



Installation and Maintenance

IM 917-4

Group: Controls

Part Number: IM 917

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BACnet® MS/TP Communication Module for MicroTech® III and MicroTech 4 Unit Controllers Applied Rooftop Systems and Self-Contained Units

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



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This manual provides instructions for installing or replacing the BACnet communication module on a MicroTech 4 (Rebel Applied) or MicroTech III (Rooftop Applied Systems, Self-Contained Unit and Maverick II models) Commercial Packaged Rooftop System unit controller. It describes how to set up the unit controller for network communication and troubleshoot common network communications issues.

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

⚠ 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.

Hazardous Information Messages

⚠ CAUTION

Cautions indicate potentially hazardous situations, which can result in personal injury or equipment damage if not avoided.

⚠ WARNING

Warnings indicate potentially hazardous situations, which can result in property damage, severe personal injury, or death if not avoided.

⚠ DANGER

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

⚠ NOTICE

Notices give important information concerning a process, procedure, special handling or equipment attributes.

Revision History

IM 917	October 2008	Initial release
IM 917-1	October 2009	Added Maverick II (MPS) model. Updated keypad display navigation menu per global standards.
IM 917-2	August 2010	Removed note about crossover cable on p.10. Updated BSP v1.1.30s reference in Table 1.
IM 917-2	March 2012	Updated Daikin logo and references. Added Rebel to cover. Removed NC Dev3 and RcvHrtBt from the Network Configuration Menu table these are no longer used. Added AHU Loc/Net, Comm Status and RstOutOfSrcv to the Network Configuration Menu table. Changed BACnet BSP Initial Value in the Network Configuration Menu table to 9.26
IM 917-3	December 2019	Rebranded layout. Added MicroTech 4 Rebel Applied, Spec table and new images. Modified Service Information troubleshooting steps, added Notice about wiring and termination resistor consistency with EIA-485 and BACnet Standard guidelines and modified Service Information section.
IM 917-4	January 2021	Fixed incorrect Rebel Applied OM number in Reference Documents table and cross references used in the IM.

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 Rebel Applied™ Unit Controller Operation Manual	www.DaikinApplied.com
OM 920		MicroTech III Unit Controller Operation Manual for Applied Rooftop and Self-Contained Systems	
ED 19117		MicroTech 4 Rebel Applied Unit Controller Network Integration Guide, BACnet and LONWORKS Networks	
ED 15112		MicroTech III Rooftop and Self Contained Unit Controller Network Integration Guide, BACnet and LONWORKS Networks	

Limited Warranty

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

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Description

The BACnet communication module is a printed circuit board within a plastic enclosure. It connects directly to the left side of the unit controller or to an attached module, if one is present (Figure 1). The BACnet communication module has application software that enables the unit controller to pass parameters using the BACnet MS/TP protocol.

Application

The BACnet communication module enables the unit controller to pass objects, events, and alarms using the BACnet MS/TP (EIA 485) data link layer. It enables the exchange of BACnet objects between the network and the unit controller. Refer to the MicroTech 4 Rebel Applied or MicroTech III Applied Air Handling Unit Controller operation manual for unit controller display menu details. The Reference Documents section provides literature numbers and locations.

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	DC 5 V (+5% / -5%) bus connector, max. 270 mA	
Network cable	RS-485 (ANSI/EIA-485) 3-wire twisted pair, shielded Galvanically isolated	
Bus connection/ Transceiver	A+, B-, REF (3 wires) Isolated transceiver with fail-safe circuitry 1/8 Unit load	
Bus termination	680 Ω / 120 Ω +1 nF / 680 Ω (switch by software)	
Additional Components		
Board-to-board connector	10-pin plug between comm module and unit controller	
BACnet connector	RS-485 connection plug, 3-pin spring cage top entry	
Agency Listings		
US	UL916, UL873	
Canada	CSA C22.2M205	
Europe	EMC directive Low-voltage directive	2004/108/EC 2006/95/EC Listings
RoHS directive	2002/95/EC	

Component Data

Figure 1: BACnet Communication Module Attached to the Unit Controller



Figure 2 shows the location of the major components of the BACnet communication module.

Figure 2: BACnet Communication Module Components



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 (Figure 2).

BSP LED

The BSP LED indicates the communication state between the BACnet communication module and the unit controller. The table below describes the status of the BSP LED.

Table 1: BSP LED Color Definitions

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 MS/TP network. The table below describes the status of the BUS LED.

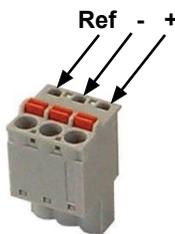
Table 2: BUS LED Color Definitions

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 RS485 connector connects the BACnet communication module to the MS/TP Network and has three pins: +, -, and Ref (Figure 3).

