

Installation and Maintenance

IM 1284

Group: **Controls**

Part Number: **IM 1284**

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MicroTech® WME Magnitude® Chiller LonWorks® Communication Module



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This manual contains information regarding the LonWorks® 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 LonWorks® network.

Revision History

IM1284 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 19112	MicroTech WME Chiller LonWorks Unit Controller Protocol Information	www.DaikinApplied.com
LonMark International	078-0120-01F	LonMark Application Layer Interoperability Guidelines, Version 3.3	www.lonmark.org
LonMark International	078-0120-01F	LonMark Layers 1–6 Interoperability Guidelines, Version 3.3	www.lonmark.org
LonMark International	8040_10	LonMark Functional Profile: Chiller, Version 1.0	www.lonmark.org
Echelon Corporation	078-0156-01G	LonWorks FTT-10A Free Topology Transceiver Users Guide	www.echelon.com

Notice

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Software Revision

This document supports LonWorks communication module application version CHCHLA25 and all subsequent versions until otherwise indicated. It also 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	LonWorks Application	Chiller Application Software Version	Chiller HMI Software Version
Magnitude Magnetic Bearing Centrifugal Chillers Model WME, C Vintage	CHCHLA25	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.

DANGER

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

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 LonWorks communication module connects the MicroTech WME chiller unit controller to a building automation system (BAS). This interface enables the exchange of LonWorks variables between the unit controller and a LonWorks Operating Network or LON.

Features

- Integration into a building automation and control system via LonWorks
- Installed with LonMark 3.3 certified firmware that conforms to the chiller functional profile
- Network controller (Neuron chip) handles the complete LonWorks network protocol and user application LEDs that indicate communication status and network activity
- Configurable using standard LonWorks commissioning tools such as Echelon's IzoT® CT software
- Circuit board components enclosed in protective housing and inserts into the unit controller

Specifications

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

General	
Dimensions	2-3/8" × 1-3/16" (60 × 30 mm)
Operating	
Temperature	32 – 149°F (0 – 65°C)
Humidity	<80% RH
Storage and Transportation	
Temperature	-4 – 158°F (-20 – 70°C)
Humidity	<80% RH
Electrical	
Power	DC 5 V (+5% / -5%)
Network	
Network cable	LON interface: Plug-in terminals 2 wires, interchangeable
Bus connection/ Transceiver	Galvanically isolated, 78k baud TP/FT-10 transceiver
LonWorks data memory	56 kbyte flash memory for the user application
Additional Components	
Network connector	3-pin (GND, A, and B) network connector plug
Ferrite enclosure	Snap-on ferrite core as optional attachment to the network cable for noise reduction
Agency Listings	
US	UL 873
Canada	CSA C22.2 No. 24-93

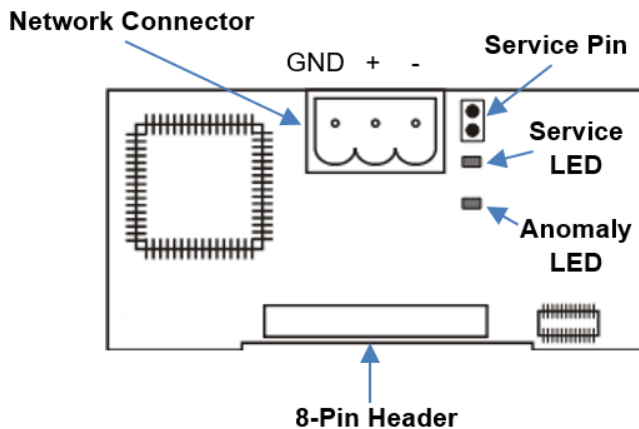
Component Data

The LonWorks communication module is a printed circuit board that inserts directly into the serial card slot of the MicroTech WME chiller unit controller. Figure 1 shows the communication module when fully inserted. Figure 2 shows the important features of the communication module circuit board, which are described in the following sections.

