DAIKIN

Sales and Engineering Data Sheet

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MicroTech® Unit Ventilator
Unit Controller Protocol Information
BACnet® Networks (MS/TP)

Member of BACnet International

Revision History

ED 19110 Feb 2019 Initial release.

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Limited Warranty

Consult your local Daikin Applied representative for warranty details. To find your local Daikin Applied representative, go to www.DaikinApplied.com.

Reference Documents

Number	Company	Title	Source
OM 732	Daikin Applied	ATS ServiceTools Software Operation Manual	www.DaikinApplied.com
IM 1286		MicroTech Unit Ventilator Unit Controller Installation Manual	
IM 817		Daikin Applied Unit Ventilator Installation Manual, Vertical Models	
IM 830		Daikin Applied Unit Ventilator Installation Manual, Horizontal Models	
IM 1065		Daikin Applied Unit Ventilator Installation Manual, Model UAZ/ EM	
IM 1082		Daikin Applied Unit Ventilator Installation Manual, UAE / EM	
IM 1083		Daikin Applied Unit Ventilator Installation Manual, UAR/GR	
OM 1280		MicroTech Unit Ventilator Operation Manual	
OM 1254		Daikin Intelligent System Manager Operation Manual	
ANSI/ ASHRAE 135-2001	BACnet International	BACnet A Data Communication Protocol for Building Automation and Control Networks	www.ashrae.org

Software Revision

This edition documents all versions of the standard MicroTech UV controller software and all subsequent revisions until otherwise indicated. You can determine the revision of the application software from the local user interface (LUI) keypad display. The software version can also be read from the Application_Software_Version property of the Device Object.

This purpose of this document is to serve as an integration guide for the MicroTech® Unit Ventilator (UV) controller from Daikin Applied. It provides the information required to incorporate the MicroTech UV controller, with on-board BACnet MS/TP capability, into a building automation system (BAS). It describes the BACnet® properties, supported data points, addressing and configuration information for the MicroTech UV controller.

How to use this Guide

The introduction provides a description of the network protocol and how the MicroTech UV controller implements BACnet objects. It is assumed that the user is familiar with the basic principals of BACnet integration.

The BACnet parameter tables that follow this section describe point mapping and addressing details for the unit-controller supported BACnet object types. These are Analog Inputs, Analog Values, Binary Values, Multi-State Inputs, Multi-State Values and Device Objects (see Table 2 - Table 7).

Some parameters require further explanation or information beyond what is shown in the tables. Those affected parameters are noted within each table, along with the reference to where the additional details can be found.

Alarm information can be found in the Alarms section.

Effective Occupancy Modes provides further details about the interaction among the various inputs that ultimately determine the effective occupancy mode of the unit.

The Space Temperature Setpoint Methods section shows the temperature setpoint mode calculations, defaults, and diagram of operation.

The PI Loop Control section gives loop control definitions for the Heating, Cooling, and Economizer Proportional-Integral (PI) control blocks. Where necessary, the references to the supplemental sections described above are identified for those points in the summary tables.

Unit Controller Data Points

The UV controller contains data points that are accessible from a BACnet MS/TP network. Not all points have the same type of accessibility from each interface. See MicroTech UV Controller OM 1280 for details (www.DaikinApplied.com).

BACnet Networks

BACnet Protocol

BACnet is a standard communication protocol for Building Automation and Control Networks developed by the American National Standards Institute (ANSI) and American Society of Heating, Refrigeration and Air-conditioning Engineers (ASHRAE) specified in ANSI/ASHRAE standard 135-2008 (www.ashrae.org). It addresses all aspects of the various systems that are applied to building control systems. BACnet provides the communication infrastructure needed to integrate products manufactured by different vendors and to integrate building services that are now independent.

BACnet Network Compatibility

The MicroTech UV controller is tested according to the BACnet Testing Laboratory (BTL) Test Plan. It is designed to meet the requirements of the BACnet Standard as stated in the Protocol Implementation and Conformance Statement (PICS). However, it is not BTL listed. The PICS are found in Appendix A: Protocol Implementation Conformance Statements (PICS).

BACnet Objects

The MicroTech UV controller incorporates standard BACnet object types (i.e., object types defined in the BACnet Standard) that conform to the BACnet Standard. Each object has properties that control unit variables or data points. Some object types occur more than once in the unit controller; each occurrence or instance has different properties and controls different unit variables or data points. Each instance is designated with a unique type and instance index. Some properties can be adjusted (read/write properties, e.g., setpoints) from the network and others can only be interrogated (read-only properties, e.g., status information).

Each data point accessible from a BACnet network is described with a detailed table that gives the Object Name, Instance Number, min/max values, and other relevant descriptive information.

Each BACnet compatible device can only have a single BACnet Device Object.

⚠ CAUTION

If another device in the network already has this object identifier (instance number), you must change the instance number of one device object, so that all devices in the network have a unique device identifier.

Device Object Properties

The Device Object contains other informative properties as shown in Table 1.

Table 1: MicroTech UV Controller Device Object Properties

Property	Default/Valid Values	Data Type
Object Identifier	Device	BACnetObjectIdentifier
Object Name	MTUC_UV	Character String
Object Type	8 (Device)	BACnetObjectType
System Status	0 (Operational)	BACnetDeviceStatus
Vendor Name	Daikin Applied	Character String
Vendor Identifier	3	Unsigned 16
Model Name	MTUC_UV	Character String
Firmware Revision	Variable	Character String
Application Software Version	Variable	Character String
Location	Location	Character String
Description		Character String
Protocol Version	1	Unsigned
Protocol Revision	4	Unsigned
Protocol Services Supported	SubscribeCOV, UnconfirmedCOVNotification, ReadProperty, ReadPropertyMultiple, WriteProperty, WritePropertyMultiple, DeviceCommunicationControl, TimeSynchronization, Relinquish_ Default, Who-Has, I-Have, Who-Is, I-Am	BACnetServicesSupported
Protocol Object Types Supported	AI, AV, BV, Device, MSI, MSV	BACnetObjectTypesSupported
Object List		Sequence of BACnetObjectIdentifer
Max APDU Length Accepted	480	Unsigned 16
Segmentation Supported	None	BACnetSegmentation
Max Segments Accepted	16	Unsigned
Device Address Binding		Sequence of BACnetAddressBinding
Database Revision	1	Unsigned
Active COV Subscriptions	15	List of BACnetCOVSubscriptions
Local Time[1]	Variable	Time
Local Date[1]	Variable	Date
UTC Offset	0 /Unsupported	Integer
Daylight Savings Status	0 / Variable	Boolean
APDU Segment Timeout	Unsupported	Unsigned
APDU Timeout	10000 / Unsupported	Unsigned
Number of APDU Retries	0 / Unsupported	Unsigned

1. The unit controller has its own time clock. This could differ if the time is changed via the LUI keypad display. The time clock re-synchronizes once a second and after every unit controller reset.

Configuring Network Communication Parameters

There are various parameters involved in setting up the MicroTech UV controller for network integration. In addition to the BAS workstation, there are two additional methods described in this section: 1) An optional local user interface (LUI) keypad display and 2) ServiceTools software.

Table 2 shows the parameters required for initial startup and BACnet commissioning.

Table 2: Important BACnet Configuration Parameters

Parameter	BACnet Object Name	Range/Default	Description/Notes
Baud Rate[1]	NA	9600,19200,38400,76800 Default: 38400	Data transfer speed (bps) of the BACnet MS/TP network.
Device Instance[1]	Object_Identifier	1-4194302 Default: 3101120	This value must be unique throughout the entire BACnet network.
MS/TP (MAC) Address[1]	MacAddress	0-127 Default: 120	MS/TP Address of the device (i.e. unit controller). Each device on the BACnet network must have a unique MAC Address.
Max Masters	Max_Master	0-127 Default: 127	Specifies the highest possible address for the network master. Nodes must be less than or equal to 127.
Device (Object) Name	Object_Name	Up to 20 characters Default: DevName	The Device Object Name must be unique throughout the entire network.
Location	Location	20 Characters Default: Location	Text string used to describe the physical location of the unit.
Units (English/Metric)	Units	Imperial (English), SI (Metric) Default: English	English: Use English units of measure (Deg F, PSI, GPM) Metric: Use metric units of measure (Deg C, kPa, liter/sec)

1. Parameter is required for minimum network configuration.

Local User Interface (LUI) Keypad Display

The LUI is an optional unit-mounted interface that indicates the current unit operating state. It can be used to set the UV operating parameters (operating mode, temperature set points, fan speed and occupancy mode) and network addressing values. The LUI has four levels of password protection. In addition to the operating mode states and fan functions, the interface displays:

- The room set point temperature
- The current room temperature
- Active alarms and unit fault conditions

See MicroTech UV Controller, OM 1280 (www.DaikinApplied.com) for the complete list of configurable parameters available via the LUI keypad display.

ServiceTools for MicroTech UV Controller

Daikin Applied's custom ServiceTools software is a free, multi-purpose desktop application used for unit startup and configuration, network addressing and diagnostics. The service interface supports the ability to:

- Configure unit for network communications
- Download and update unit controller software
- Configure the software for specific unit hardware options
- Adjust operational parameters and setpoints
- View real-time operation, alarms, and unit status
- Adjust operational parameters

Requirements

- Downloaded version of ServiceTools software from www.DaikinApplied.com.
- Laptop with Windows 7 or newer operating system
- .NET Framework v4.5 or newer
- USB Type A cable

Refer to ServiceTools OM 732, (www.DaikinApplied.com)

Contact the Daikin Applied Controls Customer Support group at 866-462-7829 or Controls@daikinapplied.com for integration assistance, if necessary.

BACnet Network Objects

The following section contains relevant information needed to integrate a MicroTech UV controller into the network via BACnet MS/TP communications. See Selected Configurable Parameters for supplemental information for network-supported analog inputs and their interaction with locally configured parameters.

⚠ CAUTION

Please note that anytime a command is written to a configuration property, this information is stored in the unit controller's non-volatile memory. Writing to non-volatile memory is an operation that has a finite limit. For this reason, the number of writes made to BACnet objects linked to configuration properties must be limited to avoid damage to the hardware. Non-volatile parameters are saved every 20 minutes.

The Effective Occupancy Modes, and Space Temperature Setpoint Methods sections provide supplemental configuration and temperature setpoint operation details. The BACnet PICS is provided in Appendix A: Protocol Implementation Conformance Statements (PICS).

NOTE: Upon unit controller power-up or reset, network values default to Null (represented by an invalid value of 32767).

The network overrides locally set values such as sensor inputs or parameters configured from the LUI keypad display or ServiceTools software. Local values take precedent when the network value is Null.

