DAIKIN

Installation and Maintenance
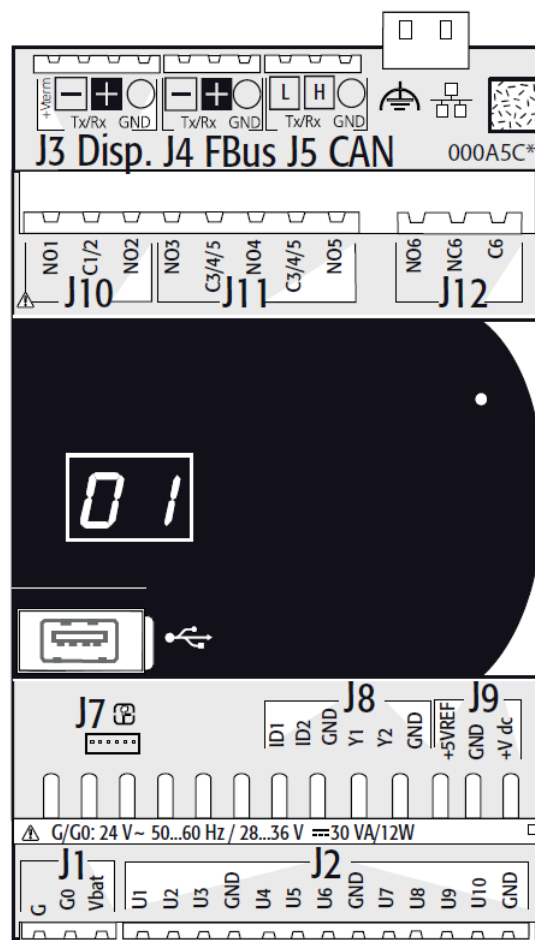
MicroTech® WME, C-vintage Chiller BACnet® and Modbus® Communication Module

This manual contains information regarding the BACnet® and Modbus® communication module used with the MicroTech® WME Magnitude chiller unit controller on Daikin Applied WME Magnitude chillers. It describes how to install or replace the communication module on the MicroTech WME chiller unit controller. It also explains how to set network parameters and establish communication between the chiller and BACnet or Modbus network.

Revision History

IM1283   January 2019   Preliminary release

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	ED 19111	MicroTech WME Chiller BACnet and Modbus Unit Controller Protocol Information	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

Notice

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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. The revision of the application software can be determined from the chiller HMI (Human Machine Interface) on the 'Interface' tab of the 'Settings' menu.

Chiller Model	Chiller Application Software Version	Chiller HMI Software Version
Magnitude Magnetic Bearing Centrifugal Chillers Model WME, C Vintage	1.0.3	1.2.2

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

Recognize Safety Symbols, Words and Labels

The following symbols and labels are used throughout this manual to indicate immediate or potential hazards. It is the owner and installer's responsibility to read and comply with all safety information and instructions accompanying these symbols. Failure to heed safety information increases the risk of property damage and/or product damage, serious personal injury or death. Improper installation, operation and maintenance can void the warranty.

⚠ CAUTION
Cautions indicate potentially hazardous situations, which can result in personal injury or equipment damage if not avoided.
Static sensitive components. Can cause equipment damage.
Discharge any static electrical charge by touching the bare metal inside the control panel before performing any service work. Never unplug cables, circuit board terminal blocks, or power plugs while power is applied to the panel

⚠ 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 situation which will result in death or serious injury if not avoided. Electric shock hazard. Can cause personal injury or equipment damage.
This equipment must be properly grounded. Connections and service to the unit controller must be performed only by personnel knowledgeable in the operation of the equipment being controlled.

⚠ NOTICE
This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with this instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his or her own expense. Daikin disclaims any liability resulting from any interference or for the correction thereof.

The BACnet and Modbus communication module connects the MicroTech WME chiller unit controller to a building automation system (BAS). This interface enables the exchange of BACnet objects or Modbus Holding Registers between the unit controller and the network. Although both BACnet (IP and MS/TP) and Modbus are supported by the same communication module hardware, the unit controller can only be configured to communicate using one of these protocols at any given time. Additionally, within the BACnet protocol, the hardware can be configured for either BACnet IP or BACnet MS/TP, not both.

The communication module, together with the unit controller, supports the BACnet (IP and MS/TP) Modbus RTU standard protocols.

Features

- Integration into a building automation and control system via BACnet (B-AAC profile) or Modbus RTU
- Simple connection to a MicroTech WME chiller unit controller
- Network parameters configurable via the unit HMI
- Circuit board components enclosed in protective housing

Specifications

The following section provides a summary of technical data and conformance to agency listings.

General	
Dimensions	W × H × D: 2.76 × 4.33 × 2.48 in (70 × 110 × 63 mm)
Material	Case - technopolymer, Traffic White RAL 9016
Operating	
Temperature	-40 – 158°F (-40 – 70°C)
Humidity	≤90% RH
Storage and Transportation	
Temperature	-40 – 158°F (-40 – 70°C)
Humidity	≤90% RH
Electrical	
Power	24 Vac +10%/-15% 50/60 Hz; 28 to 36 Vdc +10% to -15%
BACnet MS/TP Network connection	RS-485 (EIA-485)
	2-wire twisted pair, shielded
Modbus Network connection	RS-485 (EIA-485)
	3-wire twisted pair, shielded
BACnet IP Network connection	Ethernet 10/100; CAT 5 STP cable
	RJ-45 port, 8-pin connector
Baud rate BACnet MS/TP, Modbus	19200, 38400, 57600, and 76800
Additional Components	
J3 network connector	RS-485 connection plug, 3-pin spring cage top entry
Standards Compliance	
Electrical Safety	EN 60730-1, EN 60730-2-9, EN 61010-1, UL60730
Electromagnetic compatibility	EN 61000-6-1, EN 61000-6-2, EN 61000-6-2/EC, EN 61000-6-2/IS1, EN61000-6-3, EN 61000-6-4

