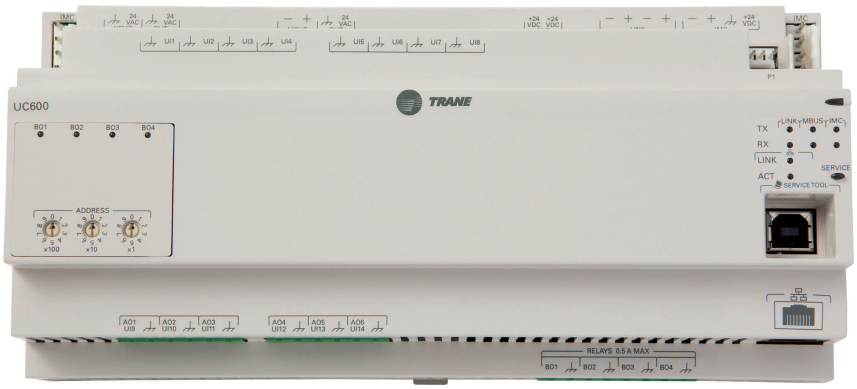
Integration Guide

Tracer® UC600 Programmable Controller

Packaged Outdoor Air Unit



⚠ 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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Introduction

Read this manual thoroughly before operating or servicing this unit.

Warnings, Cautions, and Notices

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

The three types of advisories are defined as follows:

⚠ WARNING — Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION — Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices.

NOTICE — Indicates a situation that could result in equipment or property-damage only accidents.

Important Environmental Concerns

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

⚠ WARNING

Personal Protective Equipment (PPE) Required!

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

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

⚠ WARNING

Follow EHS Policies!

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

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

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Revision History

Minor updates to document.

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Overview

The Tracer® UC600 Programmable Controller is a multi-purpose, programmable controller.

Programming is done through the Tracer Graphical Programming (TGP2) Editor or using the Tracer TU service tool. This field-installed device is designed to control Packaged Outside Air Units.

This guide provides information about the following topics:

- “The BACnet Protocol"
- “UC600 Rotary Switches and LEDs,”
- “24 Vac Measurement,”
- “Configuring the UC600,”
- “BACnet Data Points and Configuration Property Definitions,”
- “Object and Diagnostic Data Points,”
- “Alarming,”
- “Additional Resources,”

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. 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. In addition, BACnet® defines a number of application services that are used to interact with objects in a BACnet® device.

BACnet Testing Laboratory (BTL) Certification

The UC600 is BTL certified as a B-AAC profile device. A complete list of Trane certified devices is available at www.bacnetinternational.org.

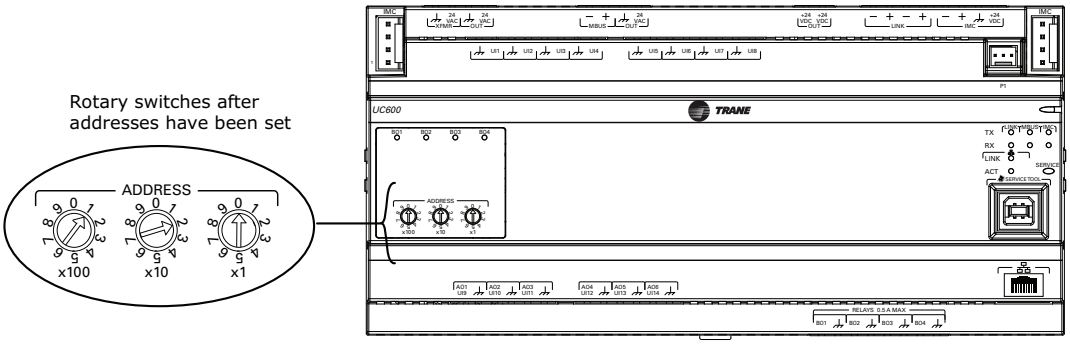
UC600 Rotary Switches and LEDs

This section provides information about the UC600 rotary switches and LED displays.

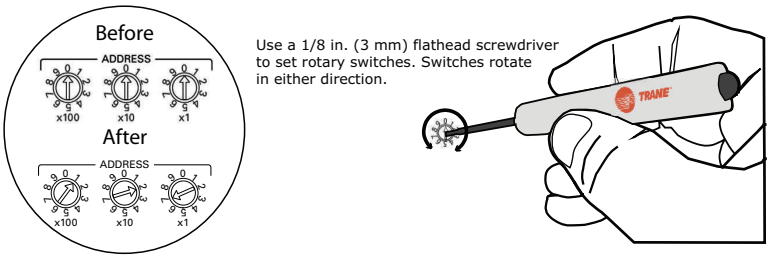
Rotary Switches

There are three (3) rotary switches on the front of the UC600. 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 UC600 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.*



LEDs Description, Behavior, and Troubleshooting

There are 14 LEDs on the front of the UC600 device as shown in Figure 2, p. 7. Table 1, p. 7 provides a description of each LED activity, indication, and troubleshooting tips for each, that includes any specific notes.

Figure 2. LED locations

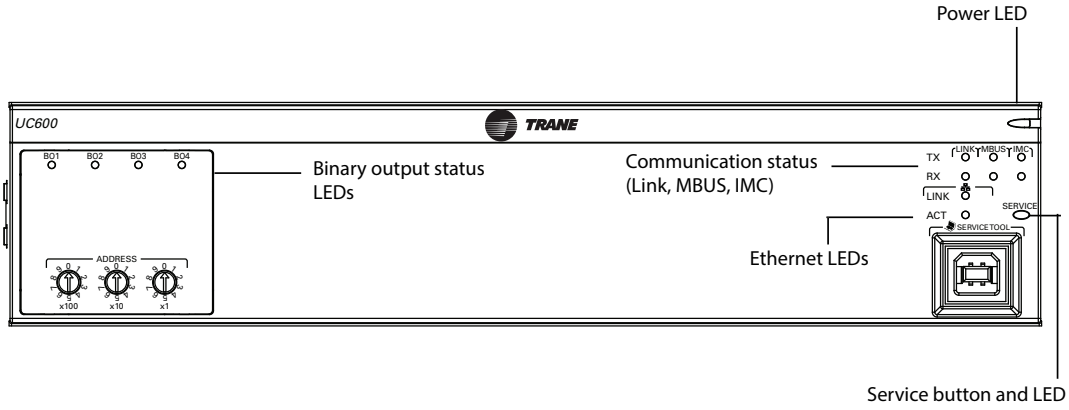


Table 1. LED activities and troubleshooting tips

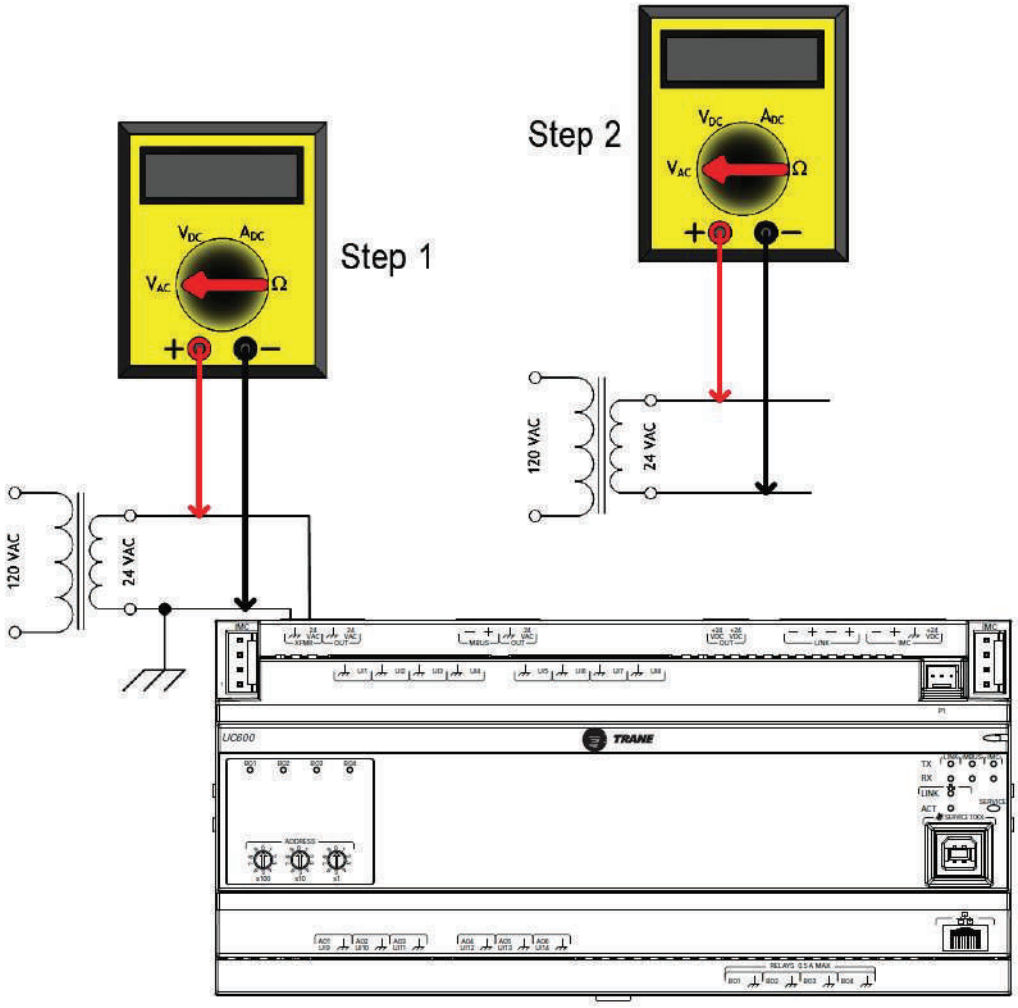
LED Type	LED Activity	Indicates	Troubleshooting/Notes
Power	Solid green	Normal operation	***Sequence on powerup***: Illuminates red, then flashes green, then solid green.
	Solid red	Low voltage or malfunction	
	Blinking red	Alarm or fault is present	
Communications (Link, MBUS, IMC)	TX (transmit) blinks green	Normal operation; blinks at a fixed rate when transferring data to other devices on the link	TX LED: Regardless of connectivity, the TX will blink as it searches for devices to communicates with.
	RX (receive) blinks yellow	Normal operation; blinks at a fixed rate when receiving data from other devices on the link	
	RX on solid (yellow)	Reverse polarity is present	
	LED not illuminated	The controller is not detecting communication	• Cycle the power to re-establish communication. • Verify that the controller is capable of communicating with other devices on the link. • Check polarity and baud rate.
Service	Solid green	LED has been pressed and remains on until powered down (does not affect normal operation)	
	LED not illuminated	Normal operation	
Binary outputs (BOI through BO4)	Solid yellow	Relay coil energized	
	LED not illuminated	Relay coil de-energized or No command	
Ethernet	LINK on solid (green)	Valid Ethernet connection	
	Act flickers (yellow)	Data transmission and reception	

24 Vac Measurement

1. Verify that the 24 Vac connector and chassis ground are properly wired.
2. Remove 24 Vac connector from the UC600.
3. Remove the lockout/tagout from the line voltage power to the electrical cabinet.
4. Using a digital multimeter (DMM), verify that 24 Vac is present at the 24 Vac connector.