Table 3: Analog Inputs

Point Name	Object Type/ Instance	Access Type[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
ANALOG INPUTS						
Local Space Temperature	AI:1	R	LocalSpaceTemp	-40 to 212ºF -40 to 100ºC Default: 32767[3]	N	The value of the hardwired space temperature sensor and tenant override. See table in the Configurable I/O Parameters section for additional information about the interaction of this input and the tenant override feature.
Leaving Water Temperature	AI:2	R	LWT	-40 to 212ºF -40 to 100ºC Default: 32767[3]	N	The current value of the local leaving water temperature sensor, if installed and configured with a valid input. If not, AI:2 displays an invalid value of 32767.
Entering Water Temperature	AI:3	R	EWT	-40 to 212ºF -40 to 100ºC Default: 32767[3]	N	The current value of the local entering water temperature sensor, if installed and configured with a valid input. If not, AI:3 displays an invalid value of 32767. Also see Effective Entering Water Temperature (AV:57).
Discharge Air Temperature	AI:4	R	DischAirTemp	-40 to 212ºF -40 to 100ºC Default: 32767[3]	N	The current value of the discharge air temperature sensor, if installed and configured with a valid input. If not, AI:4 displays an invalid value of 32767.
Local Setpoint Adjust Output	AI:5	R	LocalSetpt	-40 to 212ºF -40 to 100ºC or -5 to 5ºF -2.78 to -2.78ºC Default: 32767[3]	N	The reference setpoint used to determine the Effective Heating/Cooling setpoints. It is the value of the local, hardwired space temperature setpoint. It can be configured to limit the changes made from the room sensor using a long range (55 - 95ºF) or short range (-5 - 5ºF) setpoint adjustment.
Indoor Coil Temperature	AI:6	R	Comp1SuctionTemp	-40 to 212ºF -40 to 100ºC Default: 32767[3]	N	The current value of the compressor suction line temperature sensor, if installed and configured with a valid input. If not, AI:6 displays an invalid value of 32767. Note that in heat pump applications, the compressor suction line temperature = the indoor coil temperature.
Line Voltage	AI:8	R	LineVoltage	0 to 4095 counts	N	Reflects the line voltage reading compared to the reference setpoint to determine if the brownout or overvoltage condition exists.
Outdoor Air Temperature	AI:9	R	OutdoorTemp	-40 to 212ºF -40 to 100ºC Default: 32767[3]	N	The current value of the outdoor air temperature sensor, if installed and configured with a valid input. If not, EWT (AI:3) displays an invalid value. Also see Effective Outdoor Air Temperature (AV:44).
Outdoor Relative Humidity	AI:10	R	OutdoorRH	0 to 100% Default: 32767[3]	N	The current value of the outdoor relative humidity sensor if installed and configured with a valid input. If not, AI:10 displays an invalid value. It is used to set EffOutdoorRH (AV:47).
Indoor Relative Humidity	AI:11	R	IndoorRH	0 to 100% Default: 32767[3]	N	The current value of the indoor relative humidity sensor if installed and configured with a valid input. If not, AI:11 displays an invalid value. It is used to set EffSpaceRH (AV:49).
Space CO_2	AI:12	R	SpaceCO2	0 to 2000 ppm Default: 32767[3]	N	The current value of the space CO_2 sensor if installed and configured with a valid input. If not, AI:12 displays an invalid value of 32767.
Return Air Temperature	AI:13	R	ReturnAirTemp	-40 to 212°F -40 to 100°C Default: 32767[3]	N	The current value of the room/return air temperature (RAT), if installed and configured with a valid input. If not, AI:13 displays an invalid value of 32767.

1. Parameter is stored in FLASH/EEPROM (non-volatile memory) in either the communication module or in the unit controller. If Non-volatile Memory = Y, then the value is saved through a power cycle. Writes to this parameter must be limited. If Non-volatile Memory = N, the value is not saved through a power cycle. Non-volatile parameters are saved every 20 minutes.
2. R = Read-only access, W = Write access, C = Commandable.
3. The value of 32767 indicates a sensor failure condition or when the unit controller is not using a value within the acceptable range.

Table 4: Analog Values

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
ANALOG VALUES						
Occupancy Temperature Setpoints (AV:1 to AV:6)						Defines the heating and cooling temperature setpoints for different occupancy modes. See Effective Occupancy Modes and Space Temperature Setpoint Methods.
Occupied Cooling Setpoint	AV:1	W	cpOccupied_ Cool_Setpt	61 to 86ºF 16.1 to 30ºC Default: 73ºF / 22.8ºC	Y	The space temperature setpoint used for the Occupied Cooling mode.
Standby Cooling Setpoint	AV:2	W	cpStandby_ Cool_Setpt	61 to 86ºF 16.1 to 30ºC Default: 77ºF / 25ºC	Y	The space temperature setpoint used for the Standby Cooling mode.
Unoccupied Cooling Setpoint	AV:3	W	cpUnoccupied_ Cool_Setpt	61 to 86ºF 16.1 to 30ºC Default: 82ºF / 27.8ºC	Y	The space temperature setpoint used for the Unoccupied Cooling mode.
Occupied Heating Setpoint	AV:4	W	cpOccupied_ Heat_Setpt	50 to 82ºF 10 to 27.8ºC Default: 70ºF / 21.11ºC	Y	The space temperature setpoint used for the Occupied Heating mode.
Standby Heating Setpoint	AV:5	W	cpStandby_ Heat_Setpt	50 to 82ºF 10 to 27.8ºC Default: 66ºF / 18.88ºC	Y	The space temperature setpoint used for the Standby Heating mode.
Unoccupied Heating Setpoint	AV:6	W	cpUnoccupied_ Heat_Setpt	50 to 82ºF 10 to 27.8ºC Default: 61ºF / 16.1ºC	Y	The space temperature setpoint used for the Unoccupied Heating mode.
Local Bypass Time Setpoint	AV:7	W	cpBypassTime	0 to 480 min Default: 120 min	Y	Defines the amount of time that the unit can be in the bypass mode initiated by the timed override button. Pressing the timed override button 3-11 seconds sets the bypass timer to the maximum AV:7 value. The value of 0 disables this feature.
Brownout Reference Setpoint	AV:9	W	cpBrownoutRef	25 to 4095 counts Default: 0 counts	Y	Detects a unit controller brownout condition when line voltage is exceeds the 80% factory-calibrated count level. An alarm is generated in the event of a brownout condition. Note: Only perform the calibration procedure if the unit controller 24VAC voltage is within normal operating parameters. A technician-level password is required in order to access via the LUI keypad display.
Occupied Setpoint Differential	AV:10	W	cpOccDiff	1 to 10°F 0.56 to 5.56°C Default: 1ºF / 0.56ºC	Y	This value represents the occupied, standby, and bypass setpoint hysteresis to determine the effective off setpoints. Applies only to Occupied, Bypass and Standby modes as follows: • ClgSetptOff = EffectSetpt (AV:23) - cpOccDiff (AV:10). • HtgSetptOff = EffectSetpt (AV:23) + cpOccDiff (AV:10).
Low Suction Line Temperature Protection Setpoint	AV:12	W	cpLowTempProt	20 to 35°F -6.7 to 1.7°C Default: 28ºF / -2.22ºC	Y	The setpoint used to determine when the compressor Low Suction Line Temperature alarm becomes active.
Low Suction Temperature Protection Differential	AV:13	W	cpLowTmpProtDif	1 to 8°F 0.56 to 4.44°C Default: 4°F / 2.22°C	Y	This value is added to the selected Low Suction Line Temperature Protection Setpoint (AV:12) to determine the setting at which the alarm clears.
Compressor Minimum Off Timer	AV:15	W	cpMinCompOffTmr	300 to 600 sec Default: 360 sec	Y	A countdown timer that defines the minimum period of time the compressor must remain off before it is allowed to turn on again.
Compressor Minimum On Timer	AV:16	W	cpMinCompOnTmr	60 to 600 sec Default: 180 sec	Y	A countdown timer that defines the minimum period of time the compressor must remain on before it is allowed to turn off again.
Unoccupied Setpoint Differential	AV:17	W	cpUnoccDiff	1 to 10°F 0.56 to 5.56°C Default: 1ºF / 0.57ºC	Y	This value represents the unoccupied mode setpoint hysteresis to determine the effective off setpoint. Applies only to Occupied, Bypass and Standby modes as follows: • ClgSetptOff = EffectSetpt (AV:23) - cpUnoccDiff (AV:17). • HtgSetptOff = EffectSetpt (AV:23) + cpUnoccDiff (AV:17).

