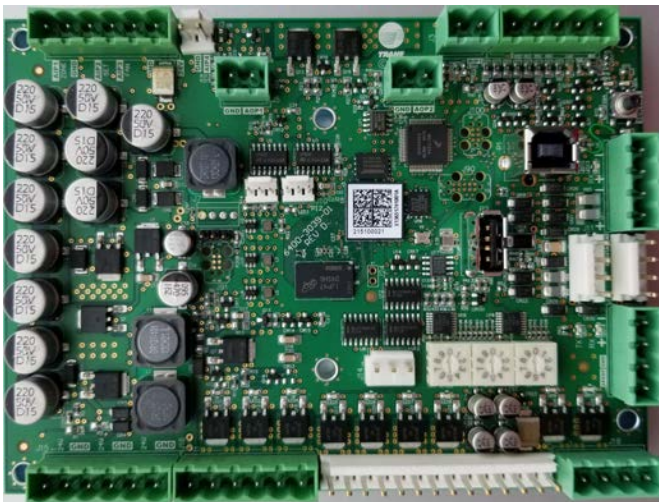




Integration Guide

Symbio™ 400–B/500 Programmable Controller

For Fan Coil, Blower Coil, and Unit Ventilator



⚠ SAFETY WARNING

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



Introduction

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:



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



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.



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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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 Symbio 400–B/500 is BTL certified as a B-BC profile device. A complete list of Trane certified devices is available at www.bacnetinternational.org.

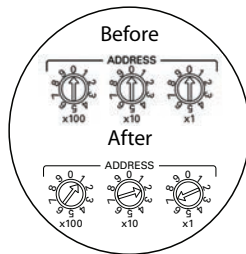


Symbio 400-B/500 Rotary Switches

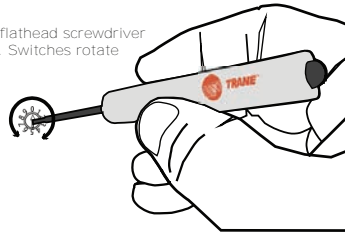
Rotary Switches

There are three (3) rotary switches on the front of the controller. They are used to set the BACnet network address and BACnet Device ID.

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



Use a 1/8 in. (3 mm) flathead screwdriver to set rotary switches. Switches rotate in either direction.





Configuring the Symbio 400-B/500

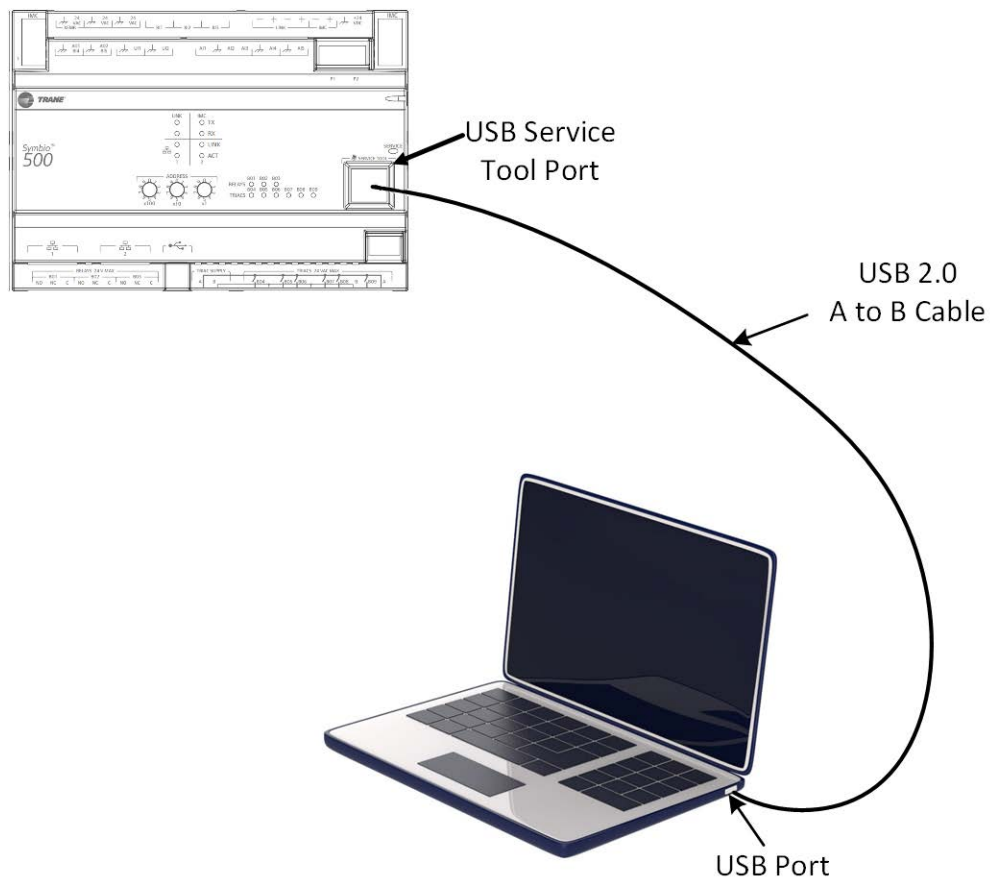
Using Symbio UI to Configure Settings

Symbio UI is a built-in web-based user interface that is used for basic setup and configuration of the Symbio 400–B/500. This interface replaces the need to use the BACnet Setup Tool to configure BACnet protocol settings and allows users to select BAS or local for the source on many sensors and setpoints on the equipment.

Connecting to Symbio UI

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

Figure 1. Connecting to Symbio UI



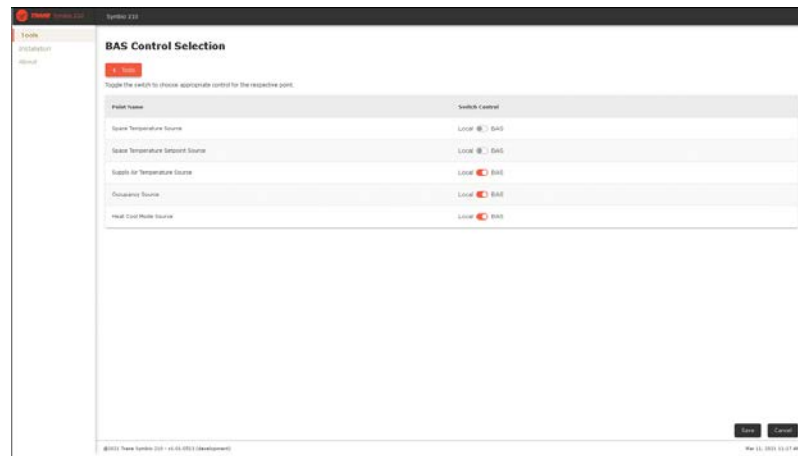
Configuring BAS Control Selection

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

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

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

Figure 2. BAS Control Selection

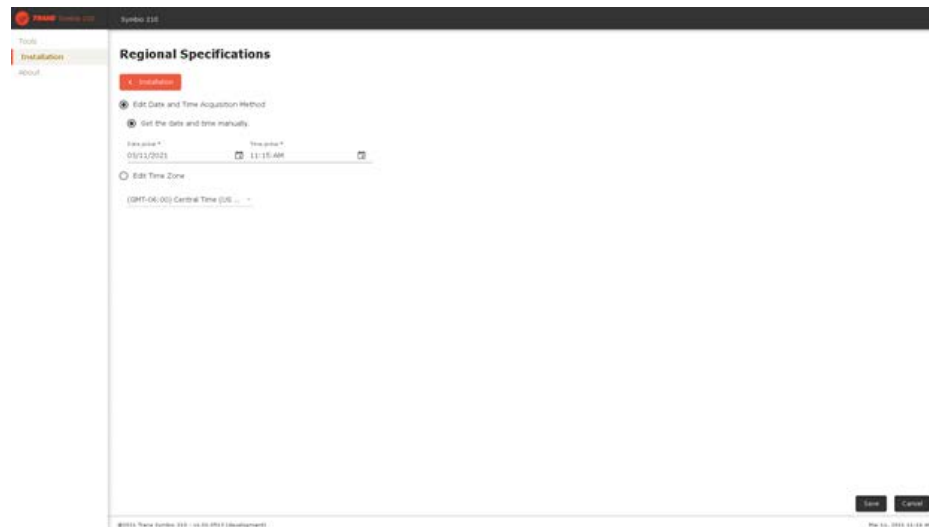


Configuring Regional Specifications

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

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

Figure 3. Regional Specifications



Configuring System Units

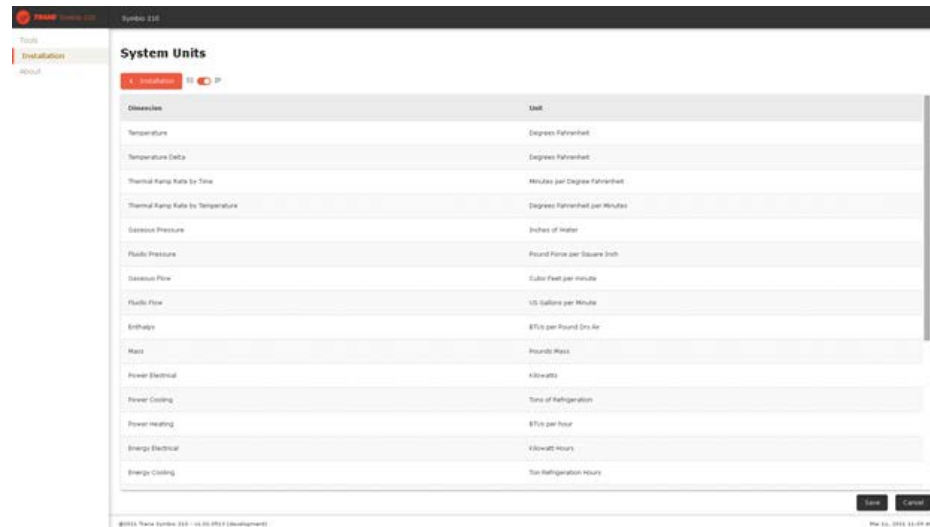
Symbio UI allows users to set the desired System Units of the controller. This will change the unit communicated over BACnet. Making changes to System Units will restart the controller and equipment will be inoperable for a brief period of time.

