Edge X Communication Guide

For Systems Integrators

Applies to AERCO Benchmark E Boilers



Other documents related to this manual:

- OMM-0170, Edge X Controller Operation Manual
- OMM-0169 BMK E - Installation, Startup, Operation and Maintenance Manual

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1. INTRODUCTION

Some information in this Manual is included in the Edge X Controller Operation & Maintenance Manual (OMM-0170). It is repeated here as a convenience to have all Edge X Controller communication setup and testing information needed by Systems Integrators in one location.

The Edge X Controller can communicate with a Building Automation System (BAS) using BACnet MSTP or BACnet IP. A BAS is a tool that enables a user to control and monitor equipment in a facility. A BAS can read parameters from the unit or it can edit/write parameters. BACnet is a Building Automation industry standard communication protocol while MSTP and IP are physical layers/means of communication for BACnet protocol.

AERCO utilizes cascade sequencing to achieve maximum operational efficiency. Some cascade technology operates with a common header temperature sensor (Boiler Sequencing Technology - BST) while other cascade technologies use individual appliances' outlet temperatures sensor (Independent Sequencing Technology - IST and Water Heater Management - WHM). BST/IST/WHM use MODBUS protocol over RS485 wiring in a daisy chain configuration. Figure 1 shows a schematic representation of the different communication layers in a plant involving Edge X controllers. Throughout this document, BST/IST/WHM will be referred to as "Cascade."

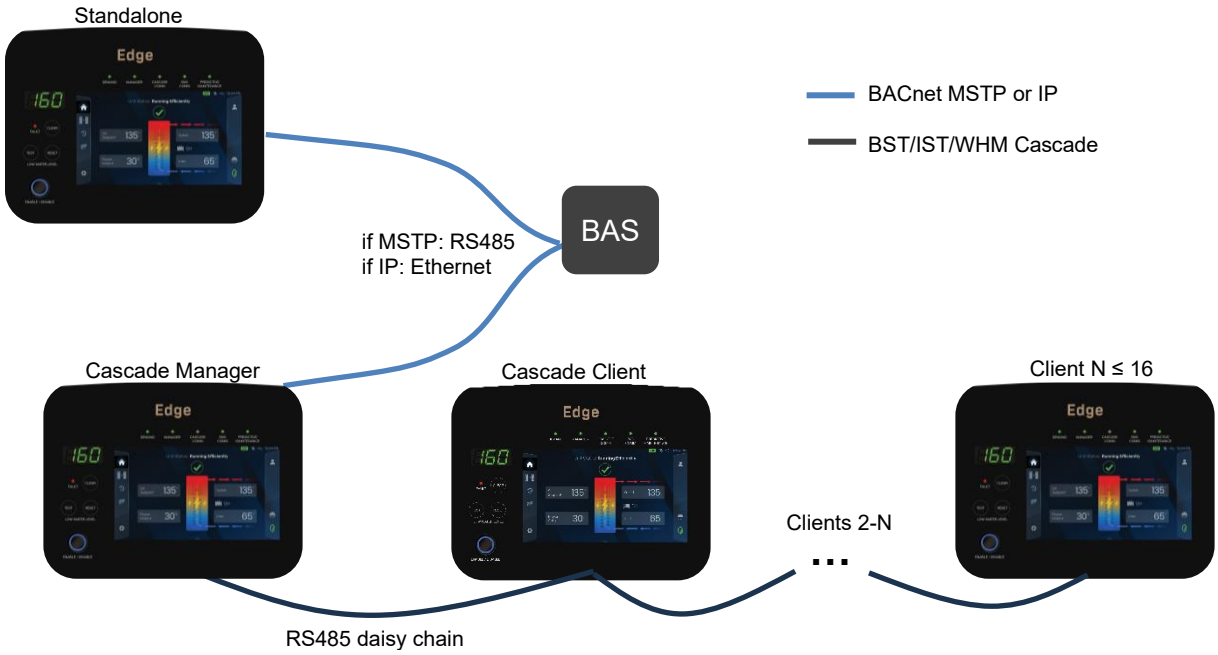


Figure 1: Schematic overview of Edge X integration into a BAS

Note that the BAS connection to the Edge X will depend on the building's choice of BACnet (MSTP or IP), which determines the type of wired connection required. If multiple boilers are installed and a Cascade is implemented, a single connection from the BAS is required to the Cascade Manager. Cascade Client-to-Client connections are all RS485 since they communicate with each other over MODBUS. A single Edge X acting as a Cascade Manager can support a plant of 16 boilers (1 Manager and 15 Clients). If a site wishes to monitor/control a standalone unit that is not in cascade, a separate BAS connection is required. The number of BAS connections to the building is equal to the sum of Cascade Managers and standalone units that are not in cascade.

1.1 Types of Communications

The Edge Controller is designed with integrated communication as one of its main features. The Controller currently supports BACnet connections from the BAS to the controller over two physical layers: ethernet for BACnet IP and RS485 for BACnet MSTP. The location of these connections on the controller is discussed in Chapter 2.



- **Ethernet**: BACnet IP. This implementation of BACnet functions over IP ("internet protocol" similar to world wide web) and uses ethernet cables and connectors to communicate between the buildings and devices such as the Edge X controller. It involves the Edge X ethernet port and ethernet cable like Cat 5 or Cat 6.



- **RS485**: BACnet MSTP. This implementation of BACnet relies on the MSTP communication protocol, which is a serial communication method and therefore relies on standard RS485 for its implementation. It involves the Edge X MODBUS serial communication port and twisted pair, shielded, grounded wire 18-24 AWG.

NOTE: Edge X Controller currently doesn't accommodate Modbus RTU, Modbus TCP/IP, and External Gateways.

2. WIRING

All field wiring connections can be made through conduit knockout holes on the enclosure. On the BMK-E, these holes are located on the top face near the front on the left-hand side.

⚠ WARNING!
The unit must be disabled and powered off at the external disconnect switch for safe field-wiring.

2.1 BACnet MSTP Communication Wiring

The I/O board is the outermost board in the Edge X controller assembly. On the Edge X I/O Board connectors, pin 1 (P1) is designated by a white dot. On terminal strip J16 labelled "MODBUS", this pin is on the right-hand side. Pins J16 P5(+) and J16 P7(-) are dedicated to BACnet MSTP connections. A schematic view of the I/O board showing the RS485 terminal for MODBUS protocol is shown below.