Table 4: Analog Values, Continued

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
ANALOG VALUES						
Space Temperature Input	AV:18	C	NetworkSpaceTemp	-40 to 212ºF -40 to 100ºC Default: 32767[3]	N	Provides a space temperature value from the network instead of using the local temperature sensor. The network override reverts back to its default value upon unit controller reboot.
Temperature Setpoint Input	AV:19	C	NetworkSetpoint	-40 to 212ºF -40 to 100ºC Default: 32767[3]	N	Allows the network to set the reference setpoint in occupied, unoccupied, standby, and bypass modes. Determines Effective Temperature Setpoint Output (AV:23) when Network Setpoint (AV:19) is valid. The network override reverts back to its default value upon unit controller reboot. See Space Temperature Setpoint Methods.
Effective Space Temperature Output	AV:22	R	EffectSpaceTemp	-40 to 212ºF -40 to 100ºC Default: 32767[3]	N	Reflects the space temperature value set by NetworkSpaceTemp (AV:18) if it is available. Otherwise, EffectSpaceTemp reflects the input value set by a local sensor.
Effective Temperature Setpoint Output	AV:23	R	EffectSetpt	-40 to 212ºF -40 to 100ºC Default: 32767[3]	N	Effective heating or cooling setpoint the unit controller is attempting to maintain, which is dependent upon Effective Occupancy (MSV:6). The network override reverts back to its default value upon unit controller reboot. See Space Temperature Setpoint Methods.
Temperature Setpoint Shift Output	AV:24	R	SetptShift	-5 to 5ºF -2.78 to - 2.78ºC Default: 0ºF	N	Represents the local hardwired setpoint adjustment value from the room sensor potentiometer. It is valid when cpRemoteSetpointAdjTyp is set to “DIFF” from the LUI keypad/display.
Temperature Setpoint Offset	AV:35	C	SetptOffset	-3 to 3ºF -1.67 to 1.67ºC Default: 32767[3]	N	Determines the setpoint offset from the network value, if available.
Fan Speed	AV:38	R	FanSpeedCmd	0 to 100˚%	N	Displays the current fan speed. Units with EC motors display the variable fan speed output. For units with PSC motors, fan speed output has the following settings: 0% = Off 5% = Low Speed 75% = Medium Speed 95% = High Speed
Compressor Run Time	AV:40	R	CompRunHoursTenths	0 to 300,000 hours Default: 0	N	Displays the total compressor run time.
Effective Outdoor Air Temperature	AV:44	R	EffectOutdoorTemp	-40 to 212°F -40 to 100°C Default: 32767[3]	N	Monitors the outdoor air temperature as provided by a valid network input or local hard-wired sensor. It represents the NetworkOutdoorTemp (AV:45) value, if available. Otherwise, it represents the locally wired sensor input provided by OutdoorTemp (AI:9).
Network Outdoor Air Temperature	AV:45	W	NetworkOutdoorTemp	-40 to 212°F -40 to 100°C Default: 32767[3]	N	Allows the outdoor temperature to be provided to the network from a single sensor. A communicating sensor typically sends the information or it can be set by a supervisory controller. If a valid network input is provided, this value overrides the unit’s hard-wired sensor. Otherwise the hard-wired sensor value is used.
Fan Run Time	AV:46	R	FanRunHoursTenths	0 to 300,000 hours Default: 0	N	Displays the total fan run time.
Effective Outdoor Humidity	AV:47	R	EffectOutdoorRH	0 to 100% Default: 0	N	Monitors the outdoor humidity as provided by a valid network input or local hard-wired sensor. It represents the NetworkOutdoorRH (AV:48) value, if available. Otherwise, it represents the locally wired humidity sensor input provided by OutdoorRH (AI-10).
Network Outdoor Humidity Input	AV:48	W	NetworkOutdoorRH	0 to 100% Default: 0	N	Network-supplied outdoor relative humidity value. It is used to set EffectOutdoorRH (AV:47).
Effective Space Humidity	AV:49	R	EffectSpaceRH	0 to 100% Default: 0	N	Monitors the indoor humidity as provided by a valid network input or local hard-wired sensor. It represents the NetworkSpaceRH (AV:50) value, if available. Otherwise, it represents the locally wired humidity sensor input provided by IndoorRH (AI-11).
Network Space Humidity	AV:50	W	NetworkSpaceRH	0 to 100% Default: 0	N	Network-supplied indoor relative humidity value. It is used to set EffectSpaceRH (AV:49).
Effective Space CO_2 Input	AV:51	R	EffectSpaceCO2	0 to 2000 ppm Default: 0	N	Monitors the space CO_2 if provided by a valid network input or local hard-wired sensor. It represents the NetworkSpaceCO2 (AV:51) value, if available. Otherwise, it represents the locally wired CO_2 sensor input provided by SpaceCO2 (AI-12).

Table 4: Analog Values, Continued

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
ANALOG VALUES						
Network Space CO_2	AV:52	W	NetworkSpaceCO2	0 to 2000 ppm Default: 32767[3]	N	Network-supplied space CO_2 value. It is used to set EffectSpaceCO2 (AV:50).
Discharge Air Temperature Setpoint	AV:53	R	DATSetpt	-40 to 212°F -40 to 100°C Default: 0	N	Monitors the unit's discharge air temperature setpoint.
Discharge Air Temperature Cooling Setpoint	AV:54	R	NetworkDATClgSetpt	-40 to 212°F -40 to 100°C Default: 32767[3]	N	Used to set the unit's discharge air temperature cooling setpoint.
Discharge Air Temperature Heating Setpoint	AV:55	R	NetworkDATHtgSetpt	-40 to 212°F -40 to 100°C Default: 32767[3]	N	Used to set the unit's discharge air temperature heating setpoint.
Outdoor Air Damper Position	AV:56	R	OADamper	0 to 100% Default: 0	N	Reflects the current position of the outdoor air damper.
Effective Entering Water Temperature	AV:57	R	EffectEWT	-40 to 212°F -40 to 100°C Default: 0	N	Monitors the entering water temperature if provided by a valid network input or local hard-wired sensor. It represents the NetworkEWT (AV:113) value, if available. Otherwise, it represents the locally wired sensor input.
Face and Bypass Damper Position	AV:58	R	FBDamper	0 to 100% Default: 0	N	Reflects the current position of the face and bypass (F&BP) damper.
Hot Water Modulating Valve Position	AV:59	R	HotWater	0 to 100% Default: 0	N	Reflects the current position of the hot water modulating valve.
Cold Water Modulating Valve Position	AV:60	R	ColdWater	0 to 100% Default: 0	N	Reflects the current position of the cold water modulating valve.
OAD Minimum Position	AV:61	W	cpOAMinPos	0 to 100% Default: 20%	Y	Minimum outdoor air damper (OAD) position when unit is configured for CO_2 control or when the space fan is set to run at high speed.
OAD Minimum Position Medium Speed	AV:62	W	cpOAMinPos MedSpeed	0 to 100% Default: 25%	Y	Minimum OAD position when the space fan is set to run at medium speed.
OAD Minimum Position Low Speed	AV:63	W	cpOAMinPos LowSpeed	0 to 100% Default: 30%	Y	Minimum OAD position when the space fan is set to run at low speed.
Space CO_2 Limit	AV:64	W	cpSpaceCO2Lim	0 to 2000 ppm Default: 1200 ppm	Y	Defines the CO_2 setpoint from the network.
Economizer Outdoor Air Differential Setpoint	AV:65	W	cpEconOASetpt	0 to 70ºF 0 to 38.39ºC Default: 9ºF/5ºC	Y	Adjusts the economizer indoor/outdoor air (IA/OA) temperature differential.
Economizer Deadband Temperature Differential	AV:66	W	cpEconDBDiff	1 to 10ºF 0.56 to - 5.56ºC Default: 2ºF/- 1.1ºC	Y	Adjusts the economizer indoor/outdoor air (IA/OA) temperature deadband differential.
Economizer Enthalpy Setpoint	AV:67	W	cpEconEnthSetpt	5 to 50 BTU/lb 11.63 to 116.3 kJ/kg Default: 29 BTU/lb 67.5 kJ/kg	Y	Adjusts the economizer OA air enthalpy setpoint. *OutdoorEnthalpy* must be less than this setpoint for free cooling to be available.
Economizer IA/OA Enthalpy Differential	AV:68	W	cpEconEnthDiff	0 to 10 BTU/lb 0 to 23.3 kJ/kg Default: 1 BTU/lb 2.3 kJ/kg	Y	Adjusts the economizer IA/OA enthalpy differential.
Space Humidity Setpoint	AV:69	W	cpSpaceRHSetpt	10 to 100% RH Default: 60% RH	Y	Adjusts the space relative humidity setpoint.
Outdoor Air Damper Position	AV:70	W	NetworkOAMinPos	0 to 100% Default: 0	N	Adjusts the current position of the minimum OA damper position from the network. It overrides the previous OA damper position.
Setpoint	AV:71	R	Setpoint	-40 to 212°F -40 to 100°C Default: 0	N	Reflects temperature setpoints for Occupied and Standby modes. Unoccupied setpoints cannot be changed from the network.

Table 4: Analog Values, Continued

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
ANALOG VALUES						
Single Zone Variable Air Volume (VAV) PI Loop[4,5]						
Discharge Air Temperature Reheat Setpoint	AV:112	W	NetworkDATReheat Setpoint	-40 to 212°F -40 to 100°C Default: 32767[3]	N	Sets the unit discharge air temperature setpoint when it is in reheat/dehumification mode.
Network Entering Water Temperature Input	AV:113	W	NetworkEWT	-40 to 212°F -40 to 100°C Default: 32767[3]	N	Reflects the network-supplied entering water temperature value. The network override reverts back to its default value upon unit controller reboot.
Proportional Gain	AV:72	W	cpSZVavPropGain	0 to 255 Default: 0.10	Y	The proportional gain (Kp) value of the loop algorithm used for temperature control function of single-zone VAV units.
Integral Gain	AV:73	W	cpSZVavIntegGain	0 to 255 Default: 0.01	Y	The integral offset (Ki) value of the loop algorithm used for temperature control function of single-zone VAV units. The value of 0 disables this feature.
Minimum Fan Output	AV:74	W	cpSZVavMinFan	0 to 100% Default: 5%	Y	Reflects the minimum fan speed for single-zone VAV units.
Maximum Fan Output	AV:75	W	cpSZVavMaxFan	0 to 100% Default: 100%	Y	Reflects the maximum fan speed for single-zone VAV units.
Maximum Temperature Differential	AV:76	W	cpSZVavMax DeltaTemp	1 to 10ºF 0.56 to - 5.56ºC Default: 5ºF/2.78ºC	Y	The value used to determine the maximum fan speed, cpSZVavMaxFan (AV:75) for single-zone VAV units.
Fan Speed Output	AV:77	R	SZVavFanSpeedPI	0 to 100%	N	Reflects the fan speed output for single-zone VAV units.
Cooling Water Valve PI Loop[4,5]						
Proportional Gain	AV:78	W	cpClgPropGain	0 to 255 Default: 0.5	Y	The proportional gain (Kp) value of the loop algorithm used to control hydronic cooling water valve function.
Integral Gain	AV:79	W	cpClgIntegGain	0 to 255 Default: 0.02	Y	The integral offset (Ki) value of the loop algorithm used to control the hydronic cooling water valve function.
Minimum Cooling Position	AV:80	W	cpClgMinPos	0 to 100% Default: 20%	Y	The hydronic cooling water valve minimum position when the difference between the discharge air temperature and the discharge air cooling setpoint is zero.
Maximum Cooling Temperature Differential	AV:81	W	cpClgMaxDeltaTemp	1 to 10ºF 0.56 to - 5.56ºC Default: 5ºF/2.78ºC	Y	The value used to determine the hydronic cooling water valve position of the loop algorithm. It reflects the difference between the discharge air temperature and discharge air setpoint that causes the valve to open 100%.
Maximum Cooling Position	AV:82	W	cpClgMaxPos	10 to 100% Default: 100%	Y	The hydronic cooling water valve maximum position.
Cooling Water Valve Position	AV:83	R	ColdWtrPI	0 to 100%	N	Reflects the hydronic cooling water valve commanded position.
Heating Water Valve PI Loop[4,5]						
Proportional Gain	AV:84	W	cpHtgPropGain	0 to 255 Default: 0.5	Y	The proportional gain (Kp) value of the loop algorithm used to control heating water valve function.
Integral Gain	AV:85	W	cpHtgIntegGain	0 to 255 Default: 0.02	Y	The integral offset (Ki) value of the loop algorithm used to control the heating water valve function.
Minimum Heating Position	AV:86	W	cpHtgMinPos	0 to 50% Default: 0%	Y	The heating water valve minimum position.
Maximum Heating Temperature Differential	AV:87	W	cpHtgMaxDeltaTemp	1 to 10ºF 0.56 to - 5.56ºC Default: 5ºF/2.78ºC	Y	The value used to determine the heating water valve position of the loop algorithm. It reflects the difference between the discharge air temperature and discharge air setpoint that causes the valve to open 100%.
Maximum Heating Position	AV:88	W	cpHtgMaxPos	10 to 100% Default: 100%	Y	The heating water valve maximum position.
Heating Water Valve Position	AV:89	R	HotWaterPI	0 to 100%	N	Reflects the hydronic heating water valve commanded position.
Discharge Air Temperature Heating Water Low Limit Output	AV:110	R	DATLLHotWaterPI	0 to 100%	N	Reflects the discharge air temperature low limit output for the heating water valve.

