Installation and Operations Manual

IOM 1135-2

Group: **Controls**
Part Number: **IOM 1135**
Date: **February 2015**
Supercedes: **IOM 1135-1**

MicroTech® III I/O Manager

For use with Daikin MicroTech Integrated System or in stand-alone operation

Revision History

Manual	Date	Description
IOM 1135	December 2011	Initial Release
IOM 1135-1	October 2012	Changed name from Generic I/O to I/O Manager. Updated HMI for the BACnet Out of Service setting.
IOM 1135-2	March 2013	Updated Universal I/Os X1 – X5 to be inputs and outputs.

Reference Documents

Number	Company	Title	Source
ED19013	Daikin	I/O Manager PICS	www.DaikinApplied.com
ED19014	Daikin	I/O Manager Protocol Information	www.DaikinApplied.com
OM1092	Daikin	MicroTech Integrated System operations manual	www.DaikinApplied.com
ANSI/ASHRAE 135-2008	American Society of Heating, Refrigerating and Air-Conditioning Engineers	BACnet® A Data Communication Protocol for Building Automation and Control Networks	www.ashrae.org

Limited Warranty

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

Notice

Daikin reserves the right to change any information contained herein without prior notice. The user is responsible for determining whether this software is appropriate for his or her application.

® ™ The following are tradenames or registered trademarks of their respective companies: BACnet from the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.; Windows from Microsoft Corporation; Daikin and MicroTech III from Daikin.

Hazard Identification Messages

⚠ DANGER

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

⚠ WARNING

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

⚠ CAUTION

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

⚠ DANGER

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

This equipment must be properly grounded. Connections and service to the MicroTech III Chiller Unit Controller must be performed only by personnel knowledgeable in the operation of the equipment being controlled.

⚠ 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.

⚠ 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. 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.**

Description

This document contains information related to the Daikin I/O Manager. This controller is for use with the Daikin's MicroTech Integrated System. The I/O Manager comes with a BACnet MS/TP module attached. This controller acts as a master node on the MS/TP network.

The Daikin I/O Manager is used to connect to a number of existing control points within a building to the VAV System for the purposes of managing and coordinating various functions on these ancillary devices. This controller is needed when the number and type of I/O points on the VAV and Air Handler unit controllers are not enough to meet the building requirements.

Use this manual to physically install the Daikin MicroTech III Communication Module and connect the I/O Manager to your MicroTech Integrated System. Use the appropriate Daikin Engineering Data (ED), known as the Protocol Information document, to integrate the unit into your network. The Protocol Information document contains addressing details, BACnet® protocol information, and a list of the data points available to the network. See the Reference Documents section of this manual for Protocol Information document numbers. MicroTech III control integration literature is available from your local Daikin sales representative and www.DaikinApplied.com.

The Daikin I/O Manager offers the following features:

- Power supply AC 24 V or DC 24 V
- 8 configurable analog I/Os
  - 4 analog outputs 10V or 25ma, or analog inputs NI1000, PT1000, I-R2500, I-NTC10K, or I-NTC100K
  - 1 analog output 10V, or analog input NI1000, PT1000, I-R2500, I-NTC10K, or I-NTC100K
  - 3 analog inputs 10V, 25ma, NI1000, PT1000, I-R2500, I-NTC10K, or I-NTC100K
- 3 analog inputs NTC 10k or NTC 100k
- DC 24 V and DC 5 V power supply for active sensors on board
- 2 digital inputs for potential-free contacts
- 2 digital inputs galvanically isolated AC 24 V
- 2 digital inputs galvanically isolated AC 115–230 V
- 8 relay outputs (6 NO contacts, 2 relays switching type)
- 2 triac outputs (AC 24 V)
- SD card interface for application and operating system upgrade
- Operating temperature -20…60°C

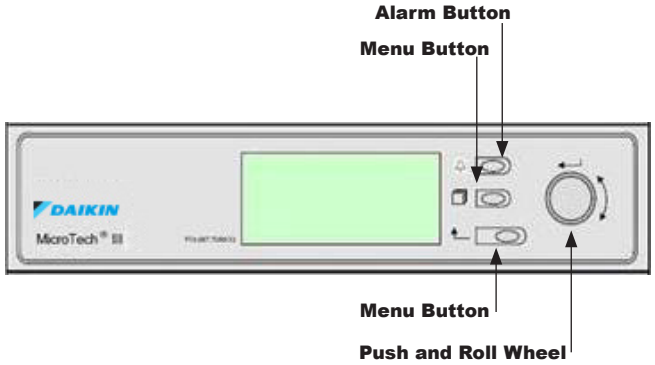
This controller acts as a master node on the VAV System MS/TP network.

The HMI consists of a 5-line by 22 character display, three keys and a “push and roll” navigation wheel. There is an Alarm Button, Menu (Home) Button, and a Back Button. The wheel is used to navigate between lines on a screen (page) and to increase and decrease changeable values when editing. Pushing the wheel acts as an Enter Button.

The first line on each page includes the page title and the line number to which the cursor is currently “pointing”. The line numbers are X/Y to indicate line number X of a total of Y lines for that page. The left most position of the title line includes an “up” arrow to indicate there are pages “above” the currently displayed items, a “down” arrow to indicate there are pages “below” the currently displayed items or an “up/down” arrow to indicate there are pages “above and below” the currently displayed page.

Each line on a page can contain status only information or include changeable data fields. When a line contains status only information and the cursor is on that line all but the value field of that line is highlighted meaning the text is white with a black box around it. When the line contains a changeable value and the cursor is at that line, the entire line is highlighted. Each line on a page may also be defined as a “jump” line, meaning pushing the navigation wheel will cause a “jump” to a new page. An arrow is displayed to the far right of the line to indicate it is a “jump” line and the entire line is highlighted when the cursor is on that line.

Figure 1: MicroTech faceplate

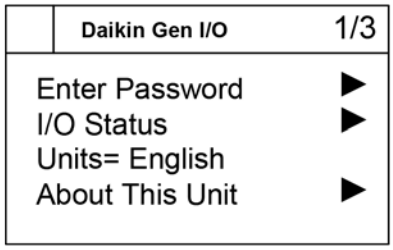


Passwords

The three password levels available are Level 2, Level 4 and Level 6 with Level 2 having the highest level of access. Entering the Level 6 password (or no password) allows access to the I/O Status menus. Entering the Level 2 or 4 password allows similar access to Level 6 with the addition of the I/O Setup menus. The Level 2 password is 6363, the Level 4 is 2526 and the Level 6 password is 5321.

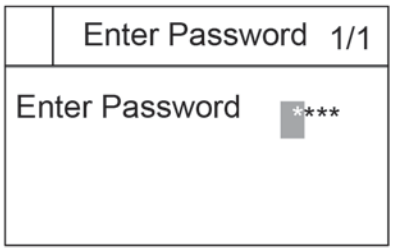
Continuing without entering one of these three levels allows access only to the I/O Status menus.

Figure 2: Access Menu



The password field initially has a value **** where each * represents an adjustable field. These values can be changed by entering the Edit Mode described below.

Figure 3: Password Menu



Entering an invalid password has the same effect as continuing without entering a password.

Once a valid password has been entered, the controller allows further changes and access without requiring the user to enter a password until either the password timer expires or a different password is entered. The default value for this password timer is 10 minutes.

Navigation Mode

In the Navigation Mode, when the wheel is turned clockwise, the cursor moves to the next line (down) on the page. When the wheel is turned counter-clockwise the cursor moves to the previous line (up) on the page. The faster the wheel is turned the faster the cursor moves.

A line contains an editable value when the entire line is highlighted in a black box. Typically, these will be user adjustable setpoints. When only the parameter name is highlighted (and not the value), that parameter is for display only and cannot be edited from the keypad. Typically, these non-editable parameters are readings from a sensor or calculated values by the MicroTech controller.

When the Back Button is pressed the display reverts back to the previously displayed page. If the Back button is repeated pressed the display continues to revert one page back along the current navigation path until the “main menu” is reached.

When the Menu (Home) Button is pressed the display reverts to the “main page”.

When the Alarm Button is depressed, the Alarm Lists menu is displayed. Since alarms are not implemented in this version, there will never be alarms listed here.

