# DAIKIN

## Network Integration Guide

# ED 19117-3

## MicroTech® 4 Rebel Applied™ Packaged Rooftop Unit Controller Protocol Information

### BACnet® MS/TP, IP Networks
### LᴏɴWᴏʀᴋs® Networks

LᴏɴMᴀʀᴋ®3.4

Member of
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International

## Description

This manual describes BAS network integration for the MicroTech® 4 Rebel Applied DPSA rooftop unit controller. It lists all BACnet® and LᴏɴWᴏʀᴋꜱ® variables available to the network.

Network communication parameters include setpoints, system status, monitoring, and alarm objects. BACnet object data applies to both BACnet MS/TP and BACnet IP protocol layers.

**NOTE:** Network setup and addressing is performed from the MicroTech 4 unit controller HMI keypad display. Once commissioned, the MicroTech 4 unit controller is ready for network communication and configuration.

A separate BAS communication module must be attached to the MicroTech 4 unit controller so that it can be configured for BACnet or LᴏɴWᴏʀᴋꜱ network integration. There are three communication modules: BACnet/IP, BACnet MS/TP (Master/Slave Token Passing), and LᴏɴWᴏʀᴋꜱ (configured for either Space Comfort Control (SCC) or Discharge Air Controller (DAC). The communication module may ship already installed on the controller or as a field-installed option.

It is assumed that the user is familiar with BACnet or LᴏɴWᴏʀᴋꜱ integration. Contact the Daikin Applied Controls Customer Support group at 866-462-7829 or Controls@daikinapplied.com for additional assistance, if necessary.

## Software Revision

This document supports the latest version of the standard MicroTech 4 unit controller application and all subsequent versions until otherwise indicated. However, if the unit software is of a later version, some of the information in this document may not completely describe the application.

The revision of the application software can be determined from the MicroTech 4 unit controller HMI under the 'About This AHU' menu. The software version can also be read from the Application_Software_Version property of the Device Object.

## Notice

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## Hazardous Information Messages

| ⚠ CAUTION |
|---|
| Cautions indicate potentially hazardous situations, which can result in personal injury, serious injury, death, or equipment damage if not avoided. |

| ⚠ WARNING |
|---|
| Warnings indicate potentially hazardous situations, which can result in property damage, severe personal injury, or death if not avoided. |

| ⚠ DANGER |
|---|
| Dangers indicate a hazardous electrical situation which will result in death or serious injury if not avoided. |

| ⚠ DANGER |
|---|
| Dangers indicate a hazardous gas situation which will result in death or serious injury if not avoided. |

| ⚠ NOTICE |
|---|
| Notices give important information concerning a process, procedure, special handling or equipment attributes. |

## Reference Documents

| Company | Number | Title | Source |
|---|---|---|---|
| Daikin Applied | OM 1288 | MicroTech 4 unit controller for Rebel Applied Rooftop Systems | www.DaikinApplied.com |
| | IM 916 | BACnet IP Communication Module Installation Manual for Applied Rooftop Systems with MicroTech 4 and MicroTech III Unit Controls | |
| | IM 917 | BACnet MS/TP Installation Manual for Applied Rooftop Systems with MicroTech 4 and MicroTech III Unit Controls | |
| | IM 918 | LᴏɴWᴏʀᴋꜱ Installation Manual for Applied Rooftop Systems with MicroTech 4 and MicroTech III Unit Controls | |
| American Society of Heating, Refrigeration, and Air-Conditioning Engineers | ANSI/ASHRAE 135-2014 | BACnet A Data Communication Protocol for Building Automation and Control Networks | www.ashrae.org |
| LonMark Interoperability Association | 078-0120-01G | LonMark® Layers 1-6 Interoperability Guidelines, Version 3.4 | www.lonmark.org |
| | 078-0120-01G | LonMark Application Layer Interoperability Guidelines, Version 3.4 | |
| | 8500_10 | LonMark Functional Profile: Space Comfort Controller, Version 1.0 | |
| | 8600_10 | LonMark Functional Profile: Discharge Air Controller, Version 1,0 | |
| Echelon Corporation | 078-0156-01G | LᴏɴWᴏʀᴋꜱ FTT-10A Free Topology Transceiver Users Guide | www.echelon.com |

## Revision History

| | | |
|---|---|---|
| ED 19117 | Jan 2020 | Initial release |
| ED 19117-1 | Apr 2022 | Added 8 new configurable I/O points to Table 17. Revised alarm enumerations for Warning, Problem and Fault alarm class ranges. Removed references to Filter Pressure 1-3 (AI:21-23) in Table 32. Added OffSnrCfg to Unit Status and CfgErr to Cooling Status. Fixed supply fan enumerations (MSV:11). Major revsions to Alarm Management section, clarified notification class and other descriptions (p.38), added BACnet objects /events to support R32 and refrigerant mgmt package. Added BACnet and LONWORKS points to support ECM fans and variable speed compressor units. |
| ED 19117-2 | Jun 2022 | Fixed range order and enumeration for MSV:11, which did not match what the controller sends. Also changed related points AV:7, AV:8, and AV:24 descriptions to match. |
| ED 19117-3 | Nov 2022 | Add UV Light Hours, BACnet AV:122. Also added new enumerations for MonitorPkgs, BACnet MSV:114 (RefSys,Pwr, Ref&Pwr, IAQ...) and MSV:108 mods, also updated controller app version in PICS. Updated Table 21 BACnet Unit Configuration options to match options supported in app version referenced in PICS. |

## Limited Warranty

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

## BACnet Agency Conformance

The MicroTech 4 unit controller supports the American National Standards Institute and American Society of Heating, Refrigeration and Air-Conditioning Engineers (ANSI/ASHRAE) standard 135-2014.

The MicroTech 4 unit 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 is found in Appendix A: Protocol Implementation Conformance Statement (PICS).

## BACnet Device Object

### Object Types

The MicroTech 4 unit 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 MicroTech 4 unit controller; each occurrence or instance has different properties and controls different unit variables or data points. Each instance is designated with a unique object identifier. Some properties can be adjusted from the network and others can only be interrogated (read-only properties).

See  BACnet Data Tables for all BACnet objects available to the network.

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

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⚠ **CAUTION**

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

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### Device Object Properties

The Device Object contains other informative properties as shown in Table 2.

### Device Object Identifier

The MicroTech 4 unit controller Device Object_Identifier uniquely specifies the unit within the network. The initial device object instance number is calculated depending on either the production code (IP) or the MAC Address (MS/TP). This number must be unique on the entire BACnet network. The device instance number can be changed via the keypad display.  Select Apply Changes under the BACnet MSTP or BACnet IP Set Up Menu for the change to take effect.

### Device Object_Name

Each device has a unique Object_Name by default. The Object_Name is MT4_AHU_#####. The ##### represents the Device Instance. If the Device Instance changes, and the "MT4_AHU_" portion of the Object_Name is retained, the Device Name is updated as well.

## Network Configuration

There are various parameters involved in setting up the MicroTech 4 unit controller. These parameters are set differently depending on which communication module is ordered and shipped with the unit. Table 1 describes the BACnet addressing parameters needed to establish communication between the unit controller and BACnet network.

See MicroTech 4 unit controller for Rebel Applied Rooftop Systems, OM 1288 (www.DaikinApplied.com) for additional details.

*Table 1: Communication Parameter Settings*

| Parameter Name | BACnet IP | BACnet MS/TP |
|---|---|---|
| **DHCP** | **On** | NA |
| Actual IP Address | DHCP Enabled | NA |
| Actual IP Subnet Mask | DHCP Enabled | NA |
| Actual Gateway Address | DHCP Enabled | NA |
| **Given IP Address[1]** | 127.0.0.1 | NA |
| **Given IP Subnet Mask[1]** | 255.255.255.0 | NA |
| **Given Gateway Address[1]** | 127.0.0.1 | NA |
| **UDP Port Number** | 47808 | NA |
| **MS/TP MAC Address[2]** | NA | 18 |
| **MS/TP Baud Rate** | NA | 38400 |
| **Device Instance Number** | Variable | Variable |
| Max APDU Length | 1476 | 480 |
| **Device Object Name** | MT4_AHU_#####[3] | MT4_AHU_#####[4] |
| **Receive Heartbeat** | NA | NA |
| **Max Master** | NA | 127 |
| **Max Info Frames** | NA | 1 |
| **Term Resistor** | NA | No[5] |

Note that the parameters in boldface can be changed using the MicroTech 4 unit controller HMI.

[1]These addresses are used if DHCP (Dynamic Host Configuration Property) is set to Off.  For changes to take effect, use the MicroTech 4 unit controller HMI and set Apply Changes on the BACnet IP Setup menu to Yes.  This causes the power on the MicroTech 4 unit controller to reset.

[2]The MS/TP MAC Address is set via the MicroTech 4 unit controller HMI. Set Apply Changes to Yes for changes to take effect.

[3]The last 6 digits are the last 6 digits of the MAC address.  The MAC address is a printed sticker affixed to the BACnet communication module.

[4]The last 8 digits are computed from the production number and date code.

[5]Term Resistor is only changeable via the MicroTech 4 unit controller HMI. This item can be set to Yes for the first and last unit on the MS/TP network. On all other units, this variable should be set to No (default).  *It is important to note that this is a software resistor, and resistance is lost when the controller is powered off.  For this reason, a physical resistor is recommended.*

### BACnet MS/TP

The BACnet MS/TP device address (Media Access Control [MAC] address) of the MicroTech 4 unit controller in a BACnet Master Slave/Token Passing (MS/TP) Local Area Network (LAN) is set using the MicroTech 4 unit controller HMI. Navigate to the BMS Communications\MSTP Set-Up menu to change this value. Set Apply MSTP Chgs to Yes in order for the new address to take effect. This causes the power on the MicroTech 4 unit controller to reset.

## BACnet IP

The BACnet/Internet Protocol (BACnet/IP) address consists of the four-octet Internet Protocol address followed by the two-octet UDP (User Datagram Protocol) port number. The BACnet/IP address is a six-octet value analogous to a MAC address. The IP address portion of the BACnet/IP address must be unique in the BACnet/IP network segment. The default UDP port number in the MicroTech 4 unit controller is 47808 (BAC0 in hexadecimal).

The device object contains a Given Internet Protocol Subnet Mask (Default is 255.255.255.0) and a default Given IP address of 127.0.0.1. The controller does support DHCP (Dynamic Host Configuration Protocol) IP addressing which is enabled by default.

The MicroTech 4 unit controller HMI is used to configure the BACnet/IP addressing.It displays the current IP address only when the network is connected.

*Table 2: MicroTech 4 Unit Controller Device Object Properties*

| Property | ID | Default Value | Data Type |
|---|---|---|---|
| Object Identifier | 75 | device | BACnetObjectIdentifier |
| Object Name | 77 | MT4_AHU_#####[1] (variable) | Character String |
| Object Type | 79 | 8 | BACnetObjectType |
| System Status | 112 | | BACnetDeviceStatus |
| Vendor Name | 121 | Daikin Applied | Character String |
| Vendor Identifier | 120 | 3 | Unsigned 16 |
| Model Name | 70 | MT4 AHU | Character String |
| Firmware Revision | 44 | variable | Character String |
| Application Software Version | 12 | variable | Character String |
| Location | 58 | | Character String |
| Description | 28 | AHU | Character String |
| Protocol Version | 98 | 1.14 | Unsigned |
| Protocol Services Supported | 97 | | BACnetServices Supported |
| Protocol Object Types Supported[2] | 96 | AI, AO, AV, BI, BO, BV, Cal, Device, MSI, MSO, MSV, NC, Alarm Mgmt, Trending, File, Event Enrollment, Calendar, DateTime Pattern Value | BACnetObjectTypes Supported |
| Object List | 76 | | Sequence of BACnetObject Identifer |
| Max APDU Length Accepted | 62 | 1476 (IP) / 480 (MS/TP) | Unsigned 16 |
| Segmentation Supported | 107 | none | BACnetSegmentation |
| Max Segments Accepted | 167 | 16 | Unsigned |
| Local Time[3] | 57 | variable | Time |
| Local Date[3] | 56 | variable | Date |
| UTC Offset | 119 | -60 (Range: –780 .. 780) | Integer |
| Daylight Savings Status | 24 | variable | Boolean |
| APDU Segment Timeout | 10 | 2000 | Unsigned |
| APDU Timeout | 11 | 6000 | Unsigned |
| Number of APDU Retries | 73 | 3 | Unsigned |
| Device Address Binding | 30 | | Sequence of BACnet AddressBinding |
| Database Revision | 115 | 1 | Unsigned |
| Active COV Subscriptions | 152 | | List of BACnetCOV Subscriptions |

[1]For BACnet IP, the last 6 digits are the last 6 digits of the MAC address. The MAC address is printed on a sticker affixed to the BACnet communication module. For BACnet MS/TP, the last 8 digits are computed from the production number printed on the bar code label affixed to the side of the BACnet communication module.

[2]While the MicroTech 4 unit controller supports the entire set of object types, not all object types are used.

[3]The BACnet communication module and the MicroTech 4 unit controller both have their own time clocks. The date and time read via BACnet could differ from the date and time in the MicroTech 4 unit controller the date or time is changed via the keypad display. The two time clocks re-synchronize approximately every 60-68 minutes and after every power cycle of the controller or BACnet communication module.

## LonMark Certification

LonMark certification is an official acknowledgement by the LonMark Interoperability Association that a product communicates using the LonTalk protocol and transmits and receives data per a standard LonMark functional profile. The LONWORKS communication module conforms to the LonMark Discharge Air Controller functional profile_8610 and is LonMark 3.4 certified. Refer to www.lonmark.org for certification conformance information.

## LonMark Files

The LONWORKS communication module software translates the LonMark Standard Network Variable Types (SNVTs) and Standard Configuration Property Types (SCPTs) in accordance with the LonMark profiles used on the LONWORKS network into the variables and parameters used in the unit controller. These include both resource and device file types.

### Device Files

The Device External Interface File (a specially formatted PC text file with an extension (.XIF) is the primary device file type. The XIF and other device files are required for displaying the standard network variables (SNVTs) and configuration properties (SCPTs).

## Resource Files

Resource files are custom (user-specific) functional profiles, network variables types (UNVTs), configuration property types (UCPTs), and enumerations. Resource files are required for displaying these UNVT and UCPTs that are not included in the standard device profile. They are available on www.DaikinApplied.com and www.lonmark.org.

### External Interface File (XIF)

LonMark guidelines specify exact documentation rules so that proprietary software is not required to commission and configure Lonworks devices. The MicroTech 4 LONWORKS Communication Module is self-documenting so that a LONWORKS network management tool can obtain the information needed to connect, configure, and manage the device over the network.

An External Interface File (a specially formatted PC text file with an extension .XIF) is also available so that any network tool can design and configure it prior to installation.

The device XIF and resource files must be downloaded and mapped for network configuration. See www.DaikinApplied.com and www.lonmark.org.

## Neuron ID

The basis of the LONWORKS communication module is an Echelon Neuron integrated circuit (Neuron chip). Every Neuron chip has a unique 48-bit Neuron ID or physical address. The Neuron ID can be used to address the device on the LONWORKS network. The Neuron ID is generally used only during initial installation or for diagnostic purposes. For normal network operation, a device address is used.

## Network Addressing

The LONWORKS communication module conforms to the LonMark standard for device addressing, which is defined at the time of network configuration. Device addresses have three parts:

1. The Domain ID - designates the domain. Devices must be in the same domain in order to communicate with each other.

2. The Subnet ID - specifies a collection of up to 127 devices that are on a single channel or a set of channels connected by repeaters. There may be up to 255 subnets in a domain.

3. The Node ID - identifies an individual device within the subnet.

## LONWORKS Commissioning

Pressing the service pin on the LONWORKS Communication Module generates a service pin message, which contains the Neuron ID and the program code identification of the node. A service pin message is a network message that is generated by a node and broadcast on the network. It can be used to commission the LONWORKS network.  A network configuration tool maps device Neuron IDs to the domain/subnet/node logical addressing scheme when it creates the network image, the logical network addresses and connection information for all devices (nodes) on the network.

## Receive Heartbeat

The integrity of some data depends on a valid network connection to maintain current values. Receive Heartbeat variables require a valid network connection if bound. If these variables do not change after a given time, the MicroTech 4 unit controller reverts to local control, and the variables will revert to their default values. The heartbeat time is set via the unit controller HMI or via the network. The heartbeat time can be overridden by setting the Receive Heartbeat time = 0. However, in doing so, the corresponding controller variable remains at the last valid value upon loss of communication. The list of Receive Heartbeat variables and descriptions can be found in Table 30.

## Network Configuration

As a general rule, the communication module does not require configuration unless advised by the network integrator. The unit controller, along with the communication module, is ready to operate with the default parameter values in the unit controller.

However, be aware that *Receive Heartbeat, Max Send Time,* and *Min Send Time* are typical parameters that may need to be changed for your network. They should be modified on an as-needed basis. Maintain default values if possible.

## Verifying Network Addressing (Wink)

A Wink command is initiated by the BAS or through the LonWorks commissioning software. The Wink function allows verification of an individual unit network address without opening the unit access panel.

**NOTE:** The Wink command is allowed during all operating modes unless a Shutdown alarm is present.

When the network issues a Wink command, unit controller performs a sequence of steps as described in the MicroTech 4 Unit Controller OM 1288.

# BACnet Network Objects

This section describes the MicroTech 4 unit controller network parameters. The BACnet object types include: multistate variables (MSV), analog value (AV), analog input (AI), binary input (BI) and notification class (NC) object types. In addition to the general data tables, a select group of network points are available for optional monitoring and unit configuration options:

All BACnet parameters available to the BAS remain at the last valid value upon loss of communication. If the network input value is invalid, the controller reverts to a default value. In the case of network sensor inputs, the controller reverts to the corresponding local sensor input. Refer to MicroTech 4 Unit Controller OM 1288 for the HMI menu display structure. The HMI is used to set BACnet addressing parameters to establish network communication.

**NOTE:** From the BACnet network, all MSV object types that are also unit configuration string code string items will read with an additional number or letter in parenthesis "(#)" at the end of the State_Text description. This additional (#) is used as a reference to the item location in the code string. Be aware that this information does not appear in the MSVs in either Table 20: Unit Configuration or other data tables in this document. As an example, MSV:101 shows "2=OnOffT" vs "OnOffT(1)" when read from BACnet.

*Table 3: Unit Status*

| Point Name | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Unit State | UnitState | MSV:15 | R | 1=Off<br>2=Start<br>3=Recirc<br>4=FanOnly<br>5=MinDAT<br>6=Htg<br>7=Econo<br>8=Clg | NA | The current operating mode of the unit. |
| Unit Status | DaikinStatus | MSV:1 | R | 1=Enable<br>2=OffMan<br>3=OffManCtrl<br>4=OffNet<br>5=OffAlm<br>6=OffRetry<br>7=OffPassVnt<br>8=OffSnsrCfg | NA | Indicates whether or not the unit is enabled to operate. If the unit status is not enabled, the unit remains in an Off operating state. Does not apply when Control Type = RefOnly.<br><br>1 = Enable (Unit is in operation. Conditions #2-8 are not active)<br>2 = OffMan (Control Mode = Off)<br>3 = OffManCtrl (Manual Control = On)<br>4 = OffNet (Control Mode = Auto and NetApplicMode = Off)<br>5 = OffAlm (Fault alarm is active)<br>6 = OffRetry (Fan Retry is active)<br>7 = OffPassVnt (Optional passive ventilation functionality is active, forcing the unit to an Off state. Also see MSV:17)<br>8 = OffSnsrCfg (Forces the unit to an Off state during space temperature sensor configuration or power-up. This allows the sensor enough time to configure so that it can provide reliable data to the Unit controller. Applies when space temperature is used for the control temperature source.) |
| Cooling Status | ClgStatus | MSV:2 | R | 1=Enabled<br>2=None<br>3=OffAmb<br>4=OffAlm<br>5=OffNet<br>6=OffMan<br>7=NA<br>8=CfgErr* | NA | Indicates if cooling is currently enabled. If not, the reason is displayed.<br><br>*ClgErr = cooling is disabled due to an incorrect unit configuration. |
| Primary Cool Enable | CoolEnable | AV:36 | W | -1=Null<br>0=Off (Disabled)<br>1= Enable | -1 (Null) | Allows primary cooling to be enabled or disabled by the network when Cooling Status is set to Enabled. Applies only when Ctrl Mode = Auto. CoolEnablePct reflects the percentage of cooling capacity in an enabled state.<br><br>• If CoolEnable = 0, then the primary cooling is disabled by the network and ClgStatus is set to OffNet.<br>• If CoolEnable is = -1 (null), it is not being controlled by the network.<br>• If CoolEnable = 1 and CoolEnablePct is greater than 0, the primary cooling is enabled by the network and takes precedent over local enable/disable configuration.<br>• If CoolEnable = 1 and CoolEnablePct = 0, primary cooling is disabled and ClgStatus is set to OffNet. |
| | CoolEnablePct | AV:37 | W | 0-100% | 100% | |
| Economizer Status | EconoStatus | MSV:3 | R | 1=Enabled<br>2=None<br>3=OffAmb<br>4=OffAlm<br>5=OffNet<br>6=OffMan<br>7=OffDehum | NA | Indicates if the economizer is currently enabled. If the economizer is disabled, the reason is indicated. |

## Table 3: Unit Status, Continued

| Point Name | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Economizer Enable | EconEnable | AV:34 | W | -1=Null 0=Off (Disabled) 1= Enable | -1 (Null) | Allows economizer cooling to be enabled or disabled by the network when Economizer Status is set to Enabled. Applies if the unit is configured for modulating economizer and when Ctrl Mode = Auto. |
| | EconEnablePct | AV:35 | W | 0-100% | 100% | • If EconEnable = 0, then the economizer is disabled by the network and EconoStatus is set to OffNet.<br>• If EconEnable = -1 (null), it is not being limited by the network.<br>• If EconEnable = 1 and EconEnablePct is greater than 0, the economizer is enabled to a maximum EconEnablePct by the network and takes precedent over local enable/disable configuration.<br>• If EconoEnable = 1 and EconolEnablePct = 0, economizing is disabled and EconoStatus is set to OffNet.<br>Economizer operation is disabled locally when the unit is in dehumidification, regardless of the network Economizer Enable settings. |
| Primary Heating Status | Primary HtgStatus | MSV:4 | R | 1=Enabled 2=None 3=OffAmb 4=OffAlm 5=OffNet 6=OffMan 7=OffDehum 8=NA | NA | Indicates if the primary (standard) heating source is enabled. If not, the reason is indicated. |
| Secondary Heating Status | Secondary HtgStatus | MSV:27 | R | 1=Enabled 2=None 3=OffAmb 4=OffAlm 5=OffNet 6=OffMan | NA | Indicates if the standard heating source is currently enabled for heat pump units. If heating is disabled, the reason is indicated. |
| Primary Heat Enable | HeatEnable | AV:38 | W | -1=Null 0=Off (Disabled) 1= Enable | -1 (Null) | Allows primary heating to be enabled or disabled by the network when Heating Status is set to Enabled. Applies only if 1) the unit is configured for heating and 2) when Ctrl Mode = Auto. |
| | HeatEnablePct | AV:39 | W | 0-100% | 100% | • If HeatEnable = 0, then the primary heating is disabled by the network and heating status is set to OffNet.<br>• If HeatEnable = -1 (null), it is not being controlled by the network.<br>• If HeatEnable = 1 and HeatEnablePct is greater than 0, the primary heating is enabled to a maximum of HeatEnablePct by the network and takes precedent over local enable/disable configuration.<br>• If HeatEnable = 1 and HeatEnablePct = 0, primary heating is disabled and HeatingStatus is set to OffNet. |
| Application Mode | ApplicCmd | MSV:5 | W | 1=Off 2=HeatOnly 3=CoolOnly 4=FanOnly 5=Auto 6=NA | 6=NA | Sets the unit in an application mode. While it does not "force" the unit into any state, it does disable certain unit operations. For example, an Application Mode of "Cool Only" disables heating, "Heat Only" disables cooling, and "Fan Only" disables heating and cooling.<br><br>Application Mode has no affect unless Control Mode is set to Auto (Ctrl Mode = Auto). Control Mode is only set at the Unit controller HMI. |
| Emergency Override | EmergOverride | MSV:10 | W | 1=Normal 2=Off | 1=Normal | Shuts off the Unit controller. If it is set to Off, the Unit controller cannot start based on a time clock or any other means. Doing so also shuts off a network signal and puts Unit Status = OffNet. The only way to start the Unit controller is to change the value to Normal. |
| BACnet Units of Measurement | UnitSupport | MSV:16 | W | 1=Metric 2=English | 2=English | Sets the type of units (English or Metric) that are passed from the Unit controller to the BACnet network. |
| Unit Local/Network Control | AHULoc/Net | MSV:19 | R | 1=Network 2=Local | 1=Network | Indicates if the Unit controller is set to use local or network inputs. AHU Loc/Net can only be changed from the unit controller HMI (applicable parameters in this table denoted with a "1"). It must be set to Network (1) for most of the writeable network properties to apply. |
| Remote Setpoint Source | RemSptSrc | MSV:25 | W | 1=None 2=AI 3=QMX1* 4=QMX2* 5=QMX3* <br>*See Description | 1=None | Allows setting occupied setpoints via a remote input from an optional remote mounted space temperature sensor. When RemSptSrc is set to None, the occupied cooling setpoint (OccClgSpt) and the occupied heating setpoint (OccHtgSpt) are configurable from both the Unit controller HMI and the network. Note that occupied heating/cooling setpoint values change with the last valid value set from either the network or Unit controller.<br>*States 3-5 are only available when configured for 1, 2 or 3 QMX[1] space sensors. |
| Dehumidification Status | DehumStatus | MSV:21 | R | 1=Inactive 2=Active | NA | Indicates if the dehumidification operation is currently active. |

### Table 3: Unit Status, Continued

| Point Name | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Network Demand Shed Enable | DemandShed | MSV:22 | W | 1=Inactive 2=Auto 3=Manual | NA | Enables the demand shed functionality. For this feature to be active, 1) the DemandShed object in the HtgClg ChgOvr Set-Up HMI menu must be set to Enable, and 2) Network Demand Shed Enable must be set to Auto or Manual. |
| Morning Warmup Status | MWUStatus | MSV:23 | R | 1=Inactive 2=Active | NA | Indicates if morning warmup is currently active. |
| Free Cooling Status | FreeClgStatus | MSV:24 | R | 1=Unavail 2=Avail | NA | Indicates if free cooling is currently available. |
| Outdoor Air Damper Position | EconCapacity | AV:16 | R | 0-100% | NA | The current percentage of economizer capacity or outdoor air damper position. |
| Filter Pressure Input | FilterPress1 FilterPress2 FilterPress3 | AI:21 AI:22 AI:23 | R | 0.0 -5.02 in 0.0-1250 Pa | NA | Filter pressure input. Used to generate a filter pressure alarm when the setpoint value has been exceeded. See Alarm Management section for more information. |
| VAV Box Output Status | VAVBoxOutput | MSV:14 | R | 1=Heat 2=Cool | 1=Heat | The VAV box output is provided for interlocking field VAV operation with the unit heating or cooling. In most cases: Heat = Unit is in any heating state, Start, or Recirc. Cool = Unit is in any other state. Applies only to units configured with supply fan VFDs. |

[1]A QMX room sensor(s) is installed on the process bus and wired directly to the unit controller.