Table 4: Analog Values, Continued

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
ANALOG VALUES						
Face and Bypass Damper PI Loop[4,5]						
Proportional Gain	AV:90	W	FBDamperPropGain	0 to 255 Default: 10	N	The proportional gain (Kp) value of the loop algorithm used to control the face and bypass damper function.
Integral Gain	AV:91	W	FBDamperIntegGain	0 to 255 Default: 1	N	The integral offset (Ki) value of the loop algorithm used to control the face and bypass damper function.
Face and Bypass Damper Position Output	AV:92	R	FBP_PIOut	0 to 100%	N	Reflects the face and bypass damper commanded position. The value of 0 puts the damper in full bypass position, which diverts the airflow and bypasses heating or cooling elements. A value of 100% puts the damper in full face position, which directs airflow over heating or cooling elements.
Electric Heat PI Loop[4,5]						
Proportional Gain	AV:93	W	cpHtgElectPropGain	0 to 255 Default: 8	Y	The proportional gain (Kp) value of the loop algorithm used to control electric heat function.
Integral Gain	AV:94	W	cpHtgElectIntegGain	0 to 255 Default: 0.5	Y	The integral offset (Ki) value of the loop algorithm used to control electric heat function.
Discharge Air Temperature Low Limit Output	AV:95	R	ElectDatLLPIOut	0 to 100%	N	Reflects the electric heat discharge air temperature low limit output. Electric heat discharge air temperature low limit is used only when there are no other forms of heat available and the discharge air temperature is below the setpoint. When enabled, the loop algorithm output is based on the discharge air temperature.
Dehumidification Electric Heat Output	AV:96	R	ElectDehumPIOut	0 to 100%	N	Reflects the electric heat dehumidification output.
CO_2 Control PI Loop[4,5]						
Proportional Gain	AV:101	W	cpCO2PropGain	0 to 255 Default: 1	Y	The proportional gain (Kp) value of the loop algorithm used to control the outside air damper for CO_2/demand control ventilation.
Integral Gain	AV:102	W	cpCO2IntegGain	0 to 255 Default: 0.01	Y	The integral offset (Ki) value of the loop algorithm used to control the outside air damper for CO_2/demand control ventilation.
Outdoor Air Damper Position	AV:103	R	OADPosCO2	0 to 100%	N	Reflects the outdoor air damper position as commanded by the CO_2/VOC setpoint for demand control ventilation. Applies under the following conditions: • A CO_2/VOC sensor is installed • The unit is in Occupied or Standby mode • The unit is configured for CO2/VOC-DCV (cpSpaceCO2Enable is enabled)
Economizer Position PI Loop[4,5]						
Proportional Gain	AV:104	W	cpEconPropGain	0 to 255 Default: 1	Y	The proportional gain (Kp) value of the loop algorithm used to control the outdoor damper position when the unit is in economizer mode and free cooling is available.
Integral Gain	AV:105	W	cpEconIntegTime	0 to 255 Default: 0.1	Y	The integral offset (Ki) value of the loop algorithm used to control the outdoor damper position when the unit is in economizer mode and free cooling is available.
Outdoor Air Damper Position	AV:106	R	FreeCoolingPiLoopOut	0 to 100%	N	Reflects the output for the outdoor air damper position. This value is generated when the unit is in economizer mode and free cooling is available.
Proportional Gain	AV:107	W	cpOADLLPropGain	0 to 255 Default: 0.10	Y	The proportional gain (Kp) value of the loop algorithm used to control the low limit outdoor damper position when the unit is in low limit.
Integral Gain	AV:108	W	cpOADLLIntegGain	0 to 255 Default: 0.05	Y	The integral offset (Ki) value of the loop algorithm used to control the control the low limit outdoor damper position when the unit is in low limit.
Outdoor Air Damper Low Limit Differential	AV:109	R	OADLLPiOut	0 to 100% Default: 0%	N	The output from the outdoor air damper low limit loop algorithm using the minimum AV:109 value and OAD Minimum Position (AV:61). When the economizer is in the low limit state, the outdoor air damper modulates up or down.

Table 4: Analog Values, Continued

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
ANALOG VALUES						
Outdoor Air Damper Position PI Loop[4,5]						
Maximum Outdoor Air Damper Position	AV:111	W	cpOAMaxPos	0 to 100% Default: 100%	Y	Reflects the maximum outdoor air damper commanded position.
Control Temperature	AV:114	R	ControlTemp	-40 to 212°F -40 to 100°C Default: 32767[3]	N	The current value of the temperature input used to determine if the unit should heat or cool. It can be configured to be space temperature, return/room air temperature, or an average of the two using the LUI keypad display or ServiceTools software. If neither input has a valid value, AV:114 displays an invalid value of 32767.
MS/TP (MAC) Address	AV:411	W	MacAddress	0 to 127 Default: 120	Y	BACnet MS/TP node (MAC address) of the unit controller. The MAC address can be set from the BAS, LUI keypad display or ServiceTools software. See Configuring Network Communication Parameters.

1. Parameter is stored in FLASH/EEPROM (non-volatile memory) of the unit controller. If Non-volatile Memory = Y, then the value is saved through a power cycle. Writes to this parameter must be limited. If Non-volatile Memory = N, the value is not saved through a power cycle. Non-volatile parameters are saved every 20 minutes.
2. R = Read-only access, W = Write access, C = Commandable. For commandable objects, the controller enables the priority to be set by the device that is commanding the Present Value of the object. Only the highest priority value (lowest number) of the priority array command is written to the Present Value. For writeable objects, the value is written to the Present Value. Range checking is performed before the write occurs or and error is returned.
3. The value of 32767 indicates a sensor failure condition or when the unit controller is not using a value within the acceptable range.
4. The unit controller ships with default PI loop values configured for each application. Before changing any of the writeable parameters, it is recommended that you contact the Daikin Applied Terminal Systems Technical Response at TechResponseATS@daikinapplied.com or (315) 282-6434 for assistance.
5. See PI Loop Control section at the end of this document and the MicroTech UV Controller OM 1280 (www.DaikinApplied.com) for additional information.
6. AV:412 has an ObjectName of SystemMinInstance, the Present Value is writeable, and it has a default value of 3101000. During the commissioning process, the present value of AV:412 is added to the MAC Address to determine the Device Instance Number. In order to change the value of AV:412 in the unconfigured state, the BAS must broadcast a new present value to AV:412 using the BACnet service (BIBB – BACnet Interface Building Block) called “Unconfirmed COV” with a ProcessID value of 1. This prevents unauthorized unconfirmed writes, or changes, to AV:412. Note that this change affects the AV:412 present value for every MicroTech UV controller (device) on the trunk.

Table 5: Binary Values

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
Clear Alarm	BV:1	C	ClearAlarm	1 = NONE 2 = CLEAR_ ALARM Default: 1 (NONE)	N	Resets the current (active) alarm. See Alarms section for details.
Reset Filter	BV:3	C	ResetFilter	1 = NONE 2 = CLEAR_ ALARM Default: 1 (NONE)	N	Clears the change filter alarm.

1. Parameter is stored in FLASH/EEPROM (non-volatile memory) in either the communication module or in the unit controller. If Non-volatile Memory = Y, then the value is saved through a power cycle. Writes to this parameter must be limited. If Non-volatile Memory = N, the value is not saved through a power cycle. Non-volatile parameters are saved every 20 minutes.
2. R = Read-only access, W = Write access, C = Commandable. For commandable objects, the controller enables the priority to be set by the device that is commanding the Present Value of the object. Only the highest priority value (lowest number) of the priority array command is written to the Present Value. For writeable objects, the value is written to the Present Value. Range checking is performed before the write occurs or and error is returned.

Table 6: Multi-State Inputs

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
Condensate Overflow Status	MSI:1	R	CondOverFlow	1 = Dry 2 = Wet 3 = Null Default: 3 (Null)	N	Monitors the Condensate Overflow sensor input. A Null value indicates that no sensor is present.
Humidistat	MSI:4	R	Humidistat	1 = Notdehumidify 2 = Dehumidify Default: 1 (Notdehumidify)	N	Input used to command dehumidification. Applies when a sensor is installed and dehumidification has been enabled via the network or LUI keypad display.

1. Parameter is stored in FLASH/EEPROM (non-volatile memory) in either the communication module or in the unit controller. If Non-volatile Memory = Y, then the value is saved through a power cycle. Writes to this parameter must be limited. If Non-volatile Memory = N, the value is not saved through a power cycle. Non-volatile parameters are saved every 20 minutes.
2. R = Read-only access, W = Write access, C = Commandable

