DAIKIN

Network Integration Guide

ED 19117-2

Group: **Controls**
Part Number: **ED 19117**
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MicroTech® 4 Rebel Applied™ Packaged Rooftop Unit Controller Protocol Information

BACnet® MS/TP, IP Networks
LonWorks® Networks

LonMark® 3.4

Member of BACnet International

Revision History

ED 19117	Jan 2020	Preliminary 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.

Notice

Limited Warranty

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

Hazardous Information Messages

⚠ CAUTION

Cautions indicate potentially hazardous situations, which can result in personal injury 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	LONWORKS 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	LONWORKS FTT-10A Free Topology Transceiver Users Guide	www.echelon.com

Software Revision

This document supports the following versions of the standard MicroTech® 4 Rebel Applied™ Rooftop 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 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.

This document provides the information you need to integrate the MicroTech® 4 Rebel Applied Rooftop unit controller from Daikin Applied into a building automation system (BAS). It lists all BACnet® and LonWorks® points available to the network.

The Introduction gives a basic overview of network concepts and terminology, along with parameter settings that are useful for establishing communication. The rest of the guide describes each data point in detail for both BACnet and LonWorks. Alarms and Events follow, along with the BACnet PICs statement in Appendix A.

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

A separate BAS communication module must be attached to the unit controller so that it can be configured for BACnet or LonWorks network integration. There are three communication modules: BACnet/IP, BACnet MS/TP (Master/Slave Token Passing), and LonWorks (configured for either Space Comfort Control (SCC) or Discharge Air Controller (DAC).

The communication module may ship already installed on the unit controller or added as a locally-mounted accessory after the unit is on-site. Connection for all BAS protocols is from the communication module.

See Reference Documents for the correct communication module installation manual number.

BACnet

BACnet is a standard communication protocol for Building Automation and Control Networks developed by the American National Standards Institute (ANSI) and American Society of Heating, Refrigeration and Air-conditioning Engineers (ASHRAE) specified in ANSI/ASHRAE standard 135-2014. It addresses all aspects of the various systems that are applied to building control systems. BACnet provides the communication infrastructure needed to integrate products manufactured by different vendors and to integrate building services that are now independent.

BACnet Network Compatibility

The 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 are found in Appendix A: Protocol Implementation Conformance Statement (PICS).

BACnet Objects

The 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 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).

Each data point accessible from a BACnet network is described in the BACnet Objects section. That section is organized into tables that provide the Object Name, Object Identifier, min/max values, and other relevant descriptive information.

MicroTech 4 Controller Device Object

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

⚠ 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.

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.

Table 1: MicroTech 4 Unit Controller Device Object Properties

Property	Identifier	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		BACnetServicesSupported
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	BACnetObjectTypesSupported
Object List	76		Sequence of BACnetObjectIdentifer
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 BACnetAddressBinding
Database Revision	115	1	Unsigned
Active COV Subscriptions	152		List of BACnetCOVSubscriptions

[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 unit controller both have their own time clocks. The date and time read via BACnet could differ from the date and time in the 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.

LONWORKS

A control network specification for information exchange built upon the use of LonTalk for transmitting data developed by the Echelon Corporation.

LonTalk Protocol

A protocol developed and owned by the Echelon Corporation. It describes how information should be transmitted between devices on a control network.

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 modules are LonMark 3.4 certified in accordance with the SCC and DAC Functional Profile Version 1.0. Refer to www.lonmark.org for details.

LONWORKS Variables

The MicroTech 4 unit controller incorporates LONWORKS network variables to access unit data points. The unit controller uses LONWORKS Standard Network Variable Types (SNVT) from each profile. Some data points can be adjusted (input network variables, nvi) (read/write attributes, e.g., setpoints) from the network and others can only be interrogated (output network variables, nvo) (read only attributes, e.g., status information). Configuration variables (nci) are included with the read/write attributes.

