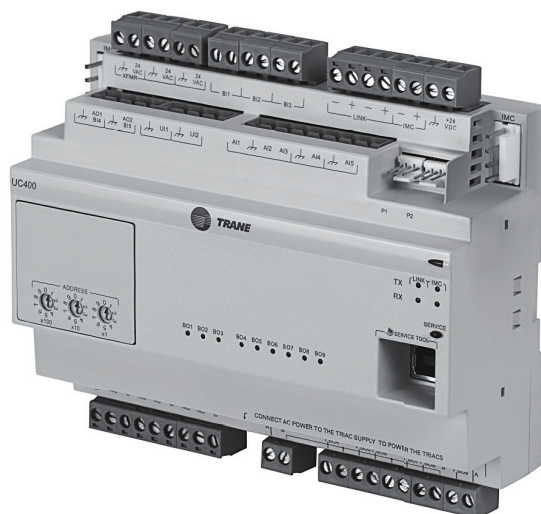




Integration Guide

Tracer™ UC400 Programmable Controller for Water Source Heat Pump



⚠ 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.



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Warnings, Cautions, and Notices

Warnings, cautions, and notices are provided in appropriate places throughout this document:

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.

Revision Summary

BAS-SVP19A-EN
Initial release.

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Overview

The Tracer™ UC400 Programmable Controller is a multi-purpose, programmable controller. Programming is done through the Tracer Graphical Programming (TGP2) software or using Tracer TU configuration tool. This field-installed device is designed to control the following types of equipment:

- Blower coils
- Fan coils
- Single- and dual-duct variable-air-volume (VAV) units
- Small air handlers
- Unit ventilators
- Water-source heat pumps (WSHP)

This integration guide is specific for water-source heat pumps (WSHP). The intent of this guide is to provide BACnet® integration information when the UC400 comes with factory downloaded programs or is programmed using the water terminal equipment configuration tool in Tracer TU.

Note: For more details on these applications, refer to the Tracer™ UC400 Programmable Controller for Blower Coil, Fan Coil, and Unit Ventilator Installation, Operation, and Programming Manual (VAV-SVX48).

This guide provides information about the following:

- “BACnet Protocol”
- “UC400 Rotary Switches and LEDs,” p. 5
- “24 Vac Measurement,” p. 8
- “Configuring the UC400,” p. 9
- “BACnet Data Points and Configuration Property Definitions,” p. 14
- “Object and Diagnostic Data Points,” p. 20
- “Alarming,” p. 35
- “Additional Resources,” p. 36

Note: Users of this guide should have basic knowledge of BACnet protocol. For more detailed information about BACnet protocol, visit the company web site at www.bacnetinternational.org.

BACnet Protocol

The Building Automation and Control Network (BACnet) protocol is ANSI/ASHRAE Standard 135. This standard 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 defines standard objects (data points) called BACnet objects. Each object has a defined list of properties that provide context information about that object. BACnet also defines a number of application services that are used to interact with objects in a BACnet device.

BACnet Testing Laboratory (BTL) Certification

The UC400 is BTL certified as a B-ASC profile device. A complete list of Trane certified devices is available at www.bacnetinternational.org.

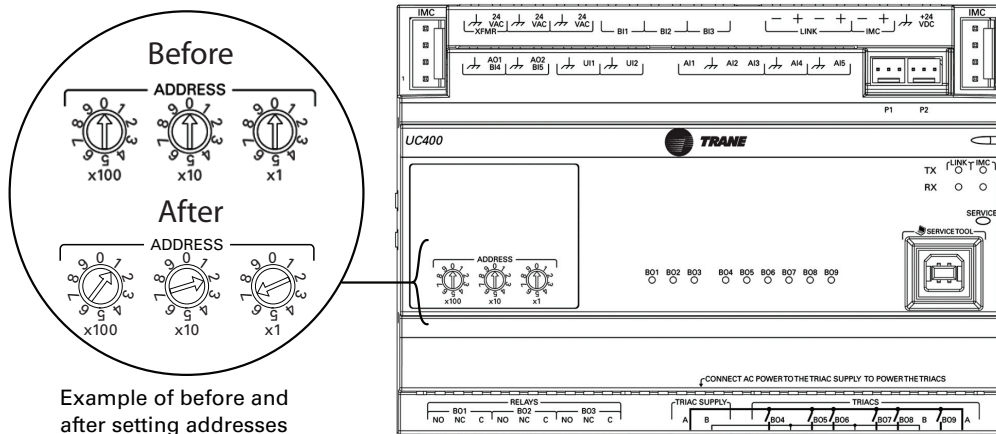
UC400 Rotary Switches and LEDs

This section provides information about the UC400 rotary switches and LED displays.

Rotary Switches

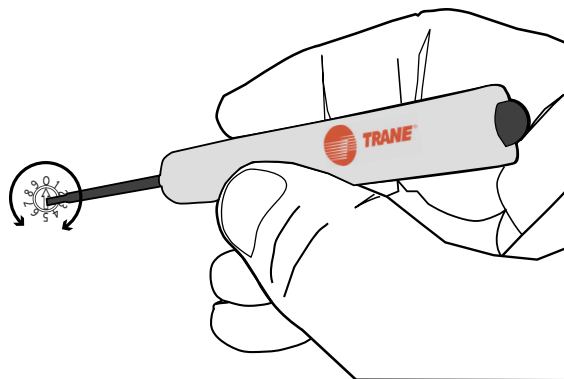
There are three (3) rotary switches on the front of the UC400. They are used to set the BACnet MS/TP network address and BACnet Device ID. Refer to the section, “[MS/TP MAC Address](#),” p. 10 for rules and restrictions with regard to setting this address.

Figure 1. Setting rotary switches



Important: Each UC400 device on the BACnet MS/TP link must have a unique rotary switch value within the range of zero (0) to 127. Otherwise, communication problems will occur.

Use a 1/8 inch flathead screwdriver to set rotary switches.



LEDs Description, Behavior, and Troubleshooting

There are 15 LEDs on the front of the UC400 device as shown in [Figure 2](#). [Table 1](#) provides a description of each LED activity, indication, and troubleshooting tips for each, that includes any specific notes.

Figure 2. LED locations

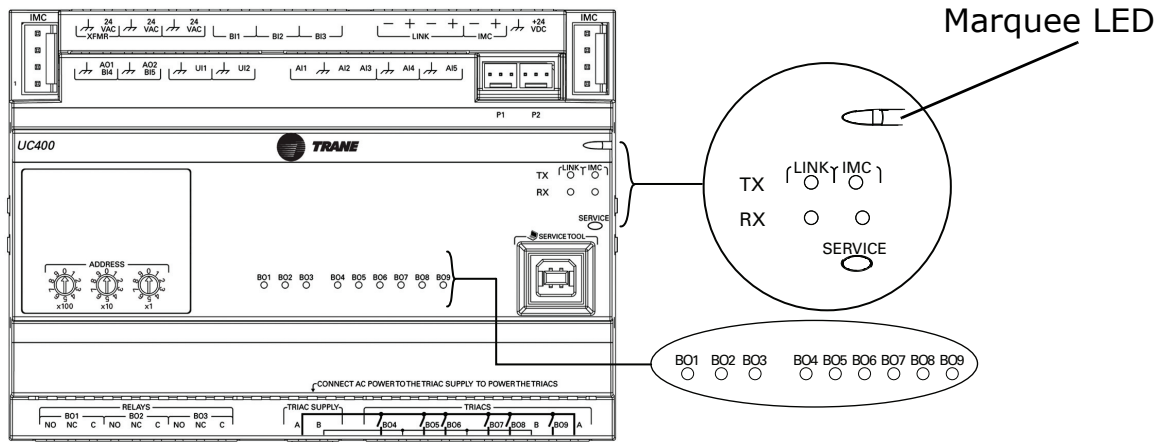


Table 1. LED Activities and Troubleshooting Tips

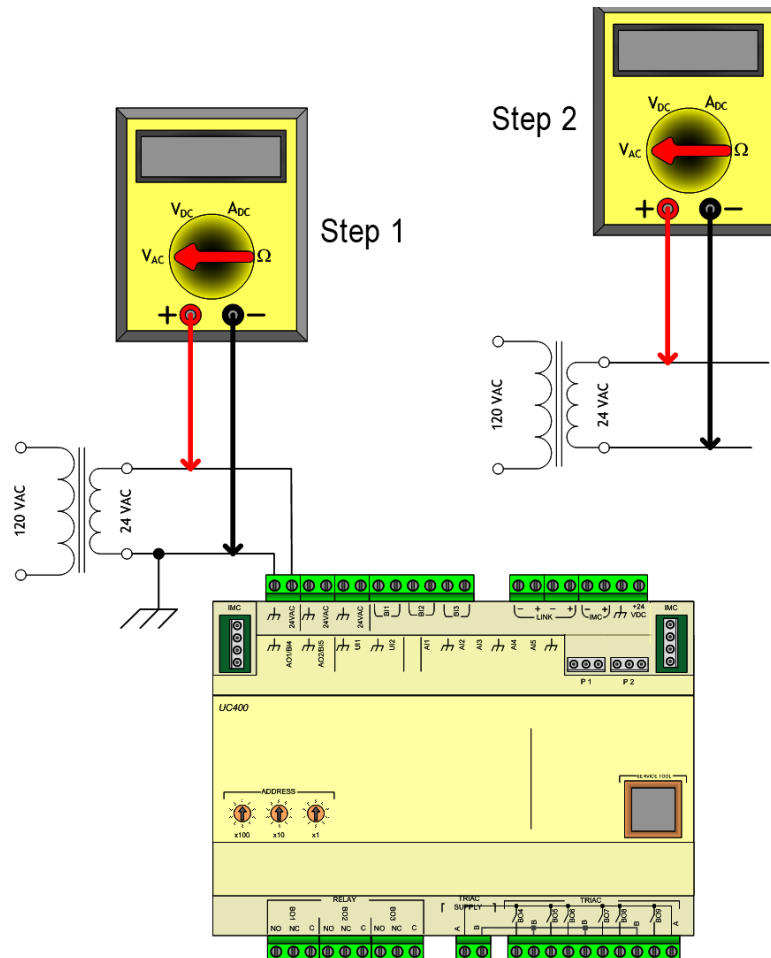
LED Name	Activities	Indication and Troubleshooting Tips	Notes
Marquee LED	Shows solid green when the unit is powered and no alarm or fault exists	Indicates normal operation	When powering the UC400 and expansion module, the power LED will blink RED , blink GREEN (indicating activated and controller/expansion module are communicating), and then stay GREEN CONTINUOUSLY (indicating normal power operation).
	Shows solid red when the unit is powered , but represents low power or a malfunction	<ul style="list-style-type: none"> • If low power; could be under voltage or the microprocessor has malfunction. Follow the troubleshoot procedure "24 Vac Measurement," p. 8 to measure for the expected value range. • If malfunction; un-power and then re-power unit to bring the unit back up to normal operation. 	
	Shows blinking red when an alarm or fault exists	Alarm; when an alarm is triggered or when a point goes into fault condition because of point failure. A common fault condition will occur if a hardware input point is configured, but no actual hardware input exists.	
	LED not lit	Indicates power is OFF or there is a malfunction <ul style="list-style-type: none"> • OFF or malfunction; cycle the power. 	

