DAIKIN

Sales and Engineering Data Sheet

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MicroTech® WME, C-vintage Chiller Unit Controller Protocol Information

BACnet® Networks (MS/TP, IP)
Modbus® Networks

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Revision History

ED19111	May 2020	Addition of Condenser/Evaporator GPM (BACnet/Modbus), Addition of Compressor Availability (BACnet), Correction of Run Hours (Modbus)
	December 2018	Preliminary release

Notice

Daikin Applied reserves the right to change any information contained herein without prior notice. The user is responsible for determining whether this product is appropriate for his or her application.

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Limited Warranty

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

This document contains the necessary information needed to incorporate a Daikin Applied MicroTech Chiller Unit Controller into a building automation system (BAS). It lists all BACnet properties, Modbus registers, and corresponding MicroTech WME Chiller Unit Controller data points. It also contains the BACnet Protocol Implementation Conformance Statement (PICS). BACnet and Modbus terms are not defined. Refer to the respective specifications for definitions and details.

Reference Documents

Company	Number	Title	Source
Daikin Applied	IOM 1266	Magnitude® Model WME, C-vintage Magnetic Bearing Centrifugal Chiller Installation, Operation, and Maintenance Manual	www.DaikinApplied.com
Daikin Applied	IM 1283	MicroTech Chiller Unit Controller BACnet® IP, BACnet® MS/TP, and Modbus® Communication Module	www.DaikinApplied.com
American Society of Heating, Refrig, and Air Conditioning Engineers	ANSI/ASHRAE 135-2012	BACnet A Data Communication Protocol for Building Automation and Control Networks	www.ashrae.org
Modbus-IDA.ORG		Modbus Application Protocol Specification V1.1b	www.Modbus.org
Modbus-IDA.ORG		Modbus over Serial Line Specification and Implementation Guide V1.02	www.Modbus.org

Software Revision

This document supports the following versions of the standard MicroTech WME Chiller 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.

Chiller Model	Chiller Application Software Version	Chiller HMI Software Version
Magnitude Magnetic Bearing Centrifugal Chillers Model WME, C Vintage	1.1.6	1.3.10

The revision of the application software can be determined from the chiller HMI under the ‘Settings’ menu.

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.

Unit Controller Data Points

The MicroTech WME Chiller Unit Controller contains data points or unit variables that are accessible from several user interfaces: the local Human Machine Interface (HMI), a BACnet network (BACnet IP or MS/TP), or a Modbus network. Not all points are accessible from each interface. This manual lists all important data points and the corresponding path for each applicable interface. Refer to the respective chiller operation manual, available on www.DaikinApplied.com, for HMI display details.

Protocol Definitions

Building Automation System (BAS) communication to the MicroTech WME Chiller Controller can be configured in either an interoperable BACnet or Modbus network. This requires a BAS module, which can be ordered with the chiller and factory-mounted or can be field-mounted at any time after the chiller unit is installed. Connection to the chiller for all BAS protocols will be at the BAS module.

BACnet Protocol

BACnet is a standard communication protocol for Building Automation and Control Networks developed by the American National Standards Institute (ANSI) and American Society of Heating, Refrigeration and Air-conditioning Engineers (ASHRAE) specified in ANSI/ASHRAE standard 135-2012. 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.

Modbus Protocol

The Modbus protocol is a standardized Application Level (OSI Level 7) protocol used in interoperable Industrial Control networks. Modbus provides the communication infrastructure necessary to integrate products manufactured by different vendors and to integrate control services that are now independent. The Modbus protocol specifies how requests from the client are sent to a server and how servers reply. The client constructs a PDU (protocol data unit) and sends it to a specific server or broadcasts it to all servers. The PDU contains a function code that defines the action the client is requesting from the server(s). The PDU also includes a data field that further defines the action to the server, for example, the location of the data to be read. A normal reply from a server includes the same function code and a response data field. In the case of a read operation, the response data field contains the requested data. In the case of a write operation, the response data field contains an echo of the write data of the request command. If the server detects an error in the transmission, the reply to the client includes an exception function code and the response data field contains an exception code.

Controllers can communicate on standard Modbus networks using one of two transmission modes: ASCII or RTU. Users select the serial port communication parameters (baud rate, parity mode, etc.), during configuration of the controller. The mode and serial parameters must be the same for all devices on a Modbus network. Transmission mode determines how information is packed into the message fields and decoded. In RTU mode, each byte contains two hexadecimal characters, and in ASCII mode, each byte contains one ASCII character. **The MicroTech WME Chiller Unit Controller uses the RTU mode only.**

Setting BAS Communication Parameters

There are various parameters involved in setting up the unit controller with three communication module options (BACnet IP, BACnet MS/TP or Modbus).These parameters are set differently depending on which communication module is ordered and shipped with the unit. The table below lists the three possible sets of default parameter settings. Not all the parameters apply to all the module options. The bold parameters can be changed using the HMI display located on the unit. The parameters in italics must be changed in the BACnet Device Object.

Communication Parameter Settings

Table 1: Communication Parameter Settings

Parameter Name	BACnet IP	BACnet MS/TP	Modbus
Device Instance	**9050**	**9050**	N/A
IP Address	**192.168.1.10**	N/A	N/A
IP Gateway	**192.168.1.1**	N/A	N/A
IP Mask	**255.255.255.0**	N/A	N/A
UDP Port Number	**47808**	NA	N/A
MS/TP MAC Address	N/A	**1**	N/A
Baud Rate	N/A	**38400**	**19200**
Device Object Name	*Daikin_ MicroTech_######, where ###### is the Device Instance*	*Daikin_ MicroTech_######, where ###### is the Device Instance*	N/A
Max Info Frames	N/A	10	N/A
Max Master	N/A	127	N/A
Modbus Address	N/A	N/A	**1**
Parity	N/A	N/A	**None**
Modbus Stop Bits	N/A	N/A	**1**

BACnet Networks Compatibility

The MicroTech WME Chiller Unit Controller is tested according to the BACnet Testing Laboratory (BTL) Test Plan. It is designed to meet the requirements of the BACnet Standard (ANSI/ ASHRAE 135-2012) as stated in the Protocol Implementation and Conformance Statement (PICS). The PICS is located at the end of this manual.

BACnet Objects

MicroTech WME Chiller Unit Controllers incorporate standard BACnet object types (i.e., object types defined in the BACnet Standard) that conform to the BACnet Standard. Each object has properties that control unit variables or data points. Some object types occur more than once in the MicroTech WME Chiller Unit Controller; each occurrence or instance has different properties and controls different unit variables or data points. Each instance is designated with a unique instance index. Some properties can be adjusted (read/write properties, e.g., setpoints) from the network and others can only be interrogated (read-only properties, e.g., status information). The Object Name is the name of the object in the device. Object Names must be unique within each BACnet device.

The Object Name, along with the Object Type and Instance Number, are described in the “Comprehensive Data Tables” section. For more information on Object Types, please refer to ASHRAE Standard 135-2012 (www.ashrae.org)

MicroTech WME Chiller Unit Controller Device Object

⚠ CAUTION

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

Each BACnet compatible device (i.e. MicroTech WME Chiller Unit Controller) can only have a single BACnet Device Object.

Device Object Identifier

The MicroTech WME Chiller Unit Controller Device Object Identifier (Device Instance Number) uniquely specifies the unit within the network. This number must be unique on the entire BACnet network. The default device instance number is 9050, but can be changed via the HMI. Cycle power on the BAS module for the change to take effect.

Device Object Properties

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

Table 2: MicroTech WME Chiller Unit Controller Device Object Properties

Property	Identifier	Default Value	Data Type
Object Identifier	75	Device-9050 (Device- followed by Instance Number)	BACnetObjectIdentifier
Object Name	77	Daikin_MicroTech_######, where ###### is the Device Instance	Character String
Object Type	79	0	BACnetObjectType
System Status	112	Operational (0)	BACnetDeviceStatus
Vendor Name	121	Carel Industries S.p.A.	Character String
Vendor Identifier	120	77	Unsigned 16
Model Name	70	pCOmini	Character String
Firmware Revision	44	4.3.000	Character String
Application Software Version	12	1.00.030	Character String
Location	58		Character String
Description	28	Carel Multitasking Controller	Character String
Protocol Version	98	1	Unsigned
Protocol Services Supported	97	acknowledgeAlarm, getAlarmSummary, getEnrollmentSummary, subscribeCOV, atomicReadFile, atomicWriteFile, readProperty, readPropertyMultiple, writeProperty, writePropertyMultiple, deviceCommunicationControl, reinitializeDevice, i-Am, timeSynchronization, who-Has, who-Is, readRange, utcTimeSynchronization, subscribeCOVProperty, getEventInformation	BACnetServicesSupported
Protocol Object Types Supported	96	analog-input, analog-value, binary-input, binary-value, calendar, device, file, schedule, multi-state-value, trend-log, analog-output, binary-output, integer-value, multistate-input, multistate-output, notification-class, and positive-integer-value to this list	BACnetObjectTypesSupported
Object List	76		Sequence of BACnetObjectIdentifer
Max APDU Length Accepted	62	1024 (IP) / 480 (MS/TP)	Unsigned 16
Segmentation Supported	107	Both	BACnetSegmentation
Max Segments Accepted	167	16	Unsigned
Local Time	57	variable	Time
Local Date	56	variable	Date
UTC Offset	119	-0 (Range: –780 .. 780)	Integer
Daylight Savings Status	24	variable	Boolean
APDU Segment Timeout	10	5000	Unsigned
APDU Timeout	11	1500	Unsigned
Number of APDU Retries	73	2	Unsigned
Device Address Binding	30	variable	Sequence of BACnetAddressBinding
Active COV Subscriptions	152	variable	List of BACnetCOVSubscriptions

Network Considerations

Access to Properties

Object properties are accessible from the network by specifying three identifiers: the device object identifier, object identifier, and the property identifier. To access a property, the user must specify the object identifier including the device object identifier or the object name including the device object name and the property identifier.

BACnet IP Network Addressing

The BACnet/Internet Protocol (BACnet/IP) address of the MicroTech WME Chiller Unit Controller in a BACnet/IP network 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 Media Access Control (MAC) address. The IP address portion of the BACnet/IP address must be unique in the BACnet/IP network segment. The default UDP port number in the MicroTech WME Chiller Unit Controller is 47808 (BAC0 in hexadecimal).

The device object of the MicroTech WME Chiller Unit Controller contains a Given Internet Protocol Subnet Mask (Default is 255.255.255.0) and a default Given IP address of 192.168.1.10. The controller also supports DHCP (Dynamic Host Configuration Protocol) IP addressing, which can be enabled using the unit HMI. The chiller HMI can be used to configure the BACnet/IP addressing.

The MicroTech WME Chiller Unit Controller can be incorporated into a BACnet/IP network dedicated to BACnet devices only or an Ethernet network shared with BACnet devices and other devices.