Resource Files

Resource files contain definitions of functional profiles, network variables types, configuration property types, and enumerations. Resource files are required for displaying manufacturer-specific variables that are not included in the standard device profile. Resource files 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. XIF files are available on 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.

Setting BAS Communication Parameters

There are various parameters involved in setting up the unit controller. These parameters are set differently depending on which communication module is ordered and shipped with the unit. Table 2 describes the possible sets of default parameter settings for each communication module. The bold parameters can be changed using the unit controller HMI.

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

Communication Parameter Settings

Table 2: Communication Parameter Settings

Parameter Name	BACnet IP	BACnet MS/TP	LONWORKS (SCC OR DAC)
DHCP	**On**	NA	NA
Actual IP Address	DHCP Enabled	NA	NA
Actual IP Subnet Mask	DHCP Enabled	NA	NA
Actual Gateway Address	DHCP Enabled	NA	NA
Given IP Address[1]	127.0.0.1	NA	NA
Given IP Subnet Mask[1]	255.255.255.0	NA	NA
Given Gateway Address[1]	127.0.0.1	NA	NA
UDP Port Number	47808	NA	NA
MS/TP MAC Address[2]	NA	18	NA
MS/TP Baud Rate	NA	38400	NA
Device Instance Number	Variable	Variable	NA
Max APDU Length	1476	480	NA
Device Object Name	MT4_AHU_#####[3]	MT4_AHU_#####[4]	NA
Receive Heartbeat	NA	NA	0 Sec
Max Master	NA	127	NA
Max Info Frames	NA	1	NA
Term Resistor	NA	No[5]	NA

Note that the parameters in boldface can be changed using the 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 unit controller HMI and set Apply Changes on the BACnet IP Setup menu to Yes. This causes the power on the unit controller to reset.

[2]The MS/TP MAC Address is set via the 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 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.*

Network Addressing and Configuration

BACnet Networks

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 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 unit controller HMI can be used to configure the BACnet/IP addressing. The keypad displays the current IP address only when the network is connected.

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 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 unit controller to reset.

LonWorks Networks

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 unit controller reverts to local control, and the variables will revert to their default values. The heartbeat time is set via the local 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.

BACnet Objects

This section describes the data that is available to the BACnet network. The BACnet objects supported by the unit controller 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 as described in these tables:

Table 15: Refrigerant Monitoring
Table 16: Energy Monitoring
Table 18: Indoor Air Quality (IAQ)
Table 19: Configurable I/O Options

All BACnet parameters available to the BAS remain at the last valid value upon loss of communications. 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 the MicroTech 4 Rebel Applied Unit Controller OM 1288 for detailed descriptions and controller HMI menu structure (www.DaikinApplied.com).

