USER MANUAL

Installation, Operation and Maintenance

AERCO ProtoNode Gateway

ProtoNode-RER
(Serial Ethernet, P/N 64084)

ProtoNode-LER
(LonWorks, P/N 64085)

For Interfacing AERCO Equipment to Building Automation Systems Utilizing: BACnet MS/TP, BACnet/IP, N2, or LonWorks Protocols

Latest Update 11/06/2014

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CHAPTER 1: Introduction

AERCO's multi-protocol communications gateway supports integration of AERCO devices with customers' building control and energy management systems. The plug-n-play package supports integration with BACnet/IP, BACnet MS/TP, LonWorks, and Johnson Controls Metasys N2 systems. AERCO's Communications Gateway is available for all AERCO boilers, water heaters, and electronically controlled indirect systems.

- Built-in translation for BACnet/IP, BACnet MS/ TP, LonWorks, Metasys N2 and Modbus TCP Protocols
- Supports individual units and systems including AERCO's WHM and BST.
- Select protocol and baud rate in the field using simple DIP switch selection
- Captures alarm and trend history for faster troubleshooting
- Non-volatile memory retains point mappings and programs in the event of power loss.
- Approvals: BACnet Testing Labs (BTL) B-ASC on ProtoNode RER, CE Mark, LonMark 3.4 Certified on ProtoNode LER, TUV approved to UL 916

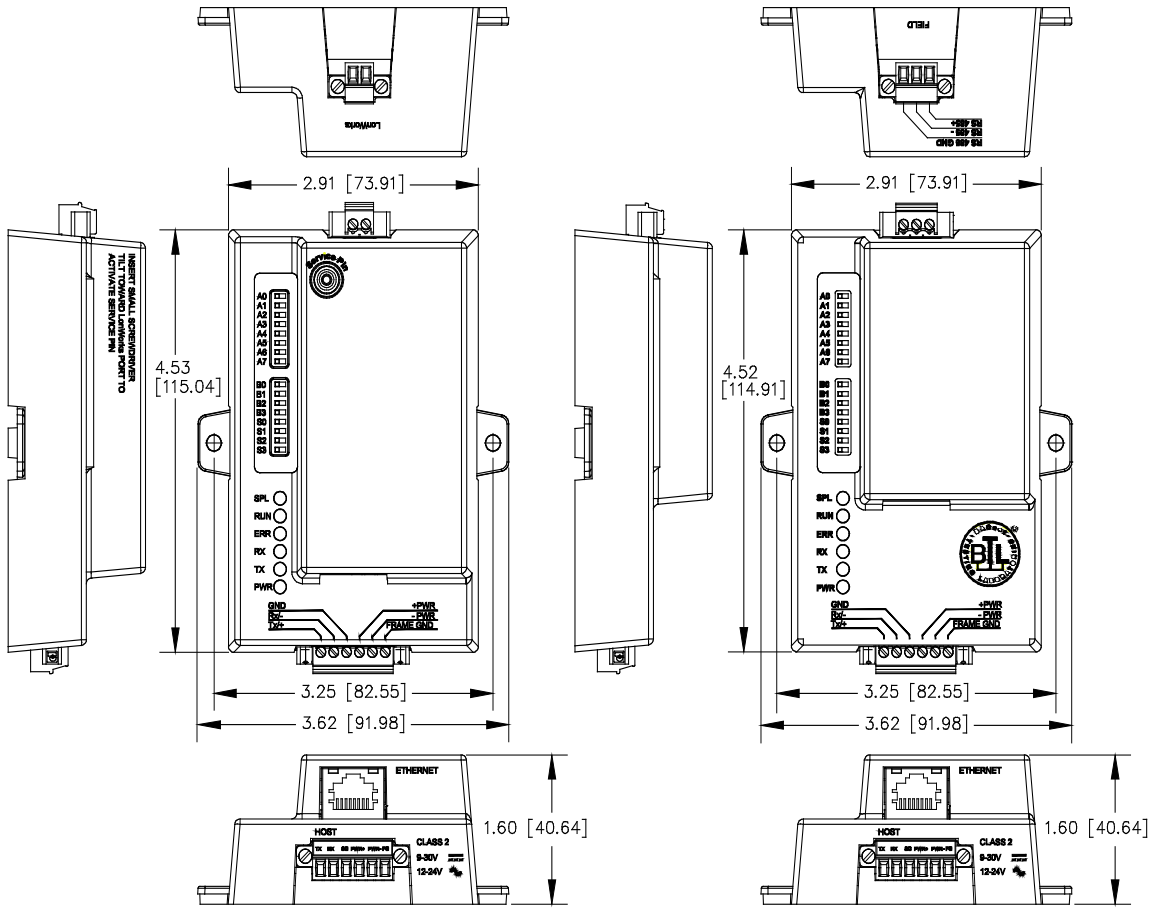


FIGURE 1-1: Dimensions for ProtoNode LER (left) and RER (right)

AERCO's Communications Gateway (ProtoNode) is an external, high performance, **Building Automation multi-protocol gateway** that has been preprogrammed for AERCO's equipment to support BACnet®[1]MS/TP, BACnet/IP, Metasys®[2] N2 by JCI, Modbus TCP, and LonWorks®[3]. All the different AERCO configurations for the various protocols are stored within the ProtoNode and are selectable via DIP switches for fast and easy installation. There is no need to download any configuration files to support the required applications.

AERCO's Communications Gateway Supports WHM and BST

AERCO has co-developed the ProtoNode to communicate between systems of AERCO units (for example: multiple water heaters running Onboard Water Heater Management (WHM) or multiple AERCO Boilers running Boiler Sequencing Technology (BST). The AERCO SSD ProtoNode eliminates multiple master issues and is included with all AERCO's Communications Gateway ProtoNodes. Use the SSD to enable a Building Automation System Modbus master to bi-directionally communicate to BST and WHM Modbus masters.

The AERCO SSD device is unique because it enables two Modbus masters to bi-directionally communicate over RS-485. The AERCO SSD device is also specifically designed to support the BST/WHM Automatic failover Feature. While the BST/WHM role can be transferred to another unit (with a different Modbus address) the SSD device operates at a fixed and constant Modbus address. The fixed SSD address is propagated to each unit and allows the BST/WHM master to resume communications after a failover without BAS changes.

This manual provides the necessary information to assist the Installers of the boilers/heaters with the installation of the ProtoNode RER on BACnet MS/TP, BACnet/IP, Modbus TCP and Metasys N2 by JCI networks and installation of the ProtoNode LER on a LonWorks network.

BACnet International BTL certification is the highest level of BACnet conformance tests that a product can be subjected to.

- The ProtoNode RER is BACnet Certified by the BACnet Testing Laboratory (BTL).
- The ProtoNode LER is LonMark Certified by LonMark International.

The ProtoNode units feature a small form factor, as indicated in Figure 1.1

[1] BACnet is a registered trademark of ASHRAE
[2] Metasys is a registered trademark of Johnson Controls Inc.
[3] LonMark is a registered trademark of LonMark International
[4] LonWorks is a registered trademark of Echelon Corporation

CHAPTER 2: Bacnet/LONWorks Setup for ProtoNode RER/LER

2.1 INSTALLATION STEPS FOR THE CUSTOMER

Installation Instructions

1. Set the A, B, and S DIP Switch banks for the proper AERCO configuration. See Section 2.4.
2. Connect the ProtoNode Field protocol port to your Building Automation System (BAS) or Energy Management System (EMS) as directed in Sections 4.1 and 4.2.
3. Connect the ProtoNode host port to AERCO equipment as shown in Section 3.1 through 3.7.

NOTE
To connect to an RS232 port, as featured on the AERCO BMS II or ACS, you must use a RS232-to-RS485 converter.

4. Power up the ProtoNode RER or LER.
5. If the Field protocol is BACnet/IP or Modbus TCP, refer to Section 5 to change the IP address using the ProtoNode Web GUI interface, or to Section 6 to run the RUInet utility program to change the IP address. No changes to the configuration files are necessary.
6. If a BACnet Instance greater than the "A" DIP switch range is desired, it can be done in the ProtoNode Web GUI interface. See Section 5.
7. If the Field Protocol is LonWorks, commission the ProtoNode on the LonWorks network. This needs to be done by the LonWorks administrator using a LonWorks commissioning tool. See Section 4.4.

2.2 RECORD IDENTIFICATION DATA

Each ProtoNode has a unique serial number located on the underside of the unit. The number format is **FPC-N3X-XXX-XXX-XXXX**. This number should be recorded as it may be required for technical support. The AERCO part numbers and model numbers are shown in the table below:

TABLE 2-1: AERCO ProtoNode P/N and Serial Number

ProtoNode Model	AERCO P/N	Model Number
RER	64084	FPC-N34-103-126-0645
LER	64085	FPC-N35-103-401-0646

2.3 MODBUS COM SETTINGS ON AERCO DEVICES (RER OR LER)

2.3.1 Set Modbus COM Setting On All Devices Connected to the ProtoNode

All devices connected to the ProtoNode host port MUST ALL have the same Baud Rate, Data Bits, Stop Bits, and Parity.

- Baud Rate = 9600
- Data Bits = 8
- Stop Bits = 1
- Parity = None

Be sure the following settings in the respective AERCO units are as indicated below:

TABLE 2-2: Modbus COM Settings for AERCO Devices

Connected To:	To Monitor Only	To Monitor and Control
ACS/BMS II	RS232 Mode = Modbus Slave RS232 Baudrate = **9600** Modbus Address = **128** To Monitor Boilers: Modbus Pass thru = **Enabled**	For remote setpoint control via Modbus, in addition to the "Monitor Only" settings, set: Header Set Mode = **Remote Setpt** Remote Signal: = **Network**
C-More: Boiler or Heater without WHM or BST	Comm. Address = **1 to 4**, or **1 to 8**, or **1 to 12**, depending on the configuration selected. Baudrate = **9600**	For remote setpoint control via Modbus, in addition to the "Monitor Only" settings, set: Boiler Mode = **Remote Setpt** Remote Signal: = **Network** For Direct Drive control via Modbus in addition to the "Monitor Only" settings, set: Boiler Mode = **Direct Drive** Remote Signal: = **Network**
MLX Boiler with BCM	Address DIP switches = **1 to 4**	Same setup as "Monitor Only"
SmartPlate or ECS Heater	Addr = **29** to **32**	For Remote Setpoint control via Modbus, in addition to the "Monitor Only" settings, set: Rmt = **SP** L-r = **rmt**
C-More Heater with WHM or Boiler with BST	SSD Address = **247**	Same setup as "To Monitor Only"

2.4 DIP SWITCH CONFIGURATION

NOTE

The ProtoNode must be restarted after changes to DIP switch settings in order for changes to take effect.

2.4.1 ProtoNode RER (DIP Switch A0–A7): Setting the MAC Address for BACnet MS/TP

- Only 1 MAC address is set for the ProtoNode regardless of how many devices are connected to it.
- BACnet MS/TP MAC address between 1 to 127 are a Master Address and can be auto-discovered by BAS front end systems that support Auto Discovery.
- Address from 128 to 255 are Slave Addresses and can not be discovered by BAS front ends that support auto discovery of BACnet MS/TP devices. Note: **Never set a BACnet MS/TP MAC Address from 128 to 255**.
- Set DIP switches A0 – A7 to assign the MAC Address for BACnet MS/TP for the ProtoNode RER (FPC-N34).
- Please refer to Appendix A1 for the full range of addresses to set Node-ID/Device Instance/MAC address.

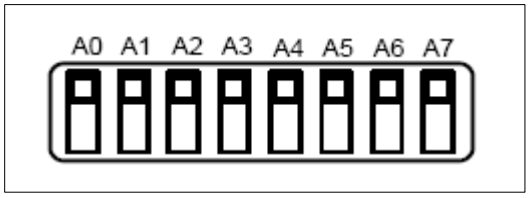


FIGURE 2-1: MAC Address DIP Switches

NOTE

When setting DIP Switches, please ensure that power to the board is OFF.

2.4.2 ProtoNode RER: Setting the Device Instance (Node-ID) for BACnet MS/TP and BACnet/IP

- The A Bank of DIP switches are also used to set the BACnet Device Instances.
- BACnet/IP and BACnet MS/TP Addressing: The BACnet device instances will be set by taking the Node Offset found in Web Configurator (Section 2.4.2.1) and adding it to the value of the A Bank DIP switches (MAC address). When more than one device is connected to the ProtoNode, the subsequent BACnet device instances will be sequential. The BACnet Device Instance can range from 1 to 4,194,303.

  For example:

  - Node Offset (default) = 0 (see NOTE below)
  - A Bank DIP Switch = 11
  - Device 1 Device Instance = 50011
  - To change the node offset see Section 2.4.2.1. The node offset can be changed from 50000 to 1 to 4,194,302 via the Web Configurator.

NOTE

If there are two instances of the same MAC address, it could result in a network crash. The node offset will allow you to avoid this situation.

2.4.2.1 Set Node_Offset to Assign Specific Device instances for BACnet MS/TP and BACnet/IP

- If the Device Instances need to be set for addresses other than 1 to 255, change the Node-Offset (See Figure 2-2)
- The BACnet Device Instance can range from 1 to 4,194,303.
- BACnet/IP and BACnet MS/TP Addressing: The BACnet device instances will be set by taking the Node_Offset found in Web Configurator (see Figure 2-2) and adding it to the value of the A Bank DIP switches. When more than one device is connected to the ProtoNode, the subsequent BACnet device instances will be sequential.
- Set the PC address to be on the same subnet as the ProtoNode. See section 5.3 on how to change the IP address. (See Figure 2-2)
- Open the PC browser to default IP address, which will bring you to the FST Web Configurator for the ProtoNode.
- Change the Node offset to meet the required device instance.

  For example:

  - Node_Offset = 20000.
  - A Bank DIP Switch = 11
  - Device 1 Device Instance = 20011

NOTE

The A bank dip switch setting + node offset = device instance setting.

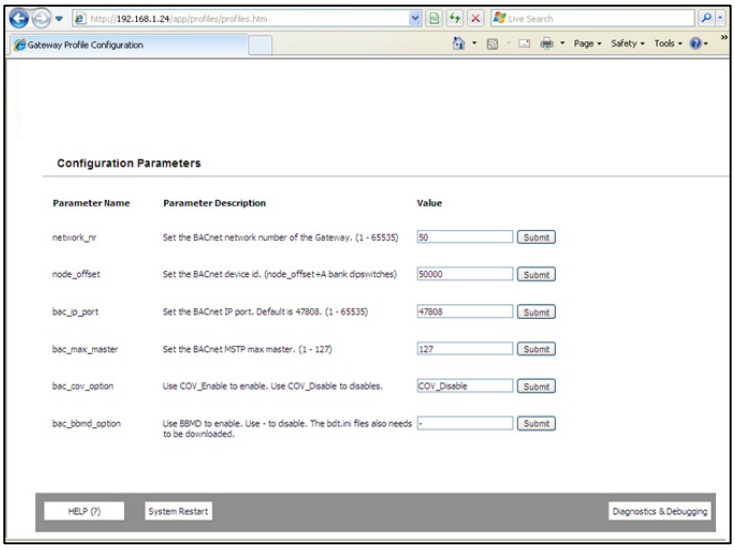


FIGURE 2-2: MAC Address DIP Switches

2.4.3 ProtoNode RER: Setting the Node-ID for Metasys N2 and Modbus/TCP

- Set DIP switches A0 – A7 to assign Node-ID for Metasys N2 and Modbus TCP for the ProtoNode RER.
- Metasys N2 and Modbus/TCP Node-ID Addressing: Metasys N2 and Modbus/TCP Node-ID's range from 1-255

Please refer to Appendix A.3 for the full range of addresses to set Node-ID/Device Instance.

2.4.4 Setting the Serial Baud Rate (DIP Switch B0 – B3) for BACnet MS/TP

- DIP Switches B0 – B3 can be used to set the serial baud rate to match the baud rate provided by the Building Automation System for BACnet MS/TP.
- DIP Switches B0 – B3 are disabled on ProtoNode LER (FPC-N35 LonWorks).
- The baud rate on the ProtoNode for Metasys N2 is set for 9600. DIP Switches B0 – B3 are disabled for Metasys N2 on ProtoNode RER (FPC-N34).

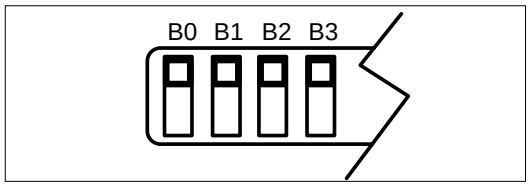


FIGURE 2-3: MAC Address DIP Switches

NOTE

When setting DIP Switches, please ensure that power to the board is OFF.

2.4.4.1 Baud Rate DIP Switch Selection

TABLE 2-3: Baud Rate DIP Switch Settings

Baud	B0	B1	B2	B3
9600	ON	ON	ON	Off
19200	Off	Off	Off	ON
38400	ON	ON	Off	ON
57600	Off	Off	ON	ON
76800	ON	Off	ON	ON

2.4.5 S0–S3 Bank DIP Switches to Select and Load Device Configuration Files

The "S" Bank of DIP switches (S0 - S3) is used to select and load a configuration file from a group of pretested/preloaded configuration files, which are stored in the ProtoNode RER FPC-N34 (BACnet MS/TP, BACnet/IP, Modbus TCP, Metasys N2) and the ProtoNode LER FPC-N35 (LonWorks).

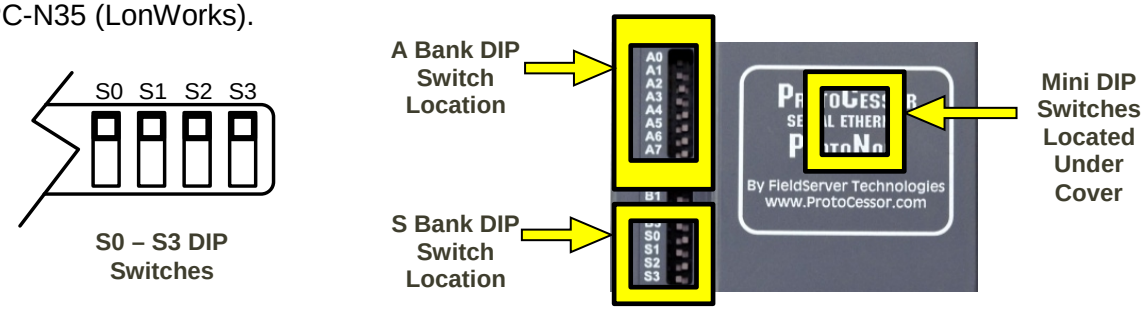


Figure 2-4: S0-S3 DIP Switch Locations

2.4.5.1 ProtoNode RER S0 to S3 (and A1& A3) DIP Switch Settings

The "A1" and "A3" switches listed in the chart below refer to the additional Mini DIP switches, ***NOT*** the "A" Bank DIP switches (A0 – A7) that are accessible with the cover on. To access the Mini DIP switches you must remove the cover, as shown in Figure 2-5.

Except for those listed below, all other Mini DIP switches are in the **Off** position.

TABLE 2-4: ProtoNode RER S0 to S3 (and A1*) DIP Switch Settings

S0	S1	S2	S3	A1	Profile
Off	Off	Off	Off	Off	BACnet/IP/BACnet MS/TP, 1 ACS/BMS II, 4 C-More Controlled Boilers
ON	Off	Off	Off	Off	BACnet/IP/BACnet MS/TP, 1 ACS/BMS II, 8 C-More Controlled Boilers
Off	ON	Off	Off	Off	BACnet/IP/BACnet MS/TP, 1 ACS/BMS II, 12 C-More Controlled Boilers
ON	ON	Off	Off	Off	BACnet/IP/BACnet MS/TP, 1 ACS/BMS II, 4 Modulex Boilers With BCMs
Off	Off	ON	Off	Off	BACnet/IP/BACnet MS/TP, 4 ECS/SP Systems
ON	Off	ON	Off	Off	BACnet/IP/BACnet MS/TP, 12 C-More, 6 ECS/SP, 4 Modulex and 2 ACS/BMS II
Off	ON	ON	Off	Off	Metasys N2, 1 ACS/BMS II, 4 C-More Controlled Boilers
ON	ON	ON	Off	Off	Metasys N2, 1 ACS/BMS II, 8 C-More Controlled Boilers
Off	Off	Off	ON	Off	Metasys N2, 1 ACS/BMS II CS, 12 C-More Controlled Boilers
ON	Off	Off	ON	Off	Metasys N2, 1 ACS/BMS II, 4 Modulex Boilers with BCMs
Off	ON	Off	ON	Off	Metasys N2, 4 ECS/SP Systems
ON	ON	Off	ON	Off	Metasys N2, 12 C-More, 6 ECS/SP, 4 Modulex and 2 ACS/BMS II
Off	Off	ON	ON	Off	Modbus TCP, 1 ACS/BMS II, 4 C-More Controlled Boilers
ON	Off	ON	ON	Off	Modbus TCP, 1 ACS/BMS II, 8 C-More Controlled Boilers
Off	ON	ON	ON	Off	Modbus TCP, 1 ACS/BMS II, 12 C-More Controlled Boilers
ON	ON	ON	ON	Off	Modbus TCP, 1 ACS/BMS II, 4 Modulex Boilers With BCMs
Off	Off	Off	Off	ON	Modbus TCP, 4 ECS/SP Systems
ON	Off	Off	Off	ON	Modbus TCP, 12 C-More, 6 ECS/SP, 4 Modulex and 2 ACS/BMS II

S0	S1	S2	S3	A1	A3	Profile
ON	Off	Off	Off	Off	ON	Slave/Slave Device (SSD) Modbus – **for WHM and BST systems**
Off	ON	Off	Off	Off	ON	Slave/Slave Device (SSD) Bacnet – **for WHM and BST systems**
ON	ON	Off	Off	Off	ON	Slave/Slave Device (SSD) N2 – **for WHM and BST systems**

2.4.5.2 ProtoNode RER S0–S3 and A1-A8 DIP Switch Locations

The S-Bank DIP switches are accessible with the top cover in place. However, the cover must be removed to access the additional MINI DIP switches A1 through A8. To remove the cover, pull it from the unit while holding onto the 6 pin Phoenix connector.