Dimensions

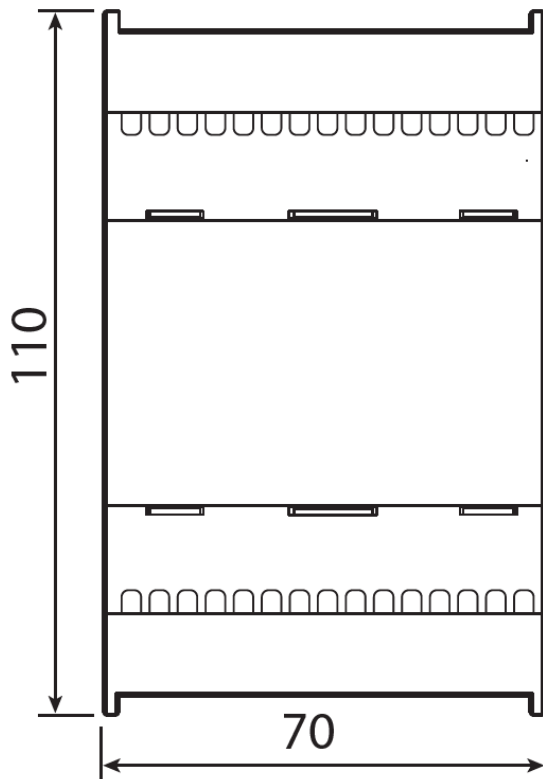*Figure 1: Communication Module Top View*

Figure 2: Communication Module Side View
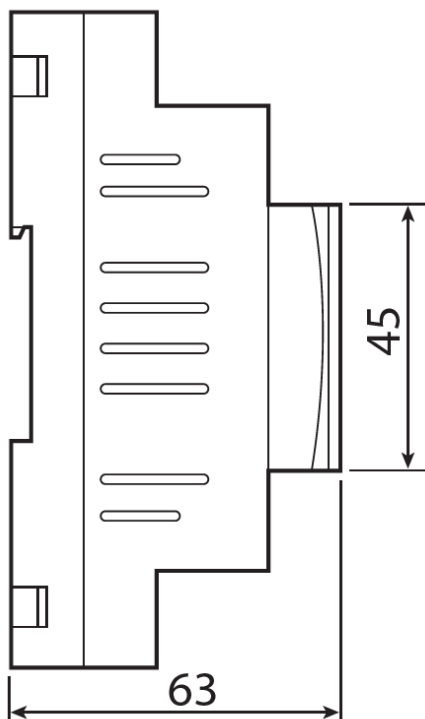
Component Data

The BACnet and Modbus communication module is a printed circuit board contained within a plastic enclosure. It is installed on DIN rail to the left of the MicroTech WME chiller unit controller within the chiller unit control panel (as shown in Figure 3). Regardless of whether the communication module being installed is a field upgrade to BACnet/Modbus communication or replacement of a factory-installed module, the installation process is similar. For a field upgrade to BACnet/Modbus communication, the existing I/O (Input/Output) module connected to the left of the unit controller will be replaced with the BACnet and Modbus communication module.

Figure 3: Unit Control Panel

Figure 4 shows the important features of the BACnet and Modbus communication module, which are described in the following sections.

Figure 4: BACnet and Modbus Communication Module – Main Features

The following section describes how to field install a new BACnet and Modbus communication module or replace an existing module on the MicroTech WME chiller unit controller.
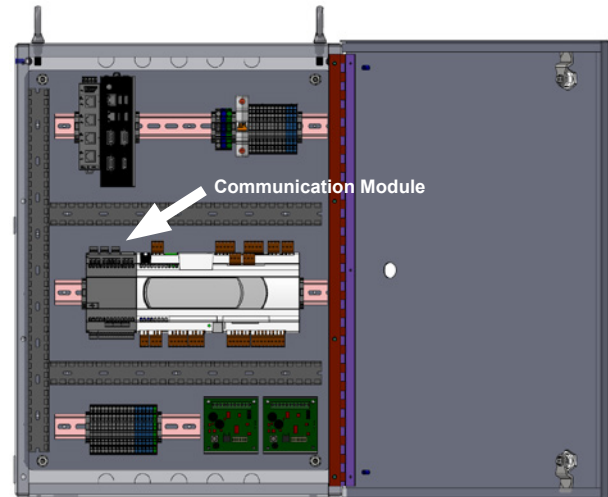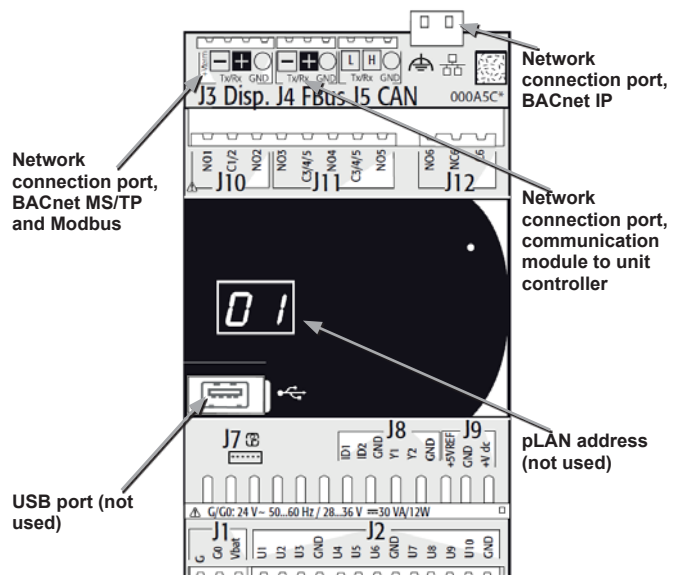

⚠ **CAUTION**

Static sensitive components. Can cause equipment damage.

Discharge any static electrical charge by touching the bare metal inside the control panel before performing any service work. Never unplug cables, circuit board terminal blocks, or power plugs while power is applied to the panel

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⚠ **DANGER**

Electric shock hazard. Can cause personal injury or equipment damage.

This equipment must be properly grounded. Only personnel knowledgeable in the operation of the equipment being controlled must perform connections and service to the unit controller.

Prior to installing the BACnet and Modbus Communication Module, disable the chiller, then remove power from the unit at either the unit disconnect switch or panel disconnect. Only repower the unit once all electrical connections are finalized.

Field Installation Kit

The BACnet and Modbus communication module field-installed kit ships with the following items:

• The BACnet and Modbus communication module
• Installation manual IM 1283

Installing a New BACnet/Modbus Module

For a new installation of a BACnet/Modbus communication module, the existing unit I/O module must be replaced. The following steps are required to complete the installation:

1. Disable the chiller by setting the Unit On/Off Switch to "Off" from inside the control panel of the unit. This must be done prior to installing a new communication module.

2. Remove power from the unit at either the unit disconnect switch or panel disconnect. Only repower the unit once all electrical connections are finalized.

3. Carefully disconnect and label all pre-terminated plugs prior to removing the existing I/O module.

4. Remove the I/O module from the DIN rail by lifting the connector tabs on the back of the module using a small flat-blade screwdriver.

5. Install the BACnet and Modbus communication module in the same location by gently pressing it onto the DIN rail until the connector tabs snap into place.

6. Reconnect all labeled, pre-terminated plugs to the corresponding port on the BACnet and Modbus communication module. See subsequent sections of this document for further information, including BACnet or Modbus connections.