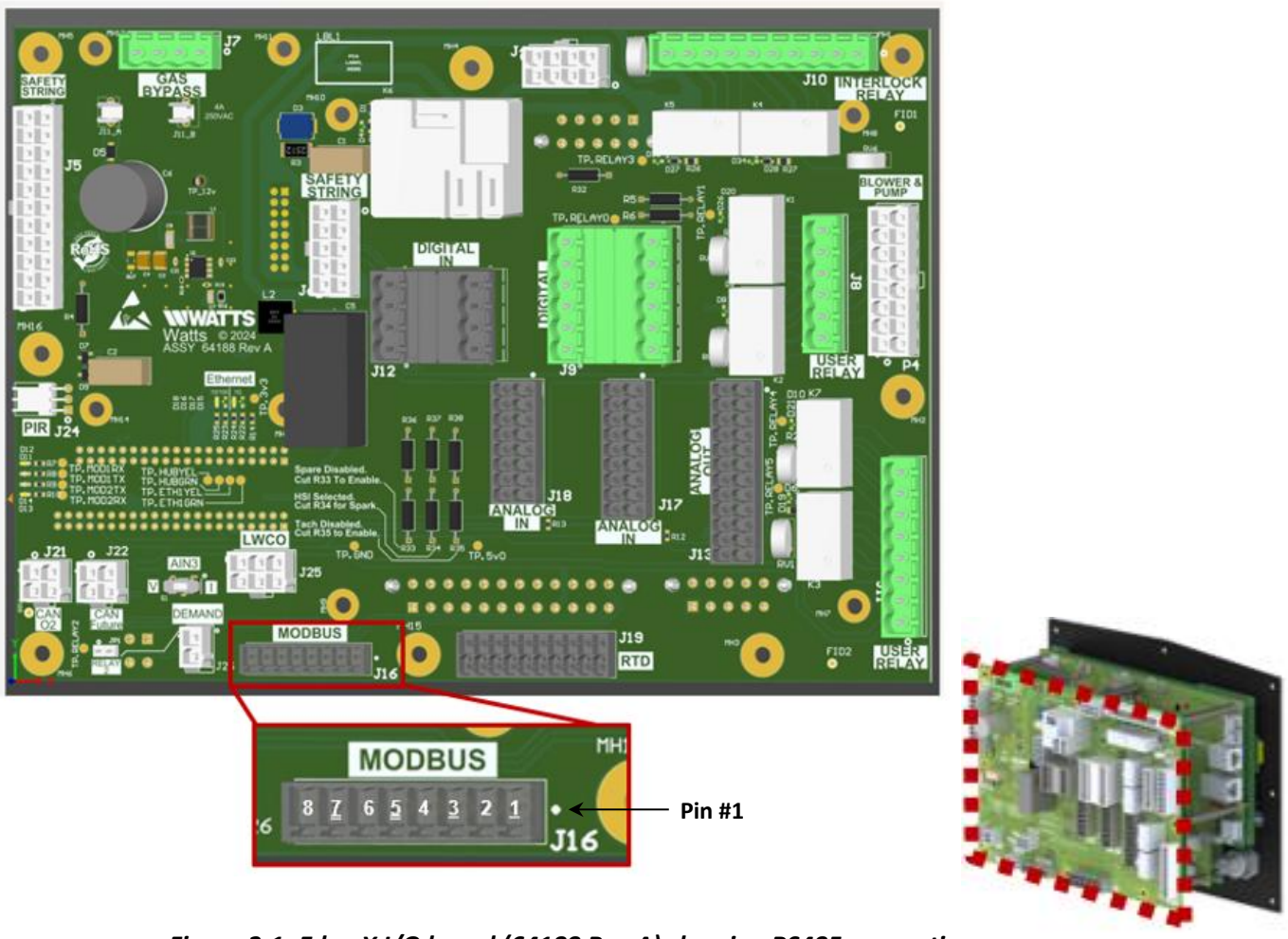


Figure 2-1: Edge X I/O board (64188 Rev A) showing RS485 connection for MODBUS protocol

NOTE: The white dot denotes pin #1. Numbers on this connector increase from right to left.
NOTE: Pin numbers are shown for clarity, but do not appear on the physical board.
NOTE: Bottom right inset indicates location of I/O board on the back of the controller.

2.2 BACnet IP Communication Wiring

The Main Control Board (MCB) located behind the I/O board contains circuitry and connections for executing the central controlling functions of the Edge X controller. For field connection purposes the MCB contains:

- A USB port (J3) for firmware upgrades,
- An ethernet port for network/BACnet IP communication (J5),
- Configuration switches for analog input (SW1/SW5), output (K1/K2), and the MODBUS biasing and termination dipswitches for the Cascade (SW2) and BAS communication (SW5) chains

(A): Analog Output configuration switches K2/K1
(B): Analog Input configuration switches SW1/SW5
(C): MODBUS1/2 dipswitch banks SW4/SW2 for BAS/Cascade termination respectively
(D): Back view of controller showing location of I/O board on back of the controller
(E): Location of J5 gigabit ethernet jack for BACnet IP connection
[F]: Location of Digital Input terminal strip J11

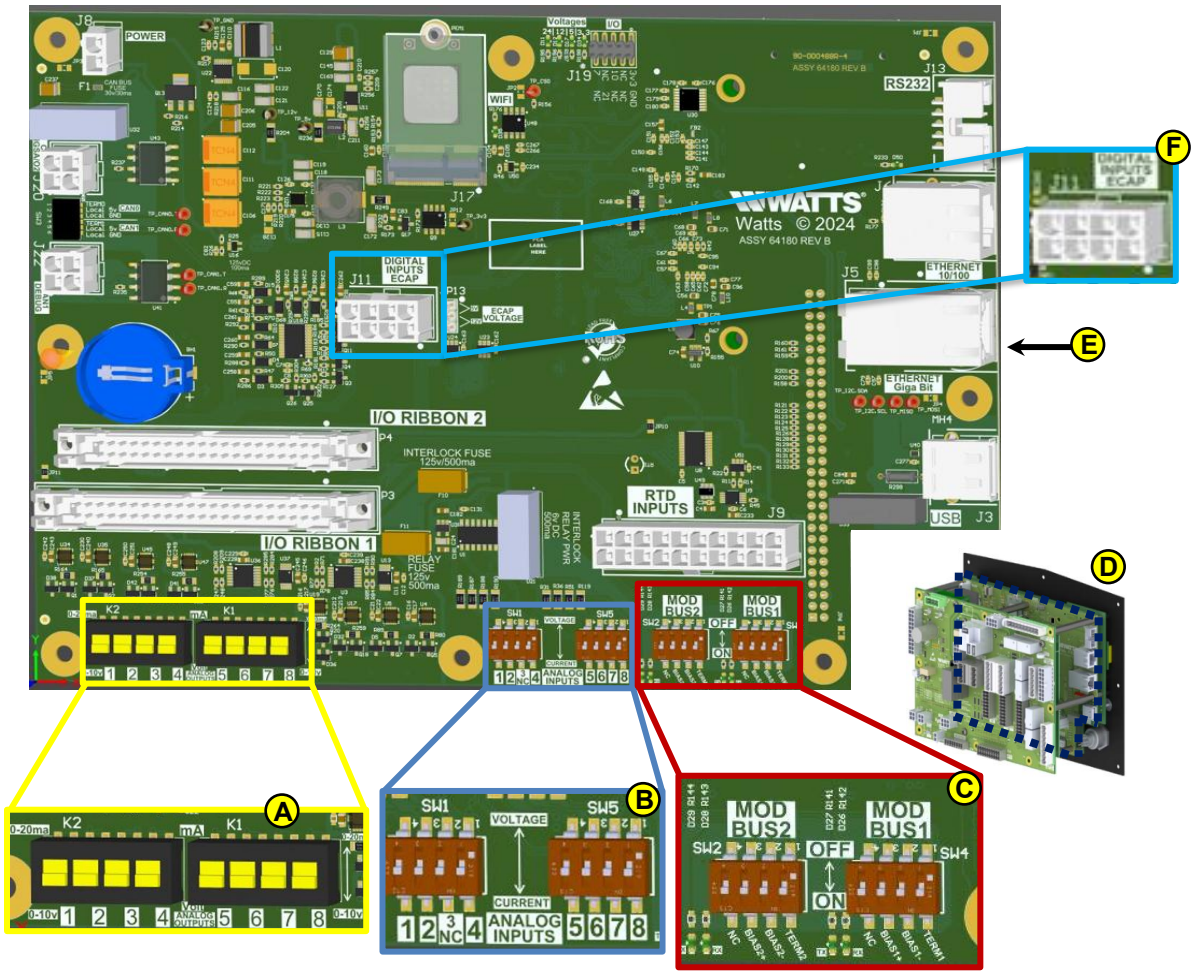


Figure 2-2: Edge X MCB (64180 Rev C)

2.2.1 Communication Termination

The figure below shows dip switch banks MODBUS2 (SW2) and MODBUS1 (SW4).
BAS side termination: If the Edge X is the first or last device in the BAS daisy chain, the Edge X should have the MODBUS1 (SW4) TERM1 dipswitch ON.