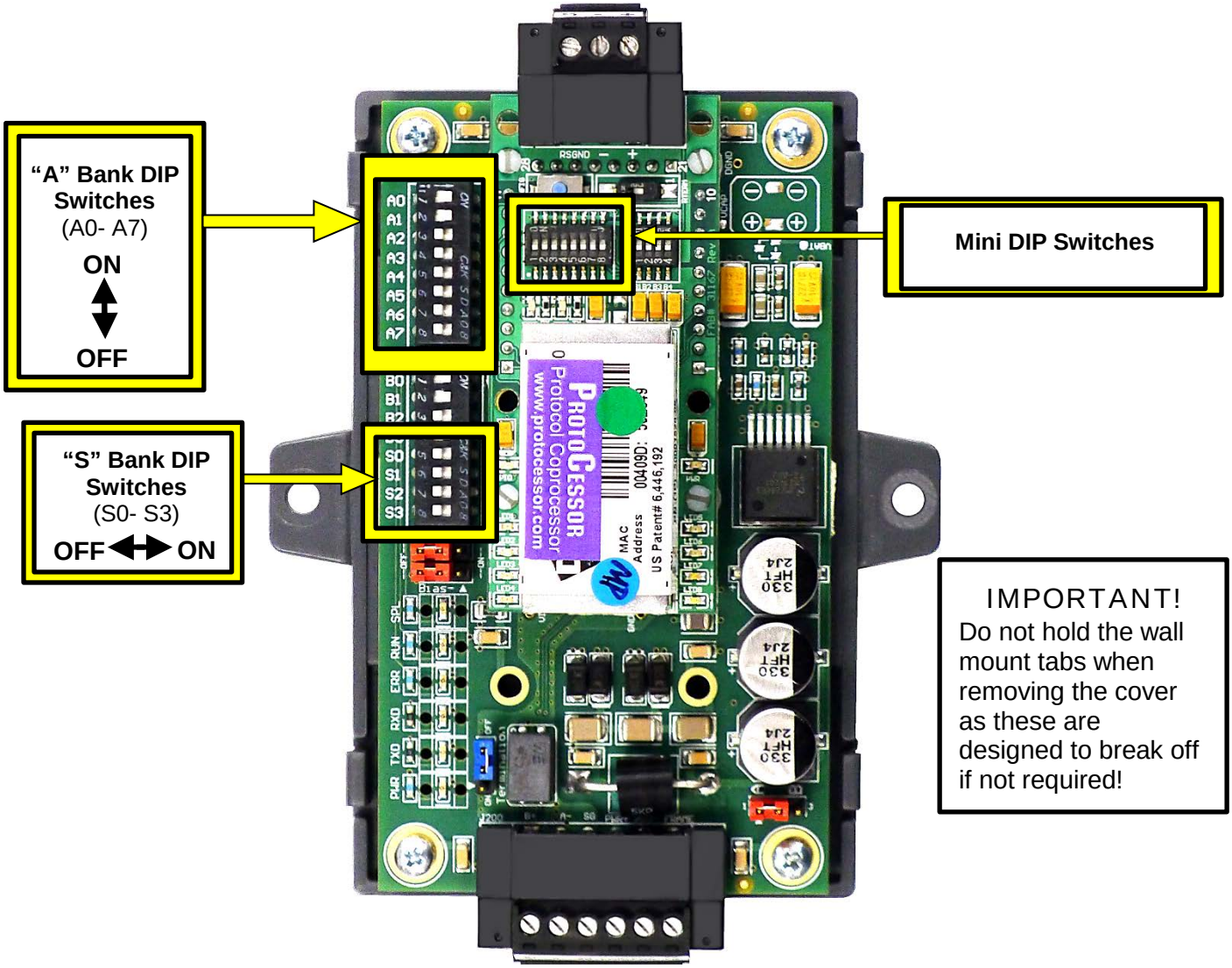


Figure 2-5: Location of DIP Switches S0 – S3 and A1-A8

2.4.5.3 ProtoNode LER S0 to S3 DIP Switch Settings

TABLE 2-5: ProtoNode LER SO to S3 DIP Switch Settings				
S0	S1	S2	S3	Profile
Off	Off	Off	Off	1 ACS/BMS II, 4 C-More Controlled Boilers
ON	Off	Off	Off	1 ACS/BMS II, 8 C-More Controlled Boilers
Off	ON	Off	Off	1 ACS/BMS II, 12 C-More Controlled Boilers
ON	ON	Off	Off	1 ACS/BMS II, 4 Modulex Boilers With BCMs
Off	Off	ON	Off	4 ECS/SP Systems
ON	Off	ON	Off	12 C-More, 6 ECS/SP, 4 Modulex and 2 ACS/BMS II
Off	ON	ON	ON	Slave/Slave Device (SSD)

CHAPTER 3: Interfacing ProtoNode to Devices

3.1 ProtoNode RER Showing Connection Ports and Features

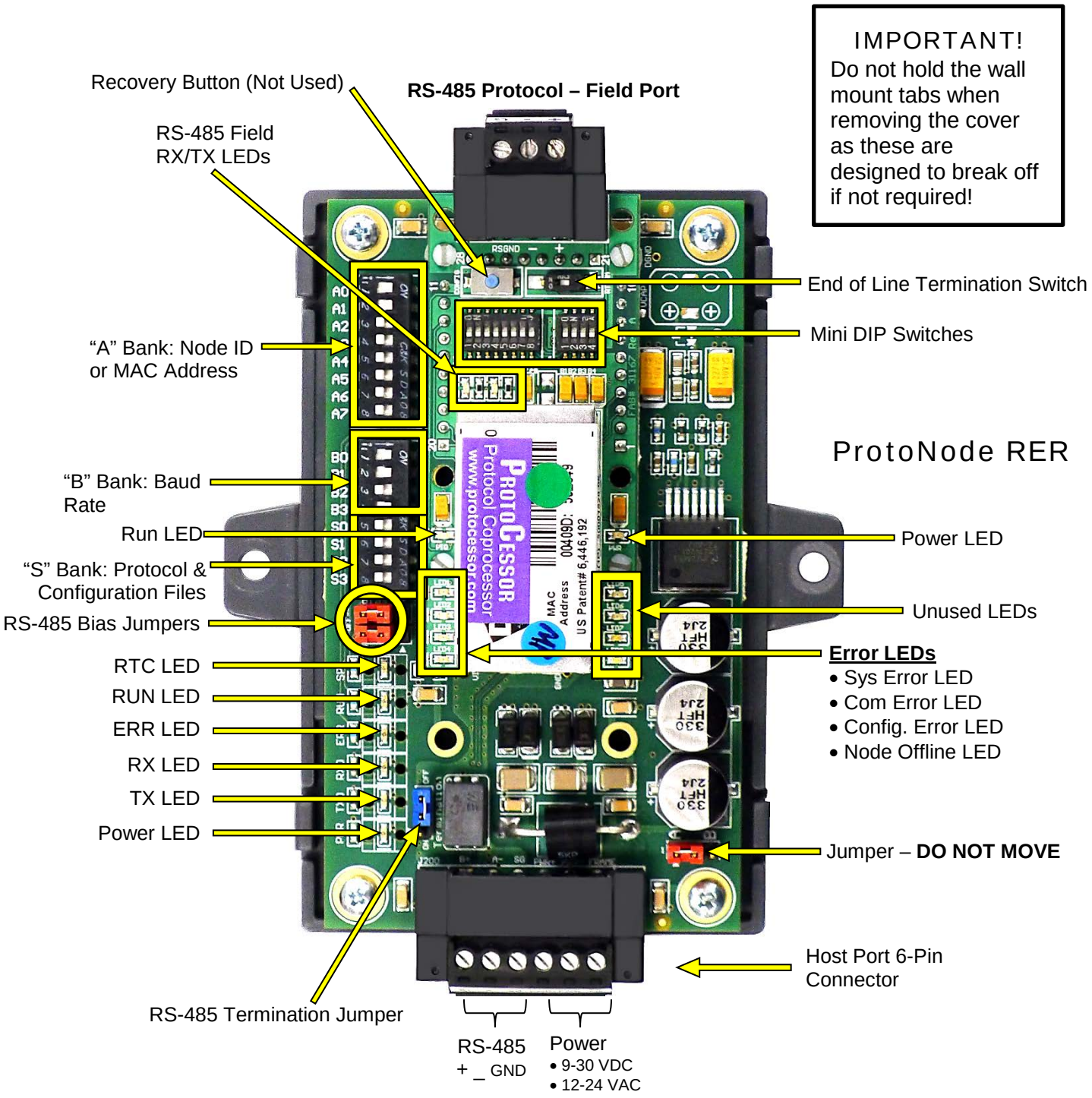


Figure 3-1: ProtoNode BACnet RER Internal Components

3.2 ProtoNode LER Showing Connection Ports and Features

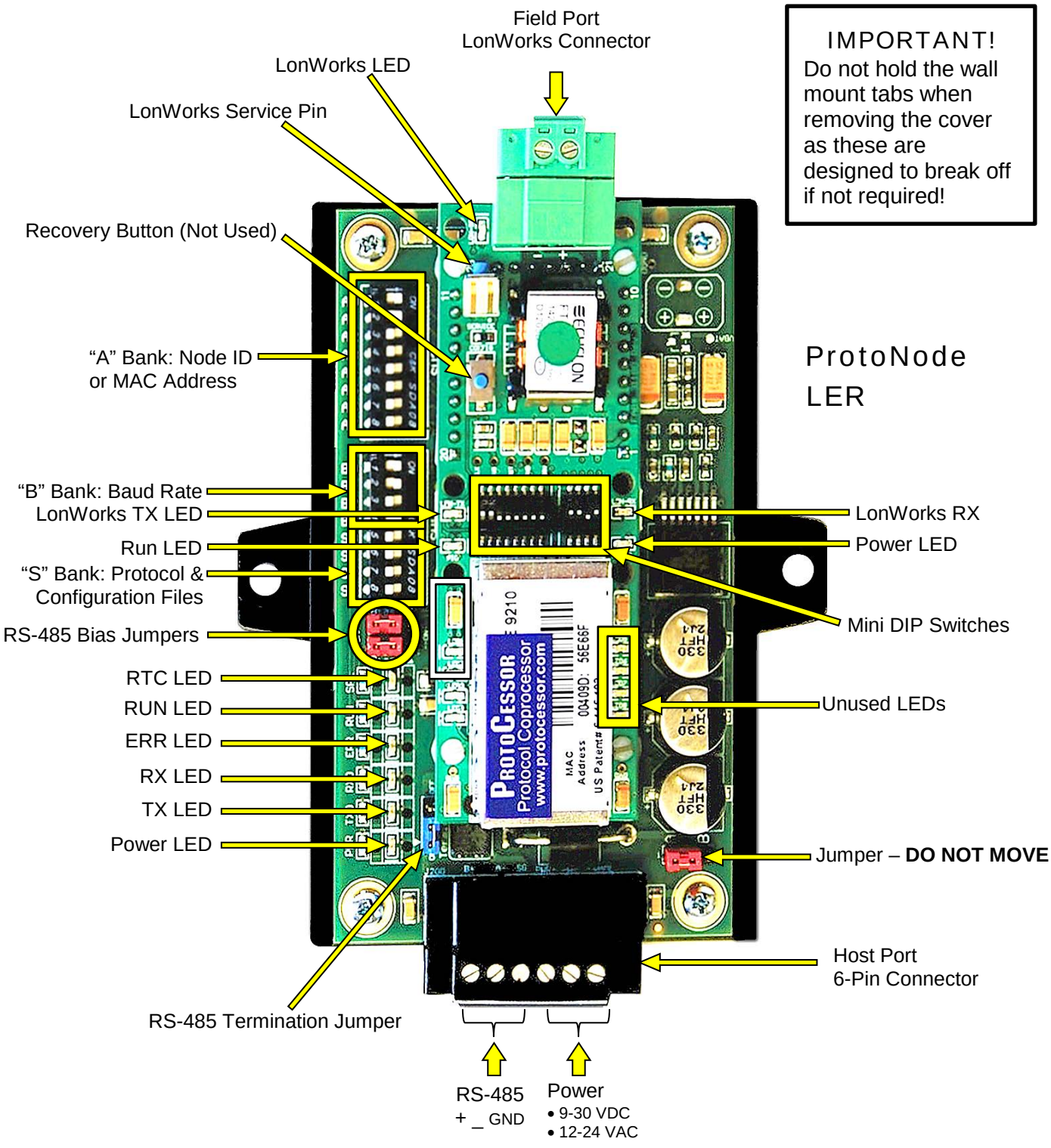


Figure 3-2: ProtoNode LER Internal Components

3.3 Wiring Connections to ProtoNode RER and ProtoNode LER

3.3.1 ProtoNode 6-Pin Phoenix Connector – Pin Outs to Modbus RTU Products

The 6 pin Phoenix connector is the same for ProtoNode RER and LER. Pins 1 through 3 are for Modbus RS-485 to the devices and pins 4 through 6 are for power.

TABLE 2-6: 6-Pin Phoenix Connector Outputs to Modbus RTU

Pin#	Device Pins	Pin assignment
Pin 1	Pin RS-485 +	RS-485 +
Pin 2	Pin RS-485 -	RS-485 -
Pin 3	Pin GND	-
Pin 4	Power In (+)	V +
Pin 5	Power In (-)	V -
Pin 6	Frame Ground	FRAME GND

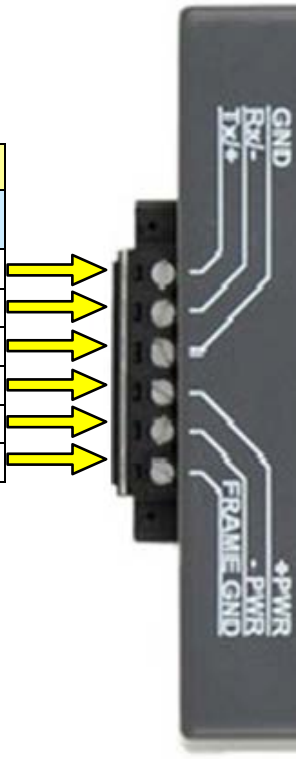


Figure 3-3: Power and RS-485 Connections for RER and LER

3.3.2 Biasing the Modbus RS-485 Network

NOTE

Turn on biasing if the BAS cannot see the devices connected to the ProtoNode AND you have checked all the settings (Modbus COM settings, wiring, and DIP switches).

- An RS-485 network with more than one device may need biasing to ensure proper communication. The biasing needs to be done on one device.
- The ProtoNode has a 510 Ohm resistor jumper that is used to set the biasing. The ProtoNode's default position for the Biasing jumper is OFF from the factory.
- The OFF position is when the 2 RED biasing jumpers straddle the 4 pins closest to the outside of the board of the ProtoNode. See Figure 3-4.

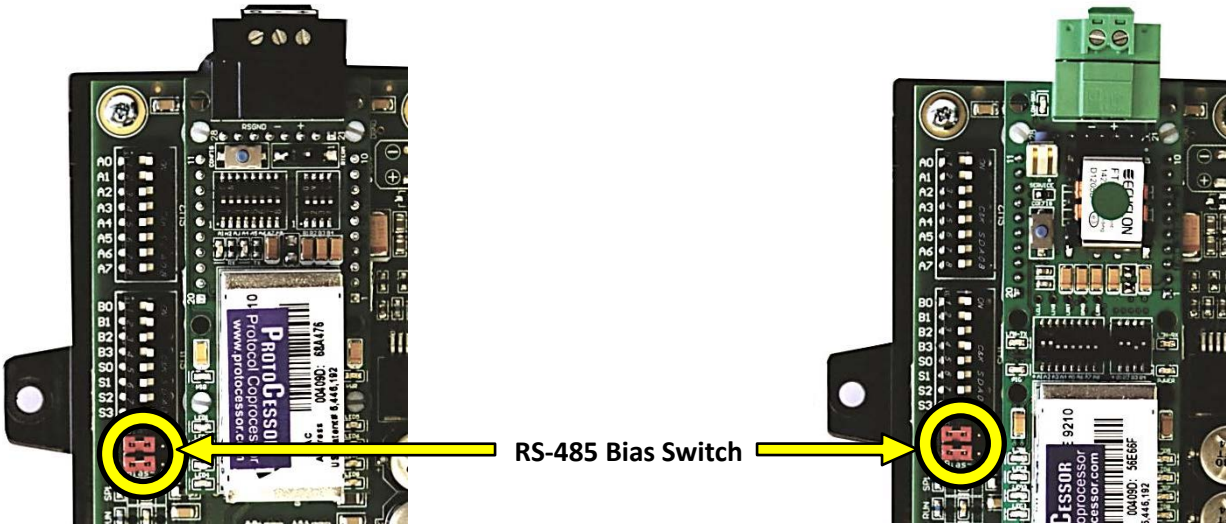


Figure 3-4: Modbus RS-485 Biasing Jumpers on the ProtoNode RER (Left) and ProtoNode LER (Right)

3.3.3 End of Line Termination Switch for the Modbus RS-485 port on the ProtoNode

- On long RS-485 cabling runs, the RS-485 trunk must be properly terminated at each end.
- If the ProtoNode is placed at one of the ends of the trunk, you place the Blue RS-485 End-of- Line terminating jumper to ON position.
- On short cabling runs the terminating EOL jumper can remain OFF except when an RS-232 to RS-485 converter is connected to the HOST (AERCO) port. In that case, put the terminating jumper in the ON position. The default setting for this blue terminating jumper is OFF.
- **Always leave the single Red Jumper in the A position. <u>NEVER move the single Red jumper</u>.**

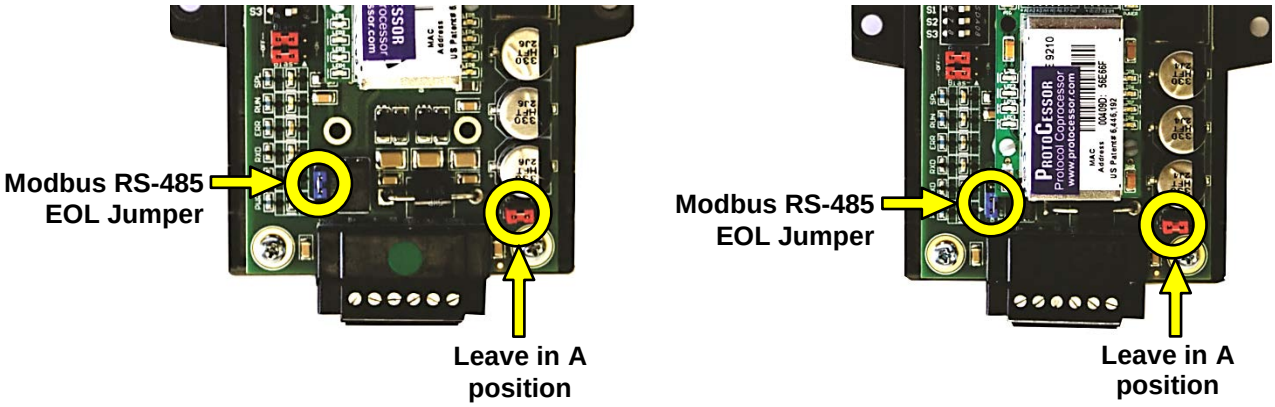


FIGURE 3-5: Modbus RS-485 End-Of-Line Termination Jumpers on the ProtoNode RER (Left) and ProtoNode LER (Right)

3.4 ACS/BMS II Wiring Connections to ProtoNode RER and LER

- When an ACS, BMS OR BMS II is being used, an RS-485-to-RS-232 converter will be required to connect it to the ProtoNode's RS485 port (6-pin Phoenix connector).
- Refer to Figures 3-6 and 3-7 to locate the internal RS-232 connector JP12 (BMS) or JP5 (BMS II/ACS) inside the wiring area of the ACS/BMS II.
- If the AERCO RS232-to-RS485 Converter (part no. 124943) is used, the RS-232 side of the converter contains a connector that plugs directly into header connector JP12 (BMS) or JP5 (BMS II/ACS).
- If a third party converter is used, connect the RS-232 Receive (RxD) and Transmit (TxD) wire leads to the internal RS-232 connector (JP12 or JP5) as shown in Figures 5 and 6. DO NOT connect the wire shield on this side of the converter.

NOTE

If a third-party RS232-to-RS485 Converter is used, consult the manufacturer's instruction manual for signal polarity.

- On the RS-485 side of the converter (Figure 3-6 and 3-7), connect the wire leads as follows:
  - Connect the TD B (+) terminal to the ProtoNode's RS485+ Port.
  - Connect the TD A (-) terminal to the ProtoNode's RS485- Port.
  - Connect the GND terminal to the ProtoNode's RS485 Frame GND Port.
  - Place the ProtoNode's termination jumper in the ON position.

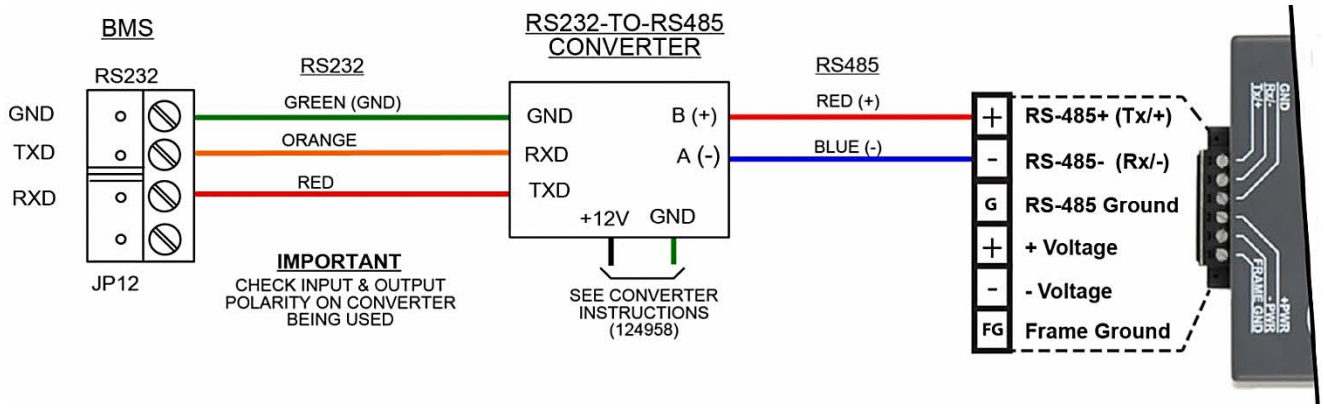


FIGURE 3-6: RS-232 Connection to BMS

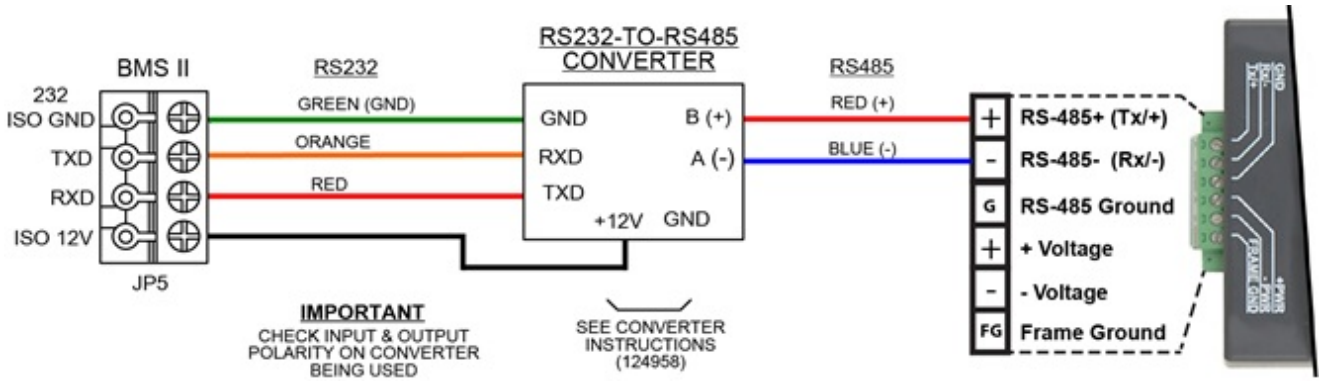


FIGURE 3-7: RS-232 Connection to ACS/BMS II

3.5 Modulex BCM Connections

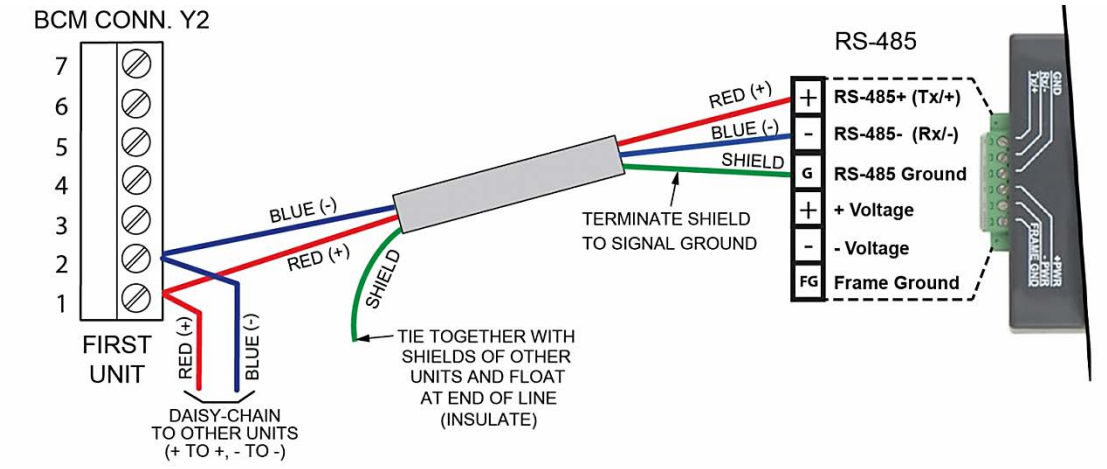
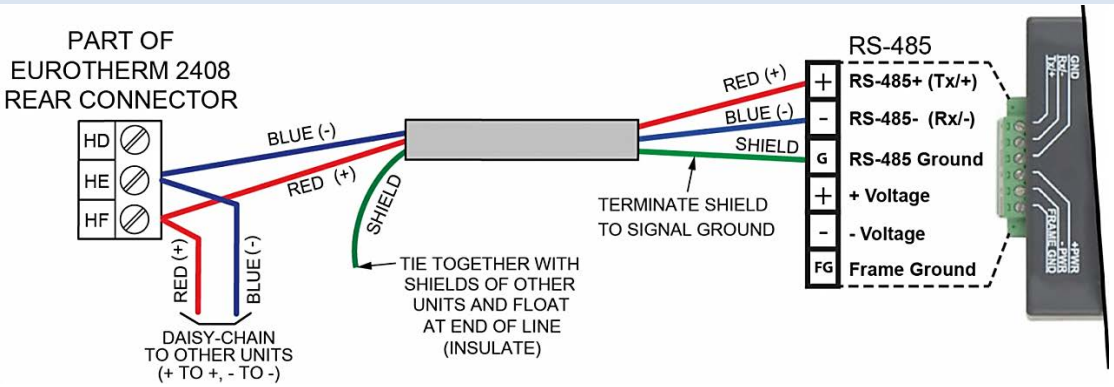