If voltage reading is within plus or minus 10%, connect the 24 Vac connector to the transformer XMRF input on the UC600.

UC600 Rotary Switches and LEDs



Configuring the UC600

Configuring the UC600 The UC600 BACnet configuration settings can be modified with either the Trane BACnet Setup Tool or the Tracer TU service 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," p. 9
- "Using Tracer TU," p. 9
- "MS/TP MAC Address," p. 10
- "BACnet Device ID," p. 10
- "BAS Unit Control," p. 11

Using the BACnet Setup Tool

Connection

To connect to the UC600:

1. Connect the universal serial bus (USB) cable between the laptop and the UC600, or to an equipment control panel USB port that is connected to the controller.
2. Click either the BACnet Setup Tool desktop icon or from the Start Menu navigate to All Programs/ Trane/Tracer BACnet Setup Tool and select BACnet Setup Tool. The setup tool splash screen displays briefly, followed by the Connect dialog box.
3. Select 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.

Configuration

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 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.

Using Tracer TU

This section describes how to first connect to the Tracer TU software and then configure the UC600 controller.

Notes:

- *If Tracer TU is not installed, refer to the Tracer TU Service Tool Getting Started Guide (TTU-SVN02). Tracer TU software, Version 8.2 or higher, is required.*
- *The Tracer TU service tool screen interface often undergoes significant changes from release to release. Please consult the Tracer TU Help for Programmable Controllers for up to date information and procedures.*

Connection

To connect to the UC600:

1. Connect the universal serial bus (USB) cable between the laptop and the UC600, or to an equipment control panel USB port that is connected to the controller.
2. Click either the 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.

Configuration

To connect to the UC600:

1. Select the Controller Settings Utility tab from the vertical tab set located on the right side of the Tracer 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.

   Note: *The UC600 device supports four baud rates: 9600, 19200, 38400, and 76800 buad. The default baud rate is 76800 baud.*
7. If 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 manager device as zero (0) to 127. All Trane devices are manager 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 manager devices, including the UC600, must have a MAC addresses within the range of 1 to 127. The three (3) rotary switches on the front of the UC600 device are used to set the MAC address. Refer to the section, “Rotary Switches,” p. 6.

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 UC600:

- Via the rotary switches (refer to the section, “Rotary Switches,” p. 6)
- Software configuration

From the factory the software method is disabled. In this state, the BACnet Device ID will be 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.

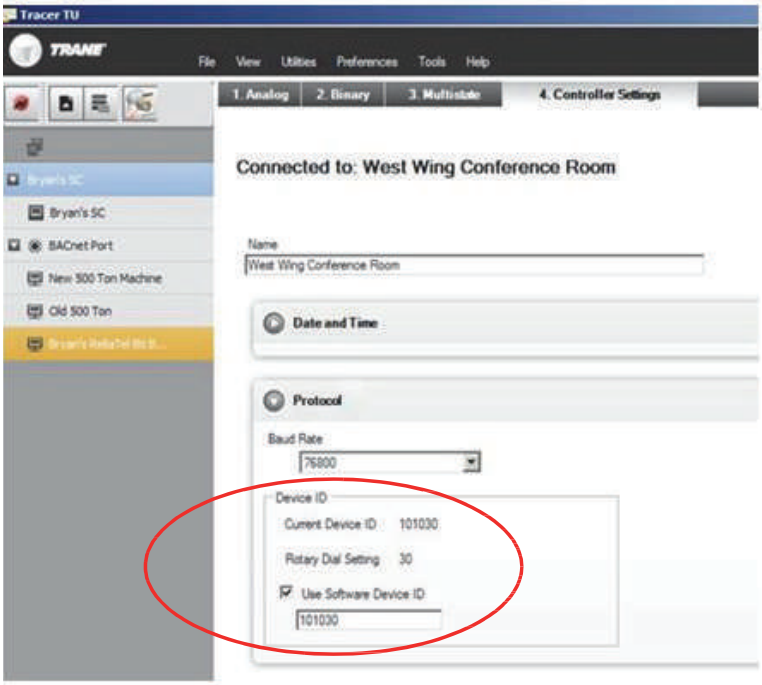
Using this method, the Device ID is limited to the range of 0 to 127. When there is a need to set the Device ID to a value greater than 127, software configuration must be used. Figure 3, p. 11 shows the setup page that is available in Tracer TU. A very similar page is available in the BACnet Setup Tool.

To set 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



Tracer SC BAS Integration

When Tracer SC is the BAS, the integration technician is not required to manually configure the Device ID of the UC600. 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 UC600 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 Humidity BAS
- Outdoor Air Temperature BAS
- Discharge Temperature BAS
- Outside Air Temperature BAS
- Outdoor Air Humidity BAS

Routinely Updating BAS Values

The UC600 requires the BAS system to provide a routine update to the sensor values. This protects against communication loss between the BAS and the UC600. 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.

Alarm Reset

The UC600 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 or alarm 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 or alarms by controlling the state of the Alarm Reset object (BV16) as follows:

- Change the state of the “Alarm Reset,” p. 12 (BV16) to the active state.
- Upon the change to active state, the UC600 control system will reset all internal diagnostics/alarms and set the state of all the diagnostic/alarm objects to inactive.
- Upon completion of this action, change the state of the “Alarm Reset,” p. 12 (BV16) back to the inactive State.

BACnet Data Points and Configuration Property Definitions

The UC600 device allows communication with BACnet systems and devices using BACnet MS/TP. This section provides information about:

- "BACnet Protocol Implementation Conformance Statement (PICS)," p. 13
- "Object and Diagnostic Data Points," p. 19

BACnet Protocol Implementation Conformance Statement (PICS)

Vendor Name:	Trane
Product Name:	Tracer® UC600
Product Model Number:	Tracer® UC600
Product Description:	The Tracer® UC600 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)

Profile Description	Supported Profile
BACnet Advanced Application Controller (B-AAC)	✓
BACnet Application Specific Controller (B-ASC)	
BACnet Building Controller (B-BC)	
BACnet Operator Workstation (B-OWS)	
BACnet Smart Actuator(B-SA)	
BACnet Smart Sensor (B-SS)	

Interoperability Building Blocks (Annex K)

Data Sharing Description	Supported BIBB
Data Sharing-COV-B (DS-COV-B)	✓
Data Sharing-ReadProperty-A (DS-RP-A)	✓
Data Sharing-ReadProperty-B (DS-RP-B)	✓
Data Sharing-ReadPropertyMultiple-B (DS-RPM-B)	✓
Data Sharing-WriteProperty-A (DS-WP-A)	✓
Data Sharing-WriteProperty-B (DS-WP-B)	✓
Data Sharing-WritePropertyMultiple-B (DS-WPM-B)	✓
Alarm and Event Management Description	**Supported BIBB**
Alarm and Event-ACKI-B (AE-ACK-B)	✓
Alarm and Event-Alarm Summary-B (AE-ASUM-B)	✓
Alarm and Event-Enrollment Summary-B (AE-ESUM-B)	✓
Alarm and Event-Information-B (AE-INFO-B)	✓
Alarm and Event-Notification Internal-B (AE-N-I-B)	✓

Trending Description	Supported BIBB
Trending-Automated Trend Retrieval-B (T-ATR-B)	✓
Trending-viewing and Modifying Trends Internal-B (T-VMT-I-B)	✓
Device Management Description	**Supported BIBB**
Device Management-Backup and Restore-B (DM-BR-B)	✓
Device Management-Device Communication Control-B (DM-DCC-B)	✓
Device Management-Dynamic Device Binding-A (DM-DDB-A)	✓
Device Management-Dynamic Device Binding-B (DM-DDB-B)	✓

Segmentation Capability

Segmentation Description	Supported Segment
Segmented Requests/Window Size: 1	✓
Segmented Responses/Window Size: 1	✓

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	• Object_Identifier • Object_Name • Object_Type • Present_Value • Status_Flags • Event_State • Out_Of_Service • Units	• 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	• 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	• Object_Identifier • Object_Name • Object_Type • Present_Value • Status_Flags • Event_State • Out_Of_Service • Units • Priority_Array • Relinquish_Default	• 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	• 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

Table 2. Descriptions and configurations (continued)

Object Type	Required Properties Read	Properties Written	Optional Properties Read	Ability to Create	Ability to Delete
Analog Value	• Object_Identifier • Object_Name • Object_Type • Present_Value • Status_Flags • Event_State • Out_Of_Service • Units	• 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	• 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	• Object_Identifier • Object_Name • Object_Type • Present_Value • Status_Flags • Event_State • Out_Of_Service • Polarity	• 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	• 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
Binary Output	• Object_Identifier • Object_Name • Object_Type • Present_Value • Status_Flags • Event_State • Out_Of_Service • Polarity • Priority_Array • Relinquish_Default	• 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	• 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

