DAIKIN

Installation and Maintenance

IM 916-6

Group: **Controls**

Part Number: **IM 916**

Date: **June 2023**

BACnet® IP Communication Module MicroTech® Unit Controllers

Commercial Packaged Rooftops, Applied Rooftop, and Self-Contained Systems

Models: DPH, DPS, DPSA/DFSA, MPS, RAH, RCE, RCS, RDE, RDS, RDT, RFS, RPE, RPS, SWP and SWT

Member of BACnet International

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Introduction

This manual provides instructions for installing or replacing the BACnet® IP communication module used on MicroTech® III and MicroTech 4 unit controller applications. It applies to Daikin Applied® Packaged Rooftops, Rebel® Rooftops, and Self-Contained models: DPH, DPS, DPSA/DFSA, MPS, RAH, RCE, RCS, RDE, RDS, RDT, RFS, RPE, RPS, SWP and SWT.

The manual describes how to set up the unit controller for network communication and troubleshoot common network issues.

This document is intended for service technicians or other qualified personnel familiar with standard BACnet concepts and terminology. For technical support, contact the Daikin Applied Controls Support Group at 866-462-7829.

Hazardous Information Messages

DANGER

Danger indicates a hazardous situation, which will result in death or serious injury if not avoided.

⚠ WARNING

Warning indicates a potentially hazardous situations, which can result in property damage, personal injury, or death if not avoided.

⚠ CAUTION

Caution indicates a potentially hazardous situations, which can result in minor injury or equipment damage if not avoided.

NOTICE

Notice indicates practices not related to physical injury.

Reference Documents

Number	Company	Title	Source
ANSI/ ASHRAE 135-2001	American Society of Heating, Refrigerating and Air-Conditioning Engineers	BACnet, a Data Communication Protocol for Building Automation and Control Networks	www.ashrae.org
OM 1288	Daikin Applied	MicroTech 4 Unit Controller Operation Manual	www. DaikinApplied. com
OM 920		MicroTech Unit Controller Operation Manual for Applied Rooftop and Self-Contained Systems	
ED 19117		MicroTech 4 Unit Controller Network Integration Guide, BACnet and LONWORKS Networks	
ED 15112		MicroTech Rooftop and Self Contained Unit Controller Network Integration Guide, BACnet and LONWORKS Networks	

Product Information

Description

The BACnet communication module is a printed circuit board with a plastic enclosure that connects to the left side of the unit controller or attached module. The BACnet communication module has application software that enables the unit controller to pass parameters using the BACnet IP protocol (Figure 1).

Application

The BACnet communication module connects the unit controller to a building automation system (BAS) on a BACnet local area network. It enables the exchange of BACnet objects between the network and the unit controller. Refer to the appropriate MicroTech 4 or MicroTech Applied Rooftop Unit Controller Operation Manual for display menu options. See Reference Documents.

Specifications

General	
Dimensions	W x H x D: 1.77 x 4.33 x 2.95 in (45 x 110 x 75 mm)
Weight	3.5 oz (98 g)
Material	Base - plastic, pigeon-blue
	Housing - plastic, light-gray
Operating	
Temperature	-40 - 158°F (-40 - 70°C)
Humidity	<90% RH
Atmospheric pressure	Min. 10 psi (70kPa), corresponding to max. 9,842 ft (3,000 m) above sea level
Storage and Transportation	
Temperature	-40 - 158°F (-40 - 70°C)
Humidity	<95% RH
Atmospheric pressure	Min. 3.77 psi (26 kPa), corresponding to max. 32,808 ft (10,000 m) above sea level
Electrical	
Power	Via unit controller: DC 5 V (+5% / –5%), max. 270 mA
Network connection	Ethernet 10/100 over CAT 5 cable
	RJ-45 port, 8-pin connector
Additional Components	
Board-to-board connector	10-pin plug between communication module and unit controller
Agency Listings	
US	UL916, UL873
Canada	CSA C22.2M205
Europe	
EMC directive	2004/108/EC
Low-voltage directive	2006/95/EC
RoHS directive	2002/95/EC

⚠ CAUTION

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. Daikin Applied disclaims any liability resulting from any interference or for the correction thereof.

Component Data

The BACnet communication module is a printed circuit board with a plastic enclosure. It connects directly to the left-hand side of the unit controller as shown in Figure 1. It may be possible that another module is also connected to the unit controller. In this case, the BACnet communication module simply attaches directly to the left side of the existing module instead of the unit controller.

Figure 2 shows the important features of the BACnet communication module.

Figure 1: BACnet Communication Module Attached to Main Controller .

