

MODBUS® RTU COMMUNICATION MODULE

MICROTECH® APPLIED AIR UNIT CONTROLLERS
REBEL® AND REBEL APPLIED® ROOFTOP SYSTEMS



- MODEL DPSA WITH R-410A OR R-32 INCLUDES REFRIGERATION ONLY CONTROLS
- MODEL DPS WITH R-32 INCLUDES REFRIGERATION ONLY CONTROLS (ROC)
- MODEL DCSA WITH R-32 AIR-COOLED SPLIT CONDENSING SYSTEM

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Safety Information

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.

NOTE: This manual provides installation, operation, and maintenance information for the BACnet® /Modbus® RTU communication module used on a MicroTech® unit controller.

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.

NOTICE

Installation and maintenance are to be performed only by licensed, if required by local codes and regulations, or qualified personnel who are familiar with local codes and regulations and are experienced with this type of equipment.



WARNING

Electric shock hazard. Improper handling of this equipment can cause personal injury or equipment damage. This equipment must be properly grounded. Connections to and service of the MicroTech control panel must be performed only by personnel that are knowledgeable in the operation of the equipment being controlled.



CAUTION

Static sensitive components. A static discharge while handling electronic circuit boards can cause damage to the components. Discharge any static electrical charge by touching the bare metal inside the control panel before performing any service work. Never unplug any cables, circuit board terminal blocks, or power plugs while power is applied to the panel.

Introduction

This manual describes how to install or replace a Modbus® RTU communication module on a MicroTech® unit controller. It also explains how to set network parameters and establish communication between the unit controller and the BAS network.

Features

- Simple attachment to a MicroTech unit controller
- LEDs indicate communication status and network activity
- Modbus baud rate, parity, and other network parameters set directly from the unit controller

Reference Documents

Company	Number	Title	Source
Daikin Applied	OM 1288	MicroTech 4 unit controller for Rebel Applied Rooftop Systems	www.DaikinApplied.com
	OM 1373	Rebel Applied DPSA Controls (R32)	
	OM 1401	Rebel Applied Refrigeration Only Controls (ROC) DPSA (R-32)	
	OM 1382	Rebel DPS MicroTech Controls (R32)	
	ED 19133	MicroTech Modbus IP/RTU Network Integration	
Modbus-IDA.ORG		Modbus Application Protocol Specification V1.1b	www.Modbus.org
		Modbus over Serial Line Specification and Implementation Guide V1.02	

Description

The communication module is a printed circuit board with a plastic enclosure that connects to the left side of the unit controller or attached expansion module (Figure 3).

The communication module firmware enables the unit controller application to exchange data using the Modbus RTU protocol over a serial network.

Firmware and Software

Firmware

This communication module (MT3044) supports the following:

- Modbus RTU communication module BSP (firmware) versions 11.18 and newer.
- MicroTech unit controller BSP versions 11.58 and newer.

Application Software

Modbus communication is supported by the following MicroTech controller application versions:

- Software v1.18 (2506036118) for Rebel Applied DPSA (R-410A) or later.
- Software v2.00 (2506036200) for Rebel Applied DPSA (R-32) and Rebel DPS (R-32) or later.

Specifications

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

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 (85 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	Supplied via unit controller DC 5 V (+5% / -5%), max. 140 mA
Network connection	RS-485 (EIA-485) - T1 and T2
	3-wire twisted pair, shielded
Bus connection/ Transceiver	Galvanically isolated
	+, -, REF (3 wires)
	Isolated transceiver with fail-safe circuitry
	1/4 Unit load
Bus termination	680 Ω / 120 Ω +1 nF / 680 Ω (switch by software)
Baud rate	4800, 9600, 19200, and 38400
Additional Components	
Board-to-board connector	10-pin plug between communication module and unit controller
Modbus network connector	RS-485 connection plug, 3-pin spring cage top entry
Agency Listings	
US	UL916, UL873
Canada	CSA C22.2M205
Europe	
EMC directive	2004/108/EC
Low-voltage directive	2006/95/EC Listings
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 disclaims any liability resulting from any interference or for the correction thereof.

Dimensions

Figure 1 and Figure 2 provide key dimensional data.