Edit Mode

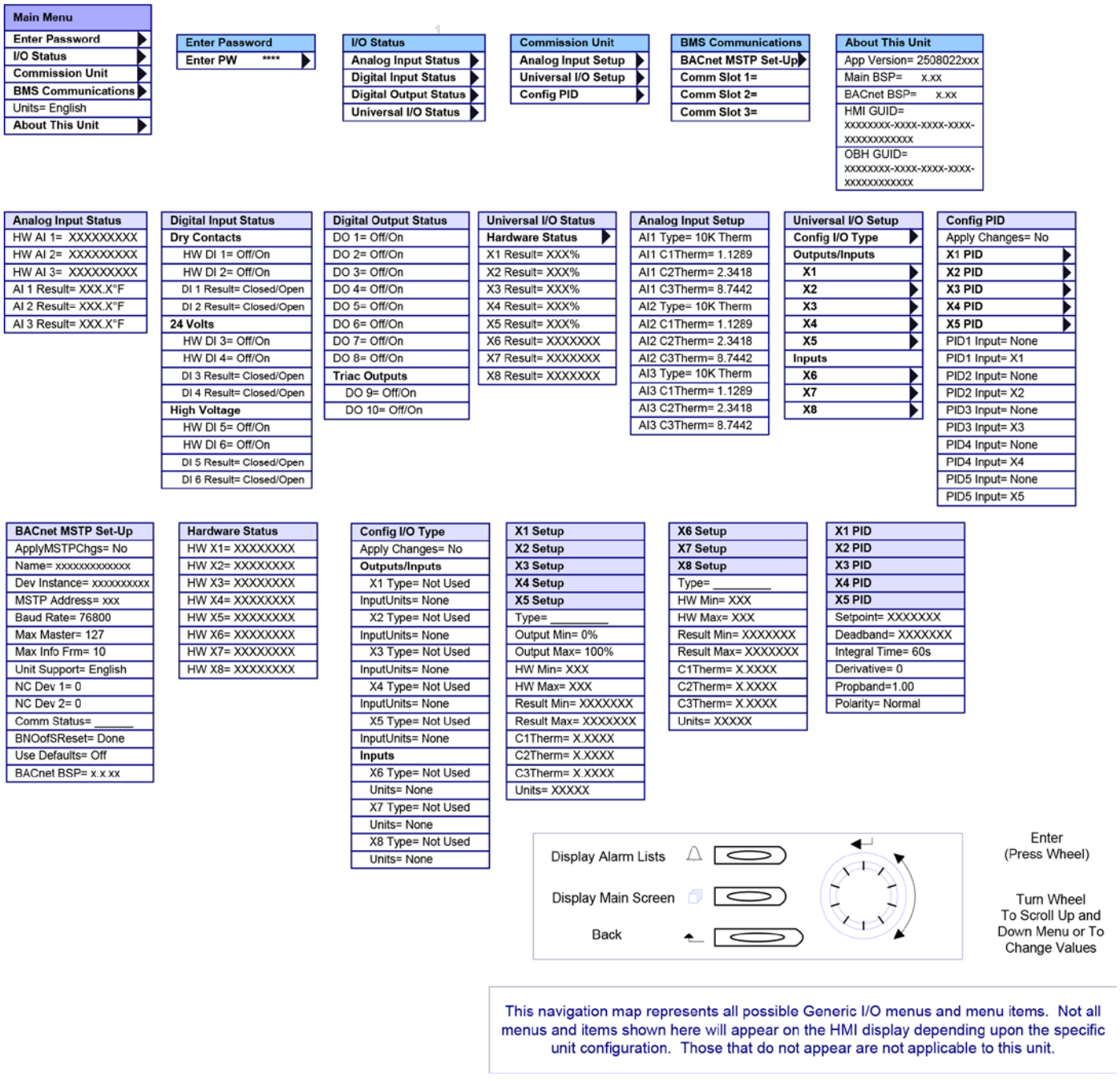
The Editing Mode is entered by pressing the navigation wheel while the cursor is pointing to a line containing an editable field. Once in the edit mode pressing the wheel again causes the editable field to be highlighted. Turning the wheel clockwise while the editable field is highlighted causes the value to be increased. Turning the wheel counter-clockwise while the editable field is highlighted causes the value to be decreased. The faster the wheel is turned the faster the value is increased or decreased. Pressing the wheel again cause the new value to be saved and the keypad/display to leave the edit mode and return to the navigation mode.

Unit Support

From the Main Screen, the user can change the type of units that are displayed on the keypad/display. The options include English (default) or SI. Power must be cycled to the unit controller before changes to Unit Support take effect.

The following is a description of the MicroTech III menu structure. These menus and items can all be displayed with the keypad/display. Menu items displayed will change based on the selected unit configuration.

Figure 4: Keypad/Display Menu Structure



This navigation map represents all possible Generic I/O menus and menu items. Not all menus and items shown here will appear on the HMI display depending upon the specific unit configuration. Those that do not appear are not applicable to this unit.

I/O Status

Analog Input Status

The analog inputs status menu lists the status of analog inputs A1 through A3.

Table 1: Analog Input Status Menu

Menu Display Name	Item Display Name
Analog Input Status	AI 1 Result=
	AI 2 Result=
	AI 3 Result=

AI 1 Result is a status only item which indicates the current temperature from the sensor wired to A1.

AI 2 Result is a status only item which indicates the current temperature from the sensor wired to A2.

AI 3 Result is a status only item which indicates the current temperature from the sensor wired to A3.

Digital Input Status

The digital inputs status menu lists the status of digital inputs DI1 through DI6.

Table 2: Digital Input Status Menu

Menu Display Name	Item Display Name	Value
Digital Input Status	HW DI 1=	OFF/ON
	HW DI 2=	OFF/ON
	DI 1 Result =	Open/Closed
	DI 2 Result =	Open/Closed
	HW DI 3=	OFF/ON
	HW DI 4=	OFF/ON
	DI 3 Result =	Open/Closed
	DI 4 Result =	Open/Closed
	HW DI 5=	OFF/ON
	HW DI 6=	OFF/ON
	DI 5 Result =	Open/Closed
	DI 6 Result =	Open/Closed

HW DI 1 is a status only item which indicates the current status of the digital input labeled DI1.

HW DI 2 is a status only item which indicates the current status of the digital input labeled DI2.

DI 1 Result is a status only item which indicates the current value for the digital input (Open/Closed). In most cases, this should match HW DI1 unless the network is overriding it.

DI 2 Result is a status only item which indicates the current value for the digital input (Open/Closed). In most cases, this should match HW DI2 unless the network is overriding it.

HW DI 3 is a status only item which indicates the current status of the digital input labeled DI1.

HW DI 4 is a status only item which indicates the current status of the digital input labeled DI2.

DI 3 Result is a status only item which indicates the current value for the digital input (Open/Closed). In most cases, this should match HW DI3 unless the network is overriding it.

DI 4 Result is a status only item which indicates the current value for the digital input (Open/Closed). In most cases, this should match HW DI4 unless the network is overriding it.

HW DI 5 is a status only item which indicates the current status of the digital input labeled DI1.

HW DI 6 is a status only item which indicates the current status of the digital input labeled DI2.

DI 5 Result is a status only item which indicates the current value for the digital input (Open/Closed). In most cases, this should match HW DI5 unless the network is overriding it.

DI 6 Result is a status only item which indicates the current value for the digital input (Open/Closed). In most cases, this should match HW DI6 unless the network is overriding it.

Digital Output Status

The digital output status menu lists the status of digital outputs DO1 through DO10.

Table 3: Digital Output Status Menu

Menu Display Name	Item Display Name	Value
Digital Output Status	DO 1=	OFF/ON
	DO 2=	OFF/ON
	DO 3=	OFF/ON
	DO 4=	OFF/ON
	DO 5=	OFF/ON
	DO 6=	OFF/ON
	DO 7=	OFF/ON
	DO 8=	OFF/ON
	DO 9=	OFF/ON
	DO 10=	OFF/ON

DO 1 is a status only item which indicates the current status of the digital output labeled DO1.

DO 2 is a status only item which indicates the current status of the digital output labeled DO2.

DO 3 is a status only item which indicates the current status of the digital output labeled DO3.

DO 4 is a status only item which indicates the current status of the digital output labeled DO4.

DO 5 is a status only item which indicates the current status of the digital output labeled DO5.

DO 6 is a status only item which indicates the current status of the digital output labeled DO6.

DO 7 is a status only item which indicates the current status of the digital output labeled DO7.

DO 8 is a status only item which indicates the current status of the digital output labeled DO8.

DO 9 is a status only item which indicates the current status of the digital output labeled DO9.

DO 10 is a status only item which indicates the current status of the digital output labeled DO10.

Universal I/O Status

The universal I/O status menu lists the status of inputs/outputs X1 through X5, and inputs X6 through X8.

Table 4: Universal I/O Status Menu

Menu Display Name	Item Display Name
Universal I/O Status	Hardware Status
	X1 Result=
	X2 Result=
	X3 Result=
	X4 Result=
	X5 Result=
	X6 Result=
	X7 Result=
	X8 Result=

X1 Result is a status only item which indicates the calculated value for the X1 input/output.