FIGURE 3-8: RS-485 Connection to BCM

3.6 ECS Connections



<u>Connect ECS terminals HE and HF to XPC Port 1a as follows:</u>

Connect the "HF" terminal to the ProtoNode's "RS485 +" port

Connect the "HE" terminal to the ProtoNode's "RS485 -" port

FIGURE 3-9: RS-485 Connection to ECS

3.7 C-MORE Connections

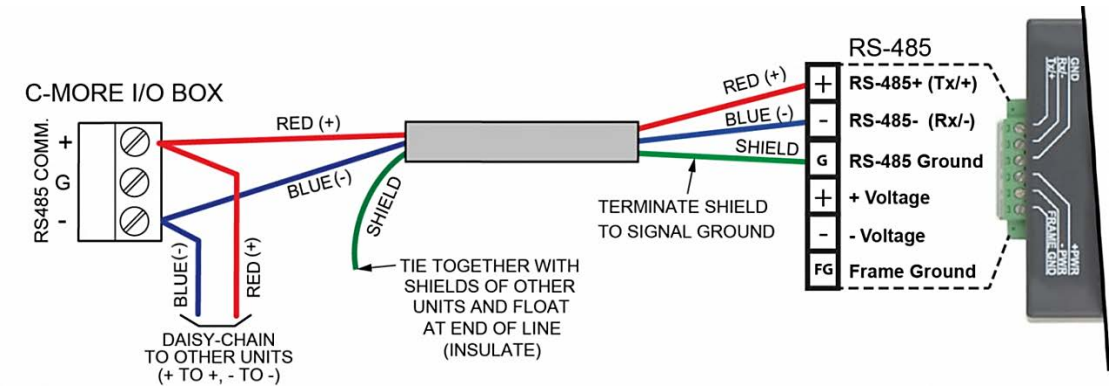


Figure 3-10: RS-485 Connection to C-MORE (RS-485)

3.8 AERCO C-More Controller PMC Board DIP Switch Settings

The RS485 DIP switches (S1 bank) on the C-More controller PMC PCB must be configured properly for use with a ProtoNode. The PMC PCB is accessed by removing the four Phillips screws at the corners of the C-More Controller front panel. The PCB is mounted on the inside of the front cover as shown in Figure 3-11.

3.8.1.1 Accessing the PMC Board in the C-More Controller

WARNING!

Shut off electrical power upstream of the boiler before opening the C-More controller to avoid the danger of electrical shock.

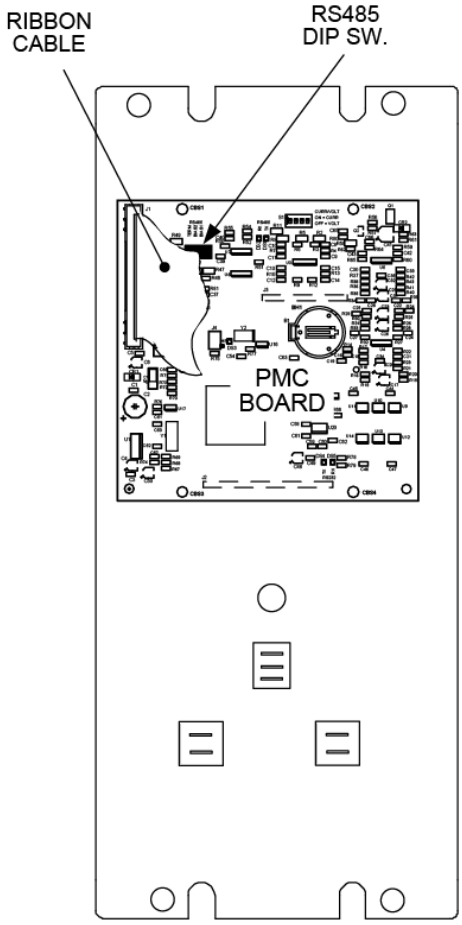


FIGURE 3-11: Location of RS-485 DIP Switch on C-More PMC PCB

CAUTION

The C-More Boiler Controller Printed Circuit Boards contain electronic components that are sensitive to electrostatic discharge (ESD). Prior to performing the following steps, put on an anti-static wrist strap and connect the clip lead to earth ground. Failure to observe this precaution may result in permanent damage to on-board ESD-sensitive components.

3.8.1.2 Setting the PMC Board RS-485 DIP Switches Instructions

The 4-position RS485 DIP Switch (S2) on the PMC PCB of the C-More Controller must be set as follows for use with the ProtoNode:

- The termination (TERM) and bias (BIAS1 & BIAS2) DIP Switches of S2 must be set to DISABLE.
- If an Oxygen Sensor is connected to the C-More Controller, switch R1 (see below) should be set to DISABLED (down). If an Oxygen Sensor is NOT connected to the C-More Controller, it should be set to ENABLED (up). Improper setting of R1 may result in error messages.

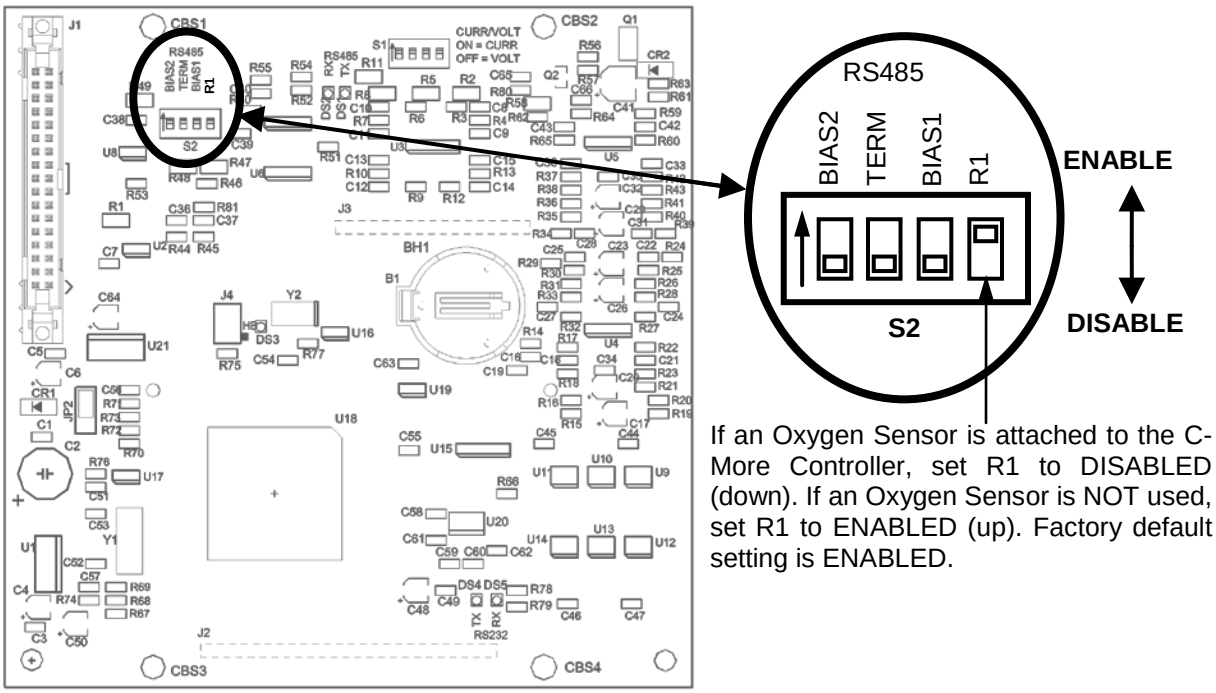


Figure 3-12: C-More Controller PCB DIP Switch Settings

NOTE

If bias is needed, activate the ProtoNode bias jumpers. If termination is needed, .activate the ProtoNode termination jumpers as well as the termination dip switch in the last boiler/heater's I/O box at the end of the RS485 daisy chain.

CHAPTER 4:

4.1 Wiring ProtoNode RER to RS-485 Field Protocol (BACnet MS/TP or Metasys N2)

Connect BAS BACnet MS/TP or Metasys N2 RS-485 port to the 3-pin RS-485 connector on ProtoNode RER as shown below.

TABLE 4-1: RER 3-Pin Connector Wiring

Pin #	BAS RS-485	Function
Pin 1	RS-485 +	RS-485 +
Pin 2	RS-485 -	RS-485 -
Pin 3	-	RS-485 GND

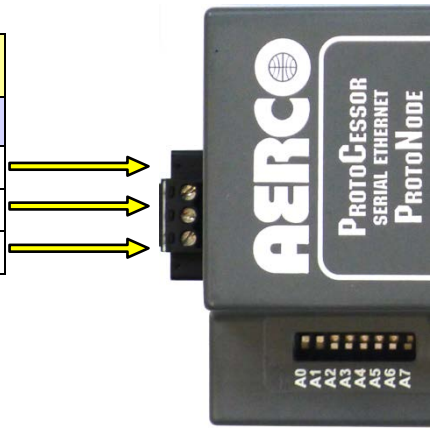


***Figure 4-1: Connection from ProtoNode to RS-485 Field Protocol** – BACnet MS/TP*

NOTE

See Section 5 for information on connecting ProtoNode RER to BACnet/IP network.

If the ProtoNode is the last device on the BACnet MS/TP or Metasys N2 trunk or if using an RS232 to RS485 converter, then the End-Of-Line Terminator may need to be enabled (See Figure 4-2). It is disabled by default.

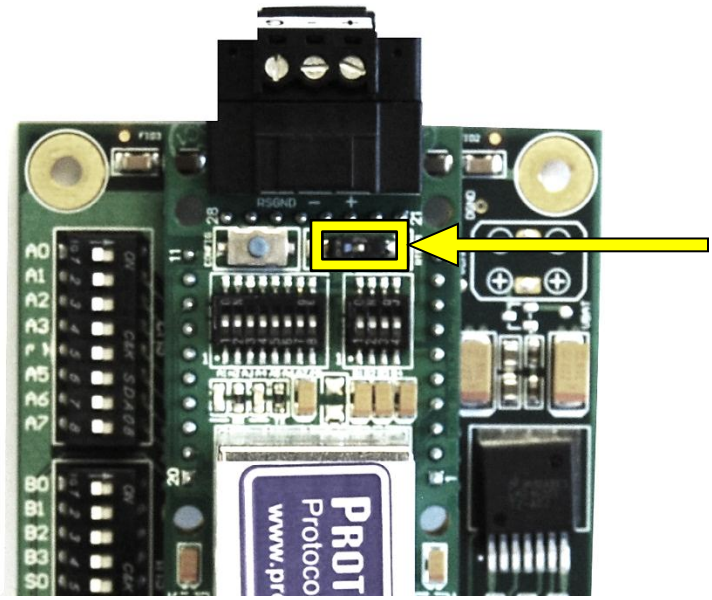


Figure 4-2: RS-485 EOL Switch

4.2 Wiring the ProtoNode LER Field Port to a LonWorks Network

Connect the ProtoNode to the field network with the LonWorks terminal using a twisted pair non-shielded cable. LonWorks has no polarity.

Figure 4-3: ProtoNode LER LonWorks Field Port Terminal

4.3 Power-Up of ProtoNode RER or ProtoNode LER

Apply power to ProtoNode. Ensure that the power supply used complies with the specifications provided in Appendix A.1. Ensure that the cable is grounded using the "Frame-GND" terminal. ProtoNode accepts either 9-30VDC or 12-24 VAC.

Table 4-2: Power Requirement for ProtoNode at 9V through 30 VDC or 12-24 VAC

ProtoNode Family	Current Draw Type		
	12VDC/VAC	24VDC/VAC	30VDC
ProtoNode RER (Typical)	170mA	100mA	80mA
ProtoNode RER (Maximum)	240mA	140mA	100mA
ProtoNode LER (Typical)	210mA	100mA	90mA
ProtoNode LER (Maximum)	250mA	130mA	100mA

Table 4-3: ProtoNode Power Connections

ProtoNode Pin #	Power to ProtoNode	Pin Assignment
Pin 4	Power In (+)	V +
Pin 5	Power In (-)	V -
Pin 6	Frame Ground	FRAME GND

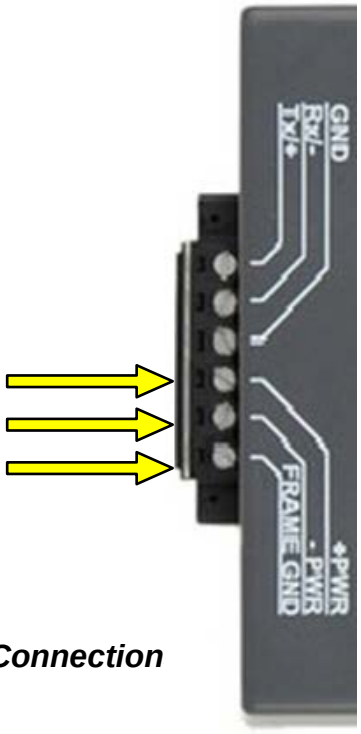


Figure 4-4: Power Connection

4.4 Commissioning ProtoNode LER on a LonWorks Network

Commissioning may only be performed by the LonWorks administrator. The User will be prompted by the LonWorks Administrator to hit the Service Pin on the ProtoNode LER at the correct step of the Commissioning process which is different for each LonWorks Network Management Tool.

If an XIF file is required, see steps in Section 4.5.

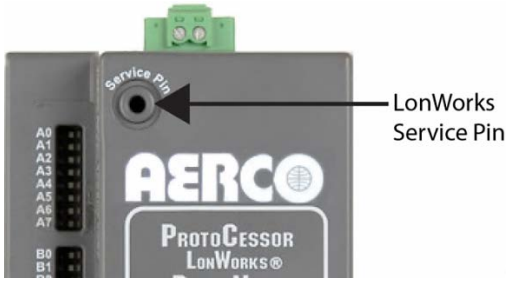


Figure 4-5: LonWorks Service Pin Location

4.5 Instructions to Upload XIF File from ProtoNode LER Using FS GUI Web Server

- Connect a standard cat5 Ethernet cable between the PC and ProtoNode
- The Default IP Address of ProtoNode is **192.168.1.24**, Subnet Mask is **255.255.255.0**. If the PC and ProtoNode are on different IP Networks, assign a static IP Address to the PC on the 192.168.1.xxx network
- **For Windows XP:**

Go to start > Control Panel > Network Connections

Right-click on Local Area Connection > Properties

Highlight Internet Protocol (TCP/IP) > Properties

- **For Windows 7:**

Go to > Control Panel > Network and Internet

> Network and Sharing Center > Change adapter settings

Right-click on Local Area Connection > Properties

Highlight Internet Protocol Version 4 (TCP/IPv4) > Properties

4.6 Commissioning ProtoNode FPC-N35 on a LonWorks Network

Commissioning may only be performed by the LonWorks administrator. The User will be prompted by the LonWorks Administrator to hit the Service Pin on the ProtoNode FPC-N35 at the correct step of the Commissioning process which is different for each LonWorks Network Management Tool.

If an XIF file is required, see steps in Section 4.7 to generate XIF

Figure 4-6: LonWorks Service Pin Location

4.7 Instructions to Upload XIF File from ProtoNode FPC-N35 Using FieldServer GUI Web Server

Connect a standard cat5 Ethernet cable between the PC and ProtoNode.

The Default IP Address of ProtoNode is 192.168.1.24, Subnet Mask is 255.255.255.0. If the PC and ProtoNode are on different IP Networks, assign a static IP Address to the PC on the 192.168.1.xxx network.

- **For Windows XP:**

Go to start > Control Panel > Network Connections

Right-click on Local Area Connection > Properties

Highlight Internet Protocol (TCP/IP) > Properties

- **For Windows 7:**

Go to > Control Panel > Network and Internet

> Network and Sharing Center > Change adapter settings

Right-click on Local Area Connection > Properties

Highlight Internet Protocol Version 4 (TCP/IPv4) > Properties

- **For Windows XP and Windows 7, select:**

Use the following IP address:

Click 

twice

Open a web browser and go to the following address: IP address of ProtoCessor/fserver.xif

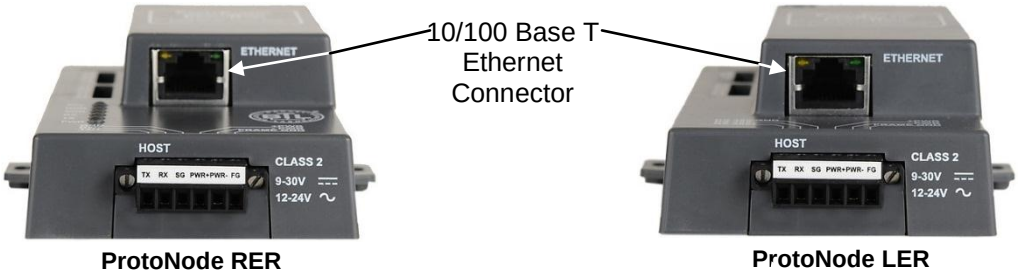
Example: 192.168.1.24/fserver.xif

If the web browser prompts you to save file, save the file onto the PC. If the web browser displays the xif file as a web page, save the file on your PC as fserver.xif

CHAPTER 5: Connect the ProtoNode's Web GUI to Setup IP Address for BACnet/IP*

***Available on ProtoNode Units with External LEDs, otherwise use the RUINET utility (section 6)**

5.1 Connect the PC to the ProtoNode via the Ethernet Port



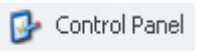
ProtoNode RER **ProtoNode LER**

Figure 5-1: Ethernet port location of ProtoNode

1) Connect a standard CAT5 Ethernet cable (straight through or cross) between the PC and ProtoNode.

2) The Default IP Address of the ProtoNode is **192.168.1.24**, Subnet Mask is **255.255.255.0**. If the PC and the ProtoNode are on different IP Networks, assign a static IP Address to the PC on the 192.168.1.xxx network.

3) Go to: 

> 

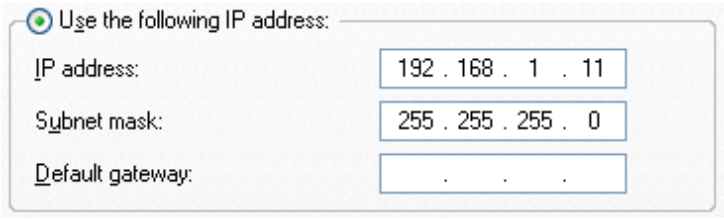
> 

4) Right-click on: **Local Area Connection > Properties**

5) Highlight: 

> 

6) Select: **Use the following IP address** (as shown below)



7) Click: 

twice.

5.2 Use the ProtoNode Web GUI to Connect to the ProtoNode

- Open PC web browser and enter the default IP address of the ProtoNode 192.168.1.24/ Determine if the ProtoNode is up and communicating. Figure 5-2 shows the main landing page for the ProtoNode.
- Under Active Profiles, the discovered Modbus RTU devices with the associated Modbus RTU Node ID's can be seen. If no profiles are present, then the wiring, baud rate, and DIP switch settings must be checked, because there is a problem with the Modbus COMs. All the active devices must show the correct Modbus Node-ID's before proceeding.