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 2=Start 3=Recirc 4=FanOnly 5=MinDAT 6=Htg 7=Econo 8=Clg	NA	The current operating mode of the unit.
Unit Status	DaikinStatus	MSV:1	R	1=Enable 2=OffMan 3=OffManCtrl 4=OffNet 5=OffAlm 6=OffRetry 7=OffPassVnt 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. 1 = Enable (Unit is in operation. Conditions #2-8 are not active) 2 = OffMan (Control Mode = Off) 3 = OffManCtrl (Manual Control = On) 4 = OffNet (Control Mode = Auto and NetApplicMode = Off) 5 = OffAlm (Fault alarm is active) 6 = OffRetry (Fan Retry is active) 7 = OffPassVnt (Optional passive ventilation functionality is active, forcing the unit to an Off state. Also see MSV:17) 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 2=None 3=OffAmb 4=OffAlm 5=OffNet 6=OffMan 7=NA 8=CfgErr*	NA	Indicates if cooling is currently enabled. If not, the reason is displayed. *ClgErr = cooling is disabled due to an incorrect unit configuration.
Primary Cool Enable	CoolEnable	AV:36	W	-1=Null 0=Off (Disabled) 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. • If CoolEnable = 0, then the primary cooling is disabled by the network and ClgStatus is set to OffNet. • If CoolEnable is = -1 (null), it is not being controlled by the network. • 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. • 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 2=None 3=OffAmb 4=OffAlm 5=OffNet 6=OffMan 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. • If EconEnable = 0, then the economizer is disabled by the network and EconoStatus is set to OffNet. • If EconEnable = -1 (null), it is not being limited by the network. • 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. • If EconoEnable = 1 and EconolEnablePct = 0, economizing is disabled and EconoStatus is set to OffNet. Economizer operation is disabled locally when the unit is in dehumidification, regardless of the network Economizer Enable settings.
	EconEnablePct	AV:35	W	0-100%	100%	
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. • If HeatEnable = 0, then the primary heating is disabled by the network and heating status is set to OffNet. • If HeatEnable = -1 (null), it is not being controlled by the network. • 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. • If HeatEnable = 1 and HeatEnablePct = 0, primary heating is disabled and HeatingStatus is set to OffNet.
	HeatEnablePct	AV:39	W	0-100%	100%	
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. 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* *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. *States 3-5 are only available when configured for 1, 2 or 3 QMX 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 unit controller 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	AI:21	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.
	FilterPress2	AI:22				
	FilterPress3	AI:23				
VAV Box Output Status	VAVBoxOutput	MSV:14	R	1=Heat 2=Cool	1=Heat	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 supply fan VFDs.

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 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 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	Effective space temperature is set to the effective local space temperature (EffLocalSpaceT) of a local sensor(s) if present and configured with valid configuration. Space temperature input may be provided to the controller by up to three Modbus-wired QMX sensors. Space temperature may also be provided by a network input. Effective space temperature is set to BACnetSpaceT (SpaceTempInput, AV:3) if value is present and valid. Otherwise, effective space temperature defaults to an invalid value (327.67°C/621.806°F). Note that the LONWORKS variable, nviSpaceTemp, takes precedence over BACnetSpaceT in the event that both are present and valid.

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 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 CtlrTempSrc 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 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=1ECMMB 3=2ECMMB 4=3ECMMB 5=4ECMMB	2=1ECMMB	Indicates the type of supply air fan installed in the unit. Not all fan options are available for each unit. 1=Anlg (Locally-supplied analog input to the unit controller) 2=1ECMMB (1 ECM Modbus-controlled fan) 3=2ECMMB (2 ECM Modbus-controlled fans) 4=3ECMMB (3 ECM Modbus-controlled fans) 5=4ECMMB (4 ECM Modbus-controlled fans)
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 a number of 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: 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). 2=Spd/Net (The supply fan modulates to maintain a speed command provided by the unit controller HMI or network command). 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). 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). 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). 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). 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 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: 1=NA (Not available on supply or return/exhaust fan static pressure sensor input) 2=DSP:NA (Duct static pressure (DSP) sensor on the supply fan input, no sensor on the return/exhaust fan input) 3=DSP:DSP (DSP sensor is present on the supply and return/exhaust fan inputs) 4=DSP:BSP (DSP sensor on the supply fan input, Building Static Pressure (BSP) sensor is present on the return/exhaust fan input) 5=BSP:NA (BSP sensor on the supply fan input, no sensor on the return/exhaust fan input) 6=NA:DSP (No sensor on the supply fan input, DSP sensor on the return/exhaust fan input) 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 unit controller HMI. See Table 20 for complete list of 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[1]	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. Not all fan options are available for each unit. 1=None (No return fan control selected) 2=RFAnlg (Return fan control via analog output from the unit controller to the fan) 3=EFAnlg (Exhaust fan control via analog output from the unit controller to the fan) 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 control) 13=EFVFD (Exhaust fan VFD 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 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 unit controller HMI. See Table 20 for complete list of 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 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 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 unit controller uses the last valid value it received from either the network or 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 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 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 unit controller HMI. See Table 20 for complete list of 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=FBP 3=HWStm 4=L2 5=L4 6=L6 7=H4 8=H6 9=L8 10=L12 11=H8 12=H12 13=2SE 14=2SG 15=4SE 16=4SG 17=SCR*	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=L200 (Modulating gas) 5=L400 (Modulating gas) 6=L600 (Modulating gas) 7=H400 (Modulating gas) 8=H600 (Modulating gas) 9=L800 (Modulating gas) 10=L1200 (Modulating gas) 11=H800 (Modulating gas) 12=H1200 (Modulating gas) 13=2StgE (Two-stage electric) 14=S2/400 (Two-stage gas) 15=4StgE (Four-stage electric) 16=S600 (Four-stage gas) 17=SCR* *SCR (silicon controlled rectifier) modulates the time the electric heater is powered on in order to satisfy the zone requirements.
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.