Table 2. Descriptions and configurations (continued)

Object Type	Required Properties Read	Properties Written	Optional Properties Read	Ability to Create	Ability to Delete
Binary Value	• Object_Identifier • Object_Name • Object_Type • Present_Value • Status_Flags • Event_State • Out_Of_Service • Polarity	• 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	• 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	• 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	• Object_Name • Location • Description • APDU_Segment_Timeout • APDU_Timeout • Number_Of_APDU_Retries • Backup_Failure_Timeout • Max_Manager • Max_Info_Frames	• Location • Description • Max_Segments_Accepted • APDU_Segment_Timeout • Max_Manager • Max_Info_Frames • Local_Time • Local_Date • Configuration_Files • Last_Restore_Time • Backup_Failure_Timeout • Profile_Name	None	None
Event Enrollment Object	• 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	• Object_Name • Notify_Type • Event_Parameters • Object_Property_Reference • Event_Enable • Notification_Class	• None	Yes	Yes, user create objects only
Multistate Input	• Object_Identifier • Object_Name • Object_Type • Present_Value • Status_Flags • Event_State • Out_Of_Service • Number_Of_States	• 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	• 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

Table 2. Descriptions and configurations (continued)

Object Type	Required Properties Read	Properties Written	Optional Properties Read	Ability to Create	Ability to Delete
Multistate Output	• Object_Identifier • Object_Name • Object_Type • Present_Value • Status_Flags • Event_State • Out_Of_Service • Number_Of_States • Priority_Array • Relinquish Default	• Object_Name • Description • State_Text • Out_Of_Service • Present_Value • Reliability • Priority_ARray • Time_Delay • Notification_Class • Event_Enable • Notify_Type • Number_Of-States	• 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	• Object_Identifier • Object_Name • Object_Type • Present_Value • Status_Flags • Event_State • Out_Of_Service • Number_Of_States	• 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	• 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	• Object_Identifier • Object_Name • Object_Type • Notification_Class • Priority • Ack_Required • Recipient_List	• Object_Name • Priority • Ack_Required • Recipient_List	None	Yes	Yes, user create objects only
Trend	• Object_Identifier • Object_Name • Object_Type • Log_Enable • Stop_When_Full • Buffer_Size • Log_Buffer • Record_Count • Total_Record_Count • Event_State	• 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	• 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

Data Link Layer Options, Device Address Binding, Network Options, and Character Sets

Data Link Layer Description	Supported Option
ANSI/ATA 878.1, 2.5 Mb ARCNET (Clause 8)	
ANSI/ATA 878.1, RS-485 ARCNET (Clause 8), Baud Rate(s)	
BACnet IP, (Annex J)	
BACnet IP, (Annex J), Foreign Device	
ISO 8802–3, Ethernet (Clause 7)(10Base2, 10Base5, 10BaseT, Fiber)	
LonTalk, (Clause 11), Medium	
MS/TP Manager (Clause 9), Baud Rate(s): 9600, 19200, 38400, 76800, and 115200 @1.5% Nominal Baud Rate	✓
MS/TP Subordinate (Clause 9), Baud Rate(s)	

Data Link Layer Description	Supported Option
Other	
Point-to-Point, EIA 232 (Clause 10), Baud Rate(s): 9600, 19200, 38400	
Point-to-Point, Modern (Clause 10), Baud Rate(s): 9600, 19200, 38400	

Device Address Binding

Device Address Binding	Supported?
Static Device Binding Supported	✓

Networking Options

Networking Descriptions	Supported Option
Annex H, BACnet Tunneling	
BACnet IP Broadcast Management Device (BBMD)	
Does the BBMD Support Registration by Foreign Devices?	
Router	

Character Sets

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

Character Set Descriptions	Supported
ANSI X3.4	✓
IBM/Microsoft DBCS	
ISO 10646 (UCS-4)	
ISO 10646 (UCS2)	✓
ISO 8859–1	✓
JIS C 6226	

Object and Diagnostic Data Points

For quick reference, the following tables are listed and sorted two different ways. Table 3, p. 19 through Table 9, p. 24 are listed by input/output type and sorted by object type. Table 10, p. 25 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	Min /Max	When the Point Exists	Description
AI1	Space Temperature Local	-25 - 135 °F	Units with Space Temperature Sensor Installed.	Local space temperature sensor.
AI2	Space Relative Humidity Local	0 - 100 %	Units with Space Humidity Sensor Installed.	Local space relative humidity sensor.
AI3	Supply Fan Pressure Local	0 - 25 in(H_2O)	Units with Piezo Ring on Supply Fan.	Local supply fan piezo ring pressure.
AI4	Circuit 1 Condenser Coil Temperature Local	-50 to 200 °F	Units with Head Pressure Control or an Air Source Heat Pump.	Local condenser coil temperature sensor on circuit 1.
AI5	Circuit 2 Condenser Coil Temperature Local	-50 to 200 °F	Units with Head Pressure Control or an Air Source Heat Pump.	Local condenser coil temperature sensor on circuit 2.
AI6	Return Air Temperature Local	-25 to 135 °F	Units with Modulating Dampers.	Local return air temperature sensor.
AI7	OAD Position Local	0 – 100 %	Units with Modulating Dampers.	Local outside air damper position.
AI8	Zone CO_2 Local	0 – 3000 ppm	Units with a CO_2 Sensor Installed.	Local Space CO_2 concentration
AI9	Exhaust Fan Pressure Local	0 - 25 in(H_2O)	Units with Piezo Ring on Exhaust Fan.	Local exhaust fan piezo ring pressure.
AI10	Outdoor Air Flow Local	0 – 15000 cfm	Units with Outside air flow Monitoring.	Local outside air flow.
AI11	Discharge Air Temperature Local	-25 to 135 °F	All Units.	Local discharge air temperature sensor.
AI12	Return Duct/Space Pressure Local	0 - 2 in(H_2O)	Units with Powered Exhaust and Modulating Dampers.	Local return duct or space pressure sensor
AI13	Exhaust Leaving Temperature Local	-25 to 135 °F	Units with an ERV.	Local exhaust leaving temperature sensor
AI14	Return Air Humidity Local	0 - 100%	Units with Modulating Dampers.	Local return air humidity sensor.
AI15	Evaporator Coil Leaving Temperature Local	-25 to 135 °F	Units with Compressors.	Local evaporator leaving air temperature sensor.
AI16	Space Occupancy Request Override	-58 to 482	Units with Thumbwheel Installed.	Local input that overrides Occupancy Request.
AI17	ERV Supply Side Leaving Temperature Local	-58 to 482 °F	Units with an ERV and is a Water Source Heat Pump.	Local temperature sensor located post ERV on the supply air side.
AI18	Circuit 1 Liquid Line Pressure Local	0 – 500 psi	Units with Head Pressure Control and is an Air Source Heat Pump.	Local refrigerant pressure sensor on circuit 1.
AI19	Circuit 2 Liquid Line Pressure Local	0 – 500 psi	Units with Head Pressure Control and is an Air Source Heat Pump.	Local refrigerant pressure sensor on circuit 2.
AI20	Space Temperature Setpoint Local	50 – 86 °F	Units with Thumbwheel Installed.	Local thumbwheel input.
AI21	Outdoor Air Temperature Local	-50 to 135 °F	All Units.	Local outside air temperature sensor.
AI22	Outdoor Air Relative Humidity Local	0 - 100%	All Units.	Local outside air humidity sensor.
AI23	Duct Static Pressure Local	0 - 2 in(H_2O)	Unit with Multizone VAV.	Local supply duct pressure sensor.

Table 4. Analog outputs

Object Type	Object Name	Min / Max	When the Point Exists	Description
AO1	HGRH Command	0 – 100 %	Units with Modulating Hot Gas Reheat.	Analog HGRH output command.
AO2	IVFD Command	0 - 100%	All Units.	Analog supply fan VFD speed.
AO3	Circuit 1 Digital Scroll/ Variable Speed Command	0 - 100%	Units with Digital Scroll or Variable Speed on the first circuit.	Analog digital scroll or variable speed output command.
AO4	PEVFD Command	0 - 100%	Units with Powered Exhaust.	Analog exhaust fan VFD speed.
AO5	OAD Position Command	0 - 100%	Units with Modulating Dampers.	Analog outdoor air damper command.

Table 4. Analog outputs (continued)

Object Type	Object Name	Min / Max	When the Point Exists	Description
AO6	ERV Bypass Position Command	0 - 100%	Units with ERV.	Analog ERV bypass damper command.
AO7	Condenser Fan Speed Command	0 - 100%	Units with Head Pressure Control.	Analog condenser fan speed command
AO8	Circuit 2 Digital Scroll/ Variable Speed Command	0 - 100%	Units with Digital Scroll or Variable Speed on the second circuit.	Analog digital scroll or variable speed output command.
AO11	Heating Output Command	0 - 100%	Units with any type of Primary Heat.	Analog heating output command.