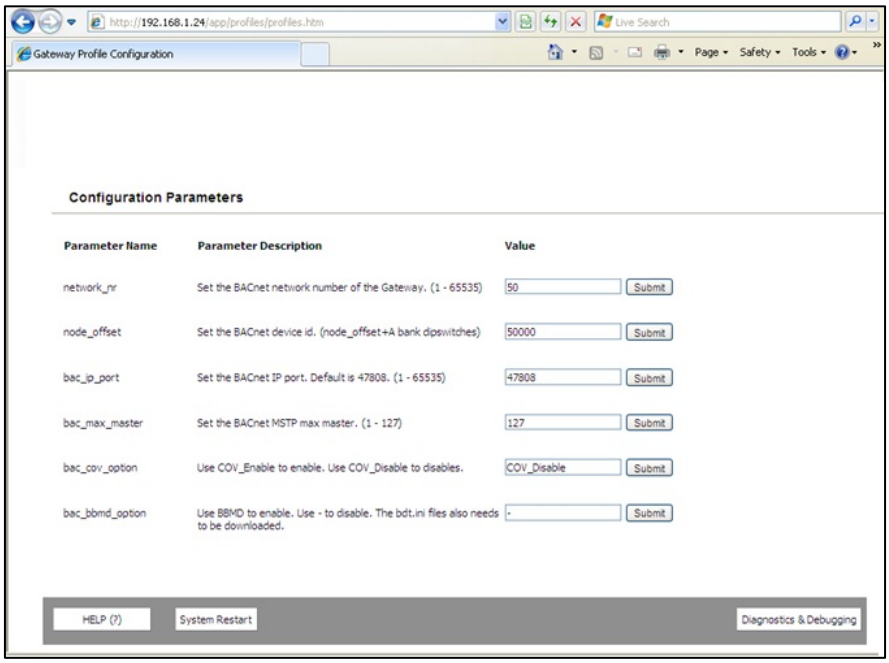


Figure 5-2: Main Landing Page for ProtoNode

5.3 Set IP Address for BACnet/IP and Modbus TCP

- Open a PC web browser, enter the default IP address of the ProtoNode 192.168.1.24 and connect to the ProtoNode.
- From the GUI main landing, click on Diagnostics and Debugging to get to the Utilities section of the GUI (to change IP Address and other capabilities). (Figure 5-3)

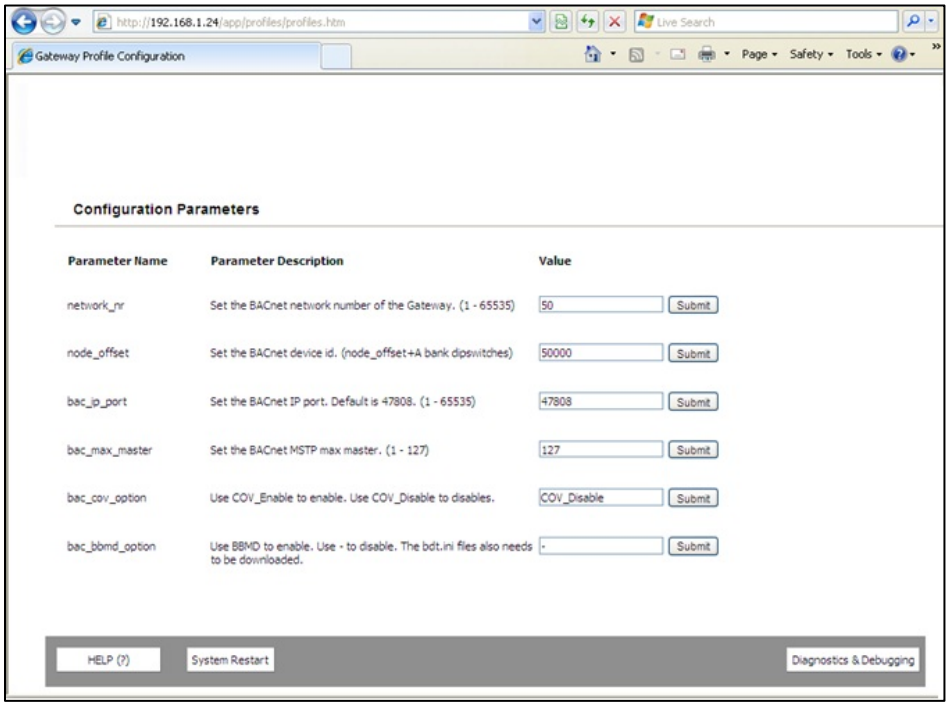


Figure 5-3: Changing IP Address using Main Landing Page for ProtoNode

- From the GUI's Utility page, click on setup and then Network Settings to enter the Edit IP Address Settings menu.
- Modify the IP address (N1 IP address field) of the ProtoNode Ethernet port.
- If necessary, change the Netmask (N1 Netmask field).
- Type in a new Subnet Mask
- If necessary, change the IP Gateway (Default Gateway field)
- Type in a new IP Gateway
- Note: If the ProtoNode is connected to a router, the IP Gateway of the ProtoNode should be set to the IP address of the router that it is connected to
- Reset ProtoNode by selecting "System Restart" or cycling the power.
- Unplug Ethernet cable from PC and connect it to the network hub or router

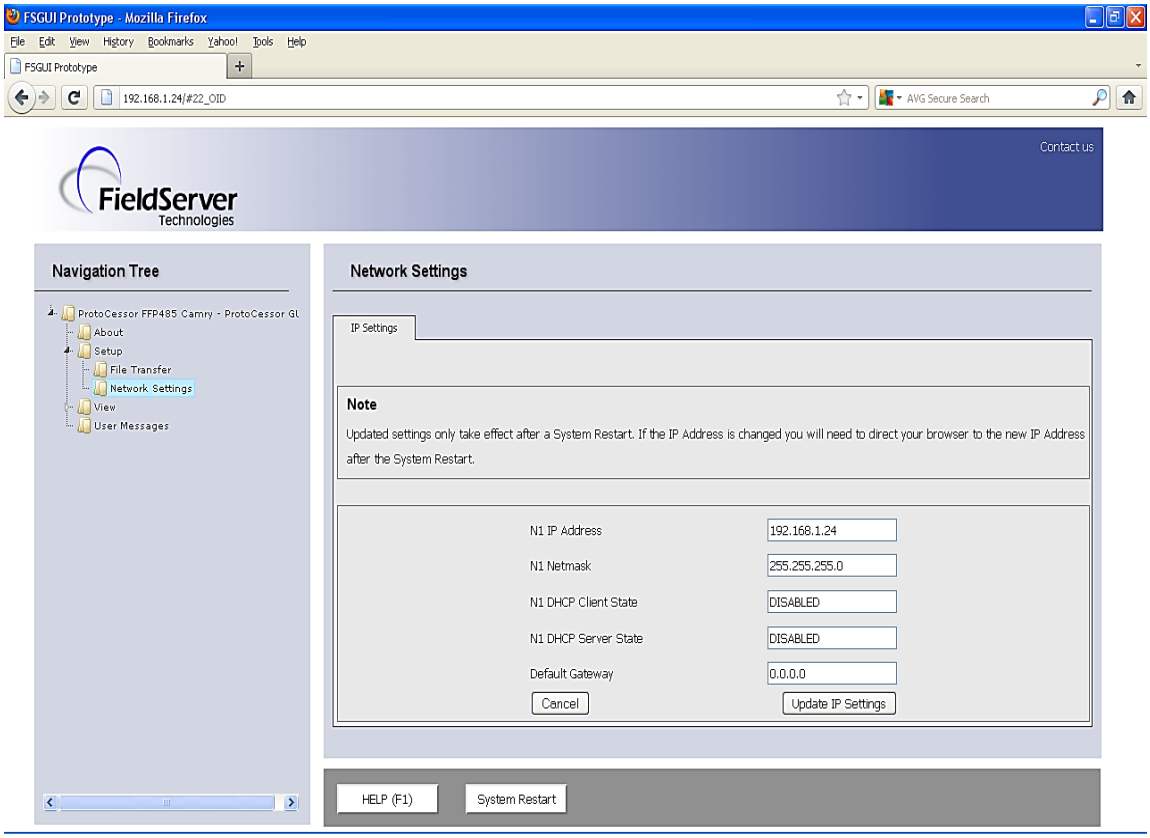


Figure 5-4: Network Settings Page

NOTE

In order to log activity from the ProtoNode, use the FST Diag utility. Software and instructions as referenced in Section 7.2.

CHAPTER 6: Install and Run the Utility Software to Setup IP Address for BACnet/IP using RUInet

1) Go to the ProtoCessor web site http://fieldserver.com/techsupport/utility/utility.php and download the RUInet Utilities by clicking on INSTALL.ZIP, circled below.

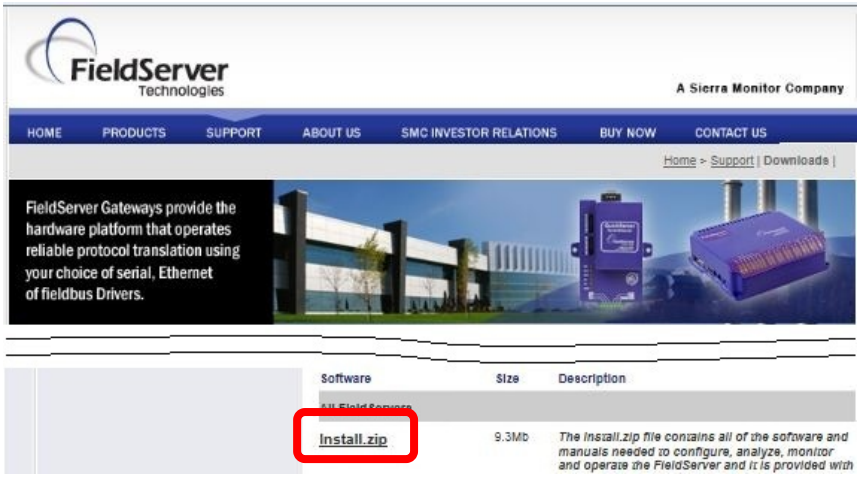


Figure 6-1: Downloading RUInet Utilities

2) Run Install.zip and follow the installation instructions

3) Once installed, the FieldServer Utilities can be located in the Windows Start menu as a desktop icon

6.1 Connect the PC to the ProtoNode via the Ethernet port

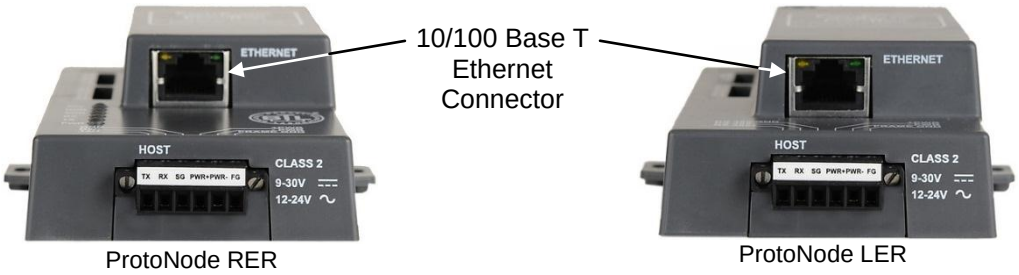


Figure 6-2: Ethernet port location of ProtoNode

1) Connect a standard CAT5 Ethernet cable (straight through or cross) between the PC and ProtoNode.

2) The Default IP Address of the ProtoNode is **192.168.1.24**, Subnet Mask is **255.255.255.0**. If the PC and the ProtoNode are on different IP Networks, assign a static IP Address to the PC on the 192.168.1.xxx network.

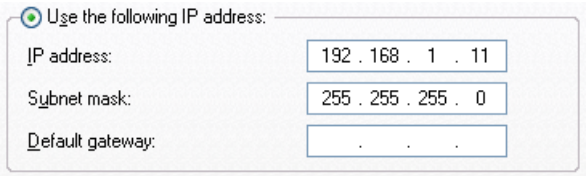
3) Go to: start > Control Panel > Network Connections

4) Right-click on: **Local Area Connection > Properties**

5) Highlight: 

>

6) Select: **Use the following IP address** (as shown below)



7) Click: 

twice.

8) Go to **Start > Programs > Field Server Utilities > Ping Utility**

9) If the IP Address of the ProtoNode module appears on the screen, the ProtoNode is running.

Figure 6-3: Ping Utility

6.2 Connect to the ProtoNode using RUI (RUInet)

- Double click on the debugging utility, "RUInet" (Remote User Interface). The following screen will appear: (if RUInet does not automatically display the main menu, select the ProtoNode by typing the 2-digit number to the left of the title name).

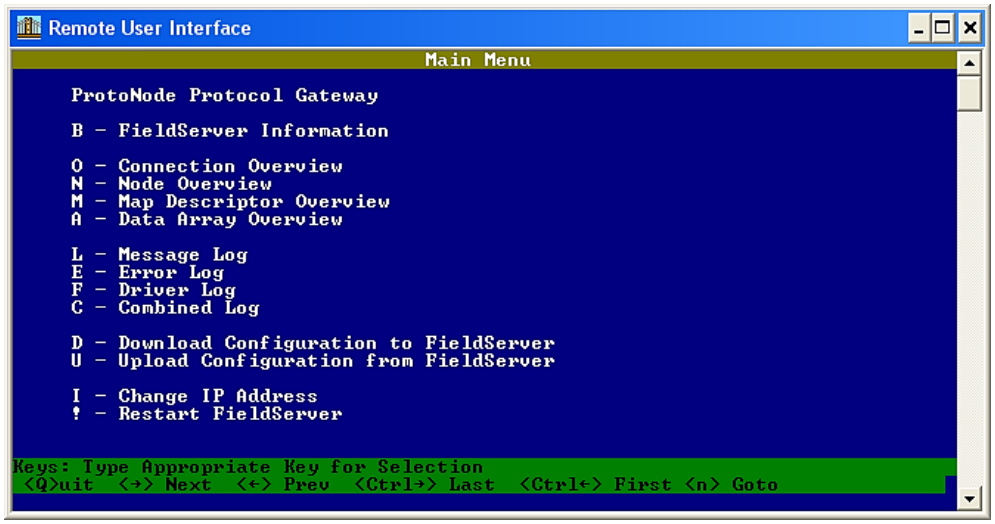


Figure 6-4: RUInet Screen

6.3 Set IP Address for BACnet/IP and Modbus TCP via RUInet

1) From the main menu, press **"I"** to enter the Edit IP Address Settings menu.
2) Press **"1"** to modify the IP address of the Ethernet adapter.
3) Type in a new IP address in the format 192.168.2.X and press **<Enter>.**
4) If necessary, press **"2"** to and change the netmask.
5) Type in a new Subnet Mask and press **<Enter>.**
6) If necessary, press **"3"** to and change the IP Gateway.
7) Type in a new IP Gateway and press **<Enter>.**
8) Note: If the ProtoNode is connected to a router, the IP Gateway of the ProtoNode should be set to the IP address of the router that it is connected to.
9) **Unplug Ethernet cable from PC and connect it to the network hub or router.**

CHAPTER 7: Troubleshooting Tips if the Unit is Not Working

7.1 Check Wiring and Settings

- No COMS on Modbus RTU side. If TX/RX is not flashing rapidly then there is a COM issue on the Modbus side and you need to check the following things:
  - Visual observations of LEDs on ProtoNode. See Section 7.4.
  - Check baud rate, parity, data bits, stop bits
  - Check Modbus device address
  - Verify wiring
- Field COM problems.
  - Visual observations of LEDs on ProtoNode. See Section 7.4.
  - Visual dipswitch settings (using correct baud rate and device instance)
  - Verify IP address setting
  - Verify wiring

If the problem still exists, a log needs to be taken and sent to FieldServer. See Section 7.2.

7.2 Make a Log with the FieldServer Utilities using the FST Diag Utility

1) Once the log is complete, email it to support@protocessor.com. The log will allow us to rapidly diagnose the problem.

2) Make sure the FieldServer utilities are loaded on the PC. You may download them from here: http://fieldserver.com/techsupport/utility/utility.php

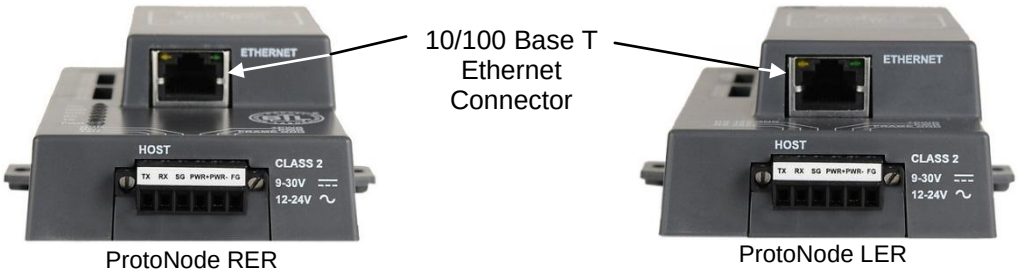


Figure 7-1: ProtoNode Ethernet Port Location

3) Disable any wireless Ethernet adapters on the PC/Laptop.

4) Disable firewall and virus protection software.

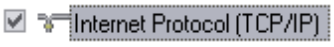
5) Connect a standard cat5 Ethernet cable between the PC and ProtoNode.

6) The Default IP Address of the ProtoNode is **192.168.1.24**, Subnet Mask is **255.255.255.0**. If the PC and the ProtoNode are on different IP Networks, assign a static IP Address to the PC on the 192.168.1.xxx network.

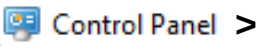
7) For **Windows XP**:

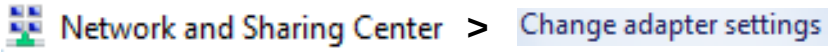
a) Go to:  >  > 

b) Right-click on: **Local Area Connection > Properties**

c) Highlight:  > 

8) For **Windows 7**:

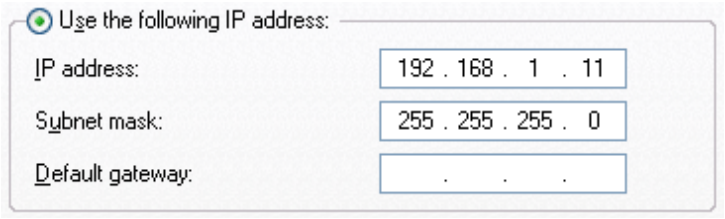
a) Go to:  > 

b) Highlight: 

c) Right-click on: **Local Area Connection > Properties**

d) Highlight: 

9) For **Windows XP** and **Windows 7**, select: Use the following IP address



10) Click:  twice.

11) Double click on the **FST Diag Utility**.

The log is now ready to be recorded. Follow the steps on the following pages to prepare a log.

Step 1: Select a Field Server IP Address.

The IP address can be entered manually or selected by clicking on button 1 using the Utility.

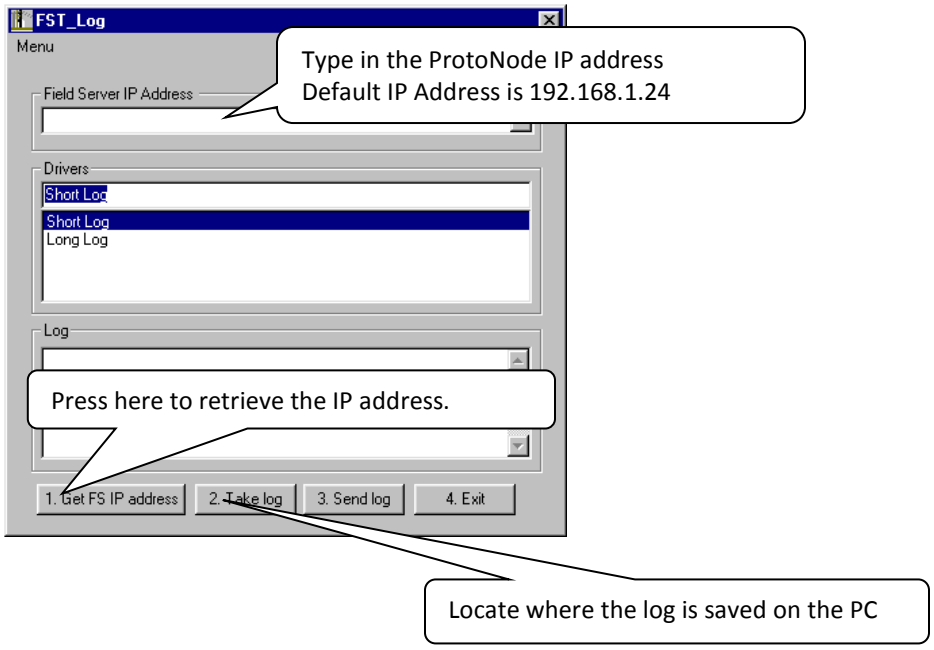


Figure 7-2: Entering Field Server IP Address

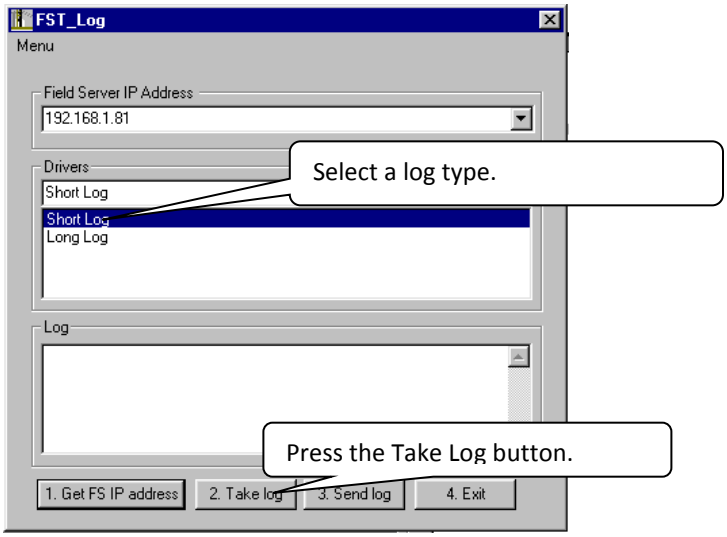


Figure 7-3: Selecting the Log Type

Step 2: Take a Log

Press the Take Log button. While the Utility runs a few DOS prompts will flash across the monitor. Don't click or type anything in to these DOS prompts. This step may take a few minutes depending on the chosen Log Type and computer speed. When the Utility is finished you will be presented with a log of events that have occurred.

Step 3: Send Log

Click the "Send Log" button located near the bottom of the dialog. The following dialog should appear.

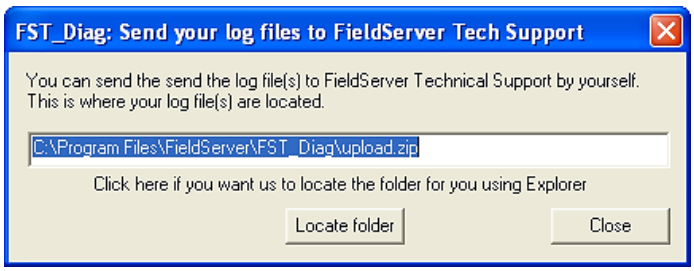


Figure 7-4: Send Log Dialog Box

Push the 'Locate Folder' button to launch explorer and have it point directly at the correct folder. The file upload.zip must be sent to support@fieldserver.com.

Step 4: Close the Program

Press the exit button when the log is completed 

7.3 Writing Setpoint to AERCO Devices

The administrator must setup their Building Automation System to write the Setpoint through the gateway to the C-More, ACS or BMS II at least three times within the Network timeout. The setpoint value to write is called "Net Remote Setpoint" in the C-More and "Net Header Set Point" in the ACS and BMS II. See Point tables in Appendix B and C. See also Section 2.3.

Table 7-1: Timeout Values

AERCO Device	Parameter	Default Value	Range	Menu
BMS II	Network Timeout	30 s	5 to 240 s	RS-232
C-More	Network Timeout	30 s	5 to 999 s	Configuration
ACS	Network Timeout	30 s	5 to 240 s	RS-232

Refer to GF-112, GF-124, and GF-131 for more information.

7.4 LED Diagnostics for Modbus RTU Communications Between the ProtoNode and AERCO's Boiler Controllers

The AERCO ProtoNode Gateway units feature six status LEDs, visible on the front panel, that indicate a number of possible activities. The following shows how to interpret the activity of the indication LEDs.

More detailed LED descriptions for LER and RER versions are shown in the following two subsections, 7.4.1 and 7.4.2.

7.4.1 ProtoNode LER and RER - LED Locations and Functions

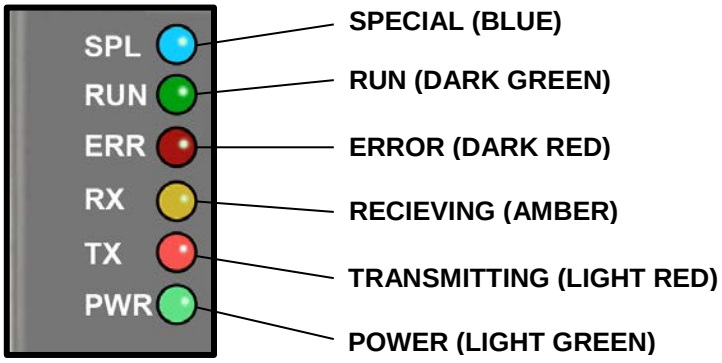


Figure 7-5: ProtoNode LER and RER Main Board Indication LEDs

Table 7-2: RER and LER Front Panel Status LED Functions

LED	Description
SPL	Special: This blue LED is reserved for future use and is normally lit.
RUN	This dark green RUN LED will start flashing 20 seconds after power up, indicating normal operation.
ERR	The dark red SYS ERR LED will go on solid 15 seconds after power up. It will turn off after 5 seconds. A steady red light will indicate there is a system error on the ProtoNode. If this occurs, immediately report the related "system error" shown in the error screen of the RUI interface to AERCO International for evaluation.
RX	The amber RX LED will flash when a message is received on the host port.
TX	The light red TX LED will flash when a message is sent on the host port.
PWR	The light green LED should show steady green at all times when the ProtoNode is powered.

