ENGINEERING SUBMITTAL DATA

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MICROTECH® APPLIED ROOFTOP UNIT CONTROLLER

NETWORK INTEGRATION GUIDE

Modbus® Protocol Information
Rebel® and Rebel Applied® Packaged Rooftop Systems
Models DPS, DPSA with R-32 Refrigerant

Introduction

Description

This manual describes how to integrate the MicroTech® 4 unit controller to a BAS (building automation system) using the Modbus network protocol.

A factory or field-installed Modbus communication module must be attached to the unit controller for network integration.

It is assumed that the user is familiar with Modbus protocol basics. Contact the Daikin Applied Controls Customer Support group at 866-462-7829 or Controls@daikinapplied.com for additional assistance, if necessary.

Software Revision

This document supports the latest version of the MicroTech Rebel Applied unit controller application and all subsequent versions until otherwise indicated. However, if the unit software is of a later version, some of the information in this document may not completely describe the application.

The revision of the application software can be determined from the unit controller HMI under the 'About This AHU' menu.

Hazard Identification

⚠ 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: Indicates important details or clarifying statements for information presented.

The MicroTech unit controller parameter objects are accessible from either the controller HMI or a Modbus serial network. Not all objects are accessible from each interface.

Reference Documents

Company	Number	Title	Source
Daikin Applied	OM 1288	MicroTech 4 unit controller for Rebel Applied Rooftop Systems	www.DaikinApplied.com
	IM 1364	Modbus Communication Module Installation Manual for MicroTech Rebel Applied Unit Controller	
Modbus-IDA.ORG		Modbus Application Protocol Specification V1.1b	www.Modbus.org
Modbus-IDA.ORG		Modbus over Serial Line Specification and Implementation Guide V1.02	www.Modbus.org

Modbus Protocol Conformance

The unit controller conforms to Modbus RTU (remote terminal unit) requirements. The Modbus RTU protocol defines how a client device polls one or more server devices to read and write data using serial data communication.The MicroTech unit controller and Modbus communication module together represent the server device according to the protocol. The controller communicates Modbus using RS-485 serial transmission.

Data Transmission

A normal reply from the MicroTech unit controller includes the same function code and a response data field. In the case of a read operation, the response data field contains the requested data. In the case of a write operation, the response data field contains an echo of the write data of the request command. If the unit controller detects an error in the transmission, the reply to the client includes and exception function code and the response data field contains an exception code

Data Type

Data is represented as either single-bit elements or 16-bit elements. A single-bit element is referred to as a Discrete Input when it refers to read-only data and as a Coil when it refers to read-write data. A 16-bit element is referred to as a Input Register when it refers to read-only data, and as a Holding Register when it refers to read-write data.

All of the Modbus registers defined in the MicroTech unit controller are 16-bit Holding Registers. Some are read only (R) and some are read-write (W).

Holding Registers

There are up to 65,536 elements of each data type in a Modbus device. Data elements are numbered from 1 to 65,536 in each type. Data elements are addressed with an index in the range from 0 to 65,535. The index is not the address of the data element in the unit controller memory, but instead it is used in Modbus PDUs to specify the location of the data in the unit controller. This means, for example, that data element number 1 (i.e., Holding Register 40001) is addressed using index 0 in the PDU.

In addition, the function code field portion of the message already specifies a "Holding Register" operation. Therefore the '4xxxx' reference is implicit. As such, this document represents the Holding Registers without the implicit 4xxxx. For example, Holding Register 8 is actually Holding Register 40008.

Valid Range

Some properties are standard data types and some are enumerated sets. If the property value represents a range of values (e.g. temperature or pressure) that range of values is shown. If the property value is an enumerated set, all enumerated values and corresponding meaning are shown as well.

Function Codes

The MicroTech unit controller supports eight Modbus function codes as shown in Table 1. However, the unit controller contains only Holding Registers (4xxxx).

Table 1: Valid Function Codes

Function Code	Description	Definition
01 (0x01)	Read Coil Status	Reads the On/Off status of discrete outputs
02 (0x02)	Read Input Status	Reads the On/Off status of discrete inputs
03 (0x03)	Read Holding Registers	Reads one to approximately 125 contiguous input registers in a remote device
04 (0x04)	Read Input Registers	Reads the contents of input registers
05 (0x05)	Force Single Coil	Forces a single coil to either On or Off
06 (0x06)	Write Single Register	Writes a single Holding Register to a remote device
15 (0x0F)	Write Multiple Coils	Forces each coil in a sequence of coils to either On or Off
16 (0x10)	Write Multiple Registers	Writes a block of one to approximately 120 contiguous registers in a remote device

Valid Error Codes

The MicroTech unit controller supports all exception codes. See Table 2 for a description of valid error codes.

Table 2: Valid Error Codes

Error Codes	Description	Definition
01	Illegal Function	The function code received in the query is not an allowable action for the server (or server)
02	Illegal Data Address	The data address received in the query is not an allowable address for the server (or server)
03	Illegal Data Value	A value contained in the query data field is not an allowable value for server (or server)
04	Server Device Failure	An unrecoverable error occurred while the server (or server) was attempting to perform the requested action
05	Acknowledged	The server (or server) has accepted and is processing the request
06	Server Device Busy	The server (or server) is busy processing a command. The client (or client) should retransmit when the server (or server) is free
08	Memory Parity Error	The server (or server) attempted to read record file, but detected a parity error in the memory. The client (or client) can retry the request, but service may be required on the server (or server) device
0A	Gateway Path Unavailable	The gateway may be configured incorrectly or overloaded
0B	Gateway Target Device Failed to Respond	No response from the target device

Modbus Data Point

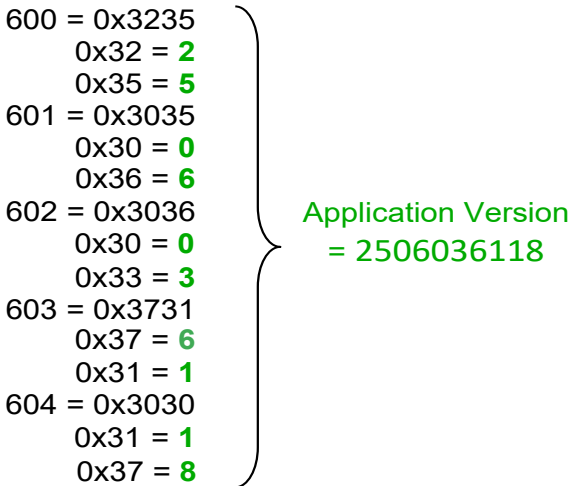
Each data point accessible from a Modbus network is described with a table that gives the data type and Holding Register. If the data point represents an enumerated variable, the enumerations are also listed.

When a variable spans multiple Holding Registers, it is important to know how the data is represented in those Holding Registers.

For strings, the interpretation differs. In this case, each Holding Register can contain two characters. If a string spans multiple registers, the first register (lowest register number) contains the two left-most characters of the string. Since the MicroTech unit controller only supports Modbus RTU, use the Appendix: ASCII Conversion Table to translate the numerical data to their corresponding ASCII characters.

Application Version is an example of registers that contain string data and is located at Holding Registers 600-604 (40600-40604). Figure 1 shows an example of the Holding Register and its value (in hexadecimal), followed by the ASCII character translation.

Figure 1: Example of Holding Register Value to ASCII Character



Configuring the Unit Controller

The MicroTech unit controller and the Modbus communication module ship with default parameter values. Default values may be changed with the unit controller HMI or via the network. Parameters must be adjusted to accommodate the specific network.

Select the serial port communication parameters (baud rate, parity mode, etc), during configuration of the controller. The mode and serial parameters must be the same for all devices on a Modbus network. Transmission mode determines how information is packed into the message fields and decoded. In RTU mode, each byte contains two hexadecimal characters.

Also refer to MicroTech Rebel Applied Unit Controller OM 1288 Modbus Communication Module IM 1374 (www.DaikinApplied.com).

Generic (Universal) I/O

When an EMB (expansion module B) is attached to the unit controller, a set of generic (universal) and dedicated outputs are available to the nework. See registers 300-349 in Table 3 for details.

Modbus Register Mapping

This section describes the MicroTech unit controller data available to the Modbus network. Modbus Alarms, Events, and Standby Event notifications can be found in the Alarms and Events tables.

Table 3: MicroTech Holding Register Data

Desription	Holding Register (4xxxx)	Read/ Write	Range	Default	Notes
Discharge Air Temperature Sensor	1	R	-50-250°F x 10 -45.6-121.1°C x 10	NA	The current reading from the unit discharge air temperature sensor. Additional alarms are generated for this object. See Alarms and Events.
Return Air Temperature Sensor	2	R	-20-200°F x 10 28.9-93.3°C x 10	NA	The current reading from the return air temperature sensor. Additional alarms are generated for this object. See Alarms and Events.
Effective Space Temperature	3	R	0-150°F x 10 -17.8-65.6°C x 10	NA	The space temperature input from a local sensor(s) if installed and configured properly. The space temperature input may be provided by up to three Modbus sensors. Space temperature may also be provided by a network input (SpaceTempInput) if value is present and valid Otherwise, effective space temperature defaults to an invalid value (327.67°C/621.806°F).
Space Temperature Sensor 1	4	R	0-150°F x 10 -17.8-65.6°C x 10	NA	The current space or zone temperature. Applies only if the unit is configured for one or more local sensors. If the optional space temperature sensor is not installed, set SpaceTCfg = None from the unit controller Unit Configuration display menu. This disables the alarm function associated with an open circuit at the space temperature sensor input. Also see Alarms and Events.
Space Temperature Sensor 2	5				
Space Temperature Sensor 3	6				
Entering Fan/Leaving Coil Temperature Sensor	7	R	-50-200°F x 10 -45.6-93.3°C x 10	NA	The current value of the unit entering fan/leaving coil air temperature sensor. Applies only to units configured for this type of sensor. Also see Alarms and Events.
Effective Outdoor Air Temperature	8	R	-50-200°F x 10 -45.6-93.3°C x 10	NA	The network outdoor air temperature value. Otherwise it The local outdoor air temperature if a valid network is not available. Also see Alarms and Events.
Building Static Pressure Sensor	9	R	-0.249-0.249" x 10 -62-62 Pa x 10	NA	The current building static pressure based on return plenum static pressure setpoint. Applies to units configured with a return fan BSP sensor.
Effective Supply Fan Capacity	10	R	0-100% x 10	NA	The effective supply air fan capacity reflects input from unit supply fan motor drives. The SAFCap value depends on the type and number of supply fan motors currently operating.
Relative Humidity Sensor 1	11	R	0-100% x 10	NA	The current reading of the optional space relative humidity sensor(s). Applies only if the unit is configured for one or more local sensors.
Relative Humidity Sensor 2	12				
Space CO_2	13	R	0-5000 ppm x 10	NA	The current value of the effective CO_2 input, either provided by the network via SpaceIAQNetIn or optional space CO_2 sensor. CO_2 is configured via the unit controller HMI.
Control Temperature	14	R	-461-525°F x 10 -274-274.2°C x 10	NA	The current control temperature sensor reading. The sensor is selected with Modbus register 265 (CtrlTempScr).
Energy Recovery Wheel Capacity	15	R	0-100% x 10 x 10	NA	The energy recovery wheel speed feedback parameter. Converted to a percentage of the total capacity. Applies to units with an ECM motor or Daikin VFD.
Energy Recovery Leaving Wheel Temperature	16	R	-50-200°F x 10 -45.6-93.3°C x 10	NA	The current value of the energy recovery leaving wheel temperature sensor.
Energy Recovery Entering Wheel Temperature	17	R	-50-200°F x 10 -45.6-93.3°C x 10	NA	The current value of the energy recovery entering wheel temperature sensor.
Return Fan Capacity	18	R	0-100% x 10	NA	The input from the VFD controlling one or more return/exhaust fan motors.
Supply Fan Duct Static Pressure	19	R	0.0-5.02" x 10 0-1250 Pa x 10	NA	The current supply fan duct static pressure. Applies to units configured with a supply fan DSP sensor.
Return Fan Duct Static Pressure	20	R	-5.02-0" x 10 -1250-0 Pa x 10	NA	The current return fan duct static pressure. Applies to units configured with a return fan DSP sensor.
Filter Pressure Input	21	R	0.0 -5.02" x 100 0.0-1250 Pa x 100	NA	Filter pressure input. Used to generate a filter pressure alarm when the setpoint value has been exceeded. Also see Alarms and Events.
	22				
	23				