7. Repower the unit.

8. Enable the chiller by setting the Unit On/Off Switch to "OFF" from inside the control panel of the unit.

Replacement of BACnet/Modbus Module

The following steps are required to complete the replacement of an existing BACnet and Modbus communication module:

1. Disable the chiller by setting the Unit On/Off Switch to "OFF" from inside the control panel of the unit. This must be done prior to installing a new communication module.

2. Remove power from the unit at either the unit disconnect switch or panel disconnect. Only repower the unit once all electrical connections are finalized.

3. Carefully disconnect and label all pre-terminated plugs prior to removing the existing BACnet and Modbus communication module.

4. Remove the existing module from the DIN rail by lifting the connector tabs on the back of the module using a small flat-blade screwdriver.

5. Install the replacement BACnet and Modbus communication module in the same location by gently pressing it onto the DIN rail until the connector tabs snap into place.

6. Reconnect all labeled, pre-terminated plugs to the corresponding port on the replacement BACnet and Modbus communication module. See subsequent sections of this document for further information, including BACnet or Modbus connections.

7. Repower the unit.

8. Enable the chiller by setting the Unit On/Off Switch to "OFF" from inside the control panel of the unit.

BACnet MS/TP and Modbus Connection Port

BACnet MSTP and Modbus are connected using the port labeled, "J3 Disp". It is important to note this is a four pin connector, however, only two of these pins are used. The module is a two-wire RS-485 (EIA-485) device, meaning only the TX/RX positive (+) and negative (-) terminals are used. It is critical to connect the network conductors to the appropriate terminals (Figure 5). Failure to do so could result in network failure or hardware damage.

NOTE: Necessary end-of-line and bias resistors for the network must be field-supplied.

Figure 5: J3 Port Connections
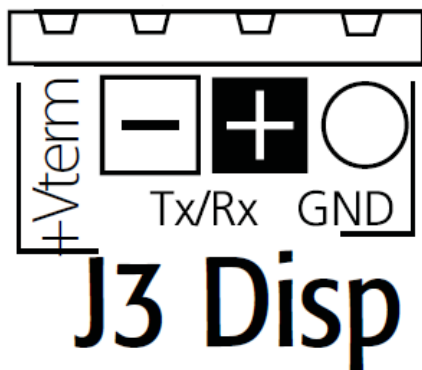
BACnet IP Connection Port

The BACnet IP network is connected using a standard CAT 5 STP cable. The Ethernet port is an RJ-45, 8-pin connection communicating at 10/100 Mbps.

Fieldbus Port

The port labeled, "J4 FBus," (Figure 6) is used to connect the communication module to the unit controller. The positive (+), negative (-) and GND terminals on port J4 are connected to the matching terminals on the, "J11 pLAN," port on the unit controller (Figure 7). The wire harness for this connection is factory-supplied.

Figure 6: J4 FBus Port
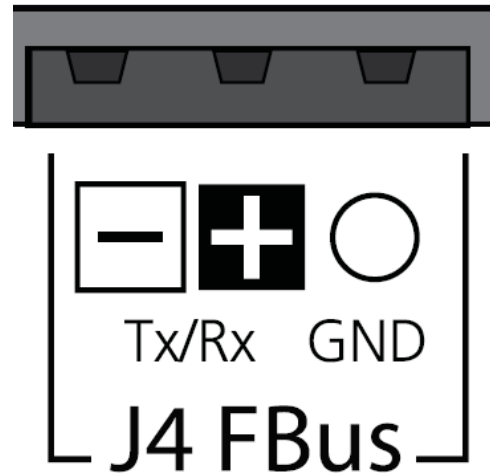
Figure 7: J11 pLAN Port
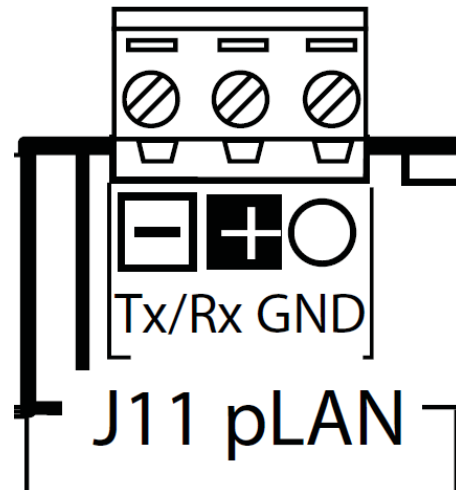
Power Connection

The power for the BACnet and Modbus communication module is provided by a pre-terminated, 3-pin plug connector. Regardless of whether the communication module is being installed as a field upgrade to BACnet/Modbus communication or replacement of a factory-installed communication module, the pre-terminated plug will already be connected to the correct 24 VAC terminals on the unit terminal block. Insert the pre-terminated, 3-pin plug into the receptacle for port J1 on the BACnet and Modbus communication module. Figure 8 provides a reference for the J1 Port terminals. The "Vbat" terminal is not used.

Figure 8: J1 Port (Power)
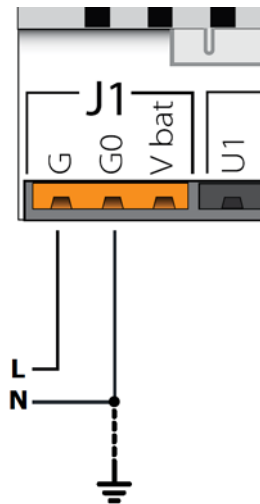
USB Port

A USB port is located on the front face of the communication module, but is not used for the BACnet or Modbus application.

pLAN address

A digital readout of the pLAN device address is located on the front face of the communication module, but is not used for the BACnet or Modbus application. This value can be ignored.

The following sections describe how to configure the BACnet and Modbus communication module for BAS network integration. All configuration is done at the chiller HMI (Human Machine Interface) under the 'Settings' menu.

BACnet IP Configuration

Below is a preview of the configuration procedure, followed by detailed instructions for each step.

1. Disable the chiller.
2. Navigate to the Settings screen.
3. If necessary, set BAS Module Connection.
4. Set BAS Protocol.
5. Set BAS Settings (Module Type, Measurement Units, Device Instance, IP Address, IP Gateway, and IP Subnet Mask).
6. Set Control Source and Remote Enable parameters.
7. Enable the chiller.

BACnet IP Network Types

Single IP Subnet

In BACnet/IP networks with only one IP subnet (IP domain), broadcast messages from a device (ex. 172.16.255.255 or 0xBAC0) are sent to all other subnet members as IP broadcasts without requiring any additional configuration.