Table 5. Analog values

Object Type	Object Name	Min / Max	When the Point Exists	Description
AV1	Occupied Cooling Setpoint	55 – 85 °F	Units with Space Control or Single Zone VAV.	Space cooling setpoint used in occupied mode.
AV2	Occupied Heating Setpoint	55 – 85 °F	Units with Space Control or Single Zone VAV.	Space heating setpoint used in occupied mode.
AV3	Occupied Offset	0.5 – 30 Δ °F	All Units.	The value used to calculate the heating/cooling setpoints in occupied mode. If the unit has a thumbwheel installed Occupied Offset defaults to 2. • Active heating setpoint = active setpoint – occupied offset. • Active cooling setpoint = active setpoint + occupied offset.
AV4	Discharge Air Temperature BAS	-10 to 150 °F	All Units.	Communicated discharge air temperature.
AV5	Discharge Air Temperature Active	-10 to 150 °F	All Units.	Actively used discharge air temperature.
AV6	DAT High Temp Cutout	90 – 130 °F	All Units.	If the discharge air temperature is greater than the discharge air high limit for (AV16) minutes, the controller signals an alarm and shuts down the unit.
AV7	Space RH Active	-150 to 150%	Units with Space Humidity Sensor Installed.	Actively used space relative humidity.
AV8	Space RH BAS	-150 to 150%	All Units.	Communicated space relative humidity.
AV9	Occupied Bypass Time	2 - 360	Units with Thumbwheel Installed.	Time that Unoccupied Mode is delayed when Occupied Button is pressed.
AV10	Outdoor Air Dewpoint Setpoint (OADS)	49 – 100 °F	Units with Space Control, Discharge Control, or Single Zone VAV.	If the outdoor air dewpoint is greater than OADS, the unit will enable dehumidification.
AV11	Outdoor Air Dewpoint Active	-10 to 150 °F	All Units.	Dewpoint of the outdoor air. This point is calculated within the program.
AV12	Liquid Line Pressure Setpoint	200 – 600 psi	Air Source Heat Pumps with Head Pressure Control.	Pressure setpoint used to modulate condenser fan(s).
AV13	Outdoor Air Minimum Flow Setpoint BAS	0 – 13500 cfm	VAV Units with Outdoor air flow Monitoring and Modulating Dampers.	air flow setpoint used to modulate dampers.
AV14	Evaporator Leaving Temperature Setpoint	45 – 75 °F	All Units.	Evaporator leaving air temperature setpoint during dehumidification mode or Single Zone VAV
AV15	DAT Low Temp Cutout	35 – 50 °F	All Units.	If the discharge air temperature is less than the discharge air low limit for (AV16) minutes, the controller signals an alarm and shuts down the unit.
AV16	DAT Temp Cutout Time	10 - 25	All Units.	Time required for low limit or high limit temperature to signal alarm.
AV17	IVFD Signal	50 - 100%	When Unit is an OAD, OAK, or OAN and the Supply Fan is CV.	Supply fan speed setpoint.
AV18	Compressor Heating Capacity	0 – 100%	Units that are Air Source or Water Source Heat Pumps.	Compressor Heating source capacity.
AV20	Space Temperature BAS	-58 to 482 °F	All Units.	Communicated space temperature.
AV23	Space Temperature Active	-58 to 482 °F	All Units.	Actively used space temperature.
AV24	Condenser Coil Temperature Setpoint	80 to 125 °F	Units with Head Pressure Control and isn't an Air Source Heat Pump.	Temperature setpoint used to modulate condenser fan(s).
AV25	Space Temperature Setpoint BAS	-58 to 482 °F	Units that are Space Control or Single Zone VAV.	Communicated space temperature setpoint.

Table 5. Analog values (continued)

Object Type	Object Name	Min / Max	When the Point Exists	Description
AV26	Unoccupied Cooling Setpoint	60 to 90 °F	Units with Space Temperature/Humidity Sensor Installed.	Space cooling setpoint used in unoccupied mode.
AV27	Unoccupied Heating Setpoint	45 to 90 °F	Units with Space Temperature/Humidity Sensor Installed.	Space heating setpoint used in unoccupied mode.
AV28	Unoccupied Dewpoint Setpoint	49 to 100 °F	Units with Space Temperature/Humidity Sensor Installed.	If the space dewpoint rises above this setpoint during unoccupied mode then dehumidification will be enabled.
AV29	Outdoor Air Cooling Setpoint (OACS)	60 – 90 °F	Units with Space Control, Discharge Control, or Single Zone VAV.	Setpoint used to enable cooling.
AV30	Discharge Air Cooling Setpoint	47 – 90 °F	Units with Discharge Air Control.	Discharge air setpoint during cooling mode.
AV31	Compressor Count	0 - 4	Units with DX Cooling.	Number of compressors installed in the unit.
AV32	Discharge Air Heating Setpoint	45 – 100 °F	Units with Discharge Air Control.	Discharge air setpoing during heating mode.
AV33	Outdoor Air Heating Setpoint (OAHS)	40 – 75 °F	Units with Space Control, Discharge Control, or Single Zone VAV.	Setpoint used to enable heating.
AV34	Space Dewpoint Setpoint (SPDS)	-10 – 150 °F	Units with Space Control, Discharge Control, or Single Zone VAV.	If the outdoor air dewpoint is greater than OADS, the unit will enable dehumidification.
AV35	Space Dewpoint Active	-58 to 482 °F	All Units.	Actively used space dewpoint.
AV36	Minimum Discharge Air Cooling Setpoint	40 – 65 °F	Units that are Space Control.	Cooling capacity is limited in order to not fall below this temperature.
AV37	Space Temperature Setpoint Active	45 – 95 °F	Units that are Space Control or Single Zone VAV.	Actively used space temperature setpoint.
AV38	Outdoor Air Flow Active	0 – 13500 cfm	Units with Outside Air Flow Monitoring.	Actively used outside air flow.
AV39	Supply Air Flow Setpoint	0 – 7500 cfm	OAB or OAG units that are 208v or 460v.	Setpoint used to modulate the indoor fan speed.
AV40	PEVFD Setpoint	0 – 100 %	OAD, OAK, or OAN that does NOT have Modulating Dampers or Powered Exhaust.	Fan speed setpoint used to control the indoor fan speed.
AV41	Supply Air Flow Active	0 – 15000 cfm	Units with Piezo Ring on Supply Fan.	Actively used supply airflow.
AV43	Minimum Discharge Air Heating Setpoint	40 - 65 °F	Units that are Space Control.	Primary or Compressor Heating Capacity is limited in order to not fall below this temperature.
AV44	Heat Capacity	0 – 100 %	Units with Primary Heat.	Primary heating source capacity.
AV45	Maximum Supply Air Temperature	80 – 120 °F	All Units with Primary Heat or Heat Pumps	Primary or Compressor Heating Capacity is limited in order to not exceed this temperature.
AV46	Duct Static Pressure Setpoint BAS	-1 to 6 in(H_2O)	Unit with Multizone VAV.	Communicated duct static pressure setpoint.
AV47	Maximum OA Damper Position	0 – 100 %	Units with Modulating Dampers.	Maximum outdoor air damper position.
AV48	Minimum OA Damper Position	0 – 100 %	Units with Modulating Dampers.	Minimum outdoor air damper position.
AV49	Duct Static Pressure Setpoint	-1 to 6 in(H_2O)	Units with Multi Zone VAV.	Setpoint used to modulate indoor fan.
AV50	Space CO_2 Concentration Setpoints	0 – 3000 ppm	All Units.	Space CO_2 concentration Setpoints
AV52	Cooling Capacity	0 – 100 %	Units with DX Cooling.	Primary cooling source capacity.
AV53	Duct Static Pressure Setpoint Active	-1 to 6 in(H_2O)	Unit with Multizone VAV.	Actively used duct static pressure setpoint.
AV54	Exhaust Air Flow Active	0 – 15000 cfm	Units with Piezo Ring on the Exhaust Fan.	The amount of air delivered by the exhaust fan.
AV56	Return Duct/Space Pressure Setpoint	0 - 2 in(H_2O)	Units with Modulating Dampers and Exhaust Fan(s).	Setpoint used to modulate exhaust fan speed.
AV57	Exhaust Air Flow Setpoint	0 – 7500 cfm	OAB or OAG units that are 208v or 460v, and does not have Modulating Dampers with Exhaust Fan(s).	Setpoint used to modulate exhaust fan speed.
AV58	Pre-Heat Enable Temperature	-10 to 35 °F	Units with an ERV and an Electric Pre-Heater.	Below this temperature pre-heat will be enabled.
AV59	Minimum Supply Air Flow Setpoint	300 – 13500 cfm	Units with Single Zone or Multi Zone VAV.	Supply air flow is limited to not fall below this number.
AV64	Duct Static Pressure BAS	-6 to 6 in(H_2O)	Units with Multi Zone VAV.	Communicated duct static pressure.
AV65	Duct Static Pressure Active	-6 to 6 in(H_2O)	Units with Multi Zone VAV.	Actively used duct static pressure.

Table 5. Analog values (continued)

Object Type	Object Name	Min / Max	When the Point Exists	Description
AV66	Discharge Air Temperature Setpoint Active	38 – 130 °F	Units with Multi Zone VAV.	Actively used discharge air temperature setpoint.
AV67	Discharge Air Temperature Setpoint BAS	45 – 90 °F	Units with Multi Zone VAV.	Communicated discharge air temperature setpoint.
AV68	Discharge Air Temperature Setpoint	45 – 120 °F	Units with Multi Zone VAV.	Discharge air temperature setpoint.
AV69	Heat/Cool Mode Deadband	-58 to 482 °F	Units with Multi Zone VAV.	Heat is enabled when Outdoor Air Temperature drops below Discharge Temperature Setpoint - Heat/Cool Mode Deadband. Cooling is enabled when Outdoor Air temperature rises above the Discharge Temperature Setpoint.
AV70	Maximum Supply Air Flow Setpoint	350 – 13500 cfm	Units with Single Zone or Multi Zone VAV.	Supply air flow is limited to not exceed this number.
AV71	Outdoor Air Minimum Flow Setpoint	350 – 13500 cfm	Units that are VAV, have Outdoor Air Flow Monitoring, and Modulating Dampers.	Setpoint to modulate the dampers.
AV72	Outdoor Air Minimum Flow Setpoint Active	350 – 13500 cfm	Units that are VAV, have Outdoor Air Flow Monitoring, and Modulating Dampers.	Actively used setpoint to modulate the dampers.
AV75	Outdoor Air Temperature BAS	-100 to 200 °F	All Units.	Communicated outdoor air temperature.
AV76	Outdoor Air Temperature Active	-100 to 200 °F	All Units.	Actively used outdoor air temperature.
AV81	Outdoor Air Humidity BAS	0 - 100%	All Units.	Communicated outdoor air relative humidity.
AV82	Outdoor Air Humidity Active	0 - 100%	All Units.	Actively used outdoor air relative humidity.