Shared Ethernet Networks

Integrating the MicroTech WME Chiller Unit Controller into a shared Ethernet LAN requires close cooperation with the network administrator of the shared Ethernet network. First, verify whether DHCP should or should not be enabled. If not, obtain the IP Subnet Mask of the shared network from the network administrator. Then, obtain static IP Addresses for all MicroTech WME Chiller Unit Controllers being integrated into the shared network. Finally, obtain the address of an IP Router to use for sending IP messages to and from the BACnet IP subnets. Once all information is determined, refer to the “Setting Unit Controller Communication Parameters” section for further instruction.

BACnet MS/TP Network Addressing

The BACnet MS/TP MAC address of the MicroTech WME Chiller Unit Controller in a BACnet Master Slave/Token Passing (MS/TP) is set using the chiller HMI.

The BAS module power must be cycled in order for the new address to take effect.

The default data transmission rate is set to 38,400 bps (baud). This rate can be changed to 19,200 or 76,800 with the HMI. Refer to the “Setting Unit Controller Communication Parameters” section.

Modbus Networks

The MicroTech WME Chiller Unit Controller can be configured in an interoperable Modbus network. The controller must have the corresponding Modbus Communication Module installed.

The MicroTech WME Chiller Unit Controller conforms to the published Modbus standards. Refer to www.Modbus.org for more information.

Valid Function Codes

The MicroTech WME Chiller Unit Controller supports the eight Modbus public function codes shown in Table 3. However, the MicroTech WME Chiller Unit Controller contains only Holding Registers (4xxxx), so not all function codes would be used.

Table 3: Valid Function Codes

Function Code	Description	Definition
01 (0x01)	Read Coil Status	Reads the On/Off status of discrete outputs
02 (0x02)	Read Input Status	Reads the On/Off status of discrete inputs
03 (0x03)	Read Holding Registers	Reads one to approximately 125 contiguous input registers in a remote device
04 (0x04)	Read Input Registers	Reads the contents of input registers
05 (0x05)	Force Single Coil	Forces a single coil to either On or Off
06 (0x06)	Write Single Register	Writes a single Holding Register to a remote device
15 (0x0F)	Write Multiple Coils	Forces each coil in a sequence of coils to either On or Off
16 (0x10)	Write Multiple Registers	Writes a block of one to approximately 120 contiguous registers in a remote device

Valid Error Codes

The MicroTech WME Chiller Unit Controller supports all exception codes. See Table 4 for a description of valid error codes.

Table 4: Valid Error Codes

Error Codes	Description	Definition
01	Illegal Function	The function code received in the query is not an allowable action for the server (or slave)
02	Illegal Data Address	The data address received in the query is not an allowable address for the server (or slave)
03	Illegal Data Value	A value contained in the query data field is not an allowable value for server (or slave)
04	Slave Device Failure	An unrecoverable error occurred while the server (or slave) was attempting to perform the requested action
05	Acknowledged	The server (or slave) has accepted and is processing the request
06	Slave Device Busy	The server (or slave) is busy processing a command. The client (or master) should retransmit when the server (or slave) is free
08	Memory Parity Error	The server (or slave) attempted to read record file, but detected a parity error in the memory. The client (or master) can retry the request, but service may be required on the server (or slave) device
0A	Gateway Path Unavailable	The gateway may be configured incorrectly or overloaded
0B	Gateway Target Device Failed to Respond	No response from the target device

Modbus Addressing

Each function code implies access to a specific Modbus reference set. Therefore, the leading digit is not included in the address field of a Modbus message. The Modbus Communication Module supports zero-based addressing. For example, Holding Register 40003 is addressed as 0002 in a Modbus message.

Modbus Data Point

Each data point accessible from a Modbus network is described with a table that gives the data type and Holding Register. If the data point represents an enumerated variable, the enumerations are also listed.

When a variable spans multiple Holding Registers, it is important to know how the data is represented in those Holding Registers.

The following example shows Compressor Run Hours. Circuit 1, Compressor 1 run hours are located at Holding Registers 74-75 (40074-40075). If the operating hours are 99900 (0x0001 0x863C), the registers will read as follows:

- 74 = 0x0001
- 75 = 0x863C

For strings, the interpretation differs. In this case, each Holding Register can contain two characters. If a string spans multiple registers, the first register (lowest register number) contains the two left-most characters of the string. Since the MicroTech WME Chiller Unit Controller only supports Modbus RTU, use the ASCII Conversion Table in Appendix B to translate the numerical data to their corresponding ASCII characters.

Example Data Point: Chiller On/Off

This output data point indicates the current state of the chiller. The OFF state is represented by state = FALSE and value = 0. The other discrete states are represented by state = TRUE and value > 0.

Data Type	Holding Register	Measurement	Units	Valid Range
RO Holding Register	8	Chiller State	NA	0 = Off 1 = On

Data Type

Data is represented as either single-bit elements or 16-bit elements. A single-bit element is referred to as a Discrete Input when it refers to read-only data and as a Coil when it refers to read-write data. A 16-bit element is referred to as an Input Register when it refers to read-only data, and as a Holding Register when it refers to read-write data. All of the Modbus registers defined in the MicroTech WME Chiller Unit Controller are 16-bit Holding Registers. Some are read only (RO) and some are read-write (RW).

Holding Register

There are up to 65,536 elements of each data type in a Modbus device. Data elements are numbered from 1 to 65,536 in each type. Data elements are addressed with an index in the range from 0 to 65,535. The index is not the address of the data element in the unit controller memory, but instead it is used in Modbus PDUs to specify the location of the data in the unit controller. This means, for example, that data element number 1 (i.e., Holding Register 40001) is addressed using index 0 in the PDU.

In addition, the function code field portion of the message already specifies a “Holding Register” operation. Therefore the ‘4xxxx’ reference is implicit. As such, this document represents the Holding Registers without the implicit 4xxxx. For example, Holding Register 8 is actually Holding Register 40008.

Valid Range

Some properties are standard data types and some are enumerated sets. If the property value represents a range of values (e.g. temperature or pressure) that range of values is shown. If the property value is an enumerated set, all enumerated values and corresponding meaning are shown as well.

Configuring the Unit Controller

The MicroTech WME Chiller Unit Controller is ready to operate with the default values of the various parameters set at the factory. Default values may be changed with the unit’s HMI or via the network. In order for the unit controller to use the Network Enable command from the BAS, ‘Control Source’ must be set to “BAS” at the unit HMI. In order for the unit controller to use the Cool Setpoint, Mode Setpoint, and Capacity Limit Setpoint commands from the BAS, ‘Remote Enable’ must be set to “Enable” at the unit HMI. See the MicroTech WME Chiller Unit Controller Operation Manual for unit settings and IM 1283 for network parameter settings. (www.DaikinApplied.com)

Network Parameters

The following section defines the network parameters, or data points, available to the BAS from the MicroTech WME Chiller Unit Controller. Table 5 lists all BACnet objects and Modbus registers that are supported for each MicroTech WME Chiller model type.

Table 5: Data Points by Chiller Model

Data Point	WME Vintage C
Active Setpoint	X
Actual Capacity	X
Alarm Code Fault	X
Alarm Code Warning	X
Alarm Digital Output	X
Alarm Index Fault	X
Alarm Index Warning	X
Application Version	X
Active Capacity Limit (Output)	X
Capacity Limit Setpoint - Network	X
Chiller Capacity Limited	X
Chiller Enable Output	X
Chiller Enable Setpoint	X
Chiller Local/Network	X
Chiller Mode Output	X
Chiller Mode Setpoint - Network	X
Chiller On/Off	X
Chiller Run Mode	X
Chiller Status	X
Clear Alarm - Network	X
Compressor Current	X
Compressor Discharge Refrigerant Pressure	X
Compressor Discharge Refrigerant Temperature	X
Compressor Discharge Saturated Refrigerant Temperature	X
Compressor Percent RLA	X
Compressor Power	X
Compressor Run Hours	X
Compressor Starts	X
Compressor Suction Refrigerant Pressure	X
Compressor Suction Refrigerant Temperature	X
Compressor Unavailable (BACnet Only)	X
Compressor Voltage	X
Condenser Entering Fluid Temperature	X
Condenser Flow Rate	X
Condenser Flow Switch Status	X
Condenser Leaving Fluid Temperature	X
Condenser Pump Run Hours	X
Condenser Pump Status	X
Condenser Refrigerant Pressure	X
Condenser Saturated Refrigerant Temperature	X
Cool Setpoint - Network	X
Current Date and Time	X
Evaporator Entering Fluid Temperature	X
Evaporator Flow Rate	X
Evaporator Flow Switch Status	X
Evaporator Leaving Fluid Temperature	X
Evaporator Pump Run Hours	X
Evaporator Pump Status	X
Evaporator Refrigerant Pressure	X
Evaporator Saturated Refrigerant Temperature	X
Liquid Line Refrigerant Temperature	X
Location	X
Run Enabled	X
Units	X

BACnet Network Objects

This section describes the data that is available to the BAS via the BACnet network. Each BACnet object may or may not be available on the unit HMI. If it is available, the keypad/display menu shows one path where the object appears, but note that it may also be available on more than one keypad menu. Table 6 throughTable 10 contain the relevant information needed to integrate the MicroTech WME Chiller Unit Controller into the BACnet network. The tables are organized by Analog Inputs, Analog Values, Binary Inputs, Binary Values, and Multi-State Values. The parameters are listed alphabetically by point name within each table.

Table 6: BACnet Analog Inputs

Point Name	Object Type/Instance	Read/Write Access	BACnet Object Name	Range/Default (In Units)	Description
Compressor Current					
Circuit 1 Compressor 1	AI:9	R	C1Comp1Current	Amp range varies by chiller model Default: NA	The average current of the compressor motor.
Circuit 1 Compressor 2	AI:10		C1Comp2Current		
Compressor Discharge Refrigerant Temperature					
Circuit 1 Compressor 1	AI:63	R	C1Comp1DischargeTemp	-40 – 249.8°F -40 – 121°C Default: NA	The current refrigerant temperature discharged from the compressor.
Circuit 1 Compressor 2	AI:64		C1Comp2DischargeTemp		
Compressor Discharge Refrigerant Pressure					
Circuit 1 Compressor 1	AI:81	R	C1Comp1DischRefPressure	0-410 Psi; 0-2827 kPa, Default: NA	The current discharge refrigerant pressure for the compressor.
Circuit 1 Compressor 2	AI:82		C1Comp2DischRefPressure		
Compressor Power					
Circuit 1 Compressor 1	AI:45	R	C1Comp1Kilowatts	0 – 3500 kilowatts Default: NA	The current power of the compressor motor.
Circuit 1 Compressor 2	AI:46		C1Comp2Kilowatts		
Compressor Suction Refrigerant Temperature					
Circuit 1 Compressor 1	AI:105	R	C1Comp1SuctionTemp	-40 – 230°F -40 – 110°C Default: NA	The current suction refrigerant temperature for the compressor.
Circuit 1 Compressor 2	AI:106		C1Comp2SuctionTemp		
Compressor Suction Refrigerant Pressure					
Circuit 1 Compressor 1	AI:123	R	C1Comp1SuctionPressure	-350–350 Psi, -2413 kPa – 2413 kPa Default: NA	The current suction refrigerant pressure for the compressor.
Circuit 1 Compressor 2	AI:124		C1Comp2SuctionPressure		
Compressor Voltage					
Circuit 1 Compressor 1	AI:27	R	C1Comp1Voltage	0 – 15000 VAC Default: NA	The average voltage of the compressor motor.
Circuit 1 Compressor 2	AI:28		C1Comp2Voltage		
Condenser Entering Fluid Temperature					
	AI:3	R	EntCondWaterTemp	-40 – 230°F -40 – 110°C Default: NA	The current temperature of the water entering the condenser.
Condenser Fluid Flow Rate					
	AI:147	R	CondWaterFlowRate	0-65,535 GPM 0-4134.6 L/S Default: NA	The current fluid flow rate for the condenser.
Condenser Leaving Fluid Temperature					
	AI:4	R	LvgCondWaterTemp	-40 – 230°F -40 – 110°C Default: NA	The current temperature of the water leaving the condenser.
Condenser Refrigerant Pressure					
Circuit 1	AI:99	R	Cond1RefPressure	0-410 Psi (700 Psi for R410A) 0-2827 kPa, (4826 kPa for R410A) Default: NA	The current condenser refrigerant pressure.
Evaporator Entering Fluid Temperature					
	AI:1	R	EntEvapWaterTemp	-40 – 230°F -40 – 110°C Default: NA	The temperature of the fluid entering the evaporator.