Table 7: Multi-State Values

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
MULTI-STATE VALUES						
Compressor Enable	MSV:1	C	NetworkComprEnable	1 = Disable 2 = Enable 3 = Null Default: 3 (Null)	N	Specifies if the compressor(s) is allowed to operate, which can be based on proof of loop fluid flow. The loop pump must be running to provide adequate flow through the unit so the compressor(s) can operate safely. A default value of Null allows the compressors to be enabled.
Current Alarm	MSV:2	R	CurrentAlarm	1 to 31	N	Displays the current highest priority active alarm. See Table 9 for alarm priorities and other details. **No. / Message / Description** 1 / NoAlm / No Alarm 2 / ShutDown / ShutdownDIAlarm (Emergency Stop) 3 / SpaceTSensor / SpaceTempSensorAlarm 4 / HighP / HighDxPressureAlarm 5 / DATLowDx / DATLLDxAlarm 6 / CondOver / CondensateOverflowAlarm 7 / ICTSensor / IndoorAirCoilDxTempSensorAlarm 8 / OATSensor / OATSensorAlarm 9 / DATSensor / DATSensorAlarm 10 / OCTSensor / OutdoorAirCoilDxTempSensorAlarm 11 / WCDxTSensor / WaterCoilDxTempSensorAlarm 12 / LWTSensor / WaterOutTempSensorAlarm 13 / EWTSensor / WaterInTempSensorAlarm 14 / IAHSensor / SpaceHumiditySensorAlarm 15 / ODHSensor / OutdoorHumiditySensorAlarm 16 / CO2Sensor / SpaceCO2SensorAlarm 17 / LowEWT / WaterInTempInadequateAlarm 18 / Freeze / WaterCoilFreezeAlarm 19 / SRTLow / LowSuctionLineTempAlarm 20 / CantCool / CantCoolAlarm 21 / CantHeat / CantHeatAlarm 22 / DATLow / DATLLAlarm 23 / BrownOut / BrownoutAlarm 24 / HighVolt / HighVoltageAlarm 25 / DirtyFilter / ChangeFilterAlarm 26 / OCTLow / LowOACoilTempAlarm 27 / RATSensor / ReturnTempSensorAlarm 28 / FactConfig / FactoryConfigStringAlarm 29 / ControlT / ControlTempAlarm 30 / Config / ConfigurationAlarm 31 / ControlBoard / ControlBoardAlarm
Effective Occupancy Output	MSV:6	R	EffectOccup	1 = Occ 2 = Unocc 3 = Bypass 4 = Standby 5 = Null Default: 5 (Null)	N	The actual occupancy mode being used by the unit controller. The mode depends on Occupancy Override, Occupancy Scheduler, an internal schedule, and/or an occupancy sensor. See Effective Occupancy Modes section for details.
Occupancy Override Input	MSV:7	C	OccManCmd	1 = Occ 2 = Unocc 3 = Bypass 4 = Standby 5 = Null Default: 5 (Null)	N	Network command that overrides the Effective Occupancy Output (MSV:6). See Effective Occupancy Modes section for details.
Occupancy Scheduler Input	MSV:8	C	OccSchedule	1 = Occ 2 = Unocc 3 = Bypass 4 = Standby 5 = Null Default: 5 (Null)	N	Network command that sets the unit into different occupancy modes. The network override reverts back to its default value upon unit controller reboot. See Effective Occupancy Modes section for details.

1. Parameter is stored in FLASH/EEPROM (non-volatile memory) in either the communication module or in the unit controller. If Non-volatile Memory = Y, then the value is saved through a power cycle. Writes to this parameter must be limited. If Non-volatile Memory = N, the value is not saved through a power cycle. Non-volatile parameters are saved every 20 minutes.
2. R = Read-only access, W = Write access, C = Commandable. For commandable objects, the controller enables the priority to be set by the device that is commanding the Present Value of the object. Only the highest priority value (lowest number) of the priority array command is written to the Present Value. For writeable objects, the value is written to the Present Value. Range checking is performed before the write occurs or and error is returned.

Table 7: Multi-State Values, Continued

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
MULTI-STATE VALUES						
Occupancy Sensor Input	MSV:9	C	OccSensor	1 = Occ 2 = Unocc 3 = Null Default: 3 (Null)	N	Network input used to indicate the presence of occupants in the space (motion detection.) The network override reverts back to its default value upon unit controller reboot. See Effective Occupancy Modes section for details.
Energy Hold Off Input	MSV:12	C	EnergyHoldOff	1 = Normal 2 = Hold_Off 3 = Null Default: 3 (Null)	N	Prevents the unit from either heating and cooling, thus allowing it to protect the space from temperature extremes. When the unit is in Energy Hold Off, heating is not provided unless the space temperature exceeds the Emergency Heat Setpoint. With the exception of free cooling, it does not allow for cooling operation.
Pump Request Output	MSV:13	R	PumpRequest	Active or Inactive Default: Inactive	N	Commands the pump on or off depending on the unit mode (heating, cooling, dehumidification). Indicates when the unit is requesting flow from the main water loop. The loop pump must be running to provide adequate flow through the unit so the compressor(s) can operate safely.
Units (English/Metric)	MSV:15	W	Units	English or Metric Default: English	Y	Units of measure for temperature conversion. The selection of either English or Metric changes the units for all the applicable properties in the BACnet application of the unit controller.
Dehumidification Enable	MSV:16	W	ncpDehumidEnable	1 = Disabled 2 = Enabled 3 = Null Default: 3 (Null)	N	Network command that allows the unit to enter the dehumidification state.
Application Mode[3]	MSV:17	W	NetworkApplicMode	1 = Auto 2 = Heat 3 = Cool 4 = Night_Purge 5 = Off 6 = Emerg_Heat 7 = Fan_Only 8 = Dehumid 9 = Null Default: 9 (Null)	N	Network command that sets the operating mode of the unit. Application Mode does not "force" the unit into any state. However, it does disable certain unit operations. Examples: 1) An application mode of Cool disables heating, 2) Heat disables cooling and dehumidification, and 3) Fan-only disables heating, cooling, and dehumidification.
Effective Heat/Cool	MSV:20	R	EffectHeatCool	1 = Auto 2 = Heat 3 = Cool 4 = Night_Purge 5 = Off 6 = Emerg_Heat 7 = Fan_Only 8 = Dehumid 9 = Null Default: 9 (Null)	N	Indicates the actual heat/cool mode of the unit.
Emergency Override	MSV:21	W	EmergOverride	1 = Normal 2 = Pressurize 3 = Depressurize 4 = Purge 5 = Shutdown 6 = Fire Default: 1 (Normal)	N	Commands the unit into an emergency (non-normal) mode from the network. Overrides the local emergency mode if configured from the LUI keypad display.
Economizer Enable	MSV:22	W	NetworkEconEnable	1 = Disable 2 = Enable 3 = Null Default: 3 (Null)	N	Network command that enables or disables economizer operation. Overrides the local economizer enable if configured from the LUI keypad display.

1. Parameter is stored in FLASH/EEPROM (non-volatile memory) in either the communication module or in the unit controller. If Non-volatile Memory = Y, then the value is saved through a power cycle. Writes to this parameter must be limited. If Non-volatile Memory = N, the value is not saved through a power cycle. Non-volatile parameters are saved every 20 minutes.
2. R = Read-only access, W = Write access, C = Commandable. For commandable objects, the controller enables the priority to be set by the device that is commanding the Present Value of the object. Only the highest priority value (lowest number) of the priority array command is written to the Present Value. For writeable objects, the value is written to the Present Value. Range checking is performed before the write occurs or and error is returned.

Table 8: Device Objects

Point Name	Object Type/ Instance	Read/ Write Access[2]	BACnet Object Name	Range/Default (in Units)	Non-volatile Memory[1]	Description
DEVICE						
Application Version	DEV:1	R	App_Software_Version	V.RR.BB Default: 0.00.01	Y	The version of software application code in the MicroTech UV controller. V=Version, RR=Revision, BB = Build
Location	DEV:2	W	Location	32 Characters Default: Location	Y	Text string used to describe the physical location of the unit. The location can be set through the BAS, ServiceTools software, or LUI keypad display. See Configuring Network Communication Parameters.
Device Instance Number	DEV:3	W	Object_Identifier	0 to 4194302 Default: 3101120	Y	Unique instance number or object-identifier assigned by integrator. The device instance number can be set from the BAS, ServiceTools software, or LUI keypad display. See Configuring Network Communication Parameters.
Device Name	DEV:4	W	Object_Name	32 Characters Default: DevName	Y	Text string used to define the BACnet device name. The device object name can be set from the BAS, ServiceTools software, or LUI keypad display. See Configuring Network Communication Parameters.
MS/TP Baud Rate	DEV:5	W	BaudRate	9600 19200 38400 76800 Default: 38400	Y	Set the baud rate to match the speed of the BACnet network. Speeds above 38400 should be avoided unless the network wiring has been tested and verified to meet the required speed. The baud rate can be set from the BAS, ServiceTools software, or LUI keypad display. See Configuring Network Communication Parameters.
MaxMasters[3]	DEV:6	W	Max_Master	1 to 127 Default: 127	Y	MaxMasters should be set to the highest address of a MS/TP master on the network segment. The default value is 127 for maximum compatibility. Setting this to the highest address of an MS/TP master device on the network reduces the MS/TP token traffic and decreases the response time of the unit controller. MaxMasters can be set from the BAS, ServiceTools software, or LUI keypad display. See Configuring Network Communication Parameters.

1. Parameter is stored in FLASH/EEPROM (non-volatile memory) in either the communication module or in the unit controller. If Non-volatile Memory = Y, then the value is saved through a power cycle. Writes to this parameter must be limited. If Non-volatile Memory = N, the value is not saved through a power cycle. Non-volatile parameters are saved every 20 minutes.
2. R = Read-only access, W = Write access, C = Commandable.

Alarm Management

The MicroTech UV controller has various ways of monitoring, acknowledging, and clearing alarms. Alarms can be managed from the LUI keypad display, ServiceTools software, and the BACnet network as described in this section.

Table 9 describes all alarms supported by the MicroTech UV controller.

Alarm Class and Priority

Alarms in the MicroTech UV controller are organized by Fault, Problem, or Warning alarm class. Alarm objects are stored according to their priority. The highest priority active alarm is stored with an alarm number (index) value 1 as indicated by the *CurrentAlarm* (MSV:2) object. Table 9 shows the alarm objects by class and alarm index number.

Fault Alarms

Fault alarms have the highest priority and require an acknowledgement from the operator. These alarms cause the unit to shut down. When *cfgAlmBOut* is set to *Fault* or *FaultProb* and a Fault occurs, the Fault binary output is activated.

Problem Alarms

Problem alarms have the next highest priority. Problem alarms do not cause unit shutdown but do limit operation of the unit in some way. When *cfgAlmBOut* is set to *FltProb* and a Problem occurs, the Fault binary output is activated.

Warning Alarms

Warning alarms have the lowest priority. A warning is enunciated whenever an abnormal condition exists which does not affect unit operation.

Alarm Monitoring

The alarms in Table 9 are monitored using the *CurrentAlarm* (MSV:2) object. When an alarm becomes active, it is added to the list according to its priority, and when an alarm becomes inactive, it is removed from the list.

Alarm History

The last 32 alarms are recorded in the alarm history with the date, the time the alarm became active and inactive, and alarm description. Alarm records are accessible from the LUI keypad display and ServiceTools software.

Clearing Alarms

Alarms can be cleared by using one of several methods:

- The *ClearAlarm* (BV:1) BACnet network object.
- The LUI keypad display parameter *LuiResetAlarm*.
- The tenant override button on the room sensor, if available. See below for details.

Tenant Override

The tenant override feature is a way to reset and clear alarms from a local sensor. Once the cause of the alarm has been addressed, apply a ground signal to the tenant override input using the *LocalSpaceTemp* (AI:1) object 11 or more seconds but less than 29 seconds. Doing so forces the unit controller to clear the alarm.