Desription	Holding Register (4xxxx)	Read/ Write	Range	Default	Notes
Exhaust Air Plenum Static Pressure	24	R	0-1.0" x 100 0-249 Pa x 100	NA	The exhaust plenum static pressure. Applies to units with a set of modulating relief dampers. Used in conjunction with return duct static pressure input to maintain desired static pressure of the exhaust plenum.
Return Air Relative Humidity	25	R	0-100% x 10	NA	The current reading of the optional return air relative humidity sensor. Applies only if the unit is configured for a locally installed and wired sensor.
Return Air Dewpoint	26	R	-50-150°F x 10 -45.6-65.6°C x 10	NA	The return air dewpoint temperature value, calculated from the optional return air relative humidity sensor.
Outdoor Air Relative Humidity	27	R	0-100% x 10	NA	The current reading of the optional outdoor air relative humidity sensor. Applies only if the unit is configured for a locally installed and wired sensor.
Outdoor Air Dewpoint	28	R	-50-150°F x 10 -45.6-65.6°C x 10	NA	The outdoor air dewpoint temperature value; calculated from the optional outdoor air humidity sensor.
Supply Fan Airflow	29	R	0-60000 cfm x 10	NA	Displays the current supply airflow value. Parameter is available for monitoring purposes when an outdoor air unit is configured with an outdoor airflow measuring station.
Return Fan Airflow	30	R	0-6000 cfm x 10	NA	Displays the effective return/exhaust fan airflow. Available for monitoring purposes when a unit is configured with a return or exhaust airflow measuring station.
Particulate Matter 2.5 Return Air	31	R	0-250 mcg/m3 x 10	NA	Indicates the particulate matter (PM) size 2.5 value provided by the return air sensor.
Particulate Matter 10 Value Return Air	32	R	0-430 mcg/m3 x 10	NA	Indicates the particulate matter (PM) size 10 value provided by the return air sensor.
Total VOC Value Return Air	33	R	0-600 mcg/m3 x 10	NA	Indicates the total volatile organic compounds (VOC) value provided by the return air sensor.
Particulate Matter 2.5 Discharge Air	34	R	0-250 mcg/m3 x 10	NA	Indicates the particulate matter (PM) size 2.5 value provided by the discharge air sensor.
Particulate Matter 10 Value Discharge Air	35	R	0-430 mcg/m3 x 10	NA	Indicates the particulate matter (PM) size 10 value provided by the discharge air sensor.
Total VOC Value Discharge Air	36	R	0-600 mcg/m3 x 10	NA	Indicates the total volatile organic compounds (VOC) value provided by the discharge air sensor.
Particulate Matter 2.5 Outdoor Air	37	R	0-250 mcg/m3 x 10	NA	Indicates the particulate matter (PM) size 2.5 value provided by the outdoor air sensor.
Particulate Matter 10 Value Outdoor Air	38	R	0-430 mcg/m3 x 10	NA	Indicates the particulate matter (PM) size 10 value provided by the outdoor air sensor.
Suction Refrigerant Temperature Circuit 1	39	R	-83-392°F x 10 -64-200°C x 10	NA	The current reading of the circuit 1 suction refrigerant temperature sensor. [1]
Suction Refrigerant Pressure Circuit 1	40	R	0-725 psi x 10 0-5000 kPa x 10	NA	The current reading of the circuit 1 suction line refrigerant pressure sensor.[1]
Discharge Refrigerant Pressure Circuit 1	41	R	0-725 psi x 10 0-5000 kPa x 10	NA	The current reading of the circuit 1 discharge refrigerant pressure sensor. [1]
Liquid Line Refrigerant Temperature Circuit 1	42	R	-83-212°F x 10 -64-100°C x 10	NA	The current reading of the circuit 1 liquid line refrigerant temperature sensor. [1]
Variable Compressor 1 Temperature	43	R	-83-392°F x 10 -64-200°C x 10	NA	The current reading of the variable compressor 1 refrigerant temperature sensor input.
Fixed Compressor Temperature Circuit 1	44	R	-83-212°F x 10 -64-100°C x 10	NA	The fixed compressor refrigerant temperature sensor value.
	45				
	46				
Discharge Line Refrigerant Temperature Circuit 1	47	R	-83-392°F x 10 -64-200°C x 10	NA	The inverter compressor circuit 1 discharge line refrigerant temperature sensor value. Applies only to units configured for variable compressors or units with an optional refrigerant system monitoring package.
	48				
	49				
Defrost Temperature Circuit 1	50	R	-83-392°F x 10 -64-200°C x 10	NA	The current reading of the circuit 1 defrost sensor. Applies to heat pump units.
Suction Refrigerant Temperature Circuit 2	51	R	-83-392°F x 10 -64-200°C x 10	NA	The current reading of the circuit 2 suction refrigerant temperature sensor input.
Suction Refrigerant Pressure Circuit 2	52	R	0-725 psi x 10 0-5000 kPa x 10	NA	The current reading of the circuit 2 suction line refrigerant pressure sensor input.
Discharge Refrigerant Pressure Circuit 2	53	R	0-725 psi x 10 0-5000 kPa x 10	NA	The current reading of the circuit 2 discharge refrigerant pressure sensor input.
Liquid Line Refrigerant Temperature Circuit 2	54	R	-83-212°F x 10 -64-100°C x 10	NA	The current reading of the circuit 2 liquid line refrigerant temperature sensor input.
Variable Compressor 2 Temperature	55	R	-83-392°F x 10 -64-200°C x 10	NA	The current reading of the variable compressor 2 refrigerant temperature sensor input.

Desription	Holding Register (4xxxx)	Read/ Write	Range	Default	Notes
Fixed Compressor Temperature Circuit 2	56 57 58	R	-83-212°F x 10 -64-100°C x 10	NA	The circuit 2 fixed compressor refrigerant temperature sensor value.
Discharge Line Refrigerant Temperature Circuit 2	59 60 61	R	-83-392°F x 10 -64-200°C x 10	NA	The inverter compressor circuit 2 discharge line refrigerant temperature sensor value. Applies only to units configured for variable compressors or units with an optional refrigerant system monitoring package.
Defrost Temperature Circuit 2	62	R	-83-392°F x 10 -64-200°C x 10	NA	The current reading of the circuit 2 defrost sensor. Applies to heat pump units.
Total Unit Energy Usage	80-81	R	0-9999999 kW x 10	NA	Total amount of unit energy usage, in kilowatt hours.
Unit Power	82-83	R	0-9999999 kW x 10	NA	Unit power, in kilowatts.
Peak Unit Power	84-85	R	0-9999999 kW x 10	NA	Peak unit power, in kilowatts.
Average Unit Power	86-87	R	0-9999999 kW x 10	NA	Average unit power, in kilowatts.
Voltage - Lines 1 and 2	88	R	0-700V x 10	NA	The voltage of the 3-phase power measured between Lines 1 and 2.
Voltage - Lines 2 and 3	89	R	0-700V x 10	NA	The voltage of the 3-phase power measured between Lines 2 and 3.
Voltage - Lines 1 and 3	90	R	0-700V x 10	NA	The voltage of the 3-phase power measured between Lines 1 and 3.
Power - Line 1	91-92	R	0-9999999 kW x 10	NA	3-phase Line 1 power, in kilowatts.
Power - Line 2	93-94	R	0-9999999 kW x 10	NA	3-phase Line 2 power, in kilowatts.
Power - Line 3	95-96	R	0-9999999 kW x 10	NA	3-phase Line 3 power, in kilowatts.
Current - Line 1	97	R	0-200 A x 10	NA	Line 1 current, in amps.
Current - Line 2	98	R	0-200 A x 10	NA	Line 2 current, in amps.
Current - Line 3	99	R	0-200 A x 10	NA	Line 3 current, in amps.
Total System Reactive Power	100	R	0-200 kVAR x 10	NA	The system total reactive power, in kilovolt amps reactive.
Reactive Power - Line 1	101	R	0-200 kVAR x 10	NA	The Line 1 reactive power, in kilovolt amps reactive.
Reactive Power - Line 2	102	R	0-200 kVAR x 10	NA	The Line 2 reactive power, in kilovolt amps reactive.
Reactive Power - Line 3	103	R	0-200 kVAR x 10	NA	The Line 3 reactive power, in kilovolt amps reactive.
Apparent Power - Line 1	104	R	0-200 kVA x 10	NA	The apparent power for Line 1, in kilovolt amps.
Apparent Power - Line 2	105	R	0-200 kVA x 10	NA	The apparent power for Line 2, in kilovolt amps.
Apparent Power - Line 3	106	R	0-200 kVA x 10	NA	The apparent power for Line 3, in kilovolt amps.
Power Factor	107	R	-1.0-1.0 x 10	NA	System total power factor. Reflects unit efficiency.
Accumulated Reactive Power - Line 1	108-109	R	0-9999999 kVARh x 10	NA	Line 1 reactive energy usage, in kilovolt amp reactive.
Accumulated Reactive Power - Line 2	110-111	R	0-9999999 kVARh x 10	NA	Line 2 reactive energy usage, in kilovolt amp reactive.
Accumulated Reactive Power - Line 3	112-113	R	0-9999999 kVARh x 10	NA	Line 3 reactive energy usage, in kilovolt amp reactive.
Accumulated Apparent Power	114-115	R	0-9999999 kVAh x 10	NA	Total amount of apparent energy usage, in kilovolt amp hours.
Suction Superheat Circuit 1	116	R	-83-147°F x 10 -64-64°C x 10	NA	The calculated suction superheat for circuit 1. The suction superheat function is used to control the indoor expansion valve in the variable capacity compressor circuit.
Discharge Superheat Circuit 1	117	R	-83-147°F x 10 -64-64°C x 10	NA	The calculated discharge superheat for circuit 1.
Subcooling Circuit 1	118	R	-83-147°F x 10 -64-64°C x 10	NA	The calculated temperature which is used to control the modulation of the liquid subcooling reheat valve. Subcooling for circuit 1 is used for display purposes when the unit is configured with a refrigeration monitoring option.
Suction Superheat Circuit 2	119	R	-83-147°F x 10 -64-64°C x 10	NA	The calculated suction superheat for circuit 2. The suction superheat function is used to control the indoor expansion valve in the variable capacity compressor circuit.
Discharge Superheat Circuit 2	120	R	-83-147°F x 10 -64-64°C x 10	NA	The calculated discharge superheat for circuit 2.
Subcooling Circuit 2	121	R	-83-147°F x 10 -64-64°C x 10	NA	The calculated temperature which is used to control the modulation of the liquid subcooling reheat valve. Subcooling for circuit 2 is used for display purposes when the unit is configured with a refrigeration monitoring option.
Unit Cooling Capacity	125	R	0-100% x 10	NA	The current cooling capacity of compressors that are commanded on when the circuit state is normal.

Desription	Holding Register (4xxxx)	Read/ Write	Range	Default	Notes
Primary Heating Capacity	126	R	0-100% x 10	NA	The capacity using a standard heating source for non-heat pump units (and standard heating is not being used for reheat purposes). Otherwise, it The capacity from a compressorized heating source for heat pump units.
Supply Fan Operation Output	127	R	0=Off 1=On	NA	Indicates if the supply fan operation output signal is on or off.
Outdoor Air Temperature	128	R	NA	NA	The current value of the outdoor air sensor. Displayed when the network is overriding the local sensor.
Discharge Air Temperature Economizer Setpoint	129	W	40-100°F x 10 4.4-37.8°C x 10	55°F x 10 12.8°C x 10	Controls the discharge air temperature to this setpoint when the unit is in economizer mode and UseDATClgSpt = No (from the Cooling Set-Up menu).
Supply Fan Duct Static Pressure Setpoint (DSP)	130	W	0.2-4" wc x 10	1" wc x 10	Supply fan is modulated to maintain the DSP at this setpoint when SupFanCtrl is set to DSP=1. Only applies to units configured with a supply fan DSP sensor.
Supply Fan Building Static Pressure (BSP) Setpoint	131	W	-0.25-0.25" x 100 -62.2-62.2 Pa x 100	0.05" x 100 12.4 Pa x 100	Supply fan is modulated to maintain the BSP at this setpoint when SupFanCtrl is set to BSP=4. Only applies to units configured with a supply fan BSP sensor.
Building Static Pressure Setpoint	137	W	-0.25-0.25" x 1000 -62.2-62.2 Pa x 1000	0.05" x 1000 12.4 Pa x 1000	The return air or exhaust fan is modulated to maintain the building static pressure sensor input at this setpoint when the ExhRetFanCtrl is set to BSP=2. Applies only if the unit is configured for a modulating return/exhaust fan.
Occupied Cooling Setpoint	138	W	0-100°F x 10 -17.8-37.8°C x 10	72°F x 10 22.2°C x 10	Sets the Occupied Cooling Setpoint value when it is not controlled by another function. It uses maximum and minimum limits, so if the Present Value is set beyond the acceptable range from the network, the value is ignored and the unit controller continues to control to the last valid value.
Unoccupied Cooling Setpoint	139	W	40-100°F x 10 4.4-37.8°C x 10	85°F x 10 29.4°C x 10	Sets the temperature above which the unit starts and provides cooling during unoccupied periods. An optional space temperature sensor is required for unoccupied cooling operation. If the network setpoint is outside the valid min/max range, the value is ignored and the unit controller continues to control to the last valid value.
Occupied Heating Setpoint	140	W	0-100°F x 10 -17.8-37.8°C x 10	68°F x 10 20°C x 10	Sets the Occupied Heating Setpoint value when it is not controlled by other function. If the network setpoint is outside the valid min/ max range, the value is ignored and the unit controller continues to control to the last valid value.
Unoccupied Heating Setpoint	141	W	40-100°F x 10 4.4-37.8°C x 10	55°F x 10 12.8°C x 10	Sets the temperature below which the unit starts and provides heating during unoccupied periods. An optional space temperature sensor is required for unoccupied heating operation. If the network setpoint is outside the valid min/max range, the value is ignored and the unit controller continues to control to the last valid value.
Discharge Air Cooling Setpoint	142	W	40-100°F x 10 4.4-37.8°C x 10	55°F x 10 12.8°C x 10	Sets the network cooling discharge setpoint only when ClgDATReset = Network. The controller limits the value written between the DefaultDATClgSetpt (143) and the maximum cooling setpoint. Refer to the HMI Commission Unit/Cooling Set-Up menu.
Minimum Discharge Air Cooling Setpoint	143	W	40-100°F x 10 4.4-37.8°C x 10	55°F x 10 12.8°C x 10	Sets the minimum allowable discharge air cooling setpoint determined by the discharge air temperature reset function as well as the default network discharge air cooling setpoint. The unit controller uses the last valid value it received from either the network or unit controller HMI.
Outdoor Air Damper Position	144	R	0-100% x 10	NA	The current percentage of economizer capacity or outdoor air damper position.
Outdoor Air Damper Minimum Position Input	145	W	0-100% x 10	0% x 10	Sets the outdoor air damper minimum position setpoint. the minimum outdoor air damper position input setpoint uses this value when 1) it is not controlled by another function and 2) when Min OAPosNetIn = Network via the unit controller HMI. The controller limits the network value written between the DCV Limit and the Vent Limit in the Min OA Damper menu. Applies only to units configured with an airside economizer.
Discharge Air Heating Setpoint (Electric Heat)	146	W	40-105°F x 10 4.4-40.6°C x 10	85°F x 10 29.4°C x 10	Sets the network discharge air electric heat setpoint when HtgDATReset = Network. The controller limits the network value written between the minimum heating setpoint and the DefaultDATHlgSetpt (148). Applies when the unit is configured for electric heat. Refer to the Commission Unit/Heating Set-Up menu on the unit controller HMI.
Discharge Air Heating Setpoint	147	W	40-140°F x 10 4.4-60°C x 10	85°F x 10 29.4°C x 10	Sets the network heating discharge setpoint when HtgDATReset = Network. The controller limits the network value written between the minimum heating setpoint and the DefaultDATHlgSetpt (148). Applies when the unit is configured for any heating type except for electric heat. Refer to the Commission Unit/Heating Set-Up menu on the unit controller HMI.