Point Name	Object Type/Instance	Read/Write Access	BACnet Object Name	Range/Default (In Units)	Description
Evaporator Fluid Flow Rate					
	AI:148	R	EvapWaterFlowRate	0-65,535 GPM 0-4134.6 L/S Default: NA	The current fluid flow rate for the evaporator.
Evaporator Leaving Fluid Temperature					
	AI:2	R	LvgEvapWaterTempUnit	-40 – 230°F -40 – 110°C Default: NA	The current temperature of the fluid leaving the evaporator.
Evaporator Refrigerant Pressure					
Circuit 1	AI:141	R	C1EvapRefPressure	-350–350 Psi, -2413 kPa – 2413 kPa Default: NA	The current evaporator refrigerant pressure.
Liquid Line Refrigerant Temperature					
Circuit 1	AI:218	R	C1LiqLineRefTemp	-40°–230°F -40°–110°C Default: NA	The current liquid line refrigerant temperature.

Table 7: BACnet Analog Values

Point Name	Object Type/ Instance	Read/Write Access	BACnet Object Name	Range/Default (In Units)	Description
Active Capacity Limit Output					
	AV:1	R	ActiveCapacityLimit	0 – 100% Default: NA	Measures of the ratio of operating capacity limit to full capacity expressed as a percentage. This value is the lowest of all limits specified by the operator, analog Demand Limit input, or Network Capacity Limit Setpoint.
Active Setpoint					
	AV:5	R	ActiveLvgWaterTarget	38.0°–149.9° F 3.33°–65.5°C Default: NA	The current setpoint used to control the chiller. The setpoint that is used is based on the operating mode (Ice, Cool or Heat) of the chiller and any “LWT reset” functions that are in effect. See Chiller Mode Output and Chiller Mode Setpoint – Network. There are three possible setpoints: Cool Setpoint – Network, Heat Setpoint – Network, and Ice Setpoint – Network. Only Cool Setpoint applies to model WME-C.
Actual Capacity					
	AV:2	R	ChillerCapacity	0 – 100% Default: NA	The percent of maximum capacity the chiller is producing under the present operating conditions. At 100%, the chiller may be producing more or less than its nominal rating due to variations in operating conditions.
Alarm Code					
Fault	AV:905	R	AVFaultAlarmCode		See BACnet Alarm Codes section for additional information. See Fault Alarms for additional information.
Warning	AV:903		AVWarningAlarmCode		See Warning Alarms for additional information.
Alarm Index					
Fault	AV:901	R	AVFaultAlarm		See BACnet Alarm Indices section for additional information. See BACnet Fault Alarm Index for additional information.
Warning	AV:902		AVWarningAlarm		See BACnet Warning Alarm Index for additional information.

Point Name	Object Type/ Instance	Read/Write Access	BACnet Object Name	Range/Default (In Units)	Description
Capacity Limit Setpoint - Network					
	AV:3	W	NetworkCapacityLimitPct	0 – 100% Default: 100%	Sets the maximum capacity level of the chiller. This level may be adjusted, but not above the factory-specified limit. The unit controller only uses this variable if Remote Enable is set to Enable. Remote Enable can only be changed using the unit HMI.
Compressor Discharge Saturated Refrigerant Temperature					
Circuit 1 Compressor 1	AV:26	R	C1Comp1DischSatRefTemp	-40 – 230°F -40 – 110°C Default: NA	The current discharge saturated refrigerant temperature for the compressor.
Circuit 1 Compressor 2	AV:27		C1Comp2DischSatRefTemp		
Compressor Percent RLA					
Circuit 1 Compressor 1	AV:8	R	C1Comp1MotorCurrentPercent	0-115% Default: 0	The current percent RLA for the compressor motor of the compressor.
Circuit 1 Compressor 2	AV:9		C1Comp2MotorCurrentPercent		
Compressor Run Hours					
Circuit 1 Compressor 1	AV:74	R	C1Comp1Hours	0 –999,999 Default: NA	The number of hours that the compressor motor has been turned on.
Circuit 1 Compressor 2	AV:75		C1Comp2Hours		
Compressor Suction Saturated Refrigerant Temperature					
Circuit 1 Compressor 1	AV:50	R	C1Comp1SuctSatTemp	-40 – 230°F -40 – 110°C Default: NA	The current suction saturated refrigerant temperature for the compressor.
Circuit 1 Compressor 2	AV:51		C1Comp2SuctSatTemp		
Compressor Starts					
Circuit 1 Compressor 1	AV:92	R	C1Comp1Starts	0 –65,535 Default: NA	The number of times the compressor motor has been started.
Circuit 1 Compressor 2	AV:93		C1Comp2Starts		
Condenser Pump Run Hours					
Condenser Pump 1	AV:110	R	CondPump1RunHours	0 –999,999 Default: NA	The number of hours that the pump motor has been turned on.
Condenser Pump 2	AV:111		CondPump2RunHours		
Condenser Saturated Refrigerant Temperature					
Circuit 1	AV:44	R	Cond1SatRefTemp	-40 – 230°F -40 – 110°C Default: NA	The current saturated refrigerant temperature of the condenser.
Cool Setpoint - Network					
	AV:4	W	NetworkCoolTempSetpoint	38.0 – 75.0°F 3.33 – 23.89°C Default: 43.88°F /6.6°C	Changes the Cooling setpoint from the network. It sets the temperature of the Leaving Chilled Fluid when the chiller is operating in the Cooling Mode. It cannot be set below the local Cool Setpoint. The unit controller only uses this variable if Remote Enable is set to Enable. Remote Enable can only be changed using the unit HMI.
Evaporator Pump Run Hours					
Evaporator Pump 1	AV:112	R	EvapPump1OperHours	0 –999,999 Default: NA	The number of hours that the pump motor has been turned on.
Evaporator Pump 2	AV:113		EvapPump2OperHours		
Evaporator Saturated Refrigerant Temperature					
Circuit 1	AV:68	R	C1EvapSatRefTemp	-40 – 230°F -40 – 110°C Default: NA	The current saturated refrigerant temperature of the evaporator.

Table 8: BACnet Binary Values

Point Name	Object Type/ Instance	Read/Write Access	BACnet Object Name	Range/Default (In Units)	Description
Chiller Enable Setpoint					
	BV:2	W	ChillerEnableStp	0 = Disable (Inactive) 1 = Enable Default: 0 = Disabled	Disables or enables chiller operation over the network. Setting this variable to Enable does not start the chiller. It only allows the chiller to start if other operating conditions are satisfied. The unit controller only uses this variable if Control Source is set to BAS. Control Source can only be changed using the unit HMI.
Clear Alarm - Network					
	BV:8	W	ClearAlarm	0 = Normal 1 = Clear Alarm	Clears all active alarms. Many alarms are automatically clearing alarms. Of the alarms that need to be manually cleared, the alarms listed below cannot be cleared from the network: • COMPRESSOR SHUTDOWN – Evaporator Pressure Low Circuit #n Compressor #n Fault • COMPRESSOR SHUTDOWN – Condenser Pressure High Circuit #n Compressor #n Fault • COMPRESSOR SHUTDOWN – Motor Temperature High Circuit #n Compressor #n Fault • UNIT SHUTDOWN – Evaporator Leaving Water Temp Low (Freeze) • COMPRESSOR SHUTDOWN – Mechanical High Pressure Trip Circuit #n Compressor #n Fault • COMPRESSOR SHUTDOWN – Mechanical Low Pressure Trip Circuit #n Compressor #n Fault

Table 9: BACnet Binary Inputs

Point Name	Object Type/Instance	Read/Write Access	BACnet Object Name	Range/Default (In Units)	Description
Alarm Digital Output					
	BI:10	R	AlarmDigitalOutput	0 = No Alarm 1 = Alarm	Indicates whether an alarm condition has occurred. This variable must be polled for alarm indication.
Chiller Capacity Limited					
	BI:6	R	ChillerLimited	0 = Not Limited 1 = Limited	Indicates whether conditions may exist that prevent the chiller from reaching full capacity.
Chiller Enable Output					
	BI:7	R	ChillerEnableOutput	0 = Disable 1 = Enable	Indicates if operation of the chiller is disabled or enabled. The chiller is allowed to run if enabled and not allowed to run if disabled.
Chiller Local/Network					
	BI:3	R	ChillerLocalRemote	0 = Network 1 = Local	Indicates whether the chiller is in local control or allowed to be controlled remotely over the network. The value can only be changed locally from the unit controller keypad/display. The values from the following variables are ignored in the chiller application if this variable is set to Local (1): • Chiller Enable Setpoint • Chiller Mode Setpoint – Network • Cool Setpoint Network • Capacity Limit Setpoint • Clear Alarm Network
Chiller On/Off					
	BI:4	R	UnitOnOff	0 = Chiller Off 1 = Chiller On	The current state of the chiller.
Compressor Unavailable					
Circuit 1 Compressor 1	BI:163	R	C1Cmp1Unavailable	0 = Available 1 = Unavailable Default: NA	Indicates wheterh the compressor is available to run.
Circuit 2 Compressor 2	BI:164	R	C2Cmp2Unavailable		
Condenser Flow Switch Status					
	BI:1	R	CondWaterFlowStatus	0 = No Flow 1 = Flow	The status of the fluid flowing through the condenser.
Condenser Pump 1 Status					
	BI:11	R	CondPump1State	0 = Pump Off Request 1 = Pump On Request	Indicates if the pump has been commanded ON or OFF.
Condenser Pump 2 Status					
	BI:12	R	CondPump2State	0 = Pump Off Request 1 = Pump On Request	Indicates if the pump has been commanded ON or OFF.
Evaporator Flow Switch Status					
	BI:2	R	EvapWaterFlowStatus	0 = No Flow 1 = Flow	The status of the fluid flowing through the evaporator.
Evaporator Pump1 Status					
	BI:8	R	EvapPump1State	0 = Pump Off Request 1 = Pump On Request	Indicates if the pump has been commanded ON or OFF.
Evaporator Pump2 Status					
	BI:9	R	EvapPump2State	0 = Pump Off Request 1 = Pump On Request	Indicates if the pump has been commanded ON or OFF.
Run Enabled					
	BI:5	R	RunEnabled	0 = Off 1 = Run Allowed Default: NA	The running mode of the chiller. Run Enabled indicates that the chiller can start if operating conditions are met.

