoint Minimum Standby	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)	0 L/s 10,000 L/s	Air Flow Setpoint Minimum Standby.
AV44	Air Flow Setpoint Minimum Standby Heat	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)	0 L/s 10,000 L/s	Air Flow Setpoint Minimum Standby Heat.
AV45	Air Flow Setpoint Minimum Heat	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)	0 L/s 10,000 L/s	Air Flow Setpoint Minimum Heat.
AV46	Air Flow Setpoint Maximum Heat	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)	0 L/s 10,000 L/s	Air Flow Setpoint Maximum Heat.
AV47	Air Flow Setpoint Maximum	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)	0 L/s 10,000 L/s	Air Flow Setpoint Maximum.
AV48	Ventilation Setpoint BAS	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)	0 L/s 10,000 L/s	This is limited by Ventilation Setpoint Local and Ventilation Setpoint Standby. Factory default is <i>Out of Service</i> . To use this point, put <i>Into Service</i> .
AV49	Ventilation Standby Setpoint	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)	0 L/s 10,000 L/s	Ventilation Standby Setpoint.

## Object and Diagnostic Data Points

**Table 3. Analog value (continued)**

Object Type	Object Name	Units of Measure	Minimum Maximum	Description
AV50	Space CO <sub>2</sub> Concentration Active	Parts-per-million	0 ppm 5,000 ppm	Space CO <sub>2</sub> concentration in ppm, used by algorithm.
AV51	Ventilation Ratio Limit BAS	Percentage (%)	0% 100%	Ventilation Ratio Limit from the BAS in percent. Factory default is <i>Out of Service</i> . To use this point, put <i>Into Service</i> . If used with a Tracer SC, the SC will place the point <i>In Service</i> during installation.
AV52	PD Mode Min Air Valve Position	Percentage (%)	0.0% 100.0%	Minimum air valve position in percent when using pressure dependent control.
AV53	ECM Fan Correction Factor	None	0 65,535	ECM Fan Correction Factor. Exists if configured only with ECM fan.
AV54	ECM Fan Maximum Flow	Gaseous Flow (cfm, L/s, L/min, m <sup>3</sup> /s, m <sup>3</sup> /min, m <sup>3</sup> /hr)	0 L/s 10,000 L/s	$PWM\% = (ECM \text{ fan flow setpoint} - \text{min}) / (\text{max} - \text{min})$ . Value is factory set.
AV55	ECM Fan Minimum Flow	Gaseous Flow (cfm, L/s, L/min, m <sup>3</sup> /s, m <sup>3</sup> /min, m <sup>3</sup> /hr)	0 L/s 10,000 L/s	$PWM\% = (ECM \text{ fan flow setpoint} - \text{min}) / (\text{max} - \text{min})$ . Value is factory set.
AV56	ECM Fan Flow Setpoint	Gaseous Flow (cfm, L/s, L/min, m <sup>3</sup> /s, m <sup>3</sup> /min, m <sup>3</sup> /hr)	0 L/s 10,000 L/s	$PWM\% = (ECM \text{ fan flow setpoint} - \text{min}) / (\text{max} - \text{min})$ .
AV57	Parallel Fan Flow Enable Point	Gaseous Flow (cfm, L/s, L/min, m <sup>3</sup> /s, m <sup>3</sup> /min, m <sup>3</sup> /hr)	0 L/s 10,000 L/s	Parallel Fan Flow Enable Point.
AV58	Parallel Fan Temp Enable Point	Temperature Delta (°F or °C)	0°C (32F) 4.44° (39.99°F)C	Parallel Fan Temp Enable Point.
AV59	Space Temperature Active	Temperature (°F or °C)	-15°C (5°F) 50°C (122°F)	Space temperature being used by algorithm.
AV60	Supply Air Temperature Active	Temperature (°F or °C)	-40°C (-40°F) 100°C (212°F)	Supply Air Temperature Active.
AV66	Cabinet Style	None	0 255	Cabinet Style.
AV67	Auxiliary Heat Control Request	Percentage (%)	0% 100%	Auxiliary heat enable - reheat enable.
AV68	Fan Override BAS	Percentage (%)	0% 101%	Used to override fan speed. <ul style="list-style-type: none"> <li>• 0% = fan Off.</li> <li>• 100% = On/Off fan override on, ECM at 100%.</li> <li>• 1%–99% = ECM fan at the specified %, On/Off fan is ON.</li> <li>• 101% and greater is default (no override).</li> </ul>
AV69	Pressure Sensor Calibration Offset	Gaseous Flow (cfm, L/s, L/min, m <sup>3</sup> /s, m <sup>3</sup> /min, m <sup>3</sup> /hr)		<ul style="list-style-type: none"> <li>• Pressure reading with air damper <b>Off</b> and fan <b>Off</b> (Pressure sensor calibration - <b>zero</b> reading).</li> <li>• This value is saved during calibration and subtracted off subsequent readings.</li> <li>• If not within valid range, a flow sensor calibration fails diagnostic is set.</li> </ul>
AV70	Fan Air Flow Rating	Gaseous Flow (cfm, L/s, L/min, m <sup>3</sup> /s, m <sup>3</sup> /min, m <sup>3</sup> /hr)	0 L/s 4, 000 L/s	<ul style="list-style-type: none"> <li>• Needed to balance ECM fan.</li> <li>• Set in the factory.</li> <li>• Exists if configured only with modulating heat.</li> </ul>
AV74	Auto Commissioning Air Valve 40	Percentage (%)		Percent air valve position at 40%.
AV75	Auto Commissioning Air Valve 100	Percentage (%)		Percent air valve position at 100% .
AV76	Auto Commissioning Discharge Air Temperature Fan Off	Temperature (°F or °C)		Discharge air temp is recorded during auto commissioning.
AV77	Auto Commissioning Discharge Air Temperature Fan On	Temperature (°F or °C)		Auto Commissioning Discharge Air Temperature with the fan off.
AV78	Auto Commissioning Discharge Air Temperature Reheat	Temperature (°F or °C)		Auto Commissioning Discharge Air Temperature with reheat turned on. Available if configured with local heat.
AV79	Auto Commissioning Discharge Air Temperature Water Valve	Temperature (°F or °C)		Auto Commissioning Discharge Air Temperature with water valve open.
AV80	Auto Commissioning Discharge Air Temperature Stage 1 Heat	Temperature (°F or °C)		Auto Commissioning Discharge Air Temperature with 1 stage of heat on.
AV81	Auto Commissioning Discharge Air Temperature Stage 2 Heat	Temperature (°F or °C)		Auto Commissioning Discharge Air Temperature with 2 stages of heat on. Available with multiple stages of local heat.