X2 Result is a status only item which indicates the calculated value for the X2 input/output.

X3 Result is a status only item which indicates the calculated value for the X3 input/output.

X4 Result is a status only item which indicates the calculated value for the X4 input/output.

X5 Result is a status only item which indicates the calculated value for the X5 input/output.

X6 Result is a status only item which indicates the calculated value for the X6 output.

X7 Result is a status only item which indicates the calculated value for the X7 output.

X8 Result is a status only item which indicates the calculated value for the X8 output.

Table 5: Hardware Status Menu

Menu Display Name	Item Display Name
Hardware Status	HW X1=
	HW X2=
	HW X3=
	HW X4=
	HW X5=
	HW X6=
	HW X7=
	HW X8=

HW X1 is a status only item which indicates the current hardware value for the X1 input/output.

HW X2 is a status only item which indicates the current hardware value for the X2 input/output.

HW X3 is a status only item which indicates the current hardware value for the X3 input/output.

HW X4 is a status only item which indicates the current hardware value for the X4 input/output.

HW X5 is a status only item which indicates the current hardware value for the X5 input/output.

HW X6 is a status only item which indicates the current hardware value for the X6 input.

HW X7 is a status only item which indicates the current hardware value for the X7 input.

HW X8 is a status only item which indicates the current hardware value for the X8 input.

Commission Unit

Analog Input Setup

The analog input setup menu allows the user to configure hardware analog inputs AI1 through AI3. These inputs are designated to be thermistor inputs. Other types of analog inputs can set up through the Universal I/O menu and utilize the respective universal input.

Table 6: Analog Input Setup Menu

Menu Display Name	Item Display Name	Default	Range
Analog Input Setup	AI1 Type=	10K Therm	10KTherm, 100KTherm
	AI1 C1Therm=	1.12887	
	AI1 C2Therm=	2.34176	
	AI1 C3Therm=	8.47223	
	AI2 Type=	10K Therm	10KTherm, 100KTherm
	AI2 C1Therm=	1.12887	
	AI2 C2Therm=	2.34176	
	AI2 C3Therm=	8.47223	
	AI3 Type=	10K Therm	10KTherm, 100KTherm
	AI3 C1Therm=	1.12887	
	AI3 C2Therm=	2.34176	
	AI3 C3Therm=	8.47223	

AI1 Type is a writable item which defines the type of thermistor connected to the AI1 input.

AI1 C1Therm is a writable item which defines the C1 constant used to calculate the temperature.

AI1 C2Therm is a writable item which defines the C2 constant used to calculate the temperature.

AI1 C3Therm is a writable item which defines the C3 constant used to calculate the temperature.

AI2 Type is a writable item which defines the type of thermistor connected to the AI2 input.

AI2 C1Therm is a writable item which defines the C1 constant used to calculate the temperature.

AI2 C2Therm is a writable item which defines the C2 constant used to calculate the temperature.

AI2 C3Therm is a writable item which defines the C3 constant used to calculate the temperature.

AI3 Type is a writable item which defines the type of thermistor connected to the AI3 input.

AI3 C1Therm is a writable item which defines the C1 constant used to calculate the temperature.

AI3 C2Therm is a writable item which defines the C2 constant used to calculate the temperature.

AI3 C3Therm is a writable item which defines the C3 constant used to calculate the temperature.

Universal I/O Setup

Config I/O Type

The Config I/O type menu allows the user to configure the hardware universal I/O inputs or outputs X1 through X5 and inputs X6 through X8. Table 7 displays the type of inputs and outputs that can be used with these terminals.

Table 7: Config I/O Type Menu

Menu Display Name	Item Display Name	Default	Range
Config I/O Type	Apply Changes=	No	No, Yes
	Outputs/Inputs		
	X1 Type=	Not Used	Not Used, Voltage Out, Current Out, PID VOut, PID mAOut, CurrentIn, VoltIn, PT1000In, I-R2500In, NI1000In, NTC10K, NTC100K
	InputUnits=	None	None, °F, %, inWC, psi, mA, V, cfm, ppm (None, °C, %, Pa, kPa, mA, V, l/s, ppm)
	X2 Type=	Not Used	Not Used, Voltage Out, Current Out, PID VOut, PID mAOut, CurrentIn, VoltIn, PT1000In, I-R2500In, NI1000In, NTC10K, NTC100K
	InputUnits=	None	None, °F, %, inWC, psi, mA, V, cfm, ppm (None, °C, %, Pa, kPa, mA, V, l/s, ppm)
	X3 Type=	Not Used	Not Used, Voltage Out, Current Out, PID VOut, PID mAOut, CurrentIn, VoltIn, PT1000In, I-R2500In, NI1000In, NTC10K, NTC100K
	InputUnits=	None	None, °F, %, inWC, psi, mA, V, cfm, ppm (None, °C, %, Pa, kPa, mA, V, l/s, ppm)
	X4 Type=	Not Used	Not Used, Voltage Out, Current Out, PID VOut, PID mAOut, CurrentIn, VoltIn, PT1000In, I-R2500In, NI1000In, NTC10K, NTC100K
	InputUnits=	None	None, °F, %, inWC, psi, mA, V, cfm, ppm (None, °C, %, Pa, kPa, mA, V, l/s, ppm)
	X5 Type=	Not Used	Not Used, Voltage Out, PID VOut, CurrentIn, VoltIn, PT1000In, I-R2500In, NI1000In, NTC10K, NTC100K
	InputUnits=	None	None, °F, %, inWC, psi, mA, V, cfm, ppm (None, °C, %, Pa, kPa, mA, V, l/s, ppm)
	Inputs		
	X6 Type=	Not Used	Not Used, CurrentIn, VoltIn, PT1000In, I-R2500In, NI1000In, NTC10K, NTC100K
	Units=	None	None, °F, %, inWC, psi, mA, V, cfm, ppm (None, °C, %, Pa, kPa, mA, V, l/s, ppm)
	X7 Type=	Not Used	Not Used, CurrentIn, VoltIn, PT1000In, I-R2500In, NI1000In, NTC10K, NTC100K
	Units=	None	None, °F, %, inWC, psi, mA, V, cfm, ppm (None, °C, %, Pa, kPa, mA, V, l/s, ppm)
	X8 Type=	Not Used	Not Used, CurrentIn, VoltIn, PT1000In, I-R2500In, NI1000In, NTC10K, NTC100K
	Units=	None	None, °F, %, inWC, psi, mA, V, cfm, ppm (None, °C, %, Pa, kPa, mA, V, l/s, ppm)

Apply Changes is a writable item which cycles power to the controller when set to Yes. This is required when anything on this menu is modified.

X1 Type is a writable item configures the X1 universal I/O as an input or an output of this type.

X2 Type is a writable item that configures the X2 universal I/O as an input or an output of this type.

X3 Type is a writable item that configures the X3 universal I/O as an input or an output of this type.

X4 Type is a writable item that configures the X4 universal I/O as an input or an output of this type.

X5 Type is a writable item that configures the X5 universal I/O as an input or an output of this type.

X6 Type is a writable item that configures the X6 universal I/O as an input of this type.

X7 Type is a writable item that configures the X7 universal I/O as an input of this type.

X8 Type is a writable item that configures the X8 universal I/O as an input of this type.

InputUnits is a writable item under each universal I/O input that that configures the appropriate units for displaying the result of the X1 through X5 hardwired inputs. Table 7 displays the type of units that can be selected for each input.

Units is a writable item under each universal I/O input that that configures the appropriate units for displaying the result of the X6 through X8 hardwired inputs. Table 7 displays the type of units that can be selected for each input.

X1 through X5 Setup Menus

The X1 through X5 setup menus allow the user to setup the min and max ranges for the universal analog inputs/outputs.

Table 8: X1 through X5 Setup Menus

Menu Display Name	Item Display Name	Default	Range
X1 Setup X2 Setup X3 Setup X4 Setup X5 Setup	Type =	—	(X1-X4) Not Used, Voltage Out, Current Out, PID VOut, PID mAOut, CurrentIn, VoltIn, PT1000In, I-R2500In, NI1000In, NTC10K, NTC100K (X5 only) Not Used, Voltage Out, PID VOut, CurrentIn, VoltIn, PT1000In, I-R2500In, NI1000In, NTC10K, NTC100K
	Input Min=		
	Input Max=		
	HW Min=		
	HWMax=		
	C1 Therm=		
	C2 Therm=		
	C3 Therm=		
	Result Min=		
	Result Max=		
	Units=	—	None, °F, %, inWC, psi, mA, V, cfm, ppm (None, °C, %, Pa, kPa, mA, V, l/s, ppm)

Type is a display only item that shows how this particular output is defined.