NOTE: For proper communication operation in a Cascade, the first and last unit in the chain should have MODBUS2 (SW2) TERM2 dipswitch ON and the units internal to the chain should have TERM2 OFF. Only the first and last units should be terminated so that communication integrity is not compromised by signal reflection.

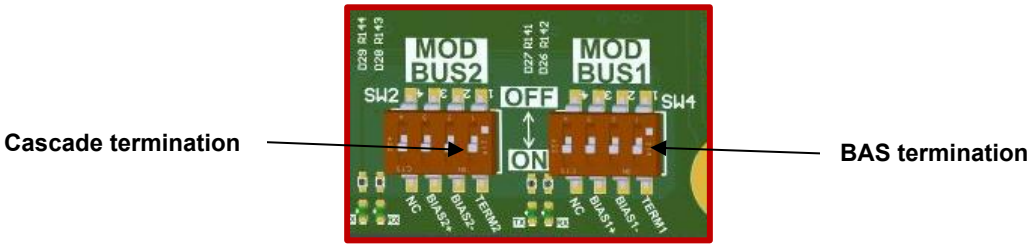


Figure 2-3: MODBUS2 and MODBUS1 Terminations

2.2.2 Ethernet Wiring

Figure 2-4 shows the location of the gigabit ethernet port J5 on the MCB. If BAS is connected to the Edge X controller by ethernet, ensure that the BAS is on the same LAN as the Edge X controller. Note that J6 is also an ethernet jack but it is currently not in use on the Edge X controller.

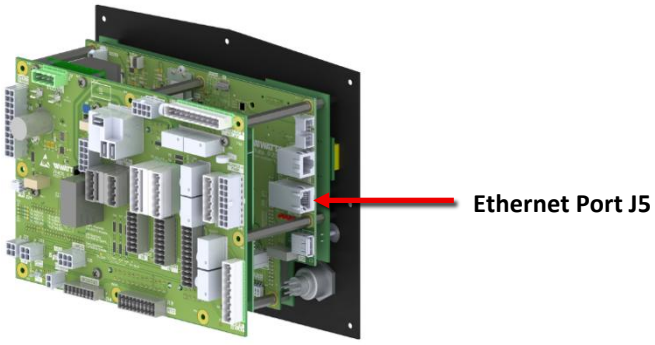


Figure 2-4: Location of Ethernet port J5 on Edge X

3. BAS CONFIGURATIONS

To see the **Communication & Failsafe** menu in the Edge X, follow the menu item path shown:

Settings > Advanced Setup > Comm & Failsafe

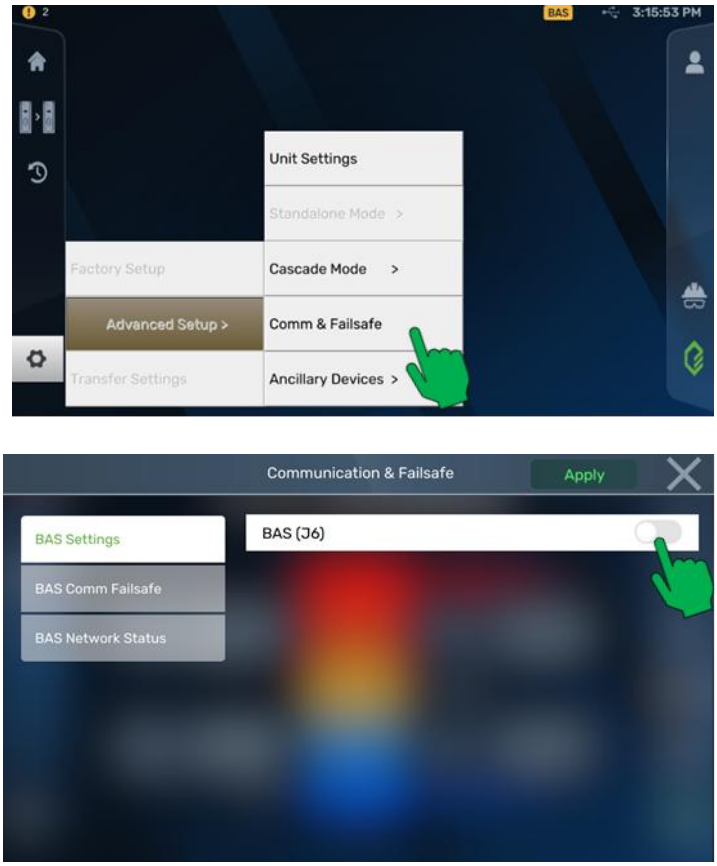


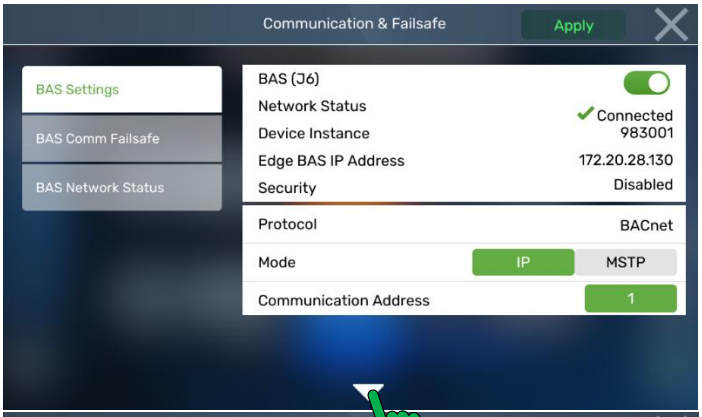
Figure 3-1: Communication & Failsafe Menu Path

The Communication & Failsafe menu will display various BAS menu options. The **BAS Comm Failsafe** menu allows you to select whether the unit will **shut down** or run at a **constant setpoint** if it loses communication with BAS. The **BAS Network Status** menu shows you the IP configuration of your device including DHCP lease information, IP address, DHCP address, and MAC address.

With ethernet connected, enable the **BAS (J6)** toggle button for the ethernet properties.

NOTE: This toggle button is called “BAS (J6)” but uses the J5 ethernet jack.