DHCP Networks

BACnet IP networks with DHCP use a server (typically a router or gateway) to automatically request network configuration parameters, such as IP addresses, to all devices. DHCP-enabled networks eliminate the need for a user to configure these settings manually since IP Addresses and other parameters are determined dynamically by the server.

There are several important aspects to consider with DHCP-enabled networks:

Aspect	Considerations
BBMDs	DHCP cannot be used together with BBMDs, as the IP addresses are configured as static addresses and cannot change during operation.
Alarm Recipient	In BACnet, alarm recipients are entered with their "Device Object Identifier" or their BACnet address. The IP address is part of the BACnet address and may not be changed for the alarm recipient. For this reason, option "Device Object Identifier" must always be used.
Access Rights	If access rights are assigned based on IP address, such as firewalls, the address must be static. Access rights are based off of the UDP Port Number (ex. UDP 47808) or the MAC Address of the BACnet communication module.
IP Version	The BACnet communication module supports IP Version 4, (i.e. IP devices with 32 bit addresses).

Multiple IP Subnets

A BACnet/IP network may consist of multiple IP subnets assigned the same BACnet network number. In this case, a BBMD (BACnet Broadcast Management Device) allows broadcasts to be transmitted to all other BBMDs on the BACnet network. BBMDs allow devices on one network to distribute broadcasts, or communicate, across multiple subnets. A BBMD also provides for foreign device registration. This allows a device on one network to communicate with a device on another network by using the BBMD to forward and route the messages.

The BACnet communication module can be registered as a BBMD device. This is done by registering the IP Address and subnet mask of the communication module as a Foreign Device with the BBMD.

BACnet IP Configuration

The BACnet communication module is configured using the HMI on the chiller. Table 1 describes the available BACnet IP network parameters used to establish communication between the unit controller and the BAS.

Refer to the applicable MicroTech WME chiller unit controller Installation and Operation Manual (see Reference Documents) for additional information on using the chiller HMI to adjust parameters and set defaults. Systems integrators should refer to Protocol Document ED 19111 for descriptions of the available BACnet objects (www.DaikinApplied.com).

Below are detailed instructions for each step in the configuration process.

Disable the Chiller

1. Set the Unit Switch on the front of the unit control panel to the "OFF" position. When placed in the OFF position while the chiller is running, the Unit Switch will shutdown the chiller in a normal controlled sequence and will stop each compressor that is running.

Settings Screen

1. From the chiller HMI, select the "Settings" icon. This displays the Settings screen of the HMI. It is not necessary to have entered the password at this point.
2. From the Settings screen, select the "Interface" tab.

Set BAS Module Connection and Protocol

1. From the "Interface" tab of the HMI, verify that "BAS Module Connected" is set to "Yes". If it is not (Figure 9), proceed to step 2. If it is, skip to step 5.

2. Press the BAS Module Connected parameter.

3. A keypad prompt will appear to enter a password. Key in the Manager level password of 2001. Press "Enter" when all digits are inputted. Note - there is a small delay between pressing the keypad and recording the entry. Be sure that an asterisk appears in the window before pressing the next number.

4. From the drop-down list, select "Yes" for the BAS Module Connected parameter.

5. Press the "BAS Network Protocol" parameter.

6. From the drop-down list, select "BACnet IP" for the BAS Network Protocol parameter. This sets the protocol to BACnet IP and enables the additional associated parameters (for a complete list of all parameters, see Table 1).

7. Once the BAS Module Connected parameter is set to Yes and the BAS Network Protocol parameter is set to BACnet IP (Figure 10), the unit controller power must be cycled to apply the changes.

8. After the unit controller is repowered, proceed to Set BAS Settings

Figure 9: BAS Module Connected Parameter

Figure 10: BAS Module Configured for BACnet IP

Table 1: BACnet IP Parameters

Parameter	Range/Default	Description
BAS Network Protocol	BACnet IP, BACnet MS/TP, Modbus LON Default: None	Sets the type of BAS communication protocol supported.
BAS Measurement Units	Imperial or Metric Default: Imperial	Sets the Units of Measure that will be broadcast to the BAS
Device Instance	0 – 4194302 Default: 9050	Device Instance of the BACnet communication module. This must be unique throughout the entire BACnet network.
UDP Port	Default: 47808 (BAC0 hex)	User Datagram Protocol. The UDP Port allows host-to-host communication via the IP network and is used to identify the application process in the destination unit. Only change the UPD Port if there are multiple subnets. See network administrator before modification.
IP Address	If DHCP is enabled, Address automatically assigned by network Default: 192.168.1.10	IP Address of the BACnet communication module.
IP Gateway	If DHCP is enabled, Address automatically assigned by network Default: 192.168.1.1	Gateway Address of the BACnet communication module.
IP Mask	If DHCP is enabled, Address automatically assigned by network Default: 255.255.255.0	Subnet Mask of the BACnet communication module.
DHCP	Default: Disabled	Dynamic Host Configuration Protocol (DHCP) is a network protocol that enables a server to automatically assign an IP Address. Set to Disable if a static IP Address is needed.

Set BAS Settings

1. From the chiller HMI, select the "Settings" icon. This displays the Settings screen of the HMI.

2. From the Settings screen, select the "Interface" tab.

3. Press the "BAS Measurement Units" parameter and select the desired value, Imperial or Metric.

4. A keypad prompt will appear to enter a password. Key in the Manager level password of 2001, then press "Enter" when all digits are inputted.

5. Press the "Device Instance" parameter and enter the desired value using the keypad. This number must be unique throughout the entire BACnet network. Press Enter when all digits are inputted. Note - there is a small delay between pressing the keypad and recording the entry. Be sure that an asterisk appears in the window before pressing the next number.

6. Press the "UDP Port" parameter and enter the desired value using the keypad. Press Enter when all digits are inputted. Note – The Default UDP Port value of 47808 rarely needs to be modified for BACnet IP networks.

7. If Dynamic Host Configuration Protocol (DHCP) will be used to provide IP addresses on the network, press the "DHCP" parameter and select Enabled. This completes the necessary BAS Settings for a DHCP BACnet IP network. Note: Enabling DHCP will initially cause the IP Address, IP Gateway, and IP Mask to revert to all zeroes. These addresses will update information once assigned by the network.

8. If the BACnet IP network requires static IP addresses, leave the DHCP parameter set to Disabled (default) and press the "IP Address" parameter on the HMI. Using the keypad, enter the desired IP address for the chiller. Once all digits are entered, press the Enter button. Note – the IP Address must be unique throughout the network segment.

9. Press the "IP Gateway" parameter on the HMI. Using the keypad, enter the desired IP Gateway for the chiller. Once all digits are entered, press the Enter button.