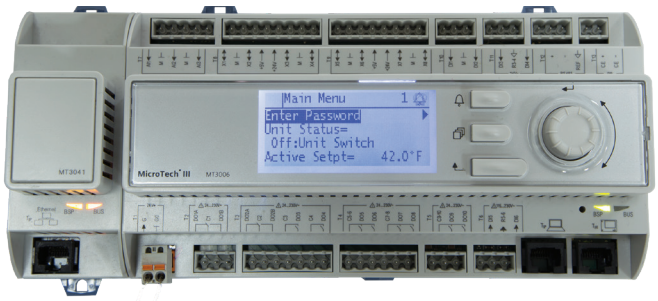
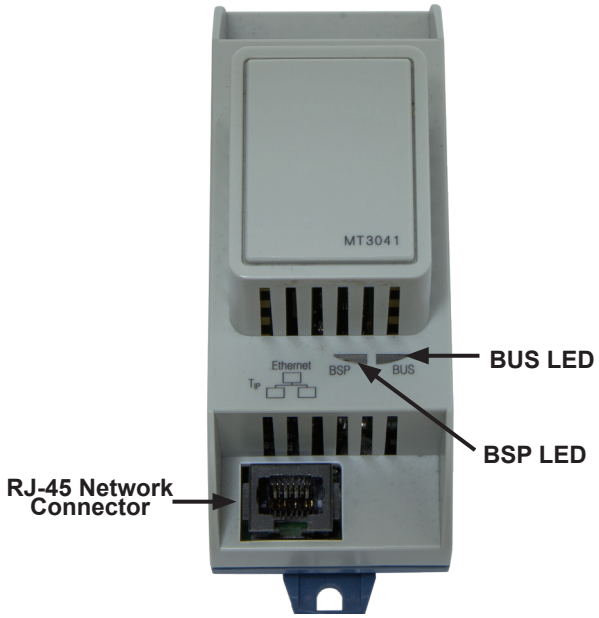


Figure 2: BACnet IP Communication Module



Light Emitting Diodes (LEDs)

The BACnet communication module has a BSP LED and a BUS LED to indicate communication activity and status of the BACnet communication module. These indicators are visible when the communication module is connected to the unit controller and the unit is powered on.

BSP LED

The BSP LED indicates the communication status between the BACnet communication module and the unit controller. Table 1 describes the status of the BSP LED.

Table 1: BSP LED Activity

BSP LED Color	Meaning
Flashing between Red and Green	Board Support Package (BSP) upgrade in progress
Green	Communication is established between the communication module and the unit controller
Yellow	The communication module is capable of communicating to the unit controller. However, communication is not established
Red flashing with 2Hz	Red flashing with 2Hz = Software error[1]
Red	Hardware error[1]

[1] In the event that this should occur, cycle power to the unit controller to attempt to clear the problem. Contact the Controls Customer Support Group at 866-462-7829 for additional assistance if necessary.

BUS LED

The BUS LED indicates the communication status between the BACnet communication module and the BACnet IP network. Table 2 describes the status of the BUS LED.

Table 2: BUS LED Activity

BUS LED Color	Meaning
Green	The unit controller is capable of communicating to the network
Red	The unit controller is not capable of communicating to the network
Orange / Yellow	Communication module is initializing

BACnet Network Connector

An RJ45 connector connects the BACnet communication module to the IP Network.

Board-to-Board Connector

The board-to-board connector connects the unit controller to the BACnet communication module (Figure 3 and Figure 4).

Figure 3: Board-to-Board Connector

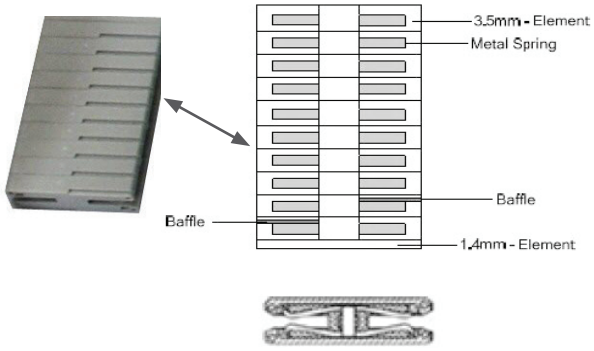
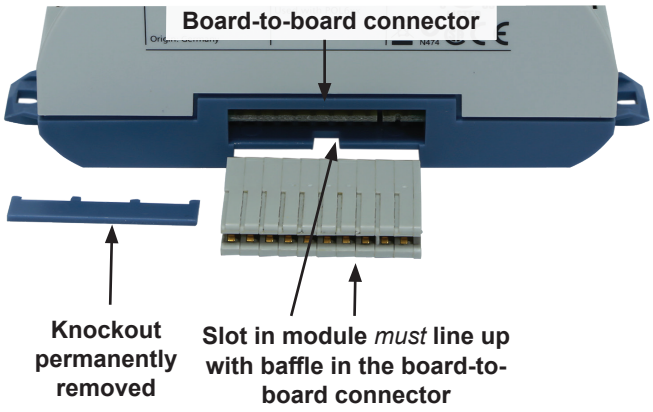