NOTE: Grounding the tenant override generates a BACnet “I Am” Service Request.

Table 9: BACnet Alarms

Alarm Number	Alarm Message	Alarm Description	Priority	Clear	Description
Fault Alarms					
31	ControlBoard	ControlBoardAlarm	2	Auto	The unit controller hardware has failed or is not reliable.
29	ControlT	ControlTempAlarm	7	Manual	Neither a space temperature or return air temperature is available.[2]
9	DATSensor	DATSensorAlarm	5	Auto	The discharge air temperature (DAT) sensor is not reliable (either shorted or open-circuited) or the discharge air temperature (*aiDAT*) is out of range.
28	FactConfig	FactoryConfigStringAlarm	6	Manual	There is an error detected in the factory-loaded unit configuration string.
8	OATSensor	OATSensorAlarm	4	Auto	The outdoor air temperature (OAT) sensor is not reliable (either shorted or open-circuited) or the outdoor air temperature (*aiOAT*) is out of range.
2	ShutDown	ShutdownDIAlarm (Emergency Stop)	3	Auto	The Shutdown Discrete input (*biShutdown*) is active.
Problem Alarms					
23	BrownOut	BrownoutAlarm	26	Auto	The line voltage value is below the minimum BrownoutVoltage object value.[2]
20	CantCool	CantCoolAlarm	23	Auto	Current conditions are preventing the unit from entering cooling mode.
21	CantHeat	CantHeatAlarm	24	Auto	Current conditions are preventing the unit from entering cooling mode.
6	CondOver	CondensateOverflowAlarm	11	Auto	A condensate overflow sensor is installed and indicates that the drain pan is full of condensate.
22	DATLow	DATLLAlarm	25	Auto	The DAT is below the minimum *DisAirEconLowLim* setpoint during. Applies when the unit is not in compressorized cooling.
5	DATLowDx	DATLLDxAlarm	10	Auto	The DAT is below the minimum *ncpDisAirMechLowLim* setpoin. Applies when the unit is in compressorized cooling.
4	HighP	HighDxPressureAlarm	9	Auto[1]	The High DX Pressure Alarm is active due to a fault (switch open).[2]
24	HighVolt	HighVoltageAlarm	27	Auto	The line voltage exceeds the maximum high voltage limit. [2]
7	ICTSensor	IndoorAirCoilDxTempSensorAlarm	12	Auto	The indoor air coil DX temperature sensor is installed but not reliable (either shorted or open-circuited) or the indoor air DX coil temperature (*aiIndoorCoilTemp*) is out of range. [2]
26	OCTLow	LowOACoilTempAlarm	28	Auto	The outdoor air coil temperature is below the minimum setpoint.
19	SRTLow	LowSuctionLineTempAlarm	22	Auto[1]	The suction line temperature sensor indicates that the suction line temperature (*aiIndoorCoilTemp*) is below the setpoint.
10	OCTSensor	OutdoorAirCoilDxTempSensorAlarm	13	Auto	The outdoor air coil DX temperature sensor is installed but not reliable (either shorted or open-circuited) or the outdoor air DX coil temperature ((*aiOutdoorCoilTemp*) is out of range.[2]
15	ODHSensor	OutdoorHumiditySensorAlarm	18	Auto	The outdoor humidity sensor is not reliable (either shorted or open-circuited) or the outside humidity level (*aiHumidityOutdoor*) is out of range.
27	RATSensor	ReturnTempSensorAlarm	29	Auto	The return air temperature sensor is not reliable (either shorted or open-circuited) or the return air temperature (*aiRAT*) is out of range.
16	CO2Sensor	SpaceCO2SensorAlarm	19	Auto	The space CO_2 sensor is not reliable (either shorted or open-circuited) or the space CO_2 level (*aiCO2*) is out of range.
14	IAHSensor	SpaceHumiditySensorAlarm	17	Auto	The space humidity sensor is not reliable (either shorted or open-circuited) or the indoor humidity level (*aiHumidityIndoor*) is out of range.
3	SpaceTSensor	SpaceTempSensorAlarm	8	Auto	The space temperature sensor is not reliable (either shorted or open-circuited) or the space temperature (*aiSpaceTemp*) is out of range.
11	WCDxTSensor	WaterCoilDxTempSensorAlarm	14	Auto	A water coil DX temperature sensor is installed but the sensor is not reliable or the outdoor coil temperature (*aiOutdoorCoilTemp*) is out of range. [2]
18	Freeze	WaterCoilFreezeAlarm	21	Auto	The freeze stat sensor indicates that the *biFreezeStat* setpoint is low.
17	LowEWT	WaterInTempInadequateAlarm	20	Auto	An entering water temperature (EWT) sensor is installed and indicates that the water temperature is not acceptable for the currrent unit mode.
13	EWTSensor	WaterInTempSensorAlarm	16	Auto	The water DX coil temperature sensor is not reliable (either shorted or open-circuited) or the entering water temperature (*aiEWT*) is out of range.
12	LWTSensor	WaterOutTempSensorAlarm	15	Auto	The water DX coil temperature sensor is not reliable (either shorted or open-circuited) or the leaving water temperature (*aiLWT*) is out of range.
Warning Alarms					
25	DirtyFilter	ChangeFilterAlarm	32	Manual	Indicates the filter needs to be changed based on fan runtime hours.
30	Config	ConfigurationAlarm	30	Auto	Indicates an error with one or more of the configuration (I/O) parameters.

[1] After seven days, alarm reverts from Auto to Manual reset.
[2] Multi-compressor alarm.

The Network “Wink” Command

The MicroTech UV controller implements a unit identification mode command to the unit controller by using the BACnet “ReinitializeDevice” request, with a Cold or Warm Start request handle, and a password of “wink” (all lower case). The “wink” unit identification function allows verification of an individual unit network address without opening the unit access panels. The Wink command can be used during all operating and non-operating (ex. Alarm) modes except for the following conditions:

- Brownout Mode
- Emergency Shutdown

Upon receiving a wink command from a network management node, the unit controller exhibits the following identification sequence (all occur simultaneously):

- Room Sensor LED: flashes ON 3 seconds, then OFF 3 seconds for 15 total seconds, unless an alarm condition exists.
- Fan: the fan turns off for 5 seconds then on 5 seconds, then off again for 5 seconds.

Several parameters are used only for maintenance and testing. A network management tool such as VTS is typically used to issue the network commands. This section describes the use of these network parameters that apply to the unit ventilator:

- DeviceCommunicationControl – Disable
- DeviceCommunicationControl - Enable
- ReinitializeDevice (Reset)
- Network “Wink” Command

DeviceCommunicationControl - Disable

The purpose of this command is to reduce network traffic for diagnostic testing of the MS/TP network. When the unit controller receives a network command to disable communication, it stops communicating unit information to the network. An optional time may be specified for how long to suspend communications. The unit continues to operate during the Disabled state.

DeviceCommunicationControl - Enable

When the unit controler receives a network command to enable communication, unit controller network communication is restored.

ReinitializeDevice (Reset)

When the unit controller receives a network ReinitializeDevice command, it performs the following:

1. Sends a command to the unit controller to perform a warm reset, maintaining non-volatile memory.
2. Resets the unit controller.

If a warm reset is requested, the unit controller’s non-volatile memory is maintained. If a cold reset is requested, then the unit controller’s non-volatile memory is set to the factory default values.

NOTE: The password required to Reinitialize Device is “MicroTech.”

Effective Occupancy

Occupancy is a critical parameter when determining the mode of operation. When the space is occupied, the unit is enabled and when the space is not occupied, the unit is off.

The unit operates in one of four different occupancy modes as described in Table 10 below.

Table 10: Occupancy Modes

Mode	Description
Occupied	Space is occupied
Unoccupied	Space is unoccupied
Standby	Unit is using setpoints that are in between the values defined by Occupied and Unoccupied states
Bypass	Space is considered occupied for the duration of the bypass timer

The MicroTech UV controller calculates the proper occupancy state based on several physical and network variables. This section describes the parameters and how Effective Occupancy (*EffectOccup*) is determined.

Table 11 describes the parameters used to calculate effective occupancy (MSV:6-MSV:9). Table 12 describes the relationship among those network occupancy inputs and the respective configuration parameters.

Table 11: Parameter Descriptions

Parameter	Description
EffectOccup	Indicates the actual occupancy mode of the unit (Occupied, Unoccupied, Bypass, Standby)
niOccManCmd	Network occupancy override input
biUnoccupied	Physical input for the Unoccupied mode
niOccSensor	Network occupancy sensor
TenantOverride	Determined by space temperature sensor input, aiSpaceTemp. Sets the unit to Occupied/Bypass mode
ncpBypassTime	Allows the unit to enter Bypass mode when the timer is active and BypassTime has been set
cpLuiOccManCmd	LUI keypad/display occupancy override input

Table 12: Occupancy Mode Interactions

niOccManCmd (MSV:7)	cpLuiOccManCmd	TenantOverride[1]	niOccSchedule (MSV:8)	IntSched	niOccSensor (MSV:9)	biUnoccupied	EffectOccup (MSV:6)
1 (Occ)	NA	NA	NA	NA	NA	NA	1 (Occ)
2 (Unoc)	NA	NA	NA	NA	NA	NA	2 (Unoc)
3 (Bypass)	NA	NA	1 (Occ)	NA	NA	NA	1 (Occ)
			2 (Unoc)	NA	NA	NA	3 (Bypass)
			3 (Standby)	NA	NA	NA	3 (Bypass)
			4 (Null)	Occ	NA	NA	1 (Occ)
				Unocc	1 (Occ)	NA	1 (Occ)
				Unocc	2 (Unoc)	NA	3 (Bypass)
				Unocc	3 (Null)	Occ	1 (Occ)
				Unocc	3 (Null)	Unocc	3 (Bypass)
4 (Standby)	NA	NA	NA	NA	NA	NA	4 (Standby)
5 (Null)	Occ	NA	NA	NA	NA	NA	1 (Occ)
5 (Null)	Unoc	NA	NA	NA	NA	NA	2 (Unoc)
5 (Null)	Bypass	NA	1 (Occ)	NA	NA	NA	1 (Occ)
			2 (Unoc)	NA	NA	NA	3 (Bypass)
			3 (Standby)	NA	NA	NA	3 (Bypass)
			4 (Null)	Occ	NA	NA	1 (Occ)
				Unocc	2 (Unoc)	NA	3 (Bypass)
				Unocc	1 (Occ)	NA	1 (Occ)
				Unocc	3 (Null)	Occ	1 (Occ)
				Unocc	3 (Null)	Unocc	3 (Bypass)
5 (Null)	Standby	NA	NA	NA	NA	NA	4 (Standby)

1. The tenant override is a set of dry contacts placed in parallel with the space temperature sensor (*aiSetpointAdjust*). When the contacts are closed momentarily, the bypass timer becomes active and is set to *ncpBypassTime*, and the unit enters the Bypass mode. The tenant override function is active until the timer expires.