Input Min is a writable item that corresponds to the minimum value for this analog output when the output is at HW Min.

Input Max is a writable item that corresponds to the minimum value for this analog output when the output is at HW Max.

HW Min is a writable item that indicates the minimum value for the hardware. For example, if the output is a 4-20mA signal, then the HW Min would be set to 4.

HW Max is a writable item that indicates the minimum value for the hardware. For example, if the output is a 4-20mA signal, then the HW Max would be set to 20.

C1 Therm is a writable item which defines the C1 constant used to calculate the temperature. This item is only present if the Type is set to NTC10K or NTC100K.

C2 Therm is a writable item which defines the C2 constant used to calculate the temperature. This item is only present if the Type is set to NTC10K or NTC100K.

C3 Therm is a writable item which defines the C3 constant used to calculate the temperature. This item is only present if the Type is set to NTC10K or NTC100K.

Result Min is a writable item indicates the value of this analog input when the signal is at HW Min.

Result Max is a writable item indicates the value of this analog input when the signal is at HW Max.

Units is a display only item that shows what units this particular output is defined for.

X6 through X8 Setup Menus

The X6 through X8 setup menus allow the user to setup the min and max ranges for the each of the universal analog inputs.

Table 9: X6 through X8 Setup Menus

Menu Display Name	Item Display Name	Default	Range
X6 Setup X7 Setup X8 Setup	Type =	—	Not Used, CurrentIn, VoltIn, PT1000In, I-R2500In, NI1000In, NTC10K, NTC100K
	C1 Therm=		
	C2 Therm=		
	C3 Therm=		
	HW Min=		
	HW Max=		
	Result Min=		
	Result Max=		
	Units=	—	None, °F, %, inWC, psi, mA, V, cfm, ppm (None, °C, %, Pa, kPa, mA, V, l/s, ppm)

Type is a display only item that shows how this particular input is defined.

C1 Therm is a writable item which defines the C1 constant used to calculate the temperature. This item is only present if the Type is set to NTC10K or NTC100K.

C2 Therm is a writable item which defines the C2 constant used to calculate the temperature. This item is only present if the Type is set to NTC10K or NTC100K.

C3 Therm is a writable item which defines the C3 constant used to calculate the temperature. This item is only present if the Type is set to NTC10K or NTC100K.

HW Min is a writable item that indicates the minimum value for the hardware. For example, if the input is a 4-20mA signal, then the HW Min would be set to 4.

HW Max is a writable item that indicates the minimum value for the hardware. For example, if the input is a 4-20mA signal, then the HW Max would be set to 20.

Result Min is a writable item indicates the value of this analog input when the signal is at HW Min.

Result Max is a writable item indicates the value of this analog input when the signal is at HW Max.

Units is a display only item that shows what units this particular output is defined for.

Config PID

The Config PID menu allows the user to configure PID control to control outputs X1 through X5.

Table 10: Config I/O Type Menu

Menu Display Name	Item Display Name	Default	Range
Config PID	Apply Changes=	No	No, Yes
	X1 PID		
	X2 PID		
	X3 PID		
	X4 PID		
	X5 PID		
	PID1 Input=	None	None, X1 – X8
	PID1 Output=	X1	—
	PID2 Input=	None	None, X1 – X8
	PID2 Output=	X2	—
	PID3 Input=	None	None, X1 – X8
	PID3 Output=	X3	—
	PID4 Input=	None	None, X1 – X8
	PID4 Output=	X4	—
	PID5 Input=	None	None, X1 – X8
	PID5 Output=	X5	—

Apply Changes is a writable item which cycles power to the controller when set to Yes. This is required when anything on this menu is modified.

X1 PID is a link that takes you to the setup parameters for the PID that controls the X1 analog output.

X2 PID is a link that takes you to the setup parameters for the PID that controls the X2 analog output.

X3 PID is a link that takes you to the setup parameters for the PID that controls the X3 analog output.

X4 PID is a link that takes you to the setup parameters for the PID that controls the X4 analog output.

X5 PID is a link that takes you to the setup parameters for the PID that controls the X5 analog output.

PID1 Input is a writable item which selects the analog input used for the PID.

PID1 Output is a read only item that always reads X1 indicating PID1 controls the X1 analog output.

PID2 Input is a writable item which selects the analog input used for the PID.

PID2 Output is a read only item that always reads X2 indicating PID2 controls the X2 analog output.

PID3 Input is a writable item which selects the analog input used for the PID.

PID3 Output is a read only item that always reads X3 indicating PID3 controls the X3 analog output.

PID4 Input is a writable item which selects the analog input used for the PID.

PID4 Output is a read only item that always reads X4 indicating PID4 controls the X4 analog output.

PID5 Input is a writable item which selects the analog input used for the PID.

PID5 Output is a read only item that always reads X5 indicating PID5 controls the X5 analog output.

X1 PID through X5 PID

The X1 PID through X5 PID menus allows the user to configure the parameters for each PID control to control outputs X1 through X5.

Table 11: X1 PID through X5 PID Menus

Menu Display Name	Item Display Name	Default	Range
X1 PID	Setpoint=	—	Depends on PID input type
X2 PID	Deadband=	—	Depends on PID input type
X3 PID	Integral Time=	60s	0 second– 999 seconds
X4 PID	Derivative=	0	0–100
X5 PID	Propband=	1.00	-64 to 64
	Polarity	Normal	Normal/Reverse

Setpoint is the setpoint the PID needs to maintain. The default and range depend on the type of units that the input uses.

Deadband defines the space around the setpoint in which the PID would be satisfied. When the absolute value of the Setpoint minus the Input is less than the deadband, the PID is satisfied and the output will not change.

Integral Time

Derivative slows the rate of change of the controller output. Derivative control is used to reduce the magnitude of the overshoot produced by the integral component and improve the combined controller/process stability.

Propband is the proportional gain factor. A high propband results in a large change in the output for a given change in the error. If the propband is too high, the system can become unstable. In contrast, a small gain results in a small output response to a large input error and a less responsive controller.

Polarity defines how the output reacts. See Table 12.

Table 12: How Polarity affects an Analog Output

Polarity	Input > Setpoint	Input < Setpoint
Normal	Output Decreases	Output Increases
Reverse	Output Increases	Output Decreases

BMS Communications

Table 13: BMS Communications

Menu Display Name	Item Display Name	Default	Range
BMS Communications	BACnet MSTP Set-Up	—	—
	Comm Slot 1=	—	—
	Comm Slot 2=	—	—
	Comm Slot 3=	—	—
BACnet MSTP Set-Up	ApplyMSTPChgs=	No	No, Yes
	Name=	—	
	Dev Instance=	—	0–4194303
	MSTP Address=	—	
	Baud Rate=	38400	9600, 19200, 38400, 76800
	Max Master=	127	1–127
	Max Info Frm=	1	1–32
	Unit Support=	English	SI, English
	Comm Status=	—	
	BNOofSReset=	Done	Done, False, True
	Use Defaults=	Off	Off, On
	BACnet BSP=	8.14	—

BACnetMSTP Set-up is the menu used to setup the parameters for the MS/TP communication module.

Comm Slot 1 defines the type of module located in the slot 1 position (closest to the main controller).

Comm Slot 2 defines the type of module located in the slot 2 position (second from the main controller).

Comm Slot 3 defines the type of module located in the slot 3 position (third from the main controller).

ApplyMSTPChgs causes the controller to reset, when set to yes, to allow the network setup changes to take effect.

Name is the Device Object Name. It must be unique throughout the entire BACnet network.

Dev Instance is the device instance of the BACnet Communication Module. It must be unique throughout the entire BACnet network.

MSTP Address is the MS/TP address of the BACnet Communication Module.

Baud Rate is the data transfer speed.

Max Master specifies the highest possible address for master nodes and shall be less than or equal to 127.

Max Info Frm specifies the maximum number of information frames the BACnet Communication Module may send before it must pass the token.

Unit Support controls the type of units that are passed through BACnet (English or Metric).

Comm Status indicates the status of the BACnet Communication Module.

BNOofSReset is a quick way to set the Out Of Service property of all setpoints to either True or False. Once complete, this item will change automatically back to Done. If the BACnet BSP is less than 9.XX, then Out of Service must be set to true to write to setpoints.

Use Defaults reverts the notification class objects recipient list property and the NC Dev1 and NC Dev2 objects to their factory defaults. For example, if the recipient list was set through the notification class object, then NC Dev1 and NC Dev2 will not work until Use Defaults is set to On. The user should use one of the two methods to set the recipient for intrinsic alarming.