Table 6. Binary inputs

Object Type	Object Name	Min / Max	When the Point Exists	Description
BI1	Supply Fan Status	None/None	All Units.	Normally Closed Input • 0 = On • 1 = Off
BI2	ESTOP		All Units.	Normally Open Input. Auto-Reset diagnostic. • 0 = Normal • 1 = ESTOP
BI3	Filter Status		All Units.	Normally open input. • 0 = Clean • 1 = Clogged
BI4	Occupancy Input		All Units.	Normally open input. • 0 = Unoccupied • 1 = Occupied
BI5	OA Damper End Switch		All Units.	Normally open input. • 0 = Not Proven • 1 = Proven
BI6	Gas Valve Status		Units with Gas as the Primary Heat.	Normally open input. • 0 = Off • 1 = On
BI7	Exhaust Damper Endswitch		Units with Isolation Dampers.	Normally open input. • 0 = Not Proven • 1 = Proven
BI8	Water Flow		Units that are Water Source Heat Pump.	Normally open input. • 0 = Off • 1 = On
BI9	Water Coil Low Temp Switch		Units that are Water Source Heat Pump.	Normally closed input. • 0 = Open • 1 = Closed

Table 7. Binary outputs

Object Type	Object Name	Min /Max	When the Point Exists	Description
BO1	Supply Fan Start Stop Command	None/None	All Units.	• 0 = Off • 1 = On
BO2	Outdoor Air Damper Command		All Units.	• 0 = Open • 1 = Closed
BO3	Heat 1 Command		Units with Primary Heat.	• 0 = Off • 1 = On
BO4	Inducer Command		Units with Gas as the Primary Heat.	• 0 = Off • 1 = On
BO5	Compressor 3 Command		Units with 3+ Compressors.	• 0 = Off • 1 = On

Table 7. Binary outputs (continued)

Object Type	Object Name	Min /Max	When the Point Exists	Description
BO6	Compressor 4 Command		Units with 4+ Compressors.	• 0 = Off • 1 = On
BO7	Heat 2 Command		Units with Gas as the Primary Heat and is a Split Manifold Burner.	• 0 = Off • 1 = On
BO8	Heat 3 Command		Units with Gas as the Primary Heat and has Two Heaters.	• 0 = Off • 1 = On
BO9	Exhaust Damper Actuators		Units with Isolation Dampers.	• 0 = Off • 1 = On
BO10	Powered Exhaust Enable		Units with Isolation Dampers or has Dual Point Power.	• 0 = Off • 1 = On
BO11	Compressor 1 Command		Units with 1+ Compressors.	• 0 = Off • 1 = On
BO12	Compressor 2 Command		Units with 2+ Compressors.	• 0 = Off • 1 = On
BO13	Pre-Heat Enable		Units with Pre-Heat.	• 0 = Off • 1 = On
BO14	Condenser Fan Command		Units with Sound Attenuation Package or an Air Source Heat Pump.	• 0 = Off • 1 = On
BO15	ERV Command		Units with an ERV.	• 0 = Off • 1 = On
BO16	Circuit 1 Reversing Valve		Units that are Heat Pump.	• 0 = Off • 1 = On
BO17	Circuit 2 Reversing Valve		Units that are Heat Pump and Two Circuits.	• 0 = Off • 1 = On

Table 8. Binary values

Object Type	Object Name	Min /Max	When the Point Exists	Description
BV1	Diagnostic: Supply Fan Failure	None/None	All Units.	Latching diagnostic. Cleared with Alarm Reset. • 0 = Normal • 1 = Fail
BV2	Diagnostic: Space Temperature Setpoint Failure		Units with Thumbwheel Installed.	• 0 = Normal • 1 = Fail
BV3	Diagnostic: OAD Proving Switch		All Units.	Latching diagnostic. Cleared with Alarm Reset. • 0 = Normal • 1 = Fail
BV4	Defrost Mode		Units that are Heat Pump.	• 0 = Disabled • 1 = Enabled
BV5	HGRH Purge Mode		Units with Hot Gas Reheat.	• 0 = Disabled • 1 = Enabled
BV6	Diagnostic: Discharge Air Temperature Source Failure		All Units.	Auto-Reset diagnostic. • 0 = Normal • 1 = Fail
BV7	Auxiliary Heating Mode		Units that are Heat Pump.	• 0 = Disabled • 1 = Enabled
BV9	Economizer Mode		Units with Modulating Dampers.	• 0 = Disabled • 1 = Enabled
BV10	Low Temp Lockout		All Units.	Latching diagnostic. Cleared with Alarm Reset. • 0 = Normal • 1 = Fail
BV11	Diagnostic: Space Temperature Source Failure	None/None	Units that are Space Control or Single Zone VAV.	Auto-Reset diagnostic. • 0 = Normal • 1 = Fail
BV12	Diagnostic: Space Humidity Source Failure		Units that are Space Control or Single Zone VAV.	Auto-Reset diagnostic. • 0 = Normal • 1 = Fail
BV13	Diagnostic: Outdoor Air Temperature Source Failure		All Units.	Auto-Reset diagnostic. • 0 = Normal • 1 = Fail
BV14	Diagnostic: Outdoor Air Humidity Source Failure		All Units.	Auto-Reset diagnostic. • 0 = Normal • 1 = Fail
BV15	High Temp Lockout		All Units.	Latching diagnostic. Cleared with Alarm Reset. • 0 = Normal • 1 = Fail
BV16	Alarm Reset		All Units.	1 = Reset diagnostics or lockouts. This will reset ALL diagnostics or lockouts. If the condition still exists, the diagnostic reoccurs.

Table 8. Binary values (continued)

Object Type	Object Name	Min /Max	When the Point Exists	Description
BV17	System LOCKOUT		All Units.	Latching diagnostic. Cleared with Alarm Reset. • 0 = Normal • 1 = Fail
BV18	Return Air Damper Option		All Units.	• 0 = Not Installed • 1 = Installed
BV19	Diagnostic: Space RH Source Failure		Units that are Space Control or Single Zone VAV.	Auto-Reset diagnostic. • 0 = Normal • 1 = Fail
BV20	Space Temp/Humidity Sensor Installed		Units that are Space Control or Single Zone VAV.	• 0 = Not Installed • 1 = Installed
BV21	Heat Cool Mode Active		All Units.	• 0 = Heat • 1 = Cool
BV22	Unoccupied Cooling Mode BAS		All Units.	• 0 = Disabled • 1 = Enabled
BV23	Unoccupied Cooling Mode		All Units.	• 0 = Disabled • 1 = Enabled
BV25	Compressor Stage 1 Request	None/None	Units with 1+ Compressors.	• 0 = Off • 1 = On
BV26	Cooling Lockout BAS		Units with DX Cooling.	• 0 = Normal • 1 = Lockout
BV27	Dehumidification Command		Units that are Space Control, Single Zone VAV, or Discharge Control.	• 0 = Disabled • 1 = Enabled
BV28	Thumbwheel Installed		All Units.	• 0 = Not Installed • 1 = Installed
BV29	Compressor Stage 2 Request		Units with 2+ Compressors.	• 0 = Off • 1 = On
BV30	Compressor Stage 3 Request		Units with 3+ Compressors.	• 0 = Off • 1 = On
BV31	Compressor Stage 4 Request		Units with 4 Compressors.	• 0 = Off • 1 = On
BV32	Diagnostic: ERV Leaving Air Conditions Failure		Units that are Water Source Heat Pump with an ERV.	Auto-Reset diagnostic. • 0 = Normal • 1 = Fail
BV33	Pre-Purge Status		Units with Gas as the Primary Heat.	• 0 = Disabled • 1 = Enabled
BV34	Diagnostic: Evap Temp Source Failure		Units with DX Cooling.	Auto-Reset diagnostic. • 0 = Normal • 1 = Fail
BV35	Y1 Space Lockout		Units that are Space Control or Single Zone VAV.	• 0 = Disabled • 1 = Enabled
BV36	Diagnostic: Duct Static Pressure Failure		Units that are Multi Zone VAV.	Auto-Reset diagnostic. • 0 = Normal • 1 = Fail
BV37	Unoccupied Dehumid Mode BAS		All Units.	• 0 = Disabled • 1 = Enabled
BV38	Unoccupied Heating Mode BAS		All Units.	• 0 = Disabled • 1 = Enabled
BV39	Unoccupied Heating Mode		All Units.	• 0 = Disabled • 1 = Enabled
BV40	Unoccupied Dehumid Mode		All Units.	• 0 = Disabled • 1 = Enabled
BV42	Diagnostic: Heat Failure		Units with Gas as the Primary Heat.	Auto-Reset diagnostic. • 0 = Normal • 1 = Fail
BV43	Ventilation		Units that are Space Control, Single Zone VAV, or Discharge Control.	• 0 = Disabled • 1 = Enabled
BV45	Economizer Control Type		All Units.	• 0 = Dry Bulb • 1 = Dry Bulb and Enthalpy

Table 9. Multi-state values

Object Type	Object Name	Min / Max	When the Point Exists	Description
MV1	Occupancy Request		All Units.	• 1 = Occupied • 2 = Unoccupied • 3 = Occupied Bypass • 4 = Occupied Standby • 5 = Auto
MV2	Occupancy Status	None/None	All Units.	• 1 = Occupied • 2 = Unoccupied • 3 = Occupied Bypass • 4 = Occupied Standby • 5 = Unknown

Table 9. Multi-state values (continued)