Desription	Holding Register (4xxxx)	Read/ Write	Range	Default	Notes
Maximum Discharge Air Heating Setpoint	148	W	40-120°F x 10 4.4-48.9°C x 10	120°F x 10 48.9°C x 10	Sets the maximum allowable discharge air heating setpoint determined by the discharge air temperature reset function as well as the default network discharge air heating setpoint. It is also changeable via the unit controller HMI. The controller uses the last valid value it last received from either the network or the controller HMI.
Relative Humidity Input 1	149	W	0-164% x 10	164% x 10	Sets the space relative humidity from the network. If the network value becomes unreliable, the humidity reverts to the value provided by the attached relative humidity sensor.
Relative Humidity Input 2	150	W	0-164% x 10	164% x 10	Sets the space relative humidity from the network. If the network value becomes unreliable, the humidity reverts to the value provided by the attached relative humidity sensor.
Seconday Heating Capacity	151	R	0-100% x 10	NA	The capacity from a standard heat source for heat pump units. Otherwise, secondary heating capacity is not applicable.
Supply Fan Capacity Input	152	W	0-164% x 10	164% x 10	Sets the supply fan VFD speed when the SupFanCtrl is set to Spd/Net=4. If the network value written is outside of the min/ max setpoint range, the value is ignored and the unit controller continues to control to the last valid value.
Return Fan Capacity Input	153	W	0-164% x 10	164% x 10	Sets the return/exhaust fan VFD speed when ExhRetFanCtrl is set to Speed=5. If the network value written is outside of the min/ max setpoint range, the value is ignored and the unit controller continues to control to the last valid value.
Effective Discharge Air Temperature Setpoint	154	R	-83-147°F x 10 -64-64°C x 10	NA	The Effective Heating Discharge Temperature Setpoint if the unit is in the heating state. If not, it The Discharge Air Cooling Setpoint when the unit is in any other operating state.
Warning Alarm	155	R	0-255	NA	The highest priority active warning alarm. This object is set to zero if no warning alarms are active.
Problem Alarm	156	R	0-255	NA	The highest priority active problem alarm. This object is set to zero if no problem alarms are active.
Fault Alarm	157	R	0-255	NA	The highest priority active warning alarm. This object is set to zero if no warning alarms are active.
Alarm Value	158	R	0-255	NA	The alarm value allows individual notification of the highest priority active alarm. This object is set to zero if no alarms are active.
Space Temperature Input	159	W	-83.2-621.8°F x 10 -64-327.7°C x 10	621.8°F x 10 327.7°C x 10	The current space or zone temperature input supplied by the network. If this network value becomes unreliable, the temperature reverts to the local space temperature sensor value.
Outdoor Air Temperature Input	160	W	-83-622°F x 10 -64-327.7°C x 10	622°F x 10 327.7°C x 10	The current outdoor air temperature input supplied by the network. If this network value becomes unreliable, the temperature reverts to the local outdoor temperature sensor value.
Space IAQ (CO_2) Input	161	W	0-32767 ppm	32767	Indicates the current space CO_2 level from the network. This value takes priority over a locally wired sensor. It is used for minimum OA damper control and only applies if ExtOAInput = CO2VDC, CO2mA or CO2QMX1.
Economizer Enable	162	W	-1=Null 0=Off (Disabled) 1= Enable	-1 (Null)	Allows economizer cooling to be enabled or disabled by the network when Economizer Status is set to Enabled. Applies if the unit is configured for modulating economizer and when Ctrl Mode = Auto. If EconEnable = 0, then the economizer is disabled by the network and EconoStatus is set to OffNet. If EconEnable = -1 (null), it is not being limited by the network. If EconEnable = 1 and EconEnablePct is greater than 0, the economizer is enabled to a maximum EconEnablePct by the network and takes precedent over local enable/disable configuration. If EconoEnable = 1 and EconolEnablePct = 0, economizing is disabled and EconoStatus is set to OffNet. Economizer operation is disabled locally when the unit is in dehumidification, regardless of the network Economizer Enable settings.
	163	W	0-100% x 10	100% x 10	

Desription	Holding Register (4xxxx)	Read/ Write	Range	Default	Notes
Primary Cool Enable	164	W	-1=Null 0=Off (Disabled) 1= Enable	-1 (Null)	Allows primary cooling to be enabled or disabled by the network when Cooling Status is set to Enabled. Applies only when Ctrl Mode = Auto. CoolEnablePct The percentage of cooling capacity in an enabled state. If CoolEnable = 0, then the primary cooling is disabled by the network and ClgStatus is set to OffNet. If CoolEnable is = -1 (null), it is not being controlled by the network. If CoolEnable = 1 and CoolEnablePct is greater than 0, the primary cooling is enabled by the network and takes precedent over local enable/disable configuration. If CoolEnable = 1 and CoolEnablePct = 0, primary cooling is disabled and ClgStatus is set to OffNet.
	165	W	0-100% x 10	100% x 10	
Primary Heat Enable	166	W	-1=Null 0=Off (Disabled) 1= Enable	-1 (Null)	Allows primary heating to be enabled or disabled by the network when Heating Status is set to Enabled. Applies only if 1) the unit is configured for heating and 2) when Ctrl Mode = Auto. If HeatEnable = 0, then the primary heating is disabled by the network and heating status is set to OffNet. If HeatEnable = -1 (null), it is not being controlled by the network. If HeatEnable = 1 and HeatEnablePct is greater than 0, the primary heating is enabled to a maximum of HeatEnablePct by the network and takes precedent over local enable/disable configuration. If HeatEnable = 1 and HeatEnablePct = 0, primary heating is disabled and HeatingStatus is set to OffNet.
	167	W	0-100% x 10	100% x 10	
Humidity Sensor 1 Setpoint Input	168	W	0-100% x 10	50% x 10	Current humidity sensor setpoint from one of the two available sensors. Relative Humidity 1 uses Humidity1SP and Relative Humidity 2 uses Humidity2SP. The temperature reverts to the local space temperature sensor value if this network value becomes unreliable. It is valid only if Dehum Method is RelHum1, RelHum2, or RelHum12.
Humidity Sensor 2 Setpoint Input	169				
Dewpoint Setpoint 1	170	W	0-100°F x 10 -17.8-37.8°C x 10	50°F x 10 10°C x 10	Current dewpoint setpoint. Used for dehumidification control, which also corresponds to one of the two relative humidity sensor inputs.
Dewpoint Setpoint 2	171				
Outdoor Airflow	172-173	R	0-60000 cfm x 10 0-28320 l/s x 10	NA	The amount of outdoor airflow entering the unit. Applies only to units configured with Outdoor Air Flow Signal set to VDC or mA.
Reheat Capacity	174	R	0-100% x 10	NA	Indicates the current percentage of the unit's reheat capacity. Applies only to units configured for reheat. With full control, the unit's cooling, heating and reheat capacity is controlled based on temperature inputs to the controller.
Outdoor Airflow Setpoint	175-176	W	0-60000 cfm x 10 0-28320 l/s	2000 cfm x 10 944 l/s x 10	Minimum outdoor air setpoint. Applies only to units configured with Outdoor Air Flow Signal set to VDC or mA.
Minimum Leaving Coil Temperature Setpoint	177	W	42-70°F x 10 5.6-21.1°C x 10	45°F x 10 7.2°C x 10	Determines the minimum value for the leaving coil temperature (LCT) setpoint. Is also used in calculating the LCT setpoint when the the LCTSptRst is not set to None or Network.
DX Coil Bypass Minimum Leaving Coil Temperature Setpoint	178	W	45-65°F x 10 7.2-18.3°C x 10	45°F x 10 7.2°C x 10	Determines the minimum value for the DX Coil Bypass (DXBP) leaving coil temperature (LCT) setpoint. Is also used in calculating the LCT setpoint when the DXBPLCTSptRst is not set to None or Network.
Maximum Leaving Coil Temperature Setpoint	179	W	42-70°F x 10 5.6-21.1°C x 10	52°F x 10 11.1°C x 10	Determines the maximum value for the leaving coil temperature (LCT) setpoint. Is also used in calculating the LCT setpoint when the the LCTSptRst is not set to None or Network.
DX Coil Bypass Maximum Leaving Coil Temperature Setpoint	180	W	45-65°F x 10 7.2-18.3°C x 10	52°F x 10 11.1°C x 10	Determines the maximum value for the DX Coil Bypass (DXBP) leaving coil temperature (LCT) setpoint. Is also used in calculating the LCT setpoint when the DXBPLCTSptRst is not set to None or Network.
Leaving Coil Temperature Setpoint	181	W	45-70°F x 10 7.2-21.1°C x 10	52°F x 10 11.1°C x 10	The current effective leaving coil setpoint when dehumidification is active (Dehum Status = Active). Applies when unit is equipped with modulating cooling (such as chilled water or variable speed compressor) and the reheat type is not None or DX Bypass Only. This value can only be written when LCTSptRst is set to Network.
Leaving Coil Temperature Setpoint - Electric Heat	182	W	32-70°F x 10 0-21.1°C x 10	52°F x 10 11.1°C x 10	The current effective leaving coil setpoint when dehumidification is active (Dehum Status = Active). Applies when unit is configured for SCR electric heat. This value can only be written when LCTSptRst is set to Network.

Desription	Holding Register (4xxxx)	Read/ Write	Range	Default	Notes
Leaving Coil Temperature Setpoint	183	W	45-65°F x 10 7.2-18.3°C x 10	52°F x 10 11.1°C x 10	The current effective leaving coil setpoint when the DX coil bypass (DXBP) function is active. This setpoint applies only if the unit is equipped with modulating cooling (such variable speed compressor), the reheat type includes DX coil bypass (DXBP) and when the DXBP function is active. This value can only be written when DXBPLCTSptRst is set to Network.
Maximum Purge Time	184	W	0-300 Min x 10	0 Min x 10	Enables purge operation prior to any scheduled start by the amount of time defined by the maximum purge time. Purge operation is disabled if maximum purge time is set to zero.
Power Monitoring Demand Time	185	W	0-1440 Min x 10	60 Min x 10	The time period over which average power measurements are determined.
Outdoor Air Damper Maximum Position	186	R	0-100% x 10	100% x 10	Effective Outdoor Air Damper maximum position.
Supply Fan Flow Setpoint	187-188	W	0-6000 cfm x 10	2000 cfm x 10	Sets the supply fan so it can modulate airflow to maintain this setpoint. Applies when the SAF Capacity Control (SupFanCtrl) is set to Flow, the Damper Type is either 300A or Econ or Econ_ FDD, and Supply Fan Flow Input (SAFFlowInput) is not None.
Return/Exhaust Fan Flow Setpoint	189-190	W	0-6000 cfm	2000 cfm x 10	Sets the return or exhaust fan flow setpoint. The return/exhaust fan is modulated to maintain this setpoint when the Return/ Exhaust Fan Control Method is set to Flow. Applies when the unit is configured for an RFEF Flow Input.
Supply Fan Hours	191-192	W	0-999999 Hrs	NA	The accumulated supply fan operating hours. This can be reset from the network.
Return Fan Hours	193-194	W	0-999999 Hrs	NA	The accumulated return or exhaust fan operating hours. This can be reset from the network.
Reheat Hours	195-196	R	0-999999 Hrs	NA	The accumulated hours of unit reheat operation. This can be reset from the network.
Cooling Hours	197-198	W	0-999999 Hrs	NA	The accumulated mechanical cooling operating hours. This can be reset from the network.
Variable Compressor 1 Hours	199-200	W	0-999999 Hrs	NA	The accumulated operating hours for each variable compressor. This can be reset from the network.
Variable Compressor 2 Hours	201-202				
Compressor 1 Hours	205-206	W	0-999999 Hrs	NA	Circuit 1 and 2 accumulated operating hours by compressor. This can be reset from the network.
Compressor 2 Hours	207-208				
Compressor 3 Hours	209-210				
Compressor 4 Hours	211-212				
Compressor 5 Hours	213-214				
Compressor 6 Hours	215-216				
Heating Hours	223-224	W	0-999999 Hrs	NA	The accumulated heating operating hours. This can be reset from the network.
Economizer Hours	225-226	W	0-999999 Hrs	NA	The accumulated economizer operating hours. This can be reset from the network.
Tenant Override Hours	227-228	W	0-999999 Hrs	NA	The accumulated tenant override operating hours. This can be reset from the network.
Dehumidification Hours	229-230	W	0-999999 Hrs	NA	The accumulated dehumidification operating hours. This can be reset from the network.
Energy Recovery Hours	231-232	W	0-999999 Hrs	NA	The accumulated energy recovery wheel operating hours. This can be reset from the network.
SCR Preheat Hours	233-234	W	0-999999 Hrs	NA	The accumulated preheat operating hours for SCR heating type. This can be reset from the network.
UV Light Hours	235-236	W	0-999999 Hrs	NA	The accumulated operating hours for the UV light. Applies when an IAQ sensor is present and unit is configured for one of the Monitoring Packages (IAQ, IAQRef, IAQPwr or IAQRP.) This can be reset from the network.

Desription	Holding Register (4xxxx)	Read/ Write	Range	Default	Notes
Unit Status	245	R	0=Enable 1=OffMan 2=OffManCtrl 3=OffNet 4=OffAlm 5=OffRetry 6=OffPassVnt 7=OffSnsrCfg 8=OffEvac	NA	Indicates whether or not the unit is enabled to operate. If the unit status is not enabled, the unit remains in an Off operating state. Does not apply when Control Type = RefOnly. 0 = Enable (Unit is in operation. Conditions #1-8 are not active) 1 = OffMan (Control Mode = Off) 2 = OffManCtrl (Manual Control = On) 3 = OffNet (Control Mode = Auto and NetApplicMode = Off) 4 = OffAlm (Fault alarm is active) 5 = OffRetry (Fan Retry is active) 6 = OffPassVnt (Optional passive ventilation functionality is active, forcing the unit to an Off state) 7 = OffSnsrCfg (Forces the unit to an Off state during space temperature sensor configuration or power-up. This allows the sensor enough time to configure so that it can provide reliable data to the Unit controller. Applies when space temperature is used for the control temperature source) 8 = OffEvac (Evac mode is active)
Cooling Status	246	R	0=Enabled 1=None 2=OffAmb 3=OffAlm 4=OffNet 5=OffMan 6=NA 7=CfgErr*	NA	Indicates if cooling is currently enabled. If not, the reason is displayed. *ClgErr = cooling is disabled due to an incorrect unit configuration.
Economizer Status	247	R	0=Enabled 1=None 2=OffAmb 3=OffAlm 4=OffNet 5=OffMan 6=OffDehum	NA	Indicates if the economizer is currently enabled. If the economizer is disabled, the reason is indicated.
Primary Heating Status	248	R	0=Enabled 1=None 2=OffAmb 3=OffAlm 4=OffNet 5=OffMan 6=OffDehum 7=NA	NA	Indicates if the primary (standard) heating source is enabled. If not, the reason is indicated.
Application Mode	249	RW	0=Off 1=HeatOnly 2=CoolOnly 3=FanOnly 4=Auto 5=NA	5=NA	Sets the unit in an application mode. While it does not “force” the unit into any state, it does disable certain unit operations. For example, an Application Mode of “Cool Only” disables heating, “Heat Only” disables cooling, and “Fan Only” disables heating and cooling. Application Mode has no affect unless Control Mode is set to Auto (Ctrl Mode = Auto). Control Mode is only set at the Unit controller HMI.
Occupancy Status	250	R	0=Occ 1=Unocc 2=TntOvrd	NA	Indicates if the unit is currently in an occupied, unoccupied, or tenant override mode of operation.
Occupancy Mode (Network)	251	RW	0=Occ 1=Unocc 2=TntOvrd 3=Standby 4=Auto	4=Auto	Sets the unit into a different occupancy mode. The request is typically sent by a wall-mounted occupant-interface module or a supervisory device used to manually control occupancy modes or to override the scheduled occupancy. Note that OccManCmd is used only as an override.
Current State	252	RW	0=Occ 1=Unocc 2=TntOvrd 3=Standby 4=NA	4=NA	Commands the occupancy function of the unit controller when Occupancy Mode is set to Auto. A scheduler or a supervisory node typically sends the request. Note that Current State is generally used for daily Occupancy (Occ/Unocc) commands. It is active only when OccManCmd, 251 = Auto.
Next State	253	RW	0=Occ 1=Unocc 2=TntOvrd 3=Standby 4=NA	4=NA	Commands the occupancy function of the unit controller when Occupancy Mode is set to Auto. A scheduler or a supervisory node typically sends the request. Next State and TimeToNextState (254) are used only when implementing “Optimal Start” functionality.
Time to Next State	254	RW	0-65535	65535	Network input that determines the occupancy scheduler time from one state to the next (occupied, unoccupied, standby, auto). TimeToNextState and NextState (253) are used only when implementing “Optimal Start” functionality.