## Object and Diagnostic Data Points

**Table 3. Analog value (continued)**

Object Type	Object Name	Units of Measure	Minimum Maximum	Description
AV82	Auto Commissioning Discharge Air Temperature Stage 3 Heat	Temperature (°F or °C)		Auto Commissioning Discharge Air Temperature with 3 stages of heat on. Available when configured with three stages of local heat.
AV83	Cool Type	None	0 255	Cool Type.
AV84	Preheat Type	None	0 255	Preheat Type.
AV85	Reheat Type	None	0 255	Reheat Type.
AV86	Supply Fan Type	None	0 255	Supply Fan Type.
AV87	Cooling Setpoint High Limit	Temperature (°F or °C)	4.44°C (20.12°F) 46.11°C (114.99°F)	High limit for cooling setpoint.
AV88	Cooling Setpoint Low Limit	Temperature (°F or °C)	4.44°C (20.12°F) 46.11°C (114.99°F)	Low limit for cooling setpoint.
AV89	Heating Setpoint High Limit	Temperature (°F or °C)	4.44°C (20.12°F) 46.11°C (114.99°F)	High limit for heating setpoint.
AV90	Heating Setpoint Low Limit	Temperature (°F or °C)	4.44°C (20.12°F) 46.11°C (114.99°F)	Low limit for heating setpoint.

**Table 4. Binary input**

Object Type	Object Name	Units of Measure	Minimum Maximum	Description
B11	Occupancy Input	None		Occupancy sensor.

**Table 5. Binary output**

Object Type	Object Name	Units of Measure	Minimum Maximum	Description
BO1	ECM Fan Output	None		ECM fan on/off.
BO2	Fan Output	None		Fan on/off (standard motor).
BO5	Heat Output 3	None		Heat stage 3.
BO6	Heat Output 2	None		Heat stage 2.
BO7	Heat Output 1	None		Heat stage 1.

**Table 6. Binary value**

Object Type	Object Name	Units of Measure	Minimum Maximum	Description
BV1	Air Valve Position Control	None		Air Valve Position Control: <ul style="list-style-type: none"> <li>• 0 = pressure independent control.</li> <li>• 1 = position control / pressure dependent.</li> </ul>
BV2	Default Supply Air Temperature Mode	None		Default Supply Air Temperature Mode: <ul style="list-style-type: none"> <li>• 1 = hot (heating).</li> <li>• 0 = cold (cooling) [default].</li> <li>• Leaves factory at default.</li> </ul>
BV3	Diagnostic: Air Flow Override Local	None		Local thumbwheel is in override position of * or **.
BV5	Reheat Priority	None		Reheat priority of local and remote heat.
BV6	Pressure Dependent Mode Reheat Enable	None		Pressure Dependent Mode Reheat Enable.
BV7	Diagnostic: Flow Sensor Calibration Failure	None		Diagnostic: Flow Sensor Calibration Failure.
BV8	Auto Calibrate	None		Auto Calibrate.