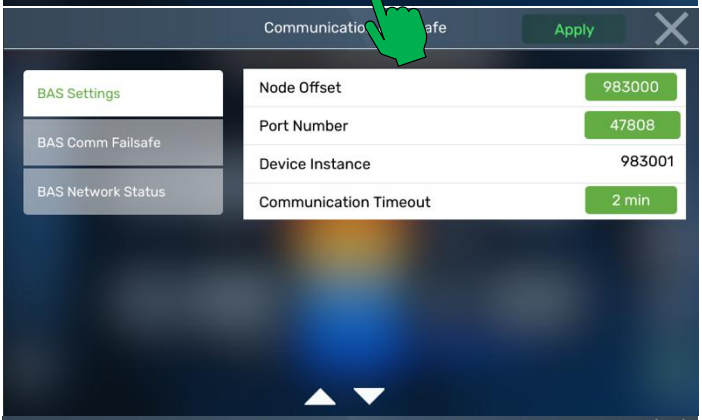
3.1 BAS Configuration: BACnet IP



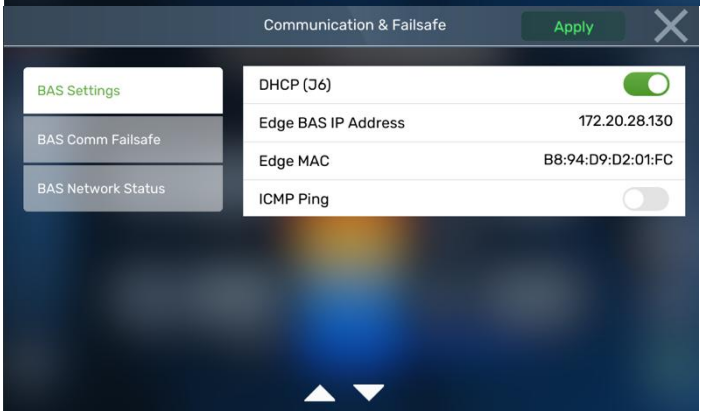
Enable/Disable
Current connectivity
BAS Unique identifier
I/P address of unit
For recognized host servers only

Diagnostic information

BAS protocol, typically BACnet
Connectivity “ethernet” or “serial”
BAS Unit identifier



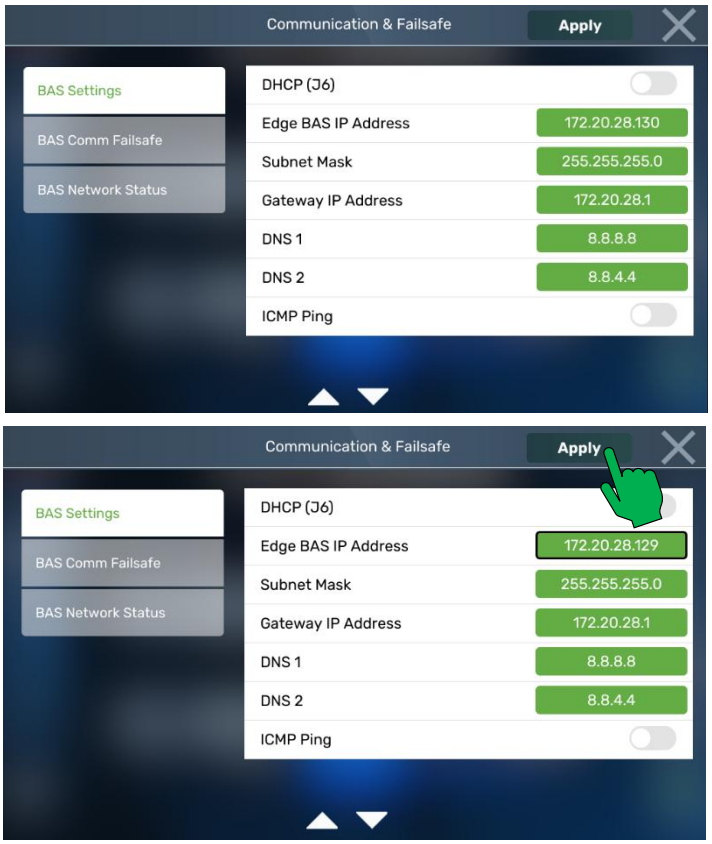
Offset for BACnet devices to avoid duplicates
UDP port number to broadcast ID and data
BAS network identifier
Delay before communication fault



Automatically assigns IP address
IP Address assigned to each network device
Unique hardware address
For testing network connectivity between devices



Security network-side authentication
Manual entry for trusted BAS server IP address



Auto-assign IP; if OFF, manual entry required

Automatically assigns IP address: when this is OFF, manual entry is required to set up IP connection.

Address assigned to this network device

Divides IP address by network/host portion

Routes traffic from local network to external

DNS 1 Main server that holds and updates

DNS 2 secondary, functions as a backup

NOTE: When these fields are changed **manually,** the Apply button will change from a green font color to a white font color and there will be a black box around it.

Apply Apply

Pressing white Apply button will save the changes and restore it to green.

NOTE: This button is only used on this screen.

Figure 3-2: BACnet IP Settings

Troubleshooting tip: If ethernet is connected, DHCP is on, and IP address is not found or shows "N/A," reconnect ethernet cable. If an IP address is still not assigned, power cycle the unit with the ethernet cable plugged in.

3.2 BAS Configuration: BACnet MSTP

The BACnet MSTP screen maintains the BAS configuration from Section 3.1 but with only **Baud Rate** selection required as MSTP-specific configuration. All other parameters involved are described in the previous section. Wiring should be carried out per the description in Section 2.

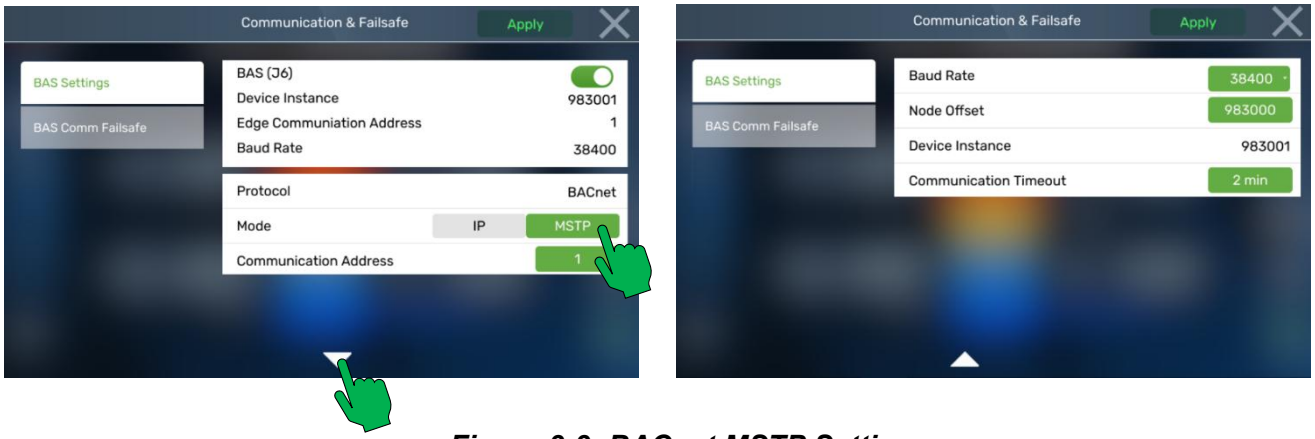


Figure 3-3: BACnet MSTP Settings

4. BACNET PICS STATEMENT

Date: October 2024
BACnet Vendor Name: AERCO International Inc
BACnet Vendor ID: 983
Product Name: Edge X, BMKE
Product Model Number: BMKE (size in kW): 216, 360, 432, 576, 684
Application Software Version: 1.0

BACnet Protocol Revision: 19

Product Description: The Edge X Controller is an integrated controller for AERCO products. It is designed to sequence boilers and water heaters while improving overall system efficiency and simplifying design, installation, startup and maintenance.