Table 9: Heating, Continued

Point Name	BACnet Object Name	Object Type/ Instance	Read/ Write Access	Range (In Units)	Default	Description
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 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 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 unit controller internally limits the Present Value that is written between the minimum heating setpoint and the DefaultDATHIgSetpt (AV:19). Refer to the Commission Unit/Heating Set-Up menu on the 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 unit controller unit controller HMI. The controller uses the last valid value it last received from either the network or the 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. Not all reheat options are available for all unit configurations. 1=None (No reheat) 2=PriHtg (Primary heating reheat) 3=PriHtBP (Primary heating with DX coil bypass) 4=MHG (Modulating hot gas) 5=MHGBP (Modulating hot gas with DX coil bypass) 6=HG_LSC (Modulating hot gas and liquid subcooling reheat) 7=HGLSCBP (Modulating hot gas and liquid subcooling reheat with DX coil bypass) 8=DXBP (DX coil bypass only) 9=MLSC (Modulating liquid subcooling reheat) Notes: • 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. • 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 unit controller HMI. See Table 20 for complete list of 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 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=30OA 3=100OA 4=Econ 5=EconoFDD	4=Econ	Indicates the type of damper installed in the unit based on the options as follows: 1=None (No damper) 2=30OA (30% OA fixed damper) 3=100OA (100% OA fixed damper) 4=Econ (Modulating airside economizer) 5=EconoFDD (Modulating airside economizer with fault detection)
Outdoor Air Fan Control	OAFanCtrl	MSV:101	R	1=None 2=OnOffT 3=OnOffP 4=VarVFD 5=VarECM1 6=VarECM2	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, ECM motor, circuit 1) 5=VarECM2 (Variable outdoor fan control, 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 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=CO2MB 8=CO2IAQMB	1=None	Indicates the type of input signal available to the unit controller for outdoor air damper reset from a CO_2 sensor or other device. 1=None 2=ExtVDC (VDC input for locally-wired device) 3=ExtmA (mA input for locally-wired device) 4=CO2VDC (VDC input for locally-wired CO_2 sensor) 5=CO2mA (mA input for locally-wired CO_2 sensor) 6=CO2QMX+ (QMX sensor CO_2 input) 7=CO2MB (Modbus sensor CO_2 input for energy monitoring) 8=CO2IAQMB (Modbus sensor CO_2 input for IAQ)
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 Configuration	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 space temperature sensor(s) installed on the unit. If this parameter is set to None, the network can still provide a space temperature value. The network can override a local sensor input. 1=None (No local sensors installed) 2=1AI (1 10k analog input available for locally-installed sensor) 3=2AI (2 10k analog inputs available for locally-installed sensors) 4=3AI (3 10k analog inputs available for locally-installed sensors) 5=1QMXS (1 QMX space sensor) 6=2QMXS (2 QMX space sensors) 7=3QMXS (3 QMX space sensors) 8=1QMX+ (1 QMX sensor) 9=2QMX+ (2 QMX sensors) 10=3QMX+ (3 QMX sensors) 11=1IAQMB (1 Modbus sensor, IAQ space)
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.
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.