## Object and Diagnostic Data Points

**Table 6. Binary value (continued)**

Object Type	Object Name	Units of Measure	Minimum Maximum	Description
BV9	Diagnostic: Low Primary Air Flow	None		Low primary: <ul style="list-style-type: none"> <li>• 0 = pressure independent control.</li> <li>• 1 = position control / pressure dependent.</li> <li>• Airflow diagnostic (<b>only</b> for electric heat).</li> </ul>
BV10	Diagnostic: Freeze Protection	None		Freeze protection diagnostic ( <b>only</b> for ventilation flow control units).
BV11	Auto Commissioning Command	None		Used to eliminate auto commissioning.
BV12	Diagnostic: High Air Flow	None		Flow sensor reading too high Diagnostic Flow > 120% of nominal flow.
BV13	Diagnostic: Flow Sensor Failure	None		Pressure sensor faulted diagnostic.

**Table 7. Multi-state input**

Object Type	Object Name	Units of Measure	Minimum Maximum	Description
MI1	Timed Override Status	None		Timed override button push detected.
MI2	Air Flow Override Local	None		Thumbwheel at * or **.

**Table 8. Multi-state value**

Object Type	Object Name	Units of Measure	Minimum Maximum	Description
MV1	Air Flow Minimum Setpoint Source	None		Air Flow Minimum Setpoint Source.
MV2	Air Flow Override	None		Air Flow Override.
MV3	Water Valve Override	None		Water Valve Override.
MV4	Heat Cool Mode Request	None		Heat Cool Mode Request communicated by BAS.
MV5	Heat Cool Mode Status	None		Heat Cool Mode Status.
MV6	Occupancy Request	None		Occupancy Request communicated by BAS.
MV7	Occupancy Status	None		Occupancy Status.
MV8	Auto Commissioning State	None		Auto Commissioning State.
MV9	Emergency Override BAS	None		Emergency override request.
MV12	Manual Test Sequence	None		Manual Test Sequence number.

## Object and Diagnostic Data Points

**Table 9. All object types sorted by object name**

Object Type	Object Name	Units of Measure	Minimum Maximum	Description	Flow Tracking (a)	Vent Flow Control (c)	Vent Flow Control With Heat (d)	Space Temp Control (a)	Space Temp Control With Heat (e)
AV16	Actual Air Valve Position	None		Valve position on % open.	X	X	X	X	X
AV17	Actual Reheat Position	None		Reheat valve position in % open.		B	B	B	B
AV18	Air Flow Gain	None	0.000 2.000	Default setting is 1.0 and can be edited based on the results of an air balancing test.	X	X	X	X	X
AV19	Air Flow Measurement Offset	None	-50.000% 50.000%	Set when air balancing.	X	X	X	X	X
AV2	Air Flow Minimum Setpoint Active	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)		Air Flow Minimum Setpoint Active.		X	X	X	X
MV1	Air Flow Minimum Setpoint Source	None		Air Flow Minimum Setpoint Source.		X	X	X	X
AV8	Air Flow Nominal Status	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)	0 L/s 10,000 L/s	Nominal airflow set by the configurator based on the unit size selected.	X	X	X	X	X
AV26	Air Flow Offset	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)	-10,000 L/s 10,000 L/s	Flow set point of Flow Tracking box relative to supply air VAV box.	X				
MV2	Air Flow Override	None		Air Flow Override.	X	X	X	X	X
M12	Air Flow Override Local	None		Thumbwheel at * or **.				X	X
AV15	Air Flow Override Percent	None	0% 100%	Air Flow Override Percent.	X	X	X	X	X
AV13	Air Flow Setpoint Active	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)		Air Flow Setpoint Active.	X	X	X	X	X
AV25	Air Flow Setpoint BAS	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)	0 L/s 65,534 L/s	Communicated airflow setpoint used for flow tracking units.	X				
AV47	Air Flow Setpoint Maximum	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)	0 L/s 10,000 L/s	Air Flow Setpoint Maximum.	X	X	X	X	X
AV46	Air Flow Setpoint Maximum Heat	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)	0 L/s 10,000 L/s	Air Flow Setpoint Maximum Heat.	X			X	X
AV42	Air Flow Setpoint Minimum	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)	0 L/s 10,000 L/s	Air Flow Setpoint Minimum.	X	X	X	X	X
AV45	Air Flow Setpoint Minimum Heat	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)	0 L/s 10,000 L/s	Air Flow Setpoint Minimum Heat.				X	X
AV31	Air Flow Setpoint Minimum Local Heat	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)	0 L/s 10,000 L/s	Reheat minimum used when local heat is <b>On</b> .		X	X	X	X
AV43	Air Flow Setpoint Minimum Standby	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)	0 L/s 10,000 L/s	Air Flow Setpoint Minimum Standby.				X	X
AV44	Air Flow Setpoint Minimum Standby Heat	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)	0 L/s 10,000 L/s	Air Flow Setpoint Minimum Standby Heat.				X	X