UC400 Rotary Switches and LEDs

Table 1. LED Activities and Troubleshooting Tips (continued)

LED Name	Activities	Indication and Troubleshooting Tips	Notes
Link and IMC	TX blinks green	Blinks at the data transfer rate when the unit transfers data to other devices on the link.	<p>TX LED: Regardless of connectivity or not, this LED will constantly blink as it continually looks for devices to communicate to.</p> <p>LED not lit: Determine if, for example, a Tracer SC or BACnet device is trying to talk to the controller or if it is capable of talking to the controller. Also determine if the communication status shows down all of the time. In addition, check polarity and baud rate.</p>
	RX blinks yellow	Blinks at the data transfer rate when the unit receives data from other devices on the link. <ul style="list-style-type: none"> • ON solid yellow; indicates there is reverse polarity. 	
	LED is not lit	Indicates that the controller is not detecting communication. <ul style="list-style-type: none"> • Not lit; cycle the power to reestablish communication. 	
Service	Shows solid green when the LED has been pressed		When the UC400 is placed into boot mode, the system will not run any applications such as trending, scheduling, and TGP2 runtime. The controller will be placed into boot mode if the service pin is held in when power is applied. In boot mode, the controller is non-operational and is waiting for a new main application to be downloaded.
	LED not lit	Indicates controller is operating normally.	
Binary B01 through B09	Shows solid yellow	Indicates a corresponding binary output has been <i>commanded ON</i> . <ul style="list-style-type: none"> • Relay coil; indicates that a command has been made to energize. • TRIAC; indicates that a command has been made to turn ON. 	<p>If the user is currently powering the UC400 from a USB port, the Led lights will turn ON. However, the binary outputs <u>will not</u> be activated.</p> <p>Commanded ON; As an example of commanded ON, a command could be a manual command such as an override or a command could be from TGP2 based on a list of conditions that are met telling these outputs to turn ON.</p> <p>LED not lit: Did the user command it to be ON? If yes, refer to the Marquee LED at the top of this table. In addition, refer to "24 Vac Measurement," p. 8.</p>
	LED not lit	Indicates that a relay output is de-energized or no power to the board. <ul style="list-style-type: none"> • Not lit; outputs are off. 	

24 Vac Measurement



General Information	Checkout Procedure	Measurement	Expected Value
<p>Checking the voltage that is powering the UC400 is often a necessary step when commissioning or troubleshooting. Operational issues and LED operation may result in a need to measure the input power.</p> <p>When troubleshooting, it is more efficient to take measurements while the load is in place. If Step 1 indicates an out-of-specification voltage, disconnect the UC400 and measure the AC voltage across the transformer. These measurements can direct the technician towards the problem source.</p>	Step 1	Measure AC voltage with the UC400 connected. Perform this measurement while the unit is under load.	$20.0 \text{ Vac} \leq V_{ac} \leq 30.0 \text{ Vac}$
	Step 2	Measure AC voltage with the UC400 unconnected. Perform this measurement while the unit is not under load.	$20.0 \text{ Vac} \leq V_{ac} \leq 30.0 \text{ Vac}$

Configuring the UC400

The UC400 BACnet configuration settings can be modified with either the Trane BACnet Setup Tool or the Tracer TU tool. The BACnet setup tool can only be used to configure the baud rate, software device ID, and device units of measure. Tracer TU provides complete configuration and programming capabilities.

This section provides information about the following:

- [“Using the BACnet Setup Tool”](#)
- [“Using Tracer TU,” p. 10](#)
- [“MS/TP MAC Address,” p. 10](#)
- [“BACnet Device ID,” p. 11](#)
- [“BAS Unit Control,” p. 12](#)
- [“Input/Output Commands and Calculations,” p. 13](#)

Using the BACnet Setup Tool

Connecting to the UC400

1. Connect the universal serial bus (USB) cable between the laptop and the UC400, 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 the Direct Connection (USB cable) radio button, if it is not already selected.
4. Click the Connect button and the Unit Summary page displays after successful connection.

Configuring the Controller

At the Unit Summary page:

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



Configuring the UC400

Using Tracer TU


This section describes how to first connect to the Tracer TU software and then configure the UC400 controller.

Note: If Tracer TU is not installed, refer to the Tracer TU Service Tool Getting Started Guide (TTU-SVN02). Tracer TU software, Version 6.0 or higher, is required.

Connecting to the UC400

1. Connect the universal serial bus (USB) cable between the laptop and the UC400, or to an equipment control panel USB port that is connected to the controller.
2. Click either the Tracer TU desktop icon or the Tracer TU program item in the Tracer TU group on the Start menu. The Tracer TU splash screen displays briefly, followed by the Connect dialog box.
3. Select the Direct Connection (USB cable) radio button, if it is not already selected.
4. Click the Connect button and the Unit Summary page displays after successful connection.

Configuring the Controller

1. Select the Controller Settings Utility tab () from the vertical tab set located on the right side of the TU window.

Note: The content of this screen is based on the type of controller that is connected and the system protocol used to communicate with the controller.

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

MS/TP MAC Address

Each device on a BACnet MS/TP network must be assigned a unique physical address. This is referred to as the Media Access Control (MAC) address. The BACnet Standard defines the valid address range of a MS/TP master device as zero (0) to 127. All Trane devices are master devices.

When a Tracer SC device is present on the MS/TP network, Trane restricts the use of the zero (0) MAC address. This address is assigned to the Tracer SC and cannot be changed. All other BACnet MS/TP master devices, including the UC400, must have a MAC addresses within the range of 1 to 127. The three (3) rotary switches on the front of the UC400 device are used to set the MAC address. Refer to the section, [“Rotary Switches,” p. 5.](#)

NOTICE:

Communication Failure!

Failure to assign a unique address to each device on the network will cause network communication failure.

BACnet Device ID

3rd Party BAS Integration

Each device on a BACnet internetwork must be assigned a unique logical address. This is referred to as the BACnet Device ID. The valid address range is 0 to 4,194,392.

There are two methods to set the Device ID for a UC400:

- By means of the rotary switches (refer to the section, [“Rotary Switches,” p. 5](#))
- Software configuration

From the factory, the software method is disabled. In this state, the BACnet Device ID is the value represented by the three (3) rotary switches on the front of the device. In this state, the MAC Address and Device ID are the same value.

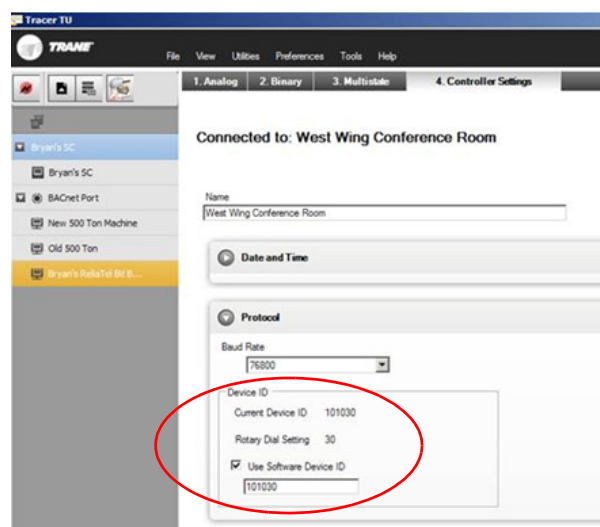
Using this method, the Device ID is limited to the range of 0 to 127. When there is a need to set the Device ID to a value greater than 127, software configuration must be used. [Figure 3](#) shows the setup page that is available in Tracer TU. A very similar page is available in the BACnet Setup Tool.

Setting the Device ID Using the Software Configuration Method

1. Navigate to the Device ID section of the Protocol frame of the page.
2. Enable the Use Software Device ID feature by checking the selection box.
3. Enter the desired value for the BACnet Device ID in the text box.
4. Save the configuration change to the device.
5. Cycle power to the device to have the new value take effect.

Note: When the software method is enabled the hardware method is automatically disabled.

Figure 3. Example Showing Rotary Dial Settings and the BACnet Device ID



Configuring the UC400

Tracer SC BAS Integration

When Tracer SC is the BAS, the integration technician is not required to manually configure the Device ID of the UC400. The Tracer SC will do this as part of the site discovery and installation process.

Tracer SC will perform the following steps:

1. Enable the Use Software Device ID feature.
2. Calculate a unique BACnet Device ID value, based on Tracer SC Device ID, MS/TP link number, and MAC address of the unit controller.
3. Send the BACnet Device ID value to the device.

BAS Unit Control

The UC400 gets controlled by the BAS by changing values of point and placing points in or out of service.

Initiating System Control

By default, the following BACnet points are put out of service and need to be put into service to be used, if required:

- Space Temperature BAS
- Space Temperature Setpoint BAS
- Source Water Temperature BAS
- Space Humidity BAS

Routinely Updating BAS Values

The UC400 requires the BAS system to provide a routine update to the sensor values. This protects against communication loss between the BAS and the UC400. By BACnet definition, the present value of the object maintains the last value written to it, regardless of the amount of time that has elapsed since the last write. If communication is lost for several minutes or longer, the present value of BAS-supplied sensor objects may no longer represent the current state of environmental conditions. This may result in decreased occupant comfort and damage to building systems.

BAS Communication Failure

The UC400 is designed to minimize communication failure mode. It does this by monitoring the length of time that has elapsed since the last *write to the present value* of the sensor object. If the length of time exceeds a predefined limit, the UC400 will place the object into the fault state and revert to a unit-supplied sensor value for control. At power-up, the sensor objects are set to a fault state and they remain in this state until a *write to the sensor object* is detected. The minimum periodic refresh rate for the objects is 15 minutes. The following list is a set of sensor values that can be supplied by the BAS:

- Space Temperature BAS
- Space Humidity BAS

Input/Output Commands and Calculations

This section provides the following information about certain inputs and outputs that perform:

- Filter timer reset command
- Diagnostic reset command
- Setpoint calculations

Filter Timer Reset Command (BV12)

The UC400 uses the *"Filter Runtime Hours"* (AV38) to generate a diagnostic (*"Diagnostic: Filter Change Required"*, BV8) when its present value is greater than the *"Filter Runtime Hours Setpoint"* (AV12) present value. The procedure for resetting the timer is as follows:

Change the state of the "Filter Timer Reset" (BV12) to the active state. Upon the change to active state, the UC400 will set the present value of the "Filter Runtime Hours" (AV38) object to zero and then set the "Filter Timer Reset" object back to the inactive state.

Diagnostics Reset Command

The UC400 control system monitors the operation of the HVAC equipment. If an abnormal condition is detected, an event notification message is sent to the Tracer SC. The corresponding binary input object will change state from *inactive* to *active* when the diagnostic is detected. The object has been configured to send a BACnet event message to external BACnet devices as defined by the protocol.