Table 12: Occupancy Mode Interactions, Continued

niOccManCmd (MSV:7)	cpLuiOccManCmd	TenantOverride[1]	niOccSchedule (MSV:8)	IntSched	niOccSensor (MSV:9)	biUnoccupied	EffectOccup (MSV:6)
5 (Null)	Auto	Off	1 (Occ)	NA	1 (Occ)	NA	1 (Occ)
				NA	2 (Unoc)	NA	4 (Standby)
			1 (Occ)	NA	3 (Null)	Occ	1 (Occ)
				NA	3 (Null)	Unocc	4 (Standby)
			2 (Unoc)	NA	NA	NA	2 (Unoc)
			3 (Standby)	NA	NA	NA	4 (Standby)
			4 (Null)	Occ	1 (Occ)	NA	1 (Occ)
				Occ	2 (Unoc)	NA	4 (Standby)
				Occ	3 (Null)	Occ	1 (Occ)
				Occ	3 (Null)	Unocc	4 (Standby)
				Unocc	1 (Occ)	NA	1 (Occ)
				Unocc	2 (Unoc)	NA	2 (Unoc)
				Unocc	3 (Null)	Occ	1 (Occ)
				Unocc	3 (Null)	Unocc	2 (Unoc)
5 (Null)	Auto	Off	4 (Null)	Unocc	3 (Null)	Occ	1 (Occ)
						Unocc	2 (Unoc)
5 (Null)	Auto	On	1 (Occ)	NA	1 (Occ)	NA	1 (Occ)
				NA	2 (Unoc)	NA	3 (Bypass)
			1 (Occ)	NA	3 (Null)	Occ	1 (Occ)
				NA	3 (Null)	Unocc	3 (Bypass)
			2 (Unoc)	NA	NA	NA	2 (Unoc)
			3 (Standby)	NA	NA	NA	3 (Bypass)
			4 (Null)	Occ	1 (Occ)	NA	1 (Occ)
				Occ	2 (Unoc)	NA	3 (Bypass)
				Occ	3 (Null)	Occ	1 (Occ)
				Occ	3 (Null)	Unocc	3 (Bypass)
				Unocc	1 (Occ)	NA	1 (Occ)
				Unocc	2 (Unoc)	NA	3 (Bypass)
				Unocc	3 (Null)	Occ	3 (Bypass)
				Unocc	3 (Null)	Unocc	3 (Bypass)
5 (Null)	Auto	On	4 (Null)	Unocc	3 (Null)	Occ	1 (Occ)
						Unocc	3 (Bypass)

1. The tenant override is a set of dry contacts placed in parallel with the space temperature sensor (*aiSetpointAdjust*). When the contacts are closed momentarily, the bypass timer becomes active and is set to *ncpBypassTime*, and the unit enters the Bypass mode. The tenant override function is active until the timer expires.

Temperature Setpoint Calculations

This section details the calculations used for setting space temperature setpoints. The calculations depend on unit status (if it is occupied, unoccupied, standby, or bypass mode) and whether a local or long range setpoint adjust is enabled. A space temperature setpoint operation diagram illustrates the relationship among the inputs and their default values (Figure 1). The last section includes examples of common applications using default values.

Table 13 is the set of default values for each parameter.

Table 13: Temperature Setpoint Defaults

AV:1 (cpOccupied_Cool_Setpt) = 73°F
AV:2 (cpStandby_Cool_Setpt) = 77°F
AV:3 (cpUnoccupied_Cool_Setpt) = 82°F
AV:4 (cpOccupied_Heat_Setpt) = 70°F
AV:5 (cpStandby_Heat_Setpt) = 66°F
AV:6 (cpUnoccupied_Heat_Setpt) = 61°F
AV:10 (cpOccDiff) = 1°F
AV:17 (cpUnoccDiff) = 1°F

Setpoint Methods with BACnet

1. **The unit is operating in Unoccupied mode.**
   - EffCoolOnSP = AV:3
   - EffCoolOffSP = (EffCoolOnSP – AV:17)
   - EffHeatOnSP = AV:6
   - EffHeatOffSP = (EffHeatOnSP + AV:17)
2. **The unit is operating in Occupied or Standby mode and the Local Setpoint Adjust is not connected or is invalid.**

   This calculation then depends on whether or not there is a valid AV:19 value. The absolute offset used in this calculation is shown for both Occupied and Standby modes (and applies to both a valid and invalid AV:19 value):

   Occupied
   absOffset = Setpoint – 0.5 (ncpOccCoolSetpt + ncpOccHeatSetpt)

   Standby
   absOffset = Setpoint – 0.5 (ncpStandbyCoolSetpt - ncpStandyHeatSetpt)

   With valid AV:19 value:
   - ReferenceSP = (AV:19 + AV:35)
     - EffCoolOnSP = (ReferenceSP + absOffset)
     - EffCoolOffSP = (EffCoolOnSP – AV:10)
     - EffHeatOnSP = (ReferenceSP – absOffset)
     - EffHeatOffSP = (EffHeatOnSP + AV:10)

   With invalid AV:19 value (Analog Null):

   The Reference setpoint used in this calculation is shown for both Occupied and Standby modes:

   Occupied
   - ReferenceSP = (AV:1 – absOffset + AV:35)
     - EffCoolOnSP = (AV:1 + AV:35)
     - EffCoolOffSP = (EffCoolOnSP – AV:10)
     - EffHeatOnSP = (AV:4 + AV:35)
     - EffHeatOffSP = (EffHeatOnSP + AV:10)

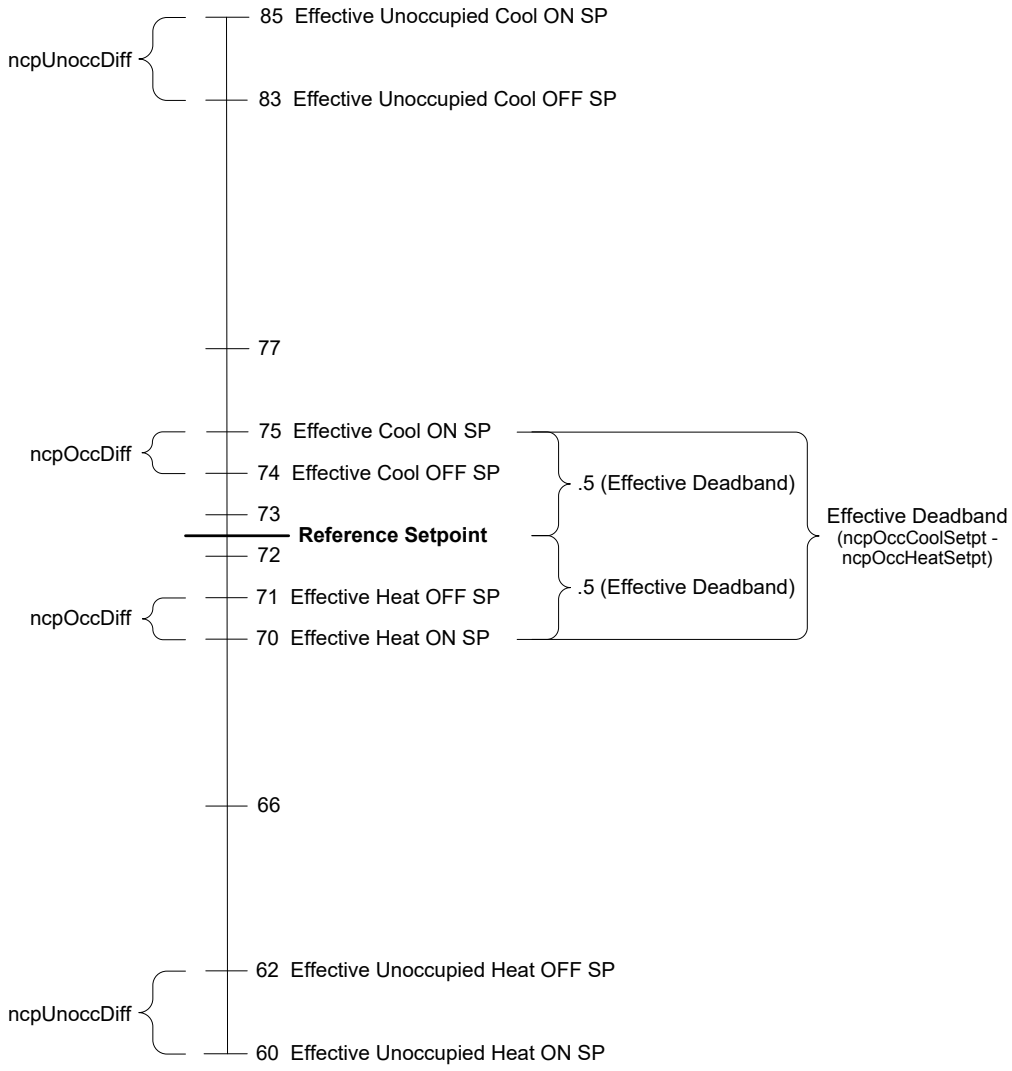
   Standby
   - ReferenceSP = (AV:2 – absOffset + AV:35)
     - EffCoolOnSP = (AV:2 + AV:35)
     - EffCoolOffSP = (EffCoolOnSP – AV:10)
     - EffHeatOnSP = (AV:5 + AV:35)
     - EffHeatOffSP = (EffHeatOnSP + AV:10)
3. **The unit is operating In Occupied or Standby mode with Long Range Local Setpoint Adjust selected.** The absolute offset used in this calculation is shown for both Occupied and Standby modes.

   Occupied
   absOffset = Setpoint – 0.5 (ncpOccCoolSetpt + ncpOccHeatSetpt)

   Standby
   absOffset = Setpoint – 0.5 (ncpStandbyCoolSetpt - ncpStandyHeatSetpt)
   - ReferenceSP = A:I5
     - EffCoolOnSP = (ReferenceSP + absOffset)
     - EffCoolOffSP = (EffCoolOnSP – AV:10)
     - EffHeatOnSP = (ReferenceSP – absOffset)
     - EffHeatOffSP = (EffHeatOnSP + AV:10)
4. **The unit is operating in Occupied mode with Short Range Local Setpoint Adjust selected and MSV:14=2.**
   - EffCoolOnSP = (AV:1 + AV:24 + AV:25)
   - EffCoolOffSP = (EffCoolOnSP – AV:10)
   - EffHeatOnSP = (AV:5 + AV:24 + AV:35)
   - EffHeatOffSP = (EffHeatOnSP + AV:10)
5. **The unit is operating in Standby mode with Short Range Local Setpoint Adjust selected.**
   - EffCoolOnSP = (AV:2 + AV:24 + AV:35)
   - EffCoolOffSP = (EffCoolOnSP – AV:10)
   - EffHeatOnSP = (AV:5 + AV:24 + AV:35)
   - EffHeatOffSP = (EffHeatOnSP + AV:10)

See MicroTech UV Controller OM 1280 (www.DaikinApplied.com) for parameter calculations referenced above.