10. Press the "IP Mask" parameter on the HMI. Using the keypad, enter the desired IP Subnet Mask for the chiller. Once all digits are entered, press the Enter button.

11. All necessary BACnet IP communication parameters should now be configured (Figure 11).

Figure 11: Chiller Configured for BACnet IP

Set Control Source and Remote Enable

The "Control Source" and "Remote Enable" parameters on the HMI determine the method used for controlling the chiller through the BAS.

Control Source indicates what method will be used to enable the chiller. The available options are: Remote Switch, Local (OITS), and BAS. "Remote Switch" is used when a hard-wired contact will enable the chiller. "Local" is used when the chiller will be enabled at the chiller HMI. "BAS" is used when a BACnet command from the BAS will enable the chiller.

Remote Enable indicates what method will be used to set the Cool (Leaving Water Temperature) Setpoint, Mode Setpoint, and Capacity Limit Setpoint and to clear alarms. The available options are: Disable (default) and Enable. With this parameter set to "Enable," the unit controller will use the Cool Setpoint, Mode Setpoint, Capacity Limit Setpoint, and Clear Alarm values written from the BAS network. With Remote Enable set to "Disable," the unit controller will ignore the Cool Setpoint, Mode Setpoint, Capacity Limit Setpoint, and Clear Alarm values written from the BAS network.

Table 2 provides a summary of chiller control with all possible settings of the Control Source and Remote Enable parameters:

Table 2: Control Source and Remote Enable Settings

Control Source = BAS, BAS Remote Enable = Enable	Control Source = BAS, BAS Remote Enable = Disable	Control Source = Local or Remote Switch, BAS Remote Enable = Disable	Control Source = Local or Remote Switch, BAS Remote Enable = Enable
Chiller will use BACnet/Modbus/LON Enable command, and will use Cool Setpoint, Mode Setpoint, Capacity Limit Setpoint and Clear Alarm values written from BAS	Chiller will use BACnet/Modbus/LON Enable command, but will ignore Cool Setpoint, Mode Setpoint, Capacity Limit Setpoint and Clear Alarm values written from BAS	Chiller will ignore BACnet/Modbus/LON Enable command, and will ignoreCool Setpoint, Mode Setpoint, Capacity Limit Setpoint and Clear Alarm values written from BAS	Chiller will ignore BACnet/Modbus/LON Enable command, but will use Cool Setpoint, Mode Setpoint, Capacity Limit Setpoint and Clear Alarm values written from BAS

Set Control Source

1. From the "Settings" screen on the HMI, select the "Modes" tab.

2. Locate the "Control Source" parameter under the "Chiller Control and Mode" category (Figure 12).

3. Press the Control Source parameter.

4. If the keypad appears, key in the Operator-level password of 100, then press "Enter" when all digits are inputted.

5. If the BAS will be used to enable and disable the chiller using a BACnet command, select "BAS" from the Control Source parameter drop-down list.

Figure 12: Control Source Parameter

Chiller Control and Mode	
Unit Enable	Auto
Control Source	Local (OITS)
Available Modes	Cool Only

Set Remote Enable

1. From the "Settings" screen on the HMI, select the "Interface" tab.

2. Locate the "BAS Remote Enable" parameter under the "BAS Protocol" category (Figure 13).

3. Press the BAS Remote Enable parameter.

4. If the keypad appears, key in the Manager-level password of 2001, then press "Enter" when all digits are inputted.

5. If the BAS will be used set the Cool (Leaving Water Temperature) Setpoint, Mode Setpoint, Capacity Limit Setpoint, and to clear alarms for the chiller using a BACnet command, select "Enable" from the BAS Remote Enable parameter drop-down list.

Figure 13: Remote Enable Parameter

BAS Protocol	
BAS Module Connected	Yes
BAS Network Protocol	BACnet IP
BAS Remote Enable	Disable
BAS Measurement Units	Imperial

Enable the Chiller

Once all configuration is complete, the unit can be re-enabled.

1. Set the Unit Switch on the front of the unit control panel to the "ON" position. When placed in the ON position, the chiller is able to run based on its current enable/disable command.

BACnet MS/TP Configuration

Below is a preview of the configuration procedure, followed by detailed instructions for each step.

1. Disable the chiller.
2. Navigate to the Settings screen.
3. If necessary, set BAS Module Connection.
4. Set BAS Protocol.
5. Set BAS Settings (Measurement Units, MS/TP MAC Address, Device Instance, Baud Rate, Max Info Frames, and Max Master).
6. Set Control Source and Remote Enable parameters.
7. Enable the chiller.

The BACnet communication module is configured using the HMI on the chiller. Table 3 describes the available BACnet MS/TP network parameters used to establish communication between the unit controller and the BAS.

Refer to the applicable MicroTech WME chiller unit controller Installation and Operation Manual (see Reference Documents) for additional information on using the chiller HMI to adjust parameters and set defaults. Systems integrators should refer to Protocol Document ED 19111 for descriptions of the available BACnet objects (www.DaikinApplied.com).

Below are detailed instructions for each step in the configuration process.

Disable the Chiller

1. Set the Unit Switch on the front of the unit control panel to the "OFF" position. When placed in the OFF position while the chiller is running, the Unit Switch will shutdown the chiller in a normal controlled sequence and will stop each compressor that is running.

Settings Screen

1. From the chiller HMI, select the "Settings" icon. This displays the Settings screen of the HMI. It is not necessary to have entered the password at this point.
2. From the Settings screen, select the "Interface" tab.

Set BAS Module Connection and Protocol

1. From the "Interface" tab of the HMI, verify that "BAS Module Connected" is set to "Yes". If it is not (Figure 14), proceed to step 2. If it is, skip to step 5.
2. Press the BAS Module Connected field on the Interface tab of the HMI.
3. A keypad prompt will appear to enter a password. Key in the Manager level password of 2001. Press "Enter" when all digits are inputted. Note - there is a small delay between pressing the keypad and recording the entry. Be sure that an asterisk appears in the window before pressing the next number.
4. From the drop-down list, select "Yes" for the BAS Module Connected parameter (Figure 14).
5. Press the "BAS Network Protocol" parameter on the Interface tab of the HMI.
6. From the drop-down list, select "BACnet MS/TP" for the BAS Network Protocol parameter. This sets the protocol to BACnet MS/TP and enables the additional associated parameters (for a complete list of all parameters, see Table 3).
7. Once the BAS Module Connected parameter is set to Yes and the BAS Network Protocol parameter is set to BACnet MS/TP (Figure 15), the unit controller power must be cycled to apply the changes.
8. After the unit controller is repowered, proceed to Set BAS Settings