The BAS has the ability to reset internal diagnostics by controlling the state of the *Reset Diagnostic Request* object (BV2) as follows:

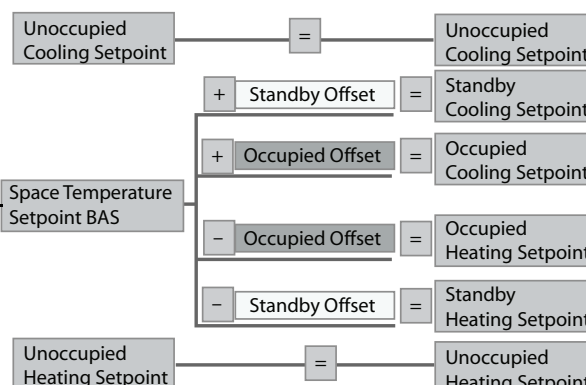
- Change the state of the *"Reset Diagnostic"* (BV2) to the *active* state.
- Upon the change to *active* state, the UC400 control system will reset all internal diagnostics other than BV8 (*"Diagnostic: Filter Change Required"*), and other than BV8 (*"Diagnostic: Filter Change Required"*) set the state of all the diagnostic objects to *inactive*.
- Upon completion of this action, the UC400 will set the present value of the *"Reset Diagnostic"* (BV2) object back to the *inactive* state.

Setpoint Calculations

The equipment has the ability to controls the air temperature of the space that contains the space air temperature sensor. This value may be provided by wiring the sensor to the unit or by means of a sensor value provided by the BAS.

The illustration below shows how the various temperature setpoints are calculated for space temperature control. When the unit is in an occupied mode the active space temperature setpoint is calculated based on the space temperature setpoint and the two setpoint offset values. In unoccupied mode, the unoccupied heating and cooling setpoints are used as the active setpoint.

Note: This can be Space Temperature Setpoint BAS. If Space Temperature Setpoint BAS is Out of Service, then it uses Space Temperature Setpoint Local (AI/1). If Space Temperature Setpoint Local is Out of Service, then Space Temperature Setpoint Default (AV/37) is used.





BACnet Data Points and Configuration Property Definitions

The UC400 device allows communication with BACnet systems and devices using BACnet MS/TP. This section provides information about:

- [“BACnet Protocol Implementation Conformance Statement \(PICS\)”](#)
- [“Object and Diagnostic Data Points,” p. 20](#)

BACnet Protocol Implementation Conformance Statement (PICS)

Vendor Name:	Trane
Product Name:	Tracer™ UC400
Product Model Number	Tracer™ UC400
Product Version:	Version 3
BACnet Protocol Revision:	Revision 4
Product Description:	The Tracer™ UC400 terminal unit controller is fully programmable to meet any control need or pre-loaded with standard applications. As a programmable controller, it is ideal for applications like VAV, fan coils, small air handlers, and many other applications. In addition, this controller can be used as a BACnet MS/TP communications interface for Trane IntelliPak™, ReliaTel™, and CH530 controls.

Standardized Device Profile (Annex L)

BACnet Operator Workstation (B-OWS)	<input type="checkbox"/>
BACnet Building Controller (B-BC)	<input type="checkbox"/>
BACnet Advanced Application Controller (B-AAC)	<input type="checkbox"/>
BACnet Application Specific Controller (B-ASC)	<input checked="" type="checkbox"/>
BACnet Smart Sensor (B-SS)	<input type="checkbox"/>
BACnet Smart Actuator (B-SA)	<input type="checkbox"/>

BACnet Data Points and Configuration Property Definitions

Interoperability Building Blocks (Annex K)

Data Sharing	Supported
Data Sharing-ReadProperty-A (DS-RP-A)	<input checked="" type="checkbox"/>
Data Sharing-WriteProperty-A (DS-WP-A)	<input checked="" type="checkbox"/>
Data Sharing-ReadProperty-B (DS-RP-B)	<input checked="" type="checkbox"/>
Data Sharing-ReadPropertyMultiple-B (DS-RPM-B)	<input checked="" type="checkbox"/>
Data Sharing-WriteProperty-B (DS-WP-B)	<input checked="" type="checkbox"/>
Data Sharing-WritePropertyMultiple-B (DS-WPM-B)	<input checked="" type="checkbox"/>
Alarm and Event Management	Supported
Alarm and Event-Notification Internal-B (AE-N-I-B)	<input checked="" type="checkbox"/>
Alarm and Event-ACKI-B (AE-ACK-B)	<input checked="" type="checkbox"/>
Alarm and Event-Alarm Summary-B (AE-ASUM-B)	<input checked="" type="checkbox"/>
Alarm and Event-Enrollment Summary-B (AE-ESUM-B)	<input checked="" type="checkbox"/>
Alarm and Event-Information-B (AE-INFO-B)	<input checked="" type="checkbox"/>
Trending	Supported
Trending-viewing and Modifying Trends Internal-B (T-VMT-I-B)	<input checked="" type="checkbox"/>
Trending-Automated Trend Retrieval-B (T-ATR-B)	<input checked="" type="checkbox"/>
Device Management Description	Supported
Device Management-Dynamic Device Binding-A (DM-DDB-A)	<input checked="" type="checkbox"/>
Device Management-Dynamic Device Binding-B (DM-DDB-B)	<input checked="" type="checkbox"/>
Device Management-Dynamic Object Binding-B (DM-DOB-B)	<input checked="" type="checkbox"/>
Device Management-Device Communication Control-B (DM-DCC-B)	<input checked="" type="checkbox"/>
Device Management- Private Transfer-A (DM-PT-A)	<input checked="" type="checkbox"/>
Device Management- Private Transfer-B (DM-PT-B)	<input checked="" type="checkbox"/>
Device Management-TimeSynchronization-B (DM-TS-B)	<input checked="" type="checkbox"/>
Device Management-Reinitialize Device-B (DM-RD-B)	<input checked="" type="checkbox"/>
Device Management-Backup and Restore-B (DM-BR-B)	<input checked="" type="checkbox"/>
Device Management-List Manipulation-B (DM-LM-B)	<input checked="" type="checkbox"/>
Device Management-Object Creation and Deletion-B (DM-OCD-B)	<input checked="" type="checkbox"/>

Segmentation Capability

Segmentation	Supported
Segmented Requests/ Window Size: 1	<input checked="" type="checkbox"/>
Segmented Responses/ Window Size: 1	<input checked="" type="checkbox"/>

BACnet Data Points and Configuration Property Definitions

Object Types

Note: For objects that contain the **Present_Value** and **Reliability** properties, these properties are only writable when the **Out_Of_Service** property is **True**.

Table 2. Descriptions and configurations

Object Type	Required Properties Read	Properties Written	Optional Properties Read	Ability to Create	Ability to Delete
Analog Input	<ul style="list-style-type: none"> Object_Identifier Object_Name Object_Type Present_Value Status_Flags Event_State Out_Of_Service Units 	<ul style="list-style-type: none"> Object_Name Description Out_Of_Service Present_Value Reliability Min_Pres_Value Max_Pres_Value COV_Increment Time_Delay Notification_Class High_Limit Low_Limit Deadband Limit_Enable Event_Enable Notify_Type 	<ul style="list-style-type: none"> Description Reliability Min_Pres_Value Max_Pres_Value COV_Increment Time_Delay Notification_Class High_Limit Low_Limit Deadband Limit_Enable Event_Enable Acked_Transitions Notify_Type Event_Time_Stamps 	Yes	Yes, user create objects only
Analog Output	<ul style="list-style-type: none"> Object_Identifier Object_Name Object_Type Present_Value Status_Flags Event_State Out_Of_Service Units Priority_Array Relinquish_Default 	<ul style="list-style-type: none"> Object_Name Description Out_Of_Service Present_Value Reliability Min_Pres_Value Max_Pres_Value Relinquish_Default COV_Increment Time_Delay Notification_Class High_Limit Low_Limit Deadband Limit_Enable Event_Enable Notify_Type 	<ul style="list-style-type: none"> Description Reliability Min_Pres_Value Max_Pres_Value COV_Increment Time_Delay Notification_Class High_Limit Low_Limit Deadband Limit_Enable Event_Enable Acked_Transitions Notify_Type Event_Time_Stamps 	Yes	Yes, user create objects only
Analog Value	<ul style="list-style-type: none"> Object_Identifier Object_Name Object_Type Present_Value Status_Flags Event_State Out_Of_Service Units 	<ul style="list-style-type: none"> Object_Name Description Out_Of_Service Present_Value Reliability Relinquish_Default COV_Increment Time_Delay Notification_Class High_Limit Low_Limit Deadband Limit_Enable Event_Enable Notify_Type 	<ul style="list-style-type: none"> Description Reliability Priority_Array Relinquish_Default COV_Increment Time_Delay Notification_Class High_Limit Low_Limit Deadband Limit_Enable Event_Enable Acked_Transitions Notify_Type Event_Time_Stamps 	Yes	Yes, user create objects only
Binary Input	<ul style="list-style-type: none"> Object_Identifier Object_Name Object_Type Present_Value Status_Flags Event_State Out_Of_Service Polarity 	<ul style="list-style-type: none"> Object_Name Description Out_Of_Service Inactive_Text Active_Text Present_Value Reliability Change_Of_State_Count Elapsed_Active_Time Time_Delay Notification_Class Alarm_Value Event_Enable Polarity Notify_Type 	<ul style="list-style-type: none"> Description Inactive_Text Active_Text Change_Of_State_Time Change_Of_State_Count Time_Of_State_Count_Reset Elapsed_Active_Time Time_Of_Active_Time_Reset Time_Delay Notification_Class Alarm_Value Event_Enable Acked_Transitions Notify_Type Event_Time_Stamps Reliability 	Yes	Yes, user create objects only

BACnet Data Points and Configuration Property Definitions

Table 2. Descriptions and configurations (continued)

Object Type	Required Properties Read	Properties Written	Optional Properties Read	Ability to Create	Ability to Delete
Binary Output	<ul style="list-style-type: none"> Object_Identifier Object_Name Object_Type Present_Value Status_Flags Event_State Out_Of_Service Polarity Priority_Array Relinquish_Default 	<ul style="list-style-type: none"> Object_Name Description Out_Of_Service Inactive_Text Active_Text Present_Value Reliability Change_Of_State_Count Elapsed_Active_Time Minimum_On_Time Minimum_Off_Time Relinquish_Default Time_Delay Notification_Class Event_Enable Notify_Type 	<ul style="list-style-type: none"> Description Inactive_Text Active_Text Change_Of_State_Time Change_Of_State_Count Time_Of_State_Count_Reset Elapsed_Active_Time Time_Of_Active_Time_Reset Minimum_On_Time Minimum_Off_Time Priority_Array Time_Delay Notification_Class Feedback_Value Event_Enable Acked_Transitions Notify_Type Event_Time_Stamps Reliability 	Yes	Yes, user create objects only
Binary Value	<ul style="list-style-type: none"> Object_Identifier Object_Name Object_Type Present_Value Status_Flags Event_State Out_Of_Service Polarity 	<ul style="list-style-type: none"> Object_Name Description Out_Of_Service Inactive_Text Active_Text Present_Value Reliability Change_Of_State_Count Elapsed_Active_Time Minimum_On_Time Minimum_Off_Time Relinquish_Default Time_Delay Notification_Class Event_Enable Acked_Transitions Notify_Type 	<ul style="list-style-type: none"> Description Inactive_Text Active_Text Change_Of_State_Time Change_Of_State_Count Time_Of_State_Count_Reset Elapsed_Active_Time Time_Of_Active_Time_Reset Priority_Array Relinquish_Default Minimum_On_Time Minimum_Off_Time Time_Delay Notification_Class Alarm_Value Event_Enable Acked_Transitions Notify_Type Event_Time_Stamps Reliability 	Yes	Yes, user create objects only
Device	<ul style="list-style-type: none"> Object_Identifier Object_Name Object_Type System_Status Vendor_Name Vendor_Identifier Model_Name Firmware_Revision Application_Software_Version Protocol_Version Protocol_Revision Protocol_Services_Supported Protocol_Object_Types_Supported Object_List Max_APDU_Length_Accepted Segmentation_Supported APDU_Timeout Number_Of_APDU_Retries Device_Address_Binding Database_Revision 	<ul style="list-style-type: none"> Object_Name Location Description APDU_Segment_Timeout APDU_Timeout Number_Of_APDU_Retries Backup_Failure_Timeout Max_Master Max_Info_Frames 	<ul style="list-style-type: none"> Location Description Max_Segments_Accepted APDU_Segment_Timeout Max_Master Max_Info_Frames Local_Time Local_Date Configuration_Files Last_Restore_Time Backup_Failure_Timeout Profile_Name 	None	None
Event Enrollment Object	<ul style="list-style-type: none"> Object_Identifier Object_Name Object_Type Event_Type Notify_Type Event_Parameters Object_Property_Reference Event_State Event_Enable Acked_Transitions Notification_Class Event_Time_Stamps 	<ul style="list-style-type: none"> Object_Name Notify_Type Event_Parameters Object_Property_Reference Event_Enable Notification_Class 	<ul style="list-style-type: none"> None 	Yes	Yes, user create objects only