Object Type	Object Name	Min / Max	When the Point Exists	Description
MV4	Heat Cool Mode Status		All Units	• 1 = Auto • 2 = Heat • 3 = Morning Warm-up • 4 = Cool • 5 = Night Purge • 6 = Pre Cool • 7 = Off
MV7	Compressor Stage 3 Status		Units with 3+ Compressors	• 1 = Off • 2 = On • 3 = Not Present
MV8	Compressor Stage 4 Status		Units with 4 Compressors	• 1 = Off • 2 = On • 3 = Not Present
MV9	Heat Type	None/None	All Units	• 1 = No Heat • 2 = Indirect Fired Gas Heat • 3 = Electric Heat • 4 = Other • 5 = Direct Fired Gas Heat • 6 = Hot Water/Steam
MV13	Program Control Type		All Units.	• 1 = Space Control • 2 = Discharge Control • 3 = Single Zone VAV • 4 = Multi Zone VAV
MV16	Dehumidification System Status		All Units.	• 1 = Off • 2 = On • 3 = Not Present
MV21	Compressor Stage 1 Status		Units with 1+ Compressors.	• 1 = Off • 2 = On • 3 = Not Present
MV22	Compressor Stage 2 Status		Units with 2+ Compressors.	• 1 = Off • 2 = On • 3 = Not Present

Table 10. All object types sorted by object name

Object Type	Object Name	Min / Max	When the Point Exists	Description
BV16	Alarm Reset		All Units.	1 = Reset diagnostics or lockouts. This will reset ALL diagnostics or lockouts. If the condition still exists, the diagnostic reoccurs.
BV7	Auxiliary Heating Mode		Units that are Heat Pump.	• 0 = Disabled • 1 = Enabled
AI4	Circuit 1 Condenser Coil Temperature Local	-50 to 200 °F	Units with Head Pressure Control or an Air Source Heat Pump.	Local condenser coil temperature sensor on circuit 1.
AO3	Circuit 1 Digital Scroll/ Variable Speed Command	0 - 100%	Units with Digital Scroll or Variable Speed on the first circuit.	Analog digital scroll or variable speed output command.
AI18	Circuit 1 Liquid Line Pressure Local	0 – 500 psi	Units with Head Pressure Control and is an Air Source Heat Pump.	Local refrigerant pressure sensor on circuit 1.
BO16	Circuit 1 Reversing Valve		Units that are Heat Pump.	• 0 = Off • 1 = On
AI5	Circuit 2 Condenser Coil Temperature Local	-50 -200 °F	Units with Head Pressure Control or an Air Source Heat Pump.	Local condenser coil temperature sensor on circuit 2.
AO8	Circuit 2 Digital Scroll/ Variable Speed Command	0 - 100%	Units with Digital Scroll or Variable Speed on the second circuit.	Analog digital scroll or variable speed output command.
AI19	Circuit 2 Liquid Line Pressure Local	0 – 500 psi	Units with Head Pressure Control and is an Air Source Heat Pump.	Local refrigerant pressure sensor on circuit 2.
BO17	Circuit 2 Reversing Valve		Units that are Heat Pump and Two Circuits.	• 0 = Off • 1 = On
BO11	Compressor 1 Command		Units with 1+ Compressors.	• 0 = Off • 1 = On
BO12	Compressor 2 Command		Units with 2+ Compressors.	• 0 = Off • 1 = On
BO5	Compressor 3 Command		Units with 3+ Compressors.	• 0 = Off • 1 = On
BO6	Compressor 4 Command		Units with 4+ Compressors.	• 0 = Off • 1 = On
AV31	Compressor Count	0 - 4	Units with DX Cooling.	Number of compressors installed in the unit.
AV18	Compressor Heating Capacity	0 - 100%	Units that are Air Source or Water Source Heat Pumps.	Compressor Heating source capacity.

Table 10. All object types sorted by object name (continued)

Object Type	Object Name	Min / Max	When the Point Exists	Description
BV25	Compressor Stage 1 Request		Units with 1+ Compressors.	• 0 = Off • 1 = On
MV21	Compressor Stage 1 Status		Units with 1+ Compressors.	• 1 = Off • 2 = On • 3 = Not Present
BV29	Compressor Stage 2 Request		Units with 2+ Compressors.	• 0 = Off • 1 = On
MV22	Compressor Stage 2 Status		Units with 2+ Compressors.	• 1 = Off • 2 = On • 3 = Not Present
BV30	Compressor Stage 3 Request		Units with 3+ Compressors.	• 0 = Off • 1 = On
MV7	Compressor Stage 3 Status		Units with 3+ Compressors	• 1 = Off • 2 = On • 3 = Not Present
BV31	Compressor Stage 4 Request		Units with 4 Compressors.	• 0 = Off • 1 = On
MV8	Compressor Stage 4 Status		Units with 4 Compressors	• 1 = Off • 2 = On • 3 = Not Present
AV24	Condenser Coil Temperature Setpoint	80 – 125 °F	Units with Head Pressure Control and isn't an Air Source Heat Pump.	Temperature setpoint used to modulate condenser fan(s).
BO14	Condenser Fan Command		Units with Sound Attenuation Package or is an Air Source Heat Pump.	• 0 = Off • 1 = On
AO7	Condenser Fan Speed Command	0 - 100%	Units with Head Pressure Control.	Analog condenser fan speed command
AV52	Cooling Capacity	0 - 100%	Units with DX Cooling.	Primary cooling source capacity.
BV26	Cooling Lockout BAS		Units with DX Cooling.	• 0 = Normal • 1 = Lockout
AV6	DAT High Temp Cutout	90 – 130 °F	All Units.	If the discharge air temperature is greater than the discharge air high limit for (AV16) minutes, the controller signals an alarm and shuts down the unit.
AV15	DAT Low Temp Cutout	35 – 50 °F	All Units.	If the discharge air temperature is less than the discharge air low limit for (AV16) minutes, the controller signals an alarm and shuts down the unit.
AV16	DAT Temp Cutout Time	10 - 25	All Units.	Time required for low limit or high limit temperature to signal alarm.
BV4	Defrost Mode		Units that are Heat Pump.	• 0 = Disabled • 1 = Enabled
BV27	Dehumidification Command		Units that are Space Control, Single Zone VAV, or Discharge Control.	• 0 = Disabled • 1 = Enabled
MV16	Dehumidification System Status		All Units.	• 1 = Off • 2 = On • 3 = Not Present
BV6	Diagnostic: Discharge Air Temperature Source Failure		All Units.	Auto-Reset diagnostic. • 0 = Normal • 1 = Fail
BV36	Diagnostic: Duct Static Pressure Failure		Units that are Multi Zone VAV.	Auto-Reset diagnostic. • 0 = Normal • 1 = Fail
BV32	Diagnostic: ERV Leaving Air Conditions Failure		Units that are Water Source Heat Pump with an ERV.	Auto-Reset diagnostic. • 0 = Normal • 1 = Fail
BV34	Diagnostic: Evap Temp Source Failure		Units with DX Cooling.	Auto-Reset diagnostic. • 0 = Normal • 1 = Fail
BV42	Diagnostic: Heat Failure		Units with Gas as the Primary Heat.	Auto-Reset diagnostic. • 0 = Normal • 1 = Fail
BV3	Diagnostic: OAD Proving Switch		All Units.	Latching diagnostic. Cleared with Alarm Reset. • 0 = Normal • 1 = Fail
BV14	Diagnostic: Outdoor Air Humidity Source Failure		All Units.	Auto-Reset diagnostic. • 0 = Normal • 1 = Fail
BV13	Diagnostic: Outdoor Air Temperature Source Failure		All Units.	Auto-Reset diagnostic. • 0 = Normal • 1 = Fail

Table 10. All object types sorted by object name (continued)

Object Type	Object Name	Min / Max	When the Point Exists	Description
BV12	Diagnostic: Space Humidity Source Failure		Units that are Space Control or Single Zone VAV.	Auto-Reset diagnostic. • 0 = Normal • 1 = Fail
BV19	Diagnostic: Space RH Source Failure		Units that are Space Control or Single Zone VAV.	Auto-Reset diagnostic. • 0 = Normal • 1 = Fail
BV2	Diagnostic: Space Temperature Setpoint Failure		Units with Thumbwheel Installed.	• 0 = Normal • 1 = Fail
BV11	Diagnostic: Space Temperature Source Failure		Units that are Space Control or Single Zone VAV.	Auto-Reset diagnostic. • 0 = Normal • 1 = Fail
BV1	Diagnostic: Supply Fan Failure		All Units.	Latching diagnostic. Cleared with Alarm Reset. • 0 = Normal • 1 = Fail
AV30	Discharge Air Cooling Setpoint	47 – 90 °F	Units with Discharge Air Control.	Discharge air setpoing during cooling mode.
AV32	Discharge Air Heating Setpoint	45 – 100 °F	Units with Discharge Air Control.	Discharge air setpoing during heating mode.
AV5	Discharge Air Temperature Active	-10 to 150 °F	All Units.	Actively used discharge air temperature.
AV4	Discharge Air Temperature BAS	-10 to 150 °F	All Units.	Communicated discharge air temperature.
AI11	Discharge Air Temperature Local	-25 to 135 °F	All Units.	Local discharge air temperature sensor.
AV68	Discharge Air Temperature Setpoint	45 – 120 °F	Units with Multi Zone VAV.	Discharge air temperature setpoint.
AV66	Discharge Air Temperature Setpoint Active	38 -130 °F	Units with Multi Zone VAV.	Actively used discharge air temperature setpoint.
AV67	Discharge Air Temperature Setpoint BAS	45 – 90 °F	Units with Multi Zone VAV.	Communicated discharge air temperature setpoint.
AV65	Duct Static Pressure Active	-6 to 6 in(H_2O)	Units with Multi Zone VAV.	Actively used duct static pressure.
AV64	Duct Static Pressure BAS	-6 to 6 in(H_2O)	Units with Multi Zone VAV.	Communicated duct static pressure.
AI23	Duct Static Pressure Local	0 - 2 in(H_2O)	Unit with Multizone VAV.	Local supply duct pressure sensor.
AV49	Duct Static Pressure Setpoint	-1 to 6 in(H_2O)	Units with Multi Zone VAV.	Setpoint used to modulate indoor fan.
AV53	Duct Static Pressure Setpoint Active	-1 to 6 in(H_2O)	Unit with Multizone VAV.	Actively used duct static pressure setpoint.
AV46	Duct Static Pressure Setpoint BAS	-1 to 6 in(H_2O)	Unit with Multizone VAV.	Communicated duct static pressure setpoint.
BV45	Economizer Control Type		All Units.	• 0 = Dry Bulb • 1 = Dry Bulb and Enthalpy
BV9	Economizer Mode		Units with Modulating Dampers.	• 0 = Disabled • 1 = Enabled
AO6	ERV Bypass Position Command	0 - 100%	Units with ERV.	Analog ERV bypass damper command.
BO15	ERV Command		Units with an ERV.	• 0 = Off • 1 = On
AI17	ERV Supply Side Leaving Temperature Local	-58 to 482 °F	Units with an ERV and is a Water Source Heat Pump.	Local temperature sensor located post ERV on the supply air side.
BI2	ESTOP		All Units.	Normally Open Input. Auto- Reset diagnostic. • 0 = Normal • 1 = ESTOP
AI15	Evaporator Coil Leaving Temperature Local	-25 to 135 °F	Units with Compressors.	Local evaporator leaving air temperature sensor.
AV14	Evaporator Leaving Temperature Setpoint	45 – 75 °F	All Units.	Evaporator leaving air temperature setpoint during dehumidification mode or Single Zone VAV
AV54	Exhaust Air Flow Active	0 – 15000 cfm	Units with Piezo Ring on the Exhaust Fan.	The amount of air delivered by the exhaust fan.
AV57	Exhaust Air Flow Setpoint	0 – 7500 cfm	OAB or OAG units that are 208v or 460v, and does not have Modulating Dampers with Exhaust Fan(s).	Setpoint used to modulate exhaust fan speed.
BO9	Exhaust Damper Actuators		Units with Isolation Dampers.	• 0 = Off • 1 = On
BI7	Exhaust Damper Endswitch		Units with Isolation Dampers.	Normally open input. • 0 = Not Proven • 1 = Proven
AI9	Exhaust Fan Pressure Local	0 - 25 in(H_2O)	Units with Piezo Ring on Exhaust Fan.	Local exhaust fan piezo ring pressure.
AI13	Exhaust Leaving Temperature Local	-25 to 135 °F	Units with an ERV.	Local exhaust leaving temperature sensor

