Daikin Magnitude® Chiller
LonWORKS® Communication Module
Model WME Magnetic Bearing Centrifugal Chiller, Single Compressor and Dual Compressor
# Table of Contents

## Introduction
- Revision History
- Notice
- Reference Documents
- Software Revision
- Limited Warranty
- Hazardous Information Messages
  - Recognize Safety Symbols, Words and Labels

## Features
- Specifications
- Application
- Component Data
- Service Pin
- Light Emitting Diodes (LEDs)
- LonWorks Network Connector
- 16-Pin Header
- Neuron ID
- Transceiver
- Bus Termination
- Transmission Specifications

## Installation
- Installation and Mounting
- Field Installation Kit
- Tools Required
- Installing a new Communication Module
- Replacing a Communication Module

## Network Integration
- LonWorks Network Addressing
- External Interface File (XIF) and NXE Files
- Resource Files
- LonMark Profile Firmware
- Set the BAS Network Protocol
- OITS Display of Network Parameters – BAS1
- Commissioning

## Parts and Service
- Troubleshooting
- General
- Network Wiring and Connections
- Bus Terminators
- Network Performance
- Parts
This manual contains information regarding network integration for MicroTech® E control systems used on Daikin Magnitude® chillers. It describes how to install or replace a LonWorks® communication module on a Magnitude Centrifugal Chiller unit controller. It also explains how to set network parameters and establish communication between the chiller and the LonWorks network.

Revision History

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IM 965</td>
<td>April 2010</td>
<td>Initial release</td>
</tr>
<tr>
<td>IM 965-1</td>
<td>July 2010</td>
<td>Updated Parts list, Daikin Applied branding and part numbers</td>
</tr>
<tr>
<td>IM 965-2</td>
<td>March 2017</td>
<td>Formatting and branding refresh, updated Ref Docs table and part lists, added specifications, Figs 1-3, Commissioning and Troubleshooting sections</td>
</tr>
</tbody>
</table>

Notice

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Reference Documents

<table>
<thead>
<tr>
<th>Company</th>
<th>Number</th>
<th>Title</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>LonMark Interoperability Association</td>
<td>8040_10</td>
<td>LonMark Functional Profile: Chiller, Version 1.0</td>
<td><a href="http://www.lonmark.org">www.lonmark.org</a></td>
</tr>
</tbody>
</table>

Software Revision

This edition documents all versions of the standard Magnitude Chiller Unit Controller software and all subsequent revisions until otherwise indicated. The software version is located on the lower left side of the Operator Interface Touch Screen (OITS) Service screen. LonWORKS can also read the software revision by reading the Application_Software_Version property of the Device Object.

Limited Warranty


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 Magnitude 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 LonWORKS communication module connects the Magnitude 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® 3.4 certified firmware that conforms to the chiller functional profile
- Ready for commissioning using standard LonWORKS tools such as Echelon’s® LonMaker® software
- Simple attachment to the Magnitude chiller unit controller
- LEDs that indicate communication status and network activity
- Network parameters configurable via the unit controller Operator Touch Screen Interface (OITS) display

Specifications

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

<table>
<thead>
<tr>
<th>General</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>W x H: 2.9 x 2.9 in (74 x 74 mm)</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>3.5 oz (98 g)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operating</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>32 - 140°F (0 - 60°C)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Storage</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>-4 - 158°F (-20 - 70°C)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>DC 5 V (+5% / –5%) power supplied by unit controller, max. 270 mA</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Network</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Network cable</td>
<td>LON interface: Plug-in terminals 2 wires, interchangeable</td>
<td></td>
</tr>
<tr>
<td>Bus connection/Transceiver</td>
<td>Galvanically isolated, 78k baud TP/FT-10 transceiver</td>
<td></td>
</tr>
<tr>
<td>LonWORKS data memory</td>
<td>56 kbyte flash memory for the user application</td>
<td></td>
</tr>
<tr>
<td>Network connector</td>
<td>3-pin (Common, A, and B) network connector plug</td>
<td></td>
</tr>
</tbody>
</table>

The LonWORKS communication module attaches to the upper left section of the Magnitude chiller’s main unit controller circuit board (referred to as the unit I/O board throughout this document). This area is labeled BAS Interface Board. Figure 1 shows the BAS Interface Board area where the communication module attaches to the unit I/O board (see orange box). Figure 2 shows a LonWORKS communication module attached to the unit I/O board.
Application
The LonWORKS communication module connects the Magnitude chiller unit controller to the BAS on a LonWORKS local area network. It is the interface for the exchange of LonWORKS objects between the network and the unit controller. Refer to the respective Magnitude Chiller Operation and Maintenance Manual (Reference Documents) for unit controller details. For a complete list of available LonWORKS variables, refer to the Magnitude Chiller Unit Controller Protocol Document, ED 15117 (www.DaikinApplied.com).