BACnet Data Points and Configuration Property Definitions

Table 2. Descriptions and configurations (continued)

Object Type	Required Properties Read	Properties Written	Optional Properties Read	Ability to Create	Ability to Delete
Multistate Input	<ul style="list-style-type: none"> Object_Identifier Object_Name Object_Type Present_Value Status_Flags Event_State Out_Of_Service Number_Of_States 	<ul style="list-style-type: none"> Object_Name Description State_Text Out_Of_Service Present_Value Reliability Time_Delay Notification_Class Alarm_Values Fault_Values Event_Enable Notify_Type Number_Of_States 	<ul style="list-style-type: none"> State_Text Description Reliability Time_Delay Notification_Class Alarm_Values Fault_Values Event_Enable Acked_Transitions Notify_Type Event_Time_Stamps 	Yes	Yes, user create objects only
Multistate Output	<ul style="list-style-type: none"> Object_Identifier Object_Name Object_Type Present_Value Status_Flags Event_State Out_Of_Service Number_Of_States Priority_Array Relinquish Default 	<ul style="list-style-type: none"> Object_Name Description State_Text Out_Of_Service Present_Value Reliability Priority_Array Time_Delay Notification_Class Event_Enable Notify_Type Number_Of_States 	<ul style="list-style-type: none"> State_Text Description Reliability Relinquish_Default Time_Delay Notification_Class Feedback_Values Event_Enable Acked_Transitions Notify_Type Event_Time_Stamps 	Yes	Yes, user create objects only
Multistate Value	<ul style="list-style-type: none"> Object_Identifier Object_Name Object_Type Present_Value Status_Flags Event_State Out_Of_Service Number_Of_States 	<ul style="list-style-type: none"> Object_Name Description State_Text Out_Of_Service Present_Value Reliability Priority_Array Relinquish_Default Time_Delay Notification_Class Alarm_Values Fault_Values Event_Enable Notify_Type 	<ul style="list-style-type: none"> State_Text Description Reliability Relinquish_Default Time_Delay Notification_Class Alarm_Values Fault_Values Event_Enable Acked_Transitions Notify_Type Event_Time_Stamps 	Yes	Yes, user create objects only
Notification Class	<ul style="list-style-type: none"> Object_Identifier Object_Name Object_Type Notification_Class Priority Ack_Required Recipient_List 	<ul style="list-style-type: none"> Object_Name Priority Ack_Required Recipient_List 	None	Yes	Yes, user create objects only
Trend	<ul style="list-style-type: none"> Object_Identifier Object_Name Object_Type Log_Enable Stop_When_Full Buffer_Size Log_Buffer Record_Count Total_Record_Count Event_State 	<ul style="list-style-type: none"> Object_Name Log_Enable Start_Time Stop_Time Log_DeviceObjectProperty Log_Interval Stop_When_Full Buffer_Size Record_Count Notification_Threshold Notification_Class Event_Enable Notify_Type 	<ul style="list-style-type: none"> Start_Time Stop_Time Log_DeviceObjectProperty Log_Interval Stop_When_Full Buffer_Size Notification_Threshold Records_Since_Notification Last_Notify_Record Notification_Class Event_Enable Acked_Transitions Event_Time_Stamps Notify_Type 	Yes	Yes, user create objects only

BACnet Data Points and Configuration Property Definitions

Data Link Layer Options

Data Link Layer	Options
BACnet IP, (Annex J)	<input type="checkbox"/>
BACnet IP, (Annex J), Foreign Device	<input type="checkbox"/>
ISO 8802-3, Ethernet (Clause 7)(10Base2, 10Base5, 10BaseT, Fiber)	<input type="checkbox"/>
ANSI/ATA 878.1, 2.5 Mb ARCNET (Clause 8)	<input type="checkbox"/>
ANSI/ATA 878.1, RS-485 ARCNET (Clause 8), Baud Rate(s)	<input type="checkbox"/>
MS/TP Master (Clause 9), Baud Rate(s): 9600, 19200, 38400, and 76800; 1.5% nominal baud rate	<input checked="" type="checkbox"/>
MS/TP Slave (Clause 9), Baud Rate(s)	<input type="checkbox"/>
Point-to-Point, EIA 232 (Clause 10), Baud Rate(s): 9600, 19200, 38400	<input type="checkbox"/>
Point-to-Point, Modem (Clause 10), Baud Rate(s): 9600, 19200, 38400	<input type="checkbox"/>
LonTalk, (Clause 11), Medium	<input type="checkbox"/>
Other	<input type="checkbox"/>

Device Address Binding

Is static device binding supported? ☐ Yes ☒ No

Networking Options

Router	<input type="checkbox"/>
Annex H, BACnet Tunneling	<input type="checkbox"/>
BACnet/IP Broadcast Management Device (BBMD)	<input type="checkbox"/>
Does the BBMD Support Registrations by Foreign Devices?	<input type="checkbox"/>

Character Sets

Indicating support for multiple characters sets does not imply that all character sets are supported simultaneously. Maximum supported string length is 64 bytes (*any character set*).

ANSI X3.4	<input checked="" type="checkbox"/>
IBM/Microsoft DBCS	<input type="checkbox"/>
JIS C 6226	<input type="checkbox"/>
ISO 10646 (UCS-4)	<input type="checkbox"/>
ISO 10646 (UCS2)	<input checked="" type="checkbox"/>
ISO 8859-1	<input checked="" type="checkbox"/>

Object and Diagnostic Data Points

For quick reference, the following tables are listed and sorted two different ways. [Table 3](#) through [Table 11](#) are listed by input/output type and sorted by object type. [Table 12, p. 28](#) is sorted by Object Name.

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 3. Analog Inputs

Object Type	Object Name	Units of Measure	Minimum Maximum	When the Point Exists	Description
AI1	Space Temperature Local	Temperature (°F or °C)	-25°C (-13°F) to 100°C (212°F)	All Units	Local zone temperature or return air temperature. When Space Temperature BAS is in service, the local space temperature will not be used.
AI2	Space Temperature Setpoint Local	Temperature (°F or °C)	4.44°C (39.99°F) to 35°C (95°F)	All Units	Local zone sensor setpoint. When Space Temperature Setpoint BAS is in service, the local setpoint will not be used.
AI3	Space Humidity Local	None	0% to 100%	Dehumidification Units	Local relative humidity sensor value. When Space Humidity BAS is in service, the local value will not be used.
AI4	Discharge Air Temperature	Temperature (°F or °C)	-50°C (-58°F) to 115°C (239°F)	All Units	Discharge air temperature from equipment.
AI5	Entering Water Temperature Local	Temperature (°F or °C)	-0°C (32°F) 100°C (212°F)	All Unit	Local sensor entering water temperature.
AI8	Leaving Water Temperature	Temperature (°F or °C)	-40°C (-40°F) to 70°C (158°F)	All Units	Leaving water temperature sensor.
AI21	Space CO ₂ Concentration Local	None	0 to 2000	CO ₂ Sensing Units	Local carbon dioxide concentration. When Space CO ₂ Concentration BAS is in service, the local value will not be used.

Table 4. Analog Output

Object Type	Object Name	Units of Measure	Minimum Maximum	When the Point Exists	Description
AO1	Supply Fan Motor Signal Output	Percent	0% to 100%	Variable Speed Fan Units	This point sends a control signal to the ECM Fan. 0% is low speed, 100% is high speed. Cannot be written to.