Figure 4: Communication Module and Knockout



Installation and Mounting

The following section describes how to field install a new BACnet IP communication module or replace an existing module on the 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.

Field Installation Kit

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

- The BACnet IP communication module
- Board-to-board connector (Figure 4)

Refer to the Parts section for replacement information.

Installing a new Communication Module

Follow these steps to install a BACnet communication module on the unit controller. The module can be connected directly to the unit controller itself or to an existing module, if present.

NOTE: There is a limit of three devices that can be attached to the left side of the unit controller.

1. Set the “Control Mode = Off” from the main menu on the unit controller display menu. This must be done prior to installing a new communication module.
2. Remove power from the unit controller.
3. Carefully remove the blue plastic knockout strip on the far left end of the unit controller itself (or additional module, if present). Figure 4 shows the knockout strip after it has been removed from the unit controller.
4. To prevent damage to the unit controller, insert a small screwdriver or other tool to the tab on the bottom of the unit controller and pull the screwdriver away from the controller.
5. Carefully remove the blue plastic knockout on the far right side of the BACnet communication module.
6. Insert the board-to-board connector into the BACnet communication module. Note that it only fits one way and that the baffles must line up with corresponding slots in BACnet communication module and the unit controller (Figure 3 and Figure 5).
7. Insert the other end of the board-to-board connector to the far left side of the unit controller or other communication module, if attached (Figure 1).
8. Insert a CAT 5 Ethernet cable into the communication module’s network connector (Figure 2 shows the location of network connector).
9. Power up the unit controller.
10. The unit controller automatically resets itself approximately 30 seconds after it is powered up. This reset is necessary so that the BACnet communication module is synchronized with the unit controller.

Figure 5: Communication Module with Board-to-Board Connector Inserted

Replacing a Communication Module

Follow these steps to remove and replace a BACnet communication module. Note that it may already be connected to either the unit controller or to an existing module.

1. Set the “Control Mode = Off” from the main menu on the unit controller display menu. This must be done prior to replacing a communication module.
2. Remove power from the unit controller.
3. Locate the BACnet communication module to the left of the unit controller (Figure 1).
4. Pull the network cable connector from the BACnet communication module.
5. Grasp the BACnet communication module and gently pull it from the unit controller (or from an adjacent module, if it is attached to one).
6. Install the new BACnet communication module.
7. Insert a CAT 5 Ethernet cable into the communication module’s network connector (Figure 2).
8. Apply power to the unit controller.

NOTE: The unit controller automatically resets itself approximately 30 seconds after power has been applied. This reset is necessary so that the module can synchronize with the unit controller.

Configuring the BACnet Communication Module

The following section describes how to configure the BACnet IP communication module for BAS network integration. Follow these instructions to set addressing parameters for the BACnet communication module using the unit controller display menu. Configuration varies depending on the structure of your network and BACnet broadcasting requirements for IP subnets.

NOTE: Refer to MicroTech 4 Unit Controller Operation Manual (OM 1288) or MicroTech Applied Rooftop Unit Controller Operation Manual (OM 920) for default values and keypad operating instructions. Refer to the respective Unit Controller Integration Guide for all BACnet objects and other network communication information. See Reference Documents.

BACnet IP Addressing

There are three parameters that must be configured properly to establish communication between the unit controller and the BACnet IP network: BACnet IP Address, IP Subnet Mask, and IP Router Address. See your system integrator for additional information regarding BACnet IP addressing.

The BACnet communication module is DHCP (Dynamic Host Configuration Protocol) enabled. See Appendix A: BACnet IP Networks for more information about IP network types.

To Configure the Module using the Unit Controller Display Menu:

1. Navigate to the Enter Password screen if you have not already entered a password. If you have entered a password, skip to step 3.
2. Enter Password: 6363.
3. Continue to navigate to the BMS Communications\ BACnet IP Set-Up menu.

NOTE: The IP Setup menu only appears if a BACnet communication module installed correctly. If the BACnet communication module is installed correctly and this menu still does not appear, cycle power to the unit controller and repeat the procedure from Step 3 above.