Component Data
The following section describes the important features of the LonWORKS communication module. Figure 3 shows these components, which include five LEDs, service pin, and network connection.

Service Pin
The service pin generates a service-pin message that contains the Neuron® ID and the program code identification of the node. The service pin message is used to commission the LonWORKS communication module by broadcasting it on the network (see Figure 3 for location).

Light Emitting Diodes (LEDs)
The LonWORKS communication module has five LEDs to indicate communication activity and data transmission status. These indicators are visible when the communication module is connected to the unit I/O board and the unit is powered on. See Table 1 for descriptions of LED activity and Figure 3 for LED locations.
LonWorks Network Connector

The network connector is the physical connection between the LonWorks communication module and the FTT-10A bus. Three pins are used for this purpose as indicated below and shown in Figure 3.

NOTE: The network connector hardware on newer communication modules may look slightly different than what is shown in Figure 3. See Parts for additional information.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Common (not used)</td>
</tr>
<tr>
<td>2</td>
<td>A connection</td>
</tr>
<tr>
<td>3</td>
<td>B connection</td>
</tr>
</tbody>
</table>

16-Pin Header

The 16-pin header connects the communication module to the unit I/O board through the bottom of the communication module. The 16-pin header is located on the back side of the communication module (Figure 4) and mates to the I/O board 16-pin receptacle (Figure 5).

Transceiver

The LonWorks communication module is equipped with an Echelon Free Topology Transceiver (FTT-10A) to enable network communication. The transceiver supports free network topology (including ring, star, and daisy-chain) using unshielded, twisted pair cable with polarity insensitive connections at each node. Free topology segments require termination for proper transmission performance.

Data transmission rate on the network is 78 kbps (baud).

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

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network topology</td>
<td>Flexible Free Topology</td>
</tr>
<tr>
<td>Neuron chip processor</td>
<td>3150</td>
</tr>
<tr>
<td>Free Topology Transceiver (FTT-10A)</td>
<td>50051</td>
</tr>
<tr>
<td>Cable types</td>
<td>TIA Category 5 (recommended)</td>
</tr>
<tr>
<td>Maximum cable length</td>
<td>1476 ft (450 m) per segment (total of all lines)</td>
</tr>
<tr>
<td>Maximum node separation</td>
<td>820 ft (250 m)</td>
</tr>
<tr>
<td>Data transmission</td>
<td>Two-wire, half duplex</td>
</tr>
<tr>
<td>Data transmission rate</td>
<td>78 kbps (baud)</td>
</tr>
<tr>
<td>Bus terminator</td>
<td>Free topology: use one (1) 52.3 Ω bus terminator at the busiest point of the network</td>
</tr>
<tr>
<td>Repeaters and routers</td>
<td>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</td>
</tr>
</tbody>
</table>

Neuron ID

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

The Neuron ID is generally used only during initial installation or for diagnostic purposes. For normal network operation, a device address is used.
Installation and Mounting

The following section describes how to field install a new LonWorks communication module or replace an existing module on the Magnitude chiller unit controller.

**CAUTION**

Electrostatic discharge hazard. Can cause equipment damage.

This equipment contains sensitive electronic components that may be damaged by electrostatic discharge from your hands. Before you handle a communication module, you need to touch a grounded object, such as the metal enclosure, in order to discharge the electrostatic potential from your body.

**WARNING**

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.

**CAUTION**

Carefully align the holes on the communication module with the standoffs on the chiller unit I/O board.

Applying power to the unit controller with the communication module installed upside down can cause damage to the communication module.

Field Installation Kit

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

- The LonWorks communication module circuit board
- LonWorks network connector (attached to module)
- Two screws
- This manual (IM 965)

Tools Required

- A small flathead screwdriver

Installing a new Communication Module

Follow these steps to install a new LonWorks communication module on the chiller’s unit I/O board.