## Object and Diagnostic Data Points

**Table 9. All object types sorted by object name (continued)**

Object Type	Object Name	Units of Measure	Minimum Maximum	Description	Flow Tracking (c)	Vent Flow Control (c)	Vent Flow Control With Heat (c)	Space Temp Control (e)	Space Temp Control With Heat (e)
AV9	Air Valve 1 Stroke Time	None	60,000 milliseconds 570,000 milliseconds	Air valve stroke time in milliseconds (100-millisecond resolution).	X	X	X	X	X
BV1	Air Valve Position Control	None		Air Valve Position Control: • 0 = pressure independent control. • 1 = position control / pressure dependent.	X	X	X	X	X
AO1	Air Valve Position Status	None		Value of AO is the requested % open. <b>Note:</b> Refer to Actual Air Valve Position.	X	X	X	X	X
BV8	Auto Calibrate	None		Auto Calibrate.	X	X	X	X	X
AV10	Auto Changeover Point	Temperature (°F or °C)	10°C (50°F) 100°C (212°F)	Auto Changeover Point.				X	X
AV75	Auto Commissioning Air Valve 100	None		Percent air valve position at 100% flow.	X	X	X	X	X
AV74	Auto Commissioning Air Valve 40	None		Percent air valve position at 40% flow.	X	X	X	X	X
BV11	Auto Commissioning Command	None		Used to eliminate auto commissioning.	X	X	X	X	X
AV76	Auto Commissioning Discharge Air Temperature Fan Off	Temperature (°F or °C)		Discharge air temp is recorded during auto commissioning.				D	D
AV77	Auto Commissioning Discharge Air Temperature Fan On	Temperature (°F or °C)		Auto Commissioning Discharge Air Temperature with the fan Off.				D	D
AV78	Auto Commissioning Discharge Air Temperature Reheat	Temperature (°F or °C)		Auto Commissioning Discharge Air Temperature with reheat turned on. Available if configured with local heat.			A		F
AV80	Auto Commissioning Discharge Air Temperature Stage 1 Heat	Temperature (°F or °C)		Auto Commissioning Discharge Air Temperature with 1 stage of heat on.			C		C
AV81	Auto Commissioning Discharge Air Temperature Stage 2 Heat	Temperature (°F or °C)		Auto Commissioning Discharge Air Temperature with 2 stages of heat on. Available with multiple stages of local heat.			A		A
AV82	Auto Commissioning Discharge Air Temperature Stage 3 Heat	Temperature (°F or °C)		Auto Commissioning Discharge Air Temperature with 3 stages of heat on. Available when configured with three stages of local heat.			A		A
AV79	Auto Commissioning Discharge Air Temperature Water Valve	Temperature (°F or °C)		Auto Commissioning Discharge Air Temperature with water valve open.			B		B
AV8	Auto Commissioning State	None		Auto Commissioning State.	X	X	X	X	X
AV67	Auxiliary Heat Control Request	None	0% 100%	Auxiliary heat enable - reheat enable.			X		X
AV66	Cabinet Style	None	0 255	Cabinet Style.	X	X	X	X	X
AV83	Cool Type	None	0 255	Cool Type.	X	X	X	X	X
AV87	Cooling Setpoint High Limit	Temperature (°F or °C)	4.44°C (20.12°F) 46.11°C (114.99°F)	High limit for cooling setpoint.				X	X
AV88	Cooling Setpoint Low Limit	Temperature (°F or °C)	4.44°C (20.12°F) 46.11°C (114.99°F)	Low limit for cooling setpoint.				X	X