### Table 4: Occupancy

| Point Name | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Occupancy Status | EffectOccup | MSV:6 | R | 1=Occ 2=Unocc 3=TntOvrd | NA | Indicates if the unit is currently in an occupied, unoccupied, or tenant override mode of operation. |
| Occupancy Mode (Network) | OccManCmd | MSV:7 | W | 1=Occ 2=Unocc 3=TntOvrd 4=Standby 5=Auto | 5=Auto | Sets the unit into a different occupancy mode. The request is typically sent by a wall-mounted occupant-interface module or a supervisory device used to manually control occupancy modes or to override the scheduled occupancy. Note that OccManCmd is used only as an override. Also see Current State, MSV:8. |
| Current State | CurrentState | MSV:8 | W | 1=Occ 2=Unocc 3=TntOvrd 4=Standby 5=NA | 5=NA | Commands the occupancy function of the MicroTech 4 unit controller when Occupancy Mode is set to Auto. A scheduler or a supervisory node typically sends the request. Note that Current State is generally used for daily Occupancy (Occ/Unocc) commands. It is active only when OccManCmd, MSV:7 = Auto. |
| Next State | NextState | MSV:9 | W | 1=Occ 2=Unocc 3=TntOvrd 4=Standby 5=NA | 5=NA | Commands the occupancy function of the MicroTech 4 unit controller when Occupancy Mode is set to Auto. A scheduler or a supervisory node typically sends the request. Next State and TimeToNextState, AV:3 are used only when implementing "Optimal Start" functionality. |
| Time to Next State | TimeToNextState | AV:3 | W | 0-65535 | 65535 (Null) | Network input that determines the occupancy scheduler time from one state to the next (occupied, unoccupied, standby, auto). TimeToNextState and NextState, MSV:9 are used only when implementing "Optimal Start" functionality. |
| Maximum Purge Time | MaxPurgeTime | AV:53 | W | 0-300 Min | 0 Min | Enables purge operation prior to any scheduled start by the amount of time defined by the maximum purge time. Purge operation is disabled if maximum purge time is set to zero. |

### Table 5: Temperatures/Control Setpoints

| Point Name | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Effective Space Temperature | EffSpaceTemp | AI:3 | R | 0-150°F -17.8-65.6°C | NA | Reflects the space temperature input from a local sensor(s) if installed and configured properly. The space temperature input may be provided by up to three Modbus sensors. Space temperature may also be provided by a network input (SpaceTempInput, AV:3) if value is present and valid Otherwise, effective space temperature defaults to an invalid value (327.67°C/621.806°F). The LONWORKS variable, nviSpaceTemp, takes precedence over BACnetSpaceT in the event that both are present. |

### *Table 5: Temperatures/Control Setpoints, Continued*

| Point Name | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Space Temperature Input[1] | SpaceTempInput | AV:31 | W | -83.2-621.8°F -64-327.7°C | 621.8°F 327.7°C | The current space or zone temperature network value. If this network value becomes unreliable, the temperature reverts to the local space temperature sensor value.[1] |
| Space Temperature Sensor 1 | SpaceTemp1 | AI:4 | R | 0-150°F -17.8-65.6°C | NA | The current space or zone temperature. Applies only if the unit is configured for one or more locally installed and wired sensors. If the optional space temperature sensor is not installed, set SpaceTCfg = None from the MicroTech 4 unit controller Unit Configuration display menu. This disables the alarm function associated with an open circuit at the space temperature sensor input. See Alarm Management section for alarm enumerations. |
| Space Temperature Sensor 2 | SpaceTemp2 | AI:5 | | | | |
| Space Temperature Sensor 3 | SpaceTemp3 | AI:6 | | | | |
| Return Air Temperature Sensor | RATemp | AI:2 | R | -20-200°F -28.9-93.3°C | NA | The current reading from the unit return air temperature sensor. An alarm is generated depending on sensor reliability or when acceptable operating limits are exceeded. See Alarm Management section for alarm enumerations. |
| Control Temp Source | CtrlTempSrc | MSV:20 | W | 1=RAT 2=Space 3=OAT 4=None | 1=RAT | Selects the temperature sensor input to be used for the unit heating/cooling changeover or zone cooling and heating capacity change decisions. For example, if CtrlTempSrc is set to "Return Air Temperature (RAT)," then the Control Temp parameter reads the same value as the Return Air parameter. When CtrlTempSrc is set to "None" during regular occupied operation, the unit uses the discharge air temperature (DAT) sensor to heat or cool to the cooling DAT setpoint. 1=RAT (Not available on 100% outdoor air temperature (OAT) units) 2=Space 3=OAT (Available on ControlType=DAT only) 4=None (Available on ControlType=DAT only) |
| Control Temperature | ControlTemp | AI:14 | R | -461-525°F -274-274.2°C | NA | The current control temperature sensor reading. The control temperature sensor is selected with Control Temp Source (CtrlTempScr, MSV:20). |
| Effective Outdoor Air Temperature | OutdoorTemp | AI:8 | R | -50-200°F -45.6-93.3°C | NA | The current value of a unit-mounted outdoor air temperature sensor. Effective outdoor temperature reflects the BACnetOAT value with valid configuration. EffOAT reflects the local outdoor air temperature if neither a valid nviOutdoorTemp or BACnetOAT value is present. See Alarm Management section for alarm enumerations. Note that the LONWORKS variable, nviOutdoorTemp , takes precedence over BACnetOAT in the event that both are present and valid. |
| Outdoor Air Temperature | LocalOATemp | AV:5 | R | -83-147°F -64-64°C | NA | Current value of the outdoor air sensor attached to the unit. Used to display this value in the event the BAS is overriding the local sensor. |
| Outdoor Air Temperature Input | OutdoorTempInput | AV:32 | W | -83-622°F -64-327.7°C | 622°F 327.7°C | The current outdoor air temperature input supplied by the network. If this network value becomes unreliable, the temperature reverts to the local outdoor temperature sensor value.[1] |
| Effective Discharge Air Temperature Setpoint | EffDATempSP | AV:26 | R | -83-147°F -64-64°C | NA | Reflects the Effective Heating Discharge Temperature Setpoint if the unit is in the heating state. If not, it reflects the Discharge Air Cooling Setpoint when the unit is in any other operating state. |
| Discharge Air Temperature Sensor | DischAirTemp | AI:1 | R | -50-250°F -45.6-121.1°C | NA | The current reading of the unit discharge air temperature sensor. Up to 3 alarms are generated depending on sensor reliability or when acceptable operating limits are exceeded. Also see BACnet Alarms and Events for alarm enumerations. |
| Entering Fan/Leaving Coil Temperature Sensor | EFT_LCT | AI:7 | R | -50-200°F -45.6-93.3°C | NA | The current value of the unit entering fan/leaving coil air temperature sensor. Applies only to units configured for this type of sensor. See Alarm Management section for alarm enumerations. |
| Discharge Line Refrigerant Temperature Circuit 1 | C1DischLnTemp1 | AI:50 | R | -83-392°F -64-200°C | NA | The inverter compressor circuit 1 discharge line refrigerant temperature sensor value. Applies only to units configured for variable compressors or units with an optional refrigerant system monitoring package. See Alarm Management section for alarm enumerations. |
| | C1DischLnTemp3 | AI:69 | | | | |
| | C1DischLnTemp5 | AI:70 | | | | |
| Discharge Line Refrigerant Temperature Circuit 2 | C2DischLnTemp2 | AI:60 | R | -83-392°F -64-200°C | NA | The inverter compressor circuit 2 discharge line refrigerant temperature sensor value. Applies only to units configured for variable compressors or units with an optional refrigerant system monitoring package. See Alarm Management section for alarm enumerations. |
| | C2DischLnTemp4 | AI:71 | | | | |
| | C2DischLnTemp6 | AI:72 | | | | |

### Table 5: Temperatures/Control Setpoints, Continued

| Point Name | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Liquid Line Refrigerant Temperature Circuit 1 | C1RefLiqLnTemp | AI:54 | R | -83-212°F -64-100°C | NA | The unit inverter compressor circuit 1 or 2 liquid line refrigerant temperature sensor value. Applies only to units configured for variable compressors or units with an optional refrigerant system monitoring package. See Alarm Management section for alarm enumerations. |
| Liquid Line Refrigerant Temperature Circuit 2 | C2RefLiqLnTemp | AI:64 | | | | |
| Variable Compressor 1 Temperature | VCmp1Temp | AI:55 | R | -83-392°F -64-200°C | NA | The refrigerant temperature sensor value for variable compressor 1 or 2. See Alarm Management section for alarm enumerations. |
| Variable Compressor 2 Temperature | VCmp2Temp | AI:65 | | | | |
| Fixed Compressor 1 Temperature | FCmp1Temp | AI:56 | R | -83-392°F -64-200°C | NA | The refrigerant temperature sensor value for fixed compressors 1-6. See Alarm Management section for alarm enumerations. |
| Fixed Compressor 2 Temperature | FCmp2Temp | AI:66 | | | | |
| Fixed Compressor 3 Temperature | FCmp3Temp | AI:57 | | | | |
| Fixed Compressor 4 Temperature | FCmp4Temp | AI:67 | | | | |
| Fixed Compressor 5 Temperature | FCmp5Temp | AI:58 | | | | |
| Fixed Compressor 6 Temperature | FCmp6Temp | AI:68 | | | | |

[1] AHU Loc/Net must be set to Network (1) for this property to apply. AHU Loc/Net can only be changed from the MicroTech 4 unit controller HMI.

### Table 6: Supply Air Fan

| Point Name | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Supply Air Fan Type[1] | SAFType | MSV:104 | R | 1=Anlg 2=1M 3=2M 4=3M 5=4M 6=6M 7=8M 8=9M 9=SAFVFD 10=8M4S 11=8M8S | 2=1M | Indicates the supply air fan type for the unit. Normally each supply air fan is controlled using one ECM motor for each fan but additional configurations are supported as indicated below. Each motor is designated as either a "master" or "slave" motor. Each master motor is controlled via a Modbus interface. 1=Anlg (Locally-supplied analog input to the unit controller) 2=1M (1 ECM fan motor master) 3=2M (2 ECM fan motor masters) 4=3M (3 ECM fan motor masters) 5=4M (4 ECM fan motor masters) 6=6M (6 ECM fan motor masters) 7=8M (8 ECM fan motor masters) 8=9M (9 ECM fan motor masters) 9=SAFVFD (Supply air fan with VFD Modbus) 10=8M4S (8 ECM fan motor masters and 4 fan motor slaves) 11=8M8S (8 ECM fan motor masters and 8 fan motor slaves) |
| Supply Air Fan 1-9 Status | SAF1Status SAF2Status SAF3Status SAF4Status SAF5Status SAF6Status SAF7Status SAF8Status SAF9Status | MSV:28 MSV:29 MSV:30 MSV:31 MSV:32 MSV:33 MSV:34 MSV:35 MSV:36 | R | 1=OK 2=HLL 3=TFEI 4=TFM 5=TFE 6=BLK 7=SKF 8=PHA 9=UzLow 10=UzHigh 11=UeLow 12=UeHigh | NA | Indicates the status of the 1-9 ECM supply air fans. 1=OK (No Error) - fan operating normally 2=HLL (Hall Sensor Error) - possible external voltage spikes or hardware problem with the fan 3=TFEI (Electronics Interior Overheated) - operating temperature for EC fan control components has been exceeded, or a hardware problem with the fan 4=TFM (Motor Overheated) operating conditions for fan motor is outside of the expected temperature range, fan load has been exceeded, or a hardware problem with the fan 5=TFE (Power Mod Overheated) - operating conditions for module have exceeded the design temperature, input power supply is over/under voltage or fan overload 6=BLK (Locked Motor) - fan motor may be blocked due to counter flow, dirt, ice, or other impurity 7=SKF (Communication Error) - possible voltage spikes or a hardware problem of the fan 8=PHA (Phase Failure) 9=UzLow (DC Link Undervoltage) 10=UzHigh (DC Link Overvoltage) 11=UeLow (Main Undervoltage) 12=UeHigh (Main Overvoltage) Items 8-12 could occur for several reasons such as DC or main voltage parameter values not within the specified range, fan power supply may be insufficient or experiencing signal disturbances, or a hardware problem with the fan. |

*Table 6: Supply Air Fan, Continued*

| Point Name | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Supply Fan Capacity Control | SupFanCtrl | MSV:11 | W | 1= DSP 2= Spd/Net 3= 1ZnVAV 4= BSP 5=CO2 6=Flow 7= CAV | 7=CAV | Supply fan control options are described as follows:<br><br>1=DSP (Duct Static Pressure. The supply fan modulates to maintain the duct static pressure at the duct static pressure setpoint, SAFDSPSpt. Does not apply when the Ctrl Type is configured for 1ZnVAV).<br>2=Spd/Net (The supply fan modulates to maintain a speed command provided by the MicroTech 4 unit controller HMI or network command).<br>3=1ZnVAV (Single Zone VAV. The supply fan modulates to maintain the control temperature at the Occupied Cooling Setpoint (OccClgSpt) or the Occupied Heating Setpoint (OccHtgSpt) when the unit is running. Only applies when Ctrl Type is configured for 1ZnVAV).<br>4=BSP (Building Static Pressure. The supply fan modulates to maintain the BSP setpoint (BSPSpt). Available when the unit is running and configured for damper type 100OA. Does not apply when Ctrl Type is configured for 1ZnVAV).<br>5=$CO_2$ (The supply fan modulates based on the $CO_2$ level between allowable range. Available when the unit is running and configured for damper type 100OA (100% outdoor air). Does not apply when the Ctrl Type is configured for 1ZnVAV).<br>6=Flow (The supply fan modulates to maintain the supply airflow setpoint (SAFlowSpt). Available when the unit is running and configured for damper type 100OA. Does not apply when Ctrl Type is configured for 1ZnVAV).<br>7=CAV (Constant Air Volume. Unit controls to a constant effective maximum supply fan (SAF) capacity, EffMaxSAFCap. Does not apply when the Ctrl Type is configured for single zone VAV (1ZnVAV)). |
| Supply Fan Duct Static Pressure Setpoint (DSP) | SAFDSPSpt | AV:7 | W | 0.2-4 in | 1 in | Supply fan is modulated to maintain the DSP at this setpoint when SupFanCtrl is set to DSP=1. Only applies to units configured with a supply fan DSP sensor. |
| Supply Fan Building Static Pressure (BSP) Setpoint | SAFBSPSpt | AV:8 | W | -0.25-0.25 in -62.2-62.2 Pa | 0.05 in 12.4 Pa | Supply fan is modulated to maintain the BSP at this setpoint when SupFanCtrl is set to BSP=4. Only applies to units configured with a supply fan BSP sensor. |
| Supply Fan Capacity Input | SupFanCapNetIn | AV:24 | W | 0-164% | 164% | Sets the supply fan VFD speed when the SupFanCtrl is set to Spd/Net=4. It uses maximum and minimum limits, so if the Present Value is set beyond these limits from the network, the value is ignored and the MicroTech 4 unit controller continues to control to the last valid value. |
| Effective Supply Fan Capacity | SAFCap | AI:10 | R | 0-100% | NA | The effective supply air fan capacity reflects input from unit supply fan motor drives. The SAFCap value depends on the type and number of supply fan motors currently operating. |
| Supply Fan Duct Static Pressure | SAFDSP | AI:19 | R | 0.0-5.02 in 0-1250 Pa | NA | Reflects the current supply fan duct static pressure. Applies to units configured with a supply fan DSP sensor. |
| Duct Static Pressure Sensor[5] | StaticPSens | MSV:112 | R | 1=NA:NA 2=DSP:NA 3=DSP:DSP 4=DSP:BSP 5=BSP:NA 6=NA:DSP 7=NA:BSP | 1=NA | Indicates if a static pressure sensor is installed. Sensor configuration types are described below:<br><br>1=NA (Not available on supply or return/exhaust fan static pressure sensor input)<br>2=DSP:NA (Duct static pressure (DSP) sensor on the supply fan input, no sensor on the return/exhaust fan input)<br>3=DSP:DSP (DSP sensor is present on the supply and return/exhaust fan inputs)<br>4=DSP:BSP (DSP sensor on the supply fan input, Building Static Pressure (BSP) sensor is present on the return/exhaust fan input)<br>5=BSP:NA (BSP sensor on the supply fan input, no sensor on the return/exhaust fan input)<br>6=NA:DSP (No sensor on the supply fan input, DSP sensor on the return/exhaust fan input)<br>7=NA:BSP (No sensor on the supply fan input, BSP sensor on the return/exhaust fan input) |
| Supply Fan Airflow | SAFFlow | AI:29 | R | 0-60000 cfm | NA | Displays the current supply airflow value. Parameter is available for monitoring purposes when an outdoor air unit is configured with an outdoor airflow measuring station. |

## Table 6: Supply Air Fan, Continued

| Point Name | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Supply Fan Flow Setpoint | SAFFlowSpt | AV:56 | W | 0-6000 cfm | 2000 cfm | Sets the supply fan so it can modulate airflow to maintain this setpoint. Applies when the SAF Capacity Control (SupFanCtrl) is set to Flow, the Damper Type is either 300A or Econ or Econ_FDD, and Supply Fan Flow Input (SAFFlowInput) is not None. |
| Supply Fan Flow Input[1] | SAFFlowInput | MSV:110 | R | 1=None 2=1Fan 3=2Fan 4=3Fan 5=4Fan 6=6Fan 7=8Fan 8=9Fan 9=12Fan 10=16Fan | 1=None | Indicates the supply fan(s) configured for outdoor air flow measurement. Applies when the unit is configured with an outdoor airflow measuring device. |

[1]Object is read-only from BACnet but can be configured from the MicroTech 4 unit controller HMI. See Table 20 for complete list of MicroTech 4 unit controller configuration code options.

## Table 7: Return/Exhaust Air Fan

| Point Name | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Return Air Fan Type | RFEFType | MSV:105 | R | 1=None 2=RFAnlg 3=EFAnlg 4=1ECMRF 5=2ECMRF 6=3ECMRF 7=4ECMRF 8=1ECMEF 9=2ECMEF 10=3ECMEF 11=4ECMEF 12=RFVFD 13=EFVFD | 1=None | Indicates the type of return air fan installed in the unit.[1] 1=None (No return fan control selected) 2=RFAnlg (Return fan control via analog output from the unit controller) 3=EFAnlg (Exhaust fan control via analog output from the unit controller) 4=1ECMRF (1 ECM Modbus-controlled return fan) 5=2ECMRF (2 ECM Modbus-controlled return fans) 6=3ECMRF (3 ECM Modbus-controlled return fans) 7=4ECMRF (4 ECM Modbus-controlled return fans) 8=1ECMEF (1 ECM Modbus-controlled exhaust fan) 9=2ECMEF (2 ECM Modbus-controlled exhaust fans) 10=3ECMEF (3 ECM Modbus-controlled exhaust fans) 11=4ECMEF (4 ECM Modbus-controlled exhaust fans) 12=RFVFD (Return fan VFD Modbus control) 13=EFVFD (Exhaust fan VFD Modbus control) |
| Return Fan Capacity Input | RFEFCapNetIn | AV:25 | W | 0-164% | 164% | Sets the return/exhaust fan VFD speed when ExhRetFanCtrl is set to Speed=5. It uses maximum and minimum limits, so if the Present Value is set beyond these limits from the network, the value is ignored and the MicroTech 4 unit controller continues to control to the last valid value. |
| Return Fan Duct Static Pressure | RAFDSP | AI:20 | R | -5.02-0 in -1250-0 Pa | NA | Reflects the current return fan duct static pressure. Applies to units configured with a return fan DSP sensor. |
| Building Static Pressure Sensor | BldgStatPress | AI:9 | R | -0.249-0.249 in -62-62 Pa | NA | Reflects the current building static pressure based on return plenum static pressure setpoint (RAFDSPSpt). Applies to units configured with a return fan BSP sensor. |
| Building Static Pressure Setpoint | BldgStaticSP | AV:9 | W | -0.25-0.25 in -62.2-62.2 Pa | 0.05 in 12.4 Pa | The return air or exhaust fan is modulated to maintain the building static pressure sensor input at this setpoint when the ExhRetFanCtrl is set to BSP=2. Applies only if the unit is configured for a modulating return/exhaust fan. |
| Return Fan Capacity | RFEFCap | AI:18 | R | 0-100% | NA | Reflects the input from the VFD controlling one or more return/exhaust fan motors. |
| Exhaust Air Plenum Static Pressure | ExhPSP | AI:24 | R | 0-1.0 in 0-249 Pa | NA | Reflects the exhaust plenum static pressure. Applies to units with a set of modulating relief dampers. Used in conjunction with return duct static pressure input to maintain desired static pressure of the exhaust plenum. |
| ReturnFan Airflow | RFEFFlow | AI:30 | R | 0-6000 cfm | NA | Displays the effective return/exhaust fan airflow. Available for monitoring purposes when a unit is configured with a return or exhaust airflow measuring station. |

*Table 7: Return/Exhaust Air Fan, Continued*

| Point Name | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Return Fan Capacity Control | ExhRetFanCtrl | MSV:12 | W | 1=CAV 2=BSP 3=Tracking 4=DSP 5=Speed 6=Flow 7=OAD 8=FlowDiff | 2=BSP | Selects the method used to control the return or exhaust fan airflow. 1=CAV (Return/Exhaust fan is held at the MaxRFEFCap value when in operation) 2=BSP (Return/exhaust fan airflow is controlled independently of the supply fan to maintain building static pressure setpoint) 3=Tracking (If unit is equipped with VFD, airflow is controlled based on an adjustable tracking relationship between the supply fan and return fan) 4=DSP (Return fan is modulated to maintain the Duct Static Pressure at the RAFDSPSpt when in operation) 5=Speed (Return/exhaust fan airflow is controlled to a VFD speed setpoint adjusted via the Return Fan Capacity Input) 6=Flow (unit modulates to maintain the RFEFflow Setpoint when in operation) 7=OAD (Exhaust fan airflow is controlled independently of the supply fan airflow based on the outdoor air damper position) 8=FlowDiff (Return/exhaust fan tracks to the SAFFlow) |
| Return Fan 1-4 Status | RFEF1Status | MSV:37 | R | 1=OK 2=HLL 3=TFEI 4=TFM 5=TFE 6=BLK 7=SKF 8=PHA 9=UzLow 10=UzHigh 11=UeLow 12=UeHigh | NA | Indicates the status of the 1-4 ECM return/exhaust air fans. 1=OK (communications as expected) 2=HLL (Hall Sensor Error) - possible external voltage spikes or hardware problem with the fan 3=TFEI (Electronics Interior Overheated) - operating temperature for EC fan control components has been exceeded, or a hardware problem with the fan 4=TFM (Motor Overheated) operating conditions for fan motor is outside of the expected temperature range, fan load has been exceeded, or a hardware problem with the fan 5=TFE (Power Mod Overheated) - operating conditions for module have exceeded the design temperature, input power supply is over/under voltage or fan overload 6=BLK (Locked Motor) - fan motor may be blocked due to counter flow, dirt, ice, or other impurity 7=SKF (Communication Error) - possible voltage spikes or a hardware problem of the fan 8=PHA (Phase Failure) 9=UzLow (DC Link Undervoltage) 10=UzHigh (DC Link Overvoltage) 11=UeLow (Main Undervoltage) 12=UeHigh (Main Overvoltage) Options 8-12 above may indicate DC or main voltage parameter values not within the specified range, fan power supply insufficient or experiencing signal disturbances, or a hardware problem with the fan. |
| | RFEF2Status | MSV:38 | | | | |
| | RFEF3Status | MSV:39 | | | | |
| | RFEF4Status | MSV:40 | | | | |
| Return Fan VFD Status | VFD_RFEFStatus | MSV:37 | R | 1=OK 2=Fault 3=No Comm | NA | Indicates the status of the return/exhaust fan drive. 1=OK 2=Fault (controller has shut down the VFD due to a fault condition 3=No Comm (controller is not receiving digital input data from the VFD) |
| ReturnFan Flow Input[1] | RFEFFlowInput | MSV:111 | R | 1=None 2=1Fan 3=2Fan | 1=None | Indicates the return or exhaust fan available for outdoor air flow measurement. Available only when the unit is configured with an outdoor airflow measuring device. 1=None (No return/exhaust fan configured) 2=1Fan (One return/exhaust fan configured) 3=2Fan (Two return/exhaust fans configured) |
| Return/Exhaust Fan Flow Setpoint | RFEFFlowSpt | AV:57 | W | 0-6000 cfm | 2000 cfm | Sets the return or exhaust fan flow setpoint. The return/exhaust fan is modulated to maintain this setpoint when the Return/Exhaust Fan Control Method is set to Flow. Applies when the unit is configured for an RFEF Flow Input. |

[1] Object is read-only from BACnet but can be configured from the MicroTech 4 unit controller HMI. See Table 20 for complete list of MicroTech 4 unit controller configuration code options.