BACnet BSP is the current version of firmware in the BACnet communication module

About this Unit

Table 14: About this Unit Menu

Menu Display Name	Item Display Name
About this Unit	App Version=
	Main BSP=
	BACnet BSP=
	HMI GUID=
	OBH GUID=

App Version is the version of application code loaded into the controller

Main BSP is the current version of firmware in the main controller

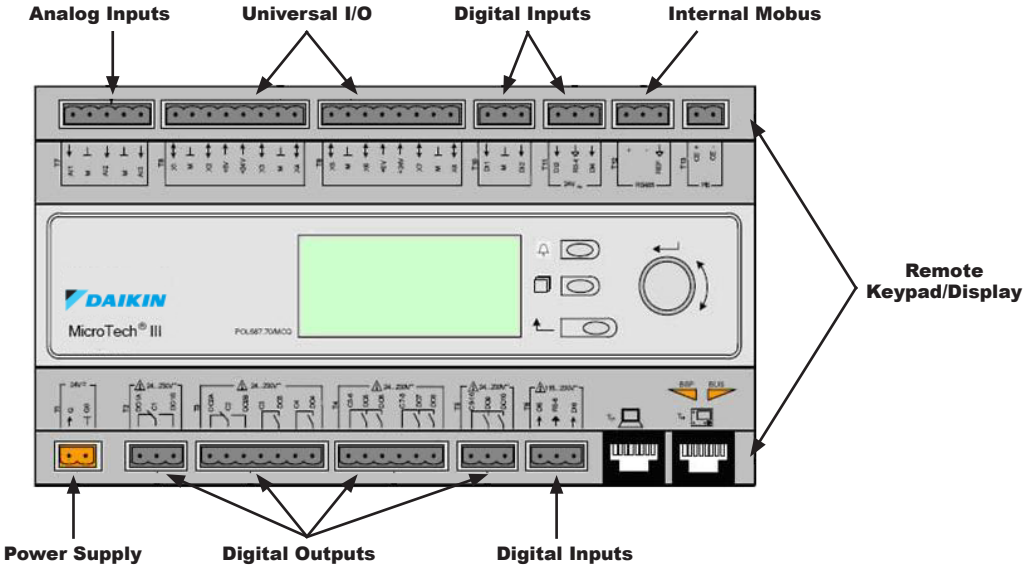
BACnet BSP is the current version of firmware in the BACnet communication module

HMI GUID is the HMI software identifier number unique to each application code version

OBH GUID is the OBH software identifier number unique to each application code version

The status of all Inputs/Outputs (I/O) is available via the keypad/display and via BACnet on the VAV System panel. The configurable I/O points are configured via the keypad/display.

Figure 5: Main Control Board



Power Supply (T1)

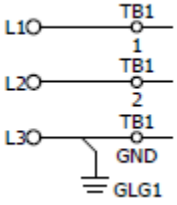
⚠ WARNING

All field installed devices must be powered from the same transformer as the controller to prevent damage to the controller.

Specifications

Operating voltage	AC 24V ±20%; DC 24V ±10%
Frequency	45…65Hz
Power consumption	Approximately 15 VA (without extension modules)
Max AC current without extension modules	1.8A @ AC 24V
Max DC current for extension modules	2.2A @ AC 24V / 3.0A @ DC 24V
Max external supply line fusing	10A slow wire fuse or circuit breaker

Figure 6: Power Wiring (T1)



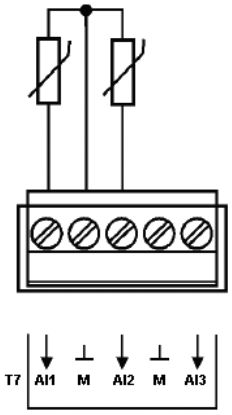
Analog Inputs (AI1-AI3)

There are 3 analog inputs defined as thermistor inputs. These inputs are AI1, AI2, and AI3. They can be configured to be 10K NTC or 100K NTC thermistor inputs.

Table 15: Analog Inputs

Controller I/O	Range	Control
AI 1	Dependent on Thermistor spec, typically -40 to 125°C (-40 to 250°F)	10K NTC Thermistor(Default) or 100K NTC Thermistor
AI 2	Dependent on Thermistor spec, typically -40 to 125°C (-40 to 250°F)	10K NTC Thermistor(Default) or 100K NTC Thermistor
AI 3	Dependent on Thermistor spec, typically -40 to 125°C (-40 to 250°F)	10K NTC Thermistor(Default) or 100K NTC Thermistor

Figure 7: Connecting Thermostats to analog inputs



Digital Inputs (DI1-6)

There are 6 digital inputs. Digital inputs DI1 and DI2 can be dry contacts. Digital inputs DI3 and DI4 are considered made when they are powered by 24VAC. Digital inputs DI5 abd DI6 are considered made when they are powered by a rated voltage of 115–239V.

Table 16: Digital Inputs

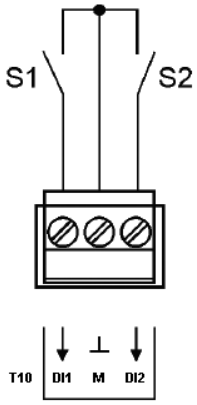
Controller I/O	Hardware Configuration
DI 1	For potential free contacts, 24 Vdc, 8mA
DI 2	For potential free contacts, 24 Vdc, 8mA
DI 3	24 Vac/dc, 8mA
DI 4	24 Vac/dc, 8mA
DI 5	High voltage
DI 6	High voltage

Potential-free (DI1, DI2)

0/1 digital signal (binary) for potential-free contacts

Sampling volate/current	DC 24V / 8mA
Contact resistance	Max 200 Ω (closed)
	Min 50 Ω (open)
Delay	10ms
Pulse frequency	Max 30Hz

Figure 8: Connecting Floating Contact to Digital Input

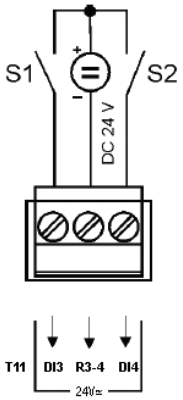


AC 24V (DI3, DI4)

0/1 digital signal (binary) – Galvanically isolated contact

Rated voltage	AC / DC 24V
Input Current	8mA
Delay	20ms
Pulse frequency	Max 5Hz

Figure 9: Connecting a DC 24V Signal to a Digital Input

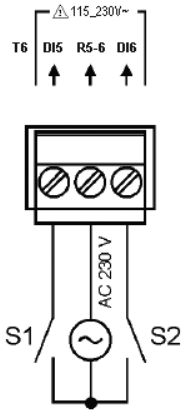


AC 230V (DI5, DI6)

0/1 digital signal (binary) – Galvanically isolated contact

Rated voltage	AC 115V…230V (-15%, +10%)
Frequency range	45…65Hz
Input Current	3mA @ AC 230V
Delay	100ms
Pulse frequency	Max 5Hz

Figure 10: Connecting an AC 230V signal to a Galvanically Isolated Digital Input



Digital Outputs (DO1-D10)

There are 10 digital outputs. DO1-DO8 are relay outputs, DO9-DO10 are triac outputs. The outputs on the Daikin I/O Manager are designed to switch 24 VAC loads.

Table 17: Digital Outputs

Controller I/O	Hardware Configuration
DO1	N.O./N.C. Relay Contact; 24 Vac, 3 A / 2 A ac max
DO2	N.O./N.C. Relay Contact; 24 Vac, 3 A / 2 A ac max
DO3	N.O. Relay Contact; 24 Vac, 3 A / 2 A ac max
DO4	N.O. Relay Contact; 24 Vac, 3 A / 2 A ac max
DO5	N.O. Relay Contact; 24 Vac, 3 A / 2 A ac max
DO6	N.O. Relay Contact; 24 Vac, 3 A / 2 A ac max
DO7	N.O. Relay Contact; 24 Vac, 3 A / 2 A ac max
DO8	N.O. Relay Contact; 24 Vac, 3 A / 2 A ac max
DO9	Triac 24 Vac, 500mA
DO10	Triac 24 Vac, 500mA

Relay Outputs (DO1…DO8)

Relay: Type, contact	Monostable, NO/NC contact Monostable, NO contact
Contact Rating	
Switch voltage	AC 24V…230V (-20%, +10%)
Rated current (res. / ind.)	Max AC 3A / 2A (cos 0.6)
Switching current at AC 19V	Min AC 30 mA
Max external supply line fusing	6.3A slow wire fuse or circuit breaker

⚠ WARNING

Do not mix (SELV / PELV) and line voltage on the same terminal. Use external protection for inductive load. Failure to do so can cause personal injury and equipment damage.