## Object and Diagnostic Data Points

**Table 9. All object types sorted by object name (continued)**

Object Type	Object Name	Units of Measure	Minimum Maximum	Description	Flow Tracking (c)	Vent Flow Control (d)	Vent Flow Control With Heat (e)	Space Temp Control (e)	Space Temp Control With Heat (e)
BV2	Default Supply Air Temperature Mode	None		Default Supply Air Temperature Mode: <ul style="list-style-type: none"> <li>1 = hot (heating).</li> <li>0 = cold (cooling) [default].</li> <li>Leaves factory at default.</li> </ul>				X	X
BV3	Diagnostic: Air Flow Override Local	None		Local thumbwheel is in override position of * or **.				X	X
BV7	Diagnostic: Flow Sensor Calibration Failure	None		Diagnostic: Flow Sensor Calibration Failure.	X	X	X	X	X
BV13	Diagnostic: Flow Sensor Failure	None		Pressure sensor faulted diagnostic.	X	X	X	X	X
BV10	Diagnostic: Freeze Protection	None		Freeze protection diagnostic ( <b>only</b> for ventilation flow control units).			B		
BV12	Diagnostic: High Air Flow	None		Flow sensor reading too high Diagnostic Flow > 120% of nominal flow.	X	X	X	X	X
BV9	Diagnostic: Low Primary Air Flow	None		Low primary airflow diagnostic ( <b>only</b> for electric heat). Exists if configured only with local electric heat.			A		A
AV20	Discharge Air Flow	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)		Pressure sensor 1 value converted to flow.	X	X	X	X	X
AV39	Discharge Air Temp Setpoint Local	Temperature (°F or °C)	-7.22°C (19.00°F) 21.11°C (69.99°F)	<b>Only</b> for VFC configuration. <ul style="list-style-type: none"> <li>Discharge air temp setpoint from wired sensor.</li> </ul>	X	X	X		
AI4	Discharge Air Temperature	Temperature (°F or °C)	-40°C (-40°F) 100°C (212°F)	Discharge air temperature sensor wire to the controller.		X	X	X	X
AV16	Discharge Air Temperature Setpoint BAS	Temperature (°F or °C)	-7.22°C (19.00°F) 21.11°C (69.99°F)	<ul style="list-style-type: none"> <li><b>Only</b> for VFC configuration.</li> <li>Discharge air temp setpoint communicated from BAS.</li> <li>Factory default is Out of Service. To use this point, put into Service.</li> </ul>	X	X	X		
AV53	ECM Fan Correction Factor	None	0 65.535	ECM Fan Correction Factor. Exists if configured only with ECM fan.				A	A
AV56	ECM Fan Flow Setpoint	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)	0 L/s 10,000 L/s	PWM% = (ECM fan flow setpoint - min) / (max - min). Exists if configured only with ECM fan.				A	A
AV54	ECM Fan Maximum Flow	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)	0 L/s 10,000 L/s	PWM% = (ECM fan flow setpoint - min) / (max - min). Exists if configured only with ECM fan. Value is factory set.				A	A
AV55	ECM Fan Minimum Flow	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)	0 L/s 10,000 L/s	PWM% = (ECM fan flow setpoint - min) / (max - min). Exists if configured only with ECM fan. Value is factory set.				A	A
BO1	ECM Fan Output	None		ECM fan on/off. With ECM fan powered only.				A	A
MV9	Emergency Override BAS	None		Emergency override request.	X	X	X	X	X
AV70	Fan Air Flow Rating	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)	0 L/s 4,000 L/s	<ul style="list-style-type: none"> <li>Needed to balance ECM fan.</li> <li>Set in the factory.</li> <li>Exists if configured only with modulating heat.</li> </ul>				A	A
BO2	Fan Output	None		Fan on/off (standard motor).				D	D