1. Remove power from the unit controller.

2. Connect the communication module to the upper left corner of the unit I/O board, in the area labeled BAS Interface Board (Figure 1 and Figure 2). Carefully align the holes on the communication module with the two standoffs attached to the unit I/O board.

   Figure 4 shows the back side of the communication module, oriented in the “up” position. When the module is positioned correctly as shown in Figure 5, the screw holes are located at the top of the module and fit into the standoffs on the I/O board. This allows the 16-pin receptacle to seat properly and secure the communication module into place.

3. Using the two screws included with the communication module kit, attach the communication module to the standoffs located on the unit I/O board.

4. Connect the communication module to the network. See Figure 3 for location of the LonWorks network connector.

5. Apply power to the unit controller.

Figure 5: Installing the Communication Module

![Image of installing the communication module](image-url)
Replacing a Communication Module

Follow these steps to remove an existing LonWorks communication module from the chiller’s unit I/O board and replace it with a new module.

1. Remove power from the unit controller.
2. Locate the communication module. It is situated at the upper left corner of the unit I/O board (Figure 1 and Figure 2).
3. Remove the network cable connector from the communication module.
4. Remove the two screws holding the communication module in place.
5. Grasp the communication module and carefully pull it from the unit I/O board.
6. Connect the communication module to the upper left corner of the unit I/O board, in the area labeled BAS Interface Board (Figure 2). Carefully align the holes on the communication module with the two standoffs attached to the unit I/O board.

   Figure 4 shows the back side of the communication module, oriented in the “up” position. When the module is positioned correctly as shown in Figure 5, the screw holes are located at the top of the module and fit into the standoffs on the I/O board. This allows the 16-pin receptacle to seat properly and secure the communication module into place.

7. Using the two screws included with the communication module kit, attach the communication module to the standoffs located on the unit I/O board.
8. Re-attach the two screws to secure the communication module to the unit I/O board.
9. Insert the network cable connector into the communication module. See Figure 3 for location of the LonWorks network connector.
10. Apply power to the unit controller.
After the LONWORKS communication module has been installed, the Magnitude chiller unit controller is ready for BAS integration. The following section explains how the communication module, together with the unit controller, support LONWORKS network addressing requirements. It describes how to set the LONWORKS network protocol using the Magnitude chiller’s Operator Interface Touch Screen (OITS) display and provides instructions for commissioning the communication module.

NOTE: It is assumed that the user is familiar with common LONWORKS terminology, networking requirements, and software tools required for commissioning and configuring LONWORKS devices.

LONWORKS Network Addressing

The LONWORKS communication module conforms to the network addressing rules as described in the LONWORKS FTT-10A Free Topology Transceiver Users Guide (www.echelon.com). According to the standard, all device addresses are defined at the time of network configuration. Device addresses have three parts:

1. The Domain ID - designates the domain. Devices must be in the same domain in order to communicate with each other.
2. The Subnet ID - specifies a collection of up to 127 devices that are on a single channel or a set of channels connected by repeaters. There may be up to 255 subnets in a domain.
3. The Node ID - identifies an individual device within the subnet.

A group is a logical collection of devices within a domain. Groups are assembled with regard for their physical location in the domain. There may be up to 256 groups in a domain. A group address is the address that identifies all devices of the group. There may be any number of devices in a group when unacknowledged messaging is used. Groups are limited to 64 devices if acknowledged messaging is used.

A broadcast address identifies all devices within a subnet. A broadcast address is used by a device to send a message to all devices on the network.

An external interface file (a specially formatted PC text file with the extension .XIF) is required, along with a LONWORKS network management tool, so the device can be designed and configured prior to installation.

The NXE file contains the application image that is downloaded into the LONWORKS communication module.

Resource Files

Resource files contain definitions of functional profiles, network variables types, configuration property types, and enumerations for Daikin Applied-specific variables that are not included in the standard device profile.

Resource files define the format of how the Daikin Applied-specific variables are displayed when using a tool such as Echelon® LonMaker® software.

Refer to ED 15117 to determine if the variable is supported by the standard Chiller functional profile or is a proprietary variable. ED 15117 includes a Profile description that indicates “Chiller” for standard network variables or “McQuayChiller” for proprietary variables.