7.4.1 ProtoNode LER LED Locations and Functions

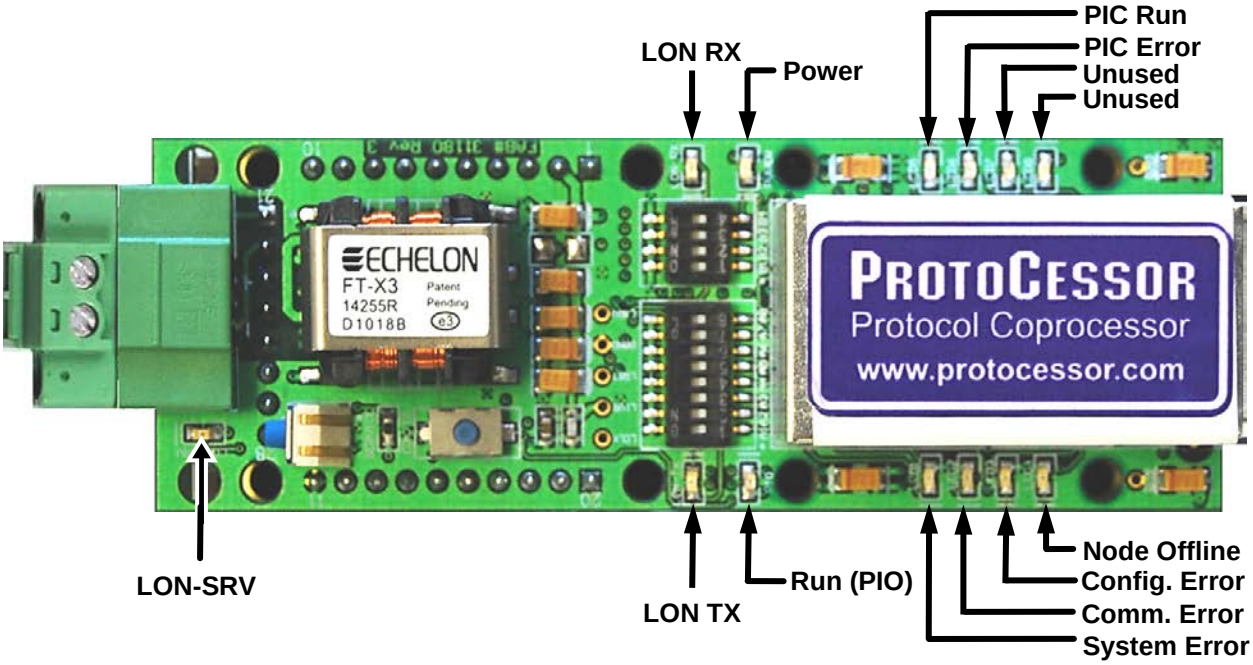


Figure 7-6: AERCO/ProtoNode Gateway LER ProtoCessor Board LED Locations

Table 7-3: ProtoNode LER LED Functions

LED	DESCRIPTION
Power	The power LED should show steady green at all times when the ProtoNode LER is powered.
System Error	The SYS ERR LED will flash once on power up and flash once 15 seconds after power up. A steady red light will indicate there is a system error on the ProtoNode LER. If this occurs, immediately report the related "system error" shown in the error screen of the RUI interface to AERCO International for evaluation.
Comm. Error	The COMM ERR LED will flash once on power up and flash once 15 seconds after power up. A steady red light will indicate a communication error has occurred. To establish the cause of the error, go to the error screen of the RUI interface.
Config. Error	The Config ERR LED will flash once on power up and flash once 15 seconds after power up. A steady amber light will indicate a configuration error exists in the active configuration. See the Error Screen in the Remote User Interface for a description of the configuration error.
Node Offline	The Node Offline LED will flash once on power up and flash once 15 seconds after power up. If the Node Offline LED stays lit, a Node Offline condition has occurred. Refer to **Section 7.5**.
RUN (PIO)	The RUN LED will start flashing 20 seconds after power indicating normal operation. The ProtoNode LER will be able to access RUInet once this LED starts flashing.
PIC Run	The PIC RUN LED will flash indicating normal operation.
PIC Error	The PIC ERR LED will go on solid indicating there is a PIC error.
LON-TX	On normal operation of ProtoNode LER, the TX LED will flash when a message is sent on the Lon port of the ProtoNode.
LON-RX	On normal operation of ProtoNode LER, the RX LED will flash when a message is received on the Lon port of the ProtoNode.
LON-SRV	The LON-SRV LED will flash if the ProtoNode is configured for implicit addressing and not commissioned. LED will be off if the ProtoNode is configured for implicit addressing and commissioned or if it is configured for explicit addressing.

7.4.2 ProtoNode RER - LED Locations and Functions

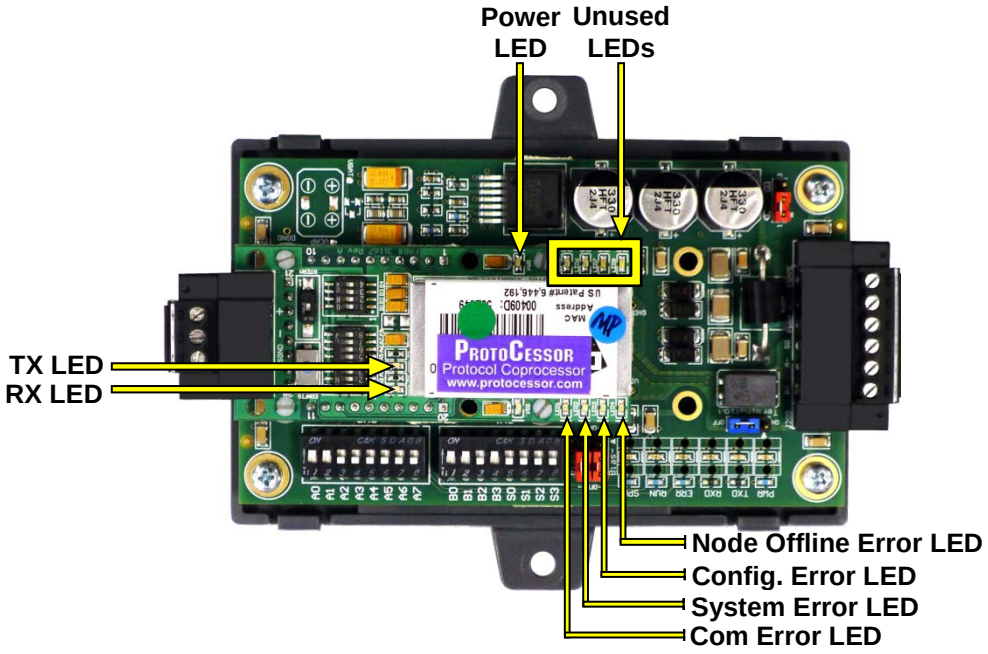


Figure 7-7A: AERCO/ProtoNode Gateway RER Indication LED Locations – OLD

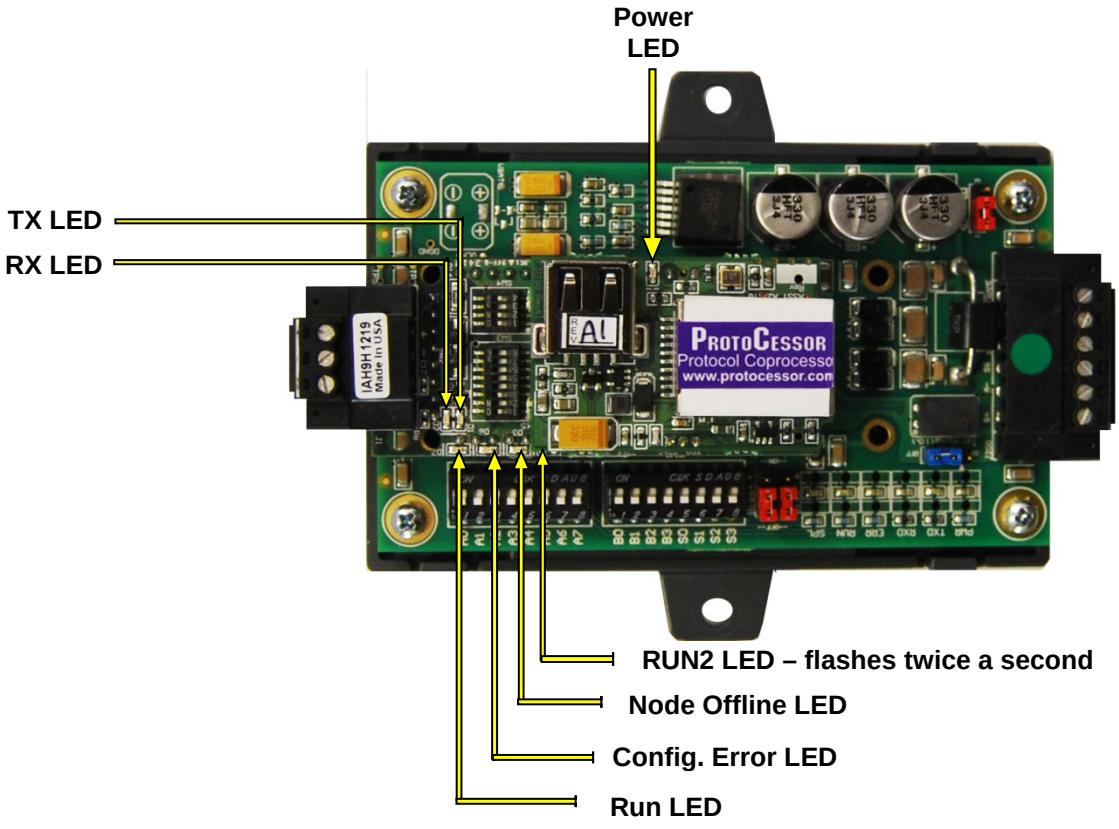


Figure 7-7B: AERCO/ProtoNode Gateway RER Indication LED Locations – NEW

Table 7-4: ProtoNode RER LED Functions	
Led	Description
PWR	The power LED should show steady green at all times when the ProtoNode LER is powered.
System Error	The SYS ERR LED will go on solid 15 seconds after power up. It will turn off after 5 seconds. A steady red light will indicate there is a system error on the ProtoCessor. If this occurs, immediately report the related "system error" shown in the error screen of the RUI interface to AERCO International for evaluation.
Comm. Error	The COMM ERR LED will go on solid 15 seconds after power up. It will turn off after 5 seconds. A steady red light will indicate the communications problem if there is a configured node connected to the ProtoCessor that is offline. To establish the cause of the error, go to the error screen of the RUI interface.
Configuration Error	The Configuration ERR LED will go on solid 15 seconds after power up. It will turn off after 5 seconds. A steady amber light indicates a configuration error exists in the active configuration. See the Error Screen in the Remote User Interface for a description of the configuration error.
Node Offline	Node Offline LED will go on solid 15 seconds after power up. It will turn off after 5 seconds. If the Node Offline LED stays lit, a node offline condition has occurred. Refer to **Section 7.5**.
Unused	15 seconds after powering up the 4 unused LEDs will turn on solid for 5 seconds, then turn off.
RX	On normal operation of ProtoNode RER, the RX LED will flash when a message is received on the field port of the ProtoCessor.
TX	On normal operation of ProtoNode RER, the TX LED will flash when a message is sent on the field port of the ProtoCessor.
Run	RUN LED will flash 20 seconds after power up, signifying normal operation. The ProtoNode RER will be able to access RUInet once this LED starts flashing. During the first 20 seconds, the LED should be off.

7.5 Node Offline LED

The Node Offline LED normally behaves for each ProtoNode model as follows:

1) LER = LED will flash once on power up and flash once 15 seconds after power up.
2) RER = LED will go on solid 15 seconds after power up. It will turn off after 5 seconds.

However, if this LED stays lit, this means an AERCO unit that is expected in the selected table applied via the DIP switches is not available for one of the following reasons:

1) The number of units installed is less than the number of units in the table. This would occur if the table with four (4) C-Mores is selected, but only three (3) units are installed.
2) One or more units is disabled or off.
3) There is a fault in the communication devices or interconnect between and including the AERCO controller and the ProtoNode.

NOTE

It is not uncommon for the Node Offline LED to remain lit without necessarily indicating a serious system problem. If you experience this error indication and require help to determine its cause, refer to section 7.2 for instructions to download a log file from the ProtoNode using the RUInet utility. Using this log, AERCO can assist you in troubleshooting the cause.

7.6 Troubleshooting Procedures for Connection Problems

- Confirm that the network cabling is correct.
- Confirm that the computer network card is operational and correctly configured.
- Confirm that there is an Ethernet adapter installed in the PC's Device Manager List, and that it is configured to run the TCP/IP protocol**.**
- Check that the IP netmask of the PC matches the ProtoNode. The Default IP Address of the ProtoNode is 192.168.1.24, Subnet Mask is 255.255.255.0
    1) Go to **Start** > **Run.**
    2) Type in "ipconfig".
    3) The account settings should be displayed.
    4) Ensure that the IP address is 192.168.1.xxx and the netmask 255.255.255.0
- Ensure that the PC and ProtoNode are on the same IP Network, or assign a Static IP Address to the PC on the 192.168.1.0 network using the Remote User Interface Utility.
- If Using Windows XP, ensure that the firewall is disabled.
- Ensure that all other Ethernet cards active on the PC, especially wireless adapters are disabled.
- Refer to the Field Server Troubleshooting Guide which can be found at www/protocessor.com/downloads/ under documentation.
- Confirm that the network cabling is correct.
- If write values are lost from time to time, check that the timeout values for the ACS, BMS II, C-More and the host system are compatible. Refer to Section 4.5 in this manual for more information.

CHAPTER 8: Configuration Information

8.1 Default ProtoNode Modbus RTU COM Settings for AERCO Controllers

Table 8-1: Default Serial Port Settings

Serial Port Setting	ACS, BMS II, BMS	ECS/SP	BCM (Modulex)	C-More
Baud Rate	9600	9600	9600	9600
Data Bits	8	8	8	8
Stop Bits	1	1	1	1
Parity	None	None	None	None

Table 8-2: Default Address Settings

Configuration	Controllers	Name	Modbus Default Address
4 C-More Controllers up to 12 C-More Controllers & 1 ACS/BMS II/BMS	C-more 1	Blr Addr 1	1
	C-more 2	Blr Addr 2	2
	C-more 3	Blr Addr 3	3
	C-more 4	Blr Addr 4	4
	C-more 5	Blr Addr 5	5
	C-more 6	Blr Addr 6	6
	C-more 7	Blr Addr 7	7
	C-more 8	Blr Addr 8	8
	C-more 9	Blr Addr 9	9
	C-more 10	Blr Addr 10	10
	C-more 11	Blr Addr 11	11
	C-more 12	Blr Addr 12	12
	ACS /BMS II	BMS Addr 128	128
4 Modulex Controllers & 1 ACS/BMS II/BMS	Modulex 1	Mlx Addr 1	1
	Modulex 2	Mlx Addr 2	2
	Modulex 3	Mlx Addr 3	3
	Modulex 4	Mlx Addr 4	4
	ACS /BMS II	BMA Addr 128	128
4 ECS/SP	ECS 1	E Value Addr 29	29
	ECS 2	E Value Addr 30	30
	ECS 3	E Value Addr 31	31
	ECS 4	E Value Addr 32	32

For Profiles defined in Appendix C, the ECS/SP Modbus default point addresses are defined below.

Table 8-3: ECS/SP Modbus Default Address Settings			
Configuration	Controllers	Name	Modbus Default Address
6 ECS/SP	ECS 1	E Value Addr 17	17
	ECS 2	E Value Addr 18	18
	ECS 3	E Value Addr 19	19
	ECS 4	E Value Addr 20	20
	ECS 5	E Value Addr 21	21
	ECS 6	E Value Addr 22	22
2 ACS/BMSII/BMS	ACS/BMSII	BMS Addr 128	128
	ACS/BMSII	BMS Addr 228	228
BST/WHM (SSD)	C-More 1-8	Blk Htr Addr 1-8	1 to 8
	C-More Master (SSD Address)	Master Addr 247	247

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Appendix A: REFERENCE

Appendix A.1: Specifications

Appendix A.1: Specifications		
	ProtoNode RER	**ProtoNode LER**
Electrical Connections	One 6-pin Phoenix connector, one RS-485 +/- ground port, power +/- frame ground port. One 3-pin RS-485 Phoenix connector, one RS-485 +/- ground port. One Ethernet-10/100 Ethernet port.	One 6-pin Phoenix connector, one RS-485 +/- ground port, power +/- frame ground port. One Ethernet 10/100 BaseT port. One FTT-10 LonWorks port.
Approvals:	CE (EN55022;EN55024; EN60950), UL916, FCC Class A Part 15, DNP3 Conformance Tested, OPC Self-tested for Compliance, RoHS Compliant, CSA 205 Approved	
	BTL Marked	LonMark Certified
Power Requirements	Multi-mode power adapter: 9-30 VDC, 12-24 VAC	
Physical Dimensions	11.5 cm L x 8.3 cm W x 4.1 cm H (4.5 x 3.2 x 1.6 in.)	
Weight:	0.2 kg (0.4 lbs)	
Operating Temperature:	-40°C to 75°C (-40°F to167°F)	
Surge Suppression	EN61000-4-2 ESD EN61000-4-3 EMC EN61000-4-4 EFT	
Humidity:	5 - 90% RH (non-condensing)	

(Specifications subject to change without notice)

Appendix A.2: Compliance with UL Regulations

For UL compliance, the following instructions must be met when operating the ProtoNode.

- The units shall be powered by listed LPS or Class 2 power supply suited to the expected operating temperature range.
- The interconnecting power connector and power cable shall:
  - Comply with local electrical code.
  - Be suited to the expected operating temperature range.
  - Meet the current and voltage rating for the ProtoNode/Net
- Furthermore, the interconnecting power cable shall:
  - not exceed 3.05m (118.3") in length.
  - Be constructed of materials rated VW-1 or FT-1 or better.
- If the unit is to be installed in an operating environment with a temperature above 65 °C, it should be installed in a Restricted Access Area requiring a key or a special tool to gain access
- This device must not be connected to a LAN segment with outdoor wiring.

Appendix A.3: ProtoNode Address DIP Switch Settings

Table A-1: ProtoNode Address DIP Switch Settings									
Address		**A0**	**A1**	**A2**	**A3**	**A4**	**A5**	**A6**	**A7**
0		Off	Off	Off	Off	Off	Off	Off	Off
1		On	Off	Off	Off	Off	Off	Off	Off
2		Off	On	Off	Off	Off	Off	Off	Off
3		On	On	Off	Off	Off	Off	Off	Off
4		Off	Off	On	Off	Off	Off	Off	Off
5		On	Off	On	Off	Off	Off	Off	Off
6		Off	On	On	Off	Off	Off	Off	Off
7		On	On	On	Off	Off	Off	Off	Off
8		Off	Off	Off	On	Off	Off	Off	Off
9		On	Off	Off	On	Off	Off	Off	Off
10		Off	On	Off	On	Off	Off	Off	Off
11		On	On	Off	On	Off	Off	Off	Off
12		Off	Off	On	On	Off	Off	Off	Off
13		On	Off	On	On	Off	Off	Off	Off
14		Off	On	On	On	Off	Off	Off	Off
15		On	On	On	On	Off	Off	Off	Off
16		Off	Off	Off	Off	On	Off	Off	Off
17		On	Off	Off	Off	On	Off	Off	Off
18		Off	On	Off	Off	On	Off	Off	Off
19		On	On	Off	Off	On	Off	Off	Off
20		Off	Off	On	Off	On	Off	Off	Off
21		On	Off	On	Off	On	Off	Off	Off
22		Off	On	On	Off	On	Off	Off	Off
23		On	On	On	Off	On	Off	Off	Off
24		Off	Off	Off	On	On	Off	Off	Off
25		On	Off	Off	On	On	Off	Off	Off
26		Off	On	Off	On	On	Off	Off	Off
27		On	On	Off	On	On	Off	Off	Off
28		Off	Off	On	On	On	Off	Off	Off
29		On	Off	On	On	On	Off	Off	Off
30		Off	On	On	On	On	Off	Off	Off
31		On	On	On	On	On	Off	Off	Off
32		Off	Off	Off	Off	Off	On	Off	Off
33		On	Off	Off	Off	Off	On	Off	Off
34		Off	On	Off	Off	Off	On	Off	Off
35		On	On	Off	Off	Off	On	Off	Off
36		Off	Off	On	Off	Off	On	Off	Off
37		On	Off	On	Off	Off	On	Off	Off
38		Off	On	On	Off	Off	On	Off	Off
39		On	On	On	Off	Off	On	Off	Off
40		Off	Off	Off	On	Off	On	Off	Off
41		On	Off	Off	On	Off	On	Off	Off

Table A-1: ProtoNode Address DIP Switch Settings									
Address		**A0**	**A1**	**A2**	**A3**	**A4**	**A5**	**A6**	**A7**
42		Off	On	Off	On	Off	On	Off	Off
43		On	On	Off	On	Off	On	Off	Off
44		Off	Off	On	On	Off	On	Off	Off
45		On	Off	On	On	Off	On	Off	Off
46		Off	On	On	On	Off	On	Off	Off
47		On	On	On	On	Off	On	Off	Off
48		Off	Off	Off	Off	On	On	Off	Off
49		On	Off	Off	Off	On	On	Off	Off
50		Off	On	Off	Off	On	On	Off	Off
51		On	On	Off	Off	On	On	Off	Off
52		Off	Off	On	Off	On	On	Off	Off
53		On	Off	On	Off	On	On	Off	Off
54		Off	On	On	Off	On	On	Off	Off
55		On	On	On	Off	On	On	Off	Off
56		Off	Off	Off	On	On	On	Off	Off
57		On	Off	Off	On	On	On	Off	Off
58		Off	On	Off	On	On	On	Off	Off
59		On	On	Off	On	On	On	Off	Off
60		Off	Off	On	On	On	On	Off	Off
61		On	Off	On	On	On	On	Off	Off
62		Off	On	On	On	On	On	Off	Off
63		On	On	On	On	On	On	Off	Off
64		Off	Off	Off	Off	Off	Off	On	Off
65		On	Off	Off	Off	Off	Off	On	Off
66		Off	On	Off	Off	Off	Off	On	Off
67		On	On	Off	Off	Off	Off	On	Off
68		Off	Off	On	Off	Off	Off	On	Off
69		On	Off	On	Off	Off	Off	On	Off
70		Off	On	On	Off	Off	Off	On	Off
71		On	On	On	Off	Off	Off	On	Off
72		Off	Off	Off	On	Off	Off	On	Off
73		On	Off	Off	On	Off	Off	On	Off
74		Off	On	Off	On	Off	Off	On	Off
75		On	On	Off	On	Off	Off	On	Off
76		Off	Off	On	On	Off	Off	On	Off
77		On	Off	On	On	Off	Off	On	Off
78		Off	On	On	On	Off	Off	On	Off
79		On	On	On	On	Off	Off	On	Off
80		Off	Off	Off	Off	On	Off	On	Off
81		On	Off	Off	Off	On	Off	On	Off
82		Off	On	Off	Off	On	Off	On	Off
83		On	On	Off	Off	On	Off	On	Off
84		Off	Off	On	Off	On	Off	On	Off
85		On	Off	On	Off	On	Off	On	Off