## Object and Diagnostic Data Points

**Table 9. All object types sorted by object name (continued)**

Object Type	Object Name	Units of Measure	Minimum Maximum	Description	Flow Tracking (c)	Vent Flow Control (d)	Vent Flow Control With Heat (e)	Space Temp Control (f)	Space Temp Control With Heat (g)
AV68	Fan Override BAS	None	0% 101%	Used to override fan speed. <ul style="list-style-type: none"> <li>0% = fan Off.</li> <li>100% = On/Off fan override on, ECM at 100%.</li> <li>1%-99% = ECM fan at the specified %, On/Off fan is ON.</li> <li>101% and greater is default (no override).</li> </ul>				D	D
MV4	Heat Cool Mode Request	None		Heat Cool Mode Request communicated by BAS.	X	X	X	X	X
MV5	Heat Cool Mode Status	None		Heat Cool Mode Status.	X	X	X	X	X
BO7	Heat Output 1	None		Heat stage 1. Does not exist if only modulating heat is configured.		A	A	A	A
BO6	Heat Output 2	None		Heat stage 2. Exists when configured with a total of 2 stages of local and remote heat.		A	A	A	A
BO5	Heat Output 3	None		Heat stage 3. Exists when configured with a total of 2 stages of local and remote heat.		A	A	A	A
AV12	Heat Output Secondary Status	None		Percent output value (not the same as capacity in all cases). <ul style="list-style-type: none"> <li>For modulating this is the valve position.</li> <li>For PWM, this is the capacity.</li> <li>For Staged, are the discrete values for each stage (for example, 2 stage is 0%, 50%, 100% or 3 stage is 0%, 33%, 66%, 100%).</li> </ul>			X		X
AV89	Heating Setpoint High Limit	Temperature (°F or °C)	4.44°C (20.12°F) 46.11°C (114.99°F)	High limit for heating setpoint.				X	X
AV90	Heating Setpoint Low Limit	Temperature (°F or °C)	4.44°C (20.12°F) 46.11°C (114.99°F)	Low limit for heating setpoint.				X	X
MV12	Manual Test Sequence	None		Manual Test Sequence number.	X	X	X	X	X
AI10	Minimum Actuator Time	None	100 milliseconds 1,000 milliseconds	<ul style="list-style-type: none"> <li>Air valve minimum actuator time 100-millisecond increments.</li> <li>Minimum 500 milliseconds.</li> </ul>	X	X	X	X	X
BI1	Occupancy Input	None		Occupancy sensor.		X	X	X	X
MV6	Occupancy Request	None		Occupancy Request communicated by BAS.		X	X	X	X
MV7	Occupancy Status	None		Occupancy Status.		X	X	X	X
AV33	Occupied Bypass Time	None	0 minutes 240 minutes	The number of minutes the unit will stay in occupied bypass after initiated by time override button.		X	X	X	X
AV30	Occupied Offset	Temperature Delta (°F or °C)	4.44°C (20.12°F) 46.11°C (114.99°F)	Setpoint offset used during occupied mode.				X	X
AV21	Outdoor Air Low Limit	Temperature (°F or °C)	-6.66°C (20.12°F) 7.22°C (44.99°F)	VFC freeze protection.			X		
AV57	Parallel Fan Flow Enable Point	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)	0 L/s 10,000 L/s	Parallel Fan Flow Enable Point. Exists if configured as a parallel fan powered box.				A	A
AV58	Parallel Fan Temp Enable Point	Temperature Delta (°F or °C)	0°C (32F) 4.44°C (39.99°F)	Parallel Fan Temp Enable Point. Exists if configured as a parallel fan powered box.				A	A