4. Modify the parameters as necessary. See Table 3 for details.
5. To modify the Given IP Address, Given IP Mask, or Given IP Gateway, follow steps a-c below:
    a. Fully change all four octets of the desired field.

NOTE: After entering all four octets of the desired field, the cursor should blink in the open space to the right of the last character of the octet.

    b. Select Enter by pressing down on the circular knob on the unit controller keypad. *Do not press the Back button until Enter has been selected.*
    c. From this screen, use the Back button to navigate to the BMS Communications\BACnet IP Set-Up menu and change “ApplyIPChgs” from No to Yes.
6. Check that the network cable is connected and navigate to the IP Setup menu to verify the Actual IP Address. The Actual IP Address displays 0.0.0.0 if the network cable is not attached. This procedure may take a minute while the BACnet communication module powers up.

Configurable Parameters

Table 3 defines the network parameters of the BACnet communication module that must be set using the unit controller display menu in order to establish communication between the unit controller and the BAS. Change parameters as required for your network.

NOTE: To save alteration of these parameters, select “ApplyIPChgs” under the BMS Communications\ BACnet IP Set-Up menu (see Step 5 from previous section).

Table 3: Network Parameter Settings

Parameter[3]	Range/Default	Description/Notes
Device Object Name	Up to 17 characters Default: Varies	This name must be unique throughout the entire BACnet network. The last 6 characters of the default are the last 6 digits of the MAC Address, which is on a printed sticker affixed to the BACnet communication module.
Device Instance Number	0 - 4194302 Default: 1579312	Device Instance of the BACnet communication module. This must be unique throughout the entire BACnet network.
Act IP	If DHCP set to On: Address automatically assigned by network If DHCP set to Off: Address = Given IP	Actual IP Address of the BACnet communication module. This parameter is not changeable. Displays 0.0.0.0 if the network is not connected when power is applied to the unit controller. If DHCP is set to On (enabled), the network automatically assigns this address. If DHCP is set to Off (not enabled), the Actual IP Address is set equal to the Given IP Address (Gvn IP) provided the network is connected when Apply Changes is set to Yes.
Gvn IP	Default: 127.0.0.1	Given IP Address of the BACnet communication module. The BACnet IP address consists of the four-octet IP address followed by the two-octet UDP (User Datagram Protocol) port number. The IP address portion of the BACnet/IP address must be unique in the BACnet/IP network segment. Set the four-octet IP Address to match the Static IP Address.
Gvn Msk	Default: 255.255.255.0	Given Subnet Mask of the BACnet communication module. Set the Given Subnet Mask to match the Static Subnet Mask Address.
Gvn Gwy	Default: 127.0.0.1	Given Gateway Address of the BACnet communication module. Set the Given Gateway Address to match the Static Gateway Address.
Act Msk	If DHCP set to On: Address automatically assigned by network If DHCP set to Off: Address = Given Subnet Mask	Actual Subnet Mask of the BACnet communication module. Displays 0.0.0.0 if the network is not connected when power is applied to the unit controller. If DHCP is set to On (enabled), the network automatically assigns this address. If DHCP is set to Off (not enabled), the Actual Subnet Mask is set equal to the Given Subnet Mask (Gvn Msk) provided the network is connected when Apply Changes is set to Yes.
Act Gwy	If DHCP set to On: Address automatically assigned by network If DHCP set to Off: Address = Given Gateway Address	Actual Gateway Address. Item remains blank if the network is not connected when power is applied to the unit controller. If DHCP is set to On, the network automatically assigns this address. If DHCP is set to Off, the Actual Gateway Address is set equal to the Given Gateway Address (Gvn Gwy) provided the network is connected when Apply Changes is set to Yes.
DHCP[2]	Off or On Default: On	Dynamic Host Configuration Protocol (DHCP) is a network protocol that enables a server to automatically assign an IP Address. Set to Off if a static IP Address is needed. See Appendix A: BACnet IP Networks for more information.
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.
Unit Support	English or Metric Default: English	Controls the type of units that are passed through BACnet.
NC Dev 1[1]	0-4194303 Default: 0 (no device)	Alarm Recipient Device 1. This is the device instance of the BACnet workstation or device that will receive the alarm notification. Use this in place of the Recipient List in the Notification Class.
NC Dev2[1]	0-4194303 Default: 0 (no device)	Alarm Recipient Device 2. This is the device instance of the BACnet workstation or device that will receive the alarm notification. Use this in place of the Recipient List in the Notification Class.
BACnetBSP	Varies	Basic Support Package. Indicates the communication module firmware version. The BSP is read-only.