Figure 3: Connector Locations



Board-To-Board Connector

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

Figure 4: Communication Module and Knockout

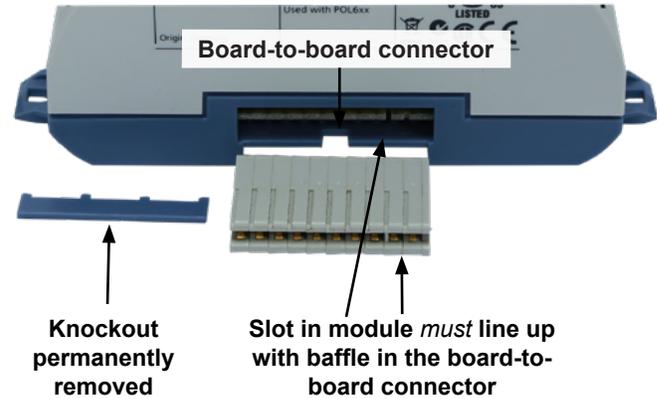
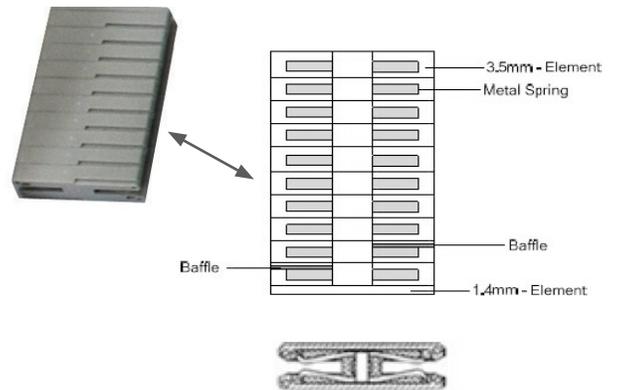


Figure 5: Board-to-Board Connector



NOTICE

EIA-485

The BACnet MS/TP protocol uses EIA-485 (RS-485) as the physical layer standard for data transmission. When equipped with an optional BACnet MS/TP communication module, the unit controller uses the BACnet MS/TP protocol over an RS-485 standard for communicating with third party devices.

Installation and Mounting

This section describes how to field install a new BACnet 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 communications module, you need to touch a grounded object, such as the metal enclosure, in order to discharge the electrostatic potential in your body.

DANGER

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.

Field Installation Kit

The following is the list of items included in the field-installed kit:

- The BACnet MS/TP communication module
- Board-to-board connector (separate)
- Network connector (attached to module)

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 BACnet communication 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.

NOTE: 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.

4. Carefully remove the knockout on the far right side of the BACnet communication module.

5. 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 5](#) and [Figure 6](#)).

Figure 6: BACnet Communication Module with Board-to-Board Connector Inserted



6. Insert the other end of the board-to-board connector to the far left side of the unit controller or from an adjacent module, if present ([Figure 1](#)).
7. Connect the BACnet communication module to the network by inserting a network cable into the communication module's network connector ([Figure 3](#)).

NOTE: For optimal performance, the network cable shield should be continuous throughout the entire network and connected to earth ground at only one point. The BACnet MS/TP network should also be terminated at each end with a 120 ohm resistor between the + and - terminals. This can be used as an alternative to setting the term resistor to Yes on the unit controller display menu ([Table 3](#)).

8. Power up the unit controller.
9. 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.

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 removing and replacing an existing 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 present).
6. Install the new BACnet communication module.
7. Insert the network cable connector into the BACnet communication module (see [Figure 3](#) for location of network connector).

NOTE: For optimal performance, the network cable shield should be continuous throughout the entire network and connected to earth ground at only one point. The BACnet MS/TP network should also be terminated at each end with a 120 ohm resistor between the + and - terminals. This can be used as an alternative to setting the term resistor to Yes on the unit controller display menu ([Table 3](#)).

8. Power up the unit controller.

NOTE: 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.

Configuring the BACnet Communication Module

The following section describes how to configure the BACnet MS/TP communication module for BAS network integration. Follow these instructions to set addressing parameters for the BACnet communication module using the unit controller display menu.

NOTE: Refer to MicroTech 4 Rebel Applied Unit Controller Operation Manual (OM 1288) or MicroTech III Applied Air Handling 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](#) for literature descriptions and locations.

BACnet MS/TP Addressing

The BACnet MS/TP Media Access Control (MAC) address is a one-octet address that must be set during the BACnet communication module configuration. The MAC address must be unique to the MS/TP network and be within the valid range of 0-127.

Additionally, there are certain parameters that must be set properly to verify communication between the unit controller and the MS/TP network. [Table 3](#) provides details about these addressing parameters. See your system integrator for additional information regarding proper BACnet MS/TP addressing.