Figure 1: Modbus Communication Module Top View

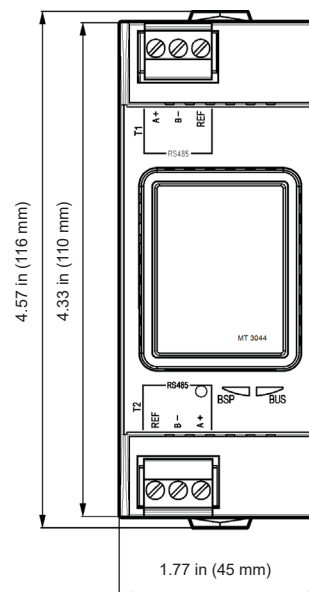
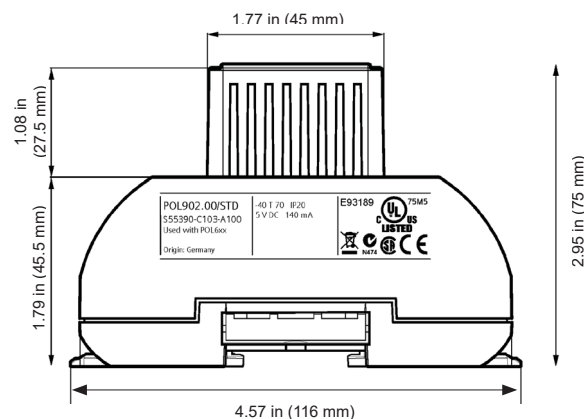


Figure 2: Modbus Communication Module Side View



Component Data

The Modbus communication module connects directly to the left-hand side of the unit controller as shown in Figure 3. It may be possible that another module is also connected to the

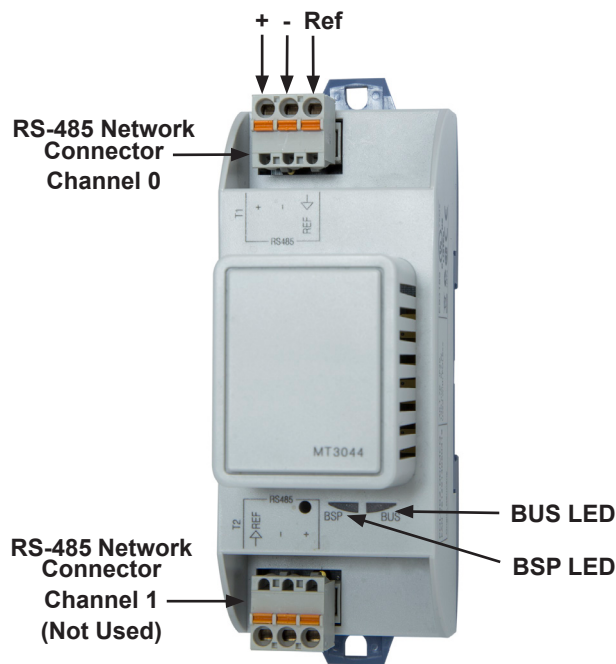
unit controller. In this case, the communication module simply attaches directly to the left side of the existing module instead of the unit controller.

Figure 3: Modbus Communication Module Attached to Unit Controller



Figure 4 shows the important features of the communication module, which are described in the following section.

Figure 4: Modbus Communication Module



Light Emitting Diodes (LEDs)

The communication module has a BSP LED and a BUS LED to indicate communication activity and status of the communication module. These indicators are visible when the module is connected to the MicroTech unit controller and power has been applied to the unit (Figure 4).

BSP LED

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

Table 1: BSP LED Activity

LED Status	Description
Alternating red and green flashing at once per second	Board Support Package (BSP) firmware upgrade in progress.
Green	BSP is running. Communication is established between the unit controller and the communication module.
Yellow	The communication module is capable of communicating to the unit controller. However, communication is not established.
Red flashing at 2 Hz	BSP (software) error. ¹
Red	Hardware error. ¹

¹Should this event occur, cycle power to the unit controller. Contact Daikin Applied Controls Customer Support at (800) 432-1342 or CTLTechSupport@daikinapplied.com for additional assistance, if necessary.

BUS LED

The BUS LED indicates the communication status between the communication module and the Modbus network. [Table 2](#) describes LED status activity.

Table 2: BUS LED Activity

LED Status	Description
Green ¹	The unit controller is communicating to the network.
Yellow	Communication module is initializing.
Red ²	Communication error or timeout has expired. The unit controller is not communicating to the network. Possible hardware error.

¹If the timeout is set to 0 and therefore disabled, the LED remains green even in the event of a communication error.

²If the Com LED Timeout parameter is set to 0, the timeout feature is disabled. See [Table 3](#) for additional information.