Triac Outputs (DO9…DO10)

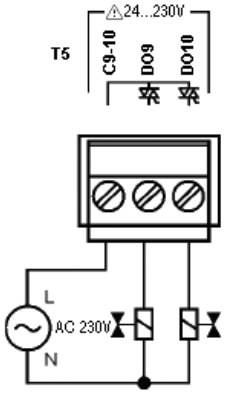
Triac Output Values

Switching voltage	AC 24V…230V (-20%, +10%)
Switching capacity	Max 500mA / Min 30mA
Max external supply line fusing	2.0A slow wire fuse or circuit breaker

⚠ WARNING

Do not mix (SELV / PELV) and line voltage on the same terminal. Use external protection for inductive load. Failure to do so can cause personal injury and equipment damage.

Figure 11: Connecting Solenoid Valves to Triac Outputs



Universal I/O (X1…X8)

The Daikin I/O Manager allows for 8 configurable analog I/O. X1 through X5 are defined as analog inputs or outputs and X6 through X8 will be analog inputs. The available types are shown in the table below. Analog Input/Output 5 is only valid as a voltage output and analog input.

Table 18: Universal I/O

Controller I/O	Type	Range	Hardware Configuration
X1	Analog Input/Output	Varies depending on configuration	Not Used, Voltage Output, Current Output, PIDV Output, PIDmA Output, Current Input, Voltage Input, NI1000 Input , PT1000 Input, I-R2500 Input, I-NTC10K, I-NTC100K Input
X2	Analog Input/Output	Varies depending on configuration	Not Used, Voltage Output, Current Output, PIDV Output, PIDmA Output, Current Input, Voltage Input, NI1000 Input , PT1000 Input, I-R2500 Input, I-NTC10K, I-NTC100K Input
X3	Analog Input/Output	Varies depending on configuration	Not Used, Voltage Output, Current Output, PIDV Output, PIDmA Output, Current Input, Voltage Input, NI1000 Input , PT1000 Input, I-R2500 Input, I-NTC10K, I-NTC100K Input
X4	Analog Input/Output	Varies depending on configuration	Not Used, Voltage Output, Current Output, PIDV Output, PIDmA Output, Current Input, Voltage Input, NI1000 Input , PT1000 Input, I-R2500 Input, I-NTC10K, I-NTC100K Input
X5	Analog Input/Output	Varies depending on configuration	Not Used, Voltage Output, PIDV Output, PIDmA Output, Current Input, Voltage Input, NI1000 Input , PT1000 Input, I-R2500 Input, I-NTC10K, I-NTC100K Input
X6	Analog Input	Varies depending on configuration	Not Used, Current Input, Voltage Input, NI1000 Input , PT1000 Input, I-R2500 Input, I-NTC10K, I-NTC100K Input
X7	Analog Input	Varies depending on configuration	Not Used, Current Input, Voltage Input, NI1000 Input , PT1000 Input, I-R2500 Input, I-NTC10K, I-NTC100K Input
X8	Analog Input	Varies depending on configuration	Not Used, Current Input, Voltage Input, NI1000 Input , PT1000 Input, I-R2500 Input, I-NTC10K, I-NTC100K Input

Analog Outputs (X1…X4)

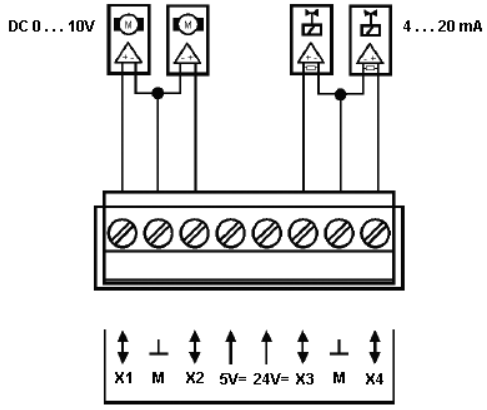
DC 0…10V Output

Resolution	11mV
Accuracy at 0V	66mV
Accuracy at 5V	95mV
Accuracy at 10V	124mV
Output Current	1mA (short-circuit-proof)

DC 4…20mA Output

Resolution	22µA
Accuracy at 4mA	150µA
Accuracy at 12mA	196µA
Accuracy at 20mA	243µA
Output Current	1mA (short-circuit-proof)

Figure 12: Connecting Voltage Output and Current Output to Universal I/Os

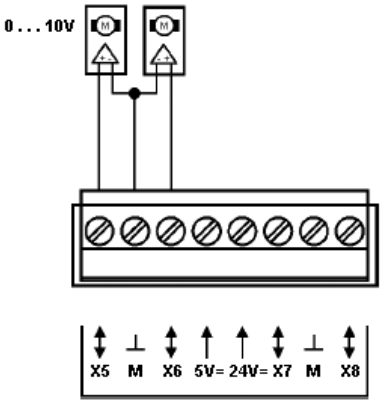


Analog Output (X5)

DC 0…10V Output

Resolution	11mV
Accuracy at 0V	66mV
Accuracy at 5V	95mV
Accuracy at 10V	124mV
Output Current	1mA (short-circuit-proof)

Figure 13: Connecting a Voltage Output to Universal I/O X5



Analog Inputs (X1…X8)

Ni1000

Sensor Current	1.4mA
Resolution	0.1K
Accuracy within the range -50…150°C	0.5K

PT1000

Sensor Current	1.8mA
Resolution	0.1K
Accuracy within the range -50…150°C	0.5K

NTC 10K

Sensor Current	140µA	
Temperature Range	Accuracy	Resolution
-50…-26°C	1K	0.2K
-25…74°C	0.5K	0.1K
75…99°C	1K	0.3K
100…124°C	3K	1K
125…150°C	6K	2.5K

NTC 100K

Sensor Current	140µA	
Temperature Range	Accuracy	Resolution
-25…-11°C	3K	0.2K
-10…9°C	1K	0.1K
10…99°C	0.5K	0.1K
100…150°C	1K	0.2K

DC 0…5V Input for Ratiometric Sensors

Sensor Current	1mV
Accuracy at 0V	10mV
Accuracy at 5V	25mV
Input Resistance	100k Ω

DC 0…10V Input

Resolution	1mV
Accuracy at 0V	10mV
Accuracy at 5V	25mV
Accuracy at 10V	50mV
Input Resistance	100k Ω

DC 0/4…20mA Input

Resolution	1µA
Accuracy at 4mA	40µA
Accuracy at 12mA	70µA
Accuracy at 20mA	120 µA

Analog Inputs 1, 2 and 3 are thermistor inputs and by default are configured as 10K thermistors. However, they can also configured as 100K thermistors. In additions, the Universal I/O X1 – X8 can be optionally configured for 10K or 100K thermistors.

The Steinhart-Hart equation is used for the calculation (see Figure 14). In this equation, X1 is the input resistance (1/10 Ohm). No table is used.

Figure 14: Steinhart-Hart Equation

$$TEMP = 1 / (C1 + C2*ln(X1) + C3*ln(X1)^3) - 273.15$$

The constants C1, C2, C3 are dependent on the sensor type. Table 19 shows the values used for our calculations. These are not changeable.

Table 19: Thermistor Calculation Constants

Sensor Type	C1	C2	C3
NTC10K	1.12887E-03	2.34176E-04	8.74223E-08
NTC100K	6.323619E-04	2.261038E-04	7.756728E-08

The input resistance (X1) must change by more than XID (see Table 20) before a new temperature is calculated. This is needed to save performance. The value is expected in 1/10 Ohms.

Table 20: XID Value

Sensor Type	XID
NTC10K	500
NTC100K	1000

I/O Configuration

The keypad/display is used to configure the available I/O on the I/O Manager controller.

Configuring the Analog Inputs

There are 3 analog inputs defined as thermistor inputs. On the controller they are labeled as AI1, AI2, and AI3. They can be configured to be 10K NTC or 100K NTC thermistor inputs.

To configure the analog inputs follow the procedure below:

1. Using the keypad/display, login if you haven't already.
2. Navigate to the Main Screen\Commission Unit\Analog Input Setup menu.
3. Set the type for each Analog input as either a 10K Therm or 100K Therm.