BACnet Standardized Device Profile (Annex L): BACnet Application Specific Controller (B-ASC)

List all BACnet Interoperability Building Blocks Supported (Annex K): K.1.2 BIBB - Data Sharing-ReadProperty-B (DS-RP-B); K.1.6 BIBB - Data Sharing-WriteProperty-B (DS-WP-B)

Segmentation Capability: None

Standard Object Types Supported: Device Object, Analog Input, Analog Value

Data Link Layer Options: BACnet IP, (Annex J)

Device Address Binding: Not supported

Networking Options:

☐ Router, Clause 6 - List all routing configurations, e.g., ARCNET-Ethernet, Ethernet-MS/TP, etc.
☐ Annex H, BACnet Tunneling Router over IP
☐ BACnet/IP Broadcast Management Device (BBMD)
☒ Not Supported

Network Security Options: N/A

APPENDIX A - BACNET OBJECTS LIST

A technician-level password is required for access to BAS communication points. BACnet communication objects are in the following sections below:

- TABLE A-1.1: BACnet Objects – Standalone or BST Client Units, Read/Write
- TABLE A-1.2: BACnet Objects – Standalone or BST Client Units, Read Only
- TABLE A-2.1: BACnet Objects – BST Manager Unit, Read/Write
- TABLE A-2.2: BACnet Objects – BST Manager Unit, Read Only
- TABLE A-3: BACnet Objects – BST Client Info Thru Manager, Read Only

TABLE A-1.1: BACnet Objects – Standalone or BST Client Units, Read/Write

TABLE A-1.1: BACnet Objects – Standalone or BST Client Units, Read/Write [Object Type = AV]					
BACnet ID	BAS Object Name	BMK E		BMK	
		Min	Max	Min	Max
2	BAS Password	0 1 2 3 4 5			
4	Setpoint	40F	220F	20F	245F
5	Language	0 = English		0 = English, 1 = Spanish, 2 = French	
6	Time	NA		12.00am	11.59pm
7	Date	NA		0/0/0	12/31/9999
8	Unit of Measurement BAS	English	Metric	English	Metric
9	Cascade Baud Rate	0 = 9600, 1 = 19200, 2 = 38400, 3 = 57600, 4 = 115200		0 = 9600, 1 = 19200, 2 = 38400, 3 = 57600, 4 = 76800, 5 = 115200	
10	Unit Type	NA		0 = KC Boiler, 1 = KC Boiler LN, 2 = BMK Boiler Std, 3 = BMK Blr Std Dual, 4 = BMK Boiler LN, 5 = BMK Blr LN Dual, 6 = KC Water Heater, 7 = KC Water Heater LN, 8 = Innovation, 9 = Innovation N	
11	Unit Size	NA		0 = SPARE, 1 = 600 MBH, 2 = 800 MBH, 3 = 1060 MBH, 4 = 1350 MBH, 5 = 500 MBH, 6 = 750 MBH, 7 = 1000 MBH, 8 = 1.5 MBTU, 9 = 1500 MBH, 10 = 2.0 MBTU, 11 = 2000 MBH, 12 = 2500 MBH, 13 = 3.0 MBTU, 14 = 3000 MBH, 15 = 4000 MBH, 16 = 5000 MBH, 17 = 6000 MBH	
12	Operating Mode	0 = Constant Setpt, 1 = Rmt Setpt, 2 = Outdoor Reset		0 = Constant Setpt, 1 = Remote Setpt, 2 = Direct Drive, 3 = Combination, 4 = Outdoor Reset	
13	Remote Signal	0 = BAS, 1 = Analog Input		0 = 4-20mA/1-5V, 1 = 0-20mA/0-5V, 2 = Network, 3 = BAS, 4 = BST (PWM) Input	
16	For BMK E:Outdoor Sensor On/Off For BMK: Outdoor Sensor	Disable	Enable	Disable	Enable
17	For BMK E: Warm Weather Standby Temperature For BMK: Warm Weather Shtdwn	30F	120F	30F	120F

18	For BMK E: SH Temperature Control Setpoint Low Limit For BMK: Setpoint Low Limit	40F	220F	40F	245F
19	For BMK E: SH Temperature Control Setpoint Hi Limit For BMK: Setpoint High Limit	40F	220F	20F	220F
20	Temperature High Limit	40F	230F	40F	210F
23	For BMK E: Interlocks Aux Delay 2 For BMK: Auxiliary Delay	10secs	240secs	0	240
24	Unit Failsafe Mode	0 = Standby, 1 = Constant Setpt		0 = Shutdown, 1 = Constant Setpt	
26	Proportional Band	1F	120F	1F	120F
27	Integral Band	0	2	0	2
28	Derivative Band	NA		0	2min
70	BAS	NA		0 = Off, 1 = BACnet MSTP, 2 = BACnet IP, 3 = Modbus RTU, 4 = Modbus TCP	
71	BAS Baud Rate	NA		0 = 9600, 1 = 19200, 2 = 38400, 3 = 57600	
81	For BMK E: Outdoor Air Temp Sensor For BMK: Outdoor Temp Source	Direct		0 = Network, 1 = Direct, 2 = BAS	
83	PLM Enabled	0=Disable	1=Enable	NA	
84	PLM Power Limit	0%	100%	NA	
85	Supply Header Temp Source	0 = OFF, 1 = Direct, 2 = BAS		NA	

TABLE A-1.2: BACnet Objects – Standalone or BST Client Units, Read Only

TABLE A-1.2: BACnet Objects – Standalone or BST Client Units, Read Only [Object Type = AI]					
BACnet ID	BAS Object Name	BMK E		BMK	
		Min	Max	Min	Max
0	For BMK E: Active Event ID For BMK: Message Code	0	9999	0	9999
1	Unit Status	0 = Disabled, 1 = Standby, 2 = Manual Mode, 3 = Automatic Mode, 4 = Direct Drive, 5 = Fault, 6 = Unit in Demand Delay, 7 = Unit Starting		0 = Disabled, 1 = Standby, 2 = Manual, 3 = Remote, 4 = Auto, 5 = Fault	
2	Outlet Temp	-40F	250F	0F	250F
3	Inlet Temp	-40F	250F	0F	250F
5	For BMK E: Outdoor Air Temp For BMK: Outside Temp	-70F	250F	-70F	130F
11	Run Cycles	0	999,999,999	0	999,999,999
13	Run Hours	0	999,999,999	0	999,999,999
16	Active Setpoint Temp	40F	220F	0F	250F
17	PID Output	NA		0	100
19	BAS Communication Address	0	16	0	255
45	For BMK E: Valve Control Mode For BMK: Control Mode	0 = On/Off		0 = On/Off, 1 = Linear Modulation, 2 = Delta T Modulation	
46	Isolation Feedback Mode	Disable	Enable	Disable	Enable
47	For BMK E: Minimum Signal Level For BMK: Open Vlv Control Signal	0V 0mA	10V 20mA	0 = 0mA, 1 = 4mA, 2 = 20mA	
48	For BMK E: Maximum Signal Level For BMK: Close Vlv Control Signal	0V 0mA	10V 20mA	0 = 0mA, 1 = 4mA, 2 = 20mA	
148	For BMK E: Serial Alpha For BMK: Unit Alpha	0 = E, 1 = G, 2 = H, 3 = R, 4 = N, 5 = A, 6 = Z		0 = E, 1 = G, 2 = H, 3 = R, 4 = N, 5 = A	
149	For BMK E: Serial Year For BMK: Unit Year	0	99	0	99
150	For BMK E: Serial Number For BMK: Unit Serial #	0	99999	0	9999
152	Unit Mode	0 = Standalone, 1 = Cascade		0=OFF(Standalone), 1=Client (Cascade), 2=Manager (Cascade)	
153	Unit Size	0 = 216kW, 1 = 360kW, 2 = 432kW, 3 = 576kW, 4 = 684kW		NA	