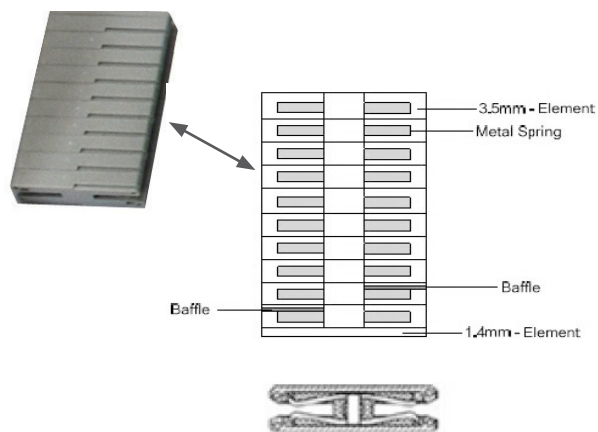
Modbus Network Connector

The RS-485 port connects the communication module to the Modbus network using the T1 and T2 ports. The port has three pins: +, -, and Ref. Note that while the communication module has two RS-485 ports, only the top connector (Channel 0) is used ([Figure 4](#)).

Board-To-Board Connector

The 10-pin board-to-board connector is used to attach the unit controller to the communication module ([Figure 5](#) and [Figure 7](#)).

Figure 5: Board-to-Board Connector



Installation

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



WARNING

Electric shock hazard. The terminals on the unit controller are high voltage. Disconnect power to avoid electrical shock potential, which may result in personal injury, serious injury, death, 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 communication module field-installed kit ships with the following items:

- Communication module with 3-pin connector used for RS-485 communications
- Board-to-board connector - [Figure 5](#)
- This manual (IM 1374)

Refer to the [Service Information](#) section for replacement part numbers.

Installing a new Communication Module

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

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 **Daikin AHU Main Menu** on the unit controller HMI. 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 6](#) shows the knockout strip after it has been removed from the unit controller.

To prevent damage to the unit controller, insert a small flathead screwdriver or similar tool into the tab on the bottom of the unit controller and pull the screwdriver away from the controller.
4. Carefully remove the blue plastic knockout strip on the right side of the communication module.
5. Insert the board-to-board connector into the communication module. Note that it only fits one way and that the baffles must line up with corresponding slots in the communication module and the unit controller ([Figure 6](#) and [Figure 7](#)).

Figure 6: Communication Module and Knockout

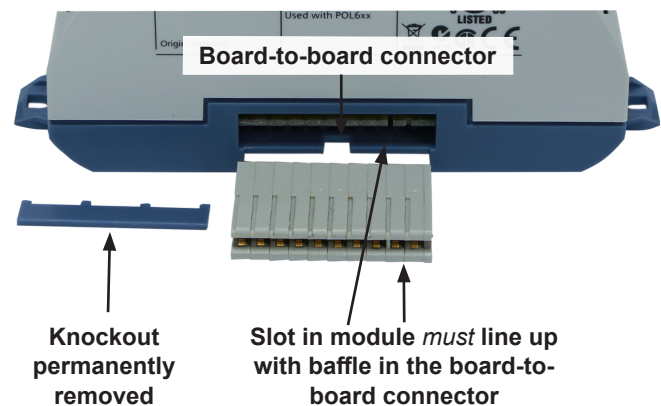


Figure 7: Communication Module with Board-to-Board Connector Inserted



6. Insert the other end of the board-to-board connector to the far-left side of the unit controller or other module, if attached.
7. Insert the network cable into the communication module's top network connector, Channel 0 ([Figure 4](#)).
8. Apply power to the unit controller.

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



WARNING

Electric shock hazard. The terminals on the unit controller are high voltage. Disconnect power to avoid electrical shock potential, which may result in personal injury, serious injury, death, 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..

Replacing a Communication Module

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

1. Set the "Control Mode = Off" from the **Daikin AHU Main Menu** on the unit controller HMI. This must be done prior to removing and replacing an existing communication module.
2. Remove power from the unit controller.
3. Locate the communication module on the left side of the unit controller.
4. Gently pull the network cable connector from the communication module ([Figure 4](#)).
5. Grasp the communication module and carefully pull it from the unit controller (or from an adjacent module, if it is attached to one).
6. Install the new communication module:

- NOTE:** To prevent damage to the unit controller, insert a small flathead screwdriver or similar tool into the tab on the bottom of the unit controller and pull the screwdriver away from the controller.
- a. Carefully remove the blue plastic knockout strip on the right side of the communication module.
 - b. Insert the board-to-board connector into the communication module. Note that it only fits one way and that the baffles must line up with corresponding slots in communication module and the unit controller ([Figure 6](#) and [Figure 7](#)).