Configuring the Universal Analog Inputs and Outputs

To configure the universal analog inputs and outputs follow the procedure below:

1. Using the keypad/display, login if you haven't already.
2. Navigate to the Main Screen\Commission Unit\Universal I/O Setup\Config I/O Type menu.
3. Scroll down to the Inputs/Outputs section and set X1 Type through X5 Type appropriately.
4. Scroll down to the Inputs section and set X6 Type, X7 Type and X8 Type appropriately.
5. Set the corresponding Units appropriately.
6. Navigate to the top of the Config I/O Type menu and change Apply Changes to Yes. This will cycle power to the unit controller.
7. Navigate to the Main Screen\Commission Unit\Universal I/O Setup menu.
8. Finish setting up your inputs/outputs by navigating one at a time to the appropriate X1 through X5 menus. If the Input/Output Type is set to Not Used or if Apply Changes was not set to Yes (step 6) after changing the Input/Output Type, the menu will not appear.
9. Press the back key to navigate back to the Universal I/O Setup menu and repeat steps 8 & 9 until all inputs/outputs are setup.
10. Finish setting up your inputs by navigating one at a time to the appropriate X6 through X8 menus. If the Input Type is set to Not Used or if Apply Changes was not set to Yes (step 6) after changing the Input Type, the menu will not appear.
11. Press the back key to navigate back to the Universal I/O Setup menu and repeat steps 10 & 11 until all inputs are setup.

PID

There are 5 optional PID loops that can be utilized in the application. Each PID loop controls one universal analog output. For example, the X1 PID controls the analog output labeled X1, the X2 PID controls the analog output labeled X2 and so on.

Configuring the PID Loop

To configure the PID loop:

1. Using the keypad/display, login if you haven't already.
2. Navigate to the Main Screen\Commission Unit\Universal I/O Setup\Config I/O Type menu.
3. Scroll to the output you want the PID to control. For example, if you want the X3 output to be controlled by the PID loop, navigate to X3 Type and change it to PID VOut or PID mAOut depending on the type of output. Change all that apply.
4. Scroll to the top of the menu and change Apply Changes to Yes. This will cycle power to the unit controller.
5. Navigate to the Main Screen\Commission Unit\Config PID menu. This menu is only available if at least one analog output is setup for PID control.
6. Set the input for the appropriate PID loop(s). For example, if you want the analog input attached to X7 to be the input for the PID that controls the X3 output, set PID3 Input to X7.
7. Scroll to the top of the menu and change Apply Changes to Yes. This will cycle power to the unit controller.
8. Navigate to the Main Screen\Commission Unit\Config PID menu.
9. Scroll down and navigate to the appropriate PID menu. For example, if you want to set the parameters for the PID that controls the X3 analog output, navigate to the X3 PID menu.
10. Set the parameters as needed.
11. If needed, press the back key to navigate back to the Config PID menu to configure another PID and repeat steps 8-10.

Component Data

Figure 15 shows the location of the major components of the BACnet Communication Module.

Figure 15: 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 (see Figure 12).

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.

BSP LED Color	Meaning
Flashing between Red & Green	Board Support Package (BSP) upgrade in progress
Green	Communication is established with the unit controller, 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 Daikin Controls Customer Support Group at 866-462-7829 for additional assistance if necessary.

BUS LEDs

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.

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 (see Figure 15).

Board-To-Board Connector

The board-to-board connector connects the Unit Controller to the BACnet Communication Module (Figure 19).

Figure 16: BACnet MS/TP Communication Module and Knockout

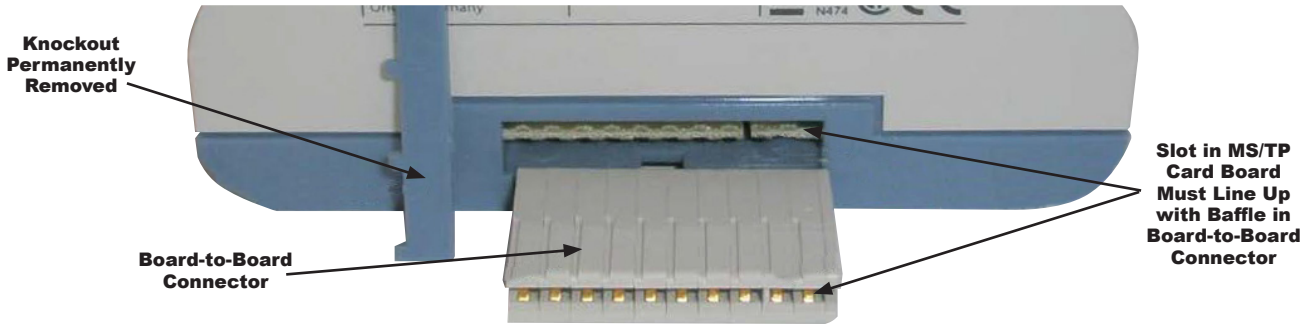


Figure 17: Diagram of Board-to-Board Connector

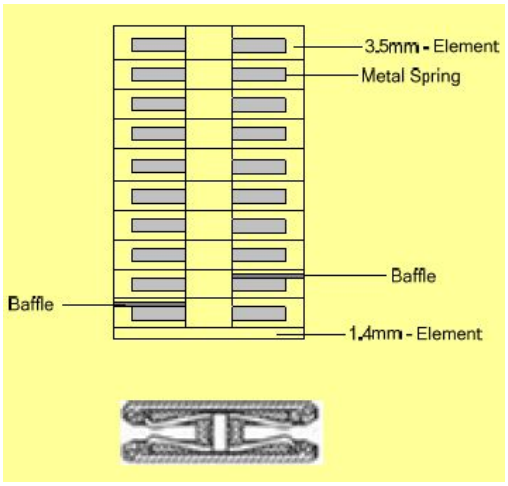


Figure 18: BACnet MS/TP Communication Module with Board-to-Board Connector Inserted

Figure 19: BACnet Communication Module Assembled with Unit Controller

Installation

The following section describes how to field install a new BACnet Communication Module or replace an existing BACnet Communication Module on the I/O Manager Unit Controller so that it can be incorporated into the BACnet network. The Communication Module can be factory or field installed. See Parts List for details.

⚠ DANGER

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.

Contents of the BACnet Communication Module Kit

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

- The BACnet Communication Module
- Board-to-board connector (separate)
- Network connector (attached)

Installing a new BACnet Communication Module

Follow these steps to install a BACnet Communication Module on the Unit Controller to incorporate it into an existing BACnet network.

⚠ DANGER

Electric shock hazard. Can result in death or serious injury if not avoided.

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.

1. Remove power from the Unit Controller.
2. Remove the knockout on the far left end of the unit controller or BACnet Communication Module (see Figure 16).

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.

3. Remove the knockout on the far right side of the BACnet Communication Module.
4. Insert the board-to-board connector into the BACnet Communication Module (see Figure 18). 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.
5. 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 (see Figure 19).
6. Connect the BACnet Communication Module to the network by inserting a network cable into the communication module's network connector.
7. Power up the unit controller.
8. The unit controller automatically resets itself approximately 20 seconds after it is powered up. This reset is necessary so that the BACnet Communication Module is synchronized with the unit controller.

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

Replacing an Existing BACnet Communication Module

Follow these steps to remove an existing BACnet Communication Module from the unit controller and replace it with a new BACnet Communication Module.

⚠ DANGER

Electric shock hazard. Can result in death or serious injury if not avoided.

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.

1. Remove power from the Unit Controller.
2. Locate the BACnet Communication Module to the left of the Unit Controller (see Figure 1).
3. Pull the network cable connector from the BACnet Communication Module.
4. Grasp the BACnet Communication Module and carefully pull it from the Unit Controller.
5. Install the new BACnet Communication Module.
6. Insert the network cable connector into the BACnet Communication Module (see Figure 2 for location of network connector).
7. Power up the Unit Controller.
8. The unit controller automatically resets itself approximately 20 seconds after it is powered up. This reset is necessary so that the BACnet Communication Module is synchronized with the unit controller.

Integration

Once the BACnet Communication Module has been properly installed on the unit controller, it is then possible to integrate the unit controller into a building automation system (BAS) via the BACnet MS/TP network. The configuration process is described in the following section.

If the I/O Manager Unit Controller is ordered with the MicroTech Integrated System, the BACnet MS/TP setup will be complete and your controller can be wired directly to your system. If ordered separately, the BACnet MS/TP addressing will need to be setup prior to wiring it into the BACnet MS/TP network. Check with your system integrator for correct addressing. See OM 1092 for information regarding startup, operation and configuration of the System.

Addressing

If the I/O Manager was ordered as part of the MicroTech Integrated System, the BACnet module addressing will be setup in the field

Configuring the BACnet Communication Module

The BACnet Communication Module can be configured using the keypad/display on the Unit Controller. The unit is ready to communicate the parameter values in the unit controller after you change the default parameters for your particular network. Refer to Daikin Protocol Document ED 19014 for descriptions of the available BACnet objects.

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 have a valid range of 0-127. If the I/O Manager Unit Controller is ordered with a MicroTech Integrated System, the BACnet MS/TP Address will be configured at the factory with an address ranging from 6 through 9. This assumes that there are no more than 4 I/O Manager Unit Controllers in one network.