*Table 8: Cooling*

| Point Name | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Refrigerant Type[1] | RefrigType | MSV:116 | R | 1=None 2=R410A | 2=R410A | Indicates the type of refrigerant in the unit. |
| Unit Cooling Capacity | ClgCapacity | AV:1 | R | 0-100% | NA | The current cooling capacity of compressors that are commanded on when the circuit state is normal. |
| Discharge Air Cooling Setpoint | DAClgSetpt | AV:14 | W | 40-100°F 4.4-37.8°C | 55°F 12.8°C | Sets the network cooling discharge setpoint only when ClgDATReset = Network. The MicroTech 4 unit controller internally limits the Present Value that is written between the DefaultDATClgSetpt (AV:15) and the maximum cooling setpoint. Refer to the Commission Unit/Cooling Set-Up menu on the MicroTech 4 unit controller HMI. |
| Minimum Discharge Air Cooling Setpoint | DefaultDATClgSetpt | AV:15 | W | 40-100°F 4.4-37.8°C | 55°F 12.8°C | Sets the minimum allowable discharge air cooling setpoint determined by the discharge air temperature reset function as well as the default network discharge air cooling setpoint. The MicroTech 4 unit controller uses the last valid value it received from either the network or MicroTech 4 unit controller HMI. |
| Discharge Air Temperature Economizer Setpoint | DATEconSpt | AV:6 | W | 40-100°F 4.4-37.8°C | 55°F 12.8°C | Controls the discharge air temperature to this setpoint when the unit is in economizer mode and UseDATClgSpt = No (from the Cooling Set-Up menu). |
| Occupied Cooling Setpoint | OccCoolSP | AV:10 | W | 0-100°F -17.8-37.8°C | 72°F 22.2°C | Sets the Occupied Cooling Setpoint value when it is not controlled by another function. It uses maximum and minimum limits, so if the Present Value is set beyond the acceptable range from the network, the value is ignored and the MicroTech 4 unit controller continues to control to the last valid value. |
| Unoccupied Cooling Setpoint | UnoccCoolSetpt | AV:11 | W | 40-100°F 4.4-37.8°C | 85°F 29.4°C | Sets the temperature above which the unit starts and provides cooling during unoccupied periods. An optional space temperature sensor is required for unoccupied cooling operation. It uses maximum and minimum limits, so if the Present Value is set beyond these limits from the network, the value is ignored and the MicroTech 4 unit controller continues to control to the last valid value. |
| Reheat Capacity | ReheatCapacity | AV:45 | R | 0-100% | NA | Indicates the current percentage of the unit's reheat capacity. Applies only to units configured for reheat. With full control, the unit's cooling, heating and reheat capacity is controlled based on temperature inputs to the controller. |
| Electronic Hot Gas Bypass Input[1] | EHGBPCfg | MSV:115 | R | 1=None 2=Circ12 3=Circ1 4=Circ2 | 1=None | Indicates which circuit (1, 2, or both circuits) that are configured for electronic hot gas bypass (EHGBPS). Note that EHGPS is used to keep the circuit suction pressure up during light load conditions when only one fixed capacity compressor is operating in the unit. |

[1]Object is read-only from BACnet but can be configured from the MicroTech 4 unit controller HMI. See Table 20 for complete list of MicroTech 4 unit controller configuration code options.

*Table 9: Heating*

| Point Name | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Heating Type[1] | HtgType | MSV:103 | R | 1=None 2=F&BP 3=HW_Stm 4=MG1StgL 5=MG1StgL 6=MG1StgL 7=MG1StgH 8=MG1StgH 9=MG2StgL 10=MG3StgL 11=MG2StgH 12=MG3StgH 13=2StgE 14=2StgG 15=4StgE 16=4StgG 17=SCR* 18=SCRSRht* 19=Not used 20= MG4StgL 21= MG4StgH | 1=None | Defines the type of heating in the unit. Not all options are available in all applications. 1=None (No heating type selected) 2=F&BP (Face and bypass) 3=HW_Stm (Steam or hot water) 4=MG1StgL (Modulating gas, 5-1) 5=MG1StgL (Modulating gas, 5-1) 6=MG1StgL (Modulating gas, 5-1) 7=MG1StgH (Modulating gas, 10-1) 8=MG1StgH (Modulating gas, 10-1) 9=MG2StgL (Modulating gas, 10-1) 10=MG3StgL (Modulating gas, 10-1) 11=MG2StgH (Modulating gas, 20-1) 12=MG3StgH (Modulating gas, 20-1) 13=2StgE (Two-stage electric) 14=2StgG (Two-stage gas) 15=4StgE (Four-stage electric) 16=4StgG (Four-stage gas) 17=SCR* (SCR electric) 18=SCRSRht* (SCR electric/supplemental reheat) 19=Not used 20= MG4StgL (Modulating gas, 20-1) 21= MG4StgH (Modulating gas, 40-1) *SCR (silicon controlled rectifier) modulates the time the electric heater is powered on in order to satisfy the zone requirements. |

*Table 9: Heating, Continued*

| Point Name | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Primary Heating Capacity | PrimaryHtgCap | AV:2 | R | 0-100% | NA | Reflects the capacity using a standard heating source for non-heat pump units (and standard heating is not being used for reheat purposes). Otherwise, it reflects the capacity from a compressorized heating source for heat pump units. |
| Seconday Heating Capacity | SecondaryHtgCap | AV:22 | R | 0-100% | NA | Reflects the capacity from a standard heat source for heat pump units. Otherwise, secondary heating capacity is not applicable. |
| Occupied Heating Setpoint | OccHeatSP | AV:12 | W | 0-100°F -17.8-37.8°C | 68°F 20°C | Sets the Occupied Heating Setpoint value when it is not controlled by other function. It uses maximum and minimum limits, so if the Present Value is set beyond these limits from the network, the value is ignored and the MicroTech 4 unit controller continues to control to the last valid value. |
| Unoccupied Heating Setpoint | UnoccHeatSetpt | AV:13 | W | 40-100°F 4.4-37.8°C | 55°F 12.8°C | Sets the temperature below which the unit starts and provides heating during unoccupied periods. An optional space temperature sensor is required for unoccupied heating operation. It uses maximum and minimum limits, so if the Present Value is set beyond these limits from the network, the value is ignored and the MicroTech 4 unit controller continues to control to the last valid value. |
| Discharge Air Heating Setpoint | DAHtgSetpt | AV:18 | W | 40-140°F 4.4-60°C | 100°F 37.8°C | Sets the network cooling discharge setpoint only when HtgDATReset = Network. The MicroTech 4 unit controller internally limits the Present Value that is written between the minimum heating setpoint and the DefaultDATHlgSetpt (AV:19). Refer to the Commission Unit/Heating Set-Up menu on the MicroTech 4 unit controller HMI. |
| Maximum Discharge Air Heating Setpoint | DefaultDATHtgSetpt | AV:19 | W | 40-120°F 4.4-48.9°C | 120°F 48.9°C | Sets the maximum allowable discharge air heating setpoint determined by the discharge air temperature reset function as well as the default network discharge air heating setpoint. It is also changeable via the MicroTech 4 unit controller MicroTech 4 unit controller HMI. The controller uses the last valid value it last received from either the network or the MicroTech 4 unit controller HMI. |
| Maximum Heat Rise[1] | MaximumHeatRise | AV:153 | R | 0-100 | 100 | When the unit is equipped with any type of gas or electric heat, MaximumHeatRise prevents the discharge air temperature heating setpoint (DATHtgSpt) from exceeding the entering fan temperature by more than this value. |
| Reheat Type[1] | ReheatType | MSV:107 | R | 1=None 2=PriHtg 3=PriHtBP 4=MHG 5=MHGBP 6=HG_LSC 7=HGLSCBP 8=DXBP 9=MLSC | 1=None | Indicates the type of reheat control for the unit.[1]<br><br>1=None (No reheat)<br>2=PriHtg (Primary heating reheat)<br>3=PriHtBP (Primary heating reheat with DX bypass)<br>4=MHG (Modulating hot gas)<br>5=MHGBP (Modulating hot gas with DX bypass)<br>6=HG_LSC (Modulating hot gas and liquid subcooling reheat)<br>7=HGLSCBP (Modulating hot gas and liquid subcooling reheat with DX bypass)<br>8=DXBP (DX bypass only)<br>9=MLSC (Modulating liquid subcooling reheat)<br>Notes:<br>• Modulating hot gas with DX coil bypass and modulating hot gas and liquid subcooling wit DX bypass configurations are only allowed on 100% outdoor air damper units.<br>• Primary heating and primary DX coil heating are only available with selected hot water steam unit configurations. |

[1]Object is read-only from BACnet but can be configured from the MicroTech 4 unit controller HMI. See Table 20 for complete list of MicroTech 4 unit controller configuration code options.

**Table 10: Dehumidification**

| Point Name | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Relative Humidity Sensor 1 | SpaceRH1 | AI:11 | R | 0-100% | NA | The current reading of the optional space relative humidity sensor(s). Applies only if the unit is configured for one or more locally installed and wired sensors. |
| Relative Humidity Sensor 2 | SpaceRH2 | AI:12 | | | | |
| Relative Humidity Input 1 | SpaceRH1NetIn | AV:20 | W | 0-164% | 164% | Sets the space relative humidity from the network. If the network value becomes unreliable, the humidity reverts to the value provided by the attached relative humidity sensor. |
| Relative Humidity Input 2[1] | SpaceRH2NetIn | AV:21 | | | | |
| Humidity Sensor 1 Setpoint Input | Humidity1SP | AV:40 | W | 0-100% | 50% | Current humidity sensor setpoint from one of the two available sensors. Relative Humidity 1 uses Humidity1SP and Relative Humidity 2 uses Humidity2SP. The temperature reverts to the local space temperature sensor value if this network value becomes unreliable. It is valid only if Dehum Method is RelHum1, RelHum2, or RelHum12. |
| Humidity Sensor 2 Setpoint Input | Humidity2SP | AV:41 | | | | |
| Dewpoint Setpoint 1 | Dewpoint1SP | AV:42 | W | 0-100°F -17.8-37.8°C | 50°F 10°C | Current dewpoint setpoint. Used for dehumidification control, which also corresponds to one of the two relative humidity sensor inputs. |
| Dewpoint Setpoint 2 | Dewpoint2SP | AV:43 | | | | |
| Return Air Relative Humidity | RARelHum | AI:25 | R | 0-100% | NA | The current reading of the optional return air relative humidity sensor. Applies only if the unit is configured for a locally installed and wired sensor. |
| Return Air Dewpoint | RADewpoint | AI:26 | R | -50-150°F -45.6-65.6°C | NA | The return air dewpoint temperature value, calculated from the optional return air relative humidity sensor. |
| Outdoor Air Relative Humidity | OARelHum | AI:27 | R | 0-100% | NA | The current reading of the optional outdoor air relative humidity sensor. Applies only if the unit is configured for a locally installed and wired sensor. |
| Outdoor Air Dewpoint | OADewpoint | AI:28 | R | -50-150°F -45.6-65.6°C | NA | The outdoor air dewpoint temperature value; calculated from the optional outdoor air humidity sensor. |
| Minimum Leaving Coil Temperature Setpoint | MinLCTSpt | AV:47 | W | 45-65°F 7.2-18.3°C | 45°F 7.2°C | Determines the minimum value for the leaving coil temperature (LCT) setpoint. Is also used in calculating the LCT setpoint when the LCTSptRst is not set to None or Network. |
| DX Coil Bypass Minimum Leaving Coil Temperature Setpoint | DXBPMinLCTSpt | AV:48 | W | 45-65°F 7.2-18.3°C | 45°F 7.2°C | Determines the minimum value for the DX Coil Bypass (DXBP) leaving coil temperature (LCT) setpoint. Is also used in calculating the LCT setpoint when the DXBPLCTSptRst is not set to None or Network. |
| Maximum Leaving Coil Temperature Setpoint | MaxLCTSpt | AV:49 | W | 45-65°F 7.2-18.3°C | 52°F 11.1°C | Determines the maximum value for the leaving coil temperature (LCT) setpoint. Is also used in calculating the LCT setpoint when the the LCTSptRst is not set to None or Network. |
| DX Coil Bypass Maximum Leaving Coil Temperature Setpoint | DXBPMaxLCTSpt | AV:50 | W | 45-65°F 7.2-18.3°C | 45°F 7.2°C | Determines the maximum value for the DX Coil Bypass (DXBP) leaving coil temperature (LCT) setpoint. Is also used in calculating the LCT setpoint when the DXBPLCTSptRst is not set to None or Network. |
| Leaving Coil Temperature Setpoint | LCTSetpoint | AV:51 | W | 45-65°F 7.2-18.3°C | 52°F 11.1°C | The current effective leaving coil setpoint when dehumidification is active (Dehum Status = Active). This setpoint applies only if the unit is equipped with modulating cooling (such as chilled water or variable speed compressor) and the reheat type is not None or DX Bypass Only. This value can only be written when LCTSptRst is set to Network. |
| Leaving Coil Temperature Setpoint | DXBPLCTSetpoint | AV:52 | W | 45-65°F 7.2-18.3°C | 52°F 11.1°C | The current effective leaving coil setpoint when the DX coil bypass (DXBP) function is active. This setpoint applies only if the unit is equipped with modulating cooling (such variable speed compressor), the reheat type includes DX coil bypass (DXBP) and when the DXBP function is active. This value can only be written when DXBPLCTSptRst is set to Network. |

*Table 11: Outdoor Air*

| Point Name | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Damper Type | DamperType | MSV:102 | R | 1=None 2=30A 3=100A 4=Econ 5=EconFDD 6=100wRec | 4=Econ | Indicates the type of damper installed in the unit based on the options as follows: 1 = None (No damper) 2 = 30A (Single position 0-30% OA fixed damper) 3 = 100A (Single position 100% OA fixed damper) 4 = Econ (Modulating airside economizer) 5 = EconoFDD (Modulating arside economizer with fault detection) 6= 100wRec (Single position 100% with recirculating air) |
| Outdoor Air Fan Control | OAFanCtrl | MSV:101 | R | 1=None 2=OnOffT 3=OnOffP 4=VarVFD 5=VarECM1 6=VarECM2 7=VarDK1 8=VarDK2 | 1=None | Indicates the outdoor air fan control strategy for the unit. 1=None (No outdoor fan control selected) 2=OnOffT (Staged on/off control using outdoor air temperature) 3=OnOffP (Outdoor fan control using discharge refrigerant pressure) 3=VarVFD (Variable outdoor fan control using single VFD) 4=VarECM1 (Variable outdoor fan control using ECM motor, circuit 1) 5=VarECM2 (Variable outdoor fan control using ECM motor, circuit 2) 7=VarDK1 (Variable frequency fan with ECM motor, circuit 1) 8=VarDK2 (Variable frequency fan with ECM motor, circuit 2) |
| Outdoor Air Damper Minimum Position Input | MinOAPosNetIn | AV:17 | W | 0-100% | 0% | Sets the Outdoor Air Damper Minimum Position setpoint. The Minimum Outdoor Air Damper Position Input setpoint uses this value when 1) it is not controlled by another function and 2) when Min OAPosNetIn = Network via the MicroTech 4 unit controller HMI. The controller limits the Present Value written between the DCV Limit and the Vent Limit in the Min OA Damper menu. Applies only to units configured with an airside economizer. |
| Outdoor Air Damper Maximum Position Input | MaxOAPos | AV:55 | W | 0-100% | 100% | Sets the Outdoor Air Damper Maximum Position setpoint. |
| External Outdoor Air Input | ExtOAInput | MSV:108 | R | 1=None 2=ExtVDC 3=ExtmA 4=CO2VDC 5=CO2mA 6=CO2QMX+ 7=IAQMB | 1=None | Indicates the type of input signal available to the unit controller for outdoor air damper reset from a local $CO_2$ sensor, QMX sensor[1] or other device. 1=None 2= ExtVDC (Generic external VDC input) 3=ExtmA (Generic external mA analog input) 4=CO2VDC (VDC input for local $CO_2$ sensor) 5=CO2mA (mA input for local $CO_2$ sensor) 6=CO2QMX+ (Input from QMX $CO_2$ sensor) 7=IAQMB ($CO_2$ input from Modbus IAQ sensor) |
| Outdoor Air Flow Input | OAFlowInput | MSV:109 | R | 1=None 2=VDC 3=mA | 1=None | Indicates if voltage or current is used to measure outdoor airflow. |
| Outdoor Airflow | OAFlow | AV:44 | R | 0-60000 cfm 0-28320 l/s | NA | The amount of outdoor airflow entering the unit. Applies only to units configured with Outdoor Air Flow Signal set to VDC or mA. |
| Outdoor Airflow Setpoint | OAFlowSpt | AV:46 | W | 0-60000 cfm 0-28320 l/s | 2000 cfm 944 l/s | Minimum outdoor air setpoint. Applies only to units configured with Outdoor Air Flow Signal set to VDC or mA. |
| Space Temperature Sensor | SpaceTConfig | MSV:113 | W | 1=None 2=1AI 3=2AI 4=3AI 5=1QMXS 6=2QMXS 7=3QMXS 8=1QMX+ 9=2QMX+ 10=3QMX+ 11=1IAQMB | 1=None | Configures the type of space temperature sensor input to the unit controller.[1] If this parameter is set to None, the network can still provide a space temperature value. The network can override a local sensor. 1=None (No local sensors installed) 2=1AI (10k analog input available for local sensor) 3=2AI (Two 10k analog inputs available for local sensors) 4=3AI (Three 10k analog inputs available for local sensors) 5=1QMXS (Input from 1 QMX space temp sensor) 6=2QMXS Input from 2 QMX space temp sensors) 7=3QMXS (Input from 3 QMX space temp sensors) 8=1QMX+ (Input from 1 QMX space/hum/$CO_2$ sensor) 9=2QMX+ (Input from 2 QMX space/hum/$CO_2$ sensors) 10=3QMX+ (Input from 3 QMX space/hum/$CO_2$ sensors) 11=1IAQMB (Input from IAQ Modbus sensor) Note: All sensors must be one type. A mix of local analog sensors and Modbus/QMX sensors[1] is not supported. |
| Space $CO_2$ | SpaceCO2 | AI:13 | R | 0-5000 ppm | NA | The current space $CO_2$ level from the optional space $CO_2$ sensor. This value reflects the SpaceIAQ Input (if valid) or the value from a locally wired sensor. |
| Space IAQ ($CO_2$) Input | SpaceIAQNetIn | AV:33 | W | 0-32767 ppm | 32767 ppm | Indicates the current space $CO_2$ level from the network. This value takes priority over a locally wired sensor. It is used for minimum OA damper control and only applies if ExtOAInput = CO2VDC, CO2mA or CO2QMX+[1]. |

### Table 11: Outdoor Air, Continued

| Point Name | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Passive Ventilation | PassiveVent | MSV:17 | W | 1=Off 2=On | 1=Off | Passive ventilation is activated by a locally-supplied contact closure or from a network command. When Passive ventilation is active, the following occurs: 1. Fan output is overridden to On 2. The Unit State is forced to Off 3. The return/exhaust fan is commanded on and set to the return/exhaust fan air fan ventilation capacity value 4. Outdoor air dampers are held at 0% 5. A passive ventilation Event message is generated Note that the Unit Status is forced to Off when the optional passive ventilation function is active. |

[1]A QMX room sensor(s) is installed on the process bus and wired directly to the unit controller.

### Table 12: Energy Recovery

| Point Name | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Default[1] | Description |
|---|---|---|---|---|---|---|
| Energy Recovery | EnergyRec | MSV:106 | R | 1=None 2=CS 3=CSRH 4=ECM1 5=ECM2 6=VFD 7=Anlg | 1=None | Indicates if there is an energy recovery wheel installed, and if so, what type. 1=None (No energy wheel control) 2=CS (Constant speed energy wheel) 3=CSRH (Constant speed energy wheel with reheat) 4=ECM1 (Energy wheel control by ECM fan motor 1) 5=ECM2 (Energy wheel control by ECM fan motor 2) 6=VFD (Energy wheel with VFD control) 7=Anlg (Generic analog input to the MicroTech 4 unit controller) |
| Energy Recovery Wheel Status | ERWhlOnOff | MSV:18 | R | 1=Off 2=On | NA | The command status (On or Off) of the energy recovery wheel. |
| Energy Recovery Wheel Capacity | ERWheelCap | AI:15 | R | 0-100% | NA | The current energy recovery wheel capacity reflects the energy recovery wheel speed feedback (ERCapFbk) parameter converted to a percentage of the total capacity. Applies to units with an ECM motor or Daikin VFD. |
| Energy Recovery Leaving Wheel Temperature | ERLWT | AI:16 | R | -50-200°F -45.6-93.3°C | NA | The current value of the energy recovery leaving wheel temperature sensor. |
| Energy Recovery Entering Wheel Temperature | EREWT | AI:17 | R | -50-200°F -45.6-93.3°C | NA | The current value of the energy recovery entering wheel temperature sensor. |

### Table 13: Unit Operation Hours

| Point Name | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Default | Description[1] |
|---|---|---|---|---|---|---|
| Supply Fan Hours | SupplyFanHrs | AV:100 | W | 0-999999 Hrs | NA | The accumulated supply fan operating hours. |
| Return Fan Hours | RF_EFHrs | AV:101 | W | 0-999999 Hrs | NA | The accumulated return or exhaust fan operating hours. |
| Reheat Hours | ReheatHrs | AV:102 | W | 0-999999 Hrs | NA | The accumulated hours of unit reheat operation. |
| Cooling Hours | CoolingHrs | AV:103 | W | 0-999999 Hrs | NA | The accumulated mechanical cooling operating hours. |
| Compressor 1 Hours | Comp1Hrs | AV:104 | W | 0-999999 Hrs | NA | The accumulated operating hours for each compressor. |
| Compressor 2 Hours | Comp2Hrs | AV:105 | | | | |
| Compressor 3 Hours | Comp3Hrs | AV:106 | | | | |
| Compressor 4 Hours | Comp4Hrs | AV:107 | | | | |
| Compressor 5 Hours | Comp5Hrs | AV:108 | | | | |
| Compressor 6 Hours | Comp6Hrs | AV:109 | | | | |
| Heating Hours | HeatingHrs | AV:112 | W | 0-999999 Hrs | NA | The accumulated heating operating hours. |
| Economizer Hours | EconoHrs | AV:113 | W | 0-999999 Hrs | NA | The accumulated economizer operating hours. |
| Tenant Override Hours | TenantORHrs | AV:114 | W | 0-999999 Hrs | NA | The accumulated tenant override operating hours. |
| Dehumidification Hours | DehumHrs | AV:115 | W | 0-999999 Hrs | NA | The accumulated dehumidification operating hours. |
| Energy Recovery Hours | ERWhlHrs | AV:116 | W | 0-999999 Hrs | NA | The accumulated energy recovery wheel operating hours. |
| Variable Compressor 1 Hours | VarCmp1Hrs | AV:117 | W | 0-999999 Hrs | NA | The accumulated operating hours for each variable compressor. |
| Variable Compressor 2 Hours | VarCmp2Hrs | AV:118 | | | | |
| SCR Preheat Hours | SCRPrehtHrs | AV:121 | W | 0-999999 Hrs | NA | The accumulated preheat operating hours for SCR heating type. |
| UV Light Hours | UVLightHrs | AV:122 | W | 0-999999 Hrs | NA | The accumulated operating hours for the UV light. Applies when an IAQ sensor is present and unit is configured for one of the Monitoring Packages (IAQ, IAQRef, IAQPwr or IAQRP.) |

[1]Operational hour parameters can be reset via the network.

*Table 14: Alarm Objects*

| Point Name[1] | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Default | Description[1] |
|---|---|---|---|---|---|---|
| Alarm Value | AlarmValue | AV:30 | R | 0-255 | NA | The alarm value allows individual notification of the highest priority active alarm. This object is set to zero if no alarms are active. |
| Warning Alarm | ActiveWarning | AV:27 | R | 0-60 | NA | Allows individual notification of the highest priority active warning alarm. The value in Table 34 is the largest number in its enumeration that corresponds to an active alarm. This object is set to zero if no warning alarms are active. |
| Clear Alarms | ClearAlarms | MSV:13 | W | 1=No 2=ClrFlts 3=ClrPrblms 4=ClrWrngs 5=ClrAllAlms | 1=No | Clears all active alarms or all active alarms in a particular alarm class. |
| Problem Alarm | ActiveProblem | AV:28 | R | 0, 61-199 | NA | Allows individual notification of the highest priority active problem alarm. The value in Table 35 is the largest number in its enumeration that corresponds to an active alarm. This object is set to zero if no problem alarms are active. |

[1]Refer to Alarm Management section for complete details.

# System Monitoring Options

This section describes the optional monitoring packages available to BACnet. The network can display these system parameters when the unit is configured properly, equipped as needed, and has required sensor inputs. Also see the Alarm Management section for suported alarms and events. System monitoring packages include:

- Refrigerant monitoring (Table 15)
- Energy management (Table 16)
- Indoor air quality (IAQ) (Table 17 and Table 18)

**NOTE:** Energy management requires a power meter package. Also refer to the table notes for information about the standard terminology used in the power calculations used by the MicroTech 4 unit controller network parameters.