Figure 1: LonWorks Communication Module Attached to Unit Controller (cover removed to show detail)



Figure 2: Communication Module Main Features



Light Emitting Diodes (LEDs)

The communication module has a Service LED and an Anomaly LED to indicate communication activity and status of the LonWorks communication module (Figure 2). These indicators cannot be seen when the module is installed in the controller. Table 1 describes the color and activity of both LEDs.

Table 1: LED Activity

LED	Function
Service (Green)	Lights when the service-pin is shorted
	Flashes (1 second) during a Wink command
	Flashes (1/2 second) during commissioning
	Blinking when the communication module is not commissioned
Anomaly (Red)	Flashes (1 second) when the communication module has no application program
	Lights when there is a connection error or other issue related to the communication module

LonWorks Network Connector

The network connector is the physical connection between the LonWorks communication module and the FTT-10A bus. Two pins are used for this purpose as indicated below and shown in Figure 2.

Pin	Function
GND	No Connection
A	FTT-10A
B	FTT-10B

8-Pin Header

The 8-pin header connects the unit controller to the LonWorks communication module.

Service Pin

The service pin generates a service-pin message that contains the Neuron® ID and the program code identification of the node (Figure 2 on page 5). The service pin message is used to commission the LonWorks communication module by broadcasting it on the network.

The service pin consists of two terminals next to the network connector that protrude below the cover on the serial card port of the unit controller. To activate the service pin, short the two pins together for an instant with the tip of a screwdriver or similar tool.

Neuron ID

The basis of the LonWorks communication module is an Echelon Neuron integrated circuit (Neuron chip). Every Neuron chip has a unique 48-bit Neuron ID or physical address. The Neuron ID can be used to address the device on the LonWorks network.

Bus Termination

Bus termination resistors are used for properly terminating a network based on twisted pair cabling with attention to impedance.

NOTE: Refer to Echelon LonWorks FTT-10A Transceiver User's Guide for details regarding acceptable configurations, cabling requirements, terminations, impedance, and other requirements (www.echelon.com).

Transmission Specifications

Component	Value
Network topology	Flexible Free Topology
Neuron chip processor	3150
Free Topology Transceiver (FTT-10A)	50051
Cable types	TIA Category 5 (recommended)
Maximum cable length	1476 ft (450 m) per segment (total of all lines)
Maximum node separation	820 ft (250 m)
Data transmission	Two-wire, half duplex
Data transmission rate	78 kbps (baud)
Bus terminator	Free topology: use one (1) 52.3 Ω bus terminator at the busiest point of the network. Daisy chain or standard line (dual) topology: use two (2) 105 Ω bus terminators at the end of both network segments.
Repeaters and routers	Repeaters and router are typically used when the entire cable length in a given segment exceeds 1476 ft (450 m) in a free topology or 2953 ft (900 m) in a line topology. Each trunk can have, at maximum, one physical repeater. Repeaters and routers may not be used in a ring topology. They must be placed before the network's ring port.

Installation and Mounting

The following section describes how to field install a new LonWorks 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

⚠ 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 LonWorks 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 LonWorks communication module field-installed kit ships with the following items:

- The LonWorks communication module circuit board and plastic cover
- Network connector
- Ferrite enclosure (for noise reduction, if necessary)
- Installation manual [IM 1284](#)

Tools Required

- A small flathead screwdriver or similar tool as shown in [Figure 4](#)
- Precision diagonal cutting pliers or similar tool as shown in [Figure 5](#)

Installing a New Communication Module

Follow these steps to install a LonWorks communication module on the unit controller.