1. With Symbio UI open in a web browser, navigate to the **Installation** menu on the left-hand navigation.

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

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

Figure 4. System Units



Configuring Identification and Communications

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

Identification Settings:

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

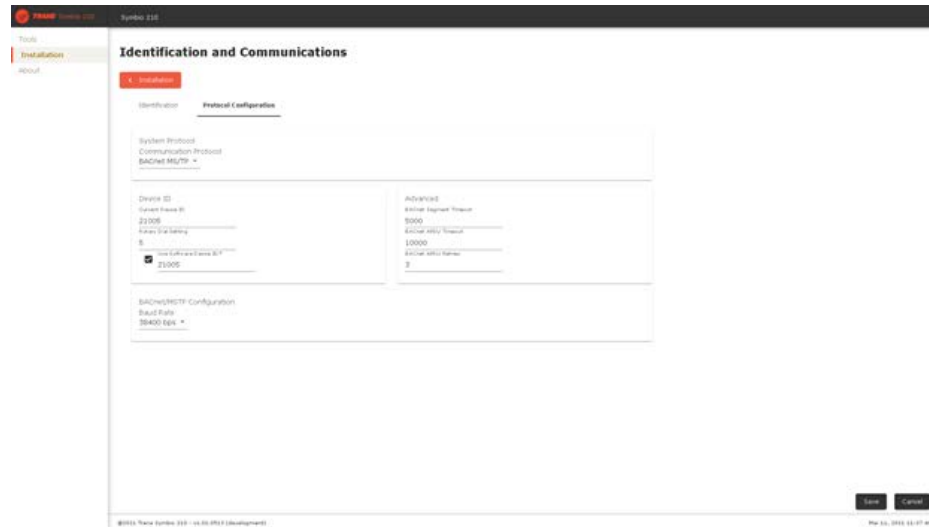
Figure 5. Identification and Communications



Protocol Settings:

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

Figure 6. Identification and Communications

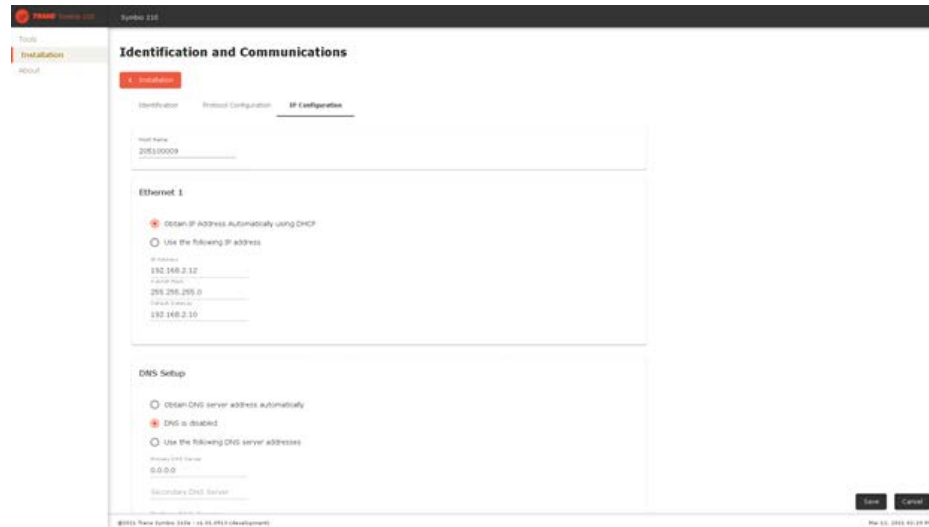


IP Settings:

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

- Click **Save** in bottom right to save changes. Saving changes will restart the controller and equipment will be inoperable for a brief period of time.

Figure 7. Identification and Communications



Points

With Symbio UI open in a web browser, navigate to the Points menu on the left-hand navigation.

- The Points menu shows analog, binary, and multistate points that are included in the controller.
- The name, instance number, present value, alarm status, override status and service status of each point is shown.
- Overrides can be initiated or released by clicking on the **Override** icon.
- Points can be put into or taken out of service by clicking on the **Service** icon.

Note: Points cannot be created or deleted using the Symbio UI tool.

Figure 8. Symbio points

| Instance | Name | Value | Alarm | Override | Service |
|----------|----------------------------------|----------|-------|----------|---------|
| 1 | Space Temperature Local | 77.5 °F | Alarm | | Service |
| 2 | Space Temperature Setpoint Local | 32.0 °F | Alarm | | Service |
| 3 | RTD 383 Input (K alarm) | 151.5 °F | Alarm | | Service |
| 4 | Discharge Air Temperature | 32.0 °F | Alarm | | Service |
| 5 | Entering Water Temperature Local | 32.0 °F | Alarm | | Service |
| 6 | Outside Air Temperature Local | 77.0 °F | | | Service |

Tracer SC+ BAS Integration

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

Tracer SC+ will perform the following steps:

- Enable the Use Software Device ID feature.



Configuring the Symbio 400-B/500

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 Symbio 400–B/500 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 Symbio 400–B/500 requires the BAS system to provide a routine update to the sensor values. This protects against communication loss between the BAS and the Symbio 400–B/500. 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 Symbio 400–B/500 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 Symbio 400–B/500 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
- Outdoor Air Temp BAS
- Space Humidity BAS
- Entering Water Temp 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

The Symbio 400-B/500 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 Request" (BV12) to the active state. Upon the change to active state, the Symbio 400-B/500 will set the present value of the "Filter Runtime Hours" (AV38) object to zero and then set the "Filter Timer Reset Request" object back to the inactive state.

Diagnostics Reset Command

The Symbio 400-B/500 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.

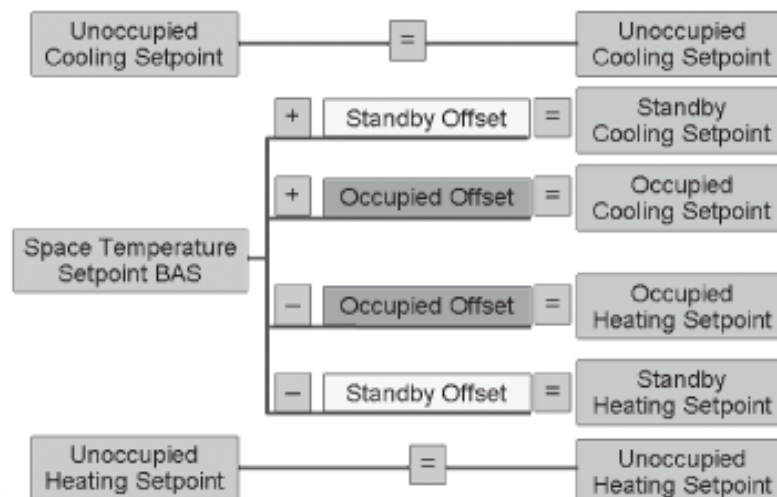
The BAS has the ability to reset internal diagnostics by controlling the state of the *Reset Diagnostic Request* object (BV2) as follows:

- Change the state of the "*Reset Diagnostic Request*" (BV2) to the *active* state.
- Upon the change to *active* state, the Symbio 400-B/500 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 Symbio 400-B/500 will set the present value of the "*Reset Diagnostic Request*" (BV2) object back to the *inactive* state.

Setpoint Calculations

The equipment has the ability to control 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.





Object and Diagnostic Data Points

For quick reference, the following tables are listed and sorted two different ways. [Table 1, p. 14](#) through [Table 9, p. 20](#) are listed by input/output type and sorted by object type. [Table 10, p. 21](#) 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 1. Analog inputs

| Object Type | Object Name | Units of Measure | Min /Max | 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. |
| 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. |
| AI3 | Space Humidity Local | None | 0% to 100% | Dehumidification Units | Local relative humidity sensor value. |
| 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) to 100°C (212°F) | Auto- changeover Unit | Local sensor entering water temperature. |
| AI8 | Outside Air Temperature Local | Temperature (°F or °C) | -40°C (-40°F) to 70°C (158°F) | All Units | Local outside air temperature sensor. |
| AI20 | Face and Bypass Damper Position Status | None | -1000 to 1000 | Face/Bypass Units | Face and bypass damper position in % of stroke time • 0= Full bypass • 100%= Max stroke • Time= Full face |
| AI21 | Space CO ₂ Concentration Local | None | 0 to 2000 | CO ₂ Sensing Units | Local carbon dioxide concentration. |

Table 2. Analog outputs

| Object Type | Object Name | Units of Measure | Min /Max | When the Point Exists | Description |
|-------------|-----------------------------|------------------|---------------|--|--|
| AO1 | Outdoor Air Damper Position | None | -1000 to 1000 | Modulating Outdoor Air Damper Units (Economizer) | Analog outdoor aire damper output command. |
| AO2 | Chilled Water Valve Command | None | -1000 to 1000 | Modulating Cooling (Hydronic) and Changeover Units | Analog chilled water valve command 0% closed. |
| AO3 | Heating Valve Command | None | -1000 to 1000 | Modulating Hot Water/Steam Heating Units | Analog heating valve output command 0% closed. |
| AO4 | Electric Heat Command | None | None | Modulating (SCR) Electric Heating Units | Analog electric heat output command. |