Desription	Holding Register (4xxxx)	Read/ Write	Range	Default	Notes
Emergency Override	255	RW	0=Normal 1=Off	0=Normal	Shuts off the Unit controller. If it is set to Off, the Unit controller cannot start based on a time clock or any other means. Doing so also shuts off a network signal and puts Unit Status = OffNet. The only way to start the Unit controller is to change the value to Normal.
Supply Fan Control	256	RW	0=DSP 1=Speed 2=1ZnVAV 3=BSP 4=CO2 5=Flow 6=CAV	6=CAV	Supply fan control options are described as follows: 0=DSP (Duct Static Pressure. The supply fan modulates to maintain the duct static pressure at the duct static pressure setpoint, SAFDSPSpt. Does not apply when the Ctrl Type is configured for 1ZnVAV). 1=Speed (The supply fan modulates to maintain a speed command provided by the unit controller HMI or network command). 2=1ZnVAV (Single Zone VAV. The supply fan modulates to maintain the control temperature at the Occupied Cooling Setpoint (OccClgSpt) or the Occupied Heating Setpoint (OccHtgSpt) when the unit is running. Only applies when Ctrl Type is configured for 1ZnVAV). 3=BSP (Building Static Pressure. The supply fan modulates to maintain the BSP setpoint (BSPSpt). Available when the unit is running and configured for damper type 100OA. Does not apply when Ctrl Type is configured for 1ZnVAV). 4=CO_2 (The supply fan modulates based on the CO_2 level between allowable range. Available when the unit is running and configured for damper type 100OA (100% x 10 outdoor air). Does not apply when the Ctrl Type is configured for 1ZnVAV). 5=Flow (The supply fan modulates to maintain the supply airflow setpoint (SAFlowSpt). Available when the unit is running and configured for damper type 100OA. Does not apply when Ctrl Type is configured for 1ZnVAV). 6=CAV (Constant Air Volume. Unit controls to a constant effective maximum supply fan (SAF) capacity, EffMaxSAFCap. Does not apply when the Ctrl Type is configured for single zone VAV (1ZnVAV)).
Return Fan Capacity Control	257	W	0=CAV 1=BSP 2=Tracking 3=DSP 4=Speed 5=Flow 6=OAD 7=FlowDiff	1=BSP	Selects the method used to control the return or exhaust fan airflow. 0=CAV (Return/Exhaust fan is held at the MaxRFEFCap value when in operation) 1=BSP (Return/exhaust fan airflow is controlled independently of the supply fan to maintain building static pressure setpoint) 2=Tracking (If unit is equipped with VFD, airflow is controlled based on an adjustable tracking relationship between the supply fan and return fan) 3=DSP (Return fan is modulated to maintain the Duct Static Pressure at the RAFDSPSpt when in operation) 4=Speed (Return/exhaust fan airflow is controlled to a VFD speed setpoint adjusted via the Return Fan Capacity Input) 5=Flow (unit modulates to maintain the RFEFflow Setpoint when in operation) 6=OAD (Exhaust fan airflow is controlled independently of the supply fan airflow based on the outdoor air damper position) 7=FlowDiff (Return/exhaust fan tracks to the SAFFlow)
Primary Heating Status	258	R	0=Enabled 1=None 2=OffAmb 3=OffAlm 4=OffNet 5=OffMan 6=OffDehum 7=CfgErr	NA	Indicates if the primary (standard) heating source is enabled. If not, the reason is indicated.
VAV Box Output Status	259	R	0=Heat 1=Cool	0=Heat	The VAV box output is provided for interlocking field VAV operation with the unit heating or cooling. In most cases: Heat = Unit is in any heating state, Start, or Recirc. Cool = Unit is in any other state. Applies only to units configured with supply fan VFDs.

Desription	Holding Register (4xxxx)	Read/ Write	Range	Default	Notes
Unit State	260	R	0=Off 1=Start 2=Recirc 3=FanOnly 4=Min x 10DAT 5=Htg 6=Econo 7=Clg	NA	The current operating mode of the unit.
Units of Measurement	261	R	0=Metric 1=English	1=English	Sets the type of units (English or Metric) that are passed from the Unit controller to the Modbus network. Cycle power for change to take effect.
Passive Ventilation	262	W	0=Off 1=On	0=Off	Passive ventilation is activated by a locally-supplied contact closure or from a network command. When Passive ventilation is active, the following occurs: 1. Fan output is overridden to On 2. The Unit State is forced to Off* 3. The return/exhaust fan is commanded on and set to the return/ exhaust fan air fan ventilation capacity value 4. Outdoor air dampers are held at 0% x 10 5. A passive ventilation Event message is generated *Note that the Unit Status is forced to Off when the optional passive ventilation function is active.
Energy Recovery Wheel Status	263	R	0=Off 1=On	0=Off	The command status (On or Off) of the energy recovery wheel.
Unit Local/Network Control	264	R	0=Network 1=Local	0=Network	Indicates if the Unit controller is set to use local or network inputs. AHU Loc/Net can only be changed from the unit controller HMI. It must be set to Network (0) for most of the writeable network properties to apply.
Control Temp Source	265	W	0=RAT 1=Space 2=OAT 3=None	0=RAT	Selects the temperature sensor input to be used for the unit heating/cooling changeover or zone cooling and heating capacity change decisions. For example, if CtrlTempSrc is set to “Return Air Temperature (RAT),” then the Control Temp parameter reads the same value as the Return Air parameter. When CtlrTempSrc is set to “None” during regular occupied operation, the unit uses the discharge air temperature (DAT) sensor to heat or cool to the cooling DAT setpoint. 0=RAT (Not available on 100% x 10 outdoor air temperature (OAT) units) 1=Space 2=OAT (Available on ControlType=DAT only) 3=None (Available on ControlType=DAT only)
Dehumidification Status	266	R	0=Inactive 1=Active	NA	Indicates if the dehumidification operation is currently active.
Network Demand Shed Enable	267	W	0=Inactive 1=Auto 2=Manual	NA	Enables the demand shed functionality. For this feature to be active, 1) the DemandShed object in the HtgClg ChgOvr Set-Up HMI menu must be set to Enable, and 2) Network Demand Shed Enable must be set to Auto or Manual.
Morning Warmup Status	268	R	0=Inactive 1=Active	NA	Indicates if morning warmup is currently active.
Free Cooling Status	269	R	0=Unavail 1=Avail	NA	Indicates if free cooling is currently available.
Remote Setpoint Source	270	W	0=None 1=AI	0=None	Configures occupied setpoints from up to three optional remote mounted space sensor analog inputs. When RemSptSrc is set to None, the occupied cooling setpoint (OccClgSpt) and the occupied heating setpoint (OccHtgSpt) are configurable from both the Unit controller HMI and the network. Note that occupied heating/cooling setpoint values change with the last valid value set from either the network or unit controller.
Remote Setpoint Source	271	W	0=None 1=QMX1 2=QMX2 3=QMX3	0=None	Configures occupied setpoints from up to three optional remote mounted QMX space sensor inputs. When RemSptSrc is set to None, the occupied cooling setpoint (OccClgSpt) and the occupied heating setpoint (OccHtgSpt) are configurable from both the Unit controller HMI and the network. Note that occupied heating/cooling setpoint values change with the last valid value set from either the network or unit controller.
Power Monitor Reset	272	W	0=No 1=Yes	0=No	Clears the accumulated power measurements.

Desription	Holding Register (4xxxx)	Read/ Write	Range	Default	Notes
Secondary Heating Status	273	R	0=Enabled 1=None 2=OffAmb 3=OffAlm 4=OffNet 5=OffMan 6=NA 7=NA	NA	Indicates if the standard heating source is currently enabled for heat pump units. If heating is disabled, the reason is indicated.
Supply Air Fan 1-6 Status	274 275 276 277 278 279	R	0=OK 1=HLL 2=TFEI 3=TFM 4=TFE 5=LK 6=SKF 7=PHA 8=UzLo 9=UzHi 10=UeLo 11=UeHi 12=NoCm13=OC 14=OT 15=RRP 16=EE 17=POC 18=AOV 19=AU	NA	Indicates the status of the 1-6 ECM supply air fans. 0=OK (No Error) - fan operating normally 1=HLL (Hall Sensor Error) - possible external voltage spikes or hardware problem with the fan 2=TFEI (Electronics Interior Overheated) - operating temperature for EC fan control components has been exceeded, or a hardware problem with the fan 3=TFM (Motor Overheated) operating conditions for fan motor is outside of the expected temperature range, fan load has been exceeded, or a hardware problem with the fan 4=TFE (Power Mod Overheated) - operating conditions for module have exceeded the design temperature, input power supply is over/under voltage or fan overload 5=LK (Locked Motor) - fan motor may be blocked due to counter flow, dirt, ice, or other impurity 6=SKF (Communication Error) - possible voltage spikes or a hardware problem of the fan 7=PHA (Phase failure) 8=UzLow (DC bus under-voltage) 9=UzHigh (DC bus over-voltage) 10=UeLow (Main under-voltage) 11=UeHigh (Main over-voltage) 12=NoCm (No Communication) 13=OC (DC bus over-current) 14=OT (DC bus over-voltage) 15= RRP (backward rotating fan) 16=EE (EEPROM read/write fail) 17=POC (DC bus peak over-current) 18=AOV (AC bus average over-voltage) 19= AU (DC bus average under-voltage) Note the options above may indicate DC or main voltage parameter values not within the specified range, insufficient fan power supply/experiencing signal disturbances, or a hardware problem with the fan.
Return Fan VFD Status	284	R	0=Fault 1=OK	NA	Indicates the status of the return/exhaust fan drive. 1=OK (communications as expected) 2=Fault (controller has shut down the VFD due to a fault condition 3=No Comm (controller is not receiving digital input data from the VFD)

Desription	Holding Register (4xxxx)	Read/ Write	Range	Default	Notes
Return Fan 1-4 Status	283 285 286 287	R	0=OK 1=HLL 2=TFEI 3=TFM 4=TFE 5=LK 6=SKF 7=PHA 8=UzLo 9=UzHi 10=UeLo 11=UeHi 12=NoCm13=OC 14=OT 15=RRP 16=EE 17=POC 18=AOV 19=AU	NA	Indicates the status of the 1-4 ECM return/exhaust air fan. Used for generating a fan failure notification as described below. 0=OK (No Error) - fan operating normally 1=HLL (Hall Sensor Error) - possible external voltage spikes or hardware problem with the fan 2=TFEI (Electronics Interior Overheated) - operating temperature for EC fan control components has been exceeded, or a hardware problem with the fan 3=TFM (Motor Overheated) operating conditions for fan motor is outside of the expected temperature range, fan load has been exceeded, or a hardware problem with the fan 4=TFE (Power Mod Overheated) - operating conditions for module have exceeded the design temperature, input power supply is over/under voltage or fan overload 5=LK (Locked Motor) - fan motor may be blocked due to counter flow, dirt, ice, or other impurity 6=SKF (Communication Error) - possible voltage spikes or a hardware problem of the fan 7=PHA (Phase failure) 8=UzLow (DC bus under-voltage) 9=UzHigh (DC bus over-voltage) 10=UeLow (Main under-voltage) 11=UeHigh (Main over-voltage) 12=NoCm (No Communication) 13=OC (DC bus over-current) 14=OT (DC bus over-voltage) 15= RRP (backward rotating fan) 16=EE (EEPROM read/write fail) 17=POC (DC bus peak over-current) 18=AOV (AC bus average over-voltage) 19= AU (DC bus average under-voltage) Note the options above may indicate DC or main voltage parameter values not within the specified range, insufficient fan power supply/experiencing signal disturbances, or a hardware problem with the fan.
Minimum Outdoor Air Reset	288	W	0=No 1=Yes	0=No	Enables the network to control the outdoor air minimum position (NetOAMinPos) value. It also allows the network to assume control of the effective minimum ventilation position (MinVentPos), if needed. Applies when the unit is configured with an outdoor airflow measuring station.[1]
Return Fan VFD Status	292	R	0=Fault 1=OK	NA	Indicates the status of the return/exhaust fan drive. 0=Fault (controller has shut down the VFD due to a fault condition 1=OK (communications as expected)
Generic Analog Inputs (0-10 VDC) 1-8	300	R	0-10 VDC x 10	NA	If an EMB expansion module B is attached to the unit controller and one or more of the eight universal I/O objects is configured for an analog input, a corresponding Modbus register (300-323) is available to read the status via 0-10 VDC, 0-20 mA or 10K NTC sensor input types.
	301				
	302				
	303				
	304				
	305				
	306				
	307				
Generic Analog Inputs (0-20mA) 1-8	308	R	0-20mA x 10	NA	
	309				
	310				
	311				
	312				
	313				
	314				
	315				
Generic Analog Inputs (10kThermistor) 1-8	316	R	-50-250°F x 10	NA	
	317				
	318				
	319				
	320				
	321				
	322				
	323				