Object and Diagnostic Data Points

Table 5. Analog Value

Object Type	Object Name	Units of Measure	Minimum Maximum	When the Point Exists	Description
AV2	Space Humidity BAS	None	0% to 100%	Dehumidification Units	Communicated space relative humidity. When this point is out of service, the unit will use the local sensor value (AI/3).
AV3	Entering Water Compressor Heat Disable Setpoint	Temperature (°F or °C)	-17.78°C (-0.004°F) to 32.22°C (89.996°F)	Units With Electric Heat	When the entering water temperature drops below this setpoint, the compressor(s) are locked out and electric heat is used. There is 5 degree deadband for re-enabling the compressors.
AV4	Source Water Temperature BAS	Temperature (°F or °C)	0°C (32°F) to 100°C (212°F)	All Units	Communicated entering water temperature. When this point is out of service, the unit will use the local sensor value (AI/5).
AV5	Entering Water Temperature Active	Temperature (°F or °C)	0°C 32°F to 100°C (212°F)	All Units	Actively used entering water temperature.
AV6	Space Humidity Active	Percent	0% to 100%	Dehumidification Units	Actively used space relative humidity.
AV8	Economizer Enable Minimum Water Temperature Setpoint	Percent	0% to 100%	Waterside Economizing Units	If the entering water temperature is ≤ the configured enable setpoint, then economizing is possible. Economizing is not disabled until the water temperature is 5°F above the setpoint.
AV9	Supply Fan Off Delay Time	Seconds	0 to 600	All Units	Fan off delay time using electric heat.
AV10	Compressor Enable BAS	Percent	0% to 100%	All Units	Compressor enable limits the compressor capacity for DX cool and heat pump. <ul style="list-style-type: none"> • 100%; Compressor Enabled. • 1% to 99%; Limits the compressor capacity (for 2 stages of DX: 1% to 50% enables stage 1 and disables stage 2 and 51% to 100% enables both stages). • 0%; Disable Compressor(s).
AV12	Filter Runtime Hours Setpoint	Hours	0 to 10,000	All Units	When the fan runtime exceeds this <i>Maintenance Request Setpoint Time</i> , the controller generates a <i>Maintenance Required</i> diagnostic (not a specified diagnostic for dirty filter). A value of zero disables this feature and no <i>Maintenance Required</i> diagnostic occurs.
AV14	Space Temperature BAS	Temperature (°F or °C)	-15°C (5°F) to 50°C (122°F)	All Units	Communicated space temperature. When this point is out of service, the unit will use the local sensor value (AI/1).
AV17	Supply Fan Speed Maximum Heat Cool Capacity	Percent	73% to 100%	Variable Speed Fan Units	Maximum supply fan speed.
AV18	Supply Fan Speed Dehumidification	Percent	73% to 100%	Variable Speed Fan Units	Fan speed used during dehumidification. This is limited between supply fan speed ventilation, AV20 and the supply fan speed maximum heat cool capacity, AV17.
AV19	Supply Fan Speed First Stage Minimum	Percent	33% to 100%	Variable Speed Fan Units	Fan speed used when first stage of heating or cooling is ON. This is limited between supply fan speed ventilation, AV20 and supply fan speed maximum heat cool capacity, AV17.
AV20	Supply Fan Speed Ventilation	Percent	33% to 100%	Variable Speed Fan Units	Fan speed used when fan is continuously ON and compressor heating or cooling is cycled OFF. This is limited between fan capacity low limit, AV64 and 100%.
AV21	Discharge Air Temperature Low Limit Setpoint	Temperature (°F or °C)	8.33°C (46.00°F) to 12.78°C (55.00°F)	All Units	Discharge air temp setpoint to trigger Low Discharge Air Temp Diagnostic which occurs when DAT ≤ DAT Low Limit (47°F default, selectable between 47°F and 55°F) for a period of 1 minute. When DAT ≥ Low limit setpoint + 5°F, then the control will transition out of Low Discharge Air Temp mode and back to normal cooling.
AV23	Unoccupied Cooling Setpoint	Temperature (°F or °C)	4.44°C (39.99°F) to 46.11°C (114.99°F)	All Units	Cooling setpoint used in unoccupied mode. Factory default is 85°F.
AV24	Unoccupied Heating Setpoint	Temperature (°F or °C)	4.44°C (39.99°F) to 46.11°C (114.99°F)	All Units	Heating setpoint used in unoccupied mode. Factory default is 60°F.
AV27	Space Temperature Setpoint BAS	Temperature (°F or °C)	-10°C (14°F) to 35°C (95°F)	All Units	Communicated space temperature setpoint. When this point is out of service, the unit will use the local setpoint (AI/2).
AV28	Space Temperature Setpoint Active	Temperature (°F or °C)	-10°C (14°F) to 50°C (122°F)	All Units	The currently used space temperature setpoint after arbitration and offsets are applied.
AV29	Heat Cool Mode Changeover Delay	Minutes	0 to 60	All Units	Before a heat/cool mode (or vice versa) changeover is allowed to occur, all capacity (including compressors) need to be OFF for this amount of time.

Object and Diagnostic Data Points

Table 5. Analog Value (continued)

Object Type	Object Name	Units of Measure	Minimum Maximum	When the Point Exists	Description
AV30	Occupied Offset	Temperature (°F or °C)	0°C (32°F) to 17°C (62.6°F)	All Units	The value used to calculate the heating /cooling setpoints in occupied mode and occupied bypass modes. Factory default is 2.5°F. <ul style="list-style-type: none"> Active heating setpoint = active setpoint - occupied offset. Active cooling setpoint = active setpoint + occupied offset.
AV33	Occupied Bypass Time	Minutes	0 to 240	All Units	Duration a unit will go into Occupied Bypass mode when a timed override is initiated.
AV34	Occupied Standby Offset	Temperature (°F or °C)	0°C (32°F) to 17°C (62.6°F)	All Units	The value used to calculate the heating/cooling setpoints in occupied standby mode. Factory default is 7.5°F. <ul style="list-style-type: none"> Active heating setpoint = active setpoint - occupied offset. Active cooling setpoint = active setpoint + occupied offset.
AV36	Space Dehumidification Setpoint BAS	Percent	0% to 100%	Dehumidification Units	<ul style="list-style-type: none"> Active relative humidity (RH) setpoint.
AV37	Space Temperature Setpoint Default	Temperature (°F or °C)	4.44°C (39.99°F) to 46.11°C (114.99°F)	All Units	Default space temperature setpoint when a valid communicated or local space temperature setpoint do not exist. Factory default is 72.5°F.
AV38	Filter Runtime Hours	Hours	0 to 100,000	All Units	Elapsed time (in hours) of fan runtime since the Filter Timer Reset Request (BV/12) was last set to TRUE.
AV40	Loop Water Temperature Low Limit	Temperature (°F or °C)	-6.67°C (19.99°F) to 1.66°C (34.99°F)	All Units	If Leaving Water Temperature (lwt) < Loop Water Temperature Low Limit, this triggers Low Leaving Water Temp Diagnostic. It resets when lwt >= Loop Water Temperature Low Limit +15 °F.
AV46	Compressor PWM Cycle Period	Seconds	360 to 3600	All Units	The total period for compressor PWM operation. The factory default 1200 seconds (2 hours).
AV47	Electric Heat PWM Cycle Period	Seconds	360 to 3600	Electric Heat Units	The total period for electric heat PWM operation. The factory default is 1200 seconds (2 hours).
AV48	Waterside Economizer PWM Cycle Period	Seconds	360 to 3600	Waterside Economizing Units	The total period for waterside economizing PWM operation. The factory default is 1200 seconds (2 hours).
AV49	Compressor Delay	Seconds	20 to 120	All Units	Isolation valve turns on for this amount of time before compressor is allowed to turn on.
AV59	Space Temperature Active	Temperature (°F or °C)	-15°C (5°F) to 50°C (122°F)	All Units	The currently used space temperature.
AV64	Fan Capacity Low Limit	Percent	0% to 100%	Variable Speed Fan Units	Lowest speed at which the fan can run. User cannot change.
AV67	Auxiliary Heat Control Request	Percent	0% to 100%	Electric and Hot Gas Reheat Units	Auxiliary heating capacity limit.
AV68	Space Relative Humidity Offset	None	None	Dehumidification Units	<ul style="list-style-type: none"> Dehumidification starts when the relative humidity is greater than relative humidity setpoint. Dehumidification stops at relative humidity if less than RH setpoint - offset. Default is 8%.
AV73	Supply Fan Speed Status	Percent	0% to 100%	All Units	Current fan capacity.
AV74	Heating Capacity Primary Status	Percent	0% to 100%	All Units	Heat Pumps: Current primary heating capacity of the compressors (in heat mode). If compressors are cooling only, this will report the current electric heat capacity.
AV75	Heating Capacity Secondary Status	Percent	0% to 100%	Electric or Hot Gas Reheat Units	<ul style="list-style-type: none"> Current capacity of the secondary heat source (electric or hot gas reheat).
AV76	Cooling Capacity Status	Percent	0% to 100%	All Units	Current capacity of the compressors when in a cooling mode: <ul style="list-style-type: none"> For 1 compressor: 0% is OFF, 100% is ON, no values in between. For 2 compressors: 0% is OFF, 50% is 1 compressor ON, 100% is both compressors ON.
AV87	Cooling Setpoint High Limit	Temperature (°F or °C)	4.44°C (39.99°F) to 46.11°C (114.998°F)	All Units	Value used to limit cooling setpoint. Factory default is 110°F.
AV88	Cooling Setpoint Low Limit	Temperature (°F or °C)	4.44°C (39.99°F) to 46.11°C (114.998°F)	All Units	Value used to limit cooling setpoint. Factory default is 40°F.

Object and Diagnostic Data Points

Table 5. Analog Value (continued)

Object Type	Object Name	Units of Measure	Minimum Maximum	When the Point Exists	Description
AV89	Heating Setpoint High Limit	Temperature (°F or °C)	4.44°C (39.99°F) to 46.11°C (114.998°F)	All Units	Value used to limit heating setpoint. Factory default is 105°F
AV90	Heating Setpoint Low Limit	Temperature (°F or °C)	4.44°C (39.99°F) to 46.11°C (114.998°F)	All Units	Value used to limit heating setpoint. Factory default is 40°F

Table 6. Binary Input

Object Type	Object Name	Units of Measure	Minimum Maximum	When the Point Exists	Description
BI1	Occupancy Input	None	None	All Units	Normally open input. • 0 = Occupied • 1 = Unoccupied
BI2	Compressor 1 Lockout Status	None	None	All Units	Normally closed input. • Compressor 1 Protection (high or low pressure or freeze protection). • 0 = Inactive • 1 = Locked out
BI3	Compressor 2 Lockout Status	None	None	2 Compressor Units	Normally closed input. • Compressor 2 Protection (high or low pressure or freeze protection). • 0 = Inactive • 1 = Locked out
BI4	Condensate Overflow Input	None	None	All Units	Normally open input. • 0 = Normal • 1 = Overflow
BI5	In Defrost	None	None	All Units	Normally closed input. • 0 = Not in defrost • 1 = In defrost
BI6	Supply Fan Status	None	None	Optional	Normally open input. • 0 = OFF • 1 = ON (fan running)

Object and Diagnostic Data Points

Table 7. Binary Output

Object Type	Object Name	Units of Measure	Minimum Maximum	When the Point Exists	Description
BO1	Supply Fan Enable	None	None	ECM Fan Motor Units	Enables/disables the variable-speed fan. • 0 = Disable • 1 = Enable
BO2	Waterside Economizer Valve Command	None	None	Waterside Economizing Units	• 0 = Closed • 1 = Open
BO4	Compressor 1 Command	None	None	All units	• 0 = OFF • 1 = ON
BO5	Compressor 2 Command	None	None	2 Compressor Units	• 0 = OFF • 1 = ON
BO6	Auxiliary Heat Command	None	None	Electric Heat Units	Electric Heat • 0 = OFF • 1 = ON
BO6	Dehumidification Output	None	None	Dehumidification Units (Hot Gas Reheat)	Hot Gas Reheat • 0 = OFF • 1 = ON
BO7	Reversing Valve Output	None	None	All Units	Reversing Valve Output • 0 = Cooling • 1 = Heating
BO8	Isolation Valve Command	None	None	All Units	Isolation Valve/External Pump • 0 = Closed • 1 = Open
BO9	Outdoor Air Damper Position Status	None	None	Units With Outdoor Air Damper	2-position Damper • 0 = Closed • 1 = Open