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 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 hours of operation.
Return Fan Hours	RF_EFHrs	AV:101	W	0-999999 Hrs	NA	The accumulated return or exhaust fan hours of operation.
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 hours of operation.
Compressor 1 Hours	Comp1Hrs	AV:104	W	0-999999 Hrs	NA	The accumulated hours of operation 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 hours of operation.
Economizer Hours	EconoHrs	AV:113	W	0-999999 Hrs	NA	The accumulated economizer hours of operation.
Tenant Override Hours	TenantORHrs	AV:114	W	0-999999 Hrs	NA	The accumulated tenant override hours of operation.
Dehumidification Hours	DehumHrs	AV:115	W	0-999999 Hrs	NA	The accumulated dehumidification hours of operation.
Energy Recovery Hours	ERWhlHrs	AV:116	W	0-999999 Hrs	NA	The accumulated energy recovery wheel hours of operation.
Variable Compressor 1 Hours	VarCmp1Hrs	AV:117	W	0-999999 Hrs	NA	The accumulated hours of operation 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 hours of operation for SCR heating type units.

[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.
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.

Table 14: Alarm Objects, Continued

Point Name[1]	BACnet Object Name	Object Type/ Instance	Read/ Write Access	Range (In Units)	Default	Description[1]
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.

[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 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. Also see Alarm Management.
Suction Refrigerant Pressure Circuit 2	C2RefSuctionP	AI:62				
Suction Line Refrigerant Temperature Circuit 1	C1SucnRefTemp	AI:51	R	-83.2-212°F -64-100°C	NA	The current reading of the circuit 1 or 2 refrigerant temperature sensor. Also see Alarm Management.
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. Also see Alarm Management.
Discharge Refrigerant Pressure Circuit 2	C2RefDischP	AI:63				
Discharge Line Refrigerant Temperature Circuit 1	C1DischLnTemp	AI:50	R	-83.2-392°F -64-200°C	NA	The current reading of the circuit 1 or 2 discharge line refrigerant temperature sensor. Also see Alarm Management.
Discharge Line Refrigerant Temperature Circuit 2	C2DischLnTemp	AI:60				
Liquid Line Refrigerant Temperature Circuit 1	C1RefLiqLnTemp	AI:54	R	-83.2-212°F -64-100°C	NA	The current reading of the circuit 1 or 2 liquid line refrigerant temperature sensor. Also see Alarm Management.
Liquid Line Refrigerant Temperature Circuit 2	C2RefLiqLnTemp	AI:64				
Suction Superheat Circuit 1	SSH1	AI:120	R	-115.2-115.2°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. Also see Alarm Management.
Suction Superheat Circuit 2	SSH2	AI:125				
Discharge Superheat Circuit 1	DSH1	AI:121	R	-115.2-115.2°F -81.8-46°C	NA	Reflects the calculated discharge superheat for each circuit. Also see Alarm Management.
Discharge Superheat Circuit 2	DSH2	AI:126				
Subcooling Circuit 1	Subcooling1	AI:122	R	-115.2-115.2°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. Also see Alarm Management.
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 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 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 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 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 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 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 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 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 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. Outputs X5-X8 only support a 0-10 VDC signal.
	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	
	X2	Generic mA AO2	AO:10			
	X3	Generic mA AO3	AO:11			
	X4	Generic mA AO4	AO:12			

Table 20: Unit Configuration

Table 20 describes the Rebel Applied unit configuration code options. They can be changed from the unit controller HMI.