Table A-1: ProtoNode Address DIP Switch Settings									
Address		**A0**	**A1**	**A2**	**A3**	**A4**	**A5**	**A6**	**A7**
86		Off	On	On	Off	On	Off	On	Off
87		On	On	On	Off	On	Off	On	Off
88		Off	Off	Off	On	On	Off	On	Off
89		On	Off	Off	On	On	Off	On	Off
90		Off	On	Off	On	On	Off	On	Off
91		On	On	Off	On	On	Off	On	Off
92		Off	Off	On	On	On	Off	On	Off
93		On	Off	On	On	On	Off	On	Off
94		Off	On	On	On	On	Off	On	Off
95		On	On	On	On	On	Off	On	Off
96		Off	Off	Off	Off	Off	On	On	Off
97		On	Off	Off	Off	Off	On	On	Off
98		Off	On	Off	Off	Off	On	On	Off
99		On	On	Off	Off	Off	On	On	Off
100		Off	Off	On	Off	Off	On	On	Off
101		On	Off	On	Off	Off	On	On	Off
102		Off	On	On	Off	Off	On	On	Off
103		On	On	On	Off	Off	On	On	Off
104		Off	Off	Off	On	Off	On	On	Off
105		On	Off	Off	On	Off	On	On	Off
106		Off	On	Off	On	Off	On	On	Off
107		On	On	Off	On	Off	On	On	Off
108		Off	Off	On	On	Off	On	On	Off
109		On	Off	On	On	Off	On	On	Off
110		Off	On	On	On	Off	On	On	Off
111		On	On	On	On	Off	On	On	Off
112		Off	Off	Off	Off	On	On	On	Off
113		On	Off	Off	Off	On	On	On	Off
114		Off	On	Off	Off	On	On	On	Off
115		On	On	Off	Off	On	On	On	Off
116		Off	Off	On	Off	On	On	On	Off
117		On	Off	On	Off	On	On	On	Off
118		Off	On	On	Off	On	On	On	Off
119		On	On	On	Off	On	On	On	Off
120		Off	Off	Off	On	On	On	On	Off
121		On	Off	Off	On	On	On	On	Off
122		Off	On	Off	On	On	On	On	Off
123		On	On	Off	On	On	On	On	Off
124		Off	Off	On	On	On	On	On	Off
125		On	Off	On	On	On	On	On	Off
126		Off	On	On	On	On	On	On	Off
127		On	On	On	On	On	On	On	Off
128		Off	Off	Off	Off	Off	Off	Off	On
129		On	Off	Off	Off	Off	Off	Off	On

Table A-1: ProtoNode Address DIP Switch Settings									
Address		**A0**	**A1**	**A2**	**A3**	**A4**	**A5**	**A6**	**A7**
130		Off	On	Off	Off	Off	Off	Off	On
131		On	On	Off	Off	Off	Off	Off	On
132		Off	Off	On	Off	Off	Off	Off	On
133		On	Off	On	Off	Off	Off	Off	On
134		Off	On	On	Off	Off	Off	Off	On
135		On	On	On	Off	Off	Off	Off	On
136		Off	Off	Off	On	Off	Off	Off	On
137		On	Off	Off	On	Off	Off	Off	On
138		Off	On	Off	On	Off	Off	Off	On
139		On	On	Off	On	Off	Off	Off	On
140		Off	Off	On	On	Off	Off	Off	On
141		On	Off	On	On	Off	Off	Off	On
142		Off	On	On	On	Off	Off	Off	On
143		On	On	On	On	Off	Off	Off	On
144		Off	Off	Off	Off	On	Off	Off	On
145		On	Off	Off	Off	On	Off	Off	On
146		Off	On	Off	Off	On	Off	Off	On
147		On	On	Off	Off	On	Off	Off	On
148		Off	Off	On	Off	On	Off	Off	On
149		On	Off	On	Off	On	Off	Off	On
150		Off	On	On	Off	On	Off	Off	On
151		On	On	On	Off	On	Off	Off	On
152		Off	Off	Off	On	On	Off	Off	On
153		On	Off	Off	On	On	Off	Off	On
154		Off	On	Off	On	On	Off	Off	On
155		On	On	Off	On	On	Off	Off	On
156		Off	Off	On	On	On	Off	Off	On
157		On	Off	On	On	On	Off	Off	On
158		Off	On	On	On	On	Off	Off	On
159		On	On	On	On	On	Off	Off	On
160		Off	Off	Off	Off	Off	On	Off	On
161		On	Off	Off	Off	Off	On	Off	On
162		Off	On	Off	Off	Off	On	Off	On
163		On	On	Off	Off	Off	On	Off	On
164		Off	Off	On	Off	Off	On	Off	On
165		On	Off	On	Off	Off	On	Off	On
166		Off	On	On	Off	Off	On	Off	On
167		On	On	On	Off	Off	On	Off	On
168		Off	Off	Off	On	Off	On	Off	On
169		On	Off	Off	On	Off	On	Off	On
170		Off	On	Off	On	Off	On	Off	On
171		On	On	Off	On	Off	On	Off	On
172		Off	Off	On	On	Off	On	Off	On
173		On	Off	On	On	Off	On	Off	On

Table A-1: ProtoNode Address DIP Switch Settings									
Address		**A0**	**A1**	**A2**	**A3**	**A4**	**A5**	**A6**	**A7**
174		Off	On	On	On	Off	On	Off	On
175		On	On	On	On	Off	On	Off	On
176		Off	Off	Off	Off	On	On	Off	On
177		On	Off	Off	Off	On	On	Off	On
178		Off	On	Off	Off	On	On	Off	On
179		On	On	Off	Off	On	On	Off	On
180		Off	Off	On	Off	On	On	Off	On
181		On	Off	On	Off	On	On	Off	On
182		Off	On	On	Off	On	On	Off	On
183		On	On	On	Off	On	On	Off	On
184		Off	Off	Off	On	On	On	Off	On
185		On	Off	Off	On	On	On	Off	On
186		Off	On	Off	On	On	On	Off	On
187		On	On	Off	On	On	On	Off	On
188		Off	Off	On	On	On	On	Off	On
189		On	Off	On	On	On	On	Off	On
190		Off	On	On	On	On	On	Off	On
191		On	On	On	On	On	On	Off	On
192		Off	Off	Off	Off	Off	Off	On	On
193		On	Off	Off	Off	Off	Off	On	On
194		Off	On	Off	Off	Off	Off	On	On
195		On	On	Off	Off	Off	Off	On	On
196		Off	Off	On	Off	Off	Off	On	On
197		On	Off	On	Off	Off	Off	On	On
198		Off	On	On	Off	Off	Off	On	On
199		On	On	On	Off	Off	Off	On	On
200		Off	Off	Off	On	Off	Off	On	On
201		On	Off	Off	On	Off	Off	On	On
202		Off	On	Off	On	Off	Off	On	On
203		On	On	Off	On	Off	Off	On	On
204		Off	Off	On	On	Off	Off	On	On
205		On	Off	On	On	Off	Off	On	On
206		Off	On	On	On	Off	Off	On	On
207		On	On	On	On	Off	Off	On	On
208		Off	Off	Off	Off	On	Off	On	On
209		On	Off	Off	Off	On	Off	On	On
210		Off	On	Off	Off	On	Off	On	On
211		On	On	Off	Off	On	Off	On	On
212		Off	Off	On	Off	On	Off	On	On
213		On	Off	On	Off	On	Off	On	On
214		Off	On	On	Off	On	Off	On	On
215		On	On	On	Off	On	Off	On	On
216		Off	Off	Off	On	On	Off	On	On
217		On	Off	Off	On	On	Off	On	On

Table A-1: ProtoNode Address DIP Switch Settings									
Address		**A0**	**A1**	**A2**	**A3**	**A4**	**A5**	**A6**	**A7**
218		Off	On	Off	On	On	Off	On	On
219		On	On	Off	On	On	Off	On	On
220		Off	Off	On	On	On	Off	On	On
221		On	Off	On	On	On	Off	On	On
222		Off	On	On	On	On	Off	On	On
223		On	On	On	On	On	Off	On	On
224		Off	Off	Off	Off	Off	On	On	On
225		On	Off	Off	Off	Off	On	On	On
226		Off	On	Off	Off	Off	On	On	On
227		On	On	Off	Off	Off	On	On	On
228		Off	Off	On	Off	Off	On	On	On
229		On	Off	On	Off	Off	On	On	On
230		Off	On	On	Off	Off	On	On	On
231		On	On	On	Off	Off	On	On	On
232		Off	Off	Off	On	Off	On	On	On
233		On	Off	Off	On	Off	On	On	On
234		Off	On	Off	On	Off	On	On	On
235		On	On	Off	On	Off	On	On	On
236		Off	Off	On	On	Off	On	On	On
237		On	Off	On	On	Off	On	On	On
238		Off	On	On	On	Off	On	On	On
239		On	On	On	On	Off	On	On	On
240		Off	Off	Off	Off	On	On	On	On
241		On	Off	Off	Off	On	On	On	On
242		Off	On	Off	Off	On	On	On	On
243		On	On	Off	Off	On	On	On	On
244		Off	Off	On	Off	On	On	On	On
245		On	Off	On	Off	On	On	On	On
246		Off	On	On	Off	On	On	On	On
247		On	On	On	Off	On	On	On	On
248		Off	Off	Off	On	On	On	On	On
249		On	Off	Off	On	On	On	On	On
250		Off	On	Off	On	On	On	On	On
251		On	On	Off	On	On	On	On	On
252		Off	Off	On	On	On	On	On	On
253		On	Off	On	On	On	On	On	On
254		Off	On	On	On	On	On	On	On
255		On	On	On	On	On	On	On	On

Appendix B: AERCO EQUIPMENT MONITOR AND CONTROL POINT DEFINITIONS

Definitions of the monitor and control points associated with the AERCO Equipment Configurations are provided in the tables which follow.

Appendix B.1: AERCO C-More & ACS/BMS II/BMS Point Definitions

Table B-1: AERCO C-More & ACS/BMS II/BMS Point Definitions

Point Name	BAS Modbus Data Address	GF-108, GF-124, GF-114 Point Name	Reg. Type	Modbus Data Address (Hex/Dec.)	Units (Range)
C-More Boiler					
01-Fire Rate Out	30009	Fire Rate Out	Input	0x0008 / 8	% (0 to 100)
02-Active Setpoint	30017	Active Set Point	Input	0x0010 / 16	deg F (40 to 220)
03-Net Remote Setpt	40001	Net Remote Set Point	Holding	0x0000 / 0	deg F (40 to 220)
* 04-Net Direct Drive	40002	Net Direct Drive	Holding	0x0001 / 1	% (0 to 100)
05-Fire Rate In	30018	Fire Rate In	Input	0x0011 / 17	% (0 to 100)
06-Outlet Temp	30003	Outlet Temp	Input	0x0002 / 2	deg F (30 to 245)
07-Display Code	30001	Default Message Display Code	Input	0x0000 / 0	Enum (1 to 48) See Part III, Appendix A
08-Unit Status	30002	Unit Status	Input	0x0001 / 1	Enum (0 to 5) 0 = Disabled 1 = Standby 2 = Manual Operation 3 = Remote Operation 4 = Auto Operation 5 = Fault
09-Run Cycles	30012-30013	Run Cycles	Input	0x000B - 0x000C / 11 - 12	(0 to 999,999)
10-Run Hours	30014-30015	Run Hours	Input	0x000D - 0x000E / 13 - 14	(0 to 999,999)
11-Oxygen	30010	O2 Level	Input	0x0009 / 9	% (0 to 25)
12-Exhaust Temp	30007	Exhaust Temp	Input	0x0006 / 6	Deg F (50 to 550)

* Where available in special profiles

ACS/BMS II/BMS					
01-Fire Rate Out	30005	Fire Rate Out	Input	0x0004 / 4	% (0 to 100)
02-Header Set Temp	30006	Header Set Temperature	Input	0x0005 / 5	°F (40 to 220)
03-Net Header Set Temp	40005	Net Header Set Temp	Holding	0x0004 / 4	°F (40 to 220)
04-Header Temp	30002	Header Temperature	Input	0x0001 / 1	°F (40 to 220)
05-Outside Air Temp	30003	Outside Air Temperature	Input	0x0002 / 2	°F (-60 to 120)

Appendix B.1: AERCO C-More & ACS/BMS II/BMS Point Definitions (Cont.)					
Point Name	**BAS Modbus Data Address**	**GF-108, GF-124, GF-114 Point Name**	**Reg. Type**	**Modbus Data Address (Hex/Dec.)**	**Units (Range)**
ACS/BMS II/BMS (Cont.)					
06-Display Code	30011	Fault/Message Code	Input	0x000A / 10	Bit (0 to 65535) Bit 0 = Outside Air Sensor Error Bit 1 = Header Sensor Error Bit 2 = Interlock 1 Error Bit 3 = Interlock 2 Error Bit 4 = Indoor Air/Return Sens Error Bit 5 = 4-20 mA Input Error
07-Num Boilers Fired	30008	Total Boilers Fired	Input	0x0007 / 7	(0 to 40) BMS (0 to 32) BMSII
08-Num Boilers Online	30009	Total Boilers On Line	Input	0x0008 / 8	(0 to 40) BMS (0 to 32) BMSII
09-Last Blr Fired	30017	Last Boiler Fired	Input	0x0010 / 16	(1 to 40) BMS (1 to 32) BMSII
10-Boiler 1 Status	30018	Boiler 1 Status (PWM Boiler 1)	Input	0x0011 / 17	Enum (1 to 40, 119, 120) 1 to 40 = Fired and Sequence 119 = Not On Line 120 = On Line But Not Fired
11-Boiler 2 Status	30019	Boiler 2 Status (PWM Boiler 2)	Input	0x0012 / 18	Same As Above
12-Boiler 3 Status	30020	Boiler 3 Status (PWM Boiler 3)	Input	0x0013 / 19	Same As Above
13-Boiler 4 Status	30021	Boiler 4 Status (PWM Boiler 4)	Input	0x0014 / 20	Same As Above
14-Boiler 5 Status	30022	Boiler 5 Status (PWM Boiler 5)	Input	0x0015 / 21	Enum (1 to 40, 119, 120) 1 to 40 = Fired and Sequence 119 = Not On Line 120 = On Line But Not Fired
15-Boiler 6 Status	30023	Boiler 6 Status (PWM Boiler 6)	Input	0x0016 / 22	Same As Above
16-Boiler 7 Status	30024	Boiler 7 Status (PWM Boiler 7)	Input	0x0017 / 23	Same As Above
17-Boiler 8 Status	30025	Boiler 8 Status (PWM Boiler 8)	Input	0x0018 / 24	Same As Above
18-Net Blr 1 Status	30026	Net Boiler 1	Input	0x0019 / 25	Enum (1 to 40, 119, 120) 1 to 40 = Fired and Sequence 119 = Not On Line 120 = On Line But Not Fired 121 = On Line But Disabled 122 = On Line But Faulted
19-Net Blr 2 Status	30027	Net Boiler 2	Input	0x001A / 26	Same As Above
20-Net Blr 3 Status	30028	Net Boiler 3	Input	0x001B / 27	Same As Above
21-Net Blr 4 Status	30029	Net Boiler 4	Input	0x001C / 28	Same As Above
22-Net Blr 5 Status	30030	Net Boiler 5	Input	0x001D / 29	Same As Above
23-Net Blr 6 Status	30031	Net Boiler 6	Input	0x001E / 30	Same As Above
24-Net Blr 7 Status	30032	Net Boiler 7	Input	0x001F / 31	Same As Above

Appendix B.1: AERCO C-More & ACS/BMS II/BMS Point Definitions (Cont.)					
Point Name	**BAS Modbus Data Address**	**GF-108, GF-124, GF-114 Point Name**	**Reg. Type**	**Modbus Data Address (Hex/Dec.)**	**Units (Range)**
ACS/BMS II/BMS (Cont.)					
25-Net Blr 8 Status	30033	Net Boiler 8	Input	0x0020 / 32	Same As Above
26-Net Blr 9 Status	30034	Net Boiler 9	Input	0x0021 / 33	Same As Above
27-Net Blr 10 Status	30035	Net Boiler 10	Input	0x0022 / 34	Same As Above
28-Net Blr 11 Status	30036	Net Boiler 11	Input	0x0023 / 35	Same As Above
29-Net Blr 12 Status	30037	Net Boiler 12	Input	0x0024 / 36	Same As Above

Appendix B.2: AERCO Electronic Control System (ECS) Point Definitions

Table B-2: AERCO Electronic Control System (ECS) Point Definitions

Point Name	BAS Modbus Data Address	GF-108, GF-124, GF-114 Point Name	Reg. Type	Modbus Data Address (Hex/Dec.)	Units (Range)
Electric Valve (ECS) and SmartPlate					
01-Cntl Output Signal	30004	OP (Control Output Signal)	Input	0x0003 / 3	% (0 to 100)
02-Setpoint	30006	w.SP (Setpoint)	Input	0x0005 / 5	°F (40 to 180)
03-RmSetpt	40027	Remote Input Comms Access parameter(Setpoint)	Holding	0x001A / 26	°F (40 to 180)
04-Outlet Temp	30002	Top Value (Outlet Temp)	Input	0x0001 / 1	°F (40 to 205)
05-FBk Sensor Temp	30290	Li1 (Feedback Sensor Temp)	Input	0x0121 / 289	°F (40 to 180)
06-Over Temp Alarm	30075	AL 1 (Over Temp Alarm)	Input	0x004A / 74	Bit 0 = Alarm 1 State (0 = Safe 1 = Alarm). Bit 1 = Alarm 2 State (0 = Safe 1 = Alarm). Bit 2 = Alarm 3 State (0 = Safe 1 = Alarm). Bit 3 = Alarm 4 State (0 = Safe 1 = Alarm). Bit 4 = Manual Mode (0 = Auto 1 = Manual). Bit 5 = Sensor Break (0 = Good PV 1 = Sensor Broken. Bit 6 = Loop Break (0 = Good closed loop 1 = Open Loop). Bit 7 = Heater Fail (0 = No Fault 1 = Load fault detected).
07-Flow Rate	30291	Li2 (Flow)	Input	0x0122 / 290	GPM

Appendix B.3: AERCO ACS/BMS II & BCM Point Definitions

Table B-3: AERCO ACS/BMS II & BCM Point Definitions (Cont.)

Point Name	BAS Modbus Data Address	GF-108, GF-124, GF-114 Point Name	Reg. Type	Modbus Data Address (Hex/Dec.)	Units (Range)
Boiler Management System (BMS II) or AERCO Control System (ACS)					
01-Fire Rate Out	30005	Fire Rate Out	Input	0x0004 / 4	% (0 to 100)
02-Header Set Temp	30006	Header Set Temperature	Input	0x0005 / 5	°F (40 to 220)
03-Net Header Set Temp	40005	Net Header Set Temp	Holding	0x0004 / 4	°F (40 to 220)
04-Header Temp	30002	Header Temperature	Input	0x0001 / 1	°F (40 to 220)
05-Outside Air Temp	30003	Outside Air Temperature	Input	0x0002 / 2	°F (-60 to 120)
06-Display Code	30011	Fault/Message Code	Input	0x000A / 10	Bit (0 to 65535) Bit 0 = Outside Air Sensor Error Bit 1 = Header Sensor Error Bit 2 = Interlock 1 Error Bit 3 = Interlock 2 Error Bit 4 = Indoor Air/Return Sens Error Bit 5 = 4-20 mA Input Error
07-Num Boilers Fired	30008	Total Boilers Fired	Input	0x0007 / 7	(0 to 32)
08-Num Boilers Online	30009	Total Boilers On Line	Input	0x0008 / 8	(0 to 32)
09-Last Blr Fired	30017	Last Boiler Fired (corr. for Lead Boiler Number)	Input	0x0010 / 16	(1 to 32)
18-Net Blr 1 Status	30026	Net Boiler 1	Input	0x0019 / 25	Enum (1 to 40, 119, 120) 1 to 40 = Fired and Sequence 119 = Not On Line 120 = On Line But Not Fired 121 = On Line But Disabled 122 = On Line But Faulted
19-Net Blr 2 Status	30027	Net Boiler 2	Input	0x001A / 26	Same As Above
20-Net Blr 3 Status	30028	Net Boiler 3	Input	0x001B / 27	Same As Above
21-Net Blr 4 Status	30029	Net Boiler 4	Input	0x001C / 28	Same As Above
Modulex Boiler with BCM					
01-Act Mod Lev (Actual Modulation Level)	41009	Global Actual Modulation Level	Holding	0x03F0 / 1008	% (0 to 100)
02-Target Setpoint	41019	Target Setpoint	Holding	0x03F8 / 1016	°F (32 to 185) (Value x 10)
03-Req Outlet Temp (Requested Outlet Temp)	41005	Requested Setpoint	Holding	0x03EC / 1004	°F (32 to 185) (Value x 10)
04-Net Direct Drive	40002	Direct Drive Requested Modulation Level	Holding	0x0001 / 1	% (0 to 100)
05-Mod Lev In (Modulation Level In)	41201	Monitor Only Global Modulation Level from Cascade Manager	Holding	0x04B0 / 1200	% (0 to 100)

Table B-3: AERCO BMS II & BCM Point Definitions (Cont.)					
Point Name	**BAS Modbus Data Address**	**GF-108, GF-124, GF-114 Point Name**	**Reg. Type**	**Modbus Data Address (Hex/Dec.)**	**Units (Range)**
Modulex Boiler with BCM - Cont.					
06-Flow Sens Temp (Flow Sensor Temperature)	41003	Flow Sensor Temperature	Holding	0x03EA / 1002	°F (14 to 212) (Value x 10)
07-Display Code	30001	Status & Error Code (C-more compatible)	Input	0x0000 / 0	Enum (2,8,10,18,23,32,38,42) 2 = Standby 8 = High Temp Switch Open 10 = Low Gas Press Switch Open 18 = Air Flow Switch Open During Ignition 23 = Flame Loss During Run 32 = Residual Flame 38 = Other Conditions Not Listed 42 = Outlet (Flow) Temp Sensor Fault
11-Error Code	40001	Error Code	Holding	0x0000 / 0	(0 to 0xFFFF) LSB = Error Code MSB = Id Code Of Fault Device (0 = BMM#0, 7 = BMM#7, 255 = BCM). See Appendix B.
08-Unit Status	30002	Unit Status (C-more Compatible)	Input	0x0001 / 1	Enum (1,3,5) 1 = Standby (ready to run but not fired) 3 = Fired 5 = Fault
09-Ret Flow Temp (Return Flow Temperature)	41004	Return Flow Temperature	Holding	0x03EB / 1003	°F (32 to 212) (Value x 10)

IMPORTANT

Some Modbus addresses specified in this manual are written generically in hexadecimal/decimal format. However, many Building Automation Systems utilize another form of addressing where:

- 40001 is added to the generic address for a Holding Register address.
- 30001 is added to the generic address for an Input Register address.

Check the addressing scheme being used by the BAS interfaced to the ProtoNode.