Table 3. Analog values

| Object Type | Object Name | Units of Measure | Min /Max | When the Point Exists | Description |
|-------------|-----------------------------------|------------------------|-----------------------------|----------------------------------|---|
| AV1 | Outdoor Air Temperature BAS | Temperature (°F or °C) | -15°C (5°F) to 50°C (122°F) | All Units | Communicated outdoor air temperature. |
| AV2 | Space Humidity BAS | None | 0% to 100% | Dehumidification Units | Communicated space relative humidity. |
| AV3 | Outdoor Air Temperature Active | Temperature (°F or °C) | -15°C (5°F) to 50°C (122°F) | All Units | Communicated outdoor air temperature. |
| AV4 | Entering Water Temperature BAS | Temperature (°F or °C) | 0°C (32°F) to 100°C (212°F) | Changeover Cooling/Heating Units | Communicated entering water temperature. |
| AV5 | Entering Water Temperature Active | Temperature (°F or °C) | 0°C 32°F) to 100°C (212°F) | Changeover Cooling/Heating Units | Actively used entering water temperature. |
| AV6 | Space Humidity Active | Percent | 0% to 100% | Dehumidification Units | Actively used space relative humidity. |

Table 3. Analog values (continued)

| Object Type | Object Name | Units of Measure | Min /Max | When the Point Exists | Description |
|-------------|--|------------------------|--|--|---|
| AV8 | Economizer Minimum Position Setpoint BAS | Percent | 0% to 100% | Modulating Outdoor Air Damper Units (Economizer) | Communicated value for minimum economizer position setpoint. |
| AV9 | Fan Off Delay Time | Seconds | 0 to 600 | All Units | Fan off delay time. |
| AV10 | Compressor Enable BAS | Percent | 0% to 100% | DX and Heat Pump 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. |
| AV16 | Economizer Request | Percent | 0% to 100% | Modulating outdoor air damper units (economizer) | Economizer position request used for manual override control. |
| AV18 | Cool Valve Request | Percent | 0% to 100% | Cooling (hydronic) and Changeover Units | Cool valve position request used for manual override control. |
| AV19 | DX Cool Request | Percent | 0% to 100% | DX and Heat Pump Units | DX compressor output request used for manual override control. |
| AV20 | Heat Valve Request | Percent | 0% to 100% | Hot Water and Steam Heating Units | Heat valve position request used for manual override control. |
| AV21 | Discharge Air Temperature Low Limit Setpoint | Temperature (°F or °C) | -1.1°C (30.02°F) to 10°C (50°F) | All Units | If the discharge air temperature is less than the discharge air low limit for three (3) minutes, the controller trips ON a freeze protection diagnostic. The valves open, the face/bypass damper goes to full face (when applicable), and all other outputs go to the OFF position. |
| AV22 | Electric Heat Request | Percent | 0% to 100% | Electric Heating Units | Electric heat request used for manual override control. |
| 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. |
| 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. |
| AV27 | Space Temperature Setpoint BAS | Temperature (°F or °C) | -10°C (14°F) to 35°C (95°F) | All Units | Communicate space temperature setpoint. |
| 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. |
| AV29 | Freeze Avoidance Setpoint | Temperature (°F or °C) | -17.78°C (-0.004°F) to 10°C (50°F) | Hydronic Units | Freeze avoidance setpoint. |
| 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. <ul style="list-style-type: none"> • Active heating setpoint = active setpoint - occupied offset. • Active cooling setpoint = active setpoint + occupied offset. |
| AV31 | Economizer Minimum Position Setpoint Local | Percent | 0% to 100% | Modulating Outdoor Air Damper Units (Economizer) | Minimum outside air damper position during occupied mode. |



Object and Diagnostic Data Points

Table 3. Analog values (continued)

| Object Type | Object Name | Units of Measure | Min /Max | When the Point Exists | Description |
|-------------|--|------------------------|--|--|--|
| AV32 | Economizer Enable Minimum Outdoor Air Temperature Setpoint | Temperature (°F or °C) | 0.0°C (32°F) to 37.78°C (100.004°F) | Modulating Outdoor Air Damper Units (Economizer) | If the outdoor air temperature is less than the economizing enable point, then economizing is possible. If the outdoor air temperature is great than economizing enable point, plus 5 degrees Fahrenheit, then economizing is not possible. For any other temperature, there is no change in the status of economizing. |
| AV33 | Occupied Bypass Time | Minutes | 0 to 240 | All Units | Occupied bypass mode time remaining. |
| AV34 | 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. <ul style="list-style-type: none"> • Active heating setpoint = active setpoint - occupied offset. • Active cooling setpoint = active setpoint + occupied offset. |
| AV35 | Exhaust fan Enable Position | Percent | 0% to 100% | Exhaust Fan Units | The economizer position at which the exhaust fan turns ON; default is 10%. Internal programming limits this between 0% and 100%. The economizer position must be greater than, or equal to, the <i>Exhaust Fan Enable Position</i> in order to turn ON the exhaust fan. The exhaust fan turns OFF 10% below the turn ON point. Note: The <i>Exhaust Fan Enable</i> must be enabled for this point to have an effect. |
| AV36 | Space Dehumidification Setpoint BAS | Percent | 0% to 100% | Dehumidification Units | <ul style="list-style-type: none"> • Communicated relative humidity (RH) setpoint. • Dehumidification starts when RH greater than RH setpoint. • Dehumidification stops when RH is less than RH setpoint - offset. • To disable dehumidification, override the setpoint to 100%. |
| 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. |
| AV38 | Filter Runtime Hours | Hours | 0 to 100,000 | All Units | Elapsed hours since dirty filter diagnostic (in hours). This value is cleared when <i>Filter Timer Reset Request</i> is set to TRUE. |
| AV58 | Standby Minimum Position Setpoint | Percent | 0% to 100% | Modulating Outdoor Air Damper Units (Economizer) | Minimum position in occupied standby mode. |
| AV59 | Space Temperature Active | Temperature (°F or °C) | -15°C (5°F) to 50°C (122°F) | All Units | The currently used space temperature. |
| AV60 | Occupied Low Fan Min Position Setpoint | Percent | 0% to 100% | Modulating Outdoor Air Damper Units (Economizer) | Minimum position in occupied with low fan speed. |
| AV63 | Supply Fan Speed Request | Percent | 0% to 100% | Variable Speed Fan Units (ECM) | <ul style="list-style-type: none"> • Reported fan speed, 0% is off, then ranges from <i>Fan Capacity Low</i> to 100%. • Requests below <i>Fan Capacity Low</i> is treated as 0%. |
| AV64 | Fan Capacity Low Limit | Percent | 0% to 100% | Variable Speed Fan Units (ECM) | Minimum fan RPMs divided by the maximum RPMs. |
| AV65 | Compressor Lockout Setpoint | Temperature (°F or °C) | -40°C (-40°F) to 40°C (104°F) | Heat Pump Units | Outside air temperature value at which the compressor(s) are disabled. |
| AV67 | Auxiliary Heat Control Request | Percent | 0% to 100% | How Water, Steam and Electric Heating Units | Auxiliary heating capacity limit (does not apply to heating with changeover valve or heat pump). <ul style="list-style-type: none"> • 100%; Full heat capacity is allowed. • 1% to 99%; Limits the heating capacity (for 2 stages of electric heat: 1% to 50% enables stage 1 and disables stage 2 and 51% to 100% enables both stages). • 0%; Disable dedicated hydronic heating and electric heat. |
| 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%. |

Table 3. Analog values (continued)

| Object Type | Object Name | Units of Measure | Min /Max | When the Point Exists | Description |
|-------------|--|------------------------|--|--|---|
| AV69 | Economizer Minimum Position Setpoint Active | Percent | 0% to 100% | Modulating Outdoor Air Damper Units (Economizer) | Current minimum allowed economizer position. |
| AV71 | Face and Bypass Damper Request | Percent | 0% to 100% | Face/Bypass Units | Request is the capacity after the damper/coil curve and diagnostics are applied. |
| AV73 | Supply Fan Speed Status | Percent | 0% to 100% | Variable Speed Fan Units (ECM) | <ul style="list-style-type: none"> Reported fan speed, 0% is off, then ranges from <i>Fan Capacity Low</i> to 100%. For discrete fans, 0% is OFF, 33% is LOW, 66% is MED, and 100% is HIGH speed. |
| AV74 | Heating Capacity Primary | Percent | 0% to 100% | All Units | Primary heating source heat capacity. |
| AV75 | Heating Capacity Secondary | Percent | 0% to 100% | All Units | Secondary heating source heat capacity. |
| AV76 | Cooling Capacity Status | Percent | 0% to 100! | Cooling Units | Cooling source cool capacity. |
| AV77 | Discharge Air Temperature Maximum Heat Limit | Temperature (°F or °C) | 3.33°C (37.40°F) to 65.56°C (150.01°F) | All Units | Heating capacity is limited in order to not exceed this temperature. |
| AV78 | Discharge Air Temperature Minimum Cool Limit | Temperature (°F or °C) | 3.33°C (37.40°F) to 65.56°C (150.01°F) | All Units | Cooling capacity is limited in order to not exceed this temperature. |
| AV81 | Electric Heat Stage 1 Fan Output | Percent | 0% to 100% | Variable Speed Fan Units (ECM) | Minimum Flow with one stage of electric heat. Code changes fan speed to minimum, then waits for 15 seconds before turning electric heat stage 1 ON. |
| AV82 | Electric Heat Stage 2 Fan Output | Percent | 0% to 100% | Variable Speed Fan Units (ECM) | Minimum Flow with one stage of electric heat. Code changes fan speed to minimum, then waits for 15 seconds before turning electric heat stage 2 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. |
| 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. |
| 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. |
| 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. |
| AV96 | Discharge Air Temperature Design Cool Limit | Temperature (°F or °C) | 1.67°C (35.01°F) to 65.56°C (150.008°F) | All Units | Fan speed increased, if possible, to limit discharge air to this temperature. |
| AV97 | Discharge Air Temperature Design Heat Limit | Temperature (°F or °C) | 33.33°C (37.99°F) to 65.56°C (150.008°F) | All Units | Fan speed increased, if possible, to limit discharge air to this temperature. |
| AV108 | DCV Minimum Economizer Position at Max Fan Speed | Percent | 0% to 100% | Modulating Outdoor Air Damper Units (Economizer) | Damper position with fan speed at maximum. |
| AV109 | DCV Minimum Economizer Position at Min Fan Speed | Percent | 0% to 100% | Modulating Outdoor Air Damper Units (Economizer) | Damper position with fan speed at minimum. |
| AV110 | Space CO ₂ Limit | PPM | 400 to 2,000 | Modulating Outdoor Air Damper Units (Economizer) | CO ₂ Maximum Setpoint |
| AV111 | Space CO ₂ Low Limit | PPM | 200 to 2,000 | Modulating Outdoor Air Damper Units (Economizer) | CO ₂ Minimum Setpoint |