Table 10: BACnet Multi-State Values

Point Name	Object Type/Instance	Read/Write Access	BACnet Object Name	Range/Default (In Units)	Description
Chiller Mode Output					
	MSV:2	R	ActiveMode	1 = ICE 2 = COOL 3 = HEAT 4= COOL/HEAT RECOVERY Default: 2 = COOL	The current operating mode of the chiller. Only Cool Mode applies to model WME-C.
Chiller Mode Setpoint - Network					
	MSV:3	R/W	ChillerOperationMode	1 = ICE 2 = COOL 3 = HEAT 4= COOL/HEAT RECOVERY Default: 2 = COOL	Changes the operating mode of the chiller and provides the ability for another node on the network to place a chiller in another mode. The unit controller only uses this variable if Remote Enable is set to Enable. Remote Enable can only be changed using the HMI. Available Modes can also be found on the HMI. Only Cool Mode applies to model WME-C.
Chiller Run Mode					
	MSV:1	R	UnitStatus	1 = OFF 2 = START 3 = RUN 4 = PRESHUTDOWN 5 = SERVICE	The unit status of the chiller.
Units					
	MSV:4	R/W	Units	1 = Metric 2 = English Default: English (2)	Sets the type of units (English or Metric) sent from the chiller unit controller to the BACnet network.

Modbus Register Mapping

The Modbus Communication Module supports zero-based addressing. For example, Holding Register 40002 is addressed as 0001 in a Modbus message. The Holding Registers shown in Table 11 through Table 14 assume 4xxxx addressing. For example, Holding Register 40001 is shown as 1.

When a variable spans multiple Holding Registers, it is important to know how the data is represented in those Holding Registers.

The following example shows Compressor Run Hours. Circuit 1, Compressor 1 run hours are located at Holding Registers 74-75 (40074-40075). If the operating hours are 99900 (0x0001 0x863C), the registers will read as follows:

74 = 0x0001
75 = 0x863C

Table 11: Chiller Data Points

Chiller Data Point	Holding Register	Data Type	Read/Write Access	Range/Default (In Units)	Description
Active Capacity Limit Output					
	14	RO Holding Register	R	0 – 100% × 10 Default: NA	A measure of the ratio of operating capacity limit to full capacity expressed in percent. This value is the lowest of all limits specified by the operator, analog Demand Limit input, or Network Capacity Limit Setpoint.
Active Setpoint					
	12	RO Holding Register	R	38.0 – 149.9°F × 10 3.33 – 65.5°C × 10 Default: Cool Setpoint	Indicates the current setpoint used to control the chiller. Based on the operating mode of the chiller, this value is derived from the Cooling Setpoint or Ice Setpoint. See Cool Setpoint - Network and Ice Setpoint - Network as well as Chiller Mode Output and Chiller Mode Setpoint - Network. Only Cool Setpoint applies to model WME-C.
Actual Capacity					
	13	RO Holding Register	R	0 – 100% × 10 Default: NA	Indicates the percent of maximum capacity the chiller is producing under the present operating conditions. At 100%, the chiller may be producing more or less than its nominal rating due to variations in operating conditions.
Alarm Code					
Fault	33	RO Holding Register	R		See Alarm Data Point Details section for additional information.
Warning	31				
Alarm Index					
Fault	30	RO Holding Register	R		See Alarm Data Point Details section for additional information.
Warning	28				
Alarm Digital Output					
	5	RO Holding Register	R	0=No Alarm 1=Alarm Default: NA	Indicates whether an alarm condition has occurred. This variable must be polled for alarm indication.
Capacity Limit Setpoint - Network					
	38	RW Holding Register	R/W	0 – 100% × 10 Default: 100% × 10	Sets the maximum capacity level of the chiller. This level may be adjusted via an operator workstation or other network device, but cannot be adjusted above a factory-specified limit. The unit controller only uses the value of this register if Remote Enable is set to Enable. Remote Enable can only be changed using the HMI.
Chiller Capacity Limited					
	4	RO Holding Register	R	0=Not Limited 1=Limited Default: NA	Indicates whether conditions may exist that prevent the chiller from reaching full capacity. If conditions exist that limit operation, the chiller may be prevented from reaching the Leaving Water Temperature setpoint.
Chiller Enable Output					
	2	RO Holding Register	R	0=Disable 1=Enable Default: 0=Disabled	Indicates if operation of the chiller is disabled or enabled. If the chiller is disabled, it cannot run. If it is enabled, it is allowed to run.
Chiller Enable Setpoint					
	9	RW Holding Register	R/W	0=Disable 1=Enable 2=Null Default: Null	Enables the chiller to run if operating conditions are satisfied, or disables the chiller from running. The default of Null causes Disable to be used, provided nothing else is writing to this point. The unit controller only uses the value of this register if Control Source is set to BAS. Control Source can only be changed using the HMI.

Chiller Data Point	Holding Register	Data Type	Read/Write Access	Range/Default (In Units)	Description
Chiller Local/Network					
	1	RO Holding Register	R	0=Remote 1=Local Default: Null	Indicates whether the chiller is in local control or allowed to be controlled remotely over the network. The value can only be changed locally. The values from the following variables are ignored in the chiller application if this variable is set to Local (1): • Chiller Enable Setpoint • Chiller Mode Setpoint – Network • Cool Setpoint Network • Ice Setpoint Network • Capacity Limit Setpoint • Clear Alarm Network
Chiller Mode Output					
	11	RO Holding Register	R	1=Ice 3=Heat 4=Cool/Heat Recovery 5=Defrost Default: NA	Indicates the current operating mode of the chiller.
Chiller Mode Setpoint - Network					
	34	RW Holding Register	R/W	0= 1=Ice 2=Cool 3=Heat 4=Cool/Heat Recovery	Changes the operating mode of the chiller. The unit controller only uses the value of this register if Remote Enable is set to Enable. Remote Enable can only be changed using the HMI. Available Modes can also be found on the unit HMI. A value of Null causes the chiller to run in the Cool mode provided that nothing else is writing to this point. Only Cool Mode applies to model WME-C.
Chiller On/Off					
	8	RO Holding Register	R	0=Off 1=On	Indicates the current state of the chiller. The OFF state is represented by State = FALSE and Value = 0. The other discrete states are represented by State = TRUE and Value > 0.
Chiller Status (Run Mode)					
	15	RO Holding Register	R	1=Off 2=Start 3=Run 4=Pre Shutdown 5=Service Default: Determined by current state of chiller	Indicates the unit status of the chiller.
Clear Alarm - Network					
	10	RW Holding Register	R/W	0=Normal 1=Clear Alarms 2=Null Default: Null	Clears all active alarms. Many alarms are automatically clearing alarms. Of the alarms that need to be manually cleared, those listed below cannot be cleared from the network: • COMPRESSOR SHUTDOWN - Evaporator Pressure Low Circuit #n Compressor #n Fault • COMPRESSOR SHUTDOWN - Condenser Pressure High Circuit #n Compressor #n Fault • UNIT SHUTDOWN – Evaporator Leaving Water Temp Low (Freeze) • COMPRESSOR SHUTDOWN - Mechanical High Pressure Trip Circuit #n Compressor #n Fault • COMPRESSOR SHUTDOWN - Mechanical Low Pressure Trip Circuit #n Compressor #n Fault The default of Null causes Normal to be used provided nothing else is writing to this point. This register is ignored by the chiller application if Chiller Local/ Remote is set to Local.
Condenser Entering Fluid Temperature					
	19	RO Holding Register	R	-40° – 230°F × 10 -40° – 110°C × 10 Default: NA	Indicates the current temperature of the fluid entering the condenser.
Condenser Flow Switch Status					
	7	RO Holding Register	R	0=OFF 1=ON Default: NA	Indicates the status of the fluid flowing through the condenser.
Condenser Fluid Flow Rate					
	21	RO Holding Register	R	0-65,535 GPM 0-4134.6 L/S Default: NA	Indicates the current fluid flow rate for the condenser.
Condenser Leaving Fluid Temperature					
	20	RO Holding Register	R	-40° – 230°F × 10 -40° – 110°C × 10 Default: NA	Indicates the current temperature of the fluid leaving the condenser.

Chiller Data Point	Holding Register	Data Type	Read/Write Access	Range/Default (In Units)	Description
Cool Setpoint - Network					
	35	RW Holding Register	R/W	38.0 – 75.0°F × 10 3.33 – 23.89°C × 10 Default: Cool Setpoint	Changes the Cooling setpoint from the network. It sets the temperature of the Leaving Chilled Fluid setpoint when the chiller is operating in the Cooling Mode. The unit controller only uses the value of this register if Remote Enable is set to Enable. Remote Enable can only be changed using the HMI.
Evaporator Entering Fluid Temperature					
	16	RO Holding Register	R	-40 – 230°F × 10 -40 – 110°C × 10 Default: NA	Indicates the current temperature of the fluid entering the evaporator.
Evaporator Flow Switch Status					
	6	RO Holding Register	R	0=No Flow 1=Flow Default: NA	Indicates the status of the fluid flowing through the evaporator.
Evaporator Leaving Fluid Temperature					
	17	RO Holding Register	R	-40 – 230°F × 10 -40 – 110°C × 10 Default: NA	Indicates the current temperature of the fluid leaving the evaporator.
Evaporator Fluid Flow Rate					
	18	RO Holding Register	R	0-65,535 GPM 0-4134.6 L/S Default: NA	Indicates the current fluid flow rate for the evaporator.
Run Enabled					
	3	RO Holding Register	R	0=OFF 1=Run Allowed Default: NA	Reflects the running mode of the chiller. Run Enabled indicates that the chiller can start if operating conditions are met.