Desription	Holding Register (4xxxx)	Read/ Write	Range	Default	Notes
Generic Analog Outputs 1-8	324	W	0-10V x 10	NA	If an EMB expansion module B is attached to the controller, analog outputs AO1-AO8 are available to the Modbus network as commandable objects 324-335. AO1-AO4 can be configured for *either* a 0-20 mA *or* a 0-10 VDC direct voltage output signal. AO1-AO4 can be one or the other, but not both.
	325				
	326				
	327				
	328				
	329				
	330				
	331				
	332	W	0-20V x 10	X10	
	333				
	334				
	335				
Generic Digital Inputs 1-8	336	R	0=Open 1=Closed	1=Closed	If an EMB expansion module B is attached to the controller and one or more of the eight universal I/O objects is configured as a digital input, corresponding Modbus registers (336-343) are available to read the status of the sensor inputs.
	337				
	338				
	339				
	340				
	341				
	342				
	343				
Generic Digital Outputs 1-6	344	R	0=Off 1=On	0=Off	If an EMB expansion module B is attached to the controller, the status of up to six digital outputs can be read from the network via Modbus registers 344-349.
	345				
	346				
	347				
	348				
	349				
Control Type	350	R	0=Zone 1=DAT 2=1ZnVAV 3=RO_FC 4=RO_FCGE 5=RO_DCSA	1=DAT	Indicates the control strategy configured for the unit controller. 0=Zone (Zone temperature control) 1=DAT (Discharge temperature control) 2=1ZnVAV (Single zone VAV control) 3=RO_FC (Refrigeration-only control for fans/compressors) 4=RO_FCGE (Refrigeration-only control for fans/compressors gas heat/electric heat) 5= RO_DCSA (Refrigeration-only control for DCSA)
Fixed Compressors	351	R	0-8	0	Indicates the number of fixed compressors on the unit.
Variable Compressors	352	R	0-4	0	Indicates the number of variable compressors on the unit.
Compressor Circuits	353	R	0-4	0	Indicates the number of compressor cooling circuits available on the unit.
Outdoor Air Fan Control	354	R	0=None 1=OnOffT 2=OnOffP 3=VarVFD 4=VarECM1 5=VarECM2 6=VarDK1 7=VarDK2	0=None	Indicates the outdoor air fan control strategy for the unit. 0=None (No outdoor fan control selected) 1=OnOffT (Staged on/off control using outdoor air temperature) 2=OnOffP (Outdoor fan control using discharge refrigerant pressure) 3=VarVFD (Variable outdoor fan control using single VFD) 4=VarECM1 (Variable outdoor fan control using ECM motor, circuit 1) 5=VarECM2 (Variable outdoor fan control using ECM motor, circuit 2) 6=VarDK1 (Variable frequency fan with ECM motor, circuit 1) 7=VarDK2 (Variable frequency fan with ECM motor, circuit 2)
Damper Type	355	R	0=None 1=30OA 2=100OA 3=Econ 4=EconoFDD 5=100wRec	3=Econ	Indicates the type of damper installed in the unit based on the options as follows: 0=None (No damper) 1=30OA (Single position 0-30% x 10 OA fixed damper) 2=100OA (Single position 100% x 10 OA fixed damper) 3=Econ (Modulating airside economizer) 4=EconoFDD (Modulating arside economizer with fault detection) 5=100wRec (Single position 100% x 10 with recirculating air)

Desription	Holding Register (4xxxx)	Read/ Write	Range	Default	Notes
Heating Type	356	R	0=None 1=F&BP 2=HW_Stm 3=M1G5-1 4= M1G5-1 5=M1G5-1 6=M1G10-1 7=M1G10-1 8=M2G10-1 9=M3G10-1 10=M2G20-1 11=M3G20-1 12=2StgE 13=2StgG 14=4StgE 15=4StgG 16=SCR 17= SCRSRht 18=Not Used 19=M4G10-1 20= M4G20-1 21=M1G12-1	0=None	Defines the type of heating in the unit. Not all options are available in all applications. 0=None (No heating type selected) 1=F&BP (Face and bypass) 2=HW_Stm (Steam or hot water) 3=M1G5-1 (Modulating gas, 5-1) 4=M1G5-1 (Modulating gas, 5-1) 5=M1G5-1 (Modulating gas, 5-1) 6=M1G10-1 (Modulating gas, 10-1) 7=M1G10-1 (Modulating gas, 10-1) 8=M2G10-1 (Modulating gas, 10-1) 9=M3G10-1 (Modulating gas, 10-1) 10=M2G20-1 (Modulating gas, 20-1) 11=M3G20-1 (Modulating gas, 20-1) 12=2StgE (Two-stage electric) 13=2StgG (Two-stage gas) 14=4StgE (Four-stage electric) 15=4StgG (Four-stage gas) 16=SCR* (SCR electric) 17=SCRSRht* (SCR electric/supplemental reheat) 18=Not used 19=MG4StgL (Modulating gas, 10-1) 20=MG4StgH (Modulating gas, 20-1) 21= MG4StgH (Modulating gas, 12-1) *SCR (silicon controlled rectifier) modulates the time the electric heater is powered on in order to satisfy the zone requirements.
Maximum Heat Rise	357	R	0-100	100	When the unit is equipped with any type of gas or electric heat, MaximumHeatRise prevents the discharge air temperature heating setpoint (DATHtgSpt) from exceeding the entering fan temperature by more than this value.
Supply Air Fan Type	358	R	0=Anlg1 1=1M 2=2M 3=3M 4=4M 5=6M 6=VFDMB	1=1M	Indicates the supply air fan type for the unit, which may be configured with one or more Modbus-controlled supply fan ECM motors or up to three VFDs. 0=Anlg1 (Locally-supplied analog input) 1=1M (1 ECM supply fan) 2=2M (2 ECM supply fans) 3=3M (3 ECM supply fans) 4=4M (4 ECM supply fans) 5=6M (6 ECM supply fans) 6=VFDMB (Supply fan VFD Modbus control)
Return Air Fan Type	359	R	0=None 1=RFAnlg1 2=EFAnlg1 3=1ECMRF 4=2ECMRF 5=3ECMRF 6=6ECMRF 7=1ECMEF 8=2ECMEF 9=3ECMEF 10=6ECMEF 11=RFVFDMB 12=EFVFDMB	0=None	Indicates the type of return or exhaust fan installed in the unit. Return/exhaust fans may be configured with one or more Modbus-controlled ECM motors or VFD. 0=None (No return/exhaust fan control) 1=RFAnlg1 (Return fan control via analog output from the unit controller) 2=EFAnlg (Exhaust fan control via analog output from the unit controller) 3=1ECMRF (1 ECM return fan) 4=2ECMRF (2 ECM Modbus-controlled return fans) 5=3ECMRF (3 ECM Modbus-controlled return fans) 6=6ECMRF 6 ECM Modbus-controlled return fans) 7=1ECMEF (1 ECM Modbus-controlled exhaust fan) 8=2ECMEF (2 ECM Modbus-controlled exhaust fans) 9=3ECMEF (3 ECM Modbus-controlled exhaust fans) 10=6ECMEF (6 ECM Modbus-controlled exhaust fans) 11=RFVFDMB (Return fan VFD Modbus control) 12=EFVFDMB (Exhaust fan VFD Modbus control)
Energy Recovery	360	R	0=None 1=CS 2=CSRH 3=NA 4=NA 5=VFD 6=Anlg	0=None	Indicates if there is an energy recovery wheel installed, and if so, what type. 0=None (No energy wheel control) 1=CS (Constant speed energy wheel) 2=CSRH (Constant speed energy wheel with reheat) 3=NA 4=NA 5=VFD (Energy wheel with VFD control) 6=Anlg (Generic analog input to the unit controller)

Desription	Holding Register (4xxxx)	Read/ Write	Range	Default	Notes
Reheat Type	361	R	0=None 1=PriHtg 2= PriHtBP 3= MHG 4= MHGBP 5= HG_LSC 6= HGLSCBP 7= DXBP 8= MLSC	0=None	Indicates the reheat control type Note that reheat options are based on unit configuration. Not all options are available to the network 0=None (No reheat) 1=PriHtg (Primary heating reheat) 2=PriHtBP (Primary heating reheat with DX bypass) 3=MHG (Modulating hot gas) 4=MHGBP (Modulating hot gas with DX bypass) 5=HG_LSC (Modulating hot gas and liquid subcooling reheat) 6=HGLSCBP (Modulating hot gas and liquid subcooling reheat with DX bypass) 7=DXBP (DX bypass only) 8=MLSC (Modulating liquid subcooling reheat)
External Outdoor Air Input	362	R	0=None 1=ExtVDC 2=ExtmA 3=CO2VDC 4=CO2mA 5=CO2QMX+ 6=IAQMB	0=None	Indicates the type of input signal available for outdoor air damper reset from a local CO_2 sensor, QMX sensor* or other device. 0=None 1= ExtVDC (Generic external VDC input) 2=ExtmA (Generic external mA analog input) 3=CO2VDC (VDC input for local CO_2 sensor) 4=CO2mA (mA input for local CO_2 sensor) 5=CO2QMX+ (Input from QMX CO_2 sensor) 6=IAQMB (CO_2 input from Modbus IAQ sensor) *A QMX room sensor(s) is installed on the network and wired directly to the unit controller.
Outdoor Air Flow Input	363	R	0=None 1=VDC 2=mA	0=None	Indicates if voltage or current is used to measure outdoor airflow.
Supply Air Fan Flow Input	364	R	0=None 1=1Fan 2=2 Fan 3=3 Fan 4=4 Fan 5=6 Fan	0=None	Indicates the supply fan configured for outdoor air flow measurement. Available only when the unit is configured with an outdoor airflow measuring device. 0=None (No supply fan) 1=1Fan (One supply fan) 2=2Fan (Two supply fans) 3=3Fan (Three supply fans) 4=4Fan (Four supply fans) 5=6Fan (Six supply fans)
Return Fan Flow Input	365	R	0=None 1=1Fan 2=2Fan 3=3Fan	0=None	Indicates the return or exhaust fan available for outdoor air flow measurement. Available only when the unit is configured with an outdoor airflow measuring device. 0=None (No return/exhaust fan) 1=1Fan (One return/exhaust fan) 2=2Fan (Two return/exhaust fans) 3=3Fan (Three return/exhaust fans)
Duct Static Pressure Sensor	366	R	0=NA:NA 1=DSP:NA 2=DSP:DSP 3=DSP:BSP 4=BSP:NA 5=NA:DSP 6=NA:BSP	0=NA:NA	Indicates if a static pressure sensor is installed. Sensor configuration types are described below: 0=NA:NA (Not available on supply or return/exhaust fan static pressure sensor input) 1=DSP:NA (Duct static pressure (DSP) sensor on the supply fan input, no sensor on the return/exhaust fan input) 2=DSP:DSP (DSP sensor is present on the supply and return/exhaust fan inputs) 3=DSP:BSP (DSP sensor on the supply fan input, Building Static Pressure (BSP) sensor is present on the return fan input) 4=BSP:NA (BSP sensor on the supply fan input, no sensor on the return/exhaust fan input) 5=NA:DSP (No sensor on the supply fan input, DSP sensor on the return/exhaust fan input) 6=NA:BSP (No sensor on the supply fan input, BSP sensor on the return/exhaust fan input)

Desription	Holding Register (4xxxx)	Read/ Write	Range	Default	Notes
Space Temperature Sensor	367	R	0=None 1=1AI 2=2AI 3=3AI 4=1QMXS 5=2QMXS 6=3QMXS 7=1QMX+ 8=2QMX+ 9=3QMX+	0=None	Configures the type of space temperature sensor input to the unit controller.2 If this parameter is set to None, the network can still provide a space temperature value. The network can override a local sensor. 0=None (No local sensors installed) 1=1AI (10k analog input available for local sensor) 2=2AI (Two 10k analog inputs available for local sensors) 3=3AI (Three 10k analog inputs available for local sensors) 4=1QMXS (Input from 1 QMX space temp sensor) 5=2QMXS Input from 2 QMX space temp sensors) 6=3QMXS (Input from 3 QMX space temp sensors) 7=1QMX+ (Input from 1 QMX space/hum/CO2 sensor) 8=2QMX+ (Input from 2 QMX space/hum/CO2 sensors) 9=3QMX+ (Input from 3 QMX space/hum/CO2 sensors) Note: All sensors must be one type. A mix of local analog sensors and Modbus/QMX2 sensors is not supported.
Unit Size	368	R	0-999	0	Three-digit configuration parameter that indicates the unit model size.
Monitoring Packages	369	R	0=None 1=RefSys 2=Pwr	0=None	Indicates the type of monitoring package installed on the unit. 0= None (No refrigerant or power monitoring package) 1=RefSys (Refrigerant monitoring only) 2=Pwr (Power monitoring only)
Electronic Hot Gas Bypass Input	370	R	0=None 1=Circ12 2=Circ1 3=Circ2	0=None	Indicates which circuit (1, 2, or both circuits) is configured for electronic hot gas bypass. Note that EHGPS is used to regulate circuit suction pressure during light load conditions when only one fixed capacity compressor is operating in the unit.
Refrigerant Type	371	R	0=None 1=R410A 2=R32 3=R32HP 4=R32HP75 5=R32HP50 6=R32HP25 7=R32HP0	1=R410A	Indicates the type of refrigerant in the unit. 0=None 1=R410A (No heat pump) 2=R32 (No heat pump) 3=R32HP (Heat pump with no auxilliary heat limit) 4=R32HP75 (Heat pump with 75% auxilliary heat limit) 5=R32HP50 (Heat pump 50% auxilliary heat limit) 6=R32HP25 (Heat pump 25% auxilliary heat limit) 7=R32HP0 (Heat pump 0% auxilliary heat limit)
Unit Voltage	372	R	0=208_60Hz 1=230_60Hz 2=460_60Hz 3=575_60Hz	2=460_60Hz	Defines the voltage applied to the unit controller.
Preheat Type	373	R	0=None 1=HW_Stm 2=F&BP 3=SCR	0=None	Indicates the preheat control method. A dedicated hot water/steam coil or heating face and bypass is located upstream of the cooling coil to maintain the leaving cooling coil temperature above an adjustable preheat leaving coil temperature setpoint. 0=None (No preheat selected) 1=HW_Stm (Hot water/steam) 2=F&BP (Face and bypass) 3=SCR (Electric heat)
Expansion Valve Type	374	R	0=None 1=DFETS 2=DFCol 3=FJPAM2 4=FJPAM3 5=Spln 6=Fj3/Fj2 7=Fj2/Fj3 8=DFC/Fj2 9=DFC/Fj3 10=Spr/Fj2 11=Spr/Fj3 12=Spr/DFC 13=Fj2/Spr 14=Fj3/Spr 15=DFC/Spr	0=None	Indicates the expansion valve model type configured for the unit. 0=None (no expansion valve selected) 1=Danfoss ETS DFETS (DFETS) 2=Danfoss Colibri (DFCol) 3=Fujikoki_PAM 2000 (FJPAM2) 4= Fujikoki_PAM 3000 (FJPAM3) 5= Sporlan (Spln) 6=Fujikoki_PAM 3000/Fujikoki_PAM 2000 (Fj3/Fj2) 7=Fujikoki_PAM 3000/Fujikoki_PAM 2000 (Fj2/Fj3) 8=Danfoss Colibri/Fujikoki_PAM 2000 (DFC/Fj2 9=Danfoss Colibri/Fujikoki_PAM 3000 (DFC/Fj3) 10=Sporlan/Fujikoki_PAM 2000 (Spr/Fj2) 11=Sporlan/Fujikoki_PAM 3000 (Spr/Fj3) 12=Sporlan/Danfoss Colibri (Spr/DFC) 13=Fujikoki_PAM 2000/Sporlan (Fj2/Spr) 14=Fujikoki_PAM 3000/Sporlan (Fj3/Spr) 15=Danfoss Colibri/Sporlan (DFC/Spr)
I/O Configuration Parameter	375	R	0=RebApp 1=Rebel 2-DCSA	0=RebApp	The I/O configuration parameter which determines the type of unit controller.
Sensor Configuration	376	R	0-8	0	Defines the number of A2L sensors equipped with the unit.