1. Remove power from the unit controller.
2. Locate the BMS card slot on the unit controller ([Figure 3](#)).
3. Remove the plastic cover if it has not already been removed. Use a small screwdriver to carefully pry the cover off from one end ([Figure 4](#)).
4. Using a precision diagonal cutting pliers or similar tool, remove the pre-cut plastic material from the BMS card cover, making the opening for the network connector ([Figure 5](#)).
5. Grasp the communication module, with the network connector on the underside. The 8-pin header must mate to the 8-pin plug in the unit controller backplane. The plug is keyed on each end to direct it into the mating guide on the communication module header. [Figure 6 on page 8](#) shows the BMS card slot with the 8-pin plug that mates to the header on the communication module.
6. Insert the communication module, pointed up, into the slot. Keeping it level, roll the module into position as you guide it into the slot, feeling the connectors align ([Figure 7 on page 8](#), Steps 1 and 2).
7. When you feel the connectors align, press the communication module into the plug. Verify that the module is firmly connected ([Figure 7](#), Step 3).
8. Insert the network connector into the communication module.
9. Install the plastic cover (provided in the field kit) on the serial card slot. Install the cover over the communication module ([Figure 8](#)).

10. Insert the network cable connector into the communication module and make connections to the correct pins ([Figure 9 on page 8](#)):
 - a. Connect one wire of the network cable to Pin A of the network connector (LON is not polarity sensitive).
 - b. Connect the other wire to Pin B of the network connector. Note that no wire is connected to the GND Pin.
11. Snap the optional ferrite enclosure ([Figure 10 on page 8](#)) over the network cable, as necessary.