Table 12: Circuit Data Points

Chiller Data Point	Holding Register	Data Type	Read/Write Access	Range/Default (In Units)	Description
Condenser Refrigerant Pressure					
Circuit 1	39	RO Holding Register	R	0 – 410 psi × 10 (700 psi for R410A) 0 – 2827 kPa × 10 (4826 kPa for R410A) Default: NA	Indicates the current condenser pressure.
Condenser Saturated Refrigerant Temperature					
Circuit 1	40	RO Holding Register	R	-14.98 – 185°F × 10 -26.1 – 85°C × 10 Default: NA	Indicates the current saturated refrigerant temperature of the condenser.
Evaporator Refrigerant Pressure					
Circuit 1	41	RO Holding Register	R	0 – 410 psi × 10 (700 psi for R410A) 0 – 2827 kPa × 10 (4826 kPa for R410A) Default: NA	Indicates the current evaporator pressure.
Evaporator Saturated Refrigerant Temperature					
Circuit 1	42	RO Holding Register	R	-14.98 – 185°F × 10 -26.1 – 85°C × 10 Default: NA	Indicates the current saturated refrigerant temperature of the evaporator.
Liquid Line Refrigerant Temperature					
Circuit 1	1984	RO Holding Register	R	-40 – 230°F × 10 -40 – 110°C × 10 Default: NA	Indicates the liquid line refrigerant temperature for the circuit.

Table 13: Compressor Data Points

Chiller Data Point	Holding Register	Data Type	Read/Write Access	Range/Default (In Units)	Description
Compressor Current					
Circuit 1 Compressor 1	70	RO Holding Register	R	0 – 10,000 Amps Default: NA	Indicates the average current of the compressor motor.
Circuit 1 Compressor 2	83				
Compressor Percent RLA					
Circuit 1 Compressor 1	69	RO Holding Register	R	0 – 100% Default: NA	Indicates the current percent RLA for the compressor motor.
Circuit 1 Compressor 2	82				
Compressor Discharge Refrigerant Pressure					
Circuit 1 Compressor 1	66	RO Holding Register	R	0 – 410 Psi × 10 (700 Psi for R410A) 0 – 2827 kPa × 10 (4826 kPa for R410A) Default: NA	The current discharge refrigerant pressure for the compressor.
Circuit 1 Compressor 2	79				
Compressor Discharge Refrigerant Temperature					
Circuit 1 Compressor 1	68	RO Holding Register	R	-40 – 230°F × 10 -40 – 110°C × 10 Default: NA	Indicates the current refrigerant temperature discharged from the compressor.
Circuit 1 Compressor 2	81				
Compressor Discharge Saturated Refrigerant Temperature					
Circuit 1 Compressor 1	67	RO Holding Register	R	-40 – 230°F × 10 -40 – 110°C × 10 Default: NA	The current discharge saturated refrigerant temperature for the compressor.
Circuit 1 Compressor 2	80				
Compressor Power					
Circuit 1 Compressor 1	72	RO Holding Register	R	0 – 3,500 kW Default: NA	Indicates the current power of the compressor motor.
Circuit 1 Compressor 2	85				
Compressor Run Hours					
Circuit 1 Compressor 1	74-75	RO Holding Register	R	0 – 999,999 hours Default: NA	Indicates the number of hours that the compressor motor has been turned on.
Circuit 1 Compressor 2	87-88				
Compressor Starts					
Circuit 1 Compressor 1	73	RO Holding Register	R	0 – 65,535 starts Default: NA	Indicates the number of times the compressor motor has been started.
Circuit 1 Compressor 2	86				
Compressor Suction Refrigerant Pressure					
Circuit 1 Compressor 1	63	RO Holding Register	R	0 – 410 Psi × 10 (700 Psi for R410A) 0 – 2827 kPa × 10 (4826 kPa for R410A) Default: NA	The current suction refrigerant pressure for the compressor.
Circuit 1 Compressor 2	76				
Compressor Suction Refrigerant Temperature					
Circuit 1 Compressor 1	65	RO Holding Register	R	-40 – 230°F × 10 -40 – 110°C × 10\ Default: NA	Indicates the current refrigerant temperature entering the compressor.
Circuit 1 Compressor 2	78				
Compressor Suction Saturated Refrigerant Temperature					
Circuit 1 Compressor 1	64	RO Holding Register	R	-40 – 230°F × 10 -40 – 110°C × 10 Default: NA	The current suction saturated refrigerant temperature for the compressor.
Circuit 1 Compressor 2	77				
Compressor Voltage					
Circuit 1 Compressor 1	71	RO Holding Register	R	0 – 15,000 VAC Default: NA	Indicates the average voltage of the compressor motor.
Circuit 1 Compressor 2	84				

Table 14: Pump Data Points

Chiller Data Point	Holding Register	Data Type	Read/Write Access	Range/Default (In Units)	Description
Condenser Pump 1 Run Hours					
	297-298	RO Holding Register	R	0 – 999,999 Hrs Default: NA	Indicates the number of hours that the pump motor has been turned ON. There is separate Holding Register for each pump.
Condenser Pump 1 Status					
	299	RO Holding Register	R	0=Pump OFF Request 1=Pump ON Request Default: NA	Indicates if the pump has been commanded ON or OFF. There is a separate Holding Register for each pump.
Condenser Pump 2 Run Hours					
	300-301	RO Holding Register	R	0 – 999,999 Hrs Default: NA	Indicates the number of hours that the pump motor has been turned ON. There is separate Holding Register for each pump.
Condenser Pump 2 Status					
	302	RO Holding Register	R	0=Pump OFF Request 1=Pump ON Request Default: NA	Indicates if the pump has been commanded ON or OFF. There is a separate Holding Register for each pump.
Evaporator Pump 1 Run Hours					
	303-304	RO Holding Register	R	0 – 999,999 Hrs Default: NA	Indicates the number of hours that the pump motor has been turned ON. There is separate Holding Register for each pump.
Evaporator Pump 1 Status					
	305	RO Holding Register	R	0=Pump OFF Request 1=Pump ON Request Default: NA	Indicates if the pump has been commanded ON or OFF. There is a separate Holding Register for each pump.
Evaporator Pump 2 Run Hours					
	306-307	RO Holding Register	R	0 – 999,999 Hrs Default: NA	Indicates the number of hours that the pump motor has been turned ON. There is separate Holding Register for each pump.
Evaporator Pump 2 Status					
	308	RO Holding Register	R	0=Pump OFF Request 1=Pump ON Request Default: NA	Indicates if the pump has been commanded ON or OFF. There is a separate Holding Register for each pump.

The MicroTech WME Chiller Unit Controller has various ways of managing alarms, depending on the protocol. Using one of the mechanisms available, alarms can be recognized and acknowledged by alarm class or individually, and cleared from the network.

Alarm Classes

Alarms in the unit controller are divided into two classes: Warnings and Faults. Warning alarms have the lowest priority. Fault alarms have the highest priority. The alarms within each class are not prioritized in any way. Refer to the MicroTech WME Chiller Controller Operation Manual (www.DaikinApplied.com) for a thorough explanation of each alarm.

Fault Alarms

Fault alarms require an acknowledgement from the operator. These alarms indicate that the compressor or unit is shut down.

Warning Alarms

A warning is annunciated whenever an abnormal condition exists which does not affect chiller operation.

Alarm Monitoring

Monitor Alarm Individually

The MicroTech WME Chiller Unit Controller provides individual alarm identification through a unique value for each alarm. The value assigned to each alarm is the same for both BACnet and Modbus applications.

Monitor by Alarm Code or Alarm Index

Alarms can be monitored by alarm code or alarm index. Monitoring by alarm index provides a more generic alarm, while monitoring by alarm code provides more detail. For example, Alarm Index 7 indicates a compressor maintenance warning. However, by monitoring the alarm code, it is possible to view which compressor needs maintenance.

Alarm Data Availability

Table 15 lists all BACnet and Modbus alarms available for each MicroTech WME Chiller model. Refer to “BACnet Alarms” or “Modbus Alarms” for details on alarm monitoring, indication, and clearing for the respective network protocol.

Table 15: Alarms by Chiller Model

Data Point	WME Vintage C
Clear Alarm - Network	X
Warning Alarm Code	X
Fault Alarm Code	X
Warning Alarm Index	X
Fault Alarm Index	X
COMPRESSOR SHUTDOWN - COMPRESSOR VFD Fault #n	X
COMPRESSOR SHUTDOWN - Condenser Pressure High #n	X
COMPRESSOR SHUTDOWN - Condenser Pressure Sensor Fault #n	X
COMPRESSOR SHUTDOWN - Condenser Water Flow Loss	X
COMPRESSOR SHUTDOWN - Current Overload Trip #n	X
COMPRESSOR SHUTDOWN - Discharge Pressure High #n	X
COMPRESSOR SHUTDOWN - Discharge Temperature High #n	X
COMPRESSOR SHUTDOWN - Evaporator Pressure Low #n	X
COMPRESSOR SHUTDOWN - Evaporator Pressure Sensor Fault #n	X
COMPRESSOR SHUTDOWN - MBC Fault #n	X
COMPRESSOR SHUTDOWN - MBC Modbus Communication Fault #n	X
COMPRESSOR SHUTDOWN - Motor Gap Temperature High #n	X
COMPRESSOR SHUTDOWN - Motor Gap Temperature Sensor Fault #n	X
COMPRESSOR SHUTDOWN - Motor Temperature Sensor Fault #n	X
COMPRESSOR SHUTDOWN - Rotor Pump Temperature Sensor Fault #n	X
COMPRESSOR SHUTDOWN - Stator Temperature High #n	X
COMPRESSOR SHUTDOWN - Suction Pressure Low #n	X
COMPRESSOR SHUTDOWN - VFD Modbus Communication Fault #n	X
Expansion Alarm Warning	X
Expansion Alarm Fault	X
UNIT SHUTDOWN - EVAPORATOR WATER FLOW LOSS	X

BACnet Alarms

BACnet Alarm Monitoring

The MicroTech WME Chiller Unit Controller may have alarms monitored by one of two methods: BACnet Binary Output or alarm class.

Monitor Alarm by BACnet Binary Output

To monitor whether or not there is any active alarm, read the Alarm Digital Output Binary Output object. If the Present_Value is Inactive (0), no alarms are active. If the Present_Value is Active (1), there is at least one alarm active in the chiller.

Monitor by Alarm Class (Code or Index)

To monitor alarms by alarm class, read the Present_Value of the appropriate Analog Value object (Warnings, Problems and Faults). The Present_Value displays a value that corresponds to the highest alarm index or code that is active. It is possible to have multiple active alarms, but only the alarm with the highest index or code is displayed. If the Present_Value displays a zero, there are no active alarms.

Clearing Alarms

Alarms within the MicroTech WME Chiller Unit Controller can be cleared via BACnet by setting the ClearAlarms variable to a value of 1. After the alarms are cleared, this variable returns to Normal (0). Refer to “Table 8: BACnet Binary Values” on page 14, Clear Alarm - Network.

BACnet Alarm Codes

This section provides a comprehensive description of all alarm codes supported by the MicroTech WME Chiller Unit Controllers. Table 16 and Table 17 display details for each of the two alarm types: Warnings and Faults.