Object and Diagnostic Data Points

Table 3. Analog values (continued)

| Object Type | Object Name | Units of Measure | Min /Max | When the Point Exists | Description |
|-------------|--|------------------|------------|--|--|
| AV112 | Space CO ₂ Concentration BAS | PPM | 0 to 5,000 | All Units | BAS communicated CO ₂ value |
| AV113 | Space CO ₂ Concentration Active | PPM | 0 to 5,000 | Modulating Outdoor Air Damper (Economizer) | Arbitrated BAS and Local CO ₂ value |

Table 4. Binary inputs

| Object Type | Object Name | Units of Measure | Min /Max | When the Point Exists | Description |
|-------------|--------------------------------|------------------|----------|-----------------------|---|
| B11 | Occupancy Input | None | None | All Units | Normally open input. • 0 = Occupied • 1 = Unoccupied |
| B12 | Condensate Overflow Input | None | None | Cooling Units | Normally closed input. |
| B13 | Low Coil Temperature Detection | None | None | Hydronic Units | Normally closed input. • 1 = Normal • 0 = Low Temperature |
| B14 | Frost Detection Input | None | None | DX Units | Normally closed input. |
| B15 | Supply Fan Status | None | None | All Units | Normally open input. • 0 = OFF • 1 = ON (fan running) |

Table 5. Binary outputs

| Object Type | Object Name | Units of Measure | Min /Max | When the Point Exists | Description |
|-------------|------------------------------------|------------------|----------|--|---|
| BO2 | Exhaust Fan Start Stop Command | None | None | Exhaust Fan Units | • 0 = OFF • 1 = Running |
| BO4 | Chilled Water Valve Command Binary | None | None | Binary Cooling (Hydronic) and Changeover Units | Binary chilled water command. |
| BO4 | Compressor 1 Command | None | None | DX and Heat Pump units | Compressor 1 command. |
| BO5 | Compressor 2 Command | None | None | Two-stage DX and Heat Pump Units | Compressor 2 command. |
| BO6 | Heating Valve Command Binary | None | None | Binary Hot Water/ Steam Heating Units | Binary heating valve output. |
| BO6 | Electric Heat Output 1 | None | None | Staged Electric Heating Units | Electric heat Stage 1 output. |
| BO7 | Reversing Valve Output | None | None | Heat Pump Units | • ON = Cooling • OFF = Heating |
| BO7 | Electric Heat Output 2 | None | None | Two-stage Electric Heating Units | Electric heat Stage 2 output. |
| BO8 | Outside Air Damper Binary Output | None | None | Binary Outdoor Air Damper Units (Ventilation) | Binary outdoor air damper output command. |

Table 6. Binary values

| Object Type | Object Name | Units of Measure | Min /Max | When the Point Exists | Description |
|-------------|---|------------------|----------|-----------------------|--|
| BV1 | Supply Fan Configuration Command | None | None | All Units | Fan in occupied mode can continuously cycle on/off with capacity or can be on. |
| BV2 | Reset Diagnostic Request | 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: Discharge Air Temperature Low Limit | None | None | All Units | Freeze Protect Diagnostic (discharge air temp low limit). • 1=Active • 0=Inactive • Latching diagnostic, but will auto-recover. |

Table 6. Binary values (continued)

| Object Type | Object Name | Units of Measure | Min /Max | When the Point Exists | Description |
|-------------|--|------------------|----------|--|---|
| BV4 | Diagnostic: Condensate Overflow | None | None | Cooling Units | Condensate Overflow Diagnostic <ul style="list-style-type: none"> • 1=Active • 0=Inactive • Latching diagnostic. Cleared with Reset Diagnostic Request or power cycle |
| BV5 | Diagnostic: Low Coil Temperature Detect | None | None | Hydronic Units | Low Coil Temperature Detection Diagnostic. <ul style="list-style-type: none"> • 1=Active • 0=Inactive • Latching diagnostic, but can auto-recover. Cleared with Reset Diagnostic Request or power cycle |
| BV6 | Diagnostic: Low Air Flow- Supply Fan Failure | None | None | Variable Speed Fan Units (ECM) | Fan status diagnostic. |
| BV7 | Diagnostic: Freeze Avoidance Mode | None | None | Hydronic Units | Freeze Avoidance Diagnostic (only applies to hydronic units). <ul style="list-style-type: none"> • 1=Active • 0=Inactive • Non-latching (will clear automatically when resolved) |
| BV8 | Diagnostic: Filter Change Required | None | None | All Units | Filter Status Diagnostic (based on fan run hours). <ul style="list-style-type: none"> • 1=Active • 0=Inactive • Non-latching (will clear automatically when resolved) |
| BV10 | Exhaust Fan Enable | None | None | Exhaust Fan Units | <ul style="list-style-type: none"> • 0 = Disable • 1 = Enable |
| BV11 | Dehumidification Status | None | None | Dehumidification Units | <ul style="list-style-type: none"> • 1 = Dehumidification is active • 0 = Not active |
| BV12 | Filter Timer Reset Request | None | None | All Units | 1 = Reset the filter timer. After the UC resets the timer, this binary value reverts back to 0. |
| BV13 | Reversing Valve Request | None | None | Heat Pump Units | Reversing valve position request used for manual override control. |
| BV14 | Predicted Occupied Heat Cool Mode Status | None | None | All Units | Anticipated Heat Cool mode upon entering the occupied mode. Can be used to help determine required Entering Water Temperature. |
| BV15 | Demand Control Ventilation Enable | None | None | Modulating Outdoor Air Damper Units (Economizer) | Enables Demand Control Ventilation. |

Table 7. Multi-state inputs

| Object Type | Object Name | Units of Measure | Min /Max | When the Point Exists | Description |
|-------------|------------------------|------------------|----------|--------------------------------|---|
| MI1 | Supply Fan Speed Local | None | None | All Units | Local fan speed setting. |
| MI2 | Timed Override Status | None | None | All Units | Timed override request from zone sensor. |
| MI3 | Communication Status | None | None | All Units | <ul style="list-style-type: none"> • 1 = Comm Up • 2 = Comm Down • 3 = No Parent Configured |
| MI4 | IMC Status | None | None | Variable Speed Fan Units (ECM) | <ul style="list-style-type: none"> • 1 = ok • 2 = commLoss • 3 = newConfig • 4 = hwMismatch • 5 = swMismatch • 6 = hwVersion • 7 = swVersion • 8 = nvDataMismatch • 9 = dupRotarySwitch • 10 = extraDevice • 11 = rotarySwitchNotFound |

Table 8. Multi-state output

| Object Type | Object Name | Units of Measure | Min /Max | When the Point Exists | Description |
|-------------|----------------------|------------------|----------|-----------------------|--|
| MO1 | Supply Fan Speed BAS | None | None | Always | <ul style="list-style-type: none"> • For a 1 speed fan: 2 = Off, 5 = High • For a 2 speed fan: 2 = Off, 3 = Low, 5 = High • For a 3 speed fan: 2 = Off, 3 = Low, 4 = Medium, 5 = High |



Object and Diagnostic Data Points

Table 9. Multi-state value

| Object Type | Object Name | Units of Measure | Min /Max | When the Point Exists | Description |
|-------------|--|------------------|----------|--|---|
| MV1 | Supply Fan Speed Active | None | None | Discrete 1-, 2-and 3- Speed Fan Units | Active supply fan speed for discrete fan speed. |
| 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 [treats this as Auto] • 6 = Pre Cool • 7 = Off • 8 = Test (status only) • 9 = Emergency Heat (treat this as Auto) • 10 = Fan Only (economizer at min) • 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 |
| MV5 | Heat Cool Mode Status | None | None | All Units | Actual heat/cool mode status. |
| 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 (UC uses local occupancy decision) |
| 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 Speed BAS | None | None | All Units | <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 - treated as shutdown • 3 = Depressurized - treated as shutdown • 4 = Purge - treated as shutdown • 5 = Shutdown • 6 = Fire - treated as shutdown |
| MV10 | Economizer Airside Enable BAS | None | None | Modulating Outdoor Air Damper Units (Economizer) | <ul style="list-style-type: none"> • 1 = Disabled • 2 = Enabled • 3 = Auto <p><i>Economizer Auto</i> means that the controller determines economizer operation. Enabled or Disabled means that economizer operation is allowed or not allowed (respectively), overriding the local decision.</p> |
| MV11 | Number of Fan Speeds | None | None | All Units | <ul style="list-style-type: none"> • 1 = Zero • 2 = One • 3 = Two • 4 = Three • 5 = Variable Speed |
| MV13 | Outdoor Air Damper Status | None | None | Modulating Outdoor Air Damper Units (Economizer) | <ul style="list-style-type: none"> • 1 = At or Below Minimum Position • 2 = Above Minimum Position • 3 = Economizer Not Present |
| MV22 | Fan Operating Mode Request | None | 1 to 2 | Variable Speed Fan Units (ECM) | <ul style="list-style-type: none"> • 1 = Energy Efficient Mode • 2 = Acoustical Mode <p>If the arbitrated fan switch speed is NOT auto then comfort control is used which is the same as the regular control.</p> |
| MV23 | First Stage Compressor Minimum Fan Speed | None | None | Variable Speed Fan Units (ECM) | <ul style="list-style-type: none"> • 1= Low • 2= Medium • 3= High (Default) <p>Minimum fan speed when first stage compressor is running (default).</p> |