Figure 3: BMS Card Slot in Unit Controller

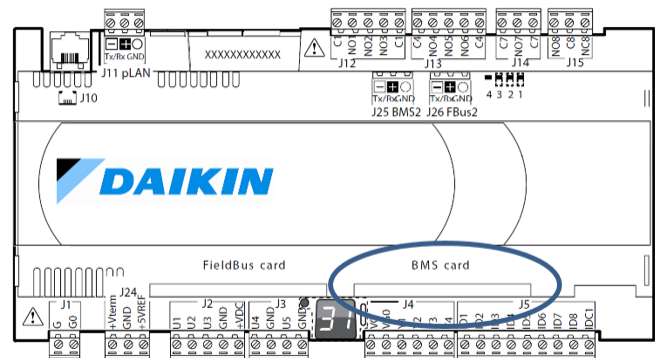


Figure 4: Remove BMS Card Slot Cover

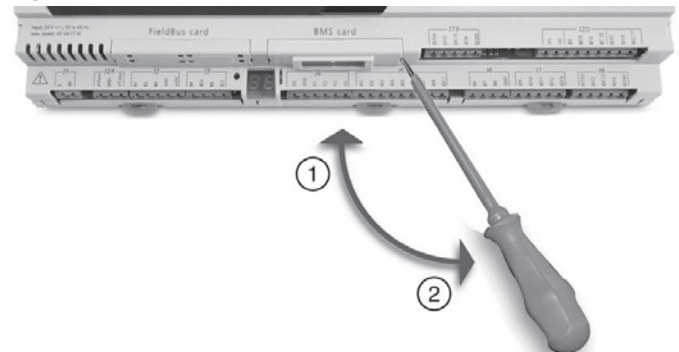


Figure 5: Trim Plastic Material

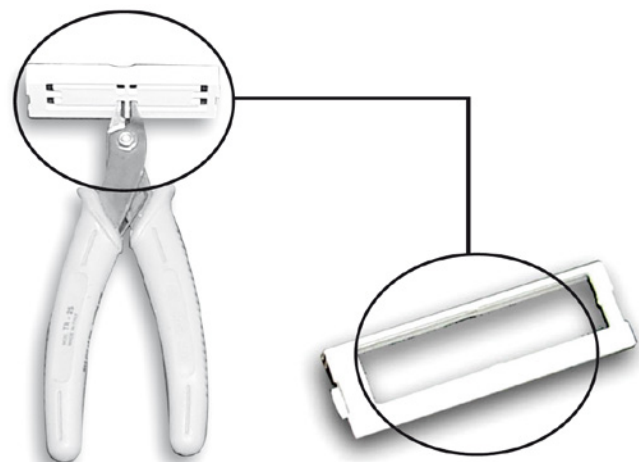


Figure 6: BMS Card Slot Connection

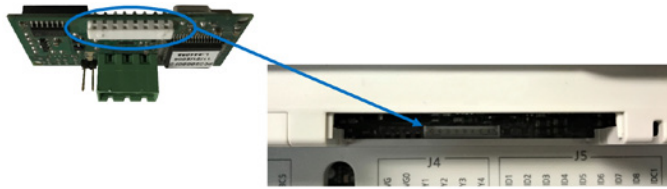
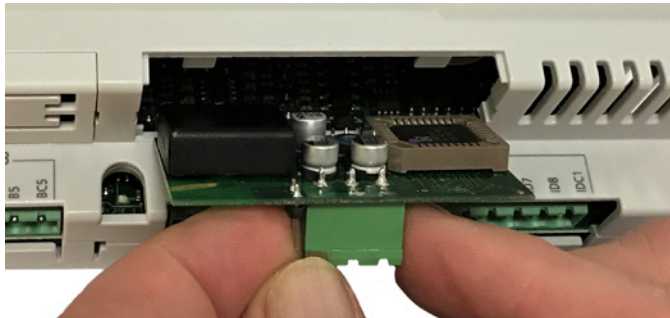
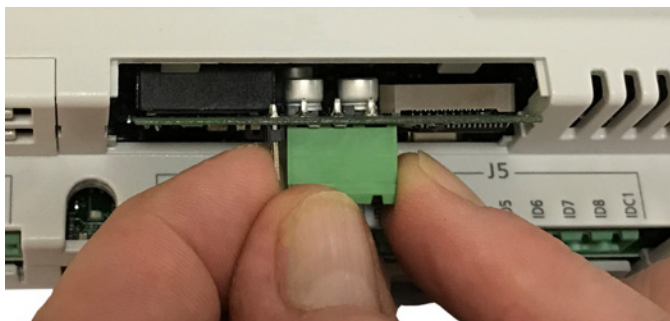


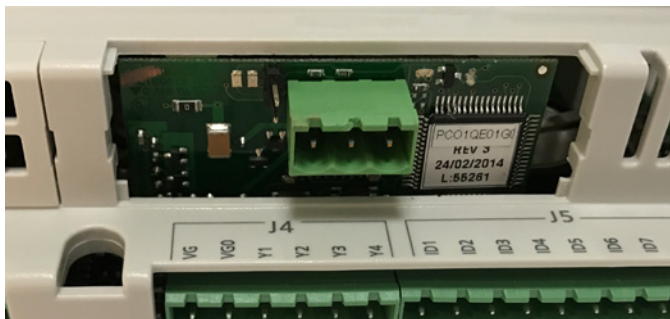
Figure 7: Inserting the Communication Module



Step 1



Step 2



Step 3

Figure 8: Network Connection Detail

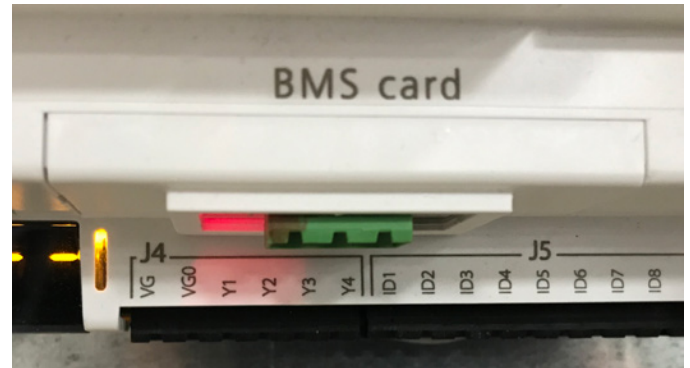


Figure 9: Cover Installed over LON Module

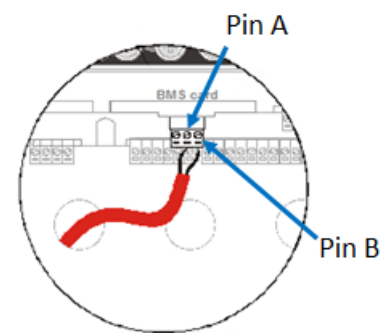
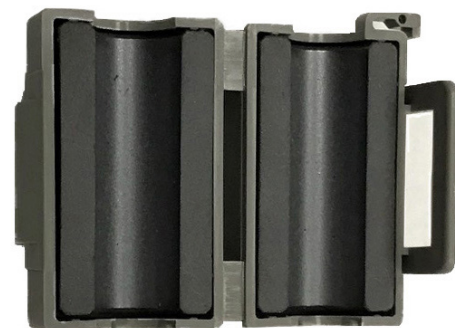