Object and Diagnostic Data Points

Table 8. Binary Value

Object Type	Object Name	Units of Measure	Minimum Maximum	When the Point Exists	Description
BV1	Supply Fan Configuration Command	None	None	All Units	<ul style="list-style-type: none"> Fan in occupied modes can cycle on/off with capacity or can be on continuously. 1=Continuous 0=Cycling (default)
BV2	Reset Diagnostic	None	None	All Units	1 = Reset diagnostics. This will reset ALL diagnostics except the <i>Filter Change Required</i> . If the condition still exists, the diagnostic reoccurs. After the UC resets the diagnostics, this value automatically reverts back to 0.
BV3	Diagnostic: Low Discharge Air Temperature	None	None	All Units	Low Leaving Air Protection Diagnostic <ul style="list-style-type: none"> 0 = Normal 1 =In Alarm
BV4	Diagnostic: Condensate Overflow	None	None	All Units	Condensate Overflow Diagnostic <ul style="list-style-type: none"> 0 =Normal 1 =In alarm Latching diagnostic. Cleared with Reset Diagnostic Request or power cycle.
BV5	Waterside Economizer Fan Speed	None	None	Waterside Economizing Units	Use this fan speed when arbitrated fan switch is auto during waterside economizing (with no compressor on). <ul style="list-style-type: none"> 0 = Low 1 = High
BV6	Diagnostic: Low Primary Air Flow	None	None	Fan Proving Option	Fan status diagnostic (B15). <ul style="list-style-type: none"> 0 = Normal 1 = In alarm Latching; Cleared with Reset Diagnostic Request or power cycle.
BV7	First Stage Compressor Minimum Fan Speed	None	None	2 Compressor Units	Fan speed when only 1 of 2 compressors are ON. <ul style="list-style-type: none"> 0 = Low (default) 1 = High
BV8	Diagnostic: Filter Change Required	None	None	All Units	Filter Status Diagnostic (based on fan run hours). <ul style="list-style-type: none"> 0 = Clean 1 = Dirty Non-latching (will clear automatically when resolved)
BV9	Water Temperature Sampling Enable	None	None	All Units	Set this to false to disable entering water temperature sampling. <ul style="list-style-type: none"> 0 = Disabled 1 = Enable
BV10	Diagnostic: Compressor 2 Failure	None	None	2 Compressor Units	Compressor 2 Protection Status (high or low pressure or freeze protection). This has a one time auto-reset function. If the diagnostic recurs within 24 hours after an auto-reset the diagnostic latches and must be manually reset. <ul style="list-style-type: none"> 0 = Normal 1 = In alarm
BV11	Dehumidification Status	None	None	Dehumidification Units	<ul style="list-style-type: none"> 1 = Dehumidification is active 0 = Not active
BV12	Filter Timer Reset	None	None	All Units	1 = Reset the filter timer. After the UC resets the timer, this binary value reverts back to 0.
BV14	Predicted Occupied Heat Cool Mode Status	None	None	All Units	<i>Anticipated Heat Cool</i> mode upon entering the occupied mode. The value is calculated based on current space conditions and occupied setpoints. Can be used to anticipate load on water loop when transitioning into occupied mode.
BV15	Diagnostic: Compressor 1 Failure	None	None	All Units	Compressor 1 Protection Status (high or low pressure or freeze protection) This has a one time auto-reset function. If the diagnostic recurs within 24 hours after an auto-reset the diagnostic latches and must be manually reset. <ul style="list-style-type: none"> 0 = Normal 1 = In alarm
BV17	Diagnostic: Low Leaving Water Temperature	None	None	All Units	Low Leaving Water Temp Diagnostic. <ul style="list-style-type: none"> 0 = Normal 1 = In alarm
BV18	Boilerless Control Enable	None	None	All Units	Boilerless Control <ul style="list-style-type: none"> 0 = Disable 1 = Enable

Object and Diagnostic Data Points

Table 9. Multi-state Input

Object Type	Object Name	Units of Measure	Minimum Maximum	When the Point Exists	Description
MI1	Timed Override Status	None	None	All Units	Status of timed override request/cancel from space temperature input. <ul style="list-style-type: none"> 1 = Idle 2 = ON 3 = Cancel
MI2	Supply Fan Speed Setpoint Local	None	None	All Units	Local fan switch. <ul style="list-style-type: none"> 1 = Auto 2 = Off 3 = Low 4 = Medium 5 = High
MI3	Communication Status	None	None	All Units	Communication status between unit controller and Trane system controllers.
MI4	Wireless Sensor Battery Level	None	None	Trane Wireless Comm Enabled Terminal Units	Description: Monitors the battery level of Trane wireless zone sensors on Trane Wireless Comm systems. <ul style="list-style-type: none"> 1 = Replace Batteries 2 = Schedule Replacement 3 = Good

Table 10. Multi-state Output

Object Type	Object Name	Units of Measure	Minimum Maximum	When the Point Exists	Description
MO1	Fan Supply Output	None	None	1- and 2-speed Fan Units (Not Variable Speed)	<ul style="list-style-type: none"> Fan speed output for 1- and 2-speed fan units. 1 = Auto 2 = Off 3 = Low 4 = Medium 5 = High <p>Note: For 1 speed fan, states 3,4 and 5 are all treated as high speed. For 2 speed fan, state 3 is low speed and states 4 and 5 are high speed</p>

Table 11. Multi-state Value

Object Type	Object Name	Units of Measure	Minimum Maximum	When the Point Exists	Description
MV1	Supply Fan Staged Speed Status	None	None	1- and 2-Speed Only	Discrete fan speed status for 1- and 2-speed fan units. <ul style="list-style-type: none"> 1 = Auto 2 = Off 3 = Low 4 = Medium 5 = High
MV2	Cooling Fan Speed Default	None	None	All Units	Default fan speed when cooling. <ul style="list-style-type: none"> 1 = Auto 2 = Off 3 = Low 4 = Medium 5 = High
MV3	Heating Fan Speed Default	None	None	All Units	Default fan speed when heating. <ul style="list-style-type: none"> 1 = Auto 2 = Off 3 = Low 4 = Medium 5 = High

Object and Diagnostic Data Points

Table 11. Multi-state Value (continued)

Object Type	Object Name	Units of Measure	Minimum Maximum	When the Point Exists	Description
MV4	Heat Cool Mode Request	None	None	All Units	<ul style="list-style-type: none"> • 1 = Auto • 2 = Heat • 3 = Morning warm-up • 4 = Cool • 5 = Night Purge • 6 = Pre Cool • 7 = Off • 8 = Test (status only) • 9 = Emergency Heat • 10 = Fan Only • 11 = Free Cool (treats this as Auto) • 12 = Ice-Making (treat this as Auto) • 13 = Max Heat (treats this as Auto) • 14 = Economizer (treats as Auto) • 15 = Dehumidify (treats this as Auto) • 16 = Calibrate (treats this as Auto)
MV5	Heat Cool Mode Status	None	None	All Units	<ul style="list-style-type: none"> • 1 = Auto • 2 = Heat • 3 = Morning warm-up • 4 = Cool • 5 = Pre Cool • 6 = Off • 7 = Test • 8 = Emergency Heat
MV6	Occupancy Request	None	None	All Units	<ul style="list-style-type: none"> • 1 = Occupied • 2 = Unoccupied • 3 = Occupied Bypass • 4 = Occupied Standby • 5 = Auto
MV7	Occupancy Status	None	None	All Units	<ul style="list-style-type: none"> • 1 = Occupied • 2 = Unoccupied • 3 = Occupied Bypass • 4 = Occupied Standby
MV8	Supply Fan Staged Speed Setpoint BAS	None	None	All Units	<p>Communicated fan speed setpoint. When in Auto, the controller will use the local fan speed decision.</p> <ul style="list-style-type: none"> • 1 = Auto • 2 = Off • 3 = Low • 4 = Medium • 5 = High
MV9	Emergency Override BAS	None	None	All Units	<ul style="list-style-type: none"> • 1 = Normal • 2 = Pressurize • 3 = De-pressurized • 4 = Purge • 5 = Shutdown • 6 = Fire <p>1 = normal operation. All other values are treated like shutdown. Unit turns OFF/Closes all outputs immediately.</p>
MV12	Manual Test Sequence	None	None	All Units	If using TU to perform manual test, then this also is the command/request.
MV15	Economizer Waterside Enable Command	None	None	Waterside Economizing Units	<ul style="list-style-type: none"> • 1 = Disabled • 2 = Enabled • 3 = Auto <p>Auto means that the local decision determines waterside economizer operation. Enabled or disabled means that economizer operation is allowed or not allowed, overriding the local decision.</p>

Object and Diagnostic Data Points

Table 12. All Object Types Sorted by Object Name

Object Type	Object Name	Units of Measure	Minimum Maximum	When the Point Exists	Description
BO6	Auxiliary Heat Command	None	None	Electric Heat Units	Electric Heat • 0 = OFF • 1 = ON
AV67	Auxiliary Heat Control Request	Percent	0% to 100%	Electric and Hot Gas Reheat Units	Auxiliary heating capacity limit.
BV18	Boilerless Control Enable	None	None	All Units	Boilerless Control • 0 = Disable • 1 = Enable
MI3	Communication Status	None	None	All Units	Communication status between unit controller and Trane system controllers.
BO4	Compressor 1 Command	None	None	All units	• 0 = OFF • 1 = ON
BI2	Compressor 1 Lockout Status	None	None	All Units	Normally closed input. • Compressor 1 Protection (high or low pressure or freeze protection). • 0 = Inactive • 1 = Locked out
BO5	Compressor 2 Command	None	None	2 Compressor Units	• 0 = OFF • 1 = ON
BI3	Compressor 2 Lockout Status	None	None	2 Compressor Units	Normally closed input. • Compressor 2 Protection (high or low pressure or freeze protection). • 0 = Inactive • 1 = Locked out
AV49	Compressor Delay	Seconds	20 to 120	All Units	Isolation valve turns on for this amount of time before compressor is allowed to turn on.
AV10	Compressor Enable BAS	Percent	0% to 100%	All Units	Compressor enable limits the compressor capacity for DX cool and heat pump. • 100%; Compressor Enabled. • 1% to 99%; Limits the compressor capacity (for 2 stages of DX: 1% to 50% enables stage 1 and disables stage 2 and 51% to 100% enables both stages). • 0%; Disable Compressor(s).
AV46	Compressor PWM Cycle Period	Seconds	360 to 3600	All Units	The total period for compressor PWM operation. The factory default 1200 seconds (2 hours).
BI4	Condensate Overflow Input	None	None	All Units	Normally open input. • 0 = Normal • 1 = Overflow
AV76	Cooling Capacity Status	Percent	0% to 100%	All Units	Current capacity of the compressors when in a cooling mode: • For 1 compressor: 0% is OFF, 100% is ON, no values in between. • For 2 compressors: 0% is OFF, 50% is 1 compressor ON, 100% is both compressors ON.
MV2	Cooling Fan Speed Default	None	None	All Units	Default fan speed when cooling. • 1 = Auto • 2 = Off • 3 = Low • 4 = Medium • 5 = High
AV87	Cooling Setpoint High Limit	Temperature (°F or °C)	4.44°C (39.99°F) to 46.11°C (114.998°F)	All Units	Value used to limit cooling setpoint. Factory default is 110°F.
AV88	Cooling Setpoint Low Limit	Temperature (°F or °C)	4.44°C (39.99°F) to 46.11°C (114.998°F)	All Units	Value used to limit cooling setpoint. Factory default is 40°F.
BO6	Dehumidification Output	None	None	Dehumidification Units (Hot Gas Reheat)	Hot Gas Reheat • 0 = OFF • 1 = ON

Object and Diagnostic Data Points

Table 12. All Object Types Sorted by Object Name (continued)