Appendix B.4: Water Heater Management System (WHM) and On-Board Boiler Sequencing Technology (BST) Point Definitions

Appendix B.4: AERCO WHM and BST Point Definitions					
Point Name	**BAS Modbus Data Address**	**GF-108, GF-124, GF-114 Point Name**	**Reg. Type**	**Modbus Data Address (Hex/Dec.)**	**Units (Range)**
WHM or BST Master					
Write Control to WHM/BST	40051		Holding	50	Write "1" to send value to WHM/BST
Read WHM Timeout	40053		Holding	52	0 to
Read WHM Mode	30100		Input	99	0 = OFF, 1 = Slave, 2 = Master
Read WHM Setpoint	30101		Input	100	°F (40 to 200)
Read WHM Setback Setpoint	30102		Input	101	°F (40 to 200)
Read WHM Setback Time Start	30103		Input	102	12:00 AM to 11:59 PM (see note)
Read WHM Setback Time End*	30104		Input	103	12:00 AM to 11:59 PM (see note)
Read Auto Master Status	30105		Input	104	0 = NO, 1 = YES
Read Average Outlet Temp.	30106		Input	105	°F (30 to 245)
Read # Units Active	30107		Input	106	0 to 8
Read # Units Faulted	30108		Input	107	0 to 8
Read WHM Master Address	30109		Input	108	0, 10-255
Write WHM Setpoint	40200		Holding	199	°F (40 to 200)
Write WHM Setback Setpoint	40201		Holding	200	°F (40 to 200)
Write WHM Setback Time Start	40202		Holding	201	12:00 AM to 11:59 PM
Write WHM Setback Time End	40203		Holding	202	12:00 AM to 11:59 PM
WHM Heater or BST Boiler					
Communication Address	3xx00		Input	(x1)	0 to 127
Unit Status	3xx01		Input	X00	Enum List (0 to 5) 0 = Disabled 1 = Standby 2 = Manual Operation 3 = Remote Operation 4 = Auto Operation 5 = Fault
Fault Code	3xx02		Input	X01	Fault codes 0-74 matching the C-More fault codes.
Outlet Temperature	3xx03		Input	X02	°F (30 to 245)
FFWD Temperature	3xx04		Input	X03	°F (30 to 245)
Inlet Temperature	3xx05		Input	X04	°F (30 to 245)
Exhaust Temperature	3xx06		Input	X05	°F (50 to 550)
Inlet Air Temperature	3xx07		Input	X06	°F (-70 to 245)
Flame Strength	3xx08		Input	X07	% (0 to 100)
Fire Rate IN	3xx09		Input	X08	% (0 to 100)
Fire Rate OUT	3xx10		Input	X09	% (0 to 100)
Unit Type	3xx11		Input	X10	Enum List (0 to 5 or 8) (see note)
Unit Size	3xx12		Input	X11	Enum List (0 to 21) (see note)
Valve State	3xx13		Input	X12	0 = Closed , 1 = Open

Net Remote Setpoint	3xx14		Input	X13	°F (40 to 200)
Run Cycles Upper 16 bits	3xx15		Input	X14	0 to 65535 (see note)
Run Cycles Lower 16 bits	3xx16		Input	X15	0 to 65535 (see note)
Run Hours Upper 16 bits	3xx17		Input	X16	0 to 65535 (see note)
Run Hours Lower 16 bits	3xx18		Input	X17	0 to 65535 (see note)
Oxygen Level	3xx19		Input	X18	% (0 to 25)

IMPORTANT

For WHM and BST, use the SSD profiles.

NOTE

For WHM Heater or BST Boiler

#1, 'x' = 03
#2, 'x' = 04
#3, 'x' = 05
#4, 'x' = 06
#5, 'x' = 07
#6, 'x' = 08
#7, 'x' = 09
#8, 'x' = 10

Time

Time is expressed in minutes since midnight. For example, 360 equals 6 AM.

Run Cycles and Run Hours

Example:

Run Cycles = Run Cycles Upper 16 bits * 65536 + Run Cycles Lower 16 bits
Run Hours = Run Hours Upper 16 bits * 65536 + Run Hours Lower 16 bits

Unit Types for BST

1=KC Boiler LN, **2**=BMK Boiler Std, **3**=BMK Blr Std Dual, **4**=BMK Boiler LN, **5**=BMK Blr LN Dual

Unit Types for WHM

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 Wtr Heater LN, **8**=Innovation WH

Unit Sizes

1=600 MBH, **2**=800 MBH, **3**=1060 MBH, **4**=1350 MBH, **5**=600 MBH, **6**=800 MBH, **7**=1060 MBH, **8**=1350 MBH, **9**=500 MBH, **10**=750 MBH, **11**=1000 MBH, **12**=1.5 MBTU, **13**=1500 MBH, **14**=2.0 MBTU, **15**=2000 MBH, **16**=2500 MBH, **17**=3.0 MBTU, **18**=3000 MBH, **19**=4000 MBH, **20**=5000 MBH, **21**=6000 MBH

Appendix C: BACNET/IP, BACNET MS/TP, METASYS N2, AND LONWORKS POINTS LIST

Appendix C.1: Four C-Mores and One ACS/BMS II/BMS

Table C-1: Four C-Mores and One ACS/BMS II/BMS

Equip	Point Name	Name	Read Only	BACnet Type:ID	N2 Type	N2 ID	Lon SNVT NAME	Lon SNVT	Lon Direction	ModBus/ Unit Addr.
Blr Addr 1										
1	01-Fire Rate Out	boilerstate_1	✓	AV:26	data float	1	nvoBlrState1	inc count (9)	Output (non-polled)	30009/1
1	02-Active Setpoint	effectsetpt_1	✓	AV:27	data float	2	nvoEffSetpt1	inc count (9)	Output (non-polled)	30017/1
1	03-Net Remote Setpt	setpt_1		AV:24	data float	3	nviSetpt1	inc count (9)	Input (non-polling)	40001/1
1	05-Fire Rate In	boilerload_1	✓	AV:28	data float	5	nvoBlrLoad1	inc count (9)	Output (non-polled)	30018/1
1	06-Outlet Temp	localsuptemp_1	✓	AV:29	data float	6	nvoLocSupTmp1	inc count (9)	Output (non-polled)	30003/1
1	07-Display Code	dispcode_1	✓	AV:22	data float	7	nvoDispCode1	inc count (9)	Output (non-polled)	30001/1
1	08-Unit Status	unitstat_1	✓	AV:23	data float	8	nvoUnitStat1	inc count (9)	Output (non-polled)	30002/1
1	09-Run Cycles	runcycles_1	✓	AV:42	data float	9	nvoRunCycles1	51	Output (non-polled)	30012-30013/1
1	10-Run Hours	runhours_1	✓	AV:43	data float	10	nvoRunHours1	51	Output (non-polled)	30014-30015/1
1	11-Oxygen	o2level_1	✓	AV:161	data float	161	nvoO2Lev1	inc count (9)	Output (non-polled)	30010/1
1	12-Exhaust Temp	exhtemp_1	✓	AV:181	data float	181	nvoExhTmp1	inc count (9)	Output (non-polled)	30007/1
Blr Addr 2										
2	01-Fire Rate Out	boilerstate_2	✓	AV:30	data float	11	nvoBlrState2	inc count (9)	Output (non-polled)	30009/2
2	02-Active Setpoint	effectsetpt_2	✓	AV:46	data float	12	nvoEffSetpt2	inc count (9)	Output (non-polled)	30017/2
2	03-Net Remote Setpt	setpt_2		AV:47	data float	13	nviSetpt2	inc count (9)	Input (non-polling)	40001/2
2	05-Fire Rate In	boilerload_2	✓	AV:50	data float	15	nvoBlrLoad2	inc count (9)	Output (non-polled)	30018/2
2	06-Outlet Temp	localsuptemp_2	✓	AV:51	data float	16	nvoLocSupTmp2	inc count (9)	Output (non-polled)	30003/2
2	07-Display Code	dispcode_2	✓	AV:52	data float	17	nvoDispCode2	inc count (9)	Output (non-polled)	30001/2
2	08-Unit Status	unitstat_2	✓	AV:53	data float	18	nvoUnitStat2	inc count (9)	Output (non-polled)	30002/2
2	09-Run Cycles	runcycles_2	✓	AV:44	data float	19	nvoRunCycles2	51	Output (non-polled)	30012-30013/2

Table C-1: Four C-Mores and One ACS/BMS II/BMS										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/ Unit Addr.**
2	10-Run Hours	runhours_2	✓	AV:45	data float	20	nvoRunHours2	51	Output (non-polled)	30014-30015/2
2	11-Oxygen	o2level_2	✓	AV:162	data float	162	nvoO2Lev2	inc count (9)	Output (non-polled)	30010/2
2	12-Exhaust Temp	exhtemp_2	✓	AV:182	data float	182	nvoExhTmp2	inc count (9)	Output (non-polled)	30007/2
Blr Addr 3										
3	01-Fire Rate Out	boilerstate_3	✓	AV:54	data float	21	nvoBlrState3	inc count (9)	Output (non-polled)	30009/3
3	02-Active Setpoint	effectsetpt_3	✓	AV:55	data float	22	nvoEffSetpt3	inc count (9)	Output (non-polled)	30017/3
3	03-Net Remote Setpt	setpt_3		AV:56	data float	23	nviSetpt3	inc count (9)	Input (non-polling)	40001/3
3	05-Fire Rate In	boilerload_3	✓	AV:60	data float	25	nvoBlrLoad3	inc count (9)	Output (non-polled)	30018/3
3	06-Outlet Temp	localsuptemp_3	✓	AV:61	data float	26	nvoLocSupTmp3	inc count (9)	Output (non-polled)	30003/3
3	07-Display Code	dispcode_3	✓	AV:62	data float	27	nvoDispCode3	inc count (9)	Output (non-polled)	30001/3
3	08-Unit Status	unitstat_3	✓	AV:63	data float	28	nvoUnitStat3	inc count (9)	Output (non-polled)	30002/3
3	09-Run Cycles	runcycles_3	✓	AV:58	data float	29	nvoRunCycles3	51	Output (non-polled)	30012-30013/3
3	10-Run Hours	runhours_3	✓	AV:59	data float	30	nvoRunHours3	51	Output (non-polled)	30014-30015/3
3	11-Oxygen	o2level_3	✓	AV:163	data float	163	nvoO2Lev3	inc count (9)	Output (non-polled)	30010/3
3	12-Exhaust Temp	exhtemp_3	✓	AV:183	data float	183	nvoExhTmp3	inc count (9)	Output (non-polled)	30007/3
Blr Addr 4										
4	01-Fire Rate Out	boilerstate_4	✓	AV:70	data float	31	nvoBlrState4	inc count (9)	Output (non-polled)	30009/4
4	02-Active Setpoint	effectsetpt_4	✓	AV:71	data float	32	nvoEffSetpt4	inc count (9)	Output (non-polled)	30017/4
4	03-Net Remote Setpt	setpt_4		AV:72	data float	33	nviSetpt4	inc count (9)	Input (non-polling)	40001/4
4	05-Fire Rate In	boilerload_4	✓	AV:73	data float	35	nvoBlrLoad4	inc count (9)	Output (non-polled)	30018/4
4	06-Outlet Temp	localsuptemp_4	✓	AV:65	data float	36	nvoLocSupTmp4	inc count (9)	Output (non-polled)	30003/4
4	07-Display Code	dispcode_4	✓	AV:66	data float	37	nvoDispCode4	inc count (9)	Output (non-polled)	30001/4
4	08-Unit Status	unitstat_4	✓	AV:67	data float	38	nvoUnitStat4	inc count (9)	Output (non-polled)	30002/4
4	09-Run Cycles	runcycles_4	✓	AV:68	data float	39	nvoRunCycles4	51	Output (non-polled)	30012-30013/4

Table C-1: Four C-Mores and One ACS/BMS II/BMS										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/ Unit Addr.**
4	10-Run Hours	runhours_4	✓	AV:69	data float	40	nvoRunHours4	51	Output (non-polled)	30014-30015/4
4	11-Oxygen	o2level_4	✓	AV:164	data float	164	nvoO2Lev4	inc count (9)	Output (non-polled)	30010/4
4	12-Exhaust Temp	exhtemp_4	✓	AV:184	data float	184	nvoExhTmp4	inc count (9)	Output (non-polled)	30007/4
BMS Addr 128										
128	01-Fire Rate Out	boilerstate_5	✓	AV:31	data float	41	nvoBlrState	inc count (9)	Output (non-polled)	30005/128
128	02-Header Set Temp	effectsetpt_5	✓	AV:32	data float	42	nvoEffSetpt	inc count (9)	Output (non-polled)	30006/128
128	03-Net Header Set Temp	setpt_5		AV:33	data float	43	nviSetpt	inc count (9)	Input (non-polling)	40005/128
128	04-Header Temp	localsuptemp_5	✓	AV:34	data float	44	nvoLocSupTmp	inc count (9)	Output (non-polled)	30002/128
128	05-Outside Air Temp	localoatemp_5	✓	AV:35	data float	45	nvoLocOATmp	inc count (9)	Output (non-polled)	30003/128
128	06-Display Code	dispcode_5	✓	AV:36	data float	46	nvoDispCode	inc count (9)	Output (non-polled)	30011/128
128	07-Num Boilers Fired	blrfired_5	✓	AV:37	data float	47	nvoBlrsFired	inc count (9)	Output (non-polled)	30008/128
128	08-Num Boilers Online	blronline_5	✓	AV:38	data float	48	nvoBlrsOnline	inc count (9)	Output (non-polled)	30009/128
128	09-Last Blr Fired	blrlast_5	✓	AV:39	data float	49	nvoLastBlrFired	inc count (9)	Output (non-polled)	30017/128
128	10-Boiler 1 Status	blr1stat_5	✓	AV:40	data float	50	nvoBlr1Stat	inc count (9)	Output (non-polled)	30018/128
128	11-Boiler 2 Status	blr2stat_5	✓	AV:41	data float	51	nvoBlr2Stat	inc count (9)	Output (non-polled)	30019/128
128	12-Boiler 3 Status	blr3stat_5	✓	AV:48	data float	52	nvoBlr3Stat	inc count (9)	Output (non-polled)	30020/128
128	13-Boiler 4 Status	blr4stat_5	✓	AV:1	data float	53	nvoBlr4Stat	inc count (9)	Output (non-polled)	30021/128
128	14-Boiler 5 Status	blr5stat_5	✓	AV:2	data float	54	nvoBlr5Stat	inc count (9)	Output (non-polled)	30022/128
128	15-Boiler 6 Status	blr6stat_5	✓	AV:3	data float	55	nvoBlr6Stat	inc count (9)	Output (non-polled)	30023/128
128	16-Boiler 7 Status	blr7stat_5	✓	AV:4	data float	56	nvoBlr7Stat	inc count (9)	Output (non-polled)	30024/128
128	17-Boiler 8 Status	blr8stat_5	✓	AV:5	data float	57	nvoBlr8Stat	inc count (9)	Output (non-polled)	30025/128
128	18-Net Blr 1 Status	blr9stat_5	✓	AV:6	data float	58	nvoNetBlr1Stat	inc count (9)	Output (non-polled)	30026/128
128	19-Net Blr 2 Status	blr10stat_5	✓	AV:7	data float	59	nvoNetBlr2Stat	inc count (9)	Output (non-polled)	30027/128

Table C-1: Four C-Mores and One ACS/BMS II/BMS										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/ Unit Addr.**
128	20-Net Blr 3 Status	blr11stat_5	✓	AV:8	data float	60	nvoNetBlr3Stat	inc count (9)	Output (non-polled)	30028/128
128	21-Net Blr 4 Status	blr12stat_5	✓	AV:9	data float	61	nvoNetBlr4Stat	inc count (9)	Output (non-polled)	30029/128
128	22-Return Temp	localrettemp_5	✓	AV:173	data float	173	nvoLocRetTmp	inc count (9)	Output (non-polled)	30004/128

Appendix C.2: Eight C-Mores and One ACS/BMS II

Table C-2: Eight C-Mores and One ACS/BMS II/BMS

Equip	Point Name	Name	Read Only	BACnet Type:ID	N2 Type	N2 ID	Lon SNVT NAME	Lon SNVT	Lon Direction	ModBus/ Unit Address
Blr Addr 1										
1	01-Fire Rate Out	boilerstate_1	✓	AV:26	data float	1	nvoBlrState1	inc count (9)	Output (non-polled)	30009/1
1	02-Active Setpoint	effectsetpt_1	✓	AV:27	data float	2	nvoEffSetpt1	inc count (9)	Output (non-polled)	30017/1
1	03-Net Remote Setpt	setpt_1	✓	AV:24	data float	3	nviSetpt1	inc count (9)	Input (non-polling)	40001/1
1	05-Fire Rate In	boilerload_1	✓	AV:28	data float	5	nvoBlrLoad1	inc count (9)	Output (non-polled)	30018/1
1	06-Outlet Temp	localsuptemp_1	✓	AV:29	data float	6	nvoLocSupTmp1	inc count (9)	Output (non-polled)	30003/1
1	07-Display Code	dispcode_1	✓	AV:22	data float	7	nvoDispCode1	inc count (9)	Output (non-polled)	30001/1
1	08-Unit Status	unitstat_1	✓	AV:23	data float	8	nvoUnitStat1	inc count (9)	Output (non-polled)	30002/1
1	09-Run Cycles	runcycles_1	✓	AV:42	data float	9	nvoRunCycles1	51	Output (non-polled)	30012-30013/1
1	10-Run Hours	runhours_1	✓	AV:43	data float	10	nvoRunHours1	51	Output (non-polled)	30014-30015/1
1	11-Oxygen	o2level_1	✓	AV:161	data float	161	nvoO2Lev1	inc count (9)	Output (non-polled)	30010/1
1	12-Exhaust Temp	exhtemp_1	✓	AV:181	data float	181	nvoExhTmp1	inc count (9)	Output (non-polled)	30007/1
Blr Addr 2										
2	01-Fire Rate Out	boilerstate_2	✓	AV:30	data float	11	nvoBlrState2	inc count (9)	Output (non-polled)	30009/2
2	02-Active Setpoint	effectsetpt_2	✓	AV:46	data float	12	nvoEffSetpt2	inc count (9)	Output (non-polled)	30017/2
2	03-Net Remote Setpt	setpt_2		AV:47	data float	13	nviSetpt2	inc count (9)	Input (non-polling)	40001/2

Table C-2: Eight C-Mores and One ACS/BMS II/BMS										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/ Unit Address**
2	05-Fire Rate In	boilerload_2	✓	AV:50	data float	15	nvoBlrLoad2	inc count (9)	Output (non-polled)	30018/2
2	06-Outlet Temp	localsuptemp_2	✓	AV:51	data float	16	nvoLocSupTmp2	inc count (9)	Output (non-polled)	30003/2
2	07-Display Code	dispcode_2	✓	AV:52	data float	17	nvoDispCode2	inc count (9)	Output (non-polled)	30001/2
2	08-Unit Status	unitstat_2	✓	AV:53	data float	18	nvoUnitStat2	inc count (9)	Output (non-polled)	30002/2
2	09-Run Cycles	runcycles_2	✓	AV:44	data float	19	nvoRunCycles2	51	Output (non-polled)	30012-30013/2
2	10-Run Hours	runhours_2	✓	AV:45	data float	20	nvoRunHours2	51	Output (non-polled)	30014-30015/2
2	11-Oxygen	o2level_2	✓	AV:162	data float	162	nvoO2Lev2	inc count (9)	Output (non-polled)	30010/2
2	12-Exhaust Temp	exhtemp_2	✓	AV:182	data float	182	nvoExhTmp2	inc count (9)	Output (non-polled)	30007/2
Blr Addr 3										
3	01-Fire Rate Out	boilerstate_3	✓	AV:54	data float	21	nvoBlrState3	inc count (9)	Output (non-polled)	30009/3
3	02-Active Setpoint	effectsetpt_3	✓	AV:55	data float	22	nvoEffSetpt3	inc count (9)	Output (non-polled)	30017/3
3	03-Net Remote Setpt	setpt_3		AV:56	data float	23	nviSetpt3	inc count (9)	Input (non-polling)	40001/3
3	05-Fire Rate In	boilerload_3	✓	AV:60	data float	25	nvoBlrLoad3	inc count (9)	Output (non-polled)	30018/3
3	06-Outlet Temp	localsuptemp_3	✓	AV:61	data float	26	nvoLocSupTmp3	inc count (9)	Output (non-polled)	30003/3
3	07-Display Code	dispcode_3	✓	AV:62	data float	27	nvoDispCode3	inc count (9)	Output (non-polled)	30001/3
3	08-Unit Status	unitstat_3	✓	AV:63	data float	28	nvoUnitStat3	inc count (9)	Output (non-polled)	30002/3
3	09-Run Cycles	runcycles_3	✓	AV:58	data float	29	nvoRunCycles3	51	Output (non-polled)	30012-30013/3

Table C-2: Eight C-Mores and One ACS/BMS II/BMS										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/ Unit Address**
3	10-Run Hours	runhours_3	✓	AV:59	data float	30	nvoRunHours3	51	Output (non-polled)	30014-30015/3
3	11-Oxygen	o2level_3	✓	AV:163	data float	163	nvoO2Lev3	inc count (9)	Output (non-polled)	30010/3
3	12-Exhaust Temp	exhtemp_3	✓	AV:183	data float	183	nvoExhTmp3	inc count (9)	Output (non-polled)	30007/3
Blr Addr 4										
4	01-Fire Rate Out	boilerstate_4	✓	AV:70	data float	31	nvoBlrState4	inc count (9)	Output (non-polled)	30009/4
4	02-Active Setpoint	effectsetpt_4	✓	AV:71	data float	32	nvoEffSetpt4	inc count (9)	Output (non-polled)	30017/4
4	03-Net Remote Setpt	setpt_4	✓	AV:72	data float	33	nviSetpt4	inc count (9)	Input (non-polling)	40001/4
4	05-Fire Rate In	boilerload_4	✓	AV:73	data float	35	nvoBlrLoad4	inc count (9)	Output (non-polled)	30018/4
4	06-Outlet Temp	localsuptemp_4	✓	AV:65	data float	36	nvoLocSupTmp4	inc count (9)	Output (non-polled)	30003/4
4	07-Display Code	dispcode_4	✓	AV:66	data float	37	nvoDispCode4	inc count (9)	Output (non-polled)	30001/4
4	08-Unit Status	unitstat_4	✓	AV:67	data float	38	nvoUnitStat4	inc count (9)	Output (non-polled)	30002/4
4	09-Run Cycles	runcycles_4	✓	AV:68	data float	39	nvoRunCycles4	51	Output (non-polled)	30012-30013/4
4	10-Run Hours	runhours_4	✓	AV:69	data float	40	nvoRunHours4	51	Output (non-polled)	30014-30015/4
4	11-Oxygen	o2level_4	✓	AV:164	data float	164	nvoO2Lev4	inc count (9)	Output (non-polled)	30010/4
4	12-Exhaust Temp	exhtemp_4	✓	AV:184	data float	184	nvoExhTmp4	inc count (9)	Output (non-polled)	30007/4
Blr Addr 5										
5	01-Fire Rate Out	boilerstate_5	✓	AV:80	data float	41	nvoBlrState5	inc count (9)	Output (non-polled)	30009/5
5	02-Active Setpoint	effectsetpt_5	✓	AV:81	data float	42	nvoEffSetpt5	inc count (9)	Output (non-polled)	30017/5