*Table 15: Refrigerant Monitoring Parameters*

| Point Name | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Suction Refrigerant Pressure Circuit 1 | C1RefSuctionP | AI:52 | R | 0-725 psi 0-5000 kPa | NA | The current reading of the circuit 1 or 2 suction line refrigerant pressure sensor. |
| Suction Refrigerant Pressure Circuit 2 | C2RefSuctionP | AI:62 | | | | |
| Suction Line Refrigerant Temperature Circuit 1 | C1SucnRefTemp | AI:51 | R | -83-392°F (-64-200°C) | NA | The current reading of the circuit 1 or 2 refrigerant temperature sensor. |
| Suction Line Refrigerant Temperature Circuit 2 | C2SucnRefTemp | AI:61 | | | | |
| Discharge Refrigerant Pressure Circuit 1 | C1RefDischP | AI:53 | R | 0-725 psi 0-5000 kPa | NA | The current reading of the circuit 1 or 2 discharge line refrigerant pressure sensor. |
| Discharge Refrigerant Pressure Circuit 2 | C2RefDischP | AI:63 | | | | |
| Discharge Line Refrigerant Temperature Circuit 1 | C1DischLnTemp | AI:50 | R | 83-212°F -64-100°C | NA | The current reading of the circuit 1 or 2 discharge line refrigerant temperature sensor. |
| Discharge Line Refrigerant Temperature Circuit 2 | C2DischLnTemp | AI:60 | | | | |
| Liquid Line Refrigerant Temperature Circuit 1 | C1RefLiqLnTemp | AI:54 | R | -83-212°F -64-100°C | NA | The current reading of the circuit 1 or 2 liquid line refrigerant temperature sensor. |
| Liquid Line Refrigerant Temperature Circuit 2 | C2RefLiqLnTemp | AI:64 | | | | |
| Suction Superheat Circuit 1 | SSH1 | AI:120 | R | -115-115°F -81.8-46°C | NA | Reflects the calculated suction superheat for each circuit. The suction superheat function is used to control the indoor expansion valve in the variable capacity compressor circuit. |
| Suction Superheat Circuit 2 | SSH2 | AI:125 | | | | |
| Discharge Superheat Circuit 1 | DSH1 | AI:121 | R | -115-115°F -81.8-46°C | NA | Reflects the calculated discharge superheat for each circuit. |
| Discharge Superheat Circuit 2 | DSH2 | AI:126 | | | | |
| Subcooling Circuit 1 | Subcooling1 | AI:122 | R | -115-115°F -81.8-46°C | NA | Reflects the calculated temperature which is used to control the modulation of the liquid subcooling reheat valve. Subcooling for circuit 1 or 2 is used for display purposes when the unit is configured with a refrigeration monitoring option. |
| Subcooling Circuit 2 | Subcooling2 | AI:127 | | | | |

*Table 16: Energy Monitoring Parameters*

| Point Name | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Power Monitor Reset | PwrMonitorReset | MSV:26 | W | 1=No 2=Yes | 1=No | Clears the accumulated power measurements. |
| Power Monitoring Demand Time | PwrMonitorPeriod | AV:54 | W | 0-1440 Min | 60 Min | The time period over which average power measurements are determined. |
| Total Unit Energy Usage | AccumUnitkWh | AI:80 | R | 0-10000000 kWh | NA | Total amount of unit energy usage, in kilowatt hours. |
| Unit Power | UnitkW | AI:81 | R | 0-10000000 kW | NA | Unit power, in kilowatts. |
| Peak Unit Power | PeakUnitkW | AI:82 | R | 0-10000000 kW | NA | Peak unit power, in kilowatts. |
| Average Unit Power | AverageUnitkW | AI:83 | R | 0-10000000 kW | NA | Average unit power, in kilowatts. |
| Voltage - Lines 1 and 2 | L1L2Voltage | AI:84 | R | 0-700 V | NA | The voltage of the 3-phase power measured between Lines 1 and 2. |
| Voltage - Lines 2 and 3 | L2L3Voltage | AI:85 | R | 0-700 V | NA | The voltage of the 3-phase power measured between Lines 2 and 3. |
| Voltage - Lines 1 and 3 | L1L3Voltage | AI:86 | R | 0-700 V | NA | The voltage of the 3-phase power measured between Lines 1 and 3. |
| Power - Line 1 | L1kW | AI:87 | R | 0-10000000 kW | NA | 3-phase Line 1 power, in kilowatts. |
| Power - Line 2 | L2kW | AI:88 | R | 0-10000000 kW | NA | 3-phase Line 2 power, in kilowatts. |
| Power - Line 3 | L3kW | AI:89 | R | 0-10000000 kW | NA | 3-phase Line 3 power, in kilowatts. |
| Current - Line 1 | L1Current | AI:90 | R | 0-200 A | NA | Line 1 current, in amps. |
| Current - Line 2 | L2Current | AI:91 | R | 0-200 A | NA | Line 2 current, in amps. |
| Current - Line 3 | L3Current | AI:92 | R | 0-200 A | NA | Line 3 current, in amps. |
| Total System Reactive Power | SysNetkVAR | AI:93 | R | 0-200 kVAR | NA | The system total reactive power, in kilovolt amps reactive. |
| Reactive Power - Line 1 | kVARL1 | AI:94 | R | 0-200 kVAR | NA | The Line 1 reactive power, in kilovolt amps reactive. |
| Reactive Power - Line 2 | kVARL2 | AI:95 | R | 0-200 kVAR | NA | The Line 2 reactive power, in kilovolt amps reactive. |
| Reactive Power - Line 3 | kVARL3 | AI:96 | R | 0-200 kVAR | NA | The Line 3 reactive power, in kilovolt amps reactive. |
| Apparent Power - Line 1 | kVAL1 | AI:97 | R | 0-200 kVA | NA | The apparent power for Line 1, in kilovolt amps. |
| Apparent Power - Line 2 | kVAL2 | AI:98 | R | 0-200 kVA | NA | The apparent power for Line 2, in kilovolt amps. |
| Apparent Power - Line 3 | kVAL3 | AI:99 | R | 0-200 kVA | NA | The apparent power for Line 3, in kilovolt amps. |
| Power Factor | DPF | AI:100 | R | -1 - 1 | NA | System total power factor. Reflects unit efficiency. |
| Accumulated Reactive Power - Line 1 | AccumkVARhL1 | AI:101 | R | 0-10000000 kVARh | NA | Line 1 reactive energy usage, in kilovolt amp reactive. |
| Accumulated Reactive Power - Line 2 | AccumkVARhL2 | AI:102 | R | 0-10000000 kVARh | NA | Line 2 reactive energy usage, in kilovolt amp reactive. |
| Accumulated Reactive Power - Line 3 | AccumkVARhL3 | AI:103 | R | 0-10000000 kVARh | NA | Line 3 reactive energy usage, in kilovolt amp reactive. |
| Accumulated Apparent Power | AccumkVAh | AI:104 | R | 0-10000000 kVAh | NA | Total amount of apparent energy usage, in kilovolt amp hours. |

- kW: Working (or active) power; kWh is energy usage. Measured in kilowatts (kW) / kilowatt hours (kWh)
- kVAR: Reactive power measured in kilovolt amps.
- kVA: Actual or apparent power, measured in kilovolt amps. It reflects the unused power generated by reactive components in an AC circuit or system.
- DPF: The Power Factor reflects the relationship between kW and kVAR. It indicates how effectively electrical energy is being used.

*Table 17: Indoor Air Quality (IAQ)*

The MicroTech 4 unit controller supports several IAQ system and sensor inputs for network monitoring. The following parameters can be accessed from BACnet when configured for a monitoring package with a local space temperature sensor, and an external input signal is provided by a local $CO_2$ sensor.

See Table 20 for IAQ monitoring package and sensor selections available via the MicroTech 4 unit controller configuration code string.

| Point Name | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Minimum Outdoor Air Reset | NetworkReset | MSV:41 | W | 1=No 2=Yes | 1=No | Enables the network to control the outdoor air minimum position (NetOAMinPos) value. It also allows the network to assume control of the effective minimum ventilation position (MinVentPos), if needed. Applies when the unit is configured with an outdoor airflow measuring station.[1] |
| Particulate Matter Size 2.5 Status | PM25Score | MSV:42 | R | 1=Good 2=Normal 3=Poor 4=Hazard | NA | Indicates the amount of particulate matter (PM). This value can be used to determine the minimum volume of outdoor air entering the unit based on IAQ requirements. Applies when the unit is configured with an IAQ, IAQRef, IAQPwr, or IAQRP sensor. See Table 20: Unit Configuration and Table 18 below for descriptions. |
| Particulate Matter Size 10 Status | PM10Score | MSV:43 | R | 1=Good 2=Normal 3=Poor 4=Hazard | NA | |
| Total VOC Status | TVOCScore | MSV:44 | R | 1=Good 2=Normal 3=Poor 4=Hazard | NA | Indicates the total outdoor air volatile organic compounds (VOCs). This value can be used to determine the minimum volume of outdoor air entering the unit based on IAQ requirements. Applies when unit is equipped with a VOC sensor. See Table 18 below for descriptions. |
| Particulate Matter 2.5 Value | PM25 | AI:31 | R | 0-250 mcg/m3 | NA | Indicates the particulate matter (PM) size 2.5 value. Input is provided when the proper IAQ sensor is installed and configured. See Table 18. |
| Particulate Matter 10 Value | PM10 | AI:32 | R | 0-430 mcg/m3 | NA | Indicates the particulate matter (PM) size 10 value. Input is provided when the proper IAQ sensor type is installed and configured. See Table 18. |
| Total VOC Value | TVOC | AI:33 | R | 0-600 mcg/m3 | NA | Indicates the total volatile organic compounds (VOC) value. Input is provided when the proper sensor is installed and configured. See Table 18. |

By reading the IAQ status and value objects listed in Table 17 and using the guide below, the amount of minimum outdoor air can be adjusted to improve IAQ.

*Table 18: IAQ Parameters*

| Parameter | Status Description | | | |
|---|---|---|---|---|
| | Good | Normal | Poor | Hazardous |
| PM 2.5 Status (mcg/m3) | 0-30 | 31-60 | 61-90 | 91-250 |
| PM 10 Status (mcg/m3) | 0-50 | 51-100 | 101-250 | 251-430 |
| TVOC Status (ppb) | 0-149 | 150-299 | 300-449 | 450-600 |

# BACnet Configurable I/O

When an EMB (expansion module B) is attached to the MicroTech 4 unit controller, there are four dedicated digital outputs and eight configurable universal I/O points available for field use. The universal points can be modified using the MicroTech 4 unit controller HMI. Input points can be monitored and output points can be commanded from an external device through the BACnet network.

• Universal I/O points can be configured as digital or analog inputs. Digital inputs are available to the network using BACnet Binary Input objects, BI:50-BI:57. Analog inputs can be configured for a 0-10 vdc, 4-20 mA or 10K NTC thermistor. They are available to the network using BACnet Analog Input objects, AI:150-AI:157.

• Universal I/O points can also be configured as 0-10 vdc or 4-20 mA analog outputs. They are commandable from the network using BACnet Analog Output objects, AO:1-AO:12.

• Four dedicated digital output points are commandable from the network using BACnet Binary Output objects, BO:1-BO:4.

Complete details about the configurable I/O options described above are provided in Table 19.

*Table 19: Configurable I/O Options*

| Point Name | I/O Designation | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Description |
|---|---|---|---|---|---|---|
| **Digital I/O** | | | | | | |
| Generic Digital Inputs 1-8 | X1 | GenericDI1 | BI:50 | R | 0=Open 1=Closed | If an EMB (expansion module B) is attached to the MicroTech 4 unit controller and one or more of the eight universal I/O points (X1-X8) is configured as a digital input, a corresponding network point (BI:50-BI:57) is available to read the status. XI-X8 support 0-10 vdc, 4-20 mA or 10K NTC thermistor input types. |
| | X2 | GenericDI2 | BI:51 | | | |
| | X3 | GenericDI3 | BI:52 | | | |
| | X4 | GenericDI4 | BI:53 | | | |
| | X5 | GenericDI5 | BI:54 | | | |
| | X6 | GenericDI6 | BI:55 | | | |
| | X7 | GenericDI7 | BI:56 | | | |
| | X8 | GenericDI8 | BI:57 | | | |
| Generic Digital Outputs 1-4 | DO1 | GenericBO1 | BO:1 | W | 0=Off 1=On | If an EMB is attached to the MicroTech 4 unit controller, up to four digital outputs (DO1-DO4) are available to the network as commandable objects via BO:1-BO:4. Outputs DO1-DO4 support a 0-10 or 0-20 vdc signal. |
| | DO2 | GenericBO2 | BO:2 | | | |
| | DO3 | GenericBO3 | BO:3 | | | |
| | DO4 | GenericBO4 | BO:4 | | | |
| **Analog I/O** | | | | | | |
| Generic Analog Inputs 1-8 | X1 | GenericInput1 | AI:150 | R | 0-10 vdc 4-20 mA NTC10K (temp sensor signal) | If an EMB is attached to the MicroTech 4 unit controller and one or more of the eight universal I/O points (X1-X8) is configured for an analog input, a corresponding network point (AI:150-AI:157) is available to read the status. |
| | X2 | GenericInput2 | AI:151 | | | |
| | X3 | GenericInput3 | AI:152 | | | |
| | X4 | GenericInput4 | AI:153 | | | |
| | X5 | GenericInput5 | AI:154 | | | |
| | X6 | GenericInput6 | AI:155 | | | |
| | X7 | GenericInput7 | AI:156 | | | |
| | X8 | GenericInput8 | AI:157 | | | |
| Generic Analog Outputs 1-8 | X1 | Generic VDC A01 | AO:1 | W | 0-10 vdc | If an EMB is attached to the MicroTech 4 unit controller, the analog outputs X1-X8 are available to the network as commandable objects via AO:1-AO:8. Only X1-X4 can be configured for *either* a 0-20 mA current output *or* a 0-10 VDC direct voltage output signal. X1-X4 can be one or the other, but not both. |
| | X2 | Generic VDC A02 | AO:2 | | | |
| | X3 | Generic VDC A03 | AO:3 | | | |
| | X4 | Generic VDC A04 | AO:4 | | | |
| | X5 | Generic VDC A05 | AO:5 | | | |
| | X6 | Generic VDC A06 | AO:6 | | | |
| | X7 | Generic VDC A07 | AO:7 | | | |
| | X8 | Generic VDC A08 | AO:8 | | | |
| | X1 | Generic mA AO1 | AO:9 | | 0-20 mA | Outputs X5-X8 only support a 0-10 VDC signal. |
| | X2 | Generic mA AO2 | AO:10 | | | |
| | X3 | Generic mA AO3 | AO:11 | | | |
| | X4 | Generic mA AO4 | AO:12 | | | |

Table 20 describes the selection of Rebel Applied unit configuration code string options that can be read from the network. They can be changed from the unit controller HMI.

**NOTE:** From the BACnet network, all MSV object types that are also unit configuration string code string items will display an additional number or letter in parenthesis "(#)" at the end of the State_Text description. This additional (#) is used as a reference to the item location in the code string. Be aware that this information does not appear in the MSVs in either Table 20: Unit Configuration or other data tables in this document. As an example, MSV:101 shows "2=OnOffT" vs "OnOffT(1)" when read from BACnet.

### Table 20: Unit Configuration

| Point Name | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Control Type | CtrlType | MSV:100 | R | 1=Zone<br>2=DAT<br>3=1ZnVAV<br>4=RO_FC<br>5=RO_FCGE | 2=DAT | Indicates the control strategy configured for the unit controller.<br>1=ZTC (Zone temperature control)<br>1=DTC (Discharge temperature control)<br>2=1ZnVAV (Single zone VAV control)<br>3=RO_FC (Refrigeration-only control for fans/compressors)<br>4=RO_FCGE (Refrigeration-only control for fans/compressors/gas heat/electric heat) |
| Fixed Compressors | BNNumVarComps | AV:151 | R | 0-6 | - | Indicates the number of fixed compressors on the unit. |
| Variable Compressors | BNNumFixedCmps | AV:150 | R | 0-4 | - | Indicates the number of variable compressors on the unit. |
| Compressor Circuits | BNNumClgCir | AV:152 | R | 0-2 | - | Indicates the number of compressor cooling circuits available on the unit. |
| Outdoor Air Fan Control | OAFanCtrl | MSV:101 | R | 1=None<br>2=OnOffT<br>3=OnOffP<br>4=VarVFD<br>5=VarECM1<br>6=VarECM2<br>7=VarDK1<br>8=VarDK2 | 1=None | Indicates the outdoor air fan control strategy for the unit.<br>1=None (No outdoor fan control selected)<br>2=OnOffT (Staged on/off control using outdoor air temperature)<br>3=OnOffP (Outdoor fan control using discharge refrigerant pressure)<br>3=VarVFD (Variable outdoor fan control using single VFD)<br>4=VarECM1 (Variable outdoor fan control using ECM motor, circuit 1)<br>5=VarECM2 (Variable outdoor fan control using ECM motor, circuit 2)<br>7=VarDK1 (Variable frequency fan with ECM motor, circuit 1)<br>8=VarDK2 (Variable frequency fan with ECM motor, circuit 2) |
| Damper Type | DamperType | MSV:102 | R | 1=None<br>2=30A<br>3=100A<br>4=Econ<br>5=EconFDD<br>6=100wRec | 4=Econ | Indicates the type of damper installed in the unit based on the options as follows:<br>1 = None (No damper)<br>2 = 30A (Single position 0-30% OA fixed damper)<br>3 = 100A (Single position 100% OA fixed damper)<br>4 = Econ (Modulating airside economizer)<br>5 = EconoFDD (Modulating arside economizer with fault detection)<br>6= 100wRec (Single position 100% with recirculating air) |
| Heating Type | HtgType | MSV:103 | R | 1=None<br>2=F&BP<br>3=HW_Stm<br>4=MG1StgL<br>5=MG1StgL<br>6=MG1StgL<br>7=MG1StgH<br>8=MG1StgH<br>9=MG2StgL<br>10=MG3StgL<br>11=MG2StgH<br>12=MG3StgH<br>13=2StgE<br>14=2StgG<br>15=4StgE<br>16=4StgG<br>17=SCR*<br>18=SCRSRht*<br>19=Not used<br>20= MG4StgL<br>21= MG4StgH | 1=None | Defines the type of heating in the unit.  Not all options are available in all applications.<br>1=None (No heating type selected)<br>2=F&BP (Face and bypass)<br>3=HW_Stm (Steam or hot water)<br>4=MG1StgL (Modulating gas, 5-1)<br>5=MG1StgL (Modulating gas, 5-1)<br>6=MG1StgL (Modulating gas, 5-1)<br>7=MG1StgH (Modulating gas, 10-1)<br>8=MG1StgH (Modulating gas, 10-1)<br>9=MG2StgL (Modulating gas, 10-1)<br>10=MG3StgL (Modulating gas, 10-1)<br>11=MG2StgH (Modulating gas, 20-1)<br>12=MG3StgH (Modulating gas, 20-1)<br>13=2StgE (Two-stage electric)<br>14=2StgG (Two-stage gas)<br>15=4StgE (Four-stage electric)<br>16=4StgG (Four-stage gas)<br>17=SCR* (SCR electric)<br>18=SCRSRht* (SCR electric/supplemental reheat)<br>19=Not used<br>20= MG4StgL (Modulating gas, 20-1)<br>21= MG4StgH (Modulating gas, 40-1)<br>*SCR (silicon controlled rectifier) modulates the time the electric heater is powered on in order to satisfy the zone requirements. |
| Maximum Heat Rise | MaximumHeatRise | AV:153 | R | 0-100 | 100 | When the unit is equipped with any type of gas or electric heat, MaximumHeatRise prevents the discharge air temperature heating setpoint (DATHtgSpt) from exceeding the entering fan temperature by more than this value. |

**Table 20: Unit Configuration, Continued**

| Point Name | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Supply Air Fan Type | SAFType | MSV:104 | R | 1=Anlg<br>2=1M<br>3=2M<br>4=3M<br>5=4M<br>6=6M<br>7=8M<br>8=9M<br>9=SAFVFD<br>10=8M4S<br>11=8M8S | 2=1M | Indicates the supply air fan type for the unit. Normally each supply air fan is controlled using one ECM motor for each fan but additional configurations are supported as indicated below. Each motor is designated as either a "master" or "slave" motor. Each master motor is controlled via a Modbus interface.<br>1=Anlg (Locally-supplied analog input to the unit controller)<br>2=1M (1 ECM fan motor master)<br>3=2M (2 ECM fan motor masters)<br>4=3M (3 ECM fan motor masters)<br>5=4M (4 ECM fan motor masters)<br>6=6M (6 ECM fan motor masters)<br>7=8M (8 ECM fan motor masters)<br>8=9M (9 ECM fan motor masters)<br>9=SAFVFD (Supply air fan with VFD Modbus)<br>10=8M4S (8 ECM fan motor masters and 4 fan motor slaves)<br>11=8M8S (8 ECM fan motor masters and 8 fan motor slaves) |
| Return Air Fan Type | RFEFType | MSV:105 | R | 1=None<br>2=RFAnlg<br>3=EFAnlg<br>4=1ECMRF<br>5=2ECMRF<br>6=3ECMRF<br>7=4ECMRF<br>8=1ECMEF<br>9=2ECMEF<br>10=3ECMEF<br>11=4ECMEF<br>12=RFVFD<br>13=EFVFD | 1=None | Indicates the type of return air fan installed in the unit.[1]<br>1=None (No return fan control selected)<br>2=RFAnlg (Return fan control via analog output from the unit controller)<br>3=EFAnlg (Exhaust fan control via analog output from the unit controller)<br>4=1ECMRF (1 ECM Modbus-controlled return fan)<br>5=2ECMRF (2 ECM Modbus-controlled return fans)<br>6=3ECMRF (3 ECM Modbus-controlled return fans)<br>7=4ECMRF (4 ECM Modbus-controlled return fans)<br>8=1ECMEF (1 ECM Modbus-controlled exhaust fan)<br>9=2ECMEF (2 ECM Modbus-controlled exhaust fans)<br>10=3ECMEF (3 ECM Modbus-controlled exhaust fans)<br>11=4ECMEF (4 ECM Modbus-controlled exhaust fans)<br>12=RFVFD (Return fan VFD Modbus control)<br>13=EFVFD (Exhaust fan VFD Modbus control) |
| Energy Recovery | EnergyRec | MSV:106 | R | 1=None<br>2=CS<br>3=CSRH<br>4=ECM1<br>5=ECM2<br>6=VFD<br>7=Anlg | 1=None | Indicates if there is an energy recovery wheel installed, and if so, what type.<br>1=None (No energy wheel control)<br>2=CS (Constant speed energy wheel)<br>3=CSRH (Constant speed energy wheel with reheat)<br>4=ECM1 (Energy wheel control by ECM fan motor 1)<br>5=ECM2 (Energy wheel control by ECM fan motor 2)<br>6=VFD (Energy wheel with VFD control)<br>7=Anlg (Generic analog input to the unit controller) |
| Reheat Type | ReheatType | MSV:107 | R | 1=None<br>2=PriHtg<br>3=PriHtBP<br>4=MHG<br>5=MHGBP<br>6=HG_LSC<br>7=HGLSCBP<br>8=DXBP<br>9=MLSC | 1=None | Indicates the type of reheat control for the unit.[1]<br>1=None (No reheat)<br>2=PriHtg (Primary heating reheat)<br>3=PriHtBP (Primary heating reheat with DX bypass)<br>4=MHG (Modulating hot gas)<br>5=MHGBP (Modulating hot gas with DX bypass)<br>6=HG_LSC (Modulating hot gas and liquid subcooling reheat)<br>7=HGLSCBP (Modulating hot gas and liquid subcooling reheat with DX bypass)<br>8=DXBP (DX bypass only)<br>9=MLSC (Modulating liquid subcooling reheat) |
| External Outdoor Air Input | ExtOAInput | MSV:108 | R | 1=None<br>2=ExtVDC<br>3=ExtmA<br>4=CO2VDC<br>5=CO2mA<br>6=CO2QMX+<br>7=IAQMB | 1=None | Indicates the type of input signal available to the unit controller for outdoor air damper reset from a local $CO_2$ sensor, QMX sensor[2] or other device.<br>1=None<br>2= ExtVDC (Generic external VDC input)<br>3=ExtmA (Generic external mA analog input)<br>4=CO2VDC (VDC input for local $CO_2$ sensor)<br>5=CO2mA (mA input for local $CO_2$ sensor)<br>6=CO2QMX+ (Input from QMX $CO_2$ sensor)<br>7=IAQMB ($CO_2$ input from Modbus IAQ sensor) |
| Outdoor Air Flow Input | OAFlowInput | MSV:109 | R | 1=None<br>2=VDC<br>3=mA | 1=None | Indicates if voltage or current is measuring outdoor airflow. |
| Supply Air Fan Flow Input | SAFFlowInput | MSV:110 | R | 1=None<br>2=1Fan<br>3=2Fan<br>4=3Fan<br>5=4Fan<br>6=6Fan<br>7=8Fan<br>8=9Fan<br>9=12Fan<br>10=16Fan | 1=None | Indicates the supply fan configured for outdoor air flow measurement. Available only when the unit is configured with an outdoor airflow measuring device.<br>1=None (No supply fan configured)<br>2=1Fan (One supply fan configured)<br>3=2Fan (Two supply fans configured)<br>4=3Fan (Three supply fans configured)<br>5=4Fan (Four supply fans configured)<br>6=6Fan (Six supply fans configured)<br>7=8Fan (Eight supply fans configured)<br>8=9Fan (Nine supply fans configured)<br>9=12Fan (Twelve supply fans configured)<br>10=16Fan (Sixteen supply fans configured) |

**Table 20: Unit Configuration, Continued**

| Point Name | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Return Fan Flow Input | RFEFFlowInput | MSV:111 | R | 1=None<br>2=1Fan<br>3=2Fan | 1=None | Indicates the return or exhaust fan available for outdoor air flow measurement. Available only when the unit is configured with an outdoor airflow measuring device.<br>1=None (No return/exhaust fan configured)<br>2=1Fan (One return/exhaust fan configured)<br>3=2Fan (Two return/exhaust fans configured) |
| Duct Static Pressure Sensor | StaticPSens | MSV:112 | R | 1=NA:NA<br>2=DSP:NA<br>3=DSP:DSP<br>4=DSP:BSP<br>5=BSP:NA<br>6=NA:DSP<br>7=NA:BSP | 1=NA:NA | Indicates if a static pressure sensor is installed. Sensor configuration types are described below:<br>1=NA:NA (Not available on supply or return/exhaust fan static pressure sensor input)<br>2=DSP:NA (Duct static pressure (DSP) sensor on the supply fan input, no sensor on the return/exhaust fan input)<br>3=DSP:DSP (DSP sensor is present on the supply and return/exhaust fan inputs)<br>4=DSP:BSP (DSP sensor on the supply fan input, Building Static Pressure (BSP) sensor is present on the return fan input)<br>5=BSP:NA (BSP sensor on the supply fan input, no sensor on the return/exhaust fan input)<br>6=NA:DSP (No sensor on the supply fan input, DSP sensor on the return/exhaust fan input)<br>7=NA:BSP (No sensor on the supply fan input, BSP sensor on the return/exhaust fan input) |
| Space Temperature Sensor | SpaceTConfig | MSV:113 | W | 1=None<br>2=1AI<br>3=2AI<br>4=3AI<br>5=1QMXS<br>6=2QMXS<br>7=3QMXS<br>8=1QMX+<br>9=2QMX+<br>10=3QMX+<br>11=1IAQMB | 1=None | Configures the type of space temperature sensor input to the unit controller.[2] If this parameter is set to None, the network can still provide a space temperature value. The network can override a local sensor.<br>1=None (No local sensors installed)<br>2=1AI (10k analog input available for local sensor)<br>3=2AI (Two 10k analog inputs available for local sensors)<br>4=3AI (Three 10k analog inputs available for local sensors)<br>5=1QMXS (Input from 1 QMX space temp sensor)<br>6=2QMXS Input from 2 QMX space temp sensors)<br>7=3QMXS (Input from 3 QMX space temp sensors)<br>8=1QMX+ (Input from 1 QMX space/hum/$CO_2$ sensor)<br>9=2QMX+ (Input from 2 QMX space/hum/$CO_2$ sensors)<br>10=3QMX+ (Input from 3 QMX space/hum/$CO_2$ sensors)<br>11=1IAQMB (Input from QMX IAQ sensor)<br>Note: All sensors must be one type. A mix of local analog sensors and Modbus/QMX[2] sensors is not supported. |
| Unit Size | UnitSize | AV:154 | R | 0-999 | 50 | Three-digit configuration parameter that indicates the unit model size. |
| Monitoring Packages | MonitorPkgs | MSV:114 | R | 1=None<br>2=RefSys<br>3=Pwr<br>4=Ref&Pwr<br>5=IAQ<br>6=IAQRef<br>7=IAQPwr<br>8=IAQRP | 1=None | Indicates the type of monitoring package installed on the unit.<br>1= None (No refrigerant or power monitoring package)<br>2=RefSys (Refrigerant monitoring only)<br>3=Pwr (Power monitoring only)<br>4=Ref&Pw (Both refrigerant and power monitoring)<br>5=IAQ (Indoor air quality package)<br>6=IAQRef (Indoor air quality and refrigerant monitoring)<br>7=IAQPwr (Indoor air quality and power monitoring)<br>8=IAQRP (Indoor air quality and refrigerant system and power monitoring) |
| Electronic Hot Gas Bypass Input | EHGBPCfg | MSV:115 | R | 1=None<br>2=Circ12<br>3=Circ1<br>4=Circ2 | 1=None | Indicates which circuit (1, 2, or both circuits) that are configured for electronic hot gas bypass (EHGBPS).<br>Note that EHGPS is used to keep the circuit suction pressure up during light load conditions when only one fixed capacity compressor is operating in the unit. |
| Refrigerant Type | RefrigType | MSV:116 | R | 1=None<br>2=R410A<br>3=R32<br>4=R410AHP<br>5=R32HP | 2=R410A | Indicates the type of refrigerant in the unit. |
| Unit Voltage | UnitVoltage | MSV:117 | R | 1=208_60Hz<br>2=230_60Hz<br>3=460_60Hz<br>4=575_60Hz | 3=460_60Hz | Defines the voltage applied to the unit controller. |

**Table 20: Unit Configuration, Continued**

| Point Name | BACnet Object Name | Object Type/ Instance | Read/ Write Access | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Preheat Type | PreheatType | MSV:118 | R | 1=None 2=HW_Stm 3=F&BP | 1=None | Indicates the preheat control method. A dedicated hot water/ steam coil or heating face and bypass is located upstream of the cooling coil to maintain the leaving cooling coil temperature above an adjustable preheat leaving coil temperature setpoint.<br>1=None (No preheat selected)<br>2=HW_Stm (Hot water/steam)<br>3=F&BP (Face and bypass) |
| Expansion Valve Type | EVType | MSV:119 | R | 1=None 2=DFETS 3= DFCol 4=FjFS 5=Spln | 1=None | Indicates the expansion valve model type configured for the unit.<br>1=None (no expansion valve selected)<br>2=DFETS (Danfoss ETS)<br>3=DFCol (Danfoss Colibri)<br>4=FJPAM2 (Fujikoki_PAM 2000)<br>5=FJPAM3 (Fujikoki_PAM 3000)<br>5=Spln (Sporlan) |

[1]Fan and reheat options are based on unit configuration. Not all options are available to the network.