Desription	Holding Register (4xxxx)	Read/ Write	Range	Default	Notes
Clear Alarms	400	W	0=No 1=ClrFlts 2=ClrPrblms 3=ClrWrngs 4=ClrAllAlms	0=No	Clears all active alarms within an alarm class or clears all active alarms. All active alarms are cleared automatically when power is cycled to the controller. If conditions that triggered the alarm are still present after a power cycle, the active alarm is re-initiated with a new date/time stamp. Also see Alarms and Events.

Alarms and Events

The MicroTech unit controller has various ways of managing Modbus alarm. Alarms can be monitored and cleared using more than one method.

Alarm Classes

Alarms in the unit controller are divided into three classes: Faults, Problems, and Warnings. Fault alarms have the highest priority. Problem alarms have the next priority. Warning alarms have the lowest priority. The alarms within each class are also prioritized.

Fault Alarms

Faults are conditions that are serious enough to completely shut down the unit. The alarm condition must be corrected and the alarm cleared before unit operation can resume. Fault alarms have the highest priority.

Problem Alarms

Problem alarms do not cause unit shutdown but do limit operation of the unit in some way. Some of these alarms must be cleared manually, others clear automatically when conditions return to normal. Problem alarms have the next highest priority.

Warning Alarms

Warnings are conditions that should be addressed, but do not limit operation in any way. Some of these alarms must be cleared manually, others will clear automatically when conditions return to normal. Warning alarms have the lowest priority.

Alarm Notification

Each alarm is assigned a priority number from 1-255. Faults (200-255) have a higher priority than Problems (61-199) which have a higher priority than Warnings (1-60).

The alarm priority number is set to 0 to indicate no alarm or to the enumeration of the highest priority active alarm. Table 5 - Table 7 describe the Warning, Problem, and Fault alarm registers and index ranges.

Active Alarm

Use holding register 158 (Alarm Value) to read, display, or view the highest priority alarm regardless of class.

Alarm Clearing

Alarms can be cleared via Modbus by setting Clear Alarms register (400) to a value other than one (1). After the alarms are cleared, the state returns to Normal (0).

All active alarms are cleared automatically when power is cycled to the unit controller. If conditions that triggered the alarm are still present after a power cycle, the active alarm is re-initiated with a new date/time stamp.

Alarm Data Points

The following section describes alarm values that can be mapped via Modbus. Table 4 describes the holding registers used for alarm class notification and clearing. Use holding register 158 (Alarm Value) to enable notification of the highest priority alarm regardless of class. Table 5 - Table 7 describe the alarms in each class based on Alarm Value priority. Table 8 describes events and standby events. Alarms and Events are read-only.

Refer to Rebel Applied unit controller OM 1288 for full alarm generation descriptions.

Table 4: Modbus Alarm Class Notification

Alarm	Holding Register (4xxxx)	Range	Description
Clear Alarms	400	0=No 1=ClrFlts 2=ClrPrblms 3=ClrWrngs 4=ClrAllAlms	Clears all active alarms or group of alarm types. Applies to ZTC, DTC or 1ZnVAV controller configurations. **Value** **Action** 0=No No Action Taken 1=ClrFlts Clear All Faults 2=ClrPrblms Clear All Problems 3=ClrWrngs Clear All Warnings 4=ClrAllAlms Clear All Alarms
Active Warning	155	0-255	Highest priority active problem alarm.
Active Problem	156	0-255	Highest priority active warning alarm.
Active Fault	157	0-255	Highest priority active fault alarm.
Alarm Value	158	0-255	Highest priority active alarm. Alarm object = 0 if no alarms are active or to the enumeration of the highest priority active alarm.

Table 5: Warning Alarms by Priority

Alarm Class Priority	Alarm Name	Clear	Description
0	No Active Warnings		No active alarms.
4	Hi Space RH1: Warning	Manual	Indicates that a space or return air humidity sensor has exceeded the setpoint high limit for longer than the Hi Humid time. Applies when units are configured for IAQ monitoring and have the proper sensor installed.
5	Lo Space Rh1: Warning	Manual	Indicates that a space or return air humidity sensor is below the setpoint low limit for longer than the Lo Humid time. Applies when units are configured for IAQ monitoring and have the proper sensor installed.
6	Lo Bldg Press: Warning	Automatic	Indicates the building static pressure (BSP) is below the low BSP setpoint. Applies when units are configured for IAQ monitoring and have the proper sensor installed.
7	Hi CO2: Warning	Manual	Indicates the amount of CO_2 in the space is at poor or hazard conditions for longer than the Hi CO2 time. Applies when units are configured for IAQ monitoring and have the proper sensor installed.
24	Main Filter: Warning	Manual	Indicates the status of the main filter switch.[1]
25	Final Filter: Warning	Manual	Indicates the status of the final filter switch.[1]
34	Return / Exhaust Fan: Warning	Automatic	An active alarm indicates that there is a problem with the return or exhaust fan operation. Applies to units with a VFD or ECM return/exhaust fan.[2]
50	Over Economizing: Warning	Automatic	An active alarm indicates that the unit is economizing when it should not be economizing.[2]
52	Under Economizing: Warning	Automatic	An active alarm indicates that the unit is not economizing when it should be economizing.[2]
54	Excess Outdoor Air: Warning	Automatic	An active alarm indicates that the unit is delivering excess outdoor air.[2]
56	Outdoor Air Damper Stuck: Warning	Automatic	An active alarm indicates that the outdoor air dampers may be stuck.[2]
58	Energy Wheel: Warning	Automatic	An active alarm indicates that the energy recovery wheel is not functioning as expected.[2]

[1] Normal = 0, In Alarm = 1
[2] Open or short-circuited = 0, Closed = 1

Table 6: Problem Alarms by Priority

Alarm Class Priority	Alarm Name[5]	Clear	Description
0	No Active Problems		No active alarms.
61	HiDptClDsbld: Problem	Automatic	Indicates that the outdoor air dewpoint is above the setpoint and dewpoint cooling is disabled.
62	CondOverflow: Problem	Manual	Indicates that the condensate input is open continuously for 10 seconds. Alarm is generated on units with R32 refrigerant.
64	C1HiC1FCmpTmp1: Problem	Automatic[3]	Indicates that the fixed compressor high temperature 1 is above 120°F continuously for 5 seconds.
65	C1HiC1FCmpTmp3: Problem	Automatic[3]	Indicates that the fixed compressor high temperature 3 is above 120°F continuously for 5 seconds.
66	C1HiC1FCmpTmp5: Problem	Automatic[3]	Indicates that the fixed compressor high temperature 5 is above 120°F continuously for 5 seconds.
67	C1FCmpTmp1: Problem	Manual	Indicates that the fixed compressor temperature sensor 1 is present and either shorted or open circuited for longer than temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range.
68	C1FCmpTmp3: Problem	Manual	Indicates that the fixed compressor temperature sensor 3 is present and either shorted or open circuited for longer than temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range.
69	C1FCmpTmp5: Problem	Manual	Indicates that the fixed compressor temperature sensor 5 is present and either shorted or open circuited for longer than temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range.
70	C1DRT3Sensor: Problem	Manual	Indicates that the DRT sensor 3 is present and either shorted or open circuited for longer than temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range.
71	C1DRT5Sensor: Problem	Manual	Indicates that the DRT sensor 5 is present and either shorted or open circuited for longer than temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range.
74	C2Hi FCmpTmp2: Problem	Automatic[3]	Indicates that the fixed compressor high temperature 2 is above 120°F for five seconds.
75	C2Hi FCmpTmp4: Problem	Automatic[3]	Indicates that the fixed compressor high temperature 4 is above 120°F for five seconds
76	C2Hi FCmpTmp6: Problem	Automatic[3]	Indicates that the fixed compressor high temperature 6 is above 120°F for five seconds
77	C2FCmpTmp2: Problem	Manual	Indicates that the fixed compressor temperature sensor 2 is present and either shorted or open circuited for longer than temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range.
78	C2FCmpTmp4: Problem	Manual	Indicates that the fixed compressor temperature sensor 4 is present and either shorted or open circuited for longer than temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range.
79	C2FCmpTmp6: Problem	Manual	Indicates that the fixed compressor temperature sensor 6 is present and either shorted or open circuited for longer than temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range.
80	C2DRT4Sensor: Problem	Manual	Indicates that the DRT sensor 4 is present and either shorted or open circuited for longer than temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range.
81	C2DRT6 Sensor: Problem	Manual	Indicates that the DRT sensor 6 is present and either shorted or open circuited for longer than temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range.
82	DFT1Sensor: Problem	Manual	Indicates the defrost sensor 1 is present and either shorted or opened for longer than the temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range. Applies to heat pump units.
83	DFT2Sensor: Problem	Manual	Indicates the defrost sensor 2 is present and either shorted or opened for longer than the temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range. Applies to heat pump units.
101	MHGRht Vlv1: Problem	Manual	Indicates that the modulating hot gas reheat valve motor and driver are not synchronizing as expected.[1]
105	C1DRT1 Sensor: Problem	Manual	Indicates that the DRT sensor 1 is present and either shorted or opened for longer than the temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range.
106	C2DRT2 Sensor: Problem	Manual	Indicates that the DRT sensor 2 is present and either shorted or opened for longer than the temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range.
107	4WV1: Problem	Manual	The 4-way reversing valve 1 indicates a problem with compressor cooling and heating operation. Applies to heat pump units.
108	4WV2: Problem	Manual	The 4-way reversing valve 2 indicates a problem with compressor cooling and heating operation. Applies to heat pump units.
109	ProtIntrlck: Problem	Manual	The Protection Interlock Problem alarm is generated when the effective compressor capacity input is greater than 5% x 10 and the system safety protection interlock input is Open or the safety switch command is Off for 90 seconds. Compressor operation is disabled under these conditions. Applies to refrigeration-only units.
110	VCmp 1: Problem	Manual	Indicates the current status of the variable speed compressor problem alarm on circuit 1. Applies to units with VFD compressors.[1]

Table 6: Problem Alarms, Continued

Alarm Class Priority	Alarm Name[5]	Clear	Description
111	VCmp 2: Problem	Manual	Indicates the current status of the variable speed compressor problem alarm on circuit 2. Applies to units with VFD compressors.[1]
115	SRT Sensor 1: Problem	Manual	Indicates that suction refrigerant temperature sensor on circuit 1 is present and either shorted or opened for longer than the temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range.
116	SRT Sensor 2: Problem	Manual	Indicates that suction refrigerant temperature sensor on circuit 2 is present and either shorted or opened for longer than the temperature alarm delay default of 30 seconds, or the sensor value has exceeded the allowable range.
120	Hi DL Temp_1: Problem	Manual	Indicates if the high discharge line temperature problem alarm on circuit 1 or 2 has exceeded the high temperature limit. Applies to units with VFD compressors.[1]
121	Hi DL Temp_2: Problem		
125	Exp Valve 1: Problem	Manual	Indicates the status of the circuit 1 or 2 expansion valve problem alarm.[1]
126	Exp Valve 2: Problem		
130	OA Fan 1: Problem	Manual	Indicates if an outdoor air fan problem alarm on circuit 1 or 2 is active.[1]
131	OA Fan 2: Problem		
133	Refrigerant Leak: Problem	Manual	Indicates the A2L leak detection board has detected a leak with one or more of the refrigerant sensors.
134	Refrig Sensor: Problem	Automatic	Indicates the A2L refrigerant sensor is in fault condition or is not communicating to the controller.
135	PTS1 Sensor: Problem	Manual	The suction refrigerant pressure sensor 1 or 2 is present and the following are true for 30 seconds: 1. Charge Loss Problem is Inactive 2. The sensor value is less than -96.53 kPa (-14.0 psi)
136	PTS2 Sensor: Problem		
140	PTD1 Sensor: Problem	Manual	The discharge refrigerant pressure sensor 1 or 2 is present and the sensor value is greater than 4619.5 kPa (670 psi) or less than -96.53 kPa (-14.0 psi).
141	PTD2 Sensor: Problem		
145	Lo Charge 1: Problem	Manual	Indicates the status of the low refrigerant charge problem alarm on circuit 1 or 2.[1]
146	Lo Charge 2: Problem		
150	ChargeLoss 1: Problem	Manual	Indicates if the refrigerant system charge on circuit 1 or 2 has been lost and the following are true for 20 seconds:[1] 1. The discharge refrigerant pressure sensor is less than or equal to 68.94 kPa (10 psi) 2. The suction refrigerant pressure sensor is less than or equal to 68.94 kPa (10 psi)
151	ChargeLoss 2: Problem		
155	VCmp1LoDSH: Problem	Manual	Indicates if the discharge superheat problem alarm on circuit 1 or 2 is active because of a low superheat reading. Applies to units with VFD compressors[1]
156	VCmp2LoDSH: Problem		
160	Lo Press 1: Problem	Manual	Indicates the status of the low pressure switch input. When it is in the alarm (Open) position, the low pressure problem alarm is active. This means that the low pressure switch input has been in the alarm (Open) position for longer than the default of two seconds or that the compressor on circuit 1 or 2 has been on for longer than 5 seconds[1]
161	Lo Press 2: Problem		
165	Hi Press 1: Problem	Manual	Indicates the status of the high pressure switch input. When it is in the alarm (Open) position, the high pressure problem alarm is active and the inverter compressor refrigerant circuit 1 or 2 high limits have been exceeded. Applies to units with VFD compressors.[1]
166	Hi Press 2: Problem		
170	Lo Press Diff 1: Problem	Manual	Current status of the low discharge pressure problem alarm on circuit 1 or 2. Applies to units with VFD compressors.[1]
171	Lo Press Diff 2: Problem		
175	HiVCmpTmp 1: Problem	Manual	Indicates if the high variable speed compressor for circuit 1 or 2 has exceeded the high temperature setpoint. Alarm requires a manual clear after VCmp1Temp is below 212°F (100°C) continuously for one minute.[1]
176	HiVCmpTmp 2: Problem		
180	VCmpTSnsr1: Problem	Manual	Indicates that the variable compressor temperature sensor 1 or 2 is present but has been shorted. It can also indicate that the sensor is in the alarm (Open) position, or that no sensor is detected.
181	VCmpTSnsr2: Problem		
185	VCmp1HiDSH: Problem	Manual	Indicates the high discharge superheat problem alarm on cooling circuit 1 or 2. Applies to units with VFD compressors.[1]
186	VCmp2HiDSH: Problem		
190	IFB1 Comm: Problem (VCmp1 & 2)	Automatic[4]	An interruption has occurred between the unit controller and an inverter compressor interface communication board (IFB) board, if installed. This indicates that both the high pressure switch HP1 and HP2 switch inputs are in the normal (Close) position. Note: The high pressure switch disables a 16 VDC power input from the variable compressor controller. This may cause an erroneous IFB1/IFB2 Comm problem alarm.
191	IFB2 Comm: Problem (VCmp3 & 4)		
192	EFT/LCT Snsr: Problem	Automatic	Indicates that the entering fan/leaving coil temperature sensor is present and either shorted or open circuited for longer than temperature alarm delay default of 30 seconds. Applies when unit control type is ZTC, DTC, or 1ZnVAV.
193	RAT Sensor: Problem	Automatic	The return air temperature sensor is present and either shorted or opened for longer than the temperature alarm delay default of 30 seconds. Applies when unit control type is ZTC, DTC, or 1ZnVAV. Alarm clears automatically when the sensor becomes reliable.
194	Space Sensor 1: Problem	Automatic	Indicates that the local space sensor input is shorted or open circuited for longer than the temperature alarm delay of 30 seconds. Applies when unit control type is ZTC, DTC, or 1ZnVAV. Alarm clears automatically when the sensor becomes reliable.
195	Space Sensor 2: Problem		
196	Space Sensor 3: Problem		

Table 6: Problem Alarms, Continued

Alarm Class Priority	Alarm Name[5]	Clear	Description
197	OAT Sensor: Problem	Manual	Indicates that a valid network outdoor air temperature input value is not present and that the local outdoor air temperature sensor is either shorted or open circuited. Applies when unit control type is ZTC, DTC, or 1ZnVAV.
198	Freeze: Problem	Automatic	Indicates that the freezestat input is in the Open position.[1] Applies when unit control type is ZTC, DTC, or 1ZnVAV.
199	Heat Fail: Problem	Automatic	Indicates the heat fail problem alarm is active.[1] Applies when unit control type is ZTC, DTC, or 1ZnVAV.