Object Type	Object Name	Units of Measure	Minimum Maximum	When the Point Exists	Description
BV11	Dehumidification Status	None	None	Dehumidification Units	<ul style="list-style-type: none"> 1 = Dehumidification is active 0 = Not active
BV15	Diagnostic: Compressor 1 Failure	None	None	All Units	<p>Compressor 1 Protection Status (high or low pressure or freeze protection). This has a one time auto-reset function. If the diagnostic recurs within 24 hours after an auto-reset the diagnostic latches and must be manually reset.</p> <ul style="list-style-type: none"> 0 = Normal 1 = In alarm
BV10	Diagnostic: Compressor 2 Failure	None	None	2 Compressor Units	<p>Compressor 2 Protection Status (high or low pressure or freeze protection). This has a one time auto-reset function. If the diagnostic recurs within 24 hours after an auto-reset the diagnostic latches and must be manually reset.</p> <ul style="list-style-type: none"> 0 = Normal 1 = In alarm
BV4	Diagnostic: Condensate Overflow	None	None	All Units	<p>Condensate Overflow Diagnostic</p> <ul style="list-style-type: none"> 0 = Normal 1 = In alarm <p>Latching diagnostic. Cleared with Reset Diagnostic Request or power cycle.</p>
BV8	Diagnostic: Filter Change Required	None	None	All Units	<p>Filter Status Diagnostic (based on fan run hours).</p> <ul style="list-style-type: none"> 0 = Clean 1 = Dirty <p>Non-latching (will clear automatically when resolved)</p>
BV3	Diagnostic: Low Discharge Air Temperature	None	None	All Units	<p>Low Leaving Air Protection Diagnostic</p> <ul style="list-style-type: none"> 0 = Normal 1 = In Alarm
BV17	Diagnostic: Low Leaving Water Temperature	None	None	All Units	<p>Low Leaving Water Temp Diagnostic.</p> <ul style="list-style-type: none"> 0 = Normal 1 = In alarm
BV6	Diagnostic: Low Primary Air Flow	None	None	Fan Proving Option	<p>Fan status diagnostic (BI5).</p> <ul style="list-style-type: none"> 0 = Normal 1 = In alarm <p>Latching; Cleared with Reset Diagnostic Request or power cycle.</p>
AI4	Discharge Air Temperature	Temperature (°F or °C)	-50°C (-58°F) to 115°C (239°F)	All Units	Discharge air temperature from equipment.
AV21	Discharge Air Temperature Low Limit Setpoint	Temperature (°F or °C)	8.33°C (46.00°F) to 12.78°C (55.00°F)	All Units	Discharge air temp setpoint to trigger Low Discharge Air Temp Diagnostic which occurs when DAT ≤ DAT Low Limit (47°F default, selectable between 47°F and 55°F) for a period of 1 minute. When DAT ≥ Low limit setpoint + 5°F, then the control will transition out of Low Discharge Air Temp mode and back to normal cooling.
AV8	Economizer Enable Minimum Water Temperature Setpoint	Percent	0% to 100%	Waterside Economizing Units	If the entering water temperature is ≤ the configured enable setpoint, then economizing is possible. Economizing is not disabled until the water temperature is 5°F above the setpoint.
MV15	Economizer Waterside Enable Command	None	None	Waterside Economizing Units	<ul style="list-style-type: none"> 1 = Disabled 2 = Enabled 3 = Auto <p>Auto means that the local decision determines waterside economizer operation. Enabled or disabled means that economizer operation is allowed or not allowed, overriding the local decision.</p>
AV47	Electric Heat PWM Cycle Period	Seconds	360 to 3600	Electric Heat Units	The total period for electric heat PWM operation. The factory default is 1200 seconds (2 hours).

Object and Diagnostic Data Points

Table 12. All Object Types Sorted by Object Name (continued)

Object Type	Object Name	Units of Measure	Minimum Maximum	When the Point Exists	Description
MV9	Emergency Override BAS	None	None	All Units	<ul style="list-style-type: none"> • 1 = Normal • 2 = Pressurize • 3 = De-pressurized • 4 = Purge • 5 = Shutdown • 6 = Fire <p>1 = normal operation. All other values are treated like shutdown. Unit turns OFF/Closes all outputs immediately.</p>
AV3	Entering Water Compressor Heat Disable Setpoint	Temperature (°F or °C)	-17.78°C (-0.004°F) to 32.22°C (89.996°F)	Units With Electric Heat	When the entering water temperature drops below this setpoint, the compressor(s) are locked out and electric heat is used. There is 5 degree deadband for re-enabling the compressors.
AV5	Entering Water Temperature Active	Temperature (°F or °C)	0°C 32°F to 100°C (212°F)	All Units	Actively used entering water temperature.
AI5	Entering Water Temperature Local	Temperature (°F or °C)	-0°C (32°F) 100°C (212°F)	All Unit	Local sensor entering water temperature.
AV64	Fan Capacity Low Limit	Percent	0% to 100%	Variable Speed Fan Units	Lowest speed at which the fan can run. User cannot change.
MO1	Fan Supply Output	None	None	1- and 2-speed Fan Units (Not Variable Speed)	<ul style="list-style-type: none"> • Fan speed output for 1- and 2-speed fan units. • 1 = Auto • 2 = Off • 3 = Low • 4 = Medium • 5 = High <p>Note: For 1 speed fan, states 3,4 and 5 are all treated as high speed. For 2 speed fan, state 3 is low speed and states 4 and 5 are high speed</p>
AV38	Filter Runtime Hours	Hours	0 to 100,000	All Units	Elapsed time (in hours) of fan runtime since the Filter Timer Reset Request (BV/12) was last set to TRUE.
AV12	Filter Runtime Hours Setpoint	Hours	0 to 10,000	All Units	When the fan runtime exceeds this <i>Maintenance Request Setpoint Time</i> , the controller generates a <i>Maintenance Required</i> diagnostic (not a specified diagnostic for dirty filter). A value of zero disables this feature and no <i>Maintenance Required</i> diagnostic occurs.
BV12	Filter Timer Reset	None	None	All Units	1 = Reset the filter timer. After the UC resets the timer, this binary value reverts back to 0.
BV7	First Stage Compressor Minimum Fan Speed	None	None	2 Compressor Units	<p>Fan speed when only 1 of 2 compressors are ON.</p> <ul style="list-style-type: none"> • 0 = Low (default) • 1 = High
AV29	Heat Cool Mode Changeover Delay	Minutes	0 to 60	All Units	Before a heat/cool mode (or vice versa) changeover is allowed to occur, all capacity (including compressors) need to be OFF for this amount of time.
MV4	Heat Cool Mode Request	None	None	All Units	<ul style="list-style-type: none"> • 1 = Auto • 2 = Heat • 3 = Morning warm-up • 4 = Cool • 5 = Night Purge • 6 = Pre Cool • 7 = Off • 8 = Test (status only) • 9 = Emergency Heat • 10 = Fan Only • 11 = Free Cool (treats this as Auto) • 12 = Ice-Making (treat this as Auto) • 13 = Max Heat (treats this as Auto) • 14 = Economizer (treats as Auto) • 15 = Dehumidify (treats this as Auto) • 16 = Calibrate (treats this as Auto)

Object and Diagnostic Data Points

Table 12. All Object Types Sorted by Object Name (continued)

Object Type	Object Name	Units of Measure	Minimum Maximum	When the Point Exists	Description
MV5	Heat Cool Mode Status	None	None	All Units	<ul style="list-style-type: none"> 1 = Auto 2 = Heat 3 = Morning warm-up 4 = Cool 5 = Pre Cool 6 = Off 7 = Test 8 = Emergency Heat
AV74	Heating Capacity Primary Status	Percent	0% to 100%	All Units	Heat Pumps: Current primary heating capacity of the compressors (in heat mode). If compressors are cooling only, this will report the current electric heat capacity.
AV75	Heating Capacity Secondary Status	Percent	0% to 100%	Electric or Hot Gas Reheat Units	<ul style="list-style-type: none"> Current capacity of the secondary heat source (electric or hot gas reheat).
MV3	Heating Fan Speed Default	None	None	All Units	Default fan speed when heating. <ul style="list-style-type: none"> 1 = Auto 2 = Off 3 = Low 4 = Medium 5 = High
AV89	Heating Setpoint High Limit	Temperature (°F or °C)	4.44°C (39.99°F) to 46.11°C (114.998°F)	All Units	Value used to limit heating setpoint. Factory default is 105°F
AV90	Heating Setpoint Low Limit	Temperature (°F or °C)	4.44°C (39.99°F) to 46.11°C (114.998°F)	All Units	Value used to limit heating setpoint. Factory default is 40°F
BI5	In Defrost	None	None	All Units	Normally closed input. <ul style="list-style-type: none"> 0 = Not in defrost 1 = In defrost
BO8	Isolation Valve Command	None	None	All Units	Isolation Valve/External Pump <ul style="list-style-type: none"> 0 = Closed 1 = Open
AI8	Leaving Water Temperature	Temperature (°F or °C)	-40°C (-40°F) to 70°C (158°F)	All Units	Leaving water temperature sensor.
AV40	Loop Water Temperature Low Limit	Temperature (°F or °C)	-6.67°C (19.99°F) to 1.66°C (34.99°F)	All Units	If Leaving Water Temperature (lwt) < Loop Water Temperature Low Limit, this triggers Low Leaving Water Temp Diagnostic. It resets when lwt >= Loop Water Temperature Low Limit +15 °F.
MV12	Manual Test Sequence	None	None	All Units	If using TU to perform manual test, then this also is the command/request.
BI1	Occupancy Input	None	None	All Units	Normally open input. <ul style="list-style-type: none"> 0 = Occupied 1 = Unoccupied
MV6	Occupancy Request	None	None	All Units	<ul style="list-style-type: none"> 1 = Occupied 2 = Unoccupied 3 = Occupied Bypass 4 = Occupied Standby 5 = Auto
MV7	Occupancy Status	None	None	All Units	<ul style="list-style-type: none"> 1 = Occupied 2 = Unoccupied 3 = Occupied Bypass 4 = Occupied Standby
AV33	Occupied Bypass Time	Minutes	0 to 240	All Units	Duration a unit will go into Occupied Bypass mode when a timed override is initiated.
AV30	Occupied Offset	Temperature (°F or °C)	0°C (32°F) to 17°C (62.6°F)	All Units	The value used to calculate the heating /cooling setpoints in occupied mode and occupied bypass modes. Factory default is 2.5°F. <ul style="list-style-type: none"> Active heating setpoint = active setpoint - occupied offset. Active cooling setpoint = active setpoint + occupied offset.