7. Insert network cable into the communication module's top network connector, Channel 0 ([Figure 4](#)).
8. Apply power to the unit controller. The communication module is now ready to be configured for network integration.
9. Follow the steps described in the next section to set Modbus addressing parameters.

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

Network Addressing

This section describes how to configure the communication module for Modbus RTU network integration. Follow these instructions to set addressing parameters from the MicroTech unit controller HMI menu display.

Network Considerations

Standard Modbus network rules apply. The network is a daisy-chain of unit controllers including all servers and the client. The Modbus standard recommends that the network be terminated on each end with the characteristic impedance of the network of approximately 120 ohms. Follow the guidelines stated in the Modbus specifications (www.Modbus.org).

Modbus RTU Configuration

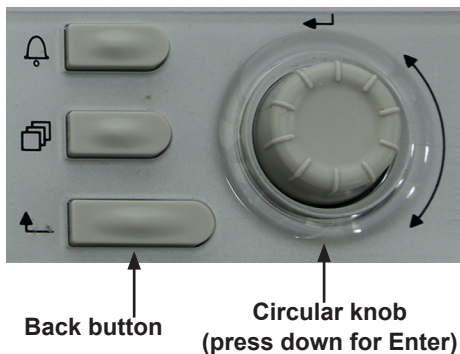
The Modbus network address (ident number), baud rate, and parity *must* be set using the unit controller HMI.

NOTE: Network address and baud rate must be configured correctly before the unit controller can communicate to the Modbus network. These parameters are only available when the communication module is correctly attached to the controller.

1. Verify the correct communication module is attached and is active upon unit controller power-up. See [Figure 1](#) and [Figure 2](#).

[Figure 8](#) describes the unit controller HMI navigation features.

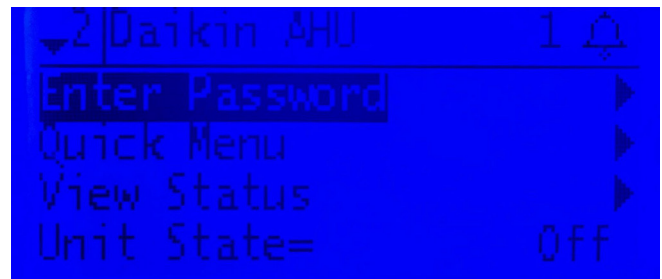
Figure 8: Unit Controller HMI Features



2. Enter the password from the **Daikin AHU Main Menu**:
 - a. Turn the circular knob on the unit controller until **Enter Password** is highlighted and Press Enter. If a password has already been entered, skip to Step 4.
3. Enter Password: 2526.
4. Set the "Control Mode = Off" from the **Daikin AHU Main Menu**.

5. Navigate to the **BMS Communications** menu.
 - a. Verify AHU Loc/Net is set to Network. This step is necessary in order to write commands from the BAS.

Figure 9: HMI Main Menu: Enter Password



Set the Address

6. Scroll down to the **BMS Communications\Modbus Set-Up** and press Enter.

NOTE: The **Modbus Set-Up** menu only appears if the communication module installed correctly (see [Installation](#) section.) If it is installed correctly and menu still does not appear, cycle power to the unit controller and repeat the configuration process.

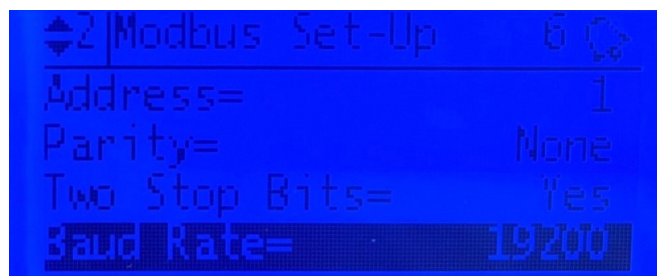
7. Scroll down to Address, press Enter and change to a unique network value within the valid range of 1-247.
8. Press Enter again to confirm selection.
9. Proceed to Step 8 to set the baud rate.

NOTE: If baud rate (or other parameters) do not require configuration, proceed to [Apply Changes and Cycle Power](#). All changes must be made before saving.