Figure 1: Space Temperature Setpoint Operation



Network Analog Input Overrides

Table 14 shows the network analog inputs (AIs) that interact with local (i.e. unit controller) configuration parameters and override the local sensor inputs. The appropriate sensor must be installed for analog inputs to be viewable or configurable.

The local configuration parameter (cp_ai$_x$) is used to select the function for each input, if applicable. Each analog input also has a corresponding analog offset. Configurable analog inputs and corresponding output offset parameters can be accessed from the LUI keypad display and ServiceTools software with valid user level access.

Refer to ServiceTools OM 732 and MicroTech UV Controller OM 1280 to view and modify the complete list of all analog and binary IO configurable parameters (www.DaikinApplied.com).

Table 14: Analog Input Descriptions

Analog Input	Input Description	Paramater Offset[2]	Network Override	Configuration Parameter	Description[1]
ai4	hardwareSpaceTemp[2]	of_aiSpaceTemp	LocalSpaceTemp (AI:1)	N/A	Input provided by space temperature sensor. Configured using *cpSpaceTempSensInst* and tenant override
ai11	aiLWT	of_aiLWT	LWT (AI:2)	N/A	Input provided by leaving water temperature sensor. Configured using *cpLWTSensInst*
Virtual	aiEWT	of_aiEWT	EWT (AI:3)	N/A	Input provided by entering water temperature sensor
ai7	aiDAT	of_aiDAT	DischAirTemp (AI:4)	N/A	Input provided by return air temperature sensor
Virtual	aiIndoorCoilTemp	of_aiIndoorCoilTemp	CompSuctionTemp (AI:6)	N/A	Indicates the indoor air/DX coil temperature virtual analog input. Defaults to Null value of 32767
ai17	aiLineVoltage	of_aiLineVoltage	Brownout (AI:8)	N/A	Indicates the line voltage to the unit ventilator
ai9	aiOAT	of_aiOAT	OutdoorTemp (AI:9)	N/A	Input provided by outdoor air temperature sensor. Configured using *cpOATSensInst*
ai6	aiHumidityOutdoor	of_aiHumidityOutdoor	OutoorRH (AI:10)	N/A	Input provided by outdoor humidity sensor. Configured using *cpOutdoorHumSensInst*
ai5	aiHumidityIndoor	of_aiHumidityIndoor	IndoorRH (AI:11)	N/A	Input provided by indoor humidity sensor. Configured using *cpIndoorHumSensInst*
Virtual	aiCO2	of_aiCO2	SpaceCO2 (AI:12)	N/A	Input provided by CO2 sensor. Available when *CO2HumSensInst* has been configured

1. If an analog parameter is not configured for a sensor input, then it defaults to an invalid value of 32767.
2. The space temperature sensor includes a tenant override button. When the tenant override button is pressed and not active, the parameter *aiSpaceTemp* is used for control. When the unit is not in tenant override, space temperature control defaults to *hardwareSpaceTemp*, which must maintain its previous value for up to 30 sec.
3. Offsets are configurable from the LUI keypad display or ServiceTools software with valid user level access.

PI Control Algorithm

Three adjustable parameters are associated with each Proportional – Integral (PI) control loop: Proportional Gain (Kp), Integral Time (Ki), and Deadband (DB). When the unit is properly sized for the space, the default settings for these parameters provide the best control action for all the various operating conditions. The following section describes the terminology and calculations used to determine these parameters. In the event of a field issue, these parameters must be set back to the original default settings.

The PI control algorithm calculates the desired actuator output, and ranges from 0 to 100%.

Definitions

- **Process Variable (PV)**: Measured analog input reading.
- **Setpoint (SP)**: Desired target value.
- **Error**: Value is calculated one of two ways depending on the PI blocks fixed action type.
- **Direct Acting PI (Cooling)**: Error = PV – SP
- **Reverse Acting PI (Heating)**: Error = SP – PV
- **Sample Time (ST)**: Scan rate of the PI control blocks, which is an internally fixed value of five seconds.
- **Sum of Errors:** Summation of all past errors. To prevent integral wind-up, the integral error summation is suspended when PI output reaches 100%.
- **Proportional Gain (Kp)**: Or proportional action, causes the controlled output to change in proportion to the magnitude of the present error amount. Error is the difference between the sensors present value and the set point. When the Kp setting is too low, the process variable (PV) response will change too slowly. When the Kp setting is too high, the process variable response will excessively overshoot and possibly oscillate around the setpoint (SP). If faster system response is desired, increase the Kp setting. Make small, incremental adjustments to the proportional gain setting to avoid system instability.
- **Integral Gain (Ki)**: Or integral action, accumulates the error amounts and causes the controlled output to approach the setpoint over time in an attempt to eliminate any system offset. The higher the integral (Ki) setting, the more the integral effects the process under control. When the Ki setting is too high, the process variable (PV) oscillates around the setpoint. When the Ki setting is too low, the process variable does not reach the setpoint.

Output Formula

*Output % = (Kp * Error) + (Sum of Error * Ki)*

Unit Ventilator PI Control Blocks

Loop 1	Modulating Hydronic Heating Valve
Loop 2	Modulating Hydronic Cooling Valve
Loop 3	Economizer Discharge Air Temperature (DAT) Setpoint
Loop 4	Economizer Position

BACnet PICS - MicroTech Unit Ventilator Controller

This section contains the Protocol Implementation Conformance Statement (PICS) for the MicroTech UV controller as required by ANSI/ASHRAE Standard 135-2008, BACnet; A Data Communication Protocol for Building Automation and Control Networks.

Protocol Implementation Conformance Statement

Date:	November 1, 2018
Vendor Name:	Daikin Applied
Product Name:	MTUC_UV
Product Model Number:	UV
Application Software Version:	0.00.01
Bootloader Revision:	1.0
BACnet Protocol Revision:	Version 1 Revision 4

Product Description

The MicroTech UV controller application with on-board BACnet communication capability is a microprocessor designed to operate the unit ventilator and integrate it into a BACnet building automation system.

BACnet Standardized Device Profile

The MicroTech UV controller supports the BACnet Interoperability Building Blocks (BIBBS) included in the BACnet Advanced Application Controller (B-AAC) profile. The following section provides a complete listing of BIBBS.

- ☐ **BACnet Standardized Device Profile**
- ☐ **BACnet Operator Workstation (B-OWS)**
- ☐ **BACnet Building Controller (B-BC)**
- ☐ **BACnet Advanced Application Specific Controller (B-AAC)**
- ☒ **BACnet Application Specific Controller (B-ASC)**
- ☐ **BACnet Smart Sensor (B-SS)**
- ☐ **BACnet Smart Actuator (B-SA)**

BACnet Interoperability Building Blocks (BIBBS) Supported

BIBB Name	Designation
Data Sharing – Read Property – B	DS-RP-B
Data Sharing – Read Property Multiple – B	DS-RPM-B
Data Sharing – Write Property – B	DS-WP-B
Data Sharing – Write Property Multiple – B	DS-WPM-B
Data Sharing – COV – B (15 Maximum Objects Supported)	DS-COV-B
Device Management – Dynamic Device Binding – B	DM-DDB-B
Device Management – Dynamic Object Binding – B	DM-DOB-B
Device Management – Device Communication Control – B	DM-DCC-B
Device Management – Time Synchronization – B	DM-TS-B
Device Management – Reinitialize Device – B	DM-RD-B

Standard Object Types Supported

Object-Type	Creatable	Deleteable	Optional	Writeable
Analog Input	☐	☐		COV_Increment[1]
Analog Value	☐	☐	Priority_Array[2]	Present_Value COV_Increment[1] Relinquish_Default
Binary Value	☐	☐	Active_Text Description Inactive_Text Priority_Array[2]	Present_Value
Multi-state Input	☐	☐	State_Text	
Multi-state Value	☐	☐	State_Text Priority_Array[2]	Present_Value
Device	☐	☐	Description Location Max_Master	Description Location (Max 20 Characters) Max_Master

1. After changing COV_Increment, wait at least 20 minutes before cycling power. Otherwise, this change is not saved.
2. The MicroTech UV controller enables the command priority to be set by the device that is commanding the Present Value of the object. Only the highest priority command takes effect. When the higher priority command is relinquished, the next lower command then takes effect as defined by the Priority Array property type.

Data Link Layer Options

- ☐ BACnet IP, (Annex J)
- ☐ BACnet IP, (Annex J), Foreign Device
- ☒ MS/TP master (Clause 9), baud rate(s): 9600, 19200, 38400 & 76800
- ☐ MS/TP slave (Clause 9), baud rate(s): 9600, 19200, 38400 & 76800

Segmentation Capability

- ☐ Segmented requests supported Window Size: 1
- ☐ Segmented responses supported Window Size: 1

Device Address Binding

- ☐ Yes Static Device Binding
- ☒ No

Character Sets Supported

- ☒ ANSI X3.4
- ☐ IBM®/Microsoft® DBCS
- ☐ ISO 8859-1
- ☐ ISO 10646 (UCS-2)
- ☐ ISO 10646 (UCS-4)
- ☐ JIS C 6226

NOTE: Support for multiple character sets does not imply they can be supported simultaneously.

Daikin Applied Training and Development

Now that you have made an investment in modern, efficient Daikin equipment, its care should be a high priority. For training information on all Daikin HVAC products, please visit us at www.DaikinApplied.com and click on Training, or call 540-248-9646 and ask for the Training Department.

Warranty

All Daikin equipment is sold pursuant to its standard terms and conditions of sale, including Limited Product Warranty. Consult your local Daikin Applied representative for warranty details. To find your local Daikin Applied representative, go to www.DaikinApplied.com.

Aftermarket Services

To find your local parts office, visit www.DaikinApplied.com or call 800-37PARTS (800-377-2787). To find your local service office, visit www.DaikinApplied.com or call 800-432-1342.

This document contains the most current product information as of this printing. For the most up-to-date product information, please go to www.DaikinApplied.com.

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