Table 16: BACnet Warning Alarm Codes

Object Type/Instance	Read/Write Access	BACnet Object Name	Description
AV:903	R	AVWarningAlarmCode	This object allows individual indication of the active warning alarm. The alarms are not ordered based on any priority. If multiple warning alarms are present at one time, this object will be set to the alarm that has the highest alarm code. This object is set to zero if no warning alarms are active.
Alarm Code	**Description**		
0	No Alarms		
16129	Unit Expansion Alarm – Warning (see Unit HMI for Cause)		
16165	Compressor 1 Expansion Alarm – Warning (see Unit HMI for Cause)		
16197	Compressor 2 Expansion Alarm – Warning (see Unit HMI for Cause)		

Table 17: BACnet Fault Alarm Codes

Object Type/Instance	Read/Write Access	BACnet Object Name	Description
AV:905	R	AVFaultAlarmCode	This object allows individual indication of the active fault alarm. The alarms are not ordered based on any priority. If multiple fault alarms are present at one time, this object will be set to the alarm that has the highest alarm code. This object is set to zero if no problem alarms are active.
Alarm Code	**Description**		
0	No Alarms		
25383	COMPRESSOR SHUTDOWN - Comp 1 Motor Gap Temperature Sensor Fault		
25387	COMPRESSOR SHUTDOWN - Comp 2 Motor Gap Temperature Sensor Fault		
25895	COMPRESSOR SHUTDOWN - Comp 1 Rotor Pump Temperature Sensor Fault		
25899	COMPRESSOR SHUTDOWN - Comp 2 Rotor Pump Temperature Sensor Fault		
26407	COMPRESSOR SHUTDOWN - Comp 1 Suction Pressure Low		
26411	COMPRESSOR SHUTDOWN - Comp 2 Suction Pressure Low		
26663	COMPRESSOR SHUTDOWN - Comp 1 Discharge Pressure High		
26667	COMPRESSOR SHUTDOWN - Comp 2 Discharge Pressure High		
27175	COMPRESSOR SHUTDOWN - Comp 1 Stator Temperature High		
27179	COMPRESSOR SHUTDOWN - Comp 2 Stator Temperature High		
27431	COMPRESSOR SHUTDOWN - Comp 1 Motor Gap Temperature High		
27435	COMPRESSOR SHUTDOWN - Comp 2 Motor Gap Temperature High		
28711	COMPRESSOR SHUTDOWN - Comp 1 MBC Fault		
28715	COMPRESSOR SHUTDOWN - Comp 2 MBC Fault		
29735	COMPRESSOR SHUTDOWN - Comp 1 MBC Modbus Communication Fault		
29739	COMPRESSOR SHUTDOWN - Comp 2 MBC Modbus Communication Fault		
29991	COMPRESSOR SHUTDOWN - Comp 1 VFD Modbus Communication Fault		
29995	COMPRESSOR SHUTDOWN - Comp 2 VFD Modbus Communication Fault		
33063	COMPRESSOR SHUTDOWN - Current Overload Trip Circuit 1, Comp 1		
33095	COMPRESSOR SHUTDOWN - Current Overload Trip Circuit 2, Comp 1		
34855	COMPRESSOR SHUTDOWN - Motor Temp Sensor Fault Circuit 1, Comp 1		
34887	COMPRESSOR SHUTDOWN - Motor Temp Sensor Fault Circuit 2, Comp 1		
36099	COMPRESSOR SHUTDOWN - Condenser Pressure Sensor Fault		
36611	COMPRESSOR SHUTDOWN - Condenser Water Flow Loss		
36867	COMPRESSOR SHUTDOWN - Condenser Pressure High		
37927	COMPRESSOR SHUTDOWN - Discharge Temp High Circuit 1, Comp 1		
37959	COMPRESSOR SHUTDOWN - Discharge Temp High Circuit 2, Comp 1		
38403	UNIT SHUTDOWN - Evaporator Water Flow Loss		
38915	COMPRESSOR SHUTDOWN - Evaporator Pressure Low		
39427	COMPRESSOR SHUTDOWN – Evaporator Pressure Sensor Fault		
50983	COMPRESSOR SHUTDOWN - COMP VFD Fault Circuit 1, Comp 1		
51015	COMPRESSOR SHUTDOWN - COMP VFD Fault Circuit 2, Comp 1		
57901	Unit Expansion Alarm – Fault (see Unit HMI for Cause)		
57127	Compressor 1 Expansion Alarm – Fault (see Unit HMI for Cause)		
57159	Compressor 2 Expansion Alarm – Fault (see Unit HMI for Cause)		

BACnet Alarm Indices

This section provides a comprehensive description of all BACnet alarm indices supported by the MicroTech WME Chiller Unit Controller. Table 18 and Table 19 display details for each of the two alarm types: Warnings and Faults.

Table 18: BACnet Warning Alarm Indices

Object Type/Instance	Read/Write Access	BACnet Object Name	Description
AV:902	R	AVWarningAlarm	This object allows individual indication of the active warning alarm. The alarms are not ordered based on any priority. If multiple warning alarms are present at one time, this object will be set to the alarm that has the highest alarm index. This object is set to zero if no warning alarms are active.
Alarm Index	**Description**		
0	No Alarms		
63	Expansion Alarm – Warning (see Unit HMI for Cause)		

Table 19: BACnet Fault Alarm Indices

Object Type/Instance	Read/Write Access	BACnet Object Name	Description
AV:901	R	AVFaultAlarm	This object allows individual indication of the active fault alarm. The alarms are not ordered based on any priority. If multiple fault alarms are present at one time, this object will be set to the alarm that has the highest alarm index. This object is set to zero if no fault alarms are active.
Alarm Index	**Description**		
0	No Alarms		
99	COMPRESSOR SHUTDOWN - Motor Gap Temperature Sensor Fault #n		
101	COMPRESSOR SHUTDOWN - Rotor Pump Temperature Sensor Fault #n		
103	COMPRESSOR SHUTDOWN - Suction Pressure Low #n		
104	COMPRESSOR SHUTDOWN - Discharge Pressure High #n		
106	COMPRESSOR SHUTDOWN - Stator Temperature High #n		
107	COMPRESSOR SHUTDOWN - Motor Gap Temperature High #n		
112	COMPRESSOR SHUTDOWN - MBC Fault #n		
116	COMPRESSOR SHUTDOWN - MBC Modbus Communication Fault #n		
117	COMPRESSOR SHUTDOWN - VFD Modbus Communication Fault #n		
129	COMPRESSOR SHUTDOWN - Current Overload Trip #n		
136	COMPRESSOR SHUTDOWN - Motor Temp Sensor Fault #n		
141	COMPRESSOR SHUTDOWN - Condenser Pressure Sensor Fault		
143	COMPRESSOR SHUTDOWN - Condenser Water Flow Loss		
144	COMPRESSOR SHUTDOWN - Condenser Pressure High #n		
148	COMPRESSOR SHUTDOWN - Discharge Temp High #n		
150	UNIT SHUTDOWN - Evaporator Water Flow Loss		
152	COMPRESSOR SHUTDOWN - Evaporator Pressure Low		
154	COMPRESSOR SHUTDOWN – Evaporator Pressure Sensor Fault		
199	COMPRESSOR SHUTDOWN - COMP VFD Fault #n		
223	Expansion Alarm – Fault (see Unit HMI for Cause)		

Modbus Alarm Codes

This section provides a comprehensive description of all alarm codes supported by the MicroTech WME Chiller Unit Controllers. Table 20 and Table 21 display details for each of the two alarm types: Warnings and Faults.

Table 20: Modbus Warning Alarm Codes

Alarm	Holding Register	Data Type	Read/Write Access	Description
Warning Alarm Code	31	RO Holding Register	R	Displays the active warning code. The alarms are not ordered based on any priority. If multiple warning alarms are present at one time, this object will be set to the alarm that has the highest alarm code. This object is set to zero if no warning alarms are active.
Alarm Code	**Description**			
0	No Alarms			
16129	Unit Expansion Alarm – Warning (see Unit HMI for Cause)			
16165	Compressor 1 Expansion Alarm – Warning (see Unit HMI for Cause)			
16197	Compressor 2 Expansion Alarm – Warning (see Unit HMI for Cause)			

Table 21: Modbus Fault Alarm Codes

Alarm	Holding Register	Data Type	Read/Write Access	Description
Fault Alarm Code	33	RO Holding Register	R	Displays the active fault code. The alarms are not ordered based on any priority. If multiple fault alarms are present at one time, this object will be set to the alarm that has the highest alarm code. This object is set to zero if no fault alarms are active.
Alarm Code	**Description**			
0	No Alarms			
25383	COMPRESSOR SHUTDOWN - Comp 1 Motor Gap Temperature Sensor Fault			
25387	COMPRESSOR SHUTDOWN - Comp 2 Motor Gap Temperature Sensor Fault			
25895	COMPRESSOR SHUTDOWN - Comp 1 Rotor Pump Temperature Sensor Fault			
25899	COMPRESSOR SHUTDOWN - Comp 2 Rotor Pump Temperature Sensor Fault			
26407	COMPRESSOR SHUTDOWN - Comp 1 Suction Pressure Low			
26411	COMPRESSOR SHUTDOWN - Comp 2 Suction Pressure Low			
26663	COMPRESSOR SHUTDOWN - Comp 1 Discharge Pressure High			
26667	COMPRESSOR SHUTDOWN - Comp 2 Discharge Pressure High			
27175	COMPRESSOR SHUTDOWN - Comp 1 Stator Temperature High			
27179	COMPRESSOR SHUTDOWN - Comp 2 Stator Temperature High			
27431	COMPRESSOR SHUTDOWN - Comp 1 Motor Gap Temperature High			
27435	COMPRESSOR SHUTDOWN - Comp 2 Motor Gap Temperature High			
28711	COMPRESSOR SHUTDOWN - Comp 1 MBC Fault			
28715	COMPRESSOR SHUTDOWN - Comp 2 MBC Fault			
29735	COMPRESSOR SHUTDOWN - Comp 1 MBC Modbus Communication Fault			
29739	COMPRESSOR SHUTDOWN - Comp 2 MBC Modbus Communication Fault			
29991	COMPRESSOR SHUTDOWN - Comp 1 VFD Modbus Communication Fault			
29995	COMPRESSOR SHUTDOWN - Comp 2 VFD Modbus Communication Fault			
33063	COMPRESSOR SHUTDOWN - Current Overload Trip Circuit 1, Comp 1			
33095	COMPRESSOR SHUTDOWN - Current Overload Trip Circuit 2, Comp 1			
34855	COMPRESSOR SHUTDOWN - Motor Temp Sensor Fault Circuit 1, Comp 1			
34887	COMPRESSOR SHUTDOWN - Motor Temp Sensor Fault Circuit 2, Comp 1			
36099	COMPRESSOR SHUTDOWN - Condenser Pressure Sensor Fault			
36611	COMPRESSOR SHUTDOWN - Condenser Water Flow Loss			
36867	COMPRESSOR SHUTDOWN - Condenser Pressure High			
37927	COMPRESSOR SHUTDOWN - Discharge Temp High Circuit 1, Comp 1			
37959	COMPRESSOR SHUTDOWN - Discharge Temp High Circuit 2, Comp 1			
38403	UNIT SHUTDOWN - Evaporator Water Flow Loss			
38915	COMPRESSOR SHUTDOWN - Evaporator Pressure Low			
39427	COMPRESSOR SHUTDOWN – Evaporator Pressure Sensor Fault			
50983	COMPRESSOR SHUTDOWN - COMP VFD Fault Circuit 1, Comp 1			
51015	COMPRESSOR SHUTDOWN - COMP VFD Fault Circuit 2, Comp 1			
57901	Unit Expansion Alarm – Fault (see Unit HMI for Cause)			
57127	Compressor 1 Expansion Alarm – Fault (see Unit HMI for Cause)			
57159	Compressor 2 Expansion Alarm – Fault (see Unit HMI for Cause)			

Modbus Alarm Indices

This section provides a comprehensive description of all BACnet alarm indices supported by the MicroTech WME Chiller Unit Controller. Table 22 and Table 23 display details for each of the two alarm types: Warnings and Faults.