Table 10. All object types sorted by object name

| Object Type | Object Name | Units of Measure | Min /Max | When the Point Exists | Description |
|-------------|--|------------------------|---|--|--|
| AV67 | Auxiliary Heat Control Request | Percent | 0% to 100% | How Water, Steam and Electric Heating Units | Auxiliary heating capacity limit (does not apply to heating with changeover valve or heat pump). <ul style="list-style-type: none"> • 100%; Full heat capacity is allowed. • 1% to 99%; Limits the heating capacity (for 2 stages of electric heat: 1% to 50% enables stage 1 and disables stage 2 and 51% to 100% enables both stages). • 0%; Disable dedicated hydronic heating and electric heat. |
| AO2 | Chilled Water Valve Command | None | -1000 to 1000 | Modulating Cooling (Hydronic) and Changeover Units | Analog chilled water valve command 0% closed. |
| BO4 | Chilled Water Valve Command Binary | None | None | Binary Cooling (Hydronic) and Changeover Units | Binary chilled water command. |
| MI3 | Communication Status | None | None | All Units | <ul style="list-style-type: none"> • 1 = Comm Up • 2 = Comm Down • 3 = No Parent Configured |
| BO4 | Compressor 1 Command | None | None | DX and Heat Pump units | Compressor 1 command. |
| BO5 | Compressor 2 Command | None | None | Two-stage DX and Heat Pump Units | Compressor 2 command. |
| AV10 | Compressor Enable BAS | Percent | 0% to 100% | DX and Heat Pump 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). |
| AV65 | Compressor Lockout Setpoint | Temperature (°F or °C) | -40°C (-40°F) to 40°C (104°F) | Heat Pump Units | Outside air temperature value at which the compressor(s) are disabled. |
| BI2 | Condensate Overflow Input | None | None | Cooling Units | Normally closed input. <ul style="list-style-type: none"> • 1 = Normal • 0 = Overflow |
| AV18 | Cool Valve Request | Percent | 0% to 100% | Cooling (hydronic) and Changeover Units | Cool valve position request used for manual override control. |
| AV76 | Cooling Capacity Status | Percent | 0% to 100! | Cooling Units | Cooling source cool capacity. |
| MV2 | Cooling Fan Speed Default | None | None | None | Do not use. |
| 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. |
| 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. |
| AV108 | DCV Minimum Economizer Position at Max Fan Speed | Percent | 0% to 100% | Modulating Outdoor Air Damper Units (Economizer) | Damper position with fan speed at maximum. |
| AV109 | DCV Minimum Economizer Position at Min Fan Speed | Percent | 0% to 100% | Modulating Outdoor Air Damper Units (Economizer) | Damper position with fan speed at minimum. |
| BV11 | Dehumidification Status | None | None | Dehumidification Units | <ul style="list-style-type: none"> • 1 = Dehumidification is Active • 0 = Not Active |
| BV15 | Demand Control Ventilation Enable | None | None | Modulating Outdoor Air Damper Units (Economizer) | Enables Demand Control Ventilation. |



Object and Diagnostic Data Points

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

| Object Type | Object Name | Units of Measure | Min /Max | When the Point Exists | Description |
|-------------|---|------------------------|--|--|--|
| BV4 | Diagnostic: Condensate Overflow | None | None | Cooling Units | Condensate Overflow Diagnostic <ul style="list-style-type: none"> • 1=Active • 0=Inactive Latching diagnostic. Cleared with Reset Diagnostic Request or power cycle. |
| BV3 | Diagnostic: Discharge Air Temperature Low Limit | None | None | All Units | Freeze Protect Diagnostic (discharge air temp low limit). <ul style="list-style-type: none"> • 1=Active • 0=Inactive Latching diagnostic, but will auto-recover. |
| BV8 | Diagnostic: Filter Change Required | None | None | All Units | Filter Status Diagnostic (based on fan run hours). <ul style="list-style-type: none"> • 1=Active • 0=Inactive Non-latching (will clear automatically when resolved) |
| BV7 | Diagnostic: Freeze Avoidance Mode | None | None | Hydronic Units | Freeze Avoidance Diagnostic (only applies to hydronic units). <ul style="list-style-type: none"> • 1=Active • 0=Inactive Non-latching (will clear automatically when resolved) |
| BV6 | Diagnostic: Low Air Flow- Supply Fan Failure | None | None | Variable Speed Fan Units (ECM) | Fan Status Diagnostic. <ul style="list-style-type: none"> • 1=Active • 0=Inactive Latching; Cleared with Reset Diagnostic Request or power cycle |
| BV5 | Diagnostic: Low Coil Temperature Detect | None | None | Hydronic Units | Low Coil Temperature Detection Diagnostic. <ul style="list-style-type: none"> • 1=Active • 0=Inactive Latching diagnostic, but can auto-recover. Cleared with Reset Diagnostic Request or power cycle |
| AI4 | Discharge Air Temperature | Temperature (°F or °C) | -50°C (-58°F) to 115°C (239°F) | All Units | Discharge air temperature from equipment. |
| AV96 | Discharge Air Temperature Design Cool Limit | Temperature (°F or °C) | 1.67°C (35.01°F) to 65.56°C (150.008°F) | All Units | Fan speed increased, if possible, to limit discharge air to this temperature. |
| AV97 | Discharge Air Temperature Design Heat Limit | Temperature (°F or °C) | 33.33°C (37.99°F) to 65.56°C (150.008°F) | All Units | Fan speed increased, if possible, to limit discharge air to this temperature. |
| AV21 | Discharge Air Temperature Low Limit Setpoint | Temperature (°F or °C) | -1.1°C (30.02°F) to 10°C (50°F) | All Units | If the discharge air temperature is less than the discharge air low limit for three (3) minutes, the controller trips ON a freeze protection diagnostic. The valves open, the face/bypass damper goes to full face (when applicable), and all other outputs go to the OFF position. |
| AV77 | Discharge Air Temperature Maximum Heat Limit | Temperature (°F or °C) | 3.33°C (37.40°F) to 65.56°C (150.01°F) | All Units | Heating capacity is limited in order to not exceed this temperature. |
| AV78 | Discharge Air Temperature Minimum Cool Limit | Temperature (°F or °C) | 3.33°C (37.40°F) to 65.56°C (150.01°F) | All Units | Cooling capacity is limited in order to not exceed this temperature. |
| AV19 | DX Cool Request | Percent | 0% to 100% | DX and Heat Pump Units | DX compressor output request used for manual override control. |
| MV10 | Economizer Airside Enable BAS | None | None | Modulating Outdoor Air Damper Units (Economizer) | <ul style="list-style-type: none"> • 1 = Disabled • 2 = Enabled • 3 = Auto <i>Economizer Auto</i> means that the controller determines economizer operation. <i>Enabled</i> or <i>Disabled</i> means that economizer operation is allowed or not allowed (respectively), overriding the local decision. |

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

| Object Type | Object Name | Units of Measure | Min /Max | When the Point Exists | Description |
|-------------|--|------------------------|-------------------------------------|--|---|
| AV32 | Economizer Enable Minimum Outdoor Air Temperature Setpoint | Temperature (°F or °C) | 0.0°C (32°F) to 37.78°C (100.004°F) | Modulating Outdoor Air Damper Units (Economizer) | If the outdoor air temperature is less than the economizing enable point, then economizing is possible. If the outdoor air temperature is great than economizing enable point, plus 5 degrees Fahrenheit, then economizing is not possible. For any other temperature, there is no change in the status of economizing. |
| AV69 | Economizer Minimum Position Setpoint Active | Percent | 0% to 100% | Modulating Outdoor Air Damper Units (Economizer) | Current minimum allowed economizer position. |
| AV8 | Economizer Minimum Position Setpoint BAS | Percent | 0% to 100% | Modulating Outdoor Air Damper Units (Economizer) | Communicated value for minimum economizer position setpoint. |
| AV31 | Economizer Minimum Position Setpoint Local | Percent | 0% to 100% | Modulating Outdoor Air Damper Units (Economizer) | Minimum outside air damper position during occupied mode. |
| AV16 | Economizer Request | Percent | 0% to 100% | Modulating outdoor air damper units (economizer) | Economizer position request used for manual override control. |
| AO4 | Electric Heat Command | None | None | Modulating (SCR) Electric Heating Units | Analog electric heat output command. |
| BO6 | Electric Heat Output 1 | None | None | Staged Electric Heating Units | Electric heat Stage 1 output. |
| BO7 | Electric Heat Output 2 | None | None | Two-stage Electric Heating Units | Electric heat Stage 2 output. |
| AV22 | Electric Heat Request | Percent | 0% to 100% | Electric Heating Units | Electric heat request used for manual override control. |
| AV81 | Electric Heat Stage 1 Fan Output | Percent | 0% to 100% | Variable Speed Fan Units (ECM) | Minimum Flow with one stage of electric heat. Code changes fan speed to minimum, then waits for 15 seconds before turning electric heat stage 1 ON. |
| AV82 | Electric Heat Stage 2 Fan Output | Percent | 0% to 100% | Variable Speed Fan Units (ECM) | Minimum Flow with one stage of electric heat. Code changes fan speed to minimum, then waits for 15 seconds before turning electric heat stage 2 ON. |
| MV9 | Emergency Override BAS | None | None | All Units | <ul style="list-style-type: none"> • 1 = Normal • 2 = Pressurize - treated as shutdown • 3 = Depressurized - treated as shutdown • 4 = Purge - treated as shutdown • 5 = Shutdown • 6 = Fire - treated as shutdown |
| AV5 | Entering Water Temperature Active | Temperature (°F or °C) | 0°C (32°F) to 100°C (212°F) | Changeover Cooling/Heating Units | Actively used entering water temperature. |
| AV4 | Entering Water Temperature BAS | Temperature (°F or °C) | 0°C (32°F) to 100°C (212°F) | Changeover Cooling/Heating Units | Communicated entering water temperature. |
| AI5 | Entering Water Temperature Local | Temperature (°F or °C) | -0°C (32°F) 100°C (212°F) | Auto- changeover Unit | Local sensor entering water temperature. |
| BV10 | Exhaust Fan Enable | None | None | Exhaust Fan Units | <ul style="list-style-type: none"> • 0 = Disable • 1 = Enable |
| AV35 | Exhaust fan Enable Position | Percent | 0% to 100% | Exhaust Fan Units | <p>The economizer position at which the exhaust fan turns ON; default is 10%. Internal programming limits this between 0% and 100%. The economizer position must be greater than, or equal to, the <i>Exhaust Fan Enable Position</i> in order to turn ON the exhaust fan. The exhaust fan turns OFF 10% below the turn ON point.</p> <p>Note: The <i>Exhaust Fan Enable</i> must be enabled for this point to have an effect.</p> |
| BO2 | Exhaust Fan Start Stop Command | None | None | Exhaust Fan Units | <ul style="list-style-type: none"> • 0 = Off • 1 = Running |