Figure 10: Ferrite Enclosure



Replacing a Communication Module

Follow these steps to remove an existing communication module from the unit controller and replace it with a new one.

1. Remove power from the unit controller.
2. Locate the BMS card slot on the unit controller (Figure 3 on page 7) and remove the network plug (Figure 9) from the communication module.
3. Remove the cover from the BMS card slot. Use a small screwdriver to carefully pry it off from one end (Figure 4 on page 7).
4. Remove the existing module from the BMS card slot by gently rocking it side-to-side until it unseats from the plug on the controller backplane.
5. Grasp the new communication module, with the network connector on the underside. The 8-pin header must mate to the 8-pin plug in the unit controller backplane. The plug has a guide on each end to direct it into the mating guide on the communication module header. Figure 6 shows the serial card slot with the 8-pin plug that mates to the header on the communication module.
6. Insert the communication module, pointed up, into the slot. Keeping it level, roll the module into position as you guide it into the slot, feeling the connectors align. (Figure 7, Steps 1 and 2).
7. When you feel the connectors align, press the communication module into the connector. Verify that the communication module is firmly connected (Figure 7, Step 3).
8. Replace the cover on the serial card slot. Slip the cover over the network connector plug (Figure 8).
9. Insert the existing network connector back into the new communication module (Figure 9). Note: the new network connector can be used, if desired. If the new connector will be used, connect one wire of the network cable to Pin A of the connector plug and the other wire to Pin B of the connector (LON is not polarity sensitive). The GND Pin is not used.

LonWorks Configuration

The LonWorks communication module is configured using the HMI on the chiller. 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 19112](#) for descriptions of the available LonWorks variables (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 11 on page 10), 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 "LON" for the BAS Network Protocol parameter. This sets the protocol to LonWorks.
7. Once the BAS Module Connected parameter is set to Yes and the BAS Network Protocol parameter is set to LonWorks (Figure 12 on page 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 11: BAS Module Connected parameter

BAS Protocol	
BAS Module Connected	No
BAS Network Protocol	None
BAS Remote Enable	Disable

Figure 12: BAS Module Configured for LonWorks

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

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. All necessary LonWorks communication parameters should now be configured.

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 LonWorks 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 ignore Cool 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 13).
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 LonWorks command, select "BAS" from the Control Source parameter drop-down list.

Figure 13: Control Source Parameter

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

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.

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 14).
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 LonWorks command, select "Enable" from the BAS Remote Enable parameter drop-down list.

Figure 14: Remote Enable Parameter

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

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

Table 3: Troubleshooting Procedures for MicroTech WME Chiller Unit Controller Integration

Symptom	Protocol	Action
No communication to MicroTech WME chiller communication module	LonWorks	<ul style="list-style-type: none"> → Verify the protocol is set to LonWorks at the HMI → Confirm network cable is connected to Pins A and B of the network connector on the MicroTech WME chiller LonWorks communication module
Intermittent communication to MicroTech WME chiller communication module	LonWorks	<ul style="list-style-type: none"> → Confirm network cable is connected to Pins A and B of the network connector on the MicroTech WME chiller LonWorks communication module → Ensure the correct termination is used for the network topology → Verify the network wiring does not exceed bus length limits for the cable type → Verify the network trunk avoids strong sources of electromagnetic interference → Verify the network trunk is not located near a DC load switch
Cannot Enable/Disable the chiller through the BAS network	LonWorks	<ul style="list-style-type: none"> → 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	LonWorks	<ul style="list-style-type: none"> → 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

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.

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