Table 22: Modbus Warning Alarm Indices

Alarm	Holding Register	Data Type	Read/Write Access	Description
Warning Alarm Index	28	RO Holding Register	R	Displays the active warning index. The alarms are not ordered based on any priority. If multiple warning alarms are present at one time, this object will be set to the alarm that has the highest alarm index. This object is set to zero if no warning alarms are active.
Alarm Code	**Description**			
0	No Alarms			
63	Expansion Alarm – Warning (see Unit HMI for Cause)			

Table 23: Modbus Fault Alarm Indices

Alarm	Holding Register	Data Type	Read/Write Access	Description
Fault Alarm Index	30	RO Holding Register	R	Displays the active fault index. The alarms are not ordered based on any priority. If multiple fault alarms are present at one time, this object will be set to the alarm that has the highest alarm index. This object is set to zero if no fault alarms are active.
Alarm Code	**Description**			
0	No Alarms			
99	COMPRESSOR SHUTDOWN - Motor Gap Temperature Sensor Fault #n			
101	COMPRESSOR SHUTDOWN - Rotor Pump Temperature Sensor Fault #n			
103	COMPRESSOR SHUTDOWN - Suction Pressure Low #n			
104	COMPRESSOR SHUTDOWN - Discharge Pressure High #n			
106	COMPRESSOR SHUTDOWN - Stator Temperature High #n			
107	COMPRESSOR SHUTDOWN - Motor Gap Temperature High #n			
112	COMPRESSOR SHUTDOWN - MBC Fault #n			
116	COMPRESSOR SHUTDOWN - MBC Modbus Communication Fault #n			
117	COMPRESSOR SHUTDOWN - VFD Modbus Communication Fault #n			
129	COMPRESSOR SHUTDOWN - Current Overload Trip #n			
136	COMPRESSOR SHUTDOWN - Motor Temp Sensor Fault #n			
141	COMPRESSOR SHUTDOWN - Condenser Pressure Sensor Fault			
143	COMPRESSOR SHUTDOWN - Condenser Water Flow Loss			
144	COMPRESSOR SHUTDOWN - Condenser Pressure High #n			
148	COMPRESSOR SHUTDOWN - Discharge Temp High #n			
150	UNIT SHUTDOWN - Evaporator Water Flow Loss			
152	COMPRESSOR SHUTDOWN - Evaporator Pressure Low			
154	COMPRESSOR SHUTDOWN – Evaporator Pressure Sensor Fault			
199	COMPRESSOR SHUTDOWN - COMP VFD Fault #n			
223	Expansion Alarm – Fault (see Unit HMI for Cause)			

BACnet Protocol Implementation Conformance Statement

Date: March 1, 2016
Vendor Name: Carel Industries S.p.A.
Product Name: BACnet c.pCO (Server Only)
Product Model Number: c.pCO
BACnet Application Software Version: 1.00.027
BACnet Firmware Revision: v3.0.000
BACnet Protocol Revision: 14

Product Description:
The c.pCO is a native BACnet controller device with BACnet/IP and MS/TP capabilities.

BACnet Standardized Device Profile (Annex L):

☐ BACnet Operator Workstation (B-OWS)

☐ BACnet Advanced Operator Workstation (B-AWS)

☐ 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)

List all BACnet Interoperability Building Blocks Supported (Annex K):

DS-RP-B	T-ATR-B	T-VMT-I-B
DS-WP-B	DM-DDB-A	DM-DDB-B
DS-RPM-B	DM-DOB-B	DM-DCC-B
DS-WPM-B	DM-TS-B	DM-UTC-B
AE-N-I-B	DM-RD-B	DM-BR-B
AE-ACK-B	AE-ASUM-B	DM-DOB-A
AE-INFO-B	DS-COV-B	DS-COVP-B
AE-ESUM-B	DS-COVU-B	SCHED-E-B

Segmentation Capability:

☑ Able to transmit segmented messages Window Size: 16

☑ Able to receive segmented messages Window Size: 16

Table 24: Standard Object Types Supported

NOTE: Modifying Writable Properties, such as State Text, Inactive Text, and Polarity, can lead to confusion when modified from defaults. When contacting technical support, all changes to default values should be disclosed.

Object Type	Optional Properties	Proprietary Properties	Writable Properties
Device	Active_COV_Subscriptions APDU_Segment_Timeout Backup_And_Restore_State Backup_Failure_Timeout Backup_Preparation_Time Configuration_Files Daylight_Savings_Status Description Last_Restore_Time Last_Restart_Reason Location Local_Date Local_Time Max_Master Max_Info_Frames Max_Segments_Accepted Restart_Notification_Recipients Restore_Completion_Time Restore_Preparation_Time Serial Number Time_of_Device_Restart UTC_Offset	(* See descriptions below) 77000 77001 77002 77003 77004 77005 77006 77007 77008 77017 77018 77019 77020	APDU_Timeout APDU_Segment_Timeout Backup_Failure_Timeout Description (max 255 chars) Location (max 64 chars) Max_Master Max_Info_Frames Number_Of_APDU_Retries Object_Name (max 64 chars) Restart_Notification_Recipients Restore_Completion_Time (* For Proprietary Properties See descriptions below) Proprietary Property 77004 Proprietary Property 77005 Proprietary Property 77008 Proprietary Property 77017 Proprietary Property 77018 Proprietary Property 77019 Proprietary Property 77020

Object Type	Optional Properties	Proprietary Properties	Writable Properties
Analog Input	Acked_Transitions COV_Increment Deadband Description Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config Event_Time_Stamps High_Limit Limit_Enable Low_Limit Max_Pres_Value Min_Pres_Value Notification_Class Notify_Type Reliability Reliability_Evaluation_Inhibit Resolution Time_Delay Time_Delay_Normal	(** See descriptions below) 77009	Deadband Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config High_Limit Limit_Enable Low_Limit Max_Pres_Value Min_Pres_Value Notification_Class Out_Of_Service Present_Value[3] Reliability[3] Reliability_Evaluation_Inhibit Resolution Time_Delay Time_Delay_Normal [3] Writable if Out_Of_Service is true
Analog Output	Acked_Transitions COV_Increment Deadband Description Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config Event_Time_Stamps High_Limit Limit_Enable Low_Limit Max_Pres_Value Min_Pres_Value Notification_Class Notify_Type Reliability Reliability_Evaluation_Inhibit Resolution Time_Delay Time_Delay_Normal	(** See descriptions below) 77009	Deadband Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config High_Limit Limit_Enable Low_Limit Max_Pres_Value Min_Pres_Value Notification_Class Out_Of_Service Present_Value Reliability[3] Reliability_Evaluation_Inhibit Relinquish_Default Resolution Time_Delay Time_Delay_Normal [3] Writable if Out_Of_Service is true
Analog Value	Acked_Transitions COV_Increment Deadband Description Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config Event_Time_Stamps High_Limit Limit_Enable Low_Limit Max_Pres_Value Min_Pres_Value Notification_Class Notify_Type Priority_Array[1] Reliability Reliability_Evaluation_Inhibit Relinquish_Default[1] Resolution Time_Delay Time_Delay_Normal [1] These Properties are present only if Proprietary Property 77009 = 2 or 130	(** See descriptions below) 77009	Deadband Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config High_Limit Limit_Enable Low_Limit Max_Pres_Value Min_Pres_Value Notification_Class Out_Of_Service Present_Value[2,3] Reliability[3] Reliability_Evaluation_Inhibit Relinquish_Default Resolution Time_Delay Time_Delay_Normal + [2] Writable only if Proprietary Property 77009 = 1 or 2 or 129 or 130 [3] Writable if Out_Of_Service is true

Object Type	Optional Properties	Proprietary Properties	Writable Properties
Binary Input	Acked_Transitions Active_Text Alarm_Value Description Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config Event_Time_Stamps Inactive_Text Notification_Class Notify_Type Reliability Reliability_Evaluation_Inhibit Time_Delay Time_Delay_Normal	(** See descriptions below) 77009	Active_Text (max 32 chars) Alarm_Value Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config Inactive_Text (max 32 chars) Notification_Class Out_Of_Service Polarity Present_Value[3] Reliability[3] Reliability_Evaluation_Inhibit Time_Delay Time_Delay_Normal [3] Writable if Out_Of_Service is true
Binary Output	Active_Text Description Inactive_Text Reliability	(** See descriptions below) 77009	Active_Text (max 32 chars) Inactive_Text (max 32 chars) Out_Of_Service Present_Value Polarity Reliability[3] Relinquish_Default [3] Writable if Out_Of_Service is true
Binary Value	Acked_Transitions Active_Text Alarm_Value Description Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config Event_Time_Stamps Notification_Class Notify_Type Inactive_Text Priority_Array[1] Reliability Relinquish_Default[1] Reliability_Evaluation_Inhibit Time_Delay Time_Delay_Normal [1] These Properties are present only if Proprietary Property 77009 = 2 or 130	(** See descriptions below) 77009	Active_Text (max 32 chars) Alarm_Value Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config Inactive_Text (max 32 chars) Notification_Class Notify_Type Present_Value[2,3] Reliability[3] Reliability_Evaluation_Inhibit Relinquish_Default Time_Delay Time_Delay_Normal [2] Writable only if Proprietary Property 77009=1 or 2 or 129 or 130 [3] Writable if Out_Of_Service is true
Calendar	Description	None	Description (max 255 chars) Object_Name (max 64 chars) Date_List (max 16)
File	Description	None	Archive