Object and Diagnostic Data Points

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

| Object Type | Object Name | Units of Measure | Min /Max | When the Point Exists | Description |
|-------------|--|------------------------|---|--|--|
| AI20 | Face and Bypass Damper Position Status | None | -1000 to 1000 | Face/Bypass Units | Face and bypass damper position in % of stroke time <ul style="list-style-type: none"> • 0= Full bypass • 100%= Max stroke • Time= Full face |
| AV71 | Face and Bypass Damper Request | Percent | 0% to 100% | Face/Bypass Units | Request is the capacity after the damper/coil curve and diagnostics are applied. |
| AV67 | Auxiliary Heat Control Request | Percent | 0% to 100% | How Water, Steam and Electric Heating Units | Auxiliary heating capacity limit (does not apply to heating with changeover valve or heat pump). <ul style="list-style-type: none"> • 100%; Full heat capacity is allowed. • 1% to 99%; Limits the heating capacity (for 2 stages of electric heat: 1% to 50% enables stage 1 and disables stage 2 and 51% to 100% enables both stages). • 0%; Disable dedicated hydronic heating and electric heat. |
| AO2 | Chilled Water Valve Command | None | -1000 to 1000 | Modulating Cooling (Hydronic) and Changeover Units | Analog chilled water valve command 0% closed. |
| BO4 | Chilled Water Valve Command Binary | None | None | Binary Cooling (Hydronic) and Changeover Units | Binary chilled water command. |
| MI3 | Communication Status | None | None | All Units | <ul style="list-style-type: none"> • 1 = Comm Up • 2 = Comm Down • 3 = No Parent Configured |
| BO4 | Compressor 1 Command | None | None | DX and Heat Pump units | Compressor 1 command. |
| BO5 | Compressor 2 Command | None | None | Two-stage DX and Heat Pump Units | Compressor 2 command. |
| AV10 | Compressor Enable BAS | Percent | 0% to 100% | DX and Heat Pump 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). |
| AV65 | Compressor Lockout Setpoint | Temperature (°F or °C) | -40°C (-40°F) to 40°C (104°F) | Heat Pump Units | Outside air temperature value at which the compressor(s) are disabled. |
| BI2 | Condensate Overflow Input | None | None | Cooling Units | Normally closed input. <ul style="list-style-type: none"> • 1= Normal • 0 = Overflow |
| AV18 | Cool Valve Request | Percent | 0% to 100% | Cooling (hydronic) and Changeover Units | Cool valve position request used for manual override control. |
| AV76 | Cooling Capacity Status | Percent | 0% to 100! | Cooling Units | Cooling source cool capacity. |
| MV2 | Cooling Fan Speed Default | None | None | None | Do not use. |
| 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. |
| 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. |
| AV108 | DCV Minimum Economizer Position at Max Fan Speed | Percent | 0% to 100% | Modulating Outdoor Air Damper Units (Economizer) | Damper position with fan speed at maximum. |
| AV109 | DCV Minimum Economizer Position at Min Fan Speed | Percent | 0% to 100% | Modulating Outdoor Air Damper Units (Economizer) | Damper position with fan speed at minimum. |
| BV11 | Dehumidification Status | None | None | Dehumidification Units | <ul style="list-style-type: none"> • 1 = Dehumidification is Active • 0 = Not Active |

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

| Object Type | Object Name | Units of Measure | Min /Max | When the Point Exists | Description |
|-------------|---|------------------------|--|--|--|
| BV15 | Demand Control Ventilation Enable | None | None | Modulating Outdoor Air Damper Units (Economizer) | Enables Demand Control Ventilation. |
| BV4 | Diagnostic: Condensate Overflow | None | None | Cooling Units | Condensate Overflow Diagnostic <ul style="list-style-type: none"> • 1=Active • 0=Inactive Latching diagnostic. Cleared with Reset Diagnostic Request or power cycle. |
| BV3 | Diagnostic: Discharge Air Temperature Low Limit | None | None | All Units | Freeze Protect Diagnostic (discharge air temp low limit). <ul style="list-style-type: none"> • 1=Active • 0=Inactive Latching diagnostic, but will auto-recover. |
| BV8 | Diagnostic: Filter Change Required | None | None | All Units | Filter Status Diagnostic (based on fan run hours). <ul style="list-style-type: none"> • 1=Active • 0=Inactive Non-latching (will clear automatically when resolved) |
| BV7 | Diagnostic: Freeze Avoidance Mode | None | None | Hydronic Units | Freeze Avoidance Diagnostic (only applies to hydronic units). <ul style="list-style-type: none"> • 1=Active • 0=Inactive Non-latching (will clear automatically when resolved) |
| BV6 | Diagnostic: Low Air Flow- Supply Fan Failure | None | None | Variable Speed Fan Units (ECM) | Fan Status Diagnostic. <ul style="list-style-type: none"> • 1=Active • 0=Inactive Latching; Cleared with Reset Diagnostic Request or power cycle |
| BV5 | Diagnostic: Low Coil Temperature Detect | None | None | Hydronic Units | Low Coil Temperature Detection Diagnostic. <ul style="list-style-type: none"> • 1=Active • 0=Inactive Latching diagnostic, but can auto-recover. Cleared with Reset Diagnostic Request or power cycle |
| AI4 | Discharge Air Temperature | Temperature (°F or °C) | -50°C (-58°F) to 115°C (239°F) | All Units | Discharge air temperature from equipment. |
| AV96 | Discharge Air Temperature Design Cool Limit | Temperature (°F or °C) | 1.67°C (35.01°F) to 65.56°C (150.008°F) | All Units | Fan speed increased, if possible, to limit discharge air to this temperature. |
| AV97 | Discharge Air Temperature Design Heat Limit | Temperature (°F or °C) | 33.33°C (37.99°F) to 65.56°C (150.008°F) | All Units | Fan speed increased, if possible, to limit discharge air to this temperature. |
| AV21 | Discharge Air Temperature Low Limit Setpoint | Temperature (°F or °C) | -1.1°C (30.02°F) to 10°C (50°F) | All Units | If the discharge air temperature is less than the discharge air low limit for three (3) minutes, the controller trips ON a freeze protection diagnostic. The valves open, the face/bypass damper goes to full face (when applicable), and all other outputs go to the OFF position. |
| AV77 | Discharge Air Temperature Maximum Heat Limit | Temperature (°F or °C) | 3.33°C (37.40°F) to 65.56°C (150.01°F) | All Units | Heating capacity is limited in order to not exceed this temperature. |
| AV78 | Discharge Air Temperature Minimum Cool Limit | Temperature (°F or °C) | 3.33°C (37.40°F) to 65.56°C (150.01°F) | All Units | Cooling capacity is limited in order to not exceed this temperature. |
| AV19 | DX Cool Request | Percent | 0% to 100% | DX and Heat Pump Units | DX compressor output request used for manual override control. |
| MV10 | Economizer Airside Enable BAS | None | None | Modulating Outdoor Air Damper Units (Economizer) | <ul style="list-style-type: none"> • 1 = Disabled • 2 = Enabled • 3 = Auto <i>Economizer Auto</i> means that the controller determines economizer operation. <i>Enabled</i> or <i>Disabled</i> means that economizer operation is allowed or not allowed (respectively), overriding the local decision. |