Table 10. All object types sorted by object name (continued)

Object Type	Object Name	Min / Max	When the Point Exists	Description
BI3	Filter Status		All Units.	Normally open input. • 0 = Clean • 1 = Clogged
BI6	Gas Valve Status		Units with Gas as the Primary Heat.	Normally open input. • 0 = Off • 1 = On
BO3	Heat 1 Command		Units with Primary Heat.	• 0 = Off • 1 = On
BO7	Heat 2 Command		Units with Gas as the Primary Heat and is a Split Manifold Burner.	• 0 = Off • 1 = On
BO8	Heat 3 Command		Units with Gas as the Primary Heat and has Two Heaters.	• 0 = Off • 1 = On
AV44	Heat Capacity	0 – 100%	Units with Primary Heat.	Primary heating source capacity.
BV21	Heat Cool Mode Active		All Units.	• 0 = Heat • 1 = Cool
MV4	Heat Cool Mode Status		All Units	• 1 = Auto • 2 = Heat • 3 = Morning Warm-up • 4 = Cool • 5 = Night Purge • 6 = Pre Cool • 7 = Off
MV9	Heat Type		All Units	• 1 = No Heat • 2 = Indirect Fired Gas Heat • 3 = Electric Heat • 4 = Other • 5 = Direct Fired Gas Heat • 6 = Hot Water/Steam
AV69	Heat/Cool Mode Deadband	-58 to 482 °F	Units with Multi Zone VAV.	Heat is enabled when Outdoor Air Temperature drops below Discharge Temperature Setpoint - Heat/Cool Mode Deadband. Cooling is enabled when Outdoor Air temperature rises above the Discharge Temperature Setpoint.
AO11	Heating Output Command	0 – 100%	Units with any type of Primary Heat.	Analog heating output command.
AO1	HGRH Command	0 - 100%	Units with Modulating Hot Gas Reheat.	Analog HGRH output command.
BV5	HGRH Purge Mode		Units with Hot Gas Reheat.	• 0 = Disabled • 1 = Enabled
BV15	High Temp Lockout		All Units.	Latching diagnostic. Cleared with Alarm Reset. • 0 = Normal • 1 = Fail
BO4	Inducer Command		Units with Gas as the Primary Heat.	• 0 = Off • 1 = On
AO2	IVFD Command	0 - 100%	All Units.	Analog supply fan VFD speed.
AV17	IVFD Signal	50 - 100%	When Unit is an OAD, OAK, or OAN and the Supply Fan is CV.	Supply fan speed setpoint.
AV12	Liquid Line Pressure Setpoint	200 – 600 psi	Air Source Heat Pumps with Head Pressure Control.	Pressure setpoint used to modulate condenser fan(s).
BV10	Low Temp Lockout		All Units.	Latching diagnostic. Cleared with Alarm Reset. • 0 = Normal • 1 = Fail
AV47	Maximum OA Damper Position	0 - 100%	Units with Modulating Dampers.	Maximum outdoor air damper position.
AV70	Maximum Supply Air Flow Setpoint	350 – 13500 cfm	Units with Single Zone or Multi Zone VAV.	Supply air flow is limited to not exceed this number.
AV45	Maximum Supply Air Temperature	80 – 120 °F	All Units with Primary Heat or Heat Pumps	Primary or Compressor Heating Capacity is limited in order to not exceed this temperature.
AV36	Minimum Discharge Air Cooling Setpoint	40 – 65 °F	Units that are Space Control.	Cooling capacity is limited in order to not fall below this temperature.
AV43	Minimum Discharge Air Heating Setpoint	40 – 65 °F	Units that are Space Control.	Primary or Compressor Heating Capacity is limited in order to not fall below this temperature.
AV48	Minimum OA Damper Position	0 - 100%	Units with Modulating Dampers.	Minimum outdoor air damper position.
AV59	Minimum Supply Air Flow Setpoint	300 – 13500 cfm	Units with Single Zone or Multi Zone VAV.	Supply air flow is limited to not fall below this number.

Table 10. All object types sorted by object name (continued)

Object Type	Object Name	Min / Max	When the Point Exists	Description
BI5	OA Damper End Switch		All Units.	Normally open input. • 0 = Not Proven • 1 = Proven
AO5	OAD Position Command	0 - 100%	Units with Modulating Dampers.	Analog outdoor air damper command.
AI7	OAD Position Local	0 - 100%	Units with Modulating Dampers.	Local outside air damper position.
BI4	Occupancy Input		All Units.	Normally open input. • 0 = Unoccupied • 1 = Occupied
MV1	Occupancy Request		All Units.	• 1 = Occupied • 2 = Unoccupied • 3 = Occupied Bypass • 4 = Occupied Standby • 5 = Auto
MV2	Occupancy Status		All Units.	• 1 = Occupied • 2 = Unoccupied • 3 = Occupied Bypass • 4 = Occupied Standby • 5 = Unknown
AV9	Occupied Bypass Time	2 - 360	Units with Thumbwheel Installed.	Time that Unoccupied Mode is delayed when Occupied Button is pressed.
AV1	Occupied Cooling Setpoint	55 – 85 °F	Units with Space Control or Single Zone VAV.	Space cooling setpoint used in occupied mode.
AV2	Occupied Heating Setpoint	55 – 85 °F	Units with Space Control or Single Zone VAV.	Space heating setpoint used in occupied mode.
AV3	Occupied Offset	0.5 – 30 Δ °F	All Units.	The value used to calculate the heating/cooling setpoints in occupied mode. If the unit has a thumbwheel installed Occupied Offset defaults to 2. ☐ Active heating setpoint = active setpoint – occupied offset. ☐ Active cooling setpoint = active setpoint + occupied offset.
AV29	Outdoor Air Cooling Setpoint (OACS)	60 – 90 °F	Units with Space Control, Discharge Control, or Single Zone VAV.	Setpoint used to enable cooling.
BO2	Outdoor Air Damper Command		All Units.	• 0 = Open • 1 = Closed
AV11	Outdoor Air Dewpoint Active	-10 to 150 °F	All Units.	Dewpoint of the outdoor air. This point is calculated within the program.
AV10	Outdoor Air Dewpoint Setpoint (OADS)	49 – 100 °F	Units with Space Control, Discharge Control, or Single Zone VAV.	If the outdoor air dewpoint is greater than OADS, the unit will enable dehumidification.
AV38	Outdoor Air Flow Active	0 - 13500 cfm	Units with Outside Air Flow Monitoring.	Actively used outside air flow.
AI10	Outdoor Air Flow Local	0 - 15000 cfm	Units with Outside air flow Monitoring.	Local outside air flow.
AV33	Outdoor Air Heating Setpoint (OAHS)	40 – 75 °F	Units with Space Control, Discharge Control, or Single Zone VAV.	Setpoint used to enable heating.
AV82	Outdoor Air Humidity Active	0 – 100%	All Units.	Actively used outdoor air relative humidity.
AV81	Outdoor Air Humidity BAS	0 - 100%	All Units.	Communicated outdoor air relative humidity.
AV71	Outdoor Air Minimum Flow Setpoint	350 - 13500 cfm	Units that are VAV, have Outdoor Air Flow Monitoring, and Modulating Dampers.	Setpoint to modulate the dampers.
AV72	Outdoor Air Minimum Flow Setpoint Active	350 - 13500 cfm	Units that are VAV, have Outdoor Air Flow Monitoring, and Modulating Dampers.	Actively used setpoint to modulate the dampers.
AV13	Outdoor Air Minimum Flow Setpoint BAS	0 - 13500 cfm	VAV Units with Outdoor air flow Monitoring and Modulating Dampers.	air flow setpoint used to modulate dampers.
AI22	Outdoor Air Relative Humidity Local	0 - 100%	All Units.	Local outside air humidity sensor.
AV76	Outdoor Air Temperature Active	-100 to 200 °F	All Units.	Actively used outdoor air temperature.
AV75	Outdoor Air Temperature BAS	-100 to 200 °F	All Units.	Communicated outdoor air temperature.