Figure 14: BAS Module Connected Parameter

Figure 15: BAS Module Configured for BACnet MS/TP

Table 3: BACnet MS/TP Parameters

Parameter	Range/Default	Description
BAS Network Protocol	BACnet IP, BACnet MS/TP, Modbus LON Default: None	Sets the type of BAS communication protocol supported.
BAS Measurement Units	Imperial or Metric Default: Imperial	Sets the Units of Measure that will be broadcast to the BAS
Address	0 – 127 Default: 1	MS/TP MAC Address of the BACnet communication module. Each device on the BACnet MS/TP network must have a unique MS/TP MAC Address
Device Instance	0 – 4194302 Default: 9050	Device Instance of the BACnet communication module. This must be unique throughout the entire BACnet network.
Baud Rate	19200, 38400, 57600, 76800 Default: 19200	Data transfer speed (bps) of the BACnet MS/TP network.
Max Info Frames	0 – 255 Default: 10	This parameter specifies the maximum number of information frames the BACnet module may send before it must pass the token.
Max Master	0 – 127 Default: 127	This parameter specifies the highest MS/TP MAC Address used on the network

Set BAS Settings

1. From the chiller HMI, select the "Settings" icon. This displays the Settings screen of the HMI.

2. From the Settings screen, select the "Interface" tab.

3. Press the "BAS Measurement Units" parameter and select the desired value, Imperial or Metric.

4. A keypad prompt will appear to enter a password. Key in the Manager-level password of 2001, then press "Enter" when all digits are inputted.

5. Press the "Address" parameter and enter the desired MS/TP MAC address using the keypad. This number must be unique throughout the entire BACnet MS/TP network. Press Enter when all digits are inputted. Note - there is a small delay between pressing the keypad and recording the entry. Be sure that an asterisk appears in the window before pressing the next number.

6. Press the "Device Instance" parameter and enter the desired value using the keypad. This number must be unique throughout the entire BACnet network. Press Enter when all digits are inputted.

7. Press the "Baud Rate" parameter and select the desired value from the drop-down list, 19200, 38400, 57600 or 76800. Note – this setting must be the same for all devices on the BACnet MS/TP network.

8. Press the "Max Info Frames" parameter on the HMI. Using the keypad, enter the desired value. Once all digits are entered, press the Enter button.

9. Press the "Max Masters" parameter on the HMI. Using the keypad, enter the value of the highest MS/TP MAC address used for any device on the network. If unsure, leave this set to 127. Once all digits are entered, press the Enter button.

10. All necessary BACnet MS/TP communication parameters should now be configured (Figure 16).

Figure 16: Chiller Configured for BACnet MS/TP

Set Control Source and Remote Enable

The "Control Source" and "Remote Enable" parameters on the HMI determine the method used for controlling the chiller through the BAS.

Control Source indicates what method will be used to enable the chiller. The available options are: Remote Switch, Local (OITS), and BAS. "Remote Switch" is used when a hard-wired contact will enable the chiller. "Local" is used when the chiller will be enabled at the chiller HMI. "BAS" is used when a BACnet command from the BAS will enable the chiller.

Remote Enable indicates what method will be used to set the Cool (Leaving Water Temperature) Setpoint, Mode Setpoint, and Capacity Limit Setpoint and to clear alarms. The available options are: Disable (default) and Enable. With this parameter set to "Enable," the unit controller will use the Cool Setpoint, Mode Setpoint, Capacity Limit Setpoint, and Clear Alarm values written from the BAS network. With Remote Enable set to "Disable," the unit controller will ignore the Cool Setpoint, Mode Setpoint, Capacity Limit Setpoint, and Clear Alarm values written from the BAS network.

Table 4 provides a summary of chiller control with all possible settings of the Control Source and Remote Enable parameters:

Table 4: Control Source and Remote Enable Settings

Control Source = BAS, BAS Remote Enable = Enable	Control Source = BAS, BAS Remote Enable = Disable	Control Source = Local or Remote Switch, BAS Remote Enable = Disable	Control Source = Local or Remote Switch, BAS Remote Enable = Enable
Chiller will use BACnet/Modbus/LON Enable command, and will use Cool Setpoint, Mode Setpoint, Capacity Limit Setpoint and Clear Alarm values written from BAS	Chiller will use BACnet/Modbus/LON Enable command, but will ignore Cool Setpoint, Mode Setpoint, Capacity Limit Setpoint and Clear Alarm values written from BAS	Chiller will ignore BACnet/Modbus/LON Enable command, and will ignoreCool Setpoint, Mode Setpoint, Capacity Limit Setpoint and Clear Alarm values written from BAS	Chiller will ignore BACnet/Modbus/LON Enable command, but will use Cool Setpoint, Mode Setpoint, Capacity Limit Setpoint and Clear Alarm values written from BAS

Set Control Source

1. From the "Settings" screen on the HMI, select the "Modes" tab.

2. Locate the "Control Source" parameter under the "Chiller Control and Mode" category (Figure 17).

3. Press the Control Source parameter.

4. If the keypad appears, key in the Operator-level password of 100, then press "Enter" when all digits are inputted.

5. If the BAS will be used to enable and disable the chiller using a BACnet command, select "BAS" from the Control Source parameter drop-down list.

Figure 17: Control Source Parameter

Chiller Control and Mode	
Unit Enable	Auto
Control Source	Local (OITS)
Available Modes	Cool Only

Set Remote Enable

1. From the "Settings" screen on the HMI, select the "Interface" tab.

2. Locate the "BAS Remote Enable" parameter under the "BAS Protocol" category (Figure 18).

3. Press the BAS Remote Enable parameter.

4. If the keypad appears, key in the Manager-level password of 2001, then press "Enter" when all digits are inputted.

5. If the BAS will be used set the Cool (Leaving Water Temperature) Setpoint, Mode Setpoint, and Capacity Limit Setpoint and to clear alarms for the chiller using a BACnet command, select "Enable" from the BAS Remote Enable parameter drop-down list.

Figure 18: Remote Enable Parameter
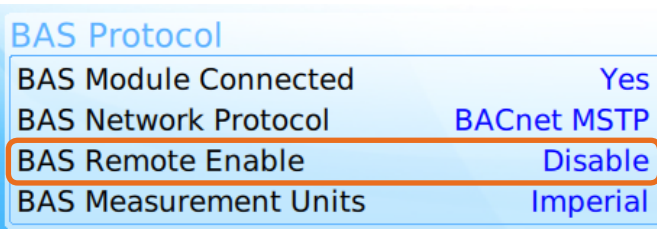
BAS Protocol	
BAS Module Connected	Yes
BAS Network Protocol	BACnet MSTP
BAS Remote Enable	Disable
BAS Measurement Units	Imperial

Enable the Chiller

Once all configuration is complete, the unit can be re-enabled.