Object Type	Optional Properties	Proprietary Properties	Writable Properties
Integer Value	Acked_Transitions COV_Increment Deadband Description Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_State Event_Message_Texts Event_Time_Stamps High_Limit Limit_Enable Low_Limit Max_Pres_Value Min_Pres_Value Notification_Class Notify_Type Out_Of_Service Priority_Array 1 Reliability Relinquish_Default 1 Reliability_Evaluation_Inhibit Resolution Time_Delay Time_Delay_Normal 1 These Properties are present only if Proprietary Property 77009=2 or 130	(** See descriptions below) 77009	Deadband Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts (64 chars each) High_Limit Limit_Enable Low_Limit Max_Pres_Value Min_Pres_Value Notification_Class Out_Of_Service Present_Value[2,3] Reliability[3] Relinquish_Default Reliability_Evaluation_Inhibit Resolution Time_Delay Time_Delay_Normal [2] Writable only if Proprietary Property 77009=1 or 2 or 129 or 130 [3] Writable if Out_Of_Service is true
Multistate Input	Acked_Transitions Alarm_Values Description Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts Event_Time_Stamps Fault_Values Notification_Class Notify_Type Reliability State_Text Reliability_Evaluation_Inhibit Time_Delay Time_Delay_Normal	(** See descriptions below) 77009	Alarm_Values Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts (64 chars each) Fault_Values Notification_Class Number_of_States (1 to 32) Out_Of_Service State_Text (max 32 chars per state) Present_Value[3] Reliability[3] Reliability_Evaluation_Inhibit Time_Delay Time_Delay_Normal [3] Writable if Out_Of_Service is true
Multistate Output	Description Reliability	(** See descriptions below) 77009	Number_of_States (1 to 32) Out_Of_Service State_Text State_Text (max 32 chars per state) Present_Value Reliability[3] Relinquish_Default [3] Writable if Out_Of_Service is true
Multistate Value	Acked_Transitions Alarm_Values Description Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config Event_Time_Stamps Fault_Values Notification_Class Notify_Type Priority_Array 1 Reliability Reliability_Evaluation_Inhibit Relinquish_Default[1] State_Text Time_Delay Time_Delay_Normal [1] These Properties are present only if Proprietary Property 77009=2 or 130	(** See descriptions below) 77009	Alarm_Values Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config Fault_Values Notification_Class Number_of_States (1 to 32) Out_Of_Service State_Text (max 32 chars per state) Present_Value[2,3] Reliability[3] Reliability_Evaluation_Inhibit Relinauish_Default Time_Delay Time_Delay_Normal [2] Writable only if Proprietary Property 77009=1 or 2 or 129 or 130 [3] Writable if Out_Of_Service is true

Object Type	Optional Properties	Proprietary Properties	Writable Properties
Notification Class	Description	None	Ack_Required Description (max 255 chars) Object_Name (max 64 chars) Priority Recipient_List (max 4 entries)
Positive Integer Value	Acked_Transitions COV_Increment Deadband Description Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_State Event_Message_Texts Event_Time_Stamps High_Limit Limit_Enable Low_Limit Max_Pres_Value Min_Pres_Value Notification_Class Out_Of_Service Max_Pres_Value Min_Pres_Value Notification_Class Notify_Type Out_Of_Service Priority_Array[1] Reliability Relinquish_Default[1] Reliability_Evaluation_Inhibit Resolution Time_Delay Time_Delay_Normal [1] These Properties are present only if Proprietary Property 77009=2 or 130	(** See descriptions below) 77009	Deadband Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts (64 chars each) High_Limit Limit_Enable Low_Limit Present_Value[2,3] Reliability[3] Reliability_Evaluation_Inhibit Relinquish_Default Resolution Time_Delay Time_Delay_Normal [2] Writable only if Proprietary Property 77009=1 or 2 or 129 or 130 [3] Writable if Out_Of_Service is true
Schedule	Description Exception_Schedule Weekly_Schedule	None	Description (max 255 chars) Object_Name (max 64 chars) Out_of_Service Effective_Period Exception_Schedule (max 4 entries) List_Of_Object_Property_ References (max 64 entries) Present_Value[3] Priority_For_Writing Schedule_Default[5] Weekly_Schedule[5] [3] Writable if Out_Of_Service is true [5] max 6 time/value pairs
Trend Log	Acked_Transitions Align_Intervals Description Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config Event_Time_Stamps Interval_Offset Last_Notify_Records Log_DeviceObjectProperty Log_Interval Notification_Class Notification_Threshold Notify_Type Records_Since_Notification Reliability_Evaluation_Inhibit Reliability Start_Time Stop_Time Trigger	None	Align_Intervals Buffer_Size Description (max 255 chars) Enable Event_Algorithm_Inhibit Event_Detection_Enable Event_Enable Event_Message_Texts_Config Interval_Offset Log_DeviceObjectProperty Logging_Type Log_Interval Notification_Class Notification_Threshold Object_Name (max 64 chars) Record_Count Reliability_Evaluation_Inhibit Start_Time Stop_Time Stop_When_Full Trigger

Table 25: Description of the Proprietary Properties of the Device Object*

Proprietary Property	Datatype	Description	Writable	Value Range
77000	Unsigned	MACType of the server device	No	0=MS/TP 2=BACnet/IP
77001	OctetString	MACaddress of the server device	No	For MS/TP, 1 octet MAC address For BACnet/IP, by 6 octet IP/UDP port MAC address
77002	OctetString	IP Subnet for BACnet/IP MACTypes	No	255.255.255.0 for example
77003	OctetString	BACnet/IP UDP	No	(big endian) 0xBAC0, etc.
77004	OctetString	BBMD_Address	Yes	0.0.0.0 indicates no BBMD registration required
77005	Unsigned	BBMD_TimeToLive	Yes	In seconds
77006	Unsigned	MAC COM Port	No	0-6
77007	Unsigned	MS/TP Baud rate	No	9600, 19200, 38400, 57600, 76800, 115200
77008	Character String	Password (for ReinitializeDevice and Device Communication Control)	Yes	Max 32 chars (default=carel)
77017	Unsigned	The amount of time of non-activity (no client sending DataExpectingReply PDUs) for the BACnet server to be declared offline	Yes	In milliseconds
77018	Unsigned	The amount of time of silence before an external device to be declared offline	Yes	In seconds
77019	Boolean	The dumptrace/start packet tracing indicator	Yes	TRUE = start tracing BACnet packets into a fixed RAM buffer
77020	Boolean	Not used	Yes	Not used

Table 26: Description of the Proprietary Properties of the Analog Input, Analog Output, Analog Value, Binary Input, Binary Output, Binary Value, Multistate Input, Multistate Output, Multistate Value, Integer Value and Positive Integer Value*

Proprietary Property	Datatype	Description	Writable	Value Range
77009	Enumerated	The BACnet read/write feature of the Present_Value property (Analog Input, Analog Output, Analog Value, Binary Input, Binary Output, Multistate Input, Multistate Output, Multistate Value, Integer Value, Positive Integer Value)	No	0=read-only 1=writeable (not commandable) 2=commandable If hexadecimal 0x80 (decimal 128) is added to the value, the object accepts SubscribeCOV requests (for example 0x82 (130) means the object commandable and accepts SubscribeCOV requests)

Proprietary Object Types Supported:

None

Data Link Layer Options:

☐ BACnet IP, (Annex J)

☐ BACnet IP, (Annex J), Foreign Device

☐ ISO 8802-3, Ethernet (Clause 7)

☐ ATA 878.1, 2.5 Mb. ARCNET (Clause 8)

☐ ATA 878.1, EIA-485 ARCNET (Clause 8), baud rate(s)

☑ MS/TP master (Clause 9), baud rate(s): 19200, 36800, 57600, 76800

☐ MS/TP slave (Clause 9), baud rate(s):

☐ Point-To-Point, EIA 232 (Clause 10), baud rate(s):

☐ Point-To-Point, modem, (Clause 10), baud rate(s):

☐ LonTalk, (Clause 11), medium:

☐ BACnet/ZigBee (ANNEX O)

☐ Other:

Device Address Binding:

Is static device binding supported? (This is currently necessary for two-way communication with MS/TP slaves and certain other devices.)

☐ Yes ☐ No

Networking Options:

☐ Router, Clause 6 - List all routing configurations, e.g., ARCNET-Ethernet, Ethernet-MS/TP, etc.

☐ Annex H, BACnet Tunneling Router over IP

☐ BACnet/IP Broadcast Management Device (BBMD)

Does the BBMD support registrations by Foreign Devices?
☐ Yes ☐ No

Does the BBMD support network address translation?
☐ Yes ☐ No

Network Security Options:

☐ Non-secure Device - is capable of operating without BACnet Network Security

☐ Secure Device - is capable of using BACnet Network Security (NS-SD BIBB)

☐ Multiple Application-Specific Keys:

☐ Supports encryption (NS-ED BIBB)

☐ Key Server (NS-KS BIBB)

Character Sets Supported:

Indicating support for multiple character sets does not imply that they can all be supported simultaneously

☐ ISO 10646 (UTF-8)
☐ IBM®/Microsoft® DBCS
☐ ISO 8859-1
☐ ISO 10646 (UCS-2)
☐ ISO 10646 (UCS-4)
☐ JIS X 0208

If this product is a communication gateway, describe the types of non-BACnet equipment/networks that the gateway supports:

N/A

Converting Register Values to ASCII Characters

Table 27 lists the ASCII characters and their decimal and hexadecimal numbers.

Table 27: ASCII Conversion Table

Char	Decimal	Hexadecimal	Char	Decimal	Hexadecimal	Char	Decimal	Hexadecimal
(Space)	32	0x20	@	64	0x40	`	96	0x60
!	33	0x21	A	65	0x41	a	97	0x61
“	34	0x22	B	66	0x42	b	98	0x62
#	35	0x23	C	67	0x43	c	99	0x63
$	36	0x24	D	68	0x44	d	100	0x64
%	37	0x25	E	69	0x45	e	101	0x65
&	38	0x26	F	70	0x46	f	102	0x66
‘	39	0x27	G	71	0x47	g	103	0x67
(	40	0x28	H	72	0x48	h	104	0x68
)	41	0x29	I	73	0x49	I	105	0x69
*	42	0x2a	J	74	0x4a	j	106	0x6a
+	43	0x2b	K	75	0x4b	k	107	0x6b
‘	44	0x2c	L	76	0x4c	l	108	0x6c
-	45	0x2d	M	77	0x4d	m	109	0x6d
.	46	0x2e	N	78	0x4e	n	110	0x6e
/	47	0x2f	O	79	0x4f	o	111	0x6f
0	48	0x30	P	80	0x50	p	112	0x70
1	49	0x31	Q	81	0x51	q	113	0x71
2	50	0x32	R	82	0x52	r	114	0x72
3	51	0x33	S	83	0x53	s	115	0x73
4	52	0x34	T	84	0x54	t	116	0x74
5	53	0x35	U	85	0x55	u	117	0x75
6	54	0x36	V	86	0x56	v	118	0x76
7	55	0x37	W	87	0x57	w	119	0x77
8	56	0x38	X	88	0x58	x	120	0x78
9	57	0x39	Y	89	0x59	y	121	0x79
:	58	0x3a	Z	90	0x5a	z	122	0x7a
;	59	0x3b	[	91	0x5b	{	123	0x7b
<	60	0x3c	\	92	0x5c	|	124	0x7c
=	61	0x3d	]	93	0x5d	}	125	0x7d
>	62	0x3e	^	94	0x5e	~	126	0x7e
?	63	0x3f	_	95	0x5f			

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.