154	Unit Type	0 = KC Boiler, 1 = KC Boiler LN, 2 = BMK Boiler Std, 3 = BMK Blr Std Dual, 4 = BMK Boiler LN, 5 = BMK Blr LN Dual, 6 = BMK Inlet Natural Gas, 7 = BMK Inlet Dual Fuel, 8 = BMK Dual Inlet NGas, 9 = BMK Dual Inlet Dual Fuel, 10 = SmartPlate, 11 = Benchmark E, 12 = Other		NA
155	BAS Enable	0 = Off, 1 = BACnet MSTP, 2 = BACnet IP		NA
156	BAS Baud Rate	0 = 9600, 1 = 19200, 2 = 38400, 4 = 115200		NA
157	Power Output	0%	100%	NA
158	Header Temp	0F	250F	NA

TABLE A-2.1: BACnet Objects – BST Manager Unit, Read/Write

TABLE A-2.1: BACnet Objects – BST Manager Unit, Read/Write [Object Type = AV]			
BACnet ID	**BAS Object Name**	**BMK E**	
		Min	**Max**
200	Setpoint	40F	220F
201	Setback Setpoint	40F	220F
202	Setback Start Time	12.00am	11.59pm
203	Setback Stop Time	12.00am	11.59pm
204	SH Temperature Control Setback Schedule	Disable	Enable
213	Supply Header Temp Source	0 = OFF, 1 = Direct, 2 = BAS	
215	Rtn Hdr Temp Sensor	0 = OFF, 1 = Direct, 2 = BAS	
217	Outdoor Air Temp Sens	Direct	
219	BACnet Communication Protocol	0 = BACnet IP, 1 = BACnet MSTP	0 = OFF, 1 = BACnet MSTP, 2 = BACnet IP
230	PLM Enabled	0=Disable	1=Enable
231	PLM Power Limit	0%	100%

TABLE A-2.2: BACnet Objects – BST Manager Unit, Read Only

TABLE A-2.1: BACnet Objects – BST Manager Unit, Read Only [Object Type = AI]			
BACnet ID	**BAS Object Name**	**BMK E**	
		Min	**Max**
100	Unit Role	0 = BST Manager, 1 = BST Client	
101	Setpoint	40F	220F
102	Setback Setpoint	40F	220F
103	Setback Start Time	12.00am	11.59pm
104	Setback Stop Time	12.00am	11.59pm
106	For BMK E: Average Outlet Temp For BMK: Outlet Temp	-40F	250F
107	Units Available	0	16
108	Units Faulted	0	16
109	BAS Communication Address	0	16
110	Header Temp	0F	250F

TABLE A-2.1: BACnet Objects – BST Manager Unit, Read Only [Object Type = AI]			
BACnet ID	**BAS Object Name**	**BMK E**	
		Min	**Max**
111	Outdoor Air Temperature	-70F	250F
112	Average Power Output	0%	100%
113	Units Active	0	16
114	Active Setpoint	40F	220F
115	Gas Next On Threshold	25%	95%
116	SH Temperature Control Setpoint Hi Limit	40F	220F
117	SH Temperature Control Setpoint Low Limit	40F	220F
118	Temperature High Limit	40F	230F
119	Operating Mode	0 = Constant Setpoint, 1 = Rmt Setpt, 2 = Outdoor Air Reset	
120	Next Off Valve Pos Gas	25%	49%
122	Casc Next On Valve Pos Elec	9%	95%
123	Power Output	0%	100%
124	Next Off Valve Pos Elec	2%	49%
126	BAS Baud Rate	0 = 9600, 1 = 19200, 2 = 38400, 3 = 57600, 4 = 115200	

TABLE A-3: BACnet Objects – BST Client Info Thru Manager, Read Only

BAS BACnet objects list for each cascade unit (manager and client) is same, except for the BACnet ID. The BACnet ID range is listed below for all 16 units in the Cascade:

Cascade	BACnet ID Range	
Unit Address	**Unit Role**	**Unit BACnet IDs**
1	Client	300-320
2	Manager	400-420
3	Client	500-520
4	Client	600-620
5	Client	700-720
6	Client	800-820
7	Client	900-920
8	Client	1000-1020
9	Client	1100-1120
10	Client	1200-1220
11	Client	1300-1320
12	Client	1400-1420
13	Client	1500-1520
14	Client	1600-1620
15	Client	1700-1720
16	Client	1800-1820

TABLE A-3: BACnet Objects – BST Client Info Thru Manager, Read Only [Object Type = AI]					
BACnet IDs	**BAS Object Name**	**BMK E**		**BMK**	
		Min	**Max**	**Min**	**Max**
300, 400, 500, … 1800	For BMK E: Cascade Unit Address For BMK: Communication Address	0	16	0	255
301, 401, 501, … 1801	For BMK E: Casc Idx Cascade Client State For BMK: Unit Status	0 = Disabled, 1 = Standby, 2 = Manual Mode, 3 = Automatic Mode, 4 = Unit Fault, 5 = Unit In Demand Delay, 6 = Unit Starting, 8 = Comm Error		0 = Disabled, 1 = Standby, 2 = Manual, 3 = Remote, 4 = Auto, 5 = Fault	
302, 402, 502, … 1802	For BMK E: Active Event ID For BMK: Fault Code	0	9999	0	9999
303, 403, 503, … 1803	Outlet Temp	-40F	250F	0	250F
305, 405, 505, … 1805	Inlet Temp	-40F	250F	0	250F
306, 406, 506, … 1806	Exhaust Temp	NA		50F	450F
307, 407, 507, … 1807	Inlet Air Temp	NA		-70F	130F
308, 408, 508, … 1808	Flame Strength	NA		0%	100%