Point Name	BACnet Object Name	Object Type/ Instance	Read/ Write Access	Range (In Units)	Default	Description
Number of Fixed Compressors	BNNumVarComps	AV:151	R	0-6	0	Indicates the number of fixed compressors on the unit.
Number of Variable Compressors	BNNumFixedCmps	AV:150	R	0-4	0	Indicates the number of variable compressors on the unit.
Number of Cooling Circuits	BNNumClgCir	AV:152	R	0-4	0	Indicates the number of compressor cooling circuits available on the unit.
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)
Damper Type	DamperType	MSV:102	R	1=None 2=30OA 3=100OA 4=Econ 5=EconoFDD 6=100wRec	4=Econ	Indicates the type of damper installed in the unit based on the options as follows: 1 = None (No damper) 2 = 30OA (30% OA fixed damper) 3 = 100OA (100% OA fixed damper) 4 = Econ (Modulating airside economizer) 5 = EconoFDD (Modulating arside economizer with fault detection) 6=Single position 100% with recirculating air
Heating Type	HtgType	MSV:103	R	1=None 2=F&BP 3=HW_Stm 4=L200 5=L400 6=L600 7=H400 8=H600 9=L800 10=L1200 11=H800 12=H1200 13=2StgE 14=S2/400 15=4StgE 16=S600 17=SCR* 18=SCRSRht 19=L1600 20=H1600	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=L200 (Modulating gas) 5=L400 (Modulating gas) 6=L600 (Modulating gas) 7=H400 (Modulating gas) 8=H600 (Modulating gas) 9=L800 (Modulating gas) 10=L1200 (Modulating gas) 11=H800 (Modulating gas) 12=H1200 (Modulating gas) 13=2StgE (Two-stage electric) 14=S2/400 (Two-stage gas) 15=4StgE (Four-stage electric) 16=S600 (Four-stage gas) 17=SCR* 18=SCR Electric SR (SCRSRht) 19=Modulating Gas, 1600 20-1 (L1600) 20=Modulating Gas, 1600 40-1 (H1600) *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.
Supply Air Fan Type	SAFType	MSV:104	R	1=Anlg 2=1M 3=2M 4=3M 5=4M 6=6M 7=8M 8=9M 9=8M4S 10=8M8S 11=SAFVFD	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=8M4S (8 ECM fan motor masters and 4 fan motor slaves) 10=8M8S (8 ECM fan motor masters and 8 fan motor slaves) 11=SAFVFD (SAF with VFD Modbus)

Table 20: Unit Configuration, Continued

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. Not all fan options are available for each unit. 1=None (No return fan control selected) 2=RFAnlg (Return fan control via analog output from the unit controller to the fan) 3=EFAnlg (Exhaust fan control via analog output from the unit controller to the fan) 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 control) 13=EFVFD (Exhaust fan VFD control)
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 unit controller)
Reheat Type	ReheatType	MSV:107	R	1= None 2= PriHtg 3= MHG 4=MLSC 5=HG_LSC	1=None	Indicates the type of reheat control for the unit. Not all reheat options are available for all unit configurations. 1=None (No reheat) 2=PriHtg (Primary heating reheat) 3=MHG (Modulating hot gas) 4=MLSC (Modulating liquid subcooling reheat) 5=HG_LSC (Modulating hot gas and liquid subcooling reheat)
External Outdoor Air Input	ExtOAInput	MSV:108	R	1=None 2=ExtVDC 3=ExtmA 4=CO2VDC 5=CO2mA 6=CO2QMX+ 7=CO2IAQMB	1=None	Indicates the type of input signal available to the unit controller for outdoor air damper reset from a CO_2 sensor or other device. 1=None 2= ExtVDC (External VDC input) 3=ExtmA (Generic external mA analog input) 4=CO2VDC (VDC input available for locally-installed CO_2 sensor) 5=CO2mA (Analog input available for locally-installed CO_2 sensor) 6=CO2QMX+ (Input signal provided by factory-installed CO_2 sensor) 7=CO2IAQMB (Input signal provided by factory-installed CO_2 sensor. Applies to units configured for IAQ)
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.
Supply Air Fan Flow Input	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 configured for outdoor air flow measurement. Available only when the unit is configured with an outdoor airflow measuring device. 1=None (No supply fan configured) 2=1Fan (One supply fan configured) 3=2Fan (Two supply fans configured) 4=3Fan (Three supply fans configured) 5=4Fan (Four supply fans configured) 6=6Fan (Six supply fans configured) 7=8Fan (Eight supply fans configured) 8=9Fan (Nine supply fans configured) 9=12Fan (Twelve supply fans configured) 10=16Fan (Sixteen supply fans configured)
Return Fan Flow Input	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)