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. Navigate to the BMS Communications\BACnet MSTP Set-Up menu and change "ApplyMSTPChgs" from No to Yes.

NOTE: The MS/TP Setup menu only appears if a BACnet communication module installed correctly. If the 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 shown in [Table 3](#) as required.
5. On the MSTP Set-Up menu, verify the settings of all parameters. This procedure may take a minute while the BACnet communication module powers up.

Changing the MS/TP Data Transmission Rate

The options for baud rate (in bps) include: 9600, 19200, 38400, and 76800. The factory default baud rate is 38400 bps.

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. Navigate to the BMS Communications\BACnet MSTP Set-Up menu and change the baud rate to desired value.
4. From the BMS Communications\MSTP Set-Up menu, change "ApplyMSTPChgs" from No to Yes.

Configurable Parameters

Table 3 defines the parameters that must be set using the unit controller display menu to enable network communication between the unit controller and the BAS. Change parameters as required for your network. Save the new settings by

navigating to the BMS Communications/Advanced Menus/ MSTP Set-Up page and changing “ApplyMSTPChgs” from No to Yes (see Step 4 from previous section).

Table 3: Network Configuration Menu

Parameter	Value (Range)/Definition	Initial Value/Note
ApplyMSTPChgs	No-Yes/Apply MSTP Changes. Setting this to yes will cycle power to the controller to allow the network setup changes to take place.	No
Name	Up to a 17-character Device Object Name. Change this value as needed to match installation parameters.	POL904_FF2BEE/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 printed on a label located on the left end of the module. “Apply MSTP Change” must be activated for changes to the Device Object Name to take effect.
Dev Instance	0-4194303/Device Instance of the BACnet communication module.	368136/This must be unique throughout the entire BACnet network.
MSTP Address ¹	0-127/ This is the MS/TP address of the BACnet communication module.	18/ Each device on the BACnet network must have a unique MS/TP address.
Baud Rate ¹	9600-19200-38400-76800/ Data transfer speed.	38400
Max Master	0-127/ This variable specifies the highest possible address for master nodes and shall be less than or equal to 127.	127
Max Info Frm	0-255/ This variable specifies the maximum number of information frames the BACnet communication module may send before it must pass the token.	10
Unit Support	Off-On/Controls the type of units that are passed through BACnet (English or Metric).	On/To set the unit for Metric, set Unit Support to Off. If Unit Support is On, they type of units will be set to the same units as the keypad.
Term Resistor ¹	No-Yes	No
NC Dev1	0-4194303/Alarm Recipient Device 1	0 (no device)/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	0-4194303/Alarm Recipient Device 2	0 (no device)/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.
AHU Loc/Net	Local-Network	Network
Comm Status	Ok, Hardware, Init, Memory, ID, COVReg, Other/Indicates the status of the BACnet module.	
RstOutOfSrv	Done, False, True/Reset Out of Service will set the value of the Out of Service Property for setpoints.	Done
BACnetBSP	Basic Support Package Version	Varies

¹ Parameter only available via the keypad/display; designates the location of the unit on the network.

NOTE: A physical 120 ohm terminating resistor may be used as an alternative to setting the term resistor to “Yes” on the unit controller display menu.

If unit controller application software requires updating, the network configuration parameters revert to their default values. Please contact the Applied Air Handling Customer Support Group at 763-553-5330 for assistance with upgrading unit controller application software.

Troubleshooting

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

Compatibility

- Verify that the correct unit software application version and communication module BSP versions are installed and functioning properly.

Network Wiring and Communication

- 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.
- Check that the MS/TP network is wired as a true daisy chain.
- Verify if there are any 3-wire (plus shield) devices on this network.
- Confirm the shield is continuous throughout the entire MS/TP trunk and grounded at only one point.
- Confirm that the shield is continuous throughout the entire MS/TP trunk.
- Confirm if the network has an IP to MS/TP router.

Network Parameters

- Verify that the MicroTech unit controller's baud rate setting matches the network baud rate.
- Make sure there are no duplicate devices on the network (Device Name and Device ID, for example).
- Verify the Max Masters is set correctly (as shown in [Table 3](#)) and that all devices have the same value.
- Be aware that cycling power to the unit controller before setting "Apply Changes = Yes" deletes the desired changes.
- Be aware that setting "Apply Changes = Yes" is required whenever changes are made to the unit controller BACnet Setup menu. This causes the unit controller to reboot.

Parts

Table 4: Replacement Kit

Description	Part Number
MicroTech III Applied Rooftop/MicroTech 4 Rebel Applied BACnet MS/TP Communication Module Kit. Kit includes communication module, board-to-board connector, and Installation Manual	090016710

Technical Support

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

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](#) for literature descriptions and locations.



Daikin Applied Training and Development

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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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