[1] Normal = 0, In Alarm = 1
[2] Open or short-circuited = 0, Closed = 1
[3] Requires a manual reset if the alarm occurs three times within 100 minutes
[4] Requires a manual reset if the alarm occurs five times within 100 minutes
[5]Circuit designation "C1" or "C2" is supported in unit controller software v2506036118 and newer

Table 7: Fault Alarms by Priority

Alarm Class Priority	Alarm Name	Clear	Description
0	No Active Faults		No active alarms.
205	High Dewpint Cooling Disable: Fault	Automatic	Indicates the outdoor air dewpoint is greater than the OA dewpoint maximum value (HiOADwptValue) setpoint. Applies to 100% OA damper units.
208	Airflow Fault	Manual	Indicates the condition of the airflow switch used to determine whether or not sufficient supply air flow is present for unit operation.[1] Does not apply to refrigeration-only units.
212	Low Discharge Air Temperature Fault	Manual	Indicates that the discharge air temperature is below the low discharge temperature setting and that the discharge air temperature sensor reading is reliable (not open or short-circuited).
216	High Discharge Air Temperature Fault	Manual	Indicates that the discharge air temperature is greater than the high discharge temperature limit and that the discharge air temperature sensor reading is reliable (not open or short-circuited).[2]
220	High Return Air Temperature Fault	Manual	Indicates that the return air temperature is greater than the high return temperature limit of 120°F for longer than the high/low temperature alarm delay of 35 seconds and that the return air temperature sensor reading is reliable (not open or short-circuited).
224	Duct High Limit Fault	Manual	Indicates that the Duct High Limit Fault alarm is active. Applies only to Variable Air Volume (VAV) units configured for a VFD or ECM supply fan.
228	Discharge Air Temperature Sensor Fault	Manual	Indicates that the discharge air temperature sensor is not reliable for longer than the temperature sensor alarm delay default of 30 seconds[2].
244	Control Temperature Fault	Manual	Indicates that the sensor configured for control temperature is not present, is not reliable[2] or is out of range. Also, no other sensor (the return air temperature, outdoor air temperature, or space temperature senor) is available.
250	Emergency Stop Fault	Manual[3]	Indicates that the emergency off switch input is in the alarm (Open) position.
252	Freeze Fault	Manual	Indicates that the freezestat input is in the alarm (Open) position and the supply air fan is on for at least 30 seconds.[2] Applies when the unit heating is face and bypass or hot water steam, or the unit cooling is chilled water.

[1] Normal = 0, In Alarm = 1
[2] Open or short-circuited = 0, Closed = 1
[3] Alarm is manual when the Emergency Off Reset parameter is set to ManClr. Otherwise, it is automatic when Emergency Off Reset is set to AutoClr from the HMI

Table 8: Alarm Status

Holding Register (4xxxx)	Alarm Name	Range	Default	Clear	Description
401	Air Flow Status	0=NoFlow 1=Flow	0=NoFlow	Manual	Indicates the airflow status.
402	Filter Switch Input	0=Open 1=Closed	1=Closed	NA	Indicates the status of the main filter switch.[2] The 0=Open position generates the warning alarm (404).
403	Final Filter Switch Input	0=Open 1=Closed	1=Closed	NA	Indicates the status of the final filter switch.[2] The 0=Open position generates the warning alarm (405).
404	Filter Warning	0=Normal 1=Alarm	0=Normal	NA	Indicates whether filter 1 (main filter) is in alarm condition. Alarm indicates the main filter switch input (FilterSw1) is in the alarm (open) position or when the filter pressure inputs 1 or 2 exceed the high filter pressure 1 or 2 setpoints.
405	Final Filter Warning	0=Normal 1=Alarm	0=Normal	Manual	Indicates whether filter 2 (final filter) is in alarm condition. Alarm indicates the final filter switch input (FilterSw2) is in the alarm (open) position or when the filter pressure 3 input exceeds the high filter pressure 3 setpoint.

Table 8: Alarm Status, Continued

Holding Register (4xxxx)	Alarm Name	Range	Default	Clear	Description
406	Energy Wheel Warning	0=Normal 1=Alarm	0=Normal	Manual	Indicates that the energy recovery wheel is not functioning as expected and the Energy Wheel Warning alarm is active.[1]
407	Over Economizing Warning	0=Normal 1=Alarm	0=Normal	Automatic	An active alarm indicates that the unit is economizing when it should not be economizing.
408	Under Economizing Warning	0=Normal 1=Alarm	0=Normal	Automatic	An active alarm indicates that the unit is not economizing when it should be economizing.
409	Excess Outdoor Air Warning	0=Normal 1=Alarm	0=Normal	Automatic	An active alarm indicates that the unit is delivering excess outdoor air.
410	Outdoor Air Damper Stuck Warning	0=Normal 1=Alarm	0=Normal	Automatic	Indicates that the freezestat is in the open position and an alarm has been generated.[2]
411	Return / Exhaust Fan Warning	0=Normal 1=Alarm	0=Normal	Automatic	An active alarm indicates that there is a problem with the return or exhaust fan operation. The OffNormal state of this object indicates a Return / Exhaust Fan Warning. Applies to units with a VFD or ECM return/exhaust fan.[1]
412	Freeze Fault	0=Open 1=Closed	1=Closed	Manual	Indicates that the freezestat is in the open position and an alarm has been generated.[2]
413	Freeze Problem	0=Alarm 1=Normal	1=Normal	Automatic	Activates the Freeze Problem alarm when input is in the Open position.[1]
414	Heat Fail Problem	0=Normal 1=Alarm	0=Normal	Automatic	Indicates the status of the Heat Fail Problem alarm.[1]
415	A2L Refrigerant Sensor Problem	0=Normal 1=Alarm	0=Normal	Manual	Iindicates that the A2Lmitigation board is in fault or that communcation to the A2L board has been lost.
416	A2L Refrigerant Leak Problem	0=Normal 1=Alarm	0=Normal	Automatic	An alarm indicates that the A2L mitigation board has detected a refrigerant concentration level above the allowable threshold.
417	High Pressure Problem Circuit 1	0=Normal 1=Alarm	0=Normal	Manual	Indicates the status of the high pressure switch input. When it is in the alarm (Open) position, the High Pressure Problem alarm is active and the inverter compressor refrigerant circuit 1 limit has been exceeded.[1]
418	Low Pressure Problem Circuit 1	0=Alarm 1=Normal	1=Normal	Automatic	Indicates the status of the low pressure switch input. When it is in the alarm (Open) position, the Low Pressure Problem alarm is active. This means that the low pressure switch input has been in the alarm (Open) position for longer than the default of two seconds or that the compressor on circuit 1 has been on for longer than five seconds.[1]
419	Low Discharge Pressure Problem Circuit 1	0=Normal 1=Alarm	0=Normal	Manual	Indicates the status of the Low Discharge Pressure Problem alarm for VFD circuit 1 compressor.[1]
420	Outdoor Air Fan 1 Problem	0=Normal 1=Alarm	0=Normal	Manual	Indicates if an Outdoor Air Fan Problem alarm is active.[1]
421	Inverter Compressor Board (IFB) 1 Problem	0=Normal 1=Alarm	0=Normal	Manual	Indicates if an interruption has occurred between the unit controller and an inverter compressor interface communication board (IFB) board, if installed.[1]
422	Charge Loss Problem Circuit 1	0=Normal 1=Alarm	0=Normal	Manual	Indicates if the refrigerant system charge on circuit 1 has been lost.[1]
423	High Variable Speed Compressor Temperature Problem Circuit 1	0=Normal 1=Alarm	0=Normal	Manual	Indicates if the variable speed compressor for circuit 1 has exceeded the high temperature setpoint.
424	Variable Speed Compressor Problem Circuit 1	0=Normal 1=Alarm	0=Normal	Manual	Indicates the status of the Variable Speed Compressor Problem alarm on circuit 1. Applies to units with VFD compressors.[1]
425	Low Discharge Superheat Problem Circuit 1	0=Normal 1=Alarm	0=Normal	Manual	Indicates if the circuit 1 Discharge Superheat Problem alarm is active because of a low superheat reading. Applies to units with VFD compressors.[1]
426	High Discharge Superheat Problem Circuit 1	0=Normal 1=Alarm	0=Normal	Manual	Indicates if the circuit 1 Discharge Superheat Problem alarm is active because of a high superheat reading.Applies to units with VFD compressors.[1]
427	High Discharge Line Temperature Problem Circuit 1	0=Normal 1=Alarm	0=Normal	Manual	Indicates if the circuit 1 High Discharge Line Temperature has exceeded the high temperature limit. Applies to units with VFD compressors.[1]
428	Expansion Valve Problem Circuit 1	0=Normal 1=Alarm	0=Normal	Manual	Indicates the status of the circuit 1 Expansion Valve Problem alarm.[1]
429	Modulating Hot Gas Reheat Problem Circuit 1	0=Normal 1=Alarm	0=Normal	Manual	Indicates that the modulating hot gas reheat valve motor and driver are not synchronizing as expected.[1]
430	High Pressure Problem Circuit 2	0=Normal 1=Alarm	0=Normal	Manual	Indicates the status of the high pressure switch input. When it is in the alarm (Open) position, the High Pressure Problem alarm is active and the inverter compressor refrigerant circuit 2 limit has been exceeded.[1]

Table 8: Alarm Status, Continued

Holding Register (4xxxx)	Alarm Name	Range	Default	Clear	Description
431	Low Pressure Problem Circuit 2	0=Normal 1=Alarm	0=Normal	Automatic	Indicates the status of the low pressure switch input. When it is in the alarm (Open) position, the Low Pressure Problem alarm is active. This means that the low pressure switch input has been in the alarm (Open) position for longer than the default of two seconds or that the compressor on circuit 2 has been on for longer than five seconds.[1]
432	Low Discharge Pressure Problem Circuit 2	0=Normal 1=Alarm	0=Normal	Manual	Indicates the status of the Low Discharge Pressure Problem alarm for VFD circuit 2 compressor.[1]
433	Outdoor Air Fan Problem Circuit 2	0=Normal 1=Alarm	0=Normal	Manual	Indicates if an Outdoor Air Fan Problem alarm is active on circuit 2.[1]
434	Inverter Compressor Board (IFB) Problem Circuit 2	0=Normal 1=Alarm	0=Normal	Manual	Indicates if an interruption has occurred between the unit controller and an inverter compressor interface communication board (IFB) board.[1]
435	Charge Loss Problem Circuit 2	0=Normal 1=Alarm	0=Normal	Manual	Indicates if the refrigerant system charge on circuit 2 has been lost.[1]
436	High Variable Speed Compressor Temperature Problem Circuit 2	0=Normal 1=Alarm	0=Normal	Manual	Indicates if the variable speed compressor for circuit 2 has exceeded the high temperature setpoint.
437	Variable Speed Compressor Problem Circuit 2	0=Normal 1=Alarm	0=Normal	Manual	Indicates the status of the Variable Speed Compressor Problem alarm on circuit 2. Applies to units with VFD compressors.[1]
425	Low Discharge Superheat Problem Circuit 2	0=Normal 1=Alarm	0=Normal	Manual	Indicates if the circuit 2 Discharge Superheat Problem alarm is active because of a low superheat reading. Applies to units with VFD compressors.[1]
439	High Discharge Superheat Problem Circuit 2	0=Normal 1=Alarm	0=Normal	Manual	Indicates if the circuit 2 Discharge Superheat Problem alarm is active because of a high superheat reading.Applies to units with VFD compressors.[1]
440	High Discharge Line Temperature Problem Circuit 2	0=Normal 1=Alarm	0=Normal	Manual	Indicates if the circuit 2 High Discharge Line Temperature Problem alarm on has exceeded the high temperature limit. Applies to units with VFD compressors.[1]
428	Expansion Valve Problem Circuit 2	0=Normal 1=Alarm	0=Normal	Manual	Indicates the status of the circuit 2 Expansion Valve Problem alarm.[1]
453	Duct High Limit Fault	0=Open 1=Closed	1=Closed	Manual	Indicates the status of the local duct high limit switch with input from the local sensor. This is the object that generates a Fault alarm when in the Open position.[2]
454	Emergency Off Fault	0=Open 1=Closed	1=Closed	Manual	Indicates the status of the emergency off switch. Input is from either a local sensor or the network. This is the object that generates a Fault alarm when in the Open position.[2]
455	Airflow Fault	0=Normal 1=Alarm	0=Normal	Manual	Indicates the condition of the airflow switch[1]. It is the object that generates the alarm. Determines whether or not sufficient supply air flow is present for unit operation. Does not apply to refrigeration-only units.
456	High Return Air Temperature Fault	0=Normal 1=Alarm	0=Normal	Manual	Indicates that the return air temperature is greater than the high return temperature limit of 120°F for longer than the high/low temperature alarm delay of 35 seconds and that the return air temperature sensor is not reliable (shorted or open circuited).[1]

[1] Normal = 0, In Alarm = 1
[2] Open or short-circuited = 0, Closed = 1

Table 9: Events and Standby Events

Holding Register (4xxxx)	Event Name	Range	Default	Clear	Description
500	Fan Retry Event	0=Inactive 1=Active	0=Inactive	Automatic	Supply Fan Retry Event control is active.
501	Tenant Override Event	0=Inactive 1=Active	0=Inactive	Automatic	Tenant Override Event operation control is active.
502	Passive Ventilation Active Event	0=Inactive 1=Active	0=Inactive	Automatic	Passive Ventilation Active Event sequence control is active.
503	Reheat Limiting Control	0=Inactive 1=Active	0=Inactive	Automatic	Reheat Compressor Limiting Event control is active.
504	Expansion Valve Synchronication Standby Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	Event is active when the expansion valve and stepper motor are not synchronized due to power interruption.
505	Fin Temperature Unload Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The circuit 1 High Fin Temperature Unloading Event control is active. Applies to units with inverter compressors.
506	High Compression Ratio Unloading Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The Circuit 1 High Compression Ratio Unloading Event control is active.