TABLE A-3: BACnet Objects – BST Client Info Thru Manager, Read Only [Object Type = AI]					
BACnet IDs	BAS Object Name	BMK E		BMK	
		Min	Max	Min	Max
309, 409, 509, … 1809	Fire Rate In	NA		0%	100%
310, 410, 510, … 1810	Fire Rate Out	NA		0%	100%
311, 411, 511, … 1811	Unit Type	0 = KC Boiler, 1 = KC Boiler LN, 2 = BMK Boiler Std, 3 = BMK Blr Std Dual, 4 = BMK Boiler LN, 5 = BMK Blr LN Dual, 6 = BMK SInlet Natural Gas, 7 = BMK SInlet Dual Fuel, 8 = BMK Dual Inlet NGas, 9 = BMK Dual Inlet Dual Fuel, 10 = SmartPlate, 11 = Benchmark E, 12 = Other		0 = KC Boiler, 1 = KC Boiler LN, 2 = BMK Boiler Std, 3 = BMK Blr Std Dual, 4 = BMK Boiler LN, 5 = BMK Blr LN Dual, 6 = KC Water Heater, 7 = KC Water Heater LN, 8 = Innovation, 9 = Innovation N	
312, 412, 512, … 1812	Unit Size	0 = 216kW, 1 = 360kW, 2 = 432kW, 3 = 576kW, 4 = 684kW		0 = SPARE, 1 = 600 MBH, 2 = 800 MBH, 3 = 1060 MBH, 4 = 1350 MBH, 5 = 500 MBH, 6 = 750 MBH, 7 = 1000 MBH, 8 = 1.5 MBTU, 9 = 1500 MBH, 10 = 2.0 MBTU, 11 = 2000 MBH, 12 = 2500 MBH, 13 = 3.0 MBTU, 14 = 3000 MBH, 15 = 4000 MBH, 16 = 5000 MBH, 17 = 6000 MBH	
313, 413, 513, … 1813	Valve Status	0 = Off, 1 = Closed, 2 = Open, 3 = Partial Open/Closed, 4 = Closing, 5 = Opening, 6 = Failed to Close, 7 = Failed to Open, 8 = Defaulted Closed		Close	Open
314, 414, 514, … 1814	Plant Setpoint	40F	220F	0	9999
315, 415, 515, … 1815	For BMK E: Run Cycles For BMK: Run Cycle Upper	0	999,999,999	0	999,999,999
316, 416, 516, … 1816	Run Cycle Lower	NA		0	999,999,999
317, 417, 517, … 1817	Run Hours	0	999,999,999	NA	

TABLE A-3: BACnet Objects – BST Client Info Thru Manager, Read Only [Object Type = AI]					
BACnet IDs	BAS Object Name	BMK E		BMK	
		Min	Max	Min	Max
319, 419, 519, … 1819	Oxygen Level	NA		0%	24%
320, 420, 520, … 1820	Power Output	0%	100%	NA	

APPENDIX B – EDGE X STATE LIST

Code #	Applicable to	State	Description
1	BMK E & BMK	Unit Disabled	Edge controller **Enable/Disabled** switch is set to Disabled position.
2	BMK E & BMK	Standby	Displayed when: 1- Enable/Disable switch on Edge controller is in Enable position, but there is no demand for heat. 2- When unit is in failsafe 3- When Warm Weather Shutdown is enabled and Warm Weather Shutdown condition is satisfied
3	BMK E & BMK	Unit In Demand Delay	Demand delay timer is active. This timer represents the time allocated for isolation valve to open and make the remote interlock contact.
4	BMK	Purging	Displayed during the purge cycle during startup. The duration of the purge cycle counts up in seconds.
5	BMK	Ignition Trial	Displayed during ignition trial of startup sequence. The duration of cycle counts up in seconds.
6	BMK	Flame Proven	Displayed after flame has been detected for 2 seconds. Initially, the flame strength is shown in %. After 5 seconds has elapsed, the time and date are shown in place of flame strength.
49	BMK	Wait Ignition Retry	Retrial for ignition.
50	BMK	WaitFault Purge	Fault while purging.
51	BMK	Wait Retry Pause	Pause before retrial for ignition.
66	BMK	Ignition Monitor	Waiting for proof of ignition.
69	BMK	Pre Ignition	Waiting for SSOV to prove open.
70	BMK	Cleaning Igniter	Ignition transformer is energized with SSOV closed.
74	BMK	Auto Diagnostic Mode ACTIVE	Informational message.
75	BMK	Auto Diagnostic Mode COMPLETED	Informational message.
76	BMK	Auto Diagnostic Mode ABORTED	Informational message.
86	BMK	O2 Cal Purge	O2 Purge in progress.
87	BMK	Auto Calibration In Progress	Auto Calibration in progress.
90	BMK	O2 Warning Service Required	O2 service is required.
-	BMK E & BMK	Fault	Unit has an active latching or non-latching fault
-	BMK E	Automatic Mode	Unit is running normally
-	BMK E	Manual Mode	Unit is being operated in Manual mode
-	BMK E & BMK	Starting	BMK E: Displayed during the initial power up only. BMK: Displayed for 2 minutes during the initial warm-up only for BMK.
-	BMK E	Meeting Demand	Displayed under Plant Dashboard when the plant is running towards meeting the demand
-	BMK E	Plant Failsafe Activated	Displayed when Manager loses contact with the external setpoint source.
-	BMK E	PLM Active	Indicates that PLM is enabled and is actively running based on the priority selected
-	BMK E	PLM Inactive	Indicates that PLM is enabled but is not actively running based on the priority selected
-	BMK E	PLM Delay	Indicates that PLM Transition Delay is active

APPENDIX C – EDGE X ALERT LIST

The Edge X controller provides the following three types of alerts:

Warning – indicates a potential problem that requires attention or inspection by a trained technician to prevent further damage, major breakdowns, or safety hazards.

Fault Non-Latching – indicates a condition that causes the unit to automatically reset and attempt a restart once the fault condition has cleared. Does not require a manual reset.

Fault Latching – This feature requires a manual reset even after the initial fault condition is cleared. Unlike a non-latching fault, a latched fault prevents unit operation to ensure the safety concern is addressed first.

These alert codes will be communicated from Edge X controller to BAS. For standalone unit, see BACnet Object ID 0. And for cascade unit, see BACnet Object IDs 302-1802.

NOTE 1: Table below shows the mode (Standalone) and role (Manager & Client) that is able to publish the alert.
NOTE 2: All Manager and Client alerts are displayed on the Manager Event History page (latest 200 records only).

CODE #	ALERT TYPE	ALERT MESSAGE	STANDALONE	MANAGER	CLIENT	
					BMK E	BMK
8	Fault Latching	High Temp Limit Control Open	Yes	Yes	Yes	Yes
9	Fault Latching	Primary Low Water Level	Yes	Yes	Yes	Yes
10	Fault Latching	Low Gas Pressure Fault	-	-	-	Yes
11	Fault Latching	High Gas Pressure Fault	-	-	-	Yes
12	Warning	Remote Interlock Open	Yes	Yes	Yes	Yes
13	Fault Latching	Delayed Interlock Open	Yes	Yes	Yes	Yes
14	Fault Latching	Airflow Fault During Purge	-	-	-	Yes
15	Fault Latching	SSOV Fault During Purge	-	-	-	Yes
16	Fault Latching	Prg Switch Open During Purge	-	-	-	Yes
17	Fault Latching	Ign Switch Open During Ignition	-	-	-	Yes
18	Fault Non-Latching	Airflow Fault During Ign	-	-	-	Yes
19	Fault Latching	Airflow Fault During Run	-	-	-	Yes
20	Fault Latching	SSOV Fault During Ignition	-	-	-	Yes
21	Fault Latching	SSOV Fault During Run	-	-	-	Yes
22	Fault Latching	Flame Loss During Ignition	-	-	-	Yes
23	Fault Latching	Flame Loss During Run	-	-	-	Yes
24	Fault Latching	High Exhaust Temp Switch	-	-	-	Yes
25	Fault Non-Latching	Loss of Power	-	-	-	Yes
28	Fault Non-Latching	High O2 Level	-	-	-	Yes
29	Fault Non-Latching	Low O2 Level	-	-	-	Yes
31	Fault Latching	SSOV Relay Failure	-	-	-	Yes
32	Fault Latching	Residual Flame	-	-	-	Yes
33	Fault Latching	Heat Demand Failure	-	-	-	Yes
34	Fault Latching	Ign Switch Closed During Purge	-	-	-	Yes
35	Fault Latching	Prg Switch Closed During Ign	-	-	-	Yes
36	Fault Latching	SSOV Switch Open	-	-	-	Yes
37	Fault Non-Latching	Ign Board Comm Fault	-	-	-	Yes