Object and Diagnostic Data Points

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

| Object Type | Object Name | Units of Measure | Min /Max | When the Point Exists | Description |
|-------------|--|------------------------|-------------------------------------|--|---|
| AV32 | Economizer Enable Minimum Outdoor Air Temperature Setpoint | Temperature (°F or °C) | 0.0°C (32°F) to 37.78°C (100.004°F) | Modulating Outdoor Air Damper Units (Economizer) | If the outdoor air temperature is less than the economizing enable point, then economizing is possible. If the outdoor air temperature is great than economizing enable point, plus 5 degrees Fahrenheit, then economizing is not possible. For any other temperature, there is no change in the status of economizing. |
| AV69 | Economizer Minimum Position Setpoint Active | Percent | 0% to 100% | Modulating Outdoor Air Damper Units (Economizer) | Current minimum allowed economizer position. |
| AV8 | Economizer Minimum Position Setpoint BAS | Percent | 0% to 100% | Modulating Outdoor Air Damper Units (Economizer) | Communicated value for minimum economizer position setpoint. |
| AV31 | Economizer Minimum Position Setpoint Local | Percent | 0% to 100% | Modulating Outdoor Air Damper Units (Economizer) | Minimum outside air damper position during occupied mode. |
| AV16 | Economizer Request | Percent | 0% to 100% | Modulating outdoor air damper units (economizer) | Economizer position request used for manual override control. |
| AO4 | Electric Heat Command | None | None | Modulating (SCR) Electric Heating Units | Analog electric heat output command. |
| BO6 | Electric Heat Output 1 | None | None | Staged Electric Heating Units | Electric heat Stage 1 output. |
| BO7 | Electric Heat Output 2 | None | None | Two-stage Electric Heating Units | Electric heat Stage 2 output. |
| AV22 | Electric Heat Request | Percent | 0% to 100% | Electric Heating Units | Electric heat request used for manual override control. |
| AV81 | Electric Heat Stage 1 Fan Output | Percent | 0% to 100% | Variable Speed Fan Units (ECM) | Minimum Flow with one stage of electric heat. Code changes fan speed to minimum, then waits for 15 seconds before turning electric heat stage 1 ON. |
| AV82 | Electric Heat Stage 2 Fan Output | Percent | 0% to 100% | Variable Speed Fan Units (ECM) | Minimum Flow with one stage of electric heat. Code changes fan speed to minimum, then waits for 15 seconds before turning electric heat stage 2 ON. |
| MV9 | Emergency Override BAS | None | None | All Units | <ul style="list-style-type: none"> • 1 = Normal • 2 = Pressurize - treated as shutdown • 3 = Depressurized - treated as shutdown • 4 = Purge - treated as shutdown • 5 = Shutdown • 6 = Fire - treated as shutdown |
| AV5 | Entering Water Temperature Active | Temperature (°F or °C) | 0°C (32°F) to 100°C (212°F) | Changeover Cooling/Heating Units | Actively used entering water temperature. |
| AV4 | Entering Water Temperature BAS | Temperature (°F or °C) | 0°C (32°F) to 100°C (212°F) | Changeover Cooling/Heating Units | Communicated entering water temperature. |
| AI5 | Entering Water Temperature Local | Temperature (°F or °C) | -0°C (32°F) 100°C (212°F) | Auto- changeover Unit | Local sensor entering water temperature. |
| BV10 | Exhaust Fan Enable | None | None | Exhaust Fan Units | <ul style="list-style-type: none"> • 0 = Disable • 1 = Enable |
| AV35 | Exhaust fan Enable Position | Percent | 0% to 100% | Exhaust Fan Units | <p>The economizer position at which the exhaust fan turns ON; default is 10%. Internal programming limits this between 0% and 100%. The economizer position must be greater than, or equal to, the <i>Exhaust Fan Enable Position</i> in order to turn ON the exhaust fan. The exhaust fan turns OFF 10% below the turn ON point.</p> <p>Note: The <i>Exhaust Fan Enable</i> must be enabled for this point to have an effect.</p> |
| BO2 | Exhaust Fan Start Stop Command | None | None | Exhaust Fan Units | <ul style="list-style-type: none"> • 0 = Off • 1 = Running |

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

| Object Type | Object Name | Units of Measure | Min /Max | When the Point Exists | Description |
|-------------|--|------------------------|---|-----------------------------------|---|
| AI20 | Face and Bypass Damper Position Status | None | -1000 to 1000 | Face/Bypass Units | Face and bypass damper position in % of stroke time <ul style="list-style-type: none"> • 0= Full bypass • 100%= Max stroke • Time= Full face |
| AV71 | Face and Bypass Damper Request | Percent | 0% to 100% | Face/Bypass Units | Request is the capacity after the damper/coil curve and diagnostics are applied. |
| AV64 | Fan Capacity Low Limit | Percent | 0% to 100% | Variable Speed Fan Units (ECM) | Minimum fan RPMs divided by the maximum RPMs. |
| AV9 | Fan Off Delay Time | Seconds | 0 to 600 | All Units | Fan off delay time. |
| MV22 | Fan Operating Mode Request | None | 1 to 2 | Variable Speed Fan Units (ECM) | <ul style="list-style-type: none"> • 1 = Energy Efficient Mode • 2 = Acoustical Mode If the arbitrated fan switch speed is NOT auto then comfort control is used which is the same as the regular control. |
| AV38 | Filter Runtime Hours | Hours | 0 to 100,000 | All Units | Elapsed hours since dirty filter diagnostic (in hours). This value is cleared when Filter Timer Reset Request is 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 Request | None | None | All Units | 1 = Reset the filter timer. After the UC resets the timer, this BV reverts back to 0. |
| MV23 | First Stage Compressor Minimum Fan Speed | None | None | Variable Speed Fan Units (ECM) | <ul style="list-style-type: none"> • 1= Low • 2= Medium • 3= High (Default) Minimum fan speed when first stage compressor is running (default). |
| AV29 | Freeze Avoidance Setpoint | Temperature (°F or °C) | -17.78°C (-0.004°F) to 10°C (50°F) | Hydronic Units | Freeze avoidance setpoint. |
| BI4 | Frost Detection Input | None | None | DX Units | Normally closed input. <ul style="list-style-type: none"> • 1 = Not in Frost • 0 = Defrost |
| 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 [treats this as Auto] • 6 = Pre Cool • 7 = Off • 8 = Test (status only) • 9 = Emergency Heat (treat this as Auto) • 10 = Fan Only (economizer at min) • 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 |
| MV5 | Heat Cool Mode Status | None | None | All Units | Actual heat/cool mode status. |
| AV20 | Heat Valve Request | Percent | 0% to 100% | Hot Water and Steam Heating Units | Heat valve position request used for manual override control. |
| AV74 | Heating Capacity Primary | Percent | 0% to 100% | All Units | Primary heating source heat capacity. |
| AV75 | Heating Capacity Secondary | Percent | 0% to 100% | All Units | Secondary heating source heat capacity. |
| 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. |
| 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. |



Object and Diagnostic Data Points

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

| Object Type | Object Name | Units of Measure | Min /Max | When the Point Exists | Description |
|-------------|--|------------------------|--|--|--|
| AO3 | Heating Valve Command | None | -1000 to 1000 | Modulating Hot Water/Steam Heating Units | Analog heating valve output command 0% closed. |
| BO6 | Heating Valve Command Binary | None | None | Binary Hot Water/Steam Heating Units | Binary heating valve output. |
| AV64 | Fan Capacity Low Limit | Percent | 0% to 100% | Variable Speed Fan Units (ECM) | Minimum fan RPMs divided by the maximum RPMs. |
| AV9 | Fan Off Delay Time | Seconds | 0 to 600 | All Units | Fan off delay time. |
| MV22 | Fan Operating Mode Request | None | 1 to 2 | Variable Speed Fan Units (ECM) | <ul style="list-style-type: none"> • 1 = Energy Efficient Mode • 2 = Acoustical Mode If the arbitrated fan switch speed is NOT auto then comfort control is used which is the same as the regular control. |
| AV38 | Filter Runtime Hours | Hours | 0 to 100,000 | All Units | Elapsed hours since dirty filter diagnostic (in hours). This value is cleared when Filter Timer Reset Request is 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 Request | None | None | All Units | 1 = Reset the filter timer. After the UC resets the timer, this BV reverts back to 0. |
| MV23 | First Stage Compressor Minimum Fan Speed | None | None | Variable Speed Fan Units (ECM) | <ul style="list-style-type: none"> • 1= Low • 2= Medium • 3= High (Default) Minimum fan speed when first stage compressor is running (default). |
| AV29 | Freeze Avoidance Setpoint | Temperature (°F or °C) | -17.78°C (-0.004°F) to 10°C (50°F) | Hydronic Units | Freeze avoidance setpoint. |
| BI4 | Frost Detection Input | None | None | DX Units | Normally closed input. <ul style="list-style-type: none"> • 1 = Not in Frost • 0 = Defrost |
| 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 [treats this as Auto] • 6 = Pre Cool • 7 = Off • 8 = Test (status only) • 9 = Emergency Heat (treat this as Auto) • 10 = Fan Only (economizer at min) • 11 = Free Cool (treats this as Auto) • 12 = Ice-Making (treats this as Auto) • 13 = Max Heat (treats this as Auto) • 14 = Economizer (treats as Auto) • 15 = Dehumidify (treats this as Auto) • 16 = Calibrate |
| MV5 | Heat Cool Mode Status | None | None | All Units | Actual heat/cool mode status. |
| AV20 | Heat Valve Request | Percent | 0% to 100% | Hot Water and Steam Heating Units | Heat valve position request used for manual override control. |
| AV74 | Heating Capacity Primary | Percent | 0% to 100% | All Units | Primary heating source heat capacity. |
| AV75 | Heating Capacity Secondary | Percent | 0% to 100% | All Units | Secondary heating source heat capacity. |
| AV89 | Heating Setpoint High Limit | Temperature (°F or °C) | 4.44°C (39.99°F) to 46.11°C (114.99°F) | All Units | Value used to limit heating setpoint. |
| AV90 | Heating Setpoint Low Limit | Temperature (°F or °C) | 4.44°C (39.99°F) to 46.11°C (114.99°F) | All Units | Value used to limit heating setpoint. |