[2]A QMX room sensor(s) is installed on the process bus and wired directly to the unit controller.

# LonWorks Network Variables

This section describes the MicroTech 4 unit controller data available to the LonWorks network.

Input variable types (.nvi, .nci, or .cpi) are writeable from the network. The output variable type (.nvo) is read-only and can only be viewed from the network. Default values do not apply to nvos.

Please note that anytime a command is written to a configuration property (nci), 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 these network inputs must be limited to avoid damage to the hardware. Non-volatile parameters are saved every 20 minutes.

*Table 21: Unit Status*

| Point Name | LonWorks Variable | SNVT/UNVT (SNVT/UNVT Index) | Receive Heart-beat | Range (In Units)[1] | Default | Description |
|---|---|---|---|---|---|---|
| Unit State | nvoUnitStatus.Mode | SNVT_hvac_status (112) | N | 1=HEAT 6=OFF 7=COOL 9=FAN_Only 10=FREE_ COOL | NA | The current operating state of the unit. The base variable (nvoUnitStatus) includes additional variables that reflect various unit sub-states. |
| Heating Capacity | nvoUnitStatus.heat_ output_primary | | | 0-100% | | The current percentage of unit maximum heating capacity. Applies only to units configured with heating. |
| Secondary Heating Capacity | nvoUnitStatus. Heat_output_ secondary | | | 0-100% | | Indicates the current percentage of the unit's reheat capacity. Applies only to units configured with cooling. With full control, the unit's cooling, heating and reheat capacity is controlled based on temperature inputs to the controller. |
| Cooling Capacity | nvoUnitStatus. cool_output | | | 0-100% | | The current percentage of unit maximum cooling capacity. Applies only if the unit is configured for cooling. |
| Outdoor Air Damper Position | nvoUnitStatus. econ_output | | | 0-100% | | The current economizer capacity or outdoor air damper position. |
| Supply Fan Capacity | nvoUnitStatus. fan_output | | | 0-100% | | The current supply fan capacity. It reads 0% when the fan is off. If the unit is configured as constant volume, it reads 100% when the fan is on. Otherwise, it reads the feedback from the VFD. |
| Active Alarm | nvoUnitStatus_in_ alarm | | | 0-255 | | The alarm value allows notification of the highest priority active alarm. See Alarm Management. |
| Economizer Status | nvoMcQAHUStatus. EconoEnable | UNVTmcQAHUStatus | N | 0=Enabled 1=None 2=OffAmb 3=Not Used 4=OffNet 5=OffMan 6=OffDehum | NA | Indicates if the economizer is currently enabled. If the economizer is disabled, the reason is indicated. |
| Cooling Status | nvoMcQAHUStatus. CoolEnable | | | 0=Enabled 1=None 2=OffAmb 3=OffAlm 4=OffNet 5=OffMan 6=NA 7=CfgErr* | | Indicates if cooling is currently enabled. If not, the reason is displayed. *ClgErr = cooling is disabled due to an incorrect unit configuration. |
| Heating Status | nvoMcQAHUStatus. HeatEnable | | | 0=Enabled 1=None 2=OffAmb 3=OffAlm 4=OffNet 5=OffMan | | Indicates if heating is currently enabled. If heating is disabled, the reason is indicated. |
| Unit Status | nvoMcQAHUStatus. Mode | | | See Descriptions. 0=Enabled 1=OffMan 2=OffManCtrl 3=Off Net 4=OffAlm 5=OffRetry 6=OffPassVnt 7=OffSnsrCfg | | The current operating mode of the unit. If the unit status is not enabled, the unit remains in an Off operating state. Does not apply when Control Type = RefOnly. **Unit Status (Mode) Descriptions** 0 = Enable (Unit is in operation. Items #2-8 are not active) 1 = OffMan (Control Mode=Off) 2 = OffManCtrl (Manual Control=On) 3 = OffNet (Control Mode=Auto and NetApplicMode=Off) 4 = OffAlm (Fault alarm is active) 5 = OffRetry (Fan Retry is active) 6 = OffPassVnt (Optional passive ventilation function is active, forcing the unit to an Off state 7 = OffSnsrCfg (Forces the unit to an Off state during space temperature sensor configuration or power-up. Applies when space temperature is used as the control temperature source.) |

*Table 21: Unit Status, Continued*

| Point Name | LONWORKS Variable | SNVT/UNVT (SNVT/UNVT Index) | Receive Heart-beat | Range (In Units)[1] | Default | Description |
|---|---|---|---|---|---|---|
| Primary Cool Enable | nviPriCoolEnable.State | SNVT_switch (95) | Y | See Description. -1=Auto (Invalid) 0=Disabled 1= Enabled | -1 | Allows primary cooling to be enabled or disabled by the network when Cooling Status is set to Enabled. Applies only when Ctrl Mode = Auto. The nviPriCoolEnable.Value reflects the percentage of cooling capacity in an enabled state. • If nviPriCoolEnable.State = 0, then the primary cooling is disabled by the network and Cooling Status is set to OffNet. • If nviPriCoolEnable.State = -1 (null), it is not being controlled by the network. • If nviPriCoolEnable.State = 1 and nviPriCoolEnable.Value is greater than 0, primary cooling is enabled by the network and takes precedent over local enable/disable configuration. Maximum cooling capacity is limited to nviPriCoolEnable.Value. • If nviPriCoolEnable.State = 1 and nviPriCoolEnable.Value = 0, primary cooling is disabled and Cooling Status is set to OffNet. If a valid network input value has not been provided within the specified amount of heartbeat time, the parameter reverts to its default value. |
| | nviPriCoolEnable.Value | | | 0-100% | 100% | |
| Primary Heat Enable | nviPrHeatEnable.State | SNVT_switch (95) | Y | See Description. -1=Auto (Invalid) 0=Disabled 1= Enabled | -1 | Allows primary heating to be enabled or disabled by the network when Heating Status is set to Enabled. Applies only when Ctrl Mode = Auto. The nviPriHeatEnable.Value reflects the percentage of heating capacity in an enabled state. • If nviPriHeatEnable.State = 0, then the primary heating is disabled by the network and Heating Status is set to OffNet. • If nviPriHeatEnable.State = -1 (null), it is not being controlled by the network. • If nviPriHeatEnable.State = 1 and nviPriHeatEnable.Value is greater than 0, the primary heating is enabled by the network and takes precedent over local enable/disable configuration. Maximum heating capacity is limited to nviPriHeatEnable.Value. • If nviPriHeatEnable.State = 1 and nviPriHeatEnable.Value = 0, primary heating is disabled and Heating Status is set to OffNet. If a valid network input value has not been provided within the specified amount of heartbeat time, the parameter reverts to its default value. |
| | nviPriHeatEnable.Value | | | 0-100% | 100% | |
| Economizer Enable | nviEconEnable.State | SNVT_switch (95) | Y | See Description. -1=Auto (Invalid) 0=Disabled 1= Enabled | -1 | Allows economizer cooling to be enabled or disabled by the network when Economizer Status is set to Enabled. Applies if the unit is configured for modulating economizer and when Ctrl Mode = Auto. • If nviEconoEnable.State = 0, then the economizer is disabled by the network and Economizer Status is set to OffNet. • If NviEconoEnable.State = -1 (null), it is not being limited by the network. • If nviEconoEnable.State = 1 and nviEconoEnable.Value is greater than 0, the economizer is enabled to a maximum nviEconoEnable.Value by the network and takes precedent over local enable/disable configuration. • If nviEconoEnable.State = 1 and nviEconoEnable.Value = 0, economizing is disabled and Economizer Status is set to OffNet. Economizer operation is disabled locally when the unit is in dehumidification, regardless of the network Economizer Enable settings. Applies only to a unit with a modulating economizer. If a valid network input value has not been provided within the specified amount of heartbeat time, the parameter reverts to its default value. |
| | nviEconEnable.Value | | | 0-100% | 100% | |
| Application Mode | nviApplicMode | SNVT_hvac_mode (108) | Y | 0=NULL 1=Off 2=Heat 3=Cool 4=FanOnly 5=Auto 6=Invalid | 6=Invalid | Sets the unit in an application mode. While it does not "force" the unit into any state, it does disable certain unit operations. For example, an Application Mode of "Cool Only" disables heating, "Heat Only" disables cooling, and "Fan Only" disables heating and cooling. If a valid network input value has not been provided within the specified amount of heartbeat time, the parameter reverts to its default value. Application Mode has no affect unless Control Mode is set to Auto (Ctrl Mode = Auto). Control Mode is only set at the MicroTech 4 unit controller HMI. |

*Table 21: Unit Status, Continued*

| Point Name | LONWORKS Variable | SNVT/UNVT (SNVT/UNVT Index) | Receive Heart-beat | Range (In Units)[1] | Default | Description |
|---|---|---|---|---|---|---|
| Emergency Override | nviEmergOverride | SNVT_hvac_emerg (103) | N | 0=Normal 1=Off | 0=Normal | Shuts off the MicroTech 4 unit controller. If it is set to Off, the MicroTech 4 unit controller cannot start based on a time clock or any other means. Doing so also disables the network signal and puts Unit Status = OffNet. The only way to start the MicroTech 4 unit controller is to change the value to Normal. |
| Return FanFan Status | nvoExhFanStatus. State | SNVT_switch (95) | N | 0=Off 1=On | NA | The current return/exhaust fan operational state. |
| | nvoExhFanStatus. Value | SNVT_hvac_status (112) | | 0-100% | | The current return/exhaust fan speed or capacity. It reflects the input from the VFD controlling one or more supply fan motors. |

*Table 22: Occupancy*

| Point Name | LONWORKS Variable | SNVT/UNVT (SNVT/UNVT Index) | Receive Heart-beat | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Occupancy | nvoEffectOccup | SNVT_occupancy (109) | N | 0=Occ 1=Unocc 2=TntOvrd | NA | Indicates if the unit is currently in an occupied, unoccupied, or tenant override mode of operation. |
| Occupancy Mode (Network) | nviOccManCmd | SNVT_occupancy (109) | N | 0=Occ 1=Unocc 2=TntOvrd 3=Standby 255=Auto | 255=Auto | Sets the unit into a different occupancy mode. The request is typically sent by a wall-mounted occupant-interface module or a supervisory device used to manually control occupancy modes or to override the scheduled occupancy. This input is used with nviOccSchedule to determine the Effective Occupancy mode. |
| Occupancy Scheduler[1,2] | nviOccSchedule. Current_State | SNVT_tod_event (128) | Y | Null 0=Occ 1=Unocc 2=TntOvrd 3=Standby Any other value=Auto | 255=Auto | Indicates current scheduled occupancy state. Commands the occupancy function of the MicroTech 4 unit controller when Occupancy Mode is set to Auto. Intended to be used for daily occupancy commands. A scheduler or a supervisory node typically sends the request. |
| | nviOccSchedule. Next_State | | | Null 0=Occ 1=Unocc 2=TntOvrd 3=Standby Any other value=Auto | 255=Auto | Indicates next scheduled occupancy state. Used in conjunction with Optimal Start functionality. Commands the occupancy function of the MicroTech 4 unit controller when Occupancy Mode is set to Auto. A scheduler or a supervisory node typically sends the request. |
| | nviOccSchedule. Time_To_Next_ State | | | 0 to 65534 | 65535 (Null) | Network input that determines the occupancy scheduler time from one state to the next (occupied, unoccupied, standby, auto). Used in conjunction with Optimal Start functionality. If time_to_next_state is valid, the MicroTech 4 unit controller uses this time to determine when the unit will start. If time_to_next_state is not valid, the MicroTech 4 unit controller uses an internal calculation to determine when the unit should start. |

[1] AHU Loc/Net must be set to Network (1) for this property to apply. AHU Loc/Net can only be changed from the MicroTech 4 unit controller HMI.
[2] If a valid network input value has not been provided within the specified amount of heartbeat time, the parameter reverts to its default value.

**Table 23: Temperature Control Setpoints**

| Point Name | LonWorks Variable | SNVT/UNVT (SNVT/UNVT Index) | Receive Heart-beat | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Temperature Setpoint Input | nviSetpoint | SNVT_temp_p (105) | N | 0-100°F -17.8-37.7°C | 621.8°F 327.7°C | Allows Effective Heat Enable and Effective Cool Enable setpoints to be commanded via the network. A valid value determines the Effective Setpoint. A value beyond 100°F/37.7°C is considered invalid and thus ignored. In this case, the effective setpoint value does not respond. This variable does not affect unoccupied setpoints. <br><br> If theTstat setpoint has been enabled via the MicroTech 4 unit controller HMI, then the space setpoint adjustment on the optional space sensor overrides nviSetpoint. |
| Effective Discharge Air Temperature Setpoint | nvoEffDATempSp | SNVT_temp_p (105) | N | -83.2-147.2°F -64-64°C | NA | Reflects the Effective Heating Discharge Temperature Setpoint if the unit is in the heating state. If not, it reflects the Discharge Air Cooling Setpoint when the unit is in any other operating state. |
| Space Temperature Input | nviSpaceTemp | SNVT_temp_p (105) | Y | 0-150°F -64-327.7°C | 621.8°F 327.7°C | The current space or zone temperature network value. If a valid network input value has not been provided within the specified amount of heartbeat time, the temperature reverts to the local sensor value. |
| Local Space Temperature | nvoLocalSpaceTmp | SNVT_temp_p (105) | N | 0-150°F -17.8-65.6°C | NA | The current effective local space air temperature. This value is provided by one of the following means: <br> • A single local temperature sensor setpoint input <br> • The min/max from 2- 3 sensor inputs <br> • The average calculated from 2-3 sensor inputs |
| Outdoor Air Temperature | nvoOutdoorTemp | SNVT_temp_p (105) | Y | -50-200°F -45.6-93.3°C | NA | The current value of the effective outdoor air sensor, either attached to the unit or provided by the network. |
| Space $CO_2$ Input | nviSpaceIAQ | SNVT_ppm (29) | Y | 0-5000 ppm Default: 32767 (Null) | 32767 ppm | Indicates the current space $CO_2$ level from the network. This value takes priority over a locally wired sensor. It is used for minimum OA damper control and only applies if the external outdoor air input is set to CO2VDC, CO2mA, or CO2QMX.[1] <br><br> If a valid network input value has not been provided within the specified amount of heartbeat time, the parameter reverts the locally wired sensor value. |
| Outdoor Air Temperature Input | nviOutdoorTemp | SNVT_temp_p (105) | Y | -50-150°F -45.6-65.6°C | 621.8°F 327.7°C | The current outdoor air temperature input supplied by the network. <br><br> If a valid network input value has not been provided within the specified amount of heartbeat time, the parameter reverts the locally wired sensor value. |
| Discharge Air Temperature | nvoDischAirTemp | SNVT_temp_p (105) | N | -50-250°F -45.6-121.1°C | NA | The current reading from the unit discharge air temperature sensor attached to the unit. See Alarm Management for additional information about potential alarms generated for this object. |
| Return Air Temperature | nvoRATemp | SNVT_temp_p (105) | N | -50-200°F -45.6-93.3°C | NA | The current reading from the return air temperature sensor attached to the unit. See Alarm Management for additional information about potential alarms generated for this object. |
| Space Temperature | nvoSpaceTemp | SNVT_temp_p (105) | N | 0-150°F -17.8-65.6°C | NA | The current reading from the effective space temperature sensor. If a space sensor(s) is not installed, this obect is still available. However, an invalid value is displayed until a valid value is provided from the network via nviSpaceTemp. If the value is provided by the MicroTech 4 unit controller, it can reflect the min/max, the average temperature of up to three local sensors, or the individual value of one of up to three sensors. See Alarm Management for additional information about potential alarms generated for this object. |
| Entering Fan/Leaving Coil Temperature Sensor | nvoEFT_LCT | SNVT_temp_p (105) | N | -50-250°F -45.6-121.1°C | NA | The current value of the unit entering fan/leaving coil air temperature sensor. Applies only to units configured for this type of sensor. See Alarm Management for additional information about potential alarms generated for this object. |
| Effective Temperature Setpoint | nvoEffectSetpt | SNVT_temp_p (105) | N | 0°-100°F -17.8-37.7°C | NA | Reflects the current changeover setpoint used by the unit. This is either the Occupied Heating Setpoint or the Occupied Cooling Setpoint, depending on the unit state. Otherwise, it reflects the Effective Discharge Cooling Setpoint when Control Temp Source = None. |
| Local Outdoor Air Temperature | nvoLocalOATemp | SNVT_temp_p (105) | N | -50-200°F -45.6-93.3°C | NA | The current value of a unit-mounted outdoor air temperature sensor. |

[1] A QMX room sensor(s) is installed on the process bus and wired directly to the unit controller.

*Table 24: Supply Air Fan*

| Point Name | LONWORKS Variable | SNVT/UNVT (SNVT/UNVT Index) | Receive Heart-beat | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Supply Air Fan Capacity Input | nviSupFanCtrl | UNVTsupFanCtrl | N | 0-100% | 33% | Indicates the remote supply air fan capacity input. |
| Duct Static Pressure Setpoint | nviDuctStaticSP | SNVT_press_p (113) | N | 0.2-4 in 50-996 Pa | 1 in 249 Pa | Sets the duct static pressure sensor setpoint used to control the supply air fan when the supply air fan capacity control is set to DAT. If the value is set beyond these limits from the network, it is ignored and the controller continues to control to the last valid value. |
| Duct Static Pressure[1] | nvoDuctStatPress | SNVT_press_p (113) | N | 0-5.02 in 0-1250 Pa | NA | Reflects the current supply fan duct static pressure. Applies to units configured with a supply fan DSP sensor. |
| Remote Supply Fan Capacity Input | nviSupFanCap | SNVT_lev_percent (81) | Y | 0-100% | 163.835 | Sets the remote supply fan capacity input. If the value is set beyond these limits from the network, it is ignored and the controller continues to control to the last valid value. |
| VAV Box Output[1] | nvoVAVBoxOut | UNVTvavBoxOutput | N | 1=Heat 2=Cool | NA | The VAV box output is provided for interlocking field VAV box operation with the unit heating or cooling. In most cases, the value = 1 when the unit is in any heating state, Start, or Recirc. The value = 2 when the unit is in any other state. Applies only to units configured with a supply fan VFD or ECM. |

[1]Applies only to DAC units.
[2] AHU Loc/Net must be set to Network (1) for this property to apply. AHU Loc/Net can only be changed from the MicroTech 4 unit controller HMI.

*Table 25: Return/Exhaust Air Fan*

| Point Name | LONWORKS Variable | SNVT/UNVT (SNVT/UNVT Index) | Receive Heart-beat | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Return Fan Capacity Control | nviExhRetFanCtrl | UNVTexhRetFanCtrl | N | 0=CAV 1=BSP 2=Tracking 3=DSP 4=Speed 5=Flow 6=OAD 7=FlowDiff | 0=CAV | Selects the method used to control the return or exhaust fan airflow. 1=CAV (Return/Exhaust fan is held at the MaxRFEFCap value when in operation) 2=BSP (Return/exhaust fan airflow is controlled independently of the supply fan to maintain building static pressure setpoint) 3=Tracking (If unit is equipped with an ECM or VFD, airflow is controlled based on an adjustable tracking relationship between the supply fan and return fan) 4=DSP (Return fan is modulated to maintain the duct static pressure at the return air discharge setpoint when in operation) 5=Speed (Return/exhaust fan airflow is controlled to an ECM or VFD speed setpoint adjusted via the return fan capacity input) 6=Flow (unit modulates to maintain the return/exhaust fan flow setpoint when in operation) 7=OAD (Exhaust fan airflow is controlled independently of the supply fan airflow based on the outdoor air damper position) 8=FlowDiff (Return/exhaust fan tracks to the supply air fan flow) |
| Building Static Pressure (BSP) Setpoint | nviBldgStaticSP | SNVT_press_p (113) | N | -0.25-0.25 in -62.2-62.2 Pa | 0.05 in 12.4 Pa | Determines the building static pressure setpoint used for controlling the return air or exhaust fan inlet ECM or VFD. It uses the network input when valid. Otherwise, it is ignored and the controller continues to control to the last valid value. Applies only if the unit is configured for a modulating return/exhaust fan. |
| Building Static Pressure | nvoBldgStatPress | SNVT_press_p (113) | N | -0.25-0.25 in -62-62 Pa | NA | The current building static pressure sensor value. Applies only to units configured for return/exhaust fan BSP sensor. |
| Return Fan Capacity Input | nviExhFanCap | SNVT_lev_percent (81) | Y | 0-100% | 163.835 | Remote exhaust/return fan capacity input. Overrides the local exhaust fan capacity control. RFEFCapCtrl must=Speed for the MicroTech 4 unit controller to use this remote capacity for control. Applies only to units that are configured for modulating exhaust fan or units that are configured for prop exhaust. If a valid network input value has not been provided within the specified amount of heartbeat time, the parameter reverts to its default value. |

*Table 26: Cooling*

| Point Name | LONWORKS Variable[1] | SNVT/UNVT (SNVT/UNVT Index) | Receive Heart-beat | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Discharge Air Cooling Setpoint Input | nviDACISP | SNVT_temp_p (105) | N | 40-100°F 4.4-37.8°C | 55°F 12.8°C | Sets the network Discharge Air Cooling Setpoint when ClgDATReset = Network. The MicroTech 4 unit controller limits the commanded value between the min/max cooling setpoints. The input is commanded by the network but can also be changed from the controller HMI. The controller uses the last valid value. |
| Default Discharge Air Cooling Setpoint Input | nciDACISP | SNVT_temp_p (105) | N | 40-100°F 4.4-37.8°C | 55°F 12.8°C | Sets the default Discharge Air Cooling Setpoint. The input is commanded by the network but can also be changed from the controller HMI. The controller uses the last valid value it received from either the network or controller HMI. |
| Occupied Cooling Setpoint | nciSetpoints. occupied_cool | SNVT_temp_setpt (106) SCPTsetPnts (60) | N | 0-100°F -17.8-37.8°C | 72°F 22.2°C | Sets the Occupied Cooling Setpoint value when it is not controlled by another function. It uses the network input when valid. Otherwise, it is ignored and the controller continues to control to the last valid value. |
| Unoccupied Cooling Setpoint | nciSetpoints. unoccupied_cool | SNVT_temp_setpt (106) SCPTsetPnts (60) | N | 40-100°F 4.4-37.8°C | 85°F 29.4°C | Sets the temperature above which the unit starts and provides cooling during unoccupied periods. An optional space temperature sensor is required for unoccupied cooling operation. The controller uses the last valid value it received from either the network or controller HMI. |

[1] Standy Cooling (nciSetpoints_standby_cool) is a standard LONWORKS variable but not supported in the MicroTech 4 unit controller.