CODE #	ALERT TYPE	ALERT MESSAGE	STANDALONE	MANAGER	CLIENT	
					BMK E	BMK
40	Fault Non-Latching	Remote Setpt Signal Fault	-	-	-	Yes
40	Warning	Remote Setpt Signal Warning	Yes	Yes	-	-
42	Fault Non-Latching	Outlet Temp Sensor Fault	-	-	-	Yes
43	Fault Non-Latching	FFWD Temp Sensor Fault	-	-	-	Yes
44	Fault Non-Latching	High Water Temp Fault	Yes	Yes	Yes	Yes
45	Fault Latching	Line Voltage Out of Phase	-	-	-	Yes
46	Fault Latching	Stepper Motor Failure	-	-	-	Yes
47	Fault Non-Latching	Setpoint Limiting Active	-	-	-	Yes
48	Fault Non-Latching	Modbus Comm fault	-	-	-	Yes
48	Warning	BST Communication Loss	-	Yes	Yes	-
52	Warning	Exhaust Temp Sensor Short	-	-	-	Yes
53	Warning	Exhaust Temp Sensor Open	-	-	-	Yes
54	Warning	Warning Exhaust Temp High	-	-	-	Yes
55	Fault Latching	Exhaust Temp High	-	-	-	Yes
56	Warning	Inlet Temp Sensor Short	Yes	Yes	Yes	Yes
57	Warning	Inlet Temp Sensor Open	Yes	Yes	Yes	Yes
58	Warning	Inlet Temp High	Yes	Yes	Yes	Yes
59	Warning	Inlet Temp Low	Yes	Yes	Yes	Yes
60	Fault Non-Latching	Inlet Gas Press Sensor Open	-	-	-	Yes
61	Fault Non-Latching	Gas Plate Dp Sensor Open	-	-	-	Yes
62	Fault Non-Latching	O2 Percentage Low	-	-	-	Yes
63	Fault Non-Latching	O2 Sensor Malfunction	-	-	-	Yes
64	Warning	Warning O2 Level High	-	-	-	Yes
65	Fault Latching	Recirc Pump Failure	-	-	-	Yes
68	Fault Latching	Ignition Spark Fault	-	-	-	Yes
71	Fault Non-Latching	Too Many Cycles In 24 Hours	-	-	-	Yes
72	Fault Non-Latching	Too Many Ovrtemps In 24 Hours	-	-	-	Yes
73	Fault Non-Latching	Air Sensor Fault	-	-	-	Yes
88	Warning	Autocal Finished	-	-	-	Yes
89	Warning	O2 Sensor Out Of Range	-	-	-	Yes
91	Warning	Wait Sensor Warm-up	-	-	-	Yes
92	Fault Non-Latching	Air Pump Failed AERtrim Disabled	-	-	-	Yes
94	Warning	Isolation Valve Stuck Open	Yes	Yes	Yes	Yes
95	Fault Non-Latching	Isolation Valve Stuck Closed	Yes	Yes	Yes	Yes
99	Warning	Delta-T Activated	-	-	-	Yes
100	Warning	Delta-T Shutdown	-	-	-	Yes

CODE #	ALERT TYPE	ALERT MESSAGE	STANDALONE	MANAGER	CLIENT	
					BMK E	BMK
102	Warning	IO Board Comm Failed	-	-	-	Yes
106	Warning	BST Warm Weather Shutdown	-	-	-	Yes
107	Warning	Warm Weather Shutdown	Yes	Yes	Yes	-
112	Warning	System Return Sensor Short Warning	-	Yes	-	-
113	Warning	System Return Sensor Open Warning	-	Yes	-	-
300	Warning	OAT Sensor Open Circuit	Yes	Yes	-	-
301	Warning	OAT Sensor Short Circuit	Yes	Yes	-	-
302	Warning	OAT Sensor Not Set	Yes	Yes	-	-
303	Fault Non-Latching	High Cabinet Temperature	Yes	Yes	Yes	-
304	Fault, Non-Latching	Cabinet Temp Sensor Open	Yes	Yes	Yes	-
305	Fault, Non-Latching	Cabinet Temp Sensor Short	Yes	Yes	Yes	-
306	Fault, Non-Latching	Outlet Temp Sensor Short	Yes	Yes	Yes	-
307	Fault, Non-Latching	Outlet Temp Sensor Open	Yes	Yes	Yes	-
308	Fault Latching	Demand Relay Open	Yes	Yes	Yes	-
309	Warning	Enable/Disable Switch Open	Yes	Yes	Yes	-
310	Fault Non-Latching	OTLC Open	Yes	Yes	Yes	-
311	Warning	24VAC Safety String Invalid	Yes	Yes	Yes	-
312	Warning	Manual Run Enabled	Yes	Yes	Yes	-
313	Warning	Manual Run User Disabled	Yes	Yes	Yes	-
314	Warning	Manual Run Auto Disabled	Yes	Yes	Yes	-
315	Warning	Setback Schedule Enabled	Yes	Yes	-	-
318	Warning	Reserve Unit Enabled	Yes	Yes	-	-
319	Warning	Comm Failsafe Activated	Yes	-	Yes	Yes
320	Warning	SWT1 Sensor Short	-	Yes	-	-
321	Warning	SWT1 Sensor Not Set	-	Yes	-	-
322	Warning	SWT1 Sensor Open	-	Yes	-	-
323	Fault, Non-Latching	Valve/Pump Not Configured	-	Yes	Yes	-
324	Warning	Plant Failsafe Warning	-	Yes	-	-
325	Warning	Pri Pump FB Signal Lost	Yes	Yes	Yes	-
344	Warning	PLM Active via TS Priority	Yes	Yes	Yes	-
345	Warning	PLM Inactive via TS Priority	Yes	Yes	Yes	-
346	Warning	PLM Active via BAS Priority	Yes	Yes	Yes	-
347	Warning	PLM Inactive via BAS Priority	Yes	Yes	Yes	-
348	Warning	PLM Active via Analog Input Priority	Yes	Yes	Yes	-
349	Warning	PLM Inactive via Analog Input Priority	Yes	Yes	Yes	-
355	Warning	Remote Setpt AI Unassigned	Yes	Yes	-	-
900	Fault Latching	Secondary Low Water Level	Yes	Yes	Yes	-
901	Fault Latching	Cabinet Door Open	Yes	Yes	Yes	-

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