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

| Object Type | Object Name | Units of Measure | Min /Max | When the Point Exists | Description |
|-------------|--|------------------------|-------------------------------|--|---|
| AO3 | Heating Valve Command | None | -1000 to 1000 | Modulating Hot Water/Steam Heating Units | Analog heating valve output command 0% closed. |
| BO6 | Heating Valve Command Binary | None | None | Binary Hot Water/Steam Heating Units | Binary heating valve output. |
| MI4 | IMC Status | None | None | Variable Speed Fan Units (ECM) | <ul style="list-style-type: none"> • 1 = ok • 2 = commLoss • 3 = newConfig • 4 = hwMismatch • 5 = swMismatch • 6 = hwVersion • 7 = swVersion • 8 = nvDataMismatch • 9 = dupRotarySwitch • 10 = extraDevice • 11 = rotarySwitchNotFound |
| BI3 | Low Coil Temperature Detection | None | None | Hydronic Units | Normally closed input. <ul style="list-style-type: none"> • 1 = Normal • 0 = Low Temperature |
| MV11 | Number of Fan Speeds | None | None | All Units | <ul style="list-style-type: none"> • 1 = Zero • 2 = One • 3 = Two • 4 = Three • 5 = Variable Speed |
| 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 (UC uses local occupancy decision) |
| 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 | Occupied bypass mode time remaining. |
| AV60 | Occupied Low Fan Min Position Setpoint | Percent | 0% to 100% | Modulating Outdoor Air Damper Units (Economizer) | Minimum position in occupied with low fan speed. |
| 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. <ul style="list-style-type: none"> • Active heating setpoint = active setpoint - occupied offset. • Active cooling setpoint = active setpoint + occupied offset. |
| AO1 | Outdoor Air Damper Position | None | -1000 to 1000 | Modulating Outdoor Air Damper Units (Economizer) | Analog outdoor aire damper output command. |
| MV13 | Outdoor Air Damper Status | None | None | Modulating Outdoor Air Damper Units (Economizer) | <ul style="list-style-type: none"> • 1 = At or Below Minimum Position • 2 = Above Minimum Position • 3 = Economizer Not Present |
| AV3 | Outdoor Air Temperature Active | Temperature (°F or °C) | -15°C (5°F) to 50°C (122°F) | All Units | Communicated outdoor air temperature. |
| AV1 | Outdoor Air Temperature BAS | Temperature (°F or °C) | -15°C (5°F) to 50°C (122°F) | All Units | Communicated outdoor air temperature. |
| BO8 | Outside Air Damper Binary Output | None | None | Binary Outdoor Air Damper Units (Ventilation) | Binary outdoor air damper output command. |
| AI8 | Outside Air Temperature Local | Temperature (°F or °C) | -40°C (-40°F) to 70°C (158°F) | All Units | Local outside air temperature sensor. |



Object and Diagnostic Data Points

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

| Object Type | Object Name | Units of Measure | Min /Max | When the Point Exists | Description |
|-------------|--|------------------------|--|--|--|
| BV14 | Predicted Occupied Heat Cool Mode Status | None | None | All Units | Anticipated Heat Cool mode upon entering the occupied mode. Can be used to help determine required Entering Water Temperature. |
| BV2 | Reset Diagnostic Request | None | None | All Units | 1 = Reset diagnostics. This will reset ALL diagnostics except the Filter Change Required. 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 | Heat Pump Units | <ul style="list-style-type: none"> • ON = Cooling • OFF = Heating |
| BV13 | Reversing Valve Request | None | None | Heat Pump Units | Reversing valve position request used for manual override control. |
| AV113 | Space CO2 Concentration Active | PPM | 0 to 5,000 | Modulating Outdoor Air Damper Units (Economizer) | Arbitrated BAS and Local CO2 value |
| AV112 | Space CO2 Concentration BAS | PPM | 0 to 5,000 | All Units | BAS communicated CO2 value |
| AI21 | Space CO2 Concentration Local | None | 0 to 2000 | CO2 Sensing Units | Local carbon dioxide concentration. |
| AV110 | Space CO2 Limit | PPM | 400 to 2,000 | Modulating Outdoor Air Damper Units (Economizer) | CO2 Maximum Setpoint |
| AV111 | Space CO2 Low Limit | PPM | 200 to 2,000 | Modulating Outdoor Air Damper Units (Economizer) | CO2 Minimum Setpoint |
| AV36 | Space Dehumidification Setpoint BAS | Percent | 0% to 100% | Dehumidification Units | <ul style="list-style-type: none"> • Communicated relative humidity (RH) setpoint. • Dehumidification starts when RH greater than RH setpoint. • Dehumidification stops when RH is less than RH setpoint - offset. • To disable dehumidification, override the setpoint to 100%. |
| 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. |
| AI3 | Space Humidity Local | None | 0% to 100% | Dehumidification Units | Local relative humidity sensor value. |
| 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. |
| 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. |
| 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. |
| AV27 | Space Temperature Setpoint BAS | Temperature (°F or °C) | -10°C (14°F) to 35°C (95°F) | All Units | Communicate space temperature 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. |
| 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. |
| AV58 | Standby Minimum Position Setpoint | Percent | 0% to 100% | Modulating Outdoor Air Damper Units (Economizer) | Minimum position in occupied standby mode. |

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

| Object Type | Object Name | Units of Measure | Min /Max | When the Point Exists | Description |
|-------------|----------------------------------|------------------------|--|--|---|
| AV34 | 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. <ul style="list-style-type: none"> • Active heating setpoint = active setpoint - occupied offset. • Active cooling setpoint = active setpoint + occupied offset. |
| BV1 | Supply Fan Configuration Command | None | None | All Units | Fan in occupied mode can continuously cycle on/off with capacity or can be on. |
| MV1 | Supply Fan Speed Active | None | None | Discrete 1-, 2- and 3- Speed Fan Units | Active supply fan speed for discrete fan speed. |
| MO1 | Supply Fan Speed BAS | None | None | Always | <ul style="list-style-type: none"> • For a 1 speed fan: 2 = Off, 5 = High • For a 2 speed fan: 2 = Off, 3 = Low, 5 = High • For a 3 speed fan: 2 = Off, 3 = Low, 4 = Medium, 5 = High |
| MV8 | Supply Fan Speed BAS | None | None | All Units | <ul style="list-style-type: none"> • 1 = Auto • 2 = Off • 3 = Low • 4 = Medium • 5 = High |
| MI1 | Supply Fan Speed Local | None | None | All Units | Local fan speed setting. |
| AV63 | Supply Fan Speed Request | Percent | 0% to 100% | Variable Speed Fan Units (ECM) | <ul style="list-style-type: none"> • Reported fan speed, 0% is off, then ranges from Fan Capacity Low to 100%. • Requests below Fan Capacity Low is treated as 0%. |
| AV73 | Supply Fan Speed Status | Percent | 0% to 100% | Variable Speed Fan Units (ECM) | <ul style="list-style-type: none"> • Reported fan speed, 0% is off, then ranges from Fan Capacity Low to 100%. • For discrete fans, 0% is OFF, 33% is LOW, 66% is MED, and 100% is HIGH speed. |
| BI5 | Supply Fan Status | None | None | All Units | Normally open input. <ul style="list-style-type: none"> • 0 = OFF • 1 = ON (fan running) |
| MI2 | Timed Override Status | None | None | All Units | Timed override request from zone sensor. |
| 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. |
| 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. |



Alarming

The Symbio 400–B/500 has several objects used for communicating alarms to the system.

Table 11. Alarm objects

| Object Type | Object Name | Description | Notification Class |
|-------------|---|---|--------------------|
| AI1 | Space Temperature Local | Local zone sensor temperature or return air temperature. | 2 |
| AI2 | Space Temperature Setpoint Local | Local zone sensor setpoint. | 2 |
| AI3 | Space Humidity Local | Local humidity sensor value. | 2 |
| AI4 | Discharge Air Temperature | Discharge air temperature from equipment. | 2 |
| AI5 | Entering Water Temperature Local | Local sensor entering water temperature. | 2 |
| AI21 | Space CO2 Concentration Local | Local carbon dioxide concentration. | 2 |
| AV59 | Space Temperature Active | The currently used space temperature. | 2 |
| BI4 | Frost Detection Input | Normally closed input. • 1 = Not in Frost • 0 = Defrost | 4 |
| BV3 | Diagnostic: Discharge Air Temperature Low Limit | • 0 = Inactive • 1 = Active | 4 |
| BV4 | Diagnostic: Condensate Overflow | Condensate Overflow Diagnostic • 1=Active • 0=Inactive • Latching diagnostic. Cleared with Reset Diagnostic Request or power cycle | 2 |
| BV5 | Diagnostic: Low Coil Temperature Detect | Low Coil Temperature Detection Diagnostic. • 1=Active • 0=Inactive • Latching diagnostic, but can auto-recover. Cleared with Reset Diagnostic Request or power cycle | 2 |
| BV6 | Diagnostic: Low Air Flow- Supply Fan Failure | Fan status diagnostic. • 1=Active • 0=Inactive • Latching; Cleared with Reset Diagnostic Request or power cycle | 2 |
| BV7 | Diagnostic: Freeze Avoidance Mode | • 0 = active • 1 = Inactive Non-latching will clear automatically when resolved. | 4 |
| BV8 | Diagnostic: Filter Change Required | Filter Status Diagnostic (based on fan run hours). • 1=Active • 0=Inactive • Non-latching (will clear automatically when resolved) | 4 |
| MI4 | IMC Status | • 1 = ok • 2 = commLoss • 3 = newConfig • 4 = hwMismatch • 5 = swMismatch • 6 = hwVersion • 7 = swVersion • 8 = nvDataMismatch • 9 = dupRotarySwitch • 10 = extraDevice • 11 = rotarySwitchNotFound | 2 |



Additional Resources

- *Tracer BACnet Terminator Installation Instructions* (BAS-SVN214*-EN)
- *Symbio 500 Programmable Controller Installation, Operation, and Maintenance Manual* (BAS-SVX090*-EN)



Notes

Trane - by Trane Technologies (NYSE: TT), a global innovator - creates comfortable, energy efficient indoor environments for commercial and residential applications. For more information, please visit trane.com or tranetechnologies.com.

Trane has a policy of continuous product and product data improvements and reserves the right to change design and specifications without notice. We are committed to using environmentally conscious print practices.

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Supersedes (New)

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