## Object and Diagnostic Data Points

**Table 9. All object types sorted by object name (continued)**

Object Type	Object Name	Units of Measure	Minimum Maximum	Description	Flow Tracking (b)	Vent Flow Control (c)	Vent Flow Control With Heat (d)	Space Temp Control (e)	Space Temp Control With Heat (e)
AV52	PD Mode Min Air Valve Position	None	0.0% 100.0%	Minimum air valve position in percent when using pressure dependent control.	X	X	X	X	X
AV84	Preheat Type	None	0 255	Preheat Type.	X	X	X	X	X
AI3	Pressure 1	Gaseous Pressure (in H <sub>2</sub> O, in Hg, mm H <sub>2</sub> O, mm Hg, Pa, kPa)	0 pascals 498 pascals	<ul style="list-style-type: none"> <li>Pressure across the flow ring.</li> <li>120% flow indicates 2 in H<sub>2</sub>O (498 pascals) across flow ring.</li> </ul>	X	X	X	X	X
BV6	Pressure Dependent Mode Reheat Enable	None		Pressure Dependent Mode Reheat Enable.			X		X
AV69	Pressure Sensor Calibration Offset	Gaseous Pressure (in H <sub>2</sub> O, in Hg, mm H <sub>2</sub> O, mm Hg, Pa, kPa)		<ul style="list-style-type: none"> <li>Pressure reading with air damper <b>Off</b> and fan <b>On</b> (Pressure sensor calibration - <b>zero</b> reading).</li> <li>This value is saved during calibration and subtracted off subsequent readings.</li> <li>If not within valid range, a flow sensor calibration fails diagnostic is set.</li> </ul>	X	X	X	X	X
AV9	Reheat Enable Point	Temperature (°F or °C)	10°C (50°F) 100°C (212°F)	Reheat Enable Point.			X		X
BV5	Reheat Priority	None		Reheat priority of local and remote heat.					A
AV85	Reheat Type	None	0 255	Reheat Type.	X	X	X	X	X
AV50	Space CO <sub>2</sub> Concentration Active	None	0 ppm 5,000 ppm	Space CO <sub>2</sub> concentration used by algorithm.				X	X
AV22	Space CO <sub>2</sub> Concentration BAS	None	0 ppm 5,000 ppm	Space CO <sub>2</sub> concentration communicated from the BAS in ppm. If used, the system will write to this point once every 15 minutes. Otherwise, the controller will put the point into fault status. Factory default is Out of Service. To use this point, put Into Service.				X	X
AI8	Space CO <sub>2</sub> Concentration Local	None	0 ppm 5,000 ppm	Space CO <sub>2</sub> concentration in ppm.				X	X
AV40	Space CO <sub>2</sub> Limit	None	0 ppm 2,000 ppm	Point where CO <sub>2</sub> demand ventilation ends in ppm.				X	X
AV41	Space CO <sub>2</sub> Low Limit	None	0 ppm 2,000 ppm	Point where CO <sub>2</sub> demand ventilation begins in ppm.				X	X
AV37	Space Temp Setpoint Default	Temperature (°F or °C)	4.44°C (20.12°F) 46.11°C (114.99°F)	Default space temperature setpoint stored in the controller and set by service tool.				X	X
AV59	Space Temperature Active	Temperature (°F or °C)	-15°C (5°F) 50°C (122°F)	Space temperature being used by algorithm.				X	X
AV14	Space Temperature BAS	Temperature (°F or °C)	-15°C (5°F) 50°C (122°F)	Space temperature communicated from BAS. If used, the Tracer SC will write to this point once every 15 minutes, but <b>ONLY</b> if this point is put into Service. If the point is in service, but not written to every 15 minutes the controller will put the point into fault status. Factory default is Out of Service. To use this point, put Into Service.				X	X
AI1	Space Temperature Local	Temperature (°F or °C)	15°C (59°F) 50°C (122°F)	Temperature sensor in the space.				X	X

## Object and Diagnostic Data Points

**Table 9. All object types sorted by object name (continued)**

Object Type	Object Name	Units of Measure	Minimum Maximum	Description	Flow Tracking (c)	Vent Flow Control (d)	Vent Flow Control With Heat (e)	Space Temp Control (e)	Space Temp Control With Heat (e)
AV28	Space Temperature Setpoint Active	Temperature (°F or °C)	-5.6°C (21.92°F) 56.1°C (132.98°F)	Space temperature setpoint being used by algorithm.				X	X
AV27	Space Temperature Setpoint BAS	Temperature (°F or °C)	-10°C (14°F) 35°C (95°F)	Communicated setpoint. Factory default is Out of Service. To use this point, put into Service. If used with a Tracer SC, the SC will place the point in Service during installation.				X	X
AI2	Space Temperature Setpoint Local	Temperature (°F or °C)	10°C (50°F) 29.4°C (84.92°F)	Zone sensor thumbwheel.				X	X
AV34	Standby Offset	Temperature Delta (°F or °C)	4.44°C (20.12°F) 46.11°C (114.99°F)	Setpoint offset used during occupied standby mode.				X	X
AV60	Supply Air Temperature Active	Temperature (°F or °C)	-40°C (-40°F) 100°C (212°F)	Supply Air Temperature Active.			B	X	X
AV29	Supply Air Temperature BAS	Temperature (°F or °C)	0°C (32°F) 100°C (212°F)	Supply air temperature communicated from BAS. Factory default is Out of Service. To use this point, put into Service. If used with a Tracer SC, the SC will place the point in Service during installation.			B	X	X
AI5	Supply Air Temperature Local	Temperature (°F or °C)	-40°C (-40°F) 100°C (212°F)	Supply air temperature sensor wired to the controller.			B	X	X
AO2	Supply Fan Speed	None		Supply fan in percent. For single-speed fans, 0% = Off, 100% = On.				D	D
AV86	Supply Fan Type	None	0 255	Supply Fan Type.	X	X	X	X	X
MI1	Timed Override Status	None		Timed override button push detected.				X	X
AV23	Unoccupied Cooling Setpoint	Temperature (°F or °C)	4.44°C (20.12°F) 46.11°C (114.99°F)	Unoccupied Cooling Setpoint.				X	X
AV24	Unoccupied Heating Setpoint	Temperature (°F or °C)	4.44°C (20.12°F) 46.11°C (114.99°F)	Unoccupied Heating Setpoint.				X	X
AV36	Ventilation Ratio	None		0%–100%. Percentage indicates the required ratio or outdoor air-to-primary air needed to meet zone ventilation requirements.				X	X
AV51	Ventilation Ratio Limit BAS	None	0% 100%	Ventilation Ratio Limit from the BAS in percent. Factory default is Out of Service. To use this point, put into Service. If used with a Tracer SC, the SC will place the point in Service during installation.				X	X
AV35	Ventilation Setpoint Active	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)		Ventilation Setpoint Active.				X	X
AV48	Ventilation Setpoint BAS	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)	0 L/s 10,000 L/s	This is limited by Ventilation Setpoint Local and Ventilation Setpoint Standby. Factory default is Out of Service. To use this point, put into Service.		X	X	X	X
AV38	Ventilation Setpoint Local	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/min, m3/hr)	0 L/s 10,000 L/s	Ventilation Setpoint Local.		X	X	X	X