*Table 27: Heating*

| Point Name | LONWORKS Variable[1] | SNVT/UNVT (SNVT/UNVT Index) | Receive Heart-beat | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Occupied Heating Setpoint | nciSetpoints. occupied_heat | SNVT_temp_setpt (106) SCPTsetPnts (60) | N | 0-100°F -17.8-37.8°C | 68°F 20°C | Sets the Occupied Heating Setpoint value when it is not controlled by other function. It uses maximum and minimum limits, so if the Present Value is set beyond the acceptable range, the value is ignored and the controller continues to control to the last valid value.<br><br>Note that the Occupied Heating Setpoint serves as the "morning warmup" temperature setpoint for Zone control and DAT units. |
| Unoccupied Heating Setpoint | nciSetpoints. unoccupied_heat | SNVT_temp_setpt (106) SCPTsetPnts (60) | N | 40-100°F 4.4-37.8°C | 55°F 12.8°C | Sets the temperature below which the unit starts and provides heating during unoccupied periods. An optional space temperature sensor is required for unoccupied heating operation. It uses maximum and minimum limits, so if the Present Value is set beyond the acceptable range, the value is ignored and the controller continues to control to the last valid value. |
| Discharge Air Heating Setpoint | nviDAHtSP | SNVT_temp_p (105) | N | 40-140°F 4.4-60°C | 85°F 29.4°C | Sets the heating discharge setpoint when a valid value is provided within range. Only applies when HtgReset = Network. It uses the network input when valid. Otherwise, it is ignored and the controller continues to control to the last valid value. |
| Maximum Discharge Air Heating Setpoint | nciDAHtSP | SNVT_temp_p (105) SCPTdischargeAir HeatingSetpoint (184) | N | 40-140°F 4.4-60°C | 120°F 48.9°C | Sets the maximum allowable discharge air heating setpoint default. It uses the network input when valid. Otherwise, it is ignored and the controller continues to control to the last valid value. |

[1] Standy Heating (nciSetpoints_standby_heat) is a standard LONWORKS variable but not supported in the MicroTech 4 unit controller.

*Table 28: Dehumidification*

| Point Name | LONWORKS Variable | SNVT/UNVT (SNVT/UNVT Index) | Receive Heart-beat | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Space Relative Humidity | nvoSpaceRH | SNVT_lev_percent (81) | N | 0-100% | NA | The current reading of the effective space relative humidity input, either attached to the unit or provided by the network. |
| Dewpoint Setpoint | nviSpaceDewPtSP | SNVT_temp_p (105) | N | 0-100°F -18-38°C | 50°F 10°C | Sets the dewpoint setpoint. It uses the network input when valid. Otherwise, it is ignored and the controller continues to control to the last valid value from the network or controller HMI. |
| Relative Humidity Setpoint | nviSpaceDehumSP | SNVT_lev_percent (81) | N | 0-100% Default: NA | 50% | Sets the relative humidity sensor setpoint. It uses the network input when valid. Otherwise, it is ignored and the controller continues to control to the last valid value from the network or controller HMI. |
| Space Relative Humidity | nviSpaceRH | SNVT_lev_percent (81) | Y | 0-100% | 163.835 | Sets the relative humidity from the network. If a valid network input value has not been provided within the allowable heartbeat time, the value reverts to the local sensor value. |
| Space Dewpoint | nvoSpaceDewPt | SNVT_temp_p (105) | N | -50-150°F -45.6-65.6°C | NA | The current dewpoint value based on inputs from effective space relative humidity and the temperature sensor. |

*Table 29: Outdoor Air*

| Point Name | LONWORKS Variable | SNVT/UNVT (SNVT/UNVT Index) | Receive Heart-beat | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Outdoor Airflow | nvoOAFlow | SNVT_flow (15) | N | 0-60000 cfm 0-28320 l/s | NA | The current value from an airflow station input connected to the unit. Applies only to units configured for Outdoor Air Flow Signal = VDC or mA. |
| Outdoor Air Damper Minimum Position Input | nviOAMinPos | SNVT_lev_percent (81) | N | 0-100% | 0% | Sets the Outdoor Air Damper Minimum Position setpoint. The Minimum Outdoor Air Damper Position Input setpoint uses this value when 1) it is not controlled by another function and 2) when the OAD min position = Network via the MicroTech 4 unit controller HMI.<br><br>The controller limits the Present Value that is written between the DCV (Demand Control) Ventilation Limit and the Vent Limit in the Min OA Damper menu. Applies only to units configured with an airside economizer. |
| Space $CO_2$ | nvoSpaceCO2 | SNVT_ppm (29) | N | 0-5000 ppm | NA | Current value of the effective $CO_2$ input, either attached to the unit or provided by the network. This value reflects the SpaceIAQ Input (if valid) or the value from a locally wired sensor.<br>$CO_2$ is configured via the MicroTech 4 unit controller HMI. |

*Table 30: LONWORKS Set-up*

| Point Name | LONWORKS Variable | SNVT/SCPT Type (SNVT/SCPT Index) | Receive Heart-beat | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| HVAC Type | nciHvacType | SNVT_hvac_type (145)<br><br>SCPThvacType (169) | N | 0=Generic 1=FanCoil 2=VAV 3=Hpump 4=RTU 5=UV 6=ChilCeil 7=Rad 8=AHU 9=SCU | 4=RTU | Indicates the primary application and equipment type. nciHvacType applies only to SCC units. For other SCC object types, the application and equipment type can be determined directly from the object type and corresponding device class within the standard program ID. HVAC Unit Type Identifier can be polled by a network tool to identify the type of equipment.<br>Equipment Type = HVT_GENERIC is set during manufacturing and is read-only. |
| Receive Heartbeat | nciRcvHrtBt | SNVT_time_sec (107)<br>SCPTmaxRcvTime (48) | N | 0-6553.4 Sec | 0 Sec | Receive Heartbeat defines the maximum amount of time that can elapse (in seconds) before the Receive Heartbeat variables listed below return to their default values if the LONWORKS network has not updated them.<br>Note that a value of 0 seconds (default) disables Receive Heartbeat functionality.<br><br>**Receive Heartbeat Variables**<br><br>nviOccSchedule / nviEconEnable<br>nviApplicCmd / nviExhFanCap<br>nviSupFanCap / nviRetFanCap<br>nviOutdoorTemp / nviCWFlow<br>nviSpaceTemp / nviSpaceIAQ<br>nviPriCoolEnable / nviSpaceRH<br>nviPriHeatEnable |
| Send Heartbeat | nciSndHrtBt | SNVT_time_sec (107)<br>SCPTmaxSendTime (49) | N | 0-6553.4 sec | 60 sec | Defines the maximum period of time that elapses before the network variable outputs (nvos) shown below are automatically updated.<br>Note that a value of 0 seconds disables the auto update feature.<br><br>**Send Heartbeat Variables**<br><br>nvoMcQAHUStatus / nvoOutdoorTemp<br>nvoUnitStatus / nvoLocalSpaceTmp<br>nvoEffectOccup / nvoLocalOATemp<br>nvoDischAirTemp / nvoEFT_LCT<br>nvoRATemp / nvoDuctStatPress<br>nvoSpaceTemp |

*Table 30: LONWORKS Set-up, Continued*

| Point Name | LONWORKS Variable | SNVT/SCPT Type (SNVT/SCPT Index) | Receive Heart-beat | Range (In Units) | Default | Description |
|---|---|---|---|---|---|---|
| Minimum Send Time | nciMinSndTm | SNVT_time_sec (107) SCPTminSendTime (52) | N | 0-6553.4 Sec | 0 Sec | The minimum period of time between automatic network variable output transmissions.  It is used to reduce traffic on the network. The following Send Heartbeat variables are limited by nciMinOutTm if the timer is greater than zero: • nvoMcQAHUStatus • nvoEFT_LCT • nvoUnitStatus • nvoDuctStatPress • nvoEffectOccup • nvoBldgStatPress • nvoDischAirTemp • nvoSpaceRH • nvoRATemp • nvoSpaceDewPt • nvoSpaceTemp • nvoSpaceCO2 • nvoOutdoorTemp • nvoEffDATempSp • nvoLocalSpaceTmp • nvoEffectSetpt • nvoLocalOATemp • nvoExhFanStatus • nvoOAFlow |
| Object Request | nviRequest | SNVT_obj_request (92) | N | 0=RQ_NORMAL 2=RQ_UPDATE_STATUS 5=RQ_REPORT_MASK -1(0xFF) = OC_NUL | NA | Provides the mechanism to request an operation or a mode for a functional block within a device. A request consists of an object ID (the object_id field) and an object request (the object_request field). The object ID is the functional block index for a functional block on the device. The Node Object functional block is index zero. The remaining functional blocks are numbered sequentially, starting with one. 0=RQ_NORMAL (Enable object and remove override) 2= RQ_UPDATE_STATUS (Report object status) 5=RQ_REPORT_MASK (Report status bit mask) -1(0xFF)=OC_NUL (Invalid) Refer to www.lonmark.org for more information on object request structure and supported functions. |
| Object Status | nvoStatus | SNVT_obj_status (93) | N | object_id= 0-65,535 invalid_id=0,1 invalid_request=0,1 report_mask=0,1 | NA | Reports the status for any functional block on a device. It is also used to report the status of the entire device and all functional blocks on the device.  A status update consists of an object ID (the object_id field) and multiple status fields. The object ID is the functional block index as described under nviRequest. If the object ID is zero, the status of the device itself and all functional blocks on the device is reported. The status fields are one-bit bitfields. The only supported status fields are the report_mask, invalid_id, and invalid_request fields; all other status fields are not supported. Refer to www.lonmark.org for the complete SNVT type description. |

*Table 31: Alarms*

| Point Name[1] | LONWORKS Variable | SNVT/UNVT (SNVT/UNVT Index) | Receive Heart-beat | Range (In Units) | Default | Description[1] |
|---|---|---|---|---|---|---|
| Active Alarm | nvoUnitStatus_in_alarm | SNVT_hvac_status (112) | N | 0-255 | NA | The alarm value allows individual notification of the highest priority active alarm. This object is set to zero if no alarms are active. |
| Warning Alarm | nvoWarnAlarm | SNVT_hvac_status (112) | N | 61-199 | NA | Allows individual notification of the highest priority active warning alarm. The value in Table 34 is the largest number in its enumeration that corresponds to an active alarm. This object is set to zero if no warning alarms are active. |
| Problem Alarm | nvoProbAlarm | SNVT_hvac_status (112) | N | 1-60 | NA | Allows individual notification of the highest priority active problem alarm. The value in Table 35 is the largest number in its enumeration that corresponds to an active alarm. This object is set to zero if no problem alarms are active. |
| Fault Alarm | nvoFaultAlarm | SNVT_hvac_status (112) | N | 200-255 | NA | Allows individual notification of the highest priority active fault alarm. The value in Table 36 is the largest number in its enumeration that corresponds to an active alarm. This object is set to zero if no fault alarms are active. |
| Clear Alarms | nviClearAlarms | UNVTclearAlarm | N | 1=No 2=ClrFlts 3=ClrPrblms 4=ClrWrngs 5=ClrAllAlms | 1=No | Clears all active alarms or all active alarms in a particular alarm class. |

[1] Refer to the Alarm Management section for complete details.

**NOTE:** The variables nvoMATemp,nvoMixedAirTemp, nvoConductivity, and nviCWFlow may appear when commissioning from the network. However, they are not available from the MicroTech 4 Rebel Applied Air controller. The variables appear because the Rebel Applied shares the same LON firmware as the MicroTech III AHU controller, which does support these nvos.

The MicroTech 4 unit controller has various ways of managing alarms, depending on the network protocol. Alarms can be monitored and cleared using more than one method.

# Alarm Classes

Alarms in the MicroTech 4 unit controller are divided into three classes: Faults, Problems, and Warnings. Fault alarms have the highest priority. Problem alarms have the next priority. Warning alarms have the lowest priority. The alarms within each class are also prioritized.

# Fault Alarms

Faults are conditions that are serious enough to completely shut down the unit. In this case, the Unit Status parameter indicates *OffAlm*. The alarm condition must be corrected and the alarm cleared before unit operation can resume. Fault alarms have the highest priority.

# Problem Alarms

Problem alarms do not cause unit shutdown but do limit operation of the unit in some way. Some of these alarms must be cleared manually, others clear automatically when conditions return to normal. Problem alarms have the next highest priority.

# Warning Alarms

Warnings are conditions that should be addressed, but do not limit operation in any way. Some of these alarms must be cleared manually, others will clear automatically when conditions return to normal. Warning alarms have the lowest priority.

# Alarm Notification

Each alarm is assigned a priority number from 1-255. Faults (200-255) have a higher priority than Problems (61-199) which have a higher priority than Warnings (1-60).

The alarm priority number is mapped to both LONWORKS and BACnet networks. The alarm priority number is set to 0 to indicate no alarm or to the enumeration of the highest priority active alarm.

**NOTE:** Applies when unit control type is ZTC, DTC, or 1ZnVAV.

# BACnet Alarm Notification

Individual alarm notification is supported through *AlarmValue* (AV:30) The highest priority active alarm can be read directly from the *AlarmValue* object's Present_Value property.

Three separate values indicate the highest active alarm numbers by Fault, Problem and Warnings. BACnet alarm objects are set to zero if no alarms are active. Alarm objects are read-only. Refer to Table 32 and the following alarm tables for more information.

*Table 32: BACnet Alarm Values*

| Point Name | BACnet Object Name | Object Type/Instance | Range | Description |
|---|---|---|---|---|
| Alarm Value | AlarmValue | AV:30 | 0-255 | Highest priority active alarm. Alarm object = 0 if no alarms are active or to the enumeration of the highest priority active alarm. |
| Warning Alarm | ActiveWarning | AV:27 | 0-60 | Highest priority active problem alarm. |
| Problem Alarm | ActiveProblem | AV:28 | 0, 61-199 | Highest priority active warning alarm. |
| Fault Alarm | ActiveFault | AV:29 | 0, 200-255 | Highest priority active fault alarm. |
| Clear Alarms | ClearAlarms | MSV:13 | 1=None 2=ClrFlts 3=ClrPrblms 4=ClrWrngs 5=ClrAllAlms | Clears all active alarms or all active alarms in a particular alarm class. Default = 1 (None) |

It is often necessary for event notifications to be sent to multiple destinations or to different destinations based on the time of day or day of week. The controller uses Notification Classes (NC) supported by standard BACnet intrinsic reporting requirements. See table below for descriptions. The Notification Class priority specifies a priority from 0 to 255 (0 being most important, 255 least important).

The MicroTech 4 unit controller can generate event notifications directed to one or more recipients (maximum 20 recipients). There is one notification class object for each class of alarms. You must subscribe to the notification class objects in order to use them. The Recipient List property must indicate when and to which device notification should be made.

| Notification Class (NC) | BACnet Object Name | Instance Number |
|---|---|---|
| NC 1 | Faults | 1 |
| NC 2 | Problems | 2 |
| NC 3 | Warnings | 3 |
| NC 4 | Events | 4 |

The Event_Enable property of each object enables and disables the reporting of To-OffNormal, To-Fault, and To-Normal events. For example, if it has been determined that an event is not to be generated when the alarm object returns to a normal state, set the To-Normal bit of the objects Event_Enable property to 0.

### Alarm Acknowledgement

In some systems, a device may need to know that someone has seen and responded to the alarm notification. The BACnet object keeps track of the acknowledgement of each of the three event transitions separately. Notification Class objects have an Ack_Transitions property that determines if acknowledgments have occurred for the To-OffNormal, To-Fault, and To-Normal bit fields. This property cannot be changed. Each one of the states (To-OffNormal, To-Fault, and To-Normal) can require a separate acknowledgement. A Time Stamp is used to identify the event notification that is being acknowledged.

### Recipient List Property (Destinations)

The recipient list property (Recipient_List) of the Notification Class object is a list of standard BACnet data type BACnetDestination elements. Within each destination (Recipient_List) record is a set of Valid Days of the week (Monday - Sunday) and a From Time and To Time, during which the destination is sent a notification. Also specified is the applicable event transition(s) (To-OffNormal, To-Fault, and To-Normal) for which the destination is sent a notification.

NOTE: For a specific event transition (To-OffNormal, To-Fault, and To-Normal) to reach a recipient, the transition choice has to be selected BOTH in the source object AND in the destination (recipient) record.

If the BAS supports intrinsic alarming but is unable to subscribe to the recipient list property of the Notification Class object, the BAS can still receive an alarm notification by adding its Device Instance to the "NC Dev 1=" or "NC Dev 2=" items on the MicroTech 4 unit controller HMI under the BACnet MSTP or BACnet IP Setup menu. Cycle power on the MicroTech 4 unit controller for changes to take effect. Once power is cycled, the MicroTech 4 unit controller sends out a "Who-Is" command directed at the device. If the device responds, the MicroTech 4 unit controller sends Unconfirmed Notifications for all alarms that are generated in the application. If the device does not respond to the Who-Is, the MicroTech 4 unit controller periodically sends out the Who-Is until the device responds.

Refer to ASHRAE 135-2014 Section 13-Alarm and Event Services for more information.

## LONWORKS Alarm Notification

The highest priority active alarm is indicated by the network variable, *nvo_UnitStatus_in_alarm*.

Separate alarm values are also provided that indicate the highest priority active Warning, Problem, and Fault alarms. It is possible to have multiple active alarms, but only the highest priority is displayed.

Refer to Table 33 and the following alarm tables for more information.

*TABLE 33: LONWORKS Alarm Variables*

| Variable Name | LONWORKS Variable | SNVT Type/Index | Range | Receive Heart-beat | Description |
|---|---|---|---|---|---|
| Alarm Value | nvoUnitStatus_in_alarm | SNVT_hvac_status (112) | 0-255 | N | Highest priority active alarm. Alarm object = 0 if no alarms are active or indicates the enumeration of the highest priority active alarm. |
| Problem Alarm | nvoProbAlm | | 0-60 | | Highest priority active problem alarm. |
| Warning Alarm | nvoWarnAlm | | 0, 61-199 | | Highest priority active warning alarm. |
| Fault Alarm | nvoFaultAlm | | 0, 200-255 | | Highest priority active fault alarm. |
| Clear Alarms | nviClearAlarms | UNVTclearAlarm | 0=None 1=ClrFlts 2=ClrPrblms 3=ClrWrngs 4=ClrAllAlms | N | Clears all active alarms or all active alarms in a particular alarm class. Default = 1 (None) |

# Alarm Clearing

All alarms and groups of alarms can be cleared via the network by setting the *ClrAlms* variable to a non-zero value as indicated. *ClrAlms* automatically reverts to zero when the alarms are cleared.

All active alarms are cleared automatically when power is cycled to the MicroTech 4 unit controller. If conditions that triggered the alarm are still present after a power cycle, the active alarm is re-initiated with a new date/time stamp.

## BACnet

Alarms can be cleared by alarm class using the *ClearAlarms* multistate object. To clear alarms in a particular class, set the value of *ClearAlarms* to the appropriate value (2-4). After the alarms are cleared, this object returns to 1 = None.

1 = None
2 = Clear All Faults
3 = Clear All Problems
4 = Clear All Warnings
5 = Clear All Alarms

## LONWORKS

Alarms can be cleared by alarm class using the network variable, *nviClearAlarms*. To clear alarms in a particular class, set the value of *nviClearAlarms* to the appropriate value (1-3). After the alarms are cleared, this variable returns to 0 = None.

0 = None
1 = Clear All Faults
2 = Clear All Problems
3 = Clear All Warnings
4 = Clear All Alarms

# Alarm Tables

The following section describes alarm enumerations available to the network (Table 34 - Table 36). A higher alarm number indicates a higher priority alarm. See Table 37 - Table 39 for BACnet-only events and alarm object inputs. Otherwise, all other alarms apply to both BACnet and LONWORKS.

Alarms can be monitored and cleared as described in the previous section. Not all alarms are available for every application.

Refer to the MicroTech 4 unit controller OM 1288 for complete alarm generation descriptions.

*Table 34: Warning Alarms*

| Active Alarm Value | Alarm Name | Clear | Description |
|---|---|---|---|
| 0 | No Active Alarm | | No active alarms. |
| 1 | Hi PM25: Warning | Manual | Indicates that PM25Status (amount of particulate matter in the space) is at poor or hazard conditions for longer than tfor longer than the Hi PM25 time. Applies to units configured with IAQ monitoring package. |
| 2 | Hi PM10: Warning | Manual | Indicates PM10Status (amount of particulate matter in the space) is at poor or hazard conditions for longer than for longer than the Hi PM10 time. Applies to units configured with IAQ monitoring package. |
| 3 | Hi TVOC: Warning | Manual | Indicates TVOCStatus (amount of VOCs in the space) is at poor or hazard conditions for longer than tfor longer than the Hi TVOC time. Applies when units are configured for IAQ monitoring and have the proper sensor installed. |
| 4 | Hi Humidity: Warning | Manual | Indicates that a space or return air humidity sensor has exceeded the setpoint high limit for longer than the Hi Humid time. Applies when units are configured for IAQ monitoring and have the proper sensor installed. |
| 5 | Lo Humidity: Warning | Manual | Indicates that a space or return air humidity sensor is below the setpoint low limit for longer than the Lo Humid time. Applies when units are configured for IAQ monitoring and have the proper sensor installed. |
| 6 | Lo Bldg Press: Warning | Automatic | Indicates the building static pressure (BSP) is below the low BSP setpoint. Applies when units are configured for IAQ monitoring and have the proper sensor installed. |
| 7 | Hi CO2: Warning | Manual | Indicates the amount of CO2 in the space is at poor or hazard conditions for longer than the Hi CO2 time. Applies when units are configured for IAQ monitoring and have the proper sensor installed. |
| 24 | Main Filter: Warning | Manual | Indicates the status of the main filter switch.[1] |
| 25 | Final Filter: Warning | Manual | Indicates the status of the final filter switch.[1] |
| 34 | Return / Exhaust Fan: Warning | Automatic | An active alarm indicates that there is a problem with the return or exhaust fan operation. Applies to units with a VFD or ECM return/exhaust fan.[2] |
| 50 | Over Economizing: Warning | Automatic | An active alarm indicates that the unit is economizing when it should not be economizing.[2] |
| 52 | Under Economizing: Warning | Automatic | An active alarm indicates that the unit is not economizing when it should be economizing.[2] |
| 54 | Excess Outdoor Air: Warning | Automatic | An active alarm indicates that the unit is delivering excess outdoor air.[2] |
| 56 | Outdoor Air Damper Stuck: Warning | Automatic | An active alarm indicates that the outdoor air dampers may be stuck.[2] |
| 58 | Energy Wheel: Warning | Automatic | An active alarm indicates that the energy recovery wheel is not functioning as expected.[2] |

[1] Normal = 0, In Alarm = 1
[2] Open or short-circuited = 0, Closed = 1

*Table 35: Problem Alarms*

| Alarm Number | Alarm Name | Clear | Description |
|---|---|---|---|
| 0 | No Active Problems | | No active alarms. |
| 64 | HiFCmpTmp1: Problem | Automatic[3] | Indicates that the fixed compressor high temperature 1 is above 120°F continuously for 5 seconds. |
| 65 | HiFCmpTmp3: Problem | Automatic[3] | Indicates that the fixed compressor high temperature 3 is above 120°F continuously for 5 seconds. |
| 66 | HiFCmpTmp5: Problem | Automatic[3] | Indicates that the fixed compressor high temperature 5 is above 120°F continuously for 5 seconds. |
| 67 | FCmpTmp1: Problem | Manual | Indicates that the fixed compressor temperature sensor 1 is present and either shorted or open circuited for longer than temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range. |
| 68 | FCmpTmp3: Problem | Manual | Indicates that the fixed compressor temperature sensor 3 is present and either shorted or open circuited for longer than temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range. |
| 69 | FCmpTmp5: Problem | Manual | Indicates that the fixed compressor temperature sensor 5 is present and either shorted or open circuited for longer than temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range. |
| 70 | DRT3Sensor: Problem | Manual | Indicates that the DRT sensor 3 is present and either shorted or open circuited for longer than temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range. |
| 71 | DRT5Sensor: Problem | Manual | Indicates that the DRT sensor 5 is present and either shorted or open circuited for longer than temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range. |
| 74 | Hi FCmpTmp2: Problem | Automatic[3] | Indicates that the fixed compressor high temperature 2 is above 120°F for five seconds. |

**Table 35: Problem Alarms, Continued**

| Alarm Number | Alarm Name | Clear | Description |
|---|---|---|---|
| 75 | Hi FCmpTmp4: Problem | Automatic[3] | Indicates that the fixed compressor high temperature 4 is above 120°F for five seconds |
| 76 | Hi FCmpTmp6: Problem | Automatic[3] | Indicates that the fixed compressor high temperature 6 is above 120°F for five seconds |
| 77 | FCmpTmp2: Problem | Manual | Indicates that the fixed compressor temperature sensor 2 is present and either shorted or open circuited for longer than temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range. |
| 78 | FCmpTmp4: Problem | Manual | Indicates that the fixed compressor temperature sensor 4 is present and either shorted or open circuited for longer than temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range. |
| 79 | FCmpTmp6: Problem | Manual | Indicates that the fixed compressor temperature sensor 6 is present and either shorted or open circuited for longer than temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range. |
| 80 | DRT4Sensor: Problem | Manual | Indicates that the DRT sensor 4 is present and either shorted or open circuited for longer than temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range. |
| 81 | DRT6 Sensor: Problem | Manual | Indicates that the DRT sensor 6 is present and either shorted or open circuited for longer than temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range. |
| 82 | DFT1Sensor: Problem | Manual | Indicates the defrost sensor 1 is present and either shorted or opened for longer than the temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range. Applies to heat pump units. |
| 83 | DFT2Sensor: Problem | Manual | Indicates the defrost sensor 2 is present and either shorted or opened for longer than the temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range. Applies to heat pump units. |
| 101 | MHGRht Vlv1: Problem | Manual | Indicates that the modulating hot gas reheat valve motor and driver are not synchronizing as expected.[1] |
| 105 | DRT1: Problem | Manual | Indicates that the DRT sensor 1 is present and either shorted or opened for longer than the temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range. |
| 106 | DRT2: Problem | Manual | Indicates that the DRT sensor 2 is present and either shorted or opened for longer than the temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range. |
| 107 | 4WV1: Problem | Manual | The 4-way reversing valve 1 indicates a problem with compressor cooling and heating operation. Applies to heat pump units. |
| 108 | 4WV2: Problem | Manual | The 4-way reversing valve 2 indicates a problem with compressor cooling and heating operation. Applies to heat pump units. |
| 109 | ProtIntrlck: Problem | Manual | The Protection Interlock Problem alarm is generated when the effective compressor capacity input is greater than 5% and the system safety protection interlock input is Open or the safety switch command is Off for 90 seconds. Compressor operation is disabled under these conditions. Applies to refrigeration-only units. |
| 110 | VCmp 1: Problem | Manual | Indicates the current status of the variable speed compressor problem alarm on circuit 1. Applies to units with VFD compressors.[1] |
| 111 | VCmp 2: Problem | Manual | Indicates the current status of the variable speed compressor problem alarm on circuit 2. Applies to units with VFD compressors.[1] |
| 115 | SRT Sensor 1: Problem | Manual | Indicates that suction refrigerant temperature sensor on circuit 1 is present and either shorted or opened for longer than the temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range. |
| 116 | SRT Sensor 2: Problem | Manual | Indicates that suction refrigerant temperature sensor on circuit 2 is present and either shorted or opened for longer than the temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range. |
| 120 | Hi DL Temp_1: Problem | Manual | Indicates if the high discharge line temperature problem alarm on circuit 1 or 2 has exceeded the high temperature limit. Applies to units with VFD compressors.[1] |
| 121 | Hi DL Temp_2: Problem | | |
| 125 | Exp Valve 1: Problem | Manual | Indicates the status of the circuit 1 or 2 expansion valve problem alarm.[1] |
| 126 | Exp Valve 2: Problem | | |
| 130 | OA Fan 1: Problem | Manual | Indicates if an outdoor air fan problem alarm on circuit 1 or 2 is active.[1] |
| 131 | OA Fan 2: Problem | | |
| 135 | PTS1 Sensor: Problem | Manual | The suction refrigerant pressure sensor 1 or 2 is present and the following are true for 30 seconds:<br>• Charge Loss Problem is Inactive<br>• The sensor value is less than -96.53 kPa (-14.0 psi) |
| 136 | PTS2 Sensor: Problem | | |
| 140 | PTD1 Sensor: Problem | Manual | The discharge refrigerant pressure sensor 1 or 2 is present and the sensor value is greater than 4619.5 kPa (670 psi) or less than -96.53 kPa (-14.0 psi). |
| 141 | PTD2 Sensor: Problem | | |
| 145 | Lo Charge 1: Problem | Manual | Indicates the status of the low refrigerant charge problem alarm on circuit 1 or 2.[1] |
| 146 | Lo Charge 2: Problem | | |
| 150 | ChargeLoss 1: Problem | Manual | Indicates if the refrigerant system charge on circuit 1 or 2 has been lost and the following are true for 20 seconds:[1]<br>• The discharge refrigerant pressure sensor is less than or equal to 68.94 kPa (10 psi)<br>• The suction refrigerant pressure sensor is less than or equal to 68.94 kPa (10 psi) |
| 151 | ChargeLoss 2: Problem | | |
| 155 | VCmp1LoDSH: Problem | Manual | Indicates if the discharge superheat problem alarm on circuit 1 or 2 is active because of a low superheat reading. Applies to units with VFD compressors[1] |
| 156 | VCmp2LoDSH: Problem | | |