Object and Diagnostic Data Points

Table 12. All Object Types Sorted by Object Name (continued)

Object Type	Object Name	Units of Measure	Minimum Maximum	When the Point Exists	Description
AV34	Occupied Standby Offset	Temperature (°F or °C)	0°C (32°F) to 17°C (62.6°F)	All Units	The value used to calculate the heating/cooling setpoints in occupied standby mode. Factory default is 7.5°F. <ul style="list-style-type: none"> Active heating setpoint = active setpoint - occupied offset. Active cooling setpoint = active setpoint + occupied offset.
BO9	Outdoor Air Damper Position Status	None	None	Units With Outdoor Air Damper	2-position Damper <ul style="list-style-type: none"> 0 = Closed 1 = Open
BV14	Predicted Occupied Heat Cool Mode Status	None	None	All Units	<i>Anticipated Heat Cool</i> mode upon entering the occupied mode. The value is calculated based on current space conditions and occupied setpoints. Can be used to anticipate load on water loop when transitioning into occupied mode.
BV2	Reset Diagnostic	None	None	All Units	1 = Reset diagnostics. This will reset ALL diagnostics except the <i>Filter Change Required</i> . If the condition still exists, the diagnostic reoccurs. After the UC resets the diagnostics, this value automatically reverts back to 0.
BO7	Reversing Valve Output	None	None	All Units	Reversing Valve Output <ul style="list-style-type: none"> 0 = Cooling 1 = Heating
AV4	Source Water Temperature BAS	Temperature (°F or °C)	0°C (32°F) to 100°C (212°F)	All Units	Communicated entering water temperature. When this point is out of service, the unit will use the local sensor value (AI/5).
AI21	Space CO ₂ Concentration Local	None	0 to 2000	CO ₂ Sensing Units	Local carbon dioxide concentration. When Space CO ₂ Concentration BAS is in service, the local value will not be used.
AV36	Space Dehumidification Setpoint BAS	Percent	0% to 100%	Dehumidification Units	<ul style="list-style-type: none"> Active relative humidity (RH) setpoint.
AV6	Space Humidity Active	Percent	0% to 100%	Dehumidification Units	Actively used space relative humidity.
AV2	Space Humidity BAS	None	0% to 100%	Dehumidification Units	Communicated space relative humidity. When this point is out of service, the unit will use the local sensor value (AI/3).
AI3	Space Humidity Local	None	0% to 100%	Dehumidification Units	Local relative humidity sensor value. When Space Humidity BAS is in service, the local value will not be used.
AV68	Space Relative Humidity Offset	None	None	Dehumidification Units	<ul style="list-style-type: none"> Dehumidification starts when the relative humidity is greater than relative humidity setpoint. Dehumidification stops at relative humidity if less than RH setpoint - offset. Default is 8%.
AV59	Space Temperature Active	Temperature (°F or °C)	-15°C (5°F) to 50°C (122°F)	All Units	The currently used space temperature.
AV14	Space Temperature BAS	Temperature (°F or °C)	-15°C (5°F) to 50°C (122°F)	All Units	Communicated space temperature. When this point is out of service, the unit will use the local sensor value (AI/1).
AI1	Space Temperature Local	Temperature (°F or °C)	-25°C (-13°F) to 100°C (212°F)	All Units	Local zone temperature or return air temperature. When Space Temperature BAS is in service, the local space temperature will not be used.
AV28	Space Temperature Setpoint Active	Temperature (°F or °C)	-10°C (14°F) to 50°C (122°F)	All Units	The currently used space temperature setpoint after arbitration and offsets are applied.
AV27	Space Temperature Setpoint BAS	Temperature (°F or °C)	-10°C (14°F) to 35°C (95°F)	All Units	Communicated space temperature setpoint. When this point is out of service, the unit will use the local setpoint (AI/2).
AV37	Space Temperature Setpoint Default	Temperature (°F or °C)	4.44°C (39.99°F) to 46.11°C (114.99°F)	All Units	Default space temperature setpoint when a valid communicated or local space temperature setpoint do not exist. Factory default is 72.5°F.
AI2	Space Temperature Setpoint Local	Temperature (°F or °C)	4.44°C (39.99°F) to 35°C (95°F)	All Units	Local zone sensor setpoint. When Space Temperature Setpoint BAS is in service, the local setpoint will not be used.
BV1	Supply Fan Configuration Command	None	None	All Units	<ul style="list-style-type: none"> Fan in occupied modes can cycle on/off with capacity or can be on continuously. 1=Continuous 0=Cycling (default)
BO1	Supply Fan Enable	None	None	Variable Speed Fan Units	Enables/disables the variable-speed fan. <ul style="list-style-type: none"> 0 = Disable 1 = Enable

Object and Diagnostic Data Points

Table 12. All Object Types Sorted by Object Name (continued)

Object Type	Object Name	Units of Measure	Minimum Maximum	When the Point Exists	Description
AO1	Supply Fan Motor Signal Output	Percent	0% to 100%	Variable Speed Fan Units	This point sends a control signal to the ECM Fan. 0% is low speed, 100% is high speed. Cannot be written to.
AV9	Supply Fan Off Delay Time	Seconds	0 to 600	All Units	Fan off delay time using electric heat.
AV18	Supply Fan Speed Dehumidification	Percent	73% to 100%	Variable Speed Fan Units	Fan speed used during dehumidification. This is limited between supply fan speed ventilation, AV20 and the supply fan speed maximum heat cool capacity, AV17.
AV19	Supply Fan Speed First Stage Minimum	Percent	33% to 100%	Variable Speed Fan Units	Fan speed used when first stage of heating or cooling is ON. This is limited between supply fan speed ventilation, AV20 and supply fan speed maximum heat cool capacity, AV17.
AV17	Supply Fan Speed Maximum Heat Cool Capacity	Percent	73% to 100%	Variable Speed Fan Units	Maximum supply fan speed.
MI2	Supply Fan Speed Setpoint Local	None	None	All Units	Local fan switch. <ul style="list-style-type: none"> • 1 = Auto • 2 = Off • 3 = Low • 4 = Medium • 5 = High
AV73	Supply Fan Speed Status	Percent	0% to 100%	All Units	Current fan capacity.
AV20	Supply Fan Speed Ventilation	Percent	33% to 100%	Variable Speed Fan Units	Fan speed used when fan is continuously ON and compressor heating or cooling is cycled OFF. This is limited between fan capacity low limit, AV64 and 100%.
MV8	Supply Fan Staged Speed Setpoint BAS	None	None	All Units	Communicated fan speed setpoint. When in Auto, the controller will use the local fan speed decision. <ul style="list-style-type: none"> • 1 = Auto • 2 = Off • 3 = Low • 4 = Medium • 5 = High
MV1	Supply Fan Staged Speed Status	None	None	1- and 2-Speed Only	Discrete fan speed status for 1- and 2-speed fan units. <ul style="list-style-type: none"> • 1 = Auto • 2 = Off • 3 = Low • 4 = Medium • 5 = High
BI6	Supply Fan Status	None	None	Optional	Normally open input. <ul style="list-style-type: none"> • 0 = OFF • 1 = ON (fan running)
MI1	Timed Override Status	None	None	All Units	Status of timed override request/cancel from space temperature input. <ul style="list-style-type: none"> • 1 = Idle • 2 = ON • 3 = Cancel
AV23	Unoccupied Cooling Setpoint	Temperature (°F or °C)	4.44°C (39.99°F) to 46.11°C (114.99°F)	All Units	Cooling setpoint used in unoccupied mode. Factory default is 85°F.
AV24	Unoccupied Heating Setpoint	Temperature (°F or °C)	4.44°C (39.99°F) to 46.11°C (114.99°F)	All Units	Heating setpoint used in unoccupied mode. Factory default is 60°F.
BV9	Water Temperature Sampling Enable	None	None	All Units	Set this to false to disable entering water temperature sampling. <ul style="list-style-type: none"> • 0 = Disabled • 1 = Enable
BV5	Waterside Economizer Fan Speed	None	None	Waterside Economizing Units	Use this fan speed when arbitrated fan switch is auto during waterside economizing (with no compressor on). <ul style="list-style-type: none"> • 0 = Low • 1 = High
AV48	Waterside Economizer PWM Cycle Period	Seconds	360 to 3600	Waterside Economizing Units	The total period for waterside economizing PWM operation. The factory default is 1200 seconds (2 hours).

Table 12. All Object Types Sorted by Object Name (continued)

Object Type	Object Name	Units of Measure	Minimum Maximum	When the Point Exists	Description
BO2	Waterside Economizer Valve Command	None	None	Waterside Economizing Units	<ul style="list-style-type: none"> • 0 = Closed • 1 = Open
MI4	Wireless Sensor Battery Level	None	None	Trane Wireless Comm Enabled Terminal Units	Description: Monitors the battery level of Trane wireless zone sensors on Trane Wireless Comm systems. <ul style="list-style-type: none"> • 1 = Replace Batteries • 2 = Schedule Replacement • 3 = Good

Alarming

The UC400 unit for VAV has several objects used for communicating alarms to the system.

Table 13. Alarm Objects

Object Type	Object Name	Description	Notification Class
AI1	Space Temperature Local	Local zone sensor temperature or return air temperature. Local zone temperature or return air temperature. When Space Temperature BAS is in service, the local space temperature will not be used.	2
AI2	Space Temperature Setpoint Local	Local zone sensor setpoint. When Space Temperature Setpoint BAS is in service, the local setpoint will not be used.	2
AI21	Space CO2 Concentration Local	Local carbon dioxide concentration.	2
AI3	Space Humidity Local	Local relative humidity sensor value. When Space Humidity BAS is in service, the local value will not be used.	2
AI4	Discharge Air Temperature	Discharge air temperature from equipment.	2
AI5	Entering Water Temperature Local	Local sensor entering water temperature.	2
AI8	Leaving Water Temperature	Leaving water temperature.	2
AV59	Space Temperature Active	The currently used space temperature.	2
BI4	Condensate Overflow Input	Normally open input. • 0 = Normal • 1 = Overflow	0
BI5	In Defrost	Normally closed input. • 0 = Not in defrost • 1 = In defrost	4
BV3	Diagnostic: Low Discharge Air Temperature	Low Leaving Air Protection Diagnostic • 0 = Normal • 1 = In Alarm	4
BV4	Diagnostic: Condensate Overflow	Condensate Overflow Diagnostic • 0 = Normal • 1 = In alarm • Latching diagnostic. Cleared with Reset Diagnostic Request or power cycle.	2
BV6	Diagnostic: Low Primary Air Flow	Fan status diagnostic (BI5). • 0 = Normal • 1 = In alarm • Latching; Cleared with Reset Diagnostic Request or power cycle.	4
BV8	Diagnostic: Filter Change Required	Filter Status Diagnostic (based on fan run hours). • 0 = Clean • 1 = Dirty • Non-latching (will clear automatically when resolved)	4
MI4	Wireless Sensor Battery Level	Description: Monitors the battery level of Trane wireless zone sensors on Trane Wireless Comm systems. • 1 = Replace Batteries • 2 = Schedule Replacement • 3 = Good	2
BV10	Diagnostic: Compressor 2 Failure	Compressor 2 Protection Status (high or low pressure or freeze protection). This has a one time auto-reset function. If the diagnostic recurs within 24 hours after an auto-reset the diagnostic latches and must be manually reset. • 0 = Normal • 1 = In alarm	2
BV15	Diagnostic: Compressor 1 Failure	Compressor 1 Protection Status (high or low pressure or freeze protection) This has a one time auto-reset function. If the diagnostic recurs within 24 hours after an auto-reset the diagnostic latches and must be manually reset. • 0 = Normal • 1 = In alarm	2
BV17	Diagnostic: Low Leaving Water Temperature	Low Leaving Water Temp Diagnostic. • 0 = Normal • 1 = In alarm	4



Additional Resources

Use the following documents and links as additional resources:

- www.bacnetinternational.org
- Tracer TU Help Online
- *Tracer™ BACnet® Terminator Installation Instructions* (X39641151-01)
- *Tracer SC™ Unit Controller Wiring Guide* (BAS-SVN03)
- *Tracer™ TU Service Tool Getting Started Guide* (TTU-SVN02)
- *Tracer™ UC400 Programmable Controller Installation, Operation, and Maintenance Manual* (BAS-SVX20)

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



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