1. Set the Unit Switch on the front of the unit control panel to the "ON" position. When placed in the ON position, the chiller is able to run based on its current enable/disable command.

Modbus Configuration

Below is a preview of the configuration procedure, followed by detailed instructions for each step.

1. Disable the chiller.

2. Navigate to the Settings screen.

3. If necessary, set BAS Module Connection.

4. Set BAS Protocol.

5. Set BAS Settings (Measurement Units, Address, Baud Rate, Parity, and Stop Bits).

6. Set Control Source and Remote Enable parameters.

7. Enable the chiller.

The Modbus communication module is configured using the HMI on the chiller. Table 5 describes the available Modbus network parameters used to establish communication between the unit controller and the BAS.

Refer to the applicable MicroTech WME chiller unit controller Installation and Operation Manual (see Reference Documents) for additional information on using the chiller HMI to adjust parameters and set defaults. Systems integrators should refer to Protocol Document ED 19111 for descriptions of the available BACnet objects (www.DaikinApplied.com).

Below are detailed instructions for each step in the configuration process.

Disable the Chiller

1. Set the Unit Switch on the front of the unit control panel to the "OFF" position. When placed in the OFF position while the chiller is running, the Unit Switch will shutdown the chiller in a normal controlled sequence and will stop each compressor that is running.

Settings Screen

1. From the chiller HMI, select the "Settings" icon. This displays the Settings screen of the HMI. It is not necessary to have entered the password at this point.

2. From the Settings screen, select the "Interface" tab.

Set BAS Module Connection and Protocol

1. From the "Interface" tab of the HMI, verify that "BAS Module Connected" is set to "Yes". If it is not (Figure 19), proceed to step 2. If it is, skip to step 5.

2. Press the "BAS Module Connected" field on the Interface tab of the HMI.

3. A keypad prompt will appear to enter a password. Key in the Manager level password of 2001. Press "Enter" when all digits are inputted. Note - there is a small delay between pressing the keypad and recording the entry. Be sure that an asterisk appears in the window before pressing the next number.

4. From the drop-down list, select "Yes" for the BAS Module Connected parameter (Figure 19).

5. Press the "BAS Network Protocol" parameter on the Interface tab of the HMI.

6. From the drop-down list, select "Modbus" for the BAS Network Protocol parameter. This sets the protocol to Modbus and enables the additional associated parameters (for a complete list of all parameters, see Table 5).

7. Once the BAS Module Connected parameter is set to Yes and the BAS Network Protocol parameter is set to Modbus (Figure 20), the unit controller power must be cycled to apply the changes.

8. After the unit controller is repowered, proceed to Set BAS Settings

Figure 19: BAS Module Connected Parameter

Figure 20: BAS Module Configured for Modbus

Table 5: Modbus Parameters

Parameter	Range/Default	Description
BAS Network Protocol	BACnet IP, BACnet MS/TP, Modbus LON Default: None	Sets the type of BAS communication protocol supported.
BAS Measurement Units	Imperial or Metric Default: Imperial	Sets the Units of Measure that will be broadcast to the BAS
Address	0 – 247 Default: 1	The Modbus Address of the communication module. This must be unique throughout the entire network.
Baud Rate	19200, 38400, 57600, 76800 Default: 19200	Data transfer speed (bps) of the Modbus network.
Parity	Even, Odd, or None Default: None	Defines the parity (i.e. the use of checksums for detecting transmission errors) that is specified for the bus. This must also be identical for all nodes on the bus.
Modbus Stop Bits	1 or 2 Default: 1	This defines the number of stop bits. This value must also be coordinated with the other bus nodes.

Set BAS Settings

1. From the chiller HMI, select the "Settings" icon. This displays the Settings screen of the HMI.

2. From the Settings screen, select the "Interface" tab.

3. Press the "BAS Measurement Units" parameter and select the desired value, Imperial or Metric.

4. A keypad prompt will appear to enter a password. Key in the Manager-level password of 2001, then press "Enter" when all digits are inputted.

5. Press the "Address" parameter and enter the desired Modbus address using the keypad. This number must be unique throughout the entire Modbus network. Press Enter when all digits are inputted. Note - there is a small delay between pressing the keypad and recording the entry. Be sure that an asterisk appears in the window before pressing the next number.

6. Press the "Baud Rate" parameter and select the desired value from the drop-down list,19200, 38400, 57600 or 76800. Note – this setting must be the same for all devices on the Modbus network.

7. Press the "Parity" parameter and select the desired value from the drop-down list, Even, Odd, or None. Note – this setting must be the same for all devices on the Modbus network.

8. Press the "Modbus Stop Bits" parameter and select the desired value from the drop-down list, 1 or 2. Note – this setting must be the same for all devices on the Modbus network.

9. All necessary Modbus communication parameters should now be configured (Figure 21).

Figure 21: Chiller Configured for Modbus

Set Control Source and Remote Enable

The "Control Source" and "Remote Enable" parameters on the HMI determine the method used for controlling the chiller through the BAS.

Control Source indicates what method will be used to enable the chiller. The available options are: Remote Switch, Local (OITS), and BAS. "Remote Switch" is used when a hard-wired contact will enable the chiller. "Local" is used when the chiller will be enabled at the chiller HMI. "BAS" is used when a BACnet command from the BAS will enable the chiller.

Remote Enable indicates what method will be used to set the Cool (Leaving Water Temperature) Setpoint, Mode Setpoint, and Capacity Limit Setpoint and to clear alarms. The available options are: Disable (default) and Enable. With this parameter set to "Enable," the unit controller will use the Cool Setpoint, Mode Setpoint, Capacity Limit Setpoint, and Clear Alarm values written from the BAS network. With "Remote Enable" set to "Disable," the unit controller will ignore the Cool Setpoint, Mode Setpoint, Capacity Limit Setpoint, and Clear Alarm values written from the BAS network.

Table 6 provides a summary of chiller control with all possible settings of the Control Source and Remote Enable parameters:

Table 6: Control Source and Remote Enable Settings

Control Source = BAS, BAS Remote Enable = Enable	Control Source = BAS, BAS Remote Enable = Disable	Control Source = Local or Remote Switch, BAS Remote Enable = Disable	Control Source = Local or Remote Switch, BAS Remote Enable = Enable
Chiller will use BACnet/Modbus/LON Enable command, and will use Cool Setpoint, Mode Setpoint, Capacity Limit Setpoint and Clear Alarm values written from BAS	Chiller will use BACnet/Modbus/LON Enable command, but will ignore Cool Setpoint, Mode Setpoint, Capacity Limit Setpoint and Clear Alarm values written from BAS	Chiller will ignore BACnet/Modbus/LON Enable command, and will ignoreCool Setpoint, Mode Setpoint, Capacity Limit Setpoint and Clear Alarm values written from BAS	Chiller will ignore BACnet/Modbus/LON Enable command, but will use Cool Setpoint, Mode Setpoint, Capacity Limit Setpoint and Clear Alarm values written from BAS

Set Control Source

1. From the Settings screen on the HMI, select the "Modes" tab.

2. Locate the "Control Source" parameter under the "Chiller Control and Mode" category (Figure 22).

3. Press the Control Source parameter.

4. If the keypad appears, key in the Operator-level password of 100, then press "Enter" when all digits are inputted.

5. If the BAS will be used to enable and disable the chiller using a BACnet command, select "BAS" from the Control Source parameter drop-down list.