Table 10. All object types sorted by object name (continued)

Object Type	Object Name	Min / Max	When the Point Exists	Description
AI21	Outdoor Air Temperature Local	-50 to 135 °F	All Units.	Local outside air temperature sensor.
AO4	PEVFD Command	0 – 100%	Units with Powered Exhaust.	Analog exhaust fan VFD speed.
AV40	PEVFD Setpoint	0 - 100%	OAD, OAK, or OAN that does NOT have Modulating Dampers or Powered Exhaust.	Fan speed setpoint used to control the indoor fan speed.
BO10	Powered Exhaust Enable		Units with Isolation Dampers or has Dual Point Power.	• 0 = Off • 1 = On
BO13	Pre-Heat Enable		Units with Pre-Heat.	• 0 = Off • 1 = On
AV58	Pre-Heat Enable Temperature	-10 to 35 °F	Units with an ERV and an Electric Pre-Heater.	Below this temperature pre-heat will be enabled.
BV33	Pre-Purge Status		Units with Gas as the Primary Heat.	• 0 = Disabled • 1 = Enabled
MV13	Program Control Type		All Units.	• 1 = Space Control • 2 = Discharge Control • 3 = Single Zone VAV • 4 = Multi Zone VAV
BV18	Return Air Damper Option		All Units.	• 0 = Not Installed • 1 = Installed
AI14	Return Air Humidity Local	0 - 100%	Units with Modulating Dampers.	Local return air humidity sensor.
AI6	Return Air Temperature Local	-25 to 135 °F	Units with Modulating Dampers.	Local return air temperature sensor.
AI12	Return Duct/Space Pressure Local	0 - 2 in(H_2O)	Units with Powered Exhaust and Modulating Dampers.	Local return duct or space pressure sensor
AV56	Return Duct/Space Pressure Setpoint	0 - 2 in(H_2O)	Units with Modulating Dampers and Exhaust Fan(s).	Setpoint used to modulate exhaust fan speed.
AV50	Space CO2 Concentration Setpoint	0 – 3000 ppm	All Units.	Space CO2 concentration setpoint.
AV35	Space Dewpoint Active	-58 to 482 °F	All Units.	Actively used space dewpoint.
AV34	Space Dewpoint Setpoint (SPDS)	-10 – 150 °F	Units with Space Control, Discharge Control, or Single Zone VAV.	If the outdoor air dewpoint is greater than OADS, the unit will enable dehumidification.
AI16	Space Occupancy Request Override	-58 to 482	Units with Thumbwheel Installed.	Local input that overrides Occupancy Request.
AI2	Space Relative Humidity Local	0 – 100%	Units with Space Humidity Sensor Installed	Local space relative humidity sensor.
AV7	Space RH Active	-150 to 150%	Units with Space Humidity Sensor Installed.	Actively used space relative humidity.
AV8	Space RH BAS	-150 to 150%	All Units.	Communicated space relative humidity.
BV20	Space Temp/Humidity Sensor Installed		Units that are Space Control or Single Zone VAV.	• 0 = Not Installed • 1 = Installed
AV23	Space Temperature Active	-58 to 482 °F	All Units.	Actively used space temperature.
AV20	Space Temperature BAS	-58 to 482 °F	All Units.	Communicated space temperature.
AI1	Space Temperature Local	-25 to 135 °F	Units with Space Temperature Sensor Installed	Local space temperature sensor.
AV37	Space Temperature Setpoint Active	45 to 95 °F	Units that are Space Control or Single Zone VAV.	Actively used space temperature setpoint.
AV25	Space Temperature Setpoint BAS	-58 to 482 °F	Units that are Space Control or Single Zone VAV.	Communicated space temperature setpoint.
AI20	Space Temperature Setpoint Local	50 to 86 °F	Units with Thumbwheel Installed.	Local thumbwheel input.
AV41	Supply Air Flow Active	0 – 15000 cfm	Units with Piezo Ring on Supply Fan.	Actively used supply airflow.
AV39	Supply Air Flow Setpoint	0 – 7500 cfm	OAB or OAG units that are 208v or 460v.	Setpoint used to modulate the indoor fan speed.
AI3	Supply Fan Pressure Local	0 - 25 in(H_2O)	Units with Piezo Ring on Supply Fan.	Local supply fan piezo ring pressure.
BO1	Supply Fan Start Stop Command		All Units.	Normally Closed Input • 0 = On • 1 = Off
BI1	Supply Fan Status		All Units.	Normally Closed Input • 0 = On • 1 = Off
BV17	System LOCKOUT		All Units.	Latching diagnostic. Cleared with Alarm Reset. • 0 = Normal • 1 = Fail
BV28	Thumbwheel Installed		All Units.	• 0 = Not Installed • 1 = Installed
BV23	Unoccupied Cooling Mode		All Units.	• 0 = Disabled • 1 = Enabled
BV22	Unoccupied Cooling Mode BAS		All Units.	• 0 = Disabled • 1 = Enabled

Table 10. All object types sorted by object name (continued)

Object Type	Object Name	Min / Max	When the Point Exists	Description
AV26	Unoccupied Cooling Setpoint	60 – 90 °F	Units with Space Temperature/Humidity Sensor Installed.	Space cooling setpoint used in unoccupied mode.
BV40	Unoccupied Dehumid Mode		All Units.	• 0 = Disabled • 1 = Enabled
BV37	Unoccupied Dehumid Mode BAS		All Units.	• 0 = Disabled • 1 = Enabled
AV28	Unoccupied Dewpoint Setpoint	49 – 100 °F	Units with Space Temperature/Humidity Sensor Installed.	If the space dewpoint rises above this setpoint during unoccupied mode then dehumidification will be enabled.
BV39	Unoccupied Heating Mode		All Units.	• 0 = Disabled • 1 = Enabled
BV38	Unoccupied Heating Mode BAS		All Units.	• 0 = Disabled • 1 = Enabled
AV27	Unoccupied Heating Setpoint	45 - 90 °F	Units with Space Temperature/Humidity Sensor Installed.	Space heating setpoint used in unoccupied mode.
BV43	Ventilation Mode		Units that are Space Control, Single Zone VAV, or Discharge Control.	• 0 = Disabled • 1 = Enabled
BI9	Water Coil Low Temp Switch		Units that are Water Source Heat Pump.	Normally closed input. • 0 = Open • 1 = Closed
BI8	Water Flow		Units that are Water Source Heat Pump.	Normally open input. • 0 = Off • 1 = On
BV35	Y1 Space Lockout		Units that are Space Control or Single Zone VAV.	• 0 = Disabled • 1 = Enabled
AI8	Zone CO_2 Local	0 – 3000 ppm	Units with a CO_2 Sensor Installed.	Local Space CO_2 concentration

Alarming

The UC600 unit for Packaged Outside Air Units has several objects used for communicating alarms to the system.

Table 11. Alarm objects

Object Type	Object Name	Description	Notification Class
BI2	ESTOP	Normal open input. • 0 = Normal • 1 = ESTOP	2
BI3	Filter Status	Normal open input. • 0 = Clean • 1 = Clogged	4
BV1	Supply Fan Failure	• 0 = Normal • 1 = Fail • Latching diagnostic. Cleared with Alarm Reset or power cycle.	2
BV3	Diagnostic: OAD Proving Switch	• 0 = Normal • 1 = Fail • Latching diagnostic. Cleared with Alarm Reset or power cycle.	2
BV6	Diagnostic: Discharge Air Temperature Source Failure	• 0 = Normal • 1 = Fail • Latching diagnostic. Cleared with Alarm Reset or power cycle.	2
BV10	Low Temp Lockout	• 0 = Normal • 1 = Fail • Latching diagnostic. Cleared with Alarm Reset or power cycle.	2
BV11	Diagnostic: Space Temperature Source Failure	• 0 = Normal • 1 = Fail • Latching diagnostic. Cleared with Alarm Reset or power cycle.	2
BV12	Diagnostic: Space Humidity Source Failure	• 0 = Normal • 1 = Fail • Latching diagnostic. Cleared with Alarm Reset or power cycle.	2
BV13	Diagnostic: Outdoor Air Temperature Source Failure	• 0 = Normal • 1 = Fail • Latching diagnostic. Cleared with Alarm Reset or power cycle.	2
BV14	Diagnostic: Outdoor Air Humidity Source Failure	• 0 = Normal • 1 = Fail • Latching diagnostic. Cleared with Alarm Reset or power cycle.	2
BV15	High Temp Lockout	• 0 = Normal • 1 = Fail • Latching diagnostic. Cleared with Alarm Reset or power cycle.	2
BV17	System LOCKOUT	• 0 = Normal • 1 = Fail • Latching diagnostic. Cleared with Alarm Reset or power cycle.	2
BV32	Diagnostic: ERV Leaving Air Conditions Failure	• 0 = Normal • 1 = Fail • Latching diagnostic. Cleared with Alarm Reset or power cycle.	2
BV42	Diagnostic: Heat Failure	• 0 = Normal • 1 = Fail	2

Additional Resources

Use the following documents and links as additional resources:

- www.bacnetinternational.org
- Tracer SC System Controller Installation and Setup (BAS-SVX31)
- BACnet Best Practices and Troubleshooting Guide (BAS-SVX51*-EN)
- Tracer Graphical Programming 2 (TGP2) Editor Online Help
- Tracer Graphical Programming (TGP2) Application Guide (BAS-APG008)
- Tracer TU Online Help
- Tracer TU Service Tool Getting Started Guide (TTU-SVN01)
- Tracer UC600 Installation Instructions (X39641178-01)
- Tracer XM30 Expansion Module Installation Instructions (X39641148-01)
- Tracer XM32 Expansion Module Installation Instructions (X39641174-01)
- Tracer Expansion Module Installation, Operation, and Maintenance (BAS-SVX046*-EN)
- Tracer® UC600 Programmable Controller Installation, Operation, and Maintenance Manual (BAS-SVX45*-EN)

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

Notes

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