### Table 35: Problem Alarms, Continued

| Alarm Number | Alarm Name | Clear | Description |
|---|---|---|---|
| 160 | Lo Press 1: Problem | Manual | Indicates the status of the low pressure switch input. When it is in the alarm (Open) position, the low pressure problem alarm is active. This means that the low pressure switch input has been in the alarm (Open) position for longer than the default of two seconds or that the compressor on circuit 1 or 2 has been on for longer than 5 seconds[1] |
| 161 | Lo Press 2: Problem | | |
| 165 | Hi Press 1: Problem | Manual | Indicates the status of the high pressure switch input. When it is in the alarm (Open) position, the high pressure problem alarm is active and the inverter compressor refrigerant circuit 1 or 2 high limits have been exceeded. Applies to units with VFD compressors.[1] |
| 166 | Hi Press 2: Problem | | |
| 170 | Lo Press Diff 1: Problem | Manual | Current status of the low discharge pressure problem alarm on circuit 1 or 2. Applies to units with VFD compressors.[1] |
| 171 | Lo Press Diff 2: Problem | | |
| 175 | HiVCmpTmp 1: Problem | Manual | Indicates if the high variable speed compressor for circuit 1 or 2 has exceeded the high temperature setpoint. Alarm requires a manual clear after VCmp1Temp is below 212°F (100°C) continuously for one minute.[1] |
| 176 | HiVCmpTmp 2: Problem | | |
| 180 | VCmpTSnsr1: Problem | Manual | Indicates that the variable compressor temperature sensor 1 or 2 is present but has been shorted. It can also indicate that the sensor is in the alarm (Open) position, or that no sensor is detected. |
| 181 | VCmpTSnsr2: Problem | | |
| 185 | VCmp1HiDSH: Problem | Manual | Indicates the high discharge superheat problem alarm on cooling circuit 1 or 2. Applies to units with VFD compressors.[1] |
| 186 | VCmp2HiDSH: Problem | | |
| 190 | IFB1 Comm: Problem | Automatic[4] | An interruption has occurred between the MicroTech 4 unit controller and an inverter compressor interface communication board (IFB) board, if installed. This indicates that both the high pressure switch HP1 and HP2 switch inputs are in the normal (Close) position. Note: The high pressure switch disables a 16VDC power input from the variable compressor controller. This may cause an erroneous IFB1/IFB2 Comm problem alarm. |
| 191 | IFB2 Comm: Problem | | |
| 192 | EFT/LCT Snsr: Problem | Automatic | Indicates that the entering fan/leaving coil temperature sensor is present and either shorted or open circuited for longer than temperature alarm delay default of 30 seconds. Applies when unit control type is ZTC, DTC, or 1ZnVAV. |
| 193 | RAT Sensor: Problem | Automatic | The return air temperature sensor is present and either shorted or opened for longer than the temperature alarm delay default of 30 seconds. Applies when unit control type is ZTC, DTC, or 1ZnVAV. Alarm clears automatically when the sensor becomes reliable. |
| 194 | Space Sensor 1: Problem | Automatic | Indicates that the local space sensor input is shorted or open circuited for longer than the temperature alarm delay of 30 seconds. Applies when unit control type is ZTC, DTC, or 1ZnVAV. Alarm clears automatically when the sensor becomes reliable. |
| 195 | Space Sensor 2: Problem | | |
| 196 | Space Sensor 3: Problem | | |
| 197 | OAT Sensor: Problem | Manual | Indicates that a valid network outdoor air temperature input value is not present and that the local outdoor air temperature sensor is either shorted or open circuited. Applies when unit control type is ZTC, DTC, or 1ZnVAV. |
| 198 | Freeze: Problem | Automatic | Indicates that the freezestat input is in the Open position.[1] Applies when unit control type is ZTC, DTC, or 1ZnVAV. |
| 199 | Heat Fail: Problem | Automatic | Indicates the heat fail problem alarm is active.[1] Applies when unit control type is ZTC, DTC, or 1ZnVAV. |

[1] Normal = 0, In Alarm = 1
[2] Open or short-circuited = 0, Closed = 1
[3] Requires a manual reset if the alarm occurs three times within 100 minutes
[4] Requires a manual reset if the alarm occurs five times within 100 minutes

### Table 36: Fault Alarms

| Alarm Number | Alarm Name | Clear | Description |
|---|---|---|---|
| 0 | NA | NA | No active alarms. |
| 208 | Airflow Fault | Manual | Indicates the condition of the airflow switch used to determine whether or not sufficient supply air flow is present for unit operation.[1] Does not apply to refrigeration-only units. |
| 212 | Low Discharge Air Temperature Fault | Manual | Indicates that the discharge air temperature is below the low discharge temperature setting and that the discharge air temperature sensor reading is reliable (not open or short-circuited). |
| 216 | High Discharge Air Temperature Fault | Manual | Indicates that the discharge air temperature is greater than the high discharge temperature limit and that the discharge air temperature sensor reading is reliable (not open or short-circuited).[2] |
| 220 | High Return Air Temperature Fault | Manual | Indicates that the return air temperature is greater than the high return temperature limit of 120°F for longer than the high/low temperature alarm delay of 35 seconds and that the return air temperature sensor reading is reliable (not open or short-circuited). |
| 224 | Duct High Limit Fault | Manual | Indicates that the Duct High Limit Fault alarm is active. Applies only to Variable Air Volume (VAV) units configured for a VFD or ECM supply fan. |
| 228 | Discharge Air Temperature Sensor Fault | Manual | Indicates that the discharge air temperature sensor is not reliable[2] for longer than the temperature sensor alarm delay default of 30 seconds. |
| 244 | Control Temperature Fault | Manual | Indicates that the sensor configured for control temperature is not present, is not reliable[2] or is out of range. Also, no other sensor (the return air temperature, outdoor air temperature, or space temperature senor) is available. |

**Table 36: Fault Alarms, Continued**

| Alarm Number | Alarm Name | Clear | Description |
|---|---|---|---|
| 250 | Emergency Off Fault | Manual[3] | Indicates that the emergency off switch input is in the alarm (Open) position and either of the following are true:<br>• BACnet EmergencyOverride is set to Off<br>• LON nviEmergOverride is set to Off |
| 252 | Freeze Fault | Manual | Indicates that the freezestat input is in the alarm (Open) position and the supply air fan is on for at least 30 seconds.[2] Applies when the unit heating is face and bypass or hot water steam, or the unit cooling is chilled water. |

[1] Normal = 0, In Alarm = 1
[2] Open or short-circuited = 0, Closed = 1
[3] Alarm is manual when the Emergency Off Reset parameter is set to ManClr. Otherwise, it is automatic when Emergency Off Reset is set to AutoClr from the HMI

**Table 37: BACnet Binary Alarm Inputs**

| Alarm Message | Object Type/ Instance | BACnet Object Name | Clear | Description |
|---|---|---|---|---|
| Airflow Fault (208) | BI:1 | AirFlwFlt | Manual | Indicates the condition of the airflow switch[1]. It is the object that generates the alarm. Determines whether or not sufficient supply air flow is present for unit operation. Does not apply to refrigeration-only units. |
| | BI:2 | AirFlwStatus | NA | Indicates the airflow status (0=NoFlow, 1=Flow). |
| Main Filter Switch Input | BI:3 | FilterSw | NA | Indicates the position of the main filter switch.[2] |
| Main Filter Warning (24) | BI:5 | FilterWrn | Manual | Generates a Main Filter Warning alarm under any one of the following conditions:<br>• The main filter switch input (FilterSw) is in the alarm (open) position<br>• Filter pressure 1 analog input 21 is above the high filter pressure 1 setpoint<br>• Filter pressure 2 analog input 22 is above the high filter pressure 2 setpoint |
| Final Filter Switch Input | BI:4 | FilterSw2 | NA | Indicates the status of the Final Filter Switch input.[2] It is one of the reasons for generating a Final Filter Warning alarm (25). |
| Final Filter Warning (25) | BI:6 | FilterWrn2 | Manual | Generates a Final Filter Warning alarm when the final filter switch input (FilterSw2) is in the alarm (open) position or when the filter pressure 3 analog input 23 is above the high filter pressure 3 setpoint. |
| Energy Wheel Warning (58) | BI:7 | ERWheelWrn | Automatic | Indicates that the energy recovery wheel is not functioning as expected and the Energy Wheel Warning alarm is active.[1] |
| High Return Air Temperature Fault (220) | BI:8 | HiRATFlt | Manual | Indicates that the return air temperature is greater than the high return temperature limit of 120°F for longer than the high/low temperature alarm delay of 35 seconds and that the return air temperature sensor is not reliable (shorted or open circuited).[1] |
| Over Economizing Warning (50) | BI:9 | OverEconoWrn | Automatic | An active alarm indicates that the unit is economizing when it should not be economizing. The OffNormal state of this object indicates the Over Economizing Warning alarm is active.[1] |
| Under Economizing Warning (52) | BI:10 | UnderEconoWrn | Automatic | An active alarm indicates that the unit is not economizing when it should be economizing. The OffNormal state of this object indicates the Under Economizing Warning alarm is active.[1] |
| Excess Outdoor Air Warning (54) | BI:11 | ExcessOAWrn | Automatic | An active alarm indicates that the unit is delivering excess outdoor air. The OffNormal state of this object indicates the Excess Outdoor Air Warning alarm is active.[1] |
| Outdoor Air Damper Stuck Warning (56) | BI:12 | OADStuckWrn | Automatic | An active alarm indicates that the air dampers may be stuck. The OffNormal state of this object indicates the Outdoor Air Damper Stuck Warning alarm is active.[1] |
| Return / Exhaust Fan Warning (34) | BI:13 | RetExhFanWrn | Automatic | An active alarm indicates that there is a problem with the return or exhaust fan operation. The OffNormal state of this object indicates a Return / Exhaust Fan Warning. Applies to units with a VFD or ECM return/exhaust fan.[1] |
| Freeze Fault (252) | BI:14 | FreezeStat | Manual | Indicates that the freezestat is in the open position and an alarm has been generated.[2] |
| Freeze Problem (198) | BI:15 | FreezePrb | Automatic | Activates the Freeze Problem alarm when input is in the Open position.[1] |
| Heat Fail Problem (199) | BI:16 | HeatFailPrb | Automatic | Indicates the status of the Heat Fail Problem alarm.[1] |
| Duct High Limit Fault (224) | BI:17 | DuctHiLmtSw | Manual | Indicates the status of the local duct high limit switch with input from the local sensor. This is the object that generates a Fault alarm when in the Open position.[2] |
| Emergency Off Fault (250) | BI:18 | EmergencyOffSw | Manual | Indicates the status of the emergency off switch. Input is from either a local sensor or the network. This is the object that generates a Fault alarm when in the Open position.[2] |
| High Pressure Problem Circuit 1 (165) | BI:100 | C1HiPressPrb | Manual | Indicates the status of the high pressure switch input. When it is in the alarm (Open) position, the High Pressure Problem alarm is active and the inverter compressor refrigerant circuit 1 or 2 high limits have been exceeded.[1] |
| High Pressure Problem Circuit 2 (166) | BI:200 | C2HiPressPrb | | |

### *Table 37: BACnet Binary Alarm Inputs, Continued*

| Alarm Message | Object Type/ Instance | BACnet Object Name | Clear | Description |
|---|---|---|---|---|
| Low Pressure Problem Circuit 1 (160) | BI:101 | C1LoPressPrb | Automatic | Indicates the status of the low pressure switch input. When it is in the alarm (Open) position, the Low Pressure Problem alarm is active. This means that the low pressure switch input has been in the alarm (Open) position for longer than the default of two seconds or that the compressor on circuit 1 or 2 has been on for longer than five seconds.[1] |
| Low Pressure Problem Circuit 2 (161) | BI:201 | C2LoPressPrb | | |
| Low Discharge Pressure Problem Circuit 1 (170) | BI:102 | C1LoDPPrb | Manual | Current binary status of the Low Discharge Pressure Problem alarm for circuit 1 or 2 of VFD compressor units.[1] |
| Low Discharge Pressure Problem Circuit 2 (171) | BI:202 | C2LoDPPrb | | |
| Outdoor Air Fan 1 Problem (130) | BI:103 | C1OAFPrb | Manual | Indicates if an Outdoor Air Fan Problem alarm is active.[1] |
| Outdoor Air Fan 2 Problem (131) | BI:203 | C2OAFPrb | | |
| Inverter Compressor Board (IFB) 1 Problem (190) | BI:104 | C1IFBCommPrb | Manual | Indicates if an interruption has occurred between the MicroTech 4 unit controller and an inverter compressor interface communication board (IFB) board, if installed.[1] |
| Inverter Compressor Board (IFB) 2 Problem (191) | BI:204 | C2IFBCommPrb | | |
| Charge Loss Problem Circuit 1 (150) | BI:105 | C1ChargeLossPrb | Manual | Indicates if the refrigerant system charge on circuit 1 or 2 has been lost.[1] |
| Charge Loss Problem Circuit 2 (151) | BI:205 | C2ChargeLossPrb | | |
| Low Refrigerant Charge Problem Circuit 1 (145) | BI:106 | C1LoChargePrb | Manual | Indicates the status of the Low Refrigerant Charge Problem alarm for circuit 1 or 2[1] |
| Low Refrigerant Charge Problem Circuit 2 (146) | BI:206 | C2LoChargePrb | | |
| High Variable Speed Compressor Temperature Problem Circuit 1 (175) | BI:107 | C1HiVCmpTPrb | Manual | Indicates if the variable speed compressor for circuit 1 or 2 has exceeded the high temperature setpoint. Alarm can be cleared manually after VCmp1Temp has been below 212°F (100°C) continuously for one minute.[1] |
| High Variable Speed Compressor Temperature Problem Circuit 2 (176) | BI:207 | C2HiVCmpTPrb | | |
| Variable Speed Compressor Problem Circuit 1 (110) | BI:108 | C1VarCompPrb | Manual | Indicates the current binary status of the Variable Speed Compressor Problem alarm on circuit 1 or 2. Applies to units with VFD compressors.[1] |
| Variable Speed Compressor Problem Circuit 2 (111) | BI:208 | C2VarCompPrb | | |
| Low Discharge Superheat Problem Circuit 1 (155) | BI:109 | C1LoDischSHPrb | Manual | Indicates if the circuit 1 or 2 Discharge Superheat Problem alarm is active because of a low superheat reading. Applies to units with VFD compressors.[1] |
| Low Discharge Superheat Problem Circuit 2 (156) | BI:209 | C2LoDischSHPrb | | |
| High Discharge Superheat Problem Circuit 1 (185) | BI:110 | C1HiDischSHPrb | Manual | Indicates the status of the circuit 1 or 2 Discharge Superheat Problem alarm. Applies to units with VFD compressors.[1] |
| High Discharge Superheat Problem Circuit 2 (186) | BI:210 | C2HiDischSHPrb | | |
| High Discharge Line Temperature Problem Circuit 1 (120) | BI:111 | C1HiDLTmpPrb | Manual | Indicates if the High Discharge Line Temperature Problem alarm on circuit 1 or 2 has exceeded the high temperature limit. Applies to units with VFD compressors.[1] |
| High Discharge Line Temperature Problem Circuit 2 (121) | BI:211 | C2HiDLTmpPrb | | |
| Expansion Valve Problem Circuit 1 (125) | BI:112 | C1EVPrb | Manual | Indicates the status of the circuit 1 or 2 Expansion Valve Problem alarm.[1] |
| Expansion Valve Problem Circuit 2 (126) | BI:212 | C2EVPrb | | |
| Modulating Hot Gas Reheat Problem (101) | BI:113 | MHGRhtVlvPrb | Manual | Indicates that the modulating hot gas reheat valve motor and driver are not synchronizing as expected.[1] |

[1] Normal = 0, In Alarm = 1
[2] Open or short-circuited = 0, Closed = 1

*Table 38: BACnet Binary Inputs - Events*

| Event Name | Object Type/ Instance | BACnet Object Name | Clear | Description |
|---|---|---|---|---|
| Fan Retry Event | BI:40 | FanRetryEvnt | Automatic | Supply Fan Retry Event control is active. |
| Tenant Override Event | BI:41 | TenantOREvnt | Automatic | Tenant Override Event operation control is active. |
| Passive Ventilation Active Event | BI:42 | PassVentEvnt | Automatic | Passive Ventilation Active Event sequence control is active. |
| Reheat Limiting Control | BI:43 | ReheatLmtgEvnt | Automatic | Reheat Compressor Limiting Event control is active. |
| High Pressure Unload Event Circuit 1 | BI:149 | C1HPULEvnt | Automatic | Circuit 1 or 2 High Pressure Unloading Event control is active. |
| High Pressure Unload Event Circuit 2 | BI:249 | C2HPULEvnt | | |
| Low Differential Pressure Unload Event Circuit 1 | BI:151 | C1LDPULEvnt | Automatic | Circuit 1 or 2 Low Differential Pressure Unloading Event control is active. |
| Low Differential Pressure Unload Event Circuit 2 | BI:251 | C2LDPULEvnt | | |
| High Discharge Line Temperature Unload Event Circuit 1 | BI:144 | C1HDLTULEvnt | Automatic | Circuit 1 High Discharge Line Temperature Unloading Event control is active on fixed compressor 1,3, or 5. |
| | BI:174 | C1HDLT3ULEvnt | | |
| | BI:175 | C1HDLT5ULEvnt | | |
| High Discharge Line Temperature Unload Event Circuit 2 | BI:244 | C2HDLTULEvnt | Automatic | Circuit 2 High Discharge Line Temperature Unloading Event control is active on fixed compressor 2, 4, or 6. |
| | BI:274 | C2HDLT4ULEvnt | | |
| | BI:275 | C2HDLT6ULEvnt | | |
| High Current Unload Event Circuit 1 | BI:145 | C1HiAmpULEvnt | Automatic | Circuit 1 or 2 High Amp Unloading Event control is active. |
| High Current Unload Event Circuit 2 | BI:245 | C2HiAmpULEvnt | | |
| Unload Request Event Circuit 1 | BI:157 | C1ReqULEvnt | Automatic | Circuit 1 or 2 Unload Request Control control is active. |
| Unload Request Event Circuit 2 | BI:257 | C2ReqULEvnt | | |
| High Compression Ratio Unloading Event Circuit 1 | BI:142 | C1HCRULEvnt | Automatic | Circuit 1 or 2 High Compression Ratio Unloading Event control is active. |
| High Compression Ratio Unloading Event Circuit 2 | BI:242 | C2HCRULEvnt | | |
| Fin Temperature Unload Event Circuit 1 | BI:141 | C1FinTULEvnt | Automatic | Circuit 1 or 2 High Fin Temperature Unloading Event control is active. Applies to units with inverter compressors. |
| Fin Temperature Unload Event Circuit 2 | BI:241 | C2FinTULEvnt | | |
| Low Pressure Unload Event Circuit 1 | BI:155 | C1LPULEvnt | Automatic | Circuit 1 or 2 Low Differential Pressure Unloading Event control is active. |
| Low Pressure Unload Event Circuit 2 | BI:255 | C2LPULEvnt | | |
| High Ambiet Limiting Control Circuit 1 | BI:160 | C1HiAmbLmtgEvnt | Automatic | Fixed Compressor Circuit 1 or 2 High Ambient Limiting control is active. |
| High Ambiet Limiting Control Circuit 2 | BI:260 | C2HiAmbLmtgEvnt | | |
| Low Suction Superheat Event Circuit 1 | BI:161 | C1LoSSHEvnt | Automatic | Circuit 1 or 2 Low Suction Superheat Event is active when the SSH1 < 5°F for at least 60 minutes. Applies to units configured for optional refrigerant monitoring system. |
| Low Suction Superheat Event Circuit 2 | BI:261 | C2LoSSHEvnt | | |
| High Suction Superheat Event Circuit 1 | BI:162 | C1HiSSHEvnt | Automatic | Circuit 1 or 2 High Suction Superheat Event is active when SSH1 > 30°F for at lest 60 minutes. Applies to units configured for optional refrigerant monitoring system. |
| High Suction Superheat Event Circuit 2 | BI:262 | C2HiSSHEvnt | | |
| Low Subcooling Event Circuit 1 | BI:165 | C1LoSubClgEvnt | Automatic | The Low Subcooling Event is active when all of the following are true for at least 60 minutes:<br>• Subcooling1 < 1°F<br>• All compressors in the circuit are running<br>• OA Problem alarm inactive<br>• Effective OAT > 75°F<br>• Unit State = Cooling<br>• The Dehumidification Status is Inactive<br>Applies to units configured for optional refrigerant monitoring system. |
| Low Subcooling Event Circuit 2 | BI:265 | C2LoSubClgEvnt | | |
| High Subcooling Event Circuit 1 | BI:166 | C1HiSubClgEvnt | Automatic | The High Subcooling Event is active when all of the following are true for at least 60 minutes:<br>• Subcooling1 > 25°F<br>• All compressors in the circuit are running<br>• The OA Problem alarm is inactive<br>• Effective OAT > 75°F<br>• Unit State = Cooling<br>• The Dehumidification Status is Inactive<br>Applies to units configured for optional refrigerant monitoring system. |
| High Subcooling Event Circuit 2 | BI:266 | C2HiSubClgEvnt | | |

**Table 38: BACnet Binary Inputs - Events, Continued**

| Alarm Message | BACnet Object Name | Object Type/ Instance | Clear | Description |
|---|---|---|---|---|
| Low Discharge Superheat Event Circuit 1 | BI:163 | C1LoDSHEvnt | Automatic | The Low Discharge Superheat Event is active when DSH1 or DSH2 < 20°F for at least 60 minutes. Applies to units configured for optional refrigerant monitoring system. |
| Low Discharge Superheat Event Circuit 2 | BI:263 | C2LoDSHEvnt | | |
| Low Discharge Superheat Disable Event Circuit 1 | BI:152 | C1LoDSHDsbEvnt | Automatic | The Low Discharge Superheat Disable Event indicates the discharge superheat temperature is below the DSH setpoint for more than 100 minutes. Low superheat protection is enabled on units with variable compressors. Also see VCmp1LoDSH Problem Alarm (155). Applies to units configured for optional refrigerant monitoring system. |
| Low Discharge Superheat Disable Event Circuit 2 | BI:252 | C2LoDSHDsbEvnt | | |
| High Discharge Superheat Event Circuit 1 | BI:164 | C1HiDSHEvnt | Automatic | The High Discharge Superheat Event is active when DSH1 or DSH2 < 20°F for at least 60 minutes. Applies to units configured for optional refrigerant monitoring system. |
| High Discharge Superheat Event Circuit 2 | BI:264 | C2HiDSHEvnt | | |
| Low Tc Event Circuit 1 | BI:167 | C1LoTcEvnt | Automatic | LoTc1 and LoTc2 inputs are determined from the circuit's average discharge pressure analog inputs. An event is triggered when the Tc1 or Tc2 value is below the acceptable range. Applies to units configured for optional refrigerant monitoring system. |
| Low Tc Event Circuit 2 | BI:267 | C2LoTcEvnt | | |
| High Tc Event Circuit 1 | BI:168 | C1HiTcEvnt | Automatic | HiTc1 and HiTc2 inputs are determined from the circuit's average discharge pressure (PTD_1 or PTD_2) analog inputs. An event is triggered when the Tc1 or Tc2 value is above the acceptable range. Applies to units configured for optional refrigerant monitoring system. |
| High Tc Event Circuit 2 | BI:268 | C2HiTcEvnt | | |
| Low Te Event Circuit 1 | BI:169 | C1LoTeg_Evnt | Automatic | LoTe1 and LoTe2 inputs are determined from the circuit's average suction pressure analog inputs. An event is triggered when the Te1 or Te2 value is below the acceptable range. Applies to units configured for optional refrigerant monitoring system. |
| Low Te Event Circuit 2 | BI:269 | C2LoTeg_Evnt | | |
| High Te Event Circuit 1 | BI:170 | C1HiTegEvnt | Automatic | HiTe1 and HiTe2 inputs are determined from the circuit's average suction pressure analog inputs. An event is triggered when the Te1 or Te2 value is above the acceptable range. |
| High Te Event Circuit 2 | BI:270 | C2HiTegEvnt | Automatic | |
| High Discharge Refrigerant Temperature Event Circuit 1 | BI:171 | C1HiDRTEvnt | Automatic | The Discharge Refrigerant Temperature Event is active when DRT1 or DRT2 sensor input is > 275°F for at least 30 minutes. Applies to units configured for optional refrigerant monitoring system. |
| High Discharge Refrigerant Temperature Event Circuit 2 | BI:271 | C2HiDRTEvnt | | |
| High Suction Return Temperature Event Circuit 1 | BI:172 | C1HiSRTEvnt | Automatic | The High Suction Return Temperature Event is active when the SRT1 or SRT2 sensor input is > 95°F for at least 45 minutes. Applies to units configured for optional refrigerant monitoring system. |
| High Suction Return Temperature Event Circuit 2 | BI:272 | C2HiSRTEvnt | | |
| Low Oil Prevention Event Circuit 1 | BI:173 | C1LowOilPrvntEvnt | Automatic | The Low Oil Prevention Event is active when compressors are operating under extreme conditions and low oil protection is required. Applies to variable compressor units. |
| Low Oil Prevention Event Circuit 2 | BI:273 | C2LowOilPrvntEvnt | | |