Figure 22: Control Source Parameter

Set Remote Enable

1. From the Settings screen on the HMI, select the "Interface" tab.

2. Locate the "BAS Remote Enable" parameter under the "BAS Protocol" category (Figure 23).

3. Press the BAS Remote Enable parameter.

4. If the keypad appears, key in the Manager-level password of 2001, then press "Enter" when all digits are inputted.

5. If the BAS will be used set the Cool (Leaving Water Temperature) Setpoint, Mode Setpoint, and Capacity Limit Setpoint and to clear alarms for the chiller using a BACnet command, select "Enable" from the "BAS Remote Enable" parameter drop-down list.

Figure 23: Remote Enable Parameter

Enable the Chiller

Once all configuration is complete, the unit can be re-enabled.

1. Set the Unit Switch on the front of the unit control panel to the "ON" position. When placed in the ON position, the chiller is able to run based on its current enable/disable command.

The following procedures can be used to troubleshoot issues with a BACnet or Modbus integration to the MicroTech WME chiller unit controller.

Table 7: Troubleshooting Procedures for MicroTech WME Chiller Unit Controller Integration

Symptom	Protocol	Action
No communication to MicroTech WME chiller communication module	BACnet IP	→ Verify the protocol is set to BACnet IP at the HMI
		→ Verify the HMI is configured to match the network IP addressing scheme, either static IP or DHCP
		→ For static IP addressing, confirm the IP address information is entered correctly on the HMI and is unique throughout the network
		→ Confirm the Device Instance number is correct and unique throughout the network
		→ Confirm Ethernet network cable is connected to the Ethernet port on the MicroTech WME chiller communication module
No communication to MicroTech WME chiller communication module	BACnet MS/TP	→ Verify the protocol is set to BACnet MS/TP at the HMI
		→ Confirm the Baud Rate setting at the HMI matches all other devices on the network
		→ Confirm the MS/TP MAC address is correct and unique throughout the network
		→ Confirm the Device Instance number is correct and unique throughout the network
		→ Verify the Max Master is set correctly at the HMI and all devices have a MS/TP MAC address less than or equal to this value
		→ Confirm the twisted-shielded pair network cable is connected to the correct terminals on the MicroTech WME chiller communication module
		→ Verify the network shield is only landed at one device on the network
		→ Verify that only the first and last devices on the network have end-of-line resistors
		→ Verify the network topology is a daisy-chain
		→ Verify the network wiring does not exceed 4000 ft total distance limit (without repeaters)
		→ Verify the wiring polarity is maintained
		→ Verify the network trunk avoids strong sources of electromagnetic interference
		→ Verify the network trunk is not located near a DC load switch (relay)
No communication to MicroTech WME chiller communication module	Modbus	→ Verify the protocol is set to Modbus at the HMI
		→ Confirm the Baud Rate setting at the HMI matches all other devices on the network
		→ Confirm the Modbus address is correct and unique throughout the network
		→ Verify the Parity and Stop Bits match all other devices on the network
		→ Confirm the twisted-shielded pair network cable is connected to the correct terminals on the MicroTech WME chiller communication module
		→ Verify the network shield is only landed at one device on the network
		→ Verify that only the first and last devices on the network have end-of-line resistors
		→ Verify the network topology is a daisy-chain
		→ Verify the network wiring does not exceed 4000 ft total distance limit (without repeaters)
		→ Verify the wiring polarity is maintained
		→ Verify the network trunk avoids strong sources of electromagnetic interference
		→ Verify the network trunk is not located near a DC load switch (relay)

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

Symptom	Protocol	Action
Intermittent communication to MicroTech WME chiller communication module	BACnet MS/TP, Modbus	→ Confirm the twisted-shielded pair network cable is connected to the correct terminals on the MicroTech WME chiller communication module (MS/TP, Modbus)
		→ Confirm the MS/TP MAC address is correct and unique throughout the network (MS/TP)
		→ Confirm the Device Instance number is correct and unique throughout the network (MS/TP)
		→ Confirm the Modbus address is correct and unique throughout the network (Modbus)
		→ Verify the Parity and Stop Bits match all other devices on the network (Modbus)
		→ Confirm the Baud Rate setting at the HMI matches all other devices on the network (MS/TP, Modbus)
		→ Verify the network shield is only landed at one device on the network (MS/TP, Modbus)
		→ Verify that only the first and last devices on the network have end-of-line resistors (MS/TP, Modbus)
		→ Verify the network topology is a daisy-chain (MS/TP, Modbus)
		→ Verify the network wiring does not exceed 4000 ft total distance limit (without repeaters) (MS/TP, Modbus)
		→ Verify the wiring polarity is maintained
		→ Verify the network trunk avoids strong sources of electromagnetic interference (MS/TP, Modbus)
		→ Verify the network trunk is not located near a DC load switch (MS/TP, Modbus)
Intermittent communication to MicroTech WME chiller communication module	BACnet IP	→ Confirm Ethernet network cable is securely connected to the Ethernet port on the MicroTech WME chiller communication module
		→ Verify the HMI is configured to match the network IP addressing scheme, either static or DHCP
		→ For static IP addressing, confirm the IP address information is entered correctly on the HMI and is unique throughout the network
		→ Confirm the Device Instance number is correct and unique throughout the network
Cannot Enable/Disable the chiller through the BAS network	BACnet IP, BACnet MS/TP, Modbus	→ Confirm the Control Source parameter on the HMI is set to BAS (Settings > Modes > Control Source)
		→ Confirm the Unit Switch on the front of the unit control panel is set to the "ON" position
Cannot set Cool Setpoint, Mode Setpoint, Capacity Limit Setpoint, or Clear Alarms through the BAS network	BACnet IP, BACnet MS/TP, Modbus	→ Confirm the BAS Remote Enable parameter on the HMI is set to Enable (Settings > Interface > BAS Remote Enable)

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

Daikin Applied Training and Development

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