Table 20: Unit Configuration, Continued

Point Name	BACnet Object Name	Object Type/ Instance	Read/ Write Access	Range (In Units)	Default	Description
Duct Static Pressure Sensor	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:NA	Indicates if a static pressure sensor is installed. Sensor configuration types are described below: 1=NA:NA (Not available on supply or return/exhaust fan static pressure sensor input) 2=DSP:NA (Duct static pressure (DSP) sensor on the supply fan input, no sensor on the return/exhaust fan input) 3=DSP:DSP (DSP sensor is present on the supply and return/ exhaust fan inputs) 4=DSP:BSP (DSP sensor on the supply fan input, Building Static Pressure (BSP) sensor is present on the return/exhaust fan input) 5=BSP:NA (BSP sensor on the supply fan input, no sensor on the return/exhaust fan input) 6=NA:DSP (No sensor on the supply fan input, DSP sensor on the return/exhaust fan input) 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 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. 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 (1 10k analog input available for locally-installed sensor) 3=2AI (2 10k analog inputs available for locally-installed sensors) 4=3AI (3 10k analog inputs available for locally-installed sensors) 5=1QMXS (1 Modbus sensor, space temp only) 6=2QMXS (2 Modbus sensors, space temp only) 7=3QMXS (3 Modbus sensors, space temp only) 8=1QMX+ (1 Modbus sensor, space/hum/CO_2) 9=2QMX+ (2 Modbus sensors, space/hum/CO_2) 10=3QMX+ (3 Modbus sensors, space/hum/CO_2) 11=1IAQMB (1 Modbus sensor, space/hum/CO_2 used for IAQ) Note: All sensors must be one type. A mix of the two is not supported.
Unit Size	UnitSize	AV:154	R	0-999	50	Configuration parameter that indicates the unit model size.
Monitoring Packages	MonitorPkgs	MSV:114	R	1=None 2=RefSys 3=Pwr 4=Ref&Pwr 5=IAQ 6=IAQRef 7=IAQPwr 8=IAQRP	1=None	Indicates the type of monitoring package installed on the unit. 1= None (No refrigerant or power monitoring package) 2=RefSys (Refrigerant monitoring only) 3=Pwr (Power monitoring only) 4=Ref&Pw (Both refrigerant and power monitoring) 5=IAQ (Indoor air quality package) 6=IAQRef (Indoor air quality and refrigerant monitoring) 7=IAQPwr (Indoor air quality and power monitoring) 8=IAQRP (Indoor air quality and refrigerant system and power monitoring)
Electronic Hot Gas Bypass Input	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.
Refrigerant Type	RefrigType	MSV:116	R	1=None 2=R410A 3=R32 4=R410AHP 5=R32HP	2=R410A	Indicates the type of refrigerant in the unit.
Unit Voltage	UnitVoltage	MSV:117	R	1=208_60Hz 2=230_60Hz 3=460_60Hz 4=575_60Hz	3=460_60Hz	Defines the voltage applied to the unit controller.
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. 1=None (No preheat selected) 2=HW_Stm (Hot water/steam) 3=F&BP (Face and bypass)
Expansion Valve Type	EVType	MSV:119	R	1=None 2=DFETS 3=FjHS 4=FjFS 5=Spln	1=None	Indicates the expansion valve model type configured for the unit. 1=None (no expansion valve selected) 2=DFETS (Danfoss ETS) 3=FJCAM (Fujikoki CAM) 4=FJPAM2 (Fujikoki_PAM 2000) 5=FJPAM3 (Fujikoki_PAM 3000) 5=Spln (Sporlan)

LonWorks Variables

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

Refer to the MicroTech 4 Rebel Applied Operation Manual OM 1288 for unit controller HMI structure.