**Table 39: BACnet Binary Inputs - Standby Events**

| Event Message (Present_Value) | Object Type/ Instance | BACnet Object Name | Clear | Description[1] |
|---|---|---|---|---|
| Expansion Valve Synchronization Standby Event Circuit 1 | BI:140 | C1EVlSyncSBEvnt | Automatic | The circuit compressor state is forced into Standby because of expansion valve re-synchronization. |
| Expansion Valve Synchronization Standby Event Circuit 2 | BI:240 | C2EVlSyncSBEvnt | | |
| High Discharge Line Temperature Sensor Standby Event Circuit 1 | BI:143 | C1HDLTSBEvnt | Automatic | The circuit compressor state is forced into Standby because of high discharge line temperature unloading. |
| High Discharge Line Temperature Sensor Standby Event Circuit 2 | BI:243 | C2HDLTSBEvnt | | |
| High Discharge Superheat Standby Event Circuit 1 | BI:146 | C1HiDSHSBEvnt | Automatic | The circuit compressor state is forced into Standby because of high discharge superheat protection. |
| High Discharge Superheat Standby Event Circuit 2 | BI:246 | C2HiDSHSBEvnt | | |
| Compressor Body High Temperature Standby Event Circuit 1 | BI:147 | C1HiTSBEvnt | Automatic | The circuit compressor state is forced into Standby because of compressor body high temperature protection. |
| Compressor Body High Temperature Standby Event Circuit 2 | BI:247 | C2HiTSBEvnt | | |
| High Pressure Standby Event Circuit 1 | BI:148 | C1HPSBEvnt | Automatic | The circuit compressor state is forced into Standby because of high pressure unloading control. |
| High Pressure Standby Event Circuit 2 | BI:248 | C2HPSBEvnt | | |

*Table 39: BACnet Binary Inputs - Standby Events, Continued*

| Event Message (Present_Value) | Object Type/ Instance | BACnet Object Name | Clear | Description[1] |
|---|---|---|---|---|
| Low Pressure Differential Pressure Standby Event Circuit 1 | BI:150 | C1LDPSBEvnt | Automatic | The circuit compressor state is forced into Standby because of low differential pressure protection unloading control. |
| Low Pressure Differential Pressure Standby Event Circuit 2 | BI:250 | C2LDPSBEvnt | | |
| Low Pressure Standby Event Circuit 1 | BI:154 | C1LPSBEvnt | Automatic | The circuit compressor state is forced into Standby because of low pressure unloading control. |
| Low Pressure Standby Event Circuit 2 | BI:254 | C2LPSBEvnt | | |
| Outdoor Air Fan Standby Event Circuit 1 | BI:156 | C1OAFSBEvnt | Automatic | The circuit compressor state is forced into Standby because of a fault detected by the outdoor air fan VFD. |
| Outdoor Air Fan Standby Event Circuit 2 | BI:256 | C2OAFSBEvnt | | |
| Variable Compressor Problem Standby Event Circuit 1 | BI:158 | C1VCmpPrbSBEvnt | Automatic | The circuit compressor state is forced into Standby because of a fault detected by the variable compressor controller. |
| Variable Compressor Problem Standby Event Circuit 2 | BI:258 | C2VCmpPrbSBEvnt | | |
| Variable Compressor Request Standby Event Circuit 1 | BI:159 | C1VCmpReqSBEvnt | Automatic | The circuit compressor state is forced into Standby because of a request from the variable compressor controller. |
| Variable Compressor Request Standby Event Circuit 2 | BI:259 | C2VCmpReqSBEvnt | | |

[1] Standby events apply to variable compressors and are supported by intrinsic reporting (NC-4) of the BACnet Event Notification requirements.

# MicroTech 4 Rebel Applied BACnet PICS

This section contains the Protocol Implementation Conformance Statement (PICS) for the MicroTech 4 unit controller of Daikin Applied as required by ANSI/ASHRAE Standard 135-2014, BACnet: A Data Communication Protocol for Building Automation and Control Networks.

| Date | November 2022 |
|---|---|
| Vendor Name | Daikin Applied |
| Product Name | MT4 Rebel Applied |
| Product Model Number | MT4 AHU |
| Application Software Version | 2506036115 |
| Firmware Revision | 11.42 |
| BACnet Protocol Version | 1 |
| BACnet Protocol Revision | 14 |

## Product Description

The MicroTech 4 unit controller with BACnet (IP or MS/TP) comunication module is designed to operate the Rebel Applied Packaged Rooftop unit and integrate it into a BACnet building automation system.

The MicroTech 4 unit controller provides normal temperature, static pressure and ventilation control and alarm monitoring with alarm-specific component shutdown in critical system conditions. Access to temperatures, pressures, operating states, alarm messages, control parameters and schedules is available through the MicroTech 4 unit controller menu display (HMI) and the BACnet control network.

## BACnet Standardized Device Profile (Annex L)

| | | |
|---|---|---|
| ☐ | BACnet Advanced Workstation | (B-AWS) |
| ☐ | BACnet Operator Workstation | (B-OWS) |
| ☐ | BACnet Operator Display | (B-OD) |
| ☒ | BACnet Building Controller | (B-BC) |
| ☐ | BACnet Advanced Application Controller | (B-AAC) |
| ☐ | BACnet Application Specific Controller | (B-ASC) |
| ☐ | BACnet Smart Sensor | (B-SS) |
| ☐ | BACnet Smart Actuator | (B-SA) |

### Data Sharing

| | | |
|---|---|---|
| ☒ | Data Sharing – Read Property-A | DS-RP-A |
| ☒ | Data Sharing – Read Property-B | DS-RP-B |
| ☒ | Data Sharing – Read Property Multiple-A | DS-RPM-A |
| ☒ | Data Sharing – Read Property Multiple-B | DS-RPM-B |
| ☒ | Data Sharing – Write Property-A | DS-WP-A |
| ☒ | Data Sharing – Write Property-B | DS-WP-B |
| ☒ | Data Sharing – Write Property Multiple-B | DS-WPM-B |
| ☒ | Data Sharing – Change of Value -A | DS-COV-A |
| ☒ | Data Sharing – Change of Value -B | DS-COV-B |

### Alarm and Event Management

| | | |
|---|---|---|
| ☒ | Alarm and Event – Notification Internal-B | AE-N-I-B |
| ☒ | Alarm and Event – ACK-B | AE-ACK-B |
| ☒ | Alarm and Event – Alarm Summary-B | AE-ASUM-B |
| ☒ | Alarm and Event – Enrollment Summary-B | AE-ESUM-B |
| ☒ | Alarm and Event – Information-B | AE-INFO-B |

### Scheduling

| | | |
|---|---|---|
| ☒ | Scheduling – Internal-B | SCHED-I-B |
| ☒ | Scheduling – External-B | SCHED-E-B |

### Trending

| | | |
|---|---|---|
| ☒ | Trending – Viewing and Modifying Internal-B | T-VMT-I-B |
| ☒ | Trending – Automated Trend Retrieval-B | T-ATR-B |

### Device management

| | | |
|---|---|---|
| ☒ | Device Management – Dynamic Device Binding-A | DM-DDB-A |
| ☒ | 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 – UTC Time Synchronization-B | DM-UTC-B |
| ☒ | Device Management – Reinitialize Device-B | DM-RD-B |
| ☒ | Device Management – Backup and Restore-B | DM-BR-B |
| ☒ | Device Management – Object Creation and Deletion-B | DM-OCD-B |

## Standard Object Types Supported

| Object type | Can be Created Dynamically | Can be Deleted Dynamically |
|---|---|---|
| Analog Input | ☐ | ☐ |
| Analog Output | ☐ | ☐ |
| Analog Value | ☐ | ☐ |
| Binary Input | ☐ | ☐ |
| Binary Output | ☐ | ☐ |
| Binary Value | ☐ | ☐ |
| Calendar | ☐ | ☐ |
| Device | ☐ | ☐ |
| Event Enrollment | ☒ | ☒ |
| File | ☐ | ☐ |
| Multi-State Input | ☐ | ☐ |
| Multi-State Output | ☐ | ☐ |
| Notification Class | ☐ | ☐ |
| Schedule | ☐ | ☐ |
| Multi-State Value | ☐ | ☐ |
| Trend Log | ☒ | ☒ |
| Accumulator | ☐ | ☐ |
| Characterstring Value | ☐ | ☐ |
| Datetime Pattern Value | ☐ | ☐ |
| Positive Integer Value | ☐ | ☐ |

# Standard Object Types Descriptions

## Analog Inputs

| Properties | Readable / Writable | Range restrictions |
|---|---|---|
| Object_Identifier | R | - |
| Object_Name | R | - |
| Object_Type | R | - |
| Present_Value | R[1] | - |
| Description | R | - |
| Status_Flags | R | - |
| Event_State | R | - |
| Reliability | R | - |
| Out_Of_Service | R | - |
| Units | R | - |
| Min_Pres_Value | R | - |
| Max_Pres_Value | R | - |
| COV_Increment | W[2] | - |
| Time_Delay | R | - |
| Notification_Class | R | - |
| High_Limit | R | - |
| Low_Limit | R | - |
| Deadband | R | - |
| Limit_Enable | W[3] | - |
| Event_Enable | W | - |
| Acked_Transitions | R | - |
| Notify_Type | R | - |
| Event_Time_Stamps | R | - |
| Property_List | R | - |
| Event_Detection_Enable | R | - |

[1] Present_Value is not commandable or writeable.

[2] Changes to this property do not take effect until the power is cycled on the MicroTech 4 unit controller.

[3] This property is writeable via BACnet. However, it reverts to the MicroTech 4 unit controller value if the object is setup for Intrinsic Reporting. This is a safety feature so the network cannot disable alarms from occurring.

## Analog Outputs

| Properties | Readable / Writable | Range restrictions |
|---|---|---|
| Object_Identifier | R | - |
| Object_Name | R | - |
| Object_Type | R | - |
| Present_Value | W | - |
| Description | R | - |
| Status_Flags | R | - |
| Event_State | R | - |
| Reliability | R | - |
| Out_Of_Service | R | - |
| Units | R | - |
| Min_Pres_Value | R | - |
| Max_Pres_Value | R | - |
| Priority_Array | R | - |
| Relinquish_Default | W | - |
| COV_Increment | W[1] | - |
| Time_Delay | R | - |
| Notification_Class | R | - |
| High_Limit | R | - |
| Low_Limit | R | - |
| Deadband | R | - |
| Limit_Enable | W | - |

| Properties | Readable / Writable | Range restrictions |
|---|---|---|
| Event_Enable | W | - |
| Acked_Transitions | R | - |
| Notify_Type | R | - |
| Event_Time_Stamps | R | - |
| Property_List | R | - |
| Event_Detection_Enable | R | - |

[1] Changes to this property do not take effect until the power is cycled on the MicroTech 4 unit controller.

## Analog Values

| Properties | Readable / Writable | Range restrictions |
|---|---|---|
| Object_Identifier | R | - |
| Object_Name | R | - |
| Object_Type | R | - |
| Present_Value | W[1,3] | - |
| Status_Flags | R | - |
| Event_State | R | - |
| Reliability | R | - |
| Out_Of_Service | R | - |
| Units | R | - |
| Priority_Array | R | - |
| Relinquish_Default | W | - |
| COV_Increment | W[2] | - |
| Time_Delay | R | - |
| Notification_Class | R | - |
| High_Limit | R | - |
| Low_Limit | R | - |
| Deadband | R | - |
| Limit_Enable | W | - |
| Event_Enable | W | - |
| Acked_Transitions | R | - |
| Notify_Type | R | - |
| Event_Time_Stamps | R | - |
| Property_List | R | - |
| Event_Detection_Enable | R | - |
| **Analog Value (Variant 2)** | | |
| Object_Identifier | R | - |
| Object_Name | R | - |
| Object_Type | R | - |
| Present_Value | R[1] | - |
| Description | R | - |
| Status_Flags | R | - |
| Event_State | R | - |
| Out_Of_Service | R | - |
| Units | R | - |
| COV_Increment | W[2] | - |
| Property_List | R | - |

[1] Present_Value is not commandable or writeable.

[2] Changes to this property do not take effect until the power is cycled on the MicroTech 4 unit controller.

[3] Priority 1 is reserved for the commandable objects application. BACnet writes at priority 1 will fail.

## Binary Inputs

| Properties | Readable / Writable | Range restrictions |
|---|---|---|
| Object_Identifier | R | - |
| Object_Name | R | - |
| Object_Type | R | - |
| Present_Value | R[1] | - |
| Description | R | - |
| Status_Flags | R | - |
| Event_State | R | - |
| Reliability | R | - |
| Out_Of_Service | R | - |
| Polarity | R | - |
| Inactive_Text | R | - |
| Active_Text | R | - |
| Elapsed_Active_Time | W | Only 0 |
| Time_Of_Active_Time_Reset | R | - |
| Time_Delay | R | - |
| Notification_Class | R | - |
| Alarm_Value | R | - |
| Event_Enable | W | - |
| Acked_Transitions | R | - |
| Notify_Type | R | - |
| Event_Time_Stamps | R | - |
| Property_List | R | - |
| Event_Detection_Enable | R | - |

## Binary Outputs

| Properties | Readable / Writable | Range restrictions |
|---|---|---|
| Object_Identifier | R | - |
| Object_Name | R | - |
| Object_Type | R | - |
| Present_Value | W | - |
| Description | R | - |
| Status_Flags | R | - |
| Event_State | R | - |
| Reliability | R[1] | - |
| Out_Of_Service | W | - |
| Polarity | W | - |
| Inactive_Text | R | - |
| Active_Text | R | - |
| Elapsed_Active_Time | W | Only 0 |
| Time_Of_Active_Time_Reset | R | - |
| Priority_Array | R | - |
| Relinquish_Default | W | - |
| Time_Delay | R | - |
| Notification_Class | R | - |
| Feedback_Value | R | - |
| Event_Enable | W | - |
| Acked_Transitions | R | - |
| Notify_Type | R | - |
| Event_Time_Stamps | R | - |
| Property_List | R | - |
| Event_Detection_Enable | R | - |

## Binary Values

| Properties | Readable / Writable | Range restrictions |
|---|---|---|
| Object_Identifier | R | - |
| Object_Name | R | - |
| Object_Type | R | - |
| Present_Value | W[1,2] | - |
| Description | R | - |
| Status_Flags | R | - |
| Event_State | R | - |
| Reliability | R | - |
| Out_Of_Service | R | - |
| Inactive_Text | R | - |
| Active_Text | R | - |
| Elapsed_Active_Time | W | Only 0 |
| Time_Of_Active_Time_Reset | R | - |
| Priority_Array | R | - |
| Relinquish_Default | W | - |
| Notification_Class | R | - |
| Alarm_Value | R | - |
| Event_Enable | W | - |
| Acked_Transitions | R | - |
| Notify_Type | R | - |
| Event_Time_Stamps | R | - |
| Property_List | R | - |
| Event_Detection_Enable | R | - |

[1] Present_Value is not commandable or writeable.
[2] Priority 5 is reserved for the commandable objects application. BACnet writes at priority 5 will fail.

## Calendar

| Properties | Readable / Writable | Range restrictions |
|---|---|---|
| Object_Identifier | R | - |
| Object_Name | R | - |
| Object_Type | R | - |
| Description | R | - |
| Present_Value | R | - |
| Date_List | W | Max 10 |
| Property_List | R | - |

## Device

| Properties | Readable/Writable | Range restrictions |
|---|---|---|
| Object_Identifier | R | - |
| Object_Name | R | - |
| Object_Type | R | - |
| System_Status | R | - |
| Vendor_Name | R | - |
| Vendor_Identifier | R | - |
| Model_Name | R | - |
| Firmware_Revision | R | - |
| Application_Software_Version | R | - |
| Location | R | - |
| Description | R | - |
| Protocol_Version | R | 1 |
| Protocol_Revision | R | 14 |
| Protocol_Services_Supported | R | - |
| Protocol_Object_Types_Supported | R | - |
| Object_List | R | - |
| Max_APDU_Length_Accepted | W | 50..1476, 50..480 |
| Segmentation_Supported | W | - |
| Max_Segments_Accepted | W | 2..16 |
| Local_Time | R | - |
| Local_Date | R | - |
| UTC_Offset | W | - |
| Daylight_Savings_Status | R | - |
| APDU_Segment_Timeout | W | 500..65535 |
| APDU_Timeout | W | 1000..65535 |
| Number_Of_APDU_Retries | W | - |
| Max_Master (MS/TP only) | W | 1-127 |
| Max_Info_Frames (MS/TP only) | W | 1-32 |
| Device_Address_Binding | R | - |
| Database_Revision | R | - |
| Configuration_Files | R | - |
| Last_Restore_Time | R | - |
| Backup_Failure_Timeout | W | - |
| Active_COV_Subscriptions | R | - |
| Last_Restart_Reason | R | - |
| Time_Of_Device_Restart | R | - |
| Restart_Notification_Recipients | W | - |
| Property_List | R | - |

## Event Enrollment

| Properties | Readable/Writable | Range restrictions |
|---|---|---|
| Object_Identifier | R | - |
| Object_Name | W | - |
| Object_Type | R | - |
| Event_Type | R | - |
| Notify_Type | W | - |
| Event_Parameters | W | Change-Of-State, Change-Of-Value, Out-Of-Range only |
| Object_Property_Reference | W | - |
| Event_State | R | - |
| Event_Enable | W | - |
| Acked_Transitions | R | - |
| Notification_Class | W | - |
| Event_Time_Stamps | R | - |
| Property_List | R | - |
| Event_Detection_Enable | R | - |
| Status_Flags | R | - |
| Reliability | R | - |

## File

| Properties | Readable / Writable | Range restrictions |
|---|---|---|
| Object_Identifier | R | - |
| Object_Name | R | - |
| Object_Type | R | - |
| Description | R | - |
| File_Type | R | - |
| File_Size | R | - |
| Modification_Date | R | - |
| Archive | W | - |
| Read_Only | R | - |
| File_Access_Method | R | - |
| Property_List | R | - |

## Multistate Inputs

| Properties | Readable / Writable | Range restrictions |
|---|---|---|
| Object_Identifier | R | - |
| Object_Name | R | - |
| Object_Type | R | - |
| Present_Value | R | - |
| Description | R | - |
| Status_Flags | R | - |
| Event_State | R | - |
| Reliability | R | - |
| Out_Of_Service | R | - |
| Number_Of_States | R | - |
| State_Text | R | - |
| Time_Delay | R | - |
| Notification_Class | R | - |
| Alarm_Values | R | - |
| Fault_Values | R | - |
| Event_Enable | W | - |
| Acked_Transitions | R | - |
| Notify_Type | R | - |
| Event_Time_Stamps | R | - |
| Property_List | R | - |
| Event_Detection_Enable | R | - |

## Multistate Outputs

| Properties | Readable / Writable | Range restrictions |
|---|---|---|
| Object_Identifier | R | - |
| Object_Name | R | - |
| Object_Type | R | - |
| Present_Value | W | - |
| Description | R | - |
| Status_Flags | R | - |
| Event_State | R | - |
| Reliability | R | - |
| Out_Of_Service | R | - |
| Number_Of_States | R | - |
| State_Text | R | - |
| Priority_Array | R | - |
| Relinquish_Default | W | - |
| Time_Delay | R | - |
| Notification_Class | R | - |
| Feedback_Value | R | - |
| Event_Enable | W | - |
| Acked_Transitions | R | - |

### Multistate Outputs, Continued

| Properties | Readable / Writable | Range restrictions |
|---|---|---|
| Notify_Type | R | - |
| Event_Time_Stamps | R | - |
| Property_List | R | - |
| Event_Detection_Enable | R | - |

### Multistate Values

| Properties | Readable / Writable | Range restrictions |
|---|---|---|
| Object_Identifier | R | - |
| Object_Name | R | - |
| Object_Type | R | - |
| Present_Value | W[1] | - |
| Description | R | - |
| Status_Flags | R | - |
| Event_State | R | - |
| Reliability | R | - |
| Out_Of_Service | R | - |
| Number_Of_States | R | - |
| State_Text | R | - |
| Priority_Array | R | - |
| Relinquish_Default | W | - |
| Time_Delay | R | - |
| Notification_Class | R | - |
| Alarm_Values | R | - |
| Fault_Values | R | - |
| Event_Enable | W | - |
| Acked_Transitions | R | - |
| Notify_Type | R | - |
| Event_Time_Stamps | R | - |
| Property_List | R | - |
| Event_Detection_Enable | R | - |
| **Multistate Value (Variant 2)** | | |
| Object_Identifier | R | - |
| Object_Name | R | - |
| Object_Type | R | - |
| Present_Value | R[1] | - |
| Description | R | - |
| Status_Flags | R | - |
| Event_State | R | - |
| Out_Of_Service | R | - |
| Number_Of_States | R | - |
| State_Text | R | - |
| Property_List | R | - |

[1] Present_Value is not commandable or writeable.

### Notification Class

| Properties | Readable / Writable | Range restrictions |
|---|---|---|
| Object_Identifier | R | - |
| Object_Name | R | - |
| Object_Type | R | - |
| Description | R | - |
| Notification_Class | R | - |
| Priority | W | - |
| Ack_Required | W | - |
| Recipient_List | W | Max. 20 |
| Property_List | R | - |

### Schedule

| Properties | Readable / Writable | Range restrictions |
|---|---|---|
| Object_Identifier | R | - |
| Object_Name | R | - |
| Object_Type | R | - |
| Present_Value | R | Multistate Analog |
| Description | R | - |
| Effective_Period | W | - |
| Weekly_Schedule | W | Max. 6 per day |
| Exception_Schedule | W | Calendar reference only<br>Max. 6 entries per list of time values |
| Schedule_Default | W | - |
| List_Of_Object_Property_References | R | Only 1 element |
| Priority_For_Writing | W | 1 … 16 |
| Status_Flags | R | - |
| Reliability | R | - |
| Out_Of_Service | R | - |
| Property_List | R | - |
| Event_Detection_Enable | R | - |

### Datetime Pattern Values

| Properties | Readable / Writable | Range restrictions |
|---|---|---|
| Object_Identifier | R | - |
| Object_Name | R | - |
| Object_Type | R | - |
| Present_Value | W | - |
| Description | R | - |
| Status_Flags | R | - |
| Property_List | R | - |

## *Trend Log*

| Properties | Readable / Writable | Range restrictions |
|---|---|---|
| Object_Identifier | R | - |
| Object_Name | R | - |
| Object_Type | R | - |
| Description | R | - |
| Enable | W | - |
| Start_Time | W | - |
| Stop_Time | W | - |
| Log_DeviceObjectProperty | W | - |
| Log_Interval | W | - |
| Client_COV_Increment | W | - |
| Stop_When_Full | W | - |
| Buffer_Size | R | - |
| Log_Buffer | R | - |
| Record_Count | W | - |
| Total_Record_Count | R | - |
| Notification_Threshold | W | - |
| Records_Since_Notification | R | - |
| Last_Notify_Record | R | - |
| Event_State | R | - |
| Notification_Class | R | - |
| Event_Enable | W | - |
| Acked_Transitions | R | - |
| Notify_Type | R | - |
| Event_Time_Stamps | R | - |
| Logging_Type | W | - |
| Status_Flags | R | - |
| Property_List | R | - |
| Event_Detection_Enable | R | - |

## Segmentation Capability

| | | | |
|---|---|---|---|
| ☒ | Able to transmit segmented messages | Window size | 4 for IP and 1 for MS/TP |
| ☒ | Able to receive segmented messages | Window size | 4 for IP and 1 for MS/TP |

## Data Link Layer Options

| | | |
|---|---|---|
| ☒ | BACnet IP, (Annex J) | - |
| ☒ | BACnet IP, (Annex J), Foreign Device | - |
| ☐ | ISO 8802-3, Ethernet (Clause 7) | - |
| ☐ | ANSI/ATA 878.1, 2.5 Mb. ARCNET (Clause 8) | - |
| ☐ | ANSI/ATA 878.1, RS-485 ARCNET (Clause 8), baud rate(s) | - |
| ☒ | MS/TP master (Clause 9), baud rate(s) | 9600 19200 38400 57600 76800 115200 |
| ☐ | MS/TP slave (Clause 9), baud rate(s) | 9600 19200 38400 57600 76800 115200 |
| ☐ | Point-To-Point, EIA 232 (Clause 10), baud rate(s) | 38400 |
| ☐ | Point-To-Point, modem, (Clause 10), baud rate(s) | 38400 |
| ☐ | LonTalk, (Clause 11), medium | TP/FT-10 |
| ☐ | Other | - |

## Device Address Binding

| Is static device binding supported? | ☐ Yes | ☒ No |
|---|---|---|

## Networking Options

| | | |
|---|---|---|
| ☐ | Router, Clause 6 (remote management functionality/BACnet PTP) | |
| ☐ | Annex H, BACnet Tunneling Router over IP | |
| ☐ | BACnet/IP Broadcast Management Device (BBMD) Number of BDT entries: 10 Number of FDT entries: 10 | |
| - | Does the BBMD support registrations by foreign devices? | oo Yes ☐ No |

## Character Sets Supported

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

| | | |
|---|---|---|
| ☒ UTF-8 | ☐ IBM / Microsoft DBCS | ☒ ISO 8859-1 |
| ☒ ISO 10646 (UCS-2) | ☐ ISO 10646 (UCS-4) | ☐ JIS C 6226 |

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