Set the Baud Rate

10. Scroll down to the **BMS Communications/Modbus Set-Up** and press Enter.
11. Scroll to Baud Rate and press Enter to select the desired baud rate. [Figure 10](#) shows view a baud rate that has been set to 19200 bps.

Figure 10: Modbus Set-Up Menu: Change Baud Rate



NOTE: The communication module has a default baud rate of 38400 bps. Additional options are shown in [Table 3](#).

12. Press Enter again to confirm selection.

13. If network configuration is complete, skip to [Apply Changes and Cycle Power](#). All changes must be made before saving.

Set Additional Network Parameters

Adjust any other network parameters as shown in [Table 3](#) or change previously configured values as needed.

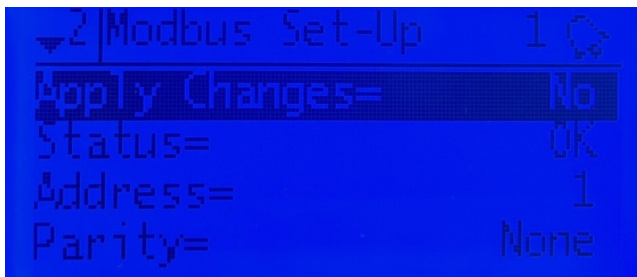
14. Scroll down to the **BMS Communications/Modbus Set-Up** menu and press Enter.
15. Scroll down to the desired parameter and press Enter.
16. Change value and press Enter again to confirm the selection.
17. Repeat these steps as needed.

NOTE: Make all changes before cycling power to the unit controller.

Apply Changes and Cycle Power

18. Scroll to Apply Changes and select Yes to save the changes ([Figure 11](#)). The unit controller then automatically resets.

Figure 11: Modbus Set-Up Menu: Apply Changes



19. Navigate back to the **BMS Communications/Modbus Set-Up** menu to verify the parameter setting(s). This procedure may take a minute while the communication module powers up.

NOTE: Refer to the applicable Unit Controller Operation Manual ([Reference Documents](#)) for additional HMI addressing information. Also refer to Network Protocol Document, ED 19133 for supported Modbus registers (www.daikinapplied.com).

Configurable Parameters

Table 3 defines all Modbus addressing parameters supported by the communication module. They are accessed from the

unit controller HMI under **BMS Communications\Modbus Set-Up** as described in the previous section.

Table 3: Network Parameters

Parameter	Range/Default	Description																
Apply Changes	Yes or No Default: No	Setting this to Yes cycles power to the unit controller, thus allowing the network setup changes to take place. This is the same status as BACnet/Modbus IP setup.																
Status	See Description	Status of the communication module. When network communication is successful, the status indicates OK. The following describes the possible communication states as displayed in the HMI: <table><tr><th>State</th><th>Meaning</th></tr><tr><td>OK</td><td>Normal operation</td></tr><tr><td>Hardware</td><td>Physical or electrical module fault</td></tr><tr><td>Init</td><td>Module is initializing or being enumerated</td></tr><tr><td>Memory</td><td>EEPROM/flash/configuration memory error</td></tr><tr><td>ID</td><td>Module identification failure</td></tr><tr><td>COVReg</td><td>Internal communication (COV) registration failure</td></tr><tr><td>Other</td><td>Miscellaneous or undefined diagnostic condition</td></tr></table>	State	Meaning	OK	Normal operation	Hardware	Physical or electrical module fault	Init	Module is initializing or being enumerated	Memory	EEPROM/flash/configuration memory error	ID	Module identification failure	COVReg	Internal communication (COV) registration failure	Other	Miscellaneous or undefined diagnostic condition
State	Meaning																	
OK	Normal operation																	
Hardware	Physical or electrical module fault																	
Init	Module is initializing or being enumerated																	
Memory	EEPROM/flash/configuration memory error																	
ID	Module identification failure																	
COVReg	Internal communication (COV) registration failure																	
Other	Miscellaneous or undefined diagnostic condition																	
Address ^{1,2}	1-247 Default: 1	The Modbus Address of the communication module. This must be unique throughout the entire network.																
Parity ^{1,2}	Even = 0 Odd = 1 None = 2 Default: None	Defines the parity (i.e. the use of checksums for detecting transmission errors) that is specified for the bus. This must also be identical for all nodes on the bus.																
Two Stop Bits ^{1,2}	Yes or No Default: Yes	This defines the number of stop bits. Yes = 2 stop bits, No = 1 stop bit. Two stop bits are used unless this parameter is set to No. This value must also be coordinated with the other bus nodes.																
Baud Rate ^{1,2}	4800, 9600, 19200, 38400 Default: 38400	Data transfer speed (bps) of the Modbus network.																
Load Resistor	Yes or No Default: No	Set this parameter to Yes if this unit is the first or last server on the segment. If an external terminating resistor is used, set this parameter to No.																
Response Dly ¹	0 - 30000 milliseconds Default: 5 milliseconds	Response Delay. When a request is received, the response is delayed by this many milliseconds to avoid over-run of the client device. In most cases, it is not necessary to change this delay. However, Response Delay can be adjusted if the client is too slow.																
Com LED Timeout	0 - 3600 seconds Default: 3 seconds	If the Com LED Timeout is set to 0, the BUS LED is always green and cannot be used to indicate communication to the client. If the client does not poll within this time, then the BUS LED turns red.																
Modbus BSP	v11.18 or newer	Board Support Package - indicates the communication module firmware version. The Modbus BSP is read-only.																