NOTE: 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.

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 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 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 disables the network signal and puts Unit Status = OffNet. The only way to start the 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	LonWorksVariable	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 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 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 unit controller uses this time to determine when the unit will start. If time_to_next_state is not valid, the 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 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. If theTstat setpoint has been enabled via the 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: • A single local temperature sensor setpoint input • The min/max from 2- 3 sensor inputs • 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. 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. 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 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.

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 unit controller HMI.

Table 25: Return/Exhaust Air Fan

Point Name	LONWORKSVariable	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 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 unit controller limits the value that is written between the min/max cooling setpoints. The input is commanded by the network but can also be changed from the controller HMI. The unit controller uses the last valid value it received from either the network or controller HMI.
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 unit controller HMI. The unit 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 unit 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 unit controller continues to control to the last valid value. 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 unit 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 unit controller HMI. 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. CO_2 is configured via the 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) 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. Equipment Type = HVT_GENERIC is set during manufacturing and is read-only.	
Receive Heartbeat	nciRcvHrtBt	SNVT_time_sec (107) 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. Note that a value of 0 seconds (default) disables Receive Heartbeat functionality. **Receive Heartbeat Variables**	
						nviOccSchedule	nviEconEnable
						nviApplicCmd	nviExhFanCap
						nviSupFanCap	nviRetFanCap
						nviOutdoorTemp	nviCWFlow
						nviSpaceTemp	nviSpaceIAQ
						nviPriCoolEnable	nviSpaceRH
						nviPriHeatEnable	
Send Heartbeat	nciSndHrtBt	SNVT_time_sec (107) 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. Note that a value of 0 seconds disables the auto update feature. **Send Heartbeat Variables**	
						nvoMcQAHUStatus	nvoOutdoorTemp
						nvoUnitStatus	nvoLocalSpaceTmp
						nvoEffectOccup	nvoLocalOATemp
						nvoDischAirTemp	nvoEFT_LCT
						nvoRATemp	nvoDuctStatPress
						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 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 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 unit controller HMI under the BACnet MSTP or BACnet IP Setup menu. Cycle power on the unit controller for changes to take effect. Once power is cycled, the unit controller sends out a “Who-Is” command directed at the device. If the device responds, the 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 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 Objects

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 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 C*learAlarms* 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 Unit Controller OM 1288 (www.DaikinApplied.com) for more about alarm generation details.

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: • Charge Loss Problem is Inactive • 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] • The discharge refrigerant pressure sensor is less than or equal to 68.94 kPa (10 psi) • 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 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: • BACnet EmergencyOverride is set to Off • 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: • The main filter switch input (FilterSw) is in the alarm (open) position • Filter pressure 1 analog input 21 is above the high filter pressure 1 setpoint • 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 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: • Subcooling1 < 1°F • All compressors in the circuit are running • OA Problem alarm inactive • Effective OAT > 75°F • Unit State = Cooling • The Dehumidification Status is Inactive 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: • Subcooling1 > 25°F • All compressors in the circuit are running • The OA Problem alarm is inactive • Effective OAT > 75°F • Unit State = Cooling • The Dehumidification Status is Inactive 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	C1EVISyncSBEvnt	Automatic	The circuit compressor state is forced into Standby because of expansion valve re-synchronization.
Expansion Valve Synchronization Standby Event Circuit 2	BI:240	C2EVISyncSBEvnt		
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.

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	March 2022
Vendor Name	Daikin Applied
Product Name	MT4 Rebel Applied
Product Model Number	MT4 AHU
Application Software Version	2506036113
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 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 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 unit controller.

[3] This property is writeable via BACnet. However, it reverts to the 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	-
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 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 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 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

Daikin Applied Training and Development

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

Warranty

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

Aftermarket Services

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

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

Products manufactured in an ISO Certified Facility.