1. Parameter must be configured via the unit controller display menu.
2. The BACnet communication module defaults to DHCP-enabled. See your system integrator for additional information regarding BACnet IP networks with DHCP functionality.
3. The parameters shown in boldface text are required for minimum network configuration.

NOTE: If the unit controller application software requires a field update, the network configuration parameters revert to their default values. Contact Daikin Applied Technical Support at 763-553-5330 for assistance with upgrading the unit controller application.

Service Information

Troubleshooting

Follow these procedures if you can control the unit controller from the display menu, but unable to communicate from the network.

Network Parameters

→ Verify that network parameters are set correctly as shown in Table 3.

→ Make sure there are no duplicate devices on the network (Device Name and Device ID, for example).

→ Check the use of the character # at the end of each IP setting. There should not be a “space” at the end.

→ Be aware that the unit controller must be restarted when a “Reset Required” message appears. Power off/on the unit controller after all settings have been configured and then select Apply Changes from the unit conroller display menu.

Network wiring

→ Check for loose connections and that devices are plugged in properly.

→ Confirm that the link light for each device’s connector is on, which indicates that information is capable of being sent and received.

Compatibility

→ Verify the unit controller software application version and communication module BSP version.

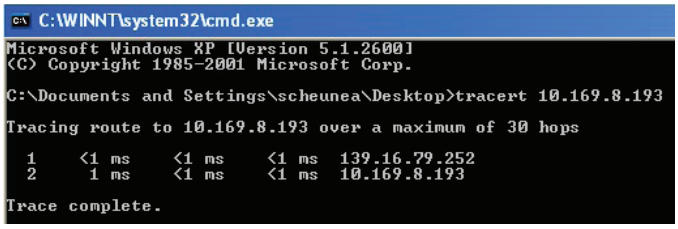
Network Communications

→ Confirm that the DHCP parameter is set to “Off” when a static IP address is being used for non-DHCP networks.

→ Check that the defined UDP port, e.g. BAC0, is open in the firewall.

→ Verify if BBMDs are required. BBMD must be used if the BACnet client and BACnet server are located on different subnets. Use the command “tracert” to check this. Tracert shows all stations used to forward the signal to another segment. See Figure 6 for the result of a BBMD network as displayed by using the “tracert” command.

Figure 6: Example of Confirmed BBMD Network



Parts

Table 4: Replacement Parts List

Description	Part Number
MicroTech/MicroTech 4 Applied Rooftop BACnet IP Communication Module Kit. Includes communication module, board-to-board connector, and Installation Manual	090016709

Technical Support

Contact Daikin Applied Controls Technical Support at 866-462-7829 for additional assistance.

Refer to the appropriate Unit Controller Operation Manual for additional information about using the unit controller display menu options for setting unit parameters and modifying unit setpoints. Also refer to the respective Unit Controller Integration Guide for all BACnet objects and other network communication information. See Reference Documents.

BACnet IP Networks

Single IP Subnet

In BACnet/IP networks with only 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 *can not* 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.

Revision History

Revision	Date	Changes
IM 916	Oct 2008	Initial release
IM 916-1	May 2009	Modified Step 5 of “To Configure the Module using the Keypad/Display” section. Additional steps were added to describe how to properly set Given IP Address, Given IP Mask, or Given IP Gateway.
IM 916-2	Oct 2009	Added Maverick II (MPS) model. Additional changes to keypad display for new global navigation menu.
IM 916-3	Aug 2010	Removed note regarding about needing a crossover cable. Updated BSP in Table 1 to v1.1.30s.
IM 916-3	Mar 2012	• Update Daikin logo and references. Added Rebel to cover.
		• Added step to turn OFF Control Mode on HMI prior to installing a new module on unit controller.
		• Removed NC Dev3 and RcvHrtBt from the Network Configuration Menu table these are no longer used.
		• Added AHU Loc/Net, Comm Status and RstOutOfSrvc to the Network Configuration Menu table
		• Changed BACnetBSP Initial Value in the Network Configuration Menu table to 9.26
IM 916-4	Apr 2020	Rebranded layout and added MicroTech 4 Rebel Applied. Other minor corrections.
IM 916-5	Jan 2021	Fixed incorrect Rebel Applied OM number in Referemce Documents table and cross referrences used in the IM.
IM 916-6	Jun 2023	Branding and other formatting updates.

Daikin Applied Training and Development

Now that you have made an investment in modern, efficient Daikin Applied equipment, its care should be a high priority. For training information on all Daikin Applied 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 Applied 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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