LonMark Profile Firmware

The LONWORKS communication module firmware translates the Standard Network Variable Types (SNVTs) and Standard Network Configuration Parameter Types (SCPTs) used in the Magnitude chiller unit controller into the variables and parameters used by the LONWORKS network. The software application conforms to the LonMark 3.4 chiller profile.

Set the BAS Network Protocol

1. Open the unit controller OITS display screen.
2. Press the SET button, located at the bottom of the screen.
3. Press the BAS button from the top of the column on the right-hand side of the screen.
4. Press the 1 button, located to the right of the BAS Network Protocol field. The BAS Network Protocol field should now be highlighted at the bottom of the screen (Figure 6).
5. Press the Change button.
6. If prompted, enter the password 100 and press Enter. Otherwise, proceed to step 7.
7. Press the Change button.
8. Select LONWORKS from the drop-down menu.
9. Press the Enter button.
10. Press the BAS button.
11. Cycle power to the unit controller.
Commissioning

Follow these steps to commission the LonWorks communication module:

1. Verify the communication module is correctly attached to the chiller unit I/O board and that the network cable is connected to Pins 2 and 3 (Figure 3).


3. Use a LonWorks network configuration tool, such as LonMaker, to map the device Neuron ID to the domain/subnet/node logical addressing scheme when it creates the network image, the network address, and connection information.

4. Confirm that the BAS is ready to receive a network device broadcast message.

5. Press the service pin button located on the top right-hand side of the communication module (Figure 3).

At this point, the initialization process begins and the WINK LED blinks green to indicate activity. Refer to the Light Emitting Diodes (LEDs) section for a detailed description of all LED activity.
Troubleshooting

Follow these procedures if you are not able to communicate with the chiller via the network:

General

→ Review the Installation and Mounting section of this document to confirm that the communication module has been installed correctly.
→ Verify that the BAS network protocol is set to LonWORKS (see Set the BAS Network Protocol).
→ View the SRVC LED activity to confirm if the service pin has been activated (Table 1). If not, press the service pin button to send the Neuron ID to the network.
→ Review the Commissioning section of this document to confirm that all procedures were followed correctly.
→ If the communication module is installed but LEDs are not active when the unit controller is powered up, remove the module and then follow the steps provided in the Installing a new Communication Module section. If the issue persists or the ERR LED is red, replace the module.

Network Wiring and Connections

→ Check for faulty cable connectors at the chiller LonWORKS communication module and throughout the network.
→ Determine if there is a network ground fault.
→ For network terminal connections, twist the wires together a minimum of three times.
→ Use only approved cable. Do not use different wire types on the same bus.
→ Follow the bus length limits for the cable type.
→ Confirm that you have the correct transceiver.
→ Make sure that the network trunk avoids strong sources of electromagnetic interference (EMI).
→ Verify that the network trunk is not located near a DC load switch (relay).

Bus Terminators

Errors from bus termination can have the following results:

• Signal level too low could indicate the wrong bus terminator or too many terminators.
• Signal level too high could indicate a high-level signal or signal reflections point due to a missing or wrong bus terminator, or that bus terminators are placed incorrectly.
→ Verify that the correct terminators are used based on your network topology.
  • Free topology should have a single 52.3 Ω bus terminator at busiest point of network.
  • Line topology should have two (2) 105 Ω bus terminators at both network ends.

Network Performance

→ If network traffic is slow, communication is intermittent, or the trunk is experiencing “noise,” it may be necessary to use a network protocol analyzer or oscilloscope to determine the source of poor performance.
→ Confirm power is applied to the unit controller.

Contact the Daikin Applied Controls Customer Support Group at 866-462-7829 for additional assistance, if necessary.

Parts

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnitude Chiller LonWorks communication module kit</td>
<td>332356952</td>
</tr>
<tr>
<td>Kit includes: LonWorks communication module, network connector, screws,</td>
<td></td>
</tr>
<tr>
<td>and IM 965</td>
<td></td>
</tr>
<tr>
<td>Network connector¹ (Wago, 231-303/026-000)</td>
<td>330803003</td>
</tr>
</tbody>
</table>

1. The network connector shown in Figure 10 has replaced the previous connector that shipped with older communication modules. While the physical appearance of the hardware is different, the installation and function remain the same.

Figure 7: Wago Network Connector

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

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