Additionally, there are certain parameters that must be set properly to verify communication between the Unit Controller and the MS/TP network. Table 20 provides details about these addressing parameters. See your system integrator for additional information regarding proper BACnet MS/TP addressing.

To Configure the Module using the Keypad/ Display:

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 BMS Communication\BACnet MSTP Set-Up.

NOTE: Note: The BACnet MSTP Set-Up menu only appears if a BACnet Communication Module installed correctly (see Installation section of this document for details.) 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
5. Continue to navigate to BMS Communication\BACnet MSTP Set-Up and change “ApplyMSTPChgs” from No to Yes (see Figure 16).
6. 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. If connecting to the VAV System, the Baud Rate needs to match the Baud Rate on the Settings\Network Setup page. The default for the MicroTech Integrated System is 38400.

⚠ DANGER

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

This equipment has exposed electrical connections inside BACnet Communication Module. Only personnel that are knowledgeable in the operation of this equipment must perform connections and service to the BACnet Communication Module.

Changing the MS/TP Data Transmission Rate:

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 Communication\BACnet MSTP Set-Up and change the baud rate to desired value (see Figure 17).
4. Continue to navigate to BMS Communication\BACnet MSTP Set-Up and change “ApplyMSTPChgs” from No to Yes (see Figure 16).

Figure 20: Unit Controller MSTP Setup Screen – Change “ApplyMSTPChgs”

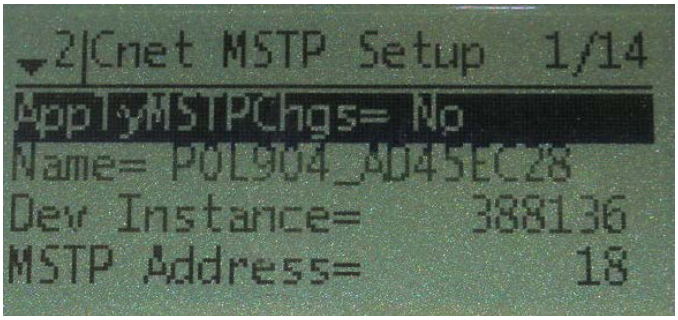
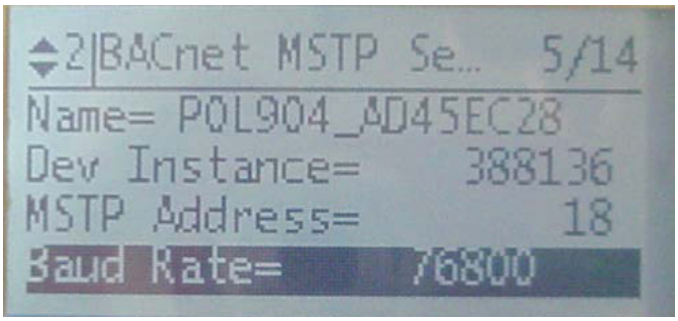


Figure 21: Unit Controller MSTP Setup Screen – Change Baud Rate



Configurable Parameters

Table 21defines the network parameters of the BACnet Communication Module that must be set using the keypad/display in order to establish communication between the Unit Controller Unit and the BAS. Change parameters as required for your network.

NOTE: To save alteration of these parameters, select "ApplyMSTPChgs" under BMS Communication\ BACnet MSTP Set-Up (see Step 4 from previous section). For additional information on using the keypad/display, refer to the Using the Keypad/Display on page 5.

Table 21: Network Configuration Menu

Parameter	Value (Range)/Definition	Initial Value/Note
ApplyMSTPChg	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
Device Instance	0-4194303/Device Instance of the BACnet Communication Module.	Variable/If ordered with the VAV System, the Device Instance will be set at the factory. This must be unique throughout the entire BACnet network.
MS/TP Address[1]	0-127/ This is the MS/TP address of the BACnet Communication Module.	Variable/ If ordered with the VAV System, the Device Instance will be set at the factory. Each device on the BACnet network must have a unique MS/TP address.
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.
Baud Rate[1]	9600-19200-38400-76800/ Data transfer speed.	38400/If connecting to the VAV System, the Baud Rate needs to match the Baud Rate on the Settings\Network Setup page. The default for the VAV System is 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 Frames	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).	English//To set the unit for Metric, set Unit Support to SI. "Apply MSTP Change" must be activated for changes to the Device Object Name to take effect.
BACnetBSP	Basic Support Package Version	8.14

1. Parameter only available via the keypad/display.

NOTE: If unit controller application software requires uploading in the field, the network configuration parameters revert to their default values. Please contact the Daikin Controls Customer Support group at 866-462-7829 for assistance with upgrading unit controller application software.

Use this procedure to upgrade the MicroTech III controller application software. To load the files into the controller, you will need an SD memory card no larger than 4GB with a FAT file system format.

Upgrading Firmware or Application Software

NOTE: Upgrading firmware or application software will result in all points being set back to their default values. Be sure to record the configuration of the unit before proceeding so it can be restored once the upgrade is complete.

1. If the application code files & firmware files are compressed in a ZIP archive file, extract the files and place them in the root directory of the SD memory card.
2. Insert the SD memory card into the controller's memory card slot. The label on the card should be facing to the rear, toward the controller (Figure 22).
3. Power off the controller.
4. Make sure that all communication modules that need to be updated are connected.
5. Insert a small tool, such as the end of a 3/64" (1 mm) Hex Key or other similar tool with a narrow end, in the service hole on the controller and hold the service button depressed.
6. While holding the service button depressed, power on the controller (Figure 23).
7. Continue depressing the service button until the BSP LED begins to flash between red and green.
8. Release the service button.
9. When all BSP LED's on all modules have stopped flashing between red and green, power cycle the controller.

NOTE: If you have a communication module connected to the controller, wait for the controller to automatically reset (approximately 30 seconds) before proceeding to the next step.

10. Configure your I/O Manager.

Figure 22: SD Memory Card Slot

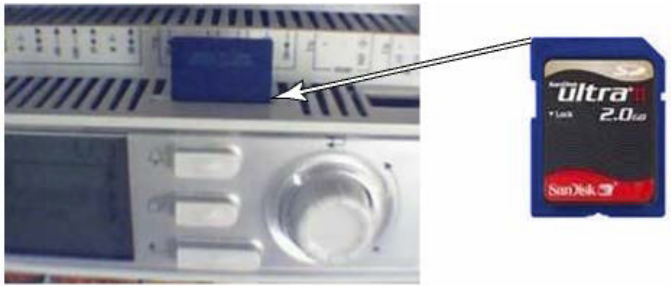


Figure 23: Service Button and BSP LED

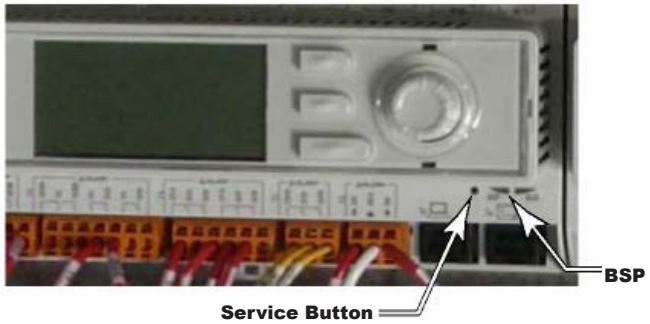


Table 22 summarizes several potential problems and corresponding solutions. Contact the Daikin Controls Customer Support group at 866-462-7829 for additional assistance.

Table 22: Common Problems and Solutions

Error/Condition	Problem	Solution
The Config PID menu is not present on the Commission Unit menu.	There are either no outputs configured for PID or power hasn't been cycled since configuring the output for PID.	• Navigate to the Main Screen\Commission Unit\Universal I/O Setup\Config I/O Type menu. • Scroll to the output you want the PID to control. Verify the Type for that output is set to PID VOut or PID mAOut. If not, change it appropriately. • Set Apply Changes to Yes. This will cycle power to the unit controller and enable the menu.

Test Procedures

If you can control the unit from its keypad, but you are not able to communicate with unit via the network, follows these steps:

- Check the network wiring
- Check the network parameters and verify that they are correct and that there are no duplicate devices on the network
- Check communications

If the BACnet Communication Module still does not respond, contact the Daikin Controls Customer Support Group at 866-462-7829.

Parts List

Installation Kit

Description	Part Number
MicroTech III BACnet Communication Module-MS/TP kit (kit includes communication module with attached network connector board-to-board connector, and Installation Manual)	090016710

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.

Products manufactured in an ISO Certified Facility.