Table 9: Events and Standby Events, Continued

Holding Register (4xxxx)	Alarm Name	Range	Default	Clear	Description
507	High Compression Ratio Unloading Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The Circuit 1 High Compression Ratio Unloading Event control is active.
508	High Discharge Line Temperature Unload Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The Circuit 1 High Discharge Line Temperature Unloading Event control is active on fixed compressor 1
509	High Current Unload Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The Circuit 1 High Amp Unloading Event control is active.
510	High Discharge Superheat Standby Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The circuit compressor state is forced into Standby because of high discharge superheat protection.
511	Compressor Body High Temperature Standby Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The circuit compressor state is forced into Standby because of compressor body high temperature protection.
512	High Pressure Standby Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The circuit compressor state is forced into Standby because of compressor body high temperature protection.
513	High Pressure Unload Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The Circuit 1 High Pressure Unloading Event control is active.
514	Low Pressure Differential Pressure Standby Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The circuit compressor state is forced into Standby because of low differential pressure protection unloading control.
515	Low Differential Pressure Unload Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The Circuit 1 Low Differential Pressure Unloading Event control is active.
516	Low Discharge Superheat Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The Low Discharge Superheat Event is active when DSH1 < 20°F for at least 60 minutes. Applies to units configured for optional refrigerant monitoring system.
517	Low Pressure Standby Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The circuit compressor state is forced into Standby because of low pressure unloading control.
518	Low Pressure Unload Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The Circuit 1 Low Differential Pressure Unloading Event control is active.
519	Outdoor Air Fan Standby Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The circuit compressor state is forced into Standby because of a fault detected by the outdoor air fan VFD.
520	Unload Request Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The Circuit 1 Unload Request Control control is active.
521	Variable Compressor Problem Standby Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The circuit compressor state is forced into Standby because of a fault detected by the variable compressor controller.
522	Variable Compressor Request Standby Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The compressor circuit is forced to Standby due to a request from the variable compressor controller.
523	High Ambient Limiting Control Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The fixed compressor circuit high ambient limiting control is active.
524	Low Suction Superheat Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The Circuit 1 Low Suction Superheat Event is active when the SSH1< 5°F for at least 60 minutes. Applies to units configured for optional refrigerant monitoring system.
525	High Suction Superheat Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The Circuit 1 High Suction Superheat Event is active when SSH1 > 30°F for at least 60 minutes. Applies to units configured for optional refrigerant monitoring system.
526	Low Discharge Superheat Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The Low Discharge Superheat Event is active when DSH1< 20°F for at least 60 minutes. Applies to units configured for optional refrigerant monitoring system.
527	High Discharge Superheat Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The High Discharge Superheat Event is active when DSH1 < 20°F for at least 60 minutes. Applies to units configured for optional refrigerant monitoring system.
528	Low Subcooling Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The Low Subcooling Event is active when all of the following are true for at least 60 minutes: • Subcooling1 < 1°F • All compressors in the circuit are running • OA Problem alarm inactive • Effective OAT > 75°F • Unit State = Cooling • The Dehumidification Status is Inactive Applies to units configured for optional refrigerant monitoring system.

Table 9: Events and Standby Events, Continued

Holding Register (4xxxx)	Alarm Name	Range	Default	Clear	Description
529	High Subcooling Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The High Subcooling Event is active when all of the following are true for at least 60 minutes: • Subcooling1 > 25°F • All compressors in the circuit are running • The OA Problem alarm is inactive • Effective OAT > 75°F • Unit State = Cooling • The Dehumidification Status is Inactive Applies to units configured for optional refrigerant monitoring system.
530	Low Tc Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	A Low Tc Event is active when the Tc1 value is below the acceptable range. Applies to units configured for optional refrigerant monitoring system. Tc = Circuit discharge pressure saturated temperature input.
531	High Tc Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	A High Tc Event is active when the Tc1 value is above the acceptable range. Applies to units configured for optional refrigerant monitoring system. Tc = Circuit discharge pressure input (PTD_1).
532	Low Te Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	A Low Te Event is active when the Te1 value is below the acceptable range. Applies to units configured for optional refrigerant monitoring system. Te = Circuit suction pressure input.
533	High Te Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	A High Te Event is active when the Te1 value is below the acceptable range. Applies to units configured for optional refrigerant monitoring system. Te = Circuit suction pressure input.
534	High Discharge Refrigerant Temperature Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The Discharge Refrigerant Temperature Event is active when the DRT1 sensor input is > 275°F for at least 30 minutes. Applies to units configured for optional refrigerant monitoring system.
535	High Suction Return Temperature Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The High Suction Return Temperature Event is active when the SRT1 sensor input is > 95°F for at least 45 minutes. Applies to units configured for optional refrigerant monitoring system.
536	Low Oil Prevention Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The Low Oil Prevention Event is active when compressors are operating under extreme conditions and low oil protection is required. Applies to variable compressor units.
537	High Discharge Line Temperature Unload Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The Circuit 1 High Discharge Line Temperature Unloading Event control is active on fixed compressor 3 or 5.
538			0=Inactive	Automatic	
539	Expansion Valve Synchronication Standby Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	Event is active when the expansion valve and stepper motor are not synchronized due to power interruption.
540	Fin Temperature Unload Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	The Circuit 2 High Fin Temperature Unloading Event control is active. Applies to units with inverter compressors.
541	High Compression Ratio Unloading Event Circuit 1	0=Inactive 1=Active	0=Inactive	Automatic	The Circuit 1 High Compression Ratio Unloading Event control is active.
542	High Compression Ratio Unloading Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	The Circuit 2 High Discharge Line Temperature Unloading Event control is active on fixed compressor 1.
543	High Discharge Line Temperature Unload Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	The Circuit 2 High Discharge Line Temperature Unloading Event control is active on fixed compressor 1.
544	High Discharge Superheat Standby Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	The circuit compressor state is forced into Standby because of high discharge superheat protection.
545	High Discharge Superheat Standby Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	The circuit compressor state is forced into Standby because of high discharge superheat protection.
546	Compressor Body High Temperature Standby Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	The circuit compressor state is forced into Standby because of compressor body high temperature protection.
547	Compressor Body High Temperature Standby Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	The circuit compressor state is forced into Standby because of compressor body high temperature protection.
548	High Pressure Unload Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	The Circuit 2 High Pressure Unloading Event control is active.
549	Low Pressure Differential Pressure Standby Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	The circuit compressor state is forced into Standby because of low differential pressure protection unloading control.
550	Low Differential Pressure Unload Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	The Circuit 2 Low Differential Pressure Unloading Event control is active.

Table 9: Events and Standby Events, Continued

Holding Register (4xxxx)	Alarm Name	Range	Default	Clear	Description
551	Low Discharge Superheat Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	The Low Discharge Superheat Event is active when DSH2 < 20°F for at least 60 minutes. Applies to units configured for optional refrigerant monitoring system.
552	Low Pressure Standby Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	The circuit compressor state is forced into Standby because of low pressure unloading control.
553	Low Pressure Unload Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	The Circuit 2 Low Differential Pressure Unloading Event control is active.
554	Outdoor Air Fan Standby Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	The circuit compressor state is forced into Standby because of a fault detected by the outdoor air fan VFD.
555	Unload Request Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	The Circuit 2 Unload Request Control control is active.
556	Variable Compressor Problem Standby Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	The circuit compressor state is forced into Standby because of a fault detected by the variable compressor controller.
557	Variable Compressor Request Standby Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	The compressor circuit is forced to Standby due to a request from the variable compressor controller.
558	High Ambient Limiting Control Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	The fixed compressor circuit high ambient limiting control is active.
559	Low Suction Superheat Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	Circuit 2 Low Suction Superheat Event is active when the SSH2 < 5°F for at least 60 minutes. Applies to units configured for optional refrigerant monitoring system.
560	High Suction Superheat Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	Circuit 2 High Suction Superheat Event is active when SSH2 > 30°F for at least 60 minutes. Applies to units configured for optional refrigerant monitoring system.
561	Low Discharge Superheat Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	The Low Discharge Superheat Event is active when DSH2 < 20°F for at least 60 minutes. Applies to units configured for optional refrigerant monitoring system.
562	High Discharge Superheat Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	The High Discharge Superheat Event is active when DSH2 < 20°F for at least 60 minutes. Applies to units configured for optional refrigerant monitoring system.
563	Low Subcooling Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	The Low Subcooling Event is active when all of the following are true for at least 60 minutes: • Subcooling1 < 1°F • All compressors in the circuit are running • OA Problem alarm inactive • Effective OAT > 75°F • Unit State = Cooling • The Dehumidification Status is Inactive Applies to units configured for optional refrigerant monitoring system.
564	High Subcooling Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	The High Subcooling Event is active when all of the following are true for at least 60 minutes: • Subcooling1 > 25°F • All compressors in the circuit are running • The OA Problem alarm is inactive • Effective OAT > 75°F • Unit State = Cooling • The Dehumidification Status is Inactive Applies to units configured for optional refrigerant monitoring system
565	Low Tc Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	A Low Tc Event is active when the Tc2 value is below the acceptable range. Applies to units configured for optional refrigerant monitoring system. Tc = Discharge pressure saturated temperature input
566	High Tc Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	A High Tc Event is active when the Tc2 value is above the acceptable range. Applies to units configured for optional refrigerant monitoring system. Tc = Discharge pressure input (PTD_1).
567	Low Te Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	A Low Te Event is active when the Te2 value is below the acceptable range. Applies to units configured for optional refrigerant monitoring system. Te = Circuit suction pressure input.
568	High Te Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	A High Te Event is active when the Te2 value is above the acceptable range. Applies to units configured for optional refrigerant monitoring system. Te = Circuit suction pressure input.
569	High Discharge Refrigerant Temperature Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	The Discharge Refrigerant Temperature Event is active when the DRT2 sensor input is > 275°F for at least 30 minutes. Applies to units configured for optional refrigerant monitoring system.
570	High Suction Return Temperature Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	The High Suction Return Temperature Event is active when the SRT2 sensor input is > 95°F for at least 45 minutes. Applies to units configured for optional refrigerant monitoring system.

Table 9: Events and Standby Events, Continued

Holding Register (4xxxx)	Alarm Name	Range	Default	Clear	Description
572	High Discharge Line Temperature Unload Event Circuit 2	0=Inactive 1=Active	0=Inactive	Automatic	The Circuit 2 High Discharge Line Temperature Unloading Event control is active on fixed compressor B or C.
573					

[1] Standby events apply to variable compressors.

Appendix: ASCII Conversion Table

Table 10 lists the ASCII characters and their decimal and hexadecimal numbers. Non-printing characters, with the exception of the (Space) character, are not listed in this table and are not supported. Characters not supported are translated to a space.

Table 10: ASCII Conversion Table

Char (Space)	Decimal	Hexadecimal	Char	Decimal	Hexadecimal	Char	Decimal	Hexadecimal
	32	0x20	@	64	0x40	`	96	0x60
!	33	0x21	A	65	0x41	a	97	0x61
“	34	0x22	B	66	0x42	b	98	0x62
#	35	0x23	C	67	0x43	c	99	0x63
$	36	0x24	D	68	0x44	d	100	0x64
% x 10	37	0x25	E	69	0x45	e	101	0x65
&	38	0x26	F	70	0x46	f	102	0x66
‘	39	0x27	G	71	0x47	g	103	0x67
(	40	0x28	H	72	0x48	h	104	0x68
)	41	0x29	I	73	0x49	I	105	0x69
*	42	0x2a	J	74	0x4a	j	106	0x6a
+	43	0x2b	K	75	0x4b	k	107	0x6b
‘	44	0x2c	L	76	0x4c	l	108	0x6c
-	45	0x2d	M	77	0x4d	m	109	0x6d
.	46	0x2e	N	78	0x4e	n	110	0x6e
/	47	0x2f	O	79	0x4f	o	111	0x6f
0	48	0x30	P	80	0x50	p	112	0x70
1	49	0x31	Q	81	0x51	q	113	0x71
2	50	0x32	R	82	0x52	r	114	0x72
3	51	0x33	S	83	0x53	s	115	0x73
4	52	0x34	T	84	0x54	t	116	0x74
5	53	0x35	U	85	0x55	u	117	0x75
6	54	0x36	V	86	0x56	v	118	0x76
7	55	0x37	W	87	0x57	w	119	0x77
8	56	0x38	X	88	0x58	x	120	0x78
9	57	0x39	Y	89	0x59	y	121	0x79
:	58	0x3a	Z	90	0x5a	z	122	0x7a
;	59	0x3b	[	91	0x5b	{	123	0x7b
<	60	0x3c	\	92	0x5c	|	124	0x7c
=	61	0x3d	]	93	0x5d	}	125	0x7d
>	62	0x3e	^	94	0x5e	~	126	0x7e
?	63	0x3f	_	95	0x5f			

Revision History

Revision	Date	Description of Changes
ED 19133	April 2024	Initial release
ED 19133-1	August 2024	Added Rebel DPS to cover page. Application software supports both Rebel Applied DPSA and Rebel DPS unit types. Added the following configuration options: 1. RO_DCSA to holding register 350 (Control Type) 2. SCR to holding register 373 (Preheat Type) and 3. Fujikoki_PAM 3000/Fujikoki_PAM 2000 (Fj2/Fj3) to holding register 374 (Expansion Valve Type), 4. DCSA to holding register 375 (IO Config), 5. OffEvac to holding register 245 (Unit Status) and removed AnlgMB1-AnlgMB3 to holding register 358 (SAF Type), holding register 364 (SAFlowInput) has been updated to remove unsupported options and holding register 365 (RFEFFlowInput) added option 3.

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