1. Parameter must be configured from the HMI keypad display.

2. Boldface indicates that the parameter is required for minimum network configuration.

NOTE: If the unit controller application software requires a field upgrade, the network configuration parameters revert to their default values. Contact the Daikin Applied Controls Customer Support group at 866-462-7829 or CTLTechSupport@daikinapplied.com for additional assistance, if necessary.

Service Information

Troubleshooting

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

General

- Review the [Installation](#) section of this document to confirm that all procedures were followed correctly.
- Review the [Network Addressing](#) section of this document to confirm that all procedures were followed correctly.
- If the communication module is installed but LEDs are not active when the unit controller is powered up, remove the module and then follow the steps provided in the [Installing a new Communication Module](#) section. If the issue persists, replace the module.
- Verify Modbus wiring is connected to channel 0 (top port) of the communication module.
- Verify that the Modbus Set-Up menu appears in the unit controller HMI keypad display. If it does not, follow this procedure:
 1. Set the "Control Mode = Off" from the HMI Main Menu on the unit controller display menu.
 2. Remove power from the unit controller, wait 10 seconds, then re-power the unit controller. Within 45 seconds, the unit controller should recognize the attached communication module, and will cycle power.
 3. Verify that the Modbus Set-Up menu now appears in the unit controller display menu.

Network Parameters

- Verify that the network address of the communication module (server) is unique in the network. In contrast, the baud rate, stop bit, and parity settings of the communication module must match the other server devices on the network.
- Make sure there are no duplicate devices on the network and that network parameters are set correctly as shown in [Table 3](#).
- View the communication module BUS and BSP LEDs. Refer to [Table 1](#) and [Table 2](#) for explanations of the communication status among the unit controller, communication module, and the network based on the LED activity.

Network wiring

If performance is unsatisfactory or network is experiencing issues such as noise or slow transmission:

- Confirm that the shield is landed at only one point in the trunk.
- Be aware that the recommended network topology is daisy-chain (no T-Taps or ring layout).
- Verify that network wiring does not exceed 4000 ft total distance limit (without repeaters) at 38400 bps baud.
- Verify that polarity is maintained.
- Check that there are end-of-line termination resistors (120 Ω) at the first and last device on the trunk. This is required by the EIA-485 specification.
- Verify that the network trunk avoids strong sources of electromagnetic interference (EMI).
- Note that the two-wire bus is *not* interchangeable and must be connected correctly.
- Verify that the network trunk is not located near a DC load switch (relay).

Network Performance

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

Parts

Table 4: Replacement Parts List

Description	Part Number
MicroTech Modbus RTU communication module kit (includes communication module, board-to-board connector and network connector)	350147413
Network connector (3-pin)	193410303
Board-to-board connector (10-pin)	300047027

Technical Support

Contact the Daikin Applied Controls Customer Support group at 866-462-7829 or CTLTechSupport@daikinapplied.com.

Refer to the applicable Unit Controller Operation Manual [Reference Documents](#) for additional information on using HMI to set unit parameters and defaults for unit setpoints. Also refer to Network Protocol Document ED 19133 for available Modbus registers (www.daikinapplied.com).

Revision History

Revision	Date	Description of Changes
IM 1374	April 2024	Initial release
IM 1374-1	February 2025	Updated cover to add Rebel model DPS (R-32 only) and specify Rebel Applied DPSA (both R-410A and R-32 refrigerants). Updated Software Revision section with current BSP and software versions supported.
IM 1374-2	June 2026	Changed title, description, and references from Modbus to Modbus RTU. Other minor formatting updates.

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