## Object and Diagnostic Data Points

**Table 9. All object types sorted by object name (continued)**

Object Type	Object Name	Units of Measure	Minimum Maximum	Description	Flow Tracking (c)	Vent Flow Control (d)	Vent Flow Control With Heat (e)	Space Temp Control (e)	Space Temp Control With Heat (e)
AV49	Ventilation Standby Setpoint	Gaseous Flow (cfm, L/s, L/min, m3/s, m3/hr)	0 L/s 10,000 L/s	Ventilation Standby Setpoint.				X	X
AI11	Water Valve Maximum Stroke Time	None	60 milliseconds 240 milliseconds	This is used for remote or local modulating water heat valve. In milliseconds.					E
AI12	Water Valve Minimum Actuator Time	None	100 milliseconds 1,000 milliseconds	Water valve minimum actuator time 100-millisecond increments.					E
MV3	Water Valve Override	None		Water Valve Override.			B		B
AO3	Heating Valve Command	None		Modulating reheat valve. This is the requested position in percent. <b>Note:</b> Refer to Heating Capacity Secondary for actual water valve position.			F		E

(a) LEGEND:

A= Dependent on configuration (refer to point description for more information)

B= If configured with hot water valve.

C= If configured with electric heat.

D= If configured as fan powered.

E= If configured with modulating hot water.

X= Exists.



# VAV Alarming

Tracer BACnet VAV controllers have four (4) analog inputs and six (6) binary values used for communicating alarms to the system.

**Table 10. Alarm objects**

Object Type	Object Name	Description	Notification Class
AI1	Space Temperature Local	Space temperature sensor has failed or is out of range.	2
AI2	Space Temperature Setpoint Local	Space temperature setpoint (thumbwheel) has failed or is out of range.	2
AI4	Discharge Air Temperature	Discharge air temperature sensor has failed or is out of range.	2
AI5	Supply Air Temperature Local	Supply air temperature sensor has failed or is out of range.	2
BV3	Diagnostic: Air Flow Override Local	Thumbwheel is presently at * or ** position, which overrides the airflow: <ul style="list-style-type: none"> <li>• 0 = Inactive</li> <li>• 1 = Active</li> </ul>	4
BV7	Diagnostic: Flow Sensor Calibration Failure	<ul style="list-style-type: none"> <li>• 0 = Inactive</li> <li>• 1 = Active</li> </ul>	2
BV9	Diagnostic: Low Primary Air Flow	Electric Heat Only: <ul style="list-style-type: none"> <li>• 0 = Inactive</li> <li>• 1 = Active</li> </ul>	4
BV10	Diagnostic: Freeze Protection	Only for ventilation flow control units.	4
BV12	Diagnostic: High Air Flow	<ul style="list-style-type: none"> <li>• 0 = Inactive</li> <li>• 1 = Active (when flow &gt; 120% of nominal flow.)</li> </ul>	3
BV13	Diagnostic: Flow Sensor Failure	Pressure Sensor Fault: <ul style="list-style-type: none"> <li>• 0 = Inactive</li> <li>• 1 = Active</li> </ul>	2

## Additional Resources

Use the following as additional resources:

- *Tracer BACnet Terminator Installation Instructions* (X39641151-01)
- *BACnet Best Practices and Troubleshooting Guide* (BAS-SVX51-EN)
- *Tracer TU Service Tool Getting Started Guide* (BAS-SVU047-EN)
- Tracer TU Online Help
- Tracer® UC400 Programmable Controller Installation, Operation, and Maintenance Manual (VAV-SVX07-EN)
- *Symbio® 210 Programmable Variable-Air-Volume (VAV) Box Controller Installation, Operation, and Maintenance Manual* (BAS-SVX084\*-EN)

**Note:** For further assistance, contact your local Trane sales office.



Notes

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# Notes



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