Table C-2: Eight C-Mores and One ACS/BMS II/BMS										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/ Unit Address**
5	03-Net Remote Setpt	setpt_5		AV:82	data float	43	nviSetpt5	inc count (9)	Input (non-polling)	40001/5
5	05-Fire Rate In	boilerload_5	✓	AV:74	data float	45	nvoBlrLoad5	inc count (9)	Output (non-polled)	30018/5
5	06-Outlet Temp	localsuptemp_5	✓	AV:75	data float	46	nvoLocSupTmp5	inc count (9)	Output (non-polled)	30003/5
5	07-Display Code	dispcode_5	✓	AV:76	data float	47	nvoDispCode5	inc count (9)	Output (non-polled)	30001/5
5	08-Unit Status	unitstat_5	✓	AV:77	data float	48	nvoUnitStat5	inc count (9)	Output (non-polled)	30002/5
5	09-Run Cycles	runcycles_5	✓	AV:78	data float	49	nvoRunCycles5	51	Output (non-polled)	30012-30013/5
5	10-Run Hours	runhours_5	✓	AV:79	data float	50	nvoRunHours5	51	Output (non-polled)	30014-30015/5
5	11-Oxygen	o2level_5	✓	AV:165	data float	165	nvoO2Lev5	inc count (9)	Output (non-polled)	30010/5
5	12-Exhaust Temp	exhtemp_5	✓	AV:185	data float	185	nvoExhTmp5	inc count (9)	Output (non-polled)	30007/5
Blr Addr 6										
6	01-Fire Rate Out	boilerstate_6	✓	AV:90	data float	51	nvoBlrState6	inc count (9)	Output (non-polled)	30009/6
6	02-Active Setpoint	effectsetpt_6	✓	AV:91	data float	52	nvoEffSetpt6	inc count (9)	Output (non-polled)	30017/6
6	03-Net Remote Setpt	setpt_6		AV:92	data float	53	nviSetpt6	inc count (9)	Input (non-polling)	40001/6
6	05-Fire Rate In	boilerload_6	✓	AV:84	data float	55	nvoBlrLoad6	inc count (9)	Output (non-polled)	30018/6
6	06-Outlet Temp	localsuptemp_6	✓	AV:85	data float	56	nvoLocSupTmp6	inc count (9)	Output (non-polled)	30003/6
6	07-Display Code	dispcode_6	✓	AV:86	data float	57	nvoDispCode6	inc count (9)	Output (non-polled)	30001/6
6	08-Unit Status	unitstat_6	✓	AV:87	data float	58	nvoUnitStat6	inc count (9)	Output (non-polled)	30002/6

Table C-2: Eight C-Mores and One ACS/BMS II/BMS										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/ Unit Address**
6	09-Run Cycles	runcycles_6	✓	AV:88	data float	59	nvoRunCycles6	51	Output (non-polled)	30012-30013/6
6	10-Run Hours	runhours_6	✓	AV:89	data float	60	nvoRunHours6	51	Output (non-polled)	30014-30015/6
6	11-Oxygen	o2level_6	✓	AV:166	data float	166	nvoO2Lev6	inc count (9)	Output (non-polled)	30010/6
6	12-Exhaust Temp	exhtemp_6	✓	AV:186	data float	186	nvoExhTmp6	inc count (9)	Output (non-polled)	30007/6
Blr Addr 7										
7	01-Fire Rate Out	boilerstate_7	✓	AV:100	data float	61	nvoBlrState7	inc count (9)	Output (non-polled)	30009/7
7	02-Active Setpoint	effectsetpt_7	✓	AV:101	data float	62	nvoEffSetpt7	inc count (9)	Output (non-polled)	30017/7
7	03-Net Remote Setpt	setpt_7	✓	AV:102	data float	63	nviSetpt7	inc count (9)	Input (non-polling)	40001/7
7	05-Fire Rate In	boilerload_7	✓	AV:94	data float	65	nvoBlrLoad7	inc count (9)	Output (non-polled)	30018/7
7	06-Outlet Temp	localsuptemp_7	✓	AV:95	data float	66	nvoLocSupTmp7	inc count (9)	Output (non-polled)	30003/7
7	07-Display Code	dispcode_7	✓	AV:96	data float	67	nvoDispCode7	inc count (9)	Output (non-polled)	30001/7
7	08-Unit Status	unitstat_7	✓	AV:97	data float	68	nvoUnitStat7	inc count (9)	Output (non-polled)	30002/7
7	09-Run Cycles	runcycles_7	✓	AV:98	data float	69	nvoRunCycles7	51	Output (non-polled)	30012-30013/7
7	10-Run Hours	runhours_7	✓	AV:99	data float	70	nvoRunHours7	51	Output (non-polled)	30014-30015/7
7	11-Oxygen	o2level_7	✓	AV:167	data float	167	nvoO2Lev7	inc count (9)	Output (non-polled)	30010/7
7	12-Exhaust Temp	exhtemp_7	✓	AV:187	data float	187	nvoExhTmp7	inc count (9)	Output (non-polled)	30007/7
Blr Addr 8										
8	01-Fire Rate Out	boilerstate_8	✓	AV:110	data float	71	nvoBlrState8	inc count (9)	Output (non-polled)	30009/8

Table C-2: Eight C-Mores and One ACS/BMS II/BMS										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/ Unit Address**
8	02-Active Setpoint	effectsetpt_8	✓	AV:111	data float	72	nvoEffSetpt8	inc count (9)	Output (non-polled)	30017/8
8	03-Net Remote Setpt	setpt_8		AV:112	data float	73	nviSetpt8	inc count (9)	Input (non-polling)	40001/8
8	05-Fire Rate In	boilerload_8	✓	AV:104	data float	75	nvoBlrLoad8	inc count (9)	Output (non-polled)	30018/8
8	06-Outlet Temp	localsuptemp_8	✓	AV:105	data float	76	nvoLocSupTmp8	inc count (9)	Output (non-polled)	30003/8
8	07-Display Code	dispcode_8	✓	AV:106	data float	77	nvoDispCode8	inc count (9)	Output (non-polled)	30001/8
8	08-Unit Status	unitstat_8	✓	AV:107	data float	78	nvoUnitStat8	inc count (9)	Output (non-polled)	30002/8
8	09-Run Cycles	runcycles_8	✓	AV:108	data float	79	nvoRunCycles8	51	Output (non-polled)	30012-30013/8
8	10-Run Hours	runhours_8	✓	AV:109	data float	80	nvoRunHours8	51	Output (non-polled)	30014-30015/8
8	11-Oxygen	o2level_8	✓	AV:168	data float	168	nvoO2Lev8	inc count (9)	Output (non-polled)	30010/8
8	12-Exhaust Temp	exhtemp_8	✓	AV:188	data float	188	nvoExhTmp8	inc count (9)	Output (non-polled)	30007/8
BMS Addr 128										
128	01-Fire Rate Out	boilerstate_13	✓	AV:31	data float	121	nvoBlrState	inc count (9)	Output (non-polled)	30005/128
128	02-Header Set Temp	effectsetpt_13	✓	AV:32	data float	122	nvoEffSetpt	inc count (9)	Output (non-polled)	30006/128
128	03-Net Header Set Temp	setpt_13		AV:33	data float	123	nviSetpt	inc count (9)	Input (non-polling)	40005/128
128	04-Header Temp	localsuptemp_13	✓	AV:34	data float	124	nvoLocSupTmp	inc count (9)	Output (non-polled)	30002/128
128	05-Outside Air Temp	localoatemp_13	✓	AV:35	data float	125	nvoLocOATmp	inc count (9)	Output (non-polled)	30003/128
128	06-Display Code	dispcode_13	✓	AV:36	data float	126	nvoDispCode	inc count (9)	Output (non-polled)	30011/128

Table C-2: Eight C-Mores and One ACS/BMS II/BMS										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/ Unit Address**
128	07-Num Boilers Fired	blrfired_13	✓	AV:37	data float	127	nvoBlrsFired	inc count (9)	Output (non-polled)	30008/128
128	08-Num Boilers Online	blronline_13	✓	AV:38	data float	128	nvoBlrsOnline	inc count (9)	Output (non-polled)	30009/128
128	09-Last Blr Fired	blrlast_13	✓	AV:39	data loat	129	nvoLastBlrFired	inc count (9)	Output (non-polled)	30017/128
128	10-Boiler 1 Status	blr1stat_13	✓	AV:40	data float	130	nvoBlr1Stat	inc count (9)	Output (non-polled)	30018/128
128	11-Boiler 2 Status	blr2stat_13	✓	AV:41	data float	131	nvoBlr2Stat	inc count (9)	Output (non-polled)	30019/128
128	12-Boiler 3 Status	blr3stat_13	✓	AV:48	data float	132	nvoBlr3Stat	inc count (9)	Output (non-polled)	30020/128
128	13-Boiler 4 Status	blr4stat_13	✓	AV:1	data float	133	nvoBlr4Stat	inc count (9)	Output (non-polled)	30021/128
128	14-Boiler 5 Status	blr5stat_13	✓	AV:2	data float	134	nvoBlr5Stat	inc count (9)	Output (non-polled)	30022/128
128	15-Boiler 6 Status	blr6stat_13	✓	AV:3	data float	135	nvoBlr6Stat	inc count (9)	Output (non-polled)	30023/128
128	16-Boiler 7 Status	blr7stat_13	✓	AV:4	data float	136	nvoBlr7Stat	inc count (9)	Output (non-polled)	30024/128
128	17-Boiler 8 Status	blr8stat_13	✓	AV:5	data float	137	nvoBlr8Stat	inc count (9)	Output (non-polled)	30025/128
128	18-Net Blr 1 Status	blr9stat_13	✓	AV:6	data float	138	nvoNetBlr1Stat	inc count (9)	Output (non-polled)	30026/128
128	19-Net Blr 2 Status	blr10stat_13	✓	AV:7	data float	139	nvoNetBlr2Stat	inc count (9)	Output (non-polled)	30027/128
128	20-Net Blr 3 Status	blr11stat_13	✓	AV:8	data float	140	nvoNetBlr3Stat	inc count (9)	Output (non-polled)	30028/128
128	21-Net Blr 4 Status	blr12stat_13	✓	AV:9	data float	141	nvoNetBlr4Stat	inc count (9)	Output (non-polled)	30029/128
128	22-Net Blr 5 Status	blr13stat_13	✓	AV:10	data float	142	nvoNetBlr5Stat	inc count (9)	Output (non-polled)	30030/128
128	23-Net Blr 6 Status	blr14stat_13	✓	AV:11	data float	143	nvoNetBlr6Stat	inc count (9)	Output (non-polled)	30031/128

Table C-2: Eight C-Mores and One ACS/BMS II/BMS										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/ Unit Address**
128	24-Net Blr 7 Status	blr15stat_13	✓	AV:12	data float	144	nvoNetBlr7Stat	inc count (9)	Output (non-polled)	30032/128
128	25-Net Blr 8 Status	blr16stat_13	✓	AV:13	data float	145	nvoNetBlr8Stat	inc count (9)	Output (non-polled)	30033/128
128	26-Return Temp	localrettemp_13	✓	AV:173	data float	173	nvoLocRetTmp	inc count (9)	Output (non-polled)	30004/128

Appendix C.3: Twelve C-Mores and One ACS/BMS II/BMS

TABLE C-3: Twelve C-Mores and One ACS/BMS II/BMS

Equip	Point Name	Name	Read Only	BACnet Type:ID	N2 Type	N2 ID	Lon SNVT NAME	Lon SNVT	Lon Direction	ModBus/Unit Address
Blr Addr 1										
1	01-Fire Rate Out	boilerstate_1	✓	AV:26	data float	1	nvoBlrState1	inc count (9)	Output (non-polled)	30009/1
1	02-Active Setpoint	effectsetpt_1	✓	AV:27	data float	2	nvoEffSetpt1	inc count (9)	Output (non-polled)	30017/1
1	03-Net Remote Setpt	setpt_1		AV:24	data float	3	nviSetpt1	inc count (9)	Input (non-polling)	40001/1
1	05-Fire Rate In	boilerload_1	✓	AV:28	data float	5	nvoBlrLoad1	inc count (9)	Output (non-polled)	30018/1
1	06-Outlet Temp	localsuptemp_1	✓	AV:29	data float	6	nvoLocSupTmp1	inc count (9)	Output (non-polled)	30003/1
1	07-Display Code	dispcode_1	✓	AV:22	data float	7	nvoDispCode1	inc count (9)	Output (non-polled)	30001/1
1	08-Unit Status	unitstat_1	✓	AV:23	data float	8	nvoUnitStat1	inc count (9)	Output (non-polled)	30002/1
1	09-Run Cycles	runcycles_1	✓	AV:42	data float	9	nvoRunCycles1	51	Output (non-polled)	30012-30013/1
1	10-Run Hours	runhours_1	✓	AV:43	data float	10	nvoRunHours1	51	Output (non-polled)	30014-30015/1
1	11-Oxygen	o2level_1	✓	AV:161	data float	161	nvoO2Lev1	inc count (9)	Output (non-polled)	30010/1
1	12-Exhaust Temp	exhtemp_1	✓	AV:181	data float	181	nvoExhTmp1	inc count (9)	Output (non-polled)	30007/1
Blr Addr 2										
2	01-Fire Rate Out	boilerstate_2	✓	AV:30	data float	11	nvoBlrState2	inc count (9)	Output (non-polled)	30009/2
2	02-Active Setpoint	effectsetpt_2	✓	AV:46	data float	12	nvoEffSetpt2	inc count (9)	Output (non-polled)	30017/2
2	03-Net Remote Setpt	setpt_2	✓	AV:47	data float	13	nviSetpt2	inc count (9)	Input (non-polling)	40001/2

TABLE C-3: Twelve C-Mores and One ACS/BMS II/BMS										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/Unit Address**
2	05-Fire Rate In	boilerload_2	✓	AV:50	data float	15	nvoBlrLoad2	inc count (9)	Output (non-polled)	30018/2
2	06-Outlet Temp	localsuptemp_2	✓	AV:51	data float	16	nvoLocSupTmp2	inc count (9)	Output (non-polled)	30003/2
2	07-Display Code	dispcode_2	✓	AV:52	data float	17	nvoDispCode2	inc count (9)	Output (non-polled)	30001/2
2	08-Unit Status	unitstat_2	✓	AV:53	data float	18	nvoUnitStat2	inc count (9)	Output (non-polled)	30002/2
2	09-Run Cycles	runcycles_2	✓	AV:44	data float	19	nvoRunCycles2	51	Output (non-polled)	30012-30013/2
2	10-Run Hours	runhours_2	✓	AV:45	data float	20	nvoRunHours2	51	Output (non-polled)	30014-30015/2
2	11-Oxygen	o2level_2	✓	AV:162	data float	162	nvoO2Lev2	inc count (9)	Output (non-polled)	30010/2
2	12-Exhaust Temp	exhtemp_2	✓	AV:182	data float	182	nvoExhTmp2	inc count (9)	Output (non-polled)	30007/2
Blr Addr 3										
3	01-Fire Rate Out	boilerstate_3	✓	AV:54	data float	21	nvoBlrState3	inc count (9)	Output (non-polled)	30009/3
3	02-Active Setpoint	effectsetpt_3	✓	AV:55	data float	22	nvoEffSetpt3	inc count (9)	Output (non-polled)	30017/3
3	03-Net Remote Setpt	setpt_3	✓	AV:56	data float	23	nviSetpt3	inc count (9)	Input (non-polling)	40001/3
3	05-Fire Rate In	boilerload_3	✓	AV:60	data float	25	nvoBlrLoad3	inc count (9)	Output (non-polled)	30018/3
3	06-Outlet Temp	localsuptemp_3	✓	AV:61	data float	26	nvoLocSupTmp3	inc count (9)	Output (non-polled)	30003/3
3	07-Display Code	dispcode_3	✓	AV:62	data float	27	nvoDispCode3	inc count (9)	Output (non-polled)	30001/3

TABLE C-3: Twelve C-Mores and One ACS/BMS II/BMS										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/Unit Address**
3	08-Unit Status	unitstat_3	✓	AV:63	data float	28	nvoUnitStat3	inc count (9)	Output (non-polled)	30002/3
3	09-Run Cycles	runcycles_3	✓	AV:58	data float	29	nvoRunCycles3	51	Output (non-polled)	30012-30013/3
3	10-Run Hours	runhours_3	✓	AV:59	data float	30	nvoRunHours3	51	Output (non-polled)	30014-30015/3
3	11-Oxygen	o2level_3	✓	AV:163	data float	163	nvoO2Lev3	inc count (9)	Output (non-polled)	30010/3
3	12-Exhaust Temp	exhtemp_3	✓	AV:183	data float	183	nvoExhTmp3	inc count (9)	Output (non-polled)	30007/3
Blr Addr 4										
4	01-Fire Rate Out	boilerstate_4	✓	AV:70	data float	31	nvoBlrState4	inc count (9)	Output (non-polled)	30009/4
4	02-Active Setpoint	effectsetpt_4	✓	AV:71	data float	32	nvoEffSetpt4	inc count (9)	Output (non-polled)	30017/4
4	03-Net Remote Setpt	setpt_4	✓	AV:72	data float	33	nviSetpt4	inc count (9)	Input (non-polling)	40001/4
4	05-Fire Rate In	boilerload_4	✓	AV:73	data float	35	nvoBlrLoad4	inc count (9)	Output (non-polled)	30018/4
4	06-Outlet Temp	localsuptemp_4	✓	AV:65	data float	36	nvoLocSupTmp4	inc count (9)	Output (non-polled)	30003/4
4	07-Display Code	dispcode_4	✓	AV:66	data float	37	nvoDispCode4	inc count (9)	Output (non-polled)	30001/4
4	08-Unit Status	unitstat_4	✓	AV:67	data float	38	nvoUnitStat4	inc count (9)	Output (non-polled)	30002/4
4	09-Run Cycles	runcycles_4	✓	AV:68	data float	39	nvoRunCycles4	51	Output (non-polled)	30012-30013/4
4	10-Run Hours	runhours_4	✓	AV:69	data float	40	nvoRunHours4	51	Output (non-polled)	30014-30015/4
4	11-Oxygen	o2level_4	✓	AV:164	data float	164	nvoO2Lev4	inc count (9)	Output (non-polled)	30010/4
4	12-Exhaust Temp	exhtemp_4	✓	AV:184	data float	184	nvoExhTmp4	inc count (9)	Output (non-polled)	30007/4
Blr Addr 5										

TABLE C-3: Twelve C-Mores and One ACS/BMS II/BMS										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/Unit Address**
5	01-Fire Rate Out	boilerstate_5	✓	AV:80	data float	41	nvoBlrState5	inc count (9)	Output (non-polled)	30009/5
5	02-Active Setpoint	effectsetpt_5	✓	AV:81	data float	42	nvoEffSetpt5	inc count (9)	Output (non-polled)	30017/5
5	03-Net Remote Setpt	setpt_5		AV:82	data float	43	nviSetpt5	inc count (9)	Input (non-polling)	40001/5
5	05-Fire Rate In	boilerload_5	✓	AV:74	data float	45	nvoBlrLoad5	inc count (9)	Output (non-polled)	30018/5
5	06-Outlet Temp	localsuptemp_5	✓	AV:75	data float	46	nvoLocSupTmp5	inc count (9)	Output (non-polled)	30003/5
5	07-Display Code	dispcode_5	✓	AV:76	data float	47	nvoDispCode5	inc count (9)	Output (non-polled)	30001/5
5	08-Unit Status	unitstat_5	✓	AV:77	data float	48	nvoUnitStat5	inc count (9)	Output (non-polled)	30002/5
5	09-Run Cycles	runcycles_5	✓	AV:78	data float	49	nvoRunCycles5	51	Output (non-polled)	30012-30013/5
5	10-Run Hours	runhours_5	✓	AV:79	data float	50	nvoRunHours5	51	Output (non-polled)	30014-30015/5
5	11-Oxygen	o2level_5	✓	AV:165	data float	165	nvoO2Lev5	inc count (9)	Output (non-polled)	30010/5
5	12-Exhaust Temp	exhtemp_5	✓	AV:185	data float	185	nvoExhTmp5	inc count (9)	Output (non-polled)	30007/5
Blr Addr 6										
6	01-Fire Rate Out	boilerstate_6	✓	AV:90	data float	51	nvoBlrState6	inc count (9)	Output (non-polled)	30009/6
6	02-Active Setpoint	effectsetpt_6	✓	AV:91	data float	52	nvoEffSetpt6	inc count (9)	Output (non-polled)	30017/6
6	03-Net Remote Setpt	setpt_6		AV:92	data float	53	nviSetpt6	inc count (9)	Input (non-polling)	40001/6
6	05-Fire Rate In	boilerload_6	✓	AV:84	data float	55	nvoBlrLoad6	inc count (9)	Output (non-polled)	30018/6

TABLE C-3: Twelve C-Mores and One ACS/BMS II/BMS										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/Unit Address**
6	06-Outlet Temp	localsuptemp_6	✓	AV:85	data float	56	nvoLocSupTmp6	inc count (9)	Output (non-polled)	30003/6
6	07-Display Code	dispcode_6	✓	AV:86	data float	57	nvoDispCode6	inc count (9)	Output (non-polled)	30001/6
6	08-Unit Status	unitstat_6	✓	AV:87	data float	58	nvoUnitStat6	inc count (9)	Output (non-polled)	30002/6
6	09-Run Cycles	runcycles_6	✓	AV:88	data float	59	nvoRunCycles6	51	Output (non-polled)	30012-30013/6
6	10-Run Hours	runhours_6	✓	AV:89	data float	60	nvoRunHours6	51	Output (non-polled)	30014-30015/6
6	11-Oxygen	o2level_6	✓	AV:166	data float	166	nvoO2Lev6	inc count (9)	Output (non-polled)	30010/6
6	12-Exhaust Temp	exhtemp_6	✓	AV:186	data float	186	nvoExhTmp6	inc count (9)	Output (non-polled)	30007/6
Blr Addr 7										
7	**01-Fire Rate Out**	**boilerstate_7**	✓	**AV:100**	**data float**	**61**	**nvoBlrState7**	**inc count (9)**	**Output (non-polled)**	**30009/7**
7	02-Active Setpoint	effectsetpt_7	✓	AV:101	data float	62	nvoEffSetpt7	inc count (9)	Output (non-polled)	30017/7
7	03-Net Remote Setpt	setpt_7		AV:102	data float	63	nviSetpt7	inc count (9)	Input (non-polling)	40001/7
7	05-Fire Rate In	boilerload_7	✓	AV:94	data float	65	nvoBlrLoad7	inc count (9)	Output (non-polled)	30018/7
7	06-Outlet Temp	localsuptemp_7	✓	AV:95	data float	66	nvoLocSupTmp7	inc count (9)	Output (non-polled)	30003/7
7	07-Display Code	dispcode_7	✓	AV:96	data float	67	nvoDispCode7	inc count (9)	Output (non-polled)	30001/7
7	08-Unit Status	unitstat_7	✓	AV:97	data float	68	nvoUnitStat7	inc count (9)	Output (non-polled)	30002/7
7	09-Run Cycles	runcycles_7	✓	AV:98	data float	69	nvoRunCycles7	51	Output (non-polled)	30012-30013/7

TABLE C-3: Twelve C-Mores and One ACS/BMS II/BMS										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/Unit Address**
7	10-Run Hours	runhours_7	✓	AV:99	data float	70	nvoRunHours7	51	Output (non-polled)	30014-30015/7
7	11-Oxygen	o2level_7	✓	AV:167	data float	167	nvoO2Lev7	inc count (9)	Output (non-polled)	30010/7
7	12-Exhaust Temp	exhtemp_7	✓	AV:187	data float	187	nvoExhTmp7	inc count (9)	Output (non-polled)	30007/7
Blr Addr 8										
8	01-Fire Rate Out	boilerstate_8	✓	AV:110	data float	71	nvoBlrState8	inc count (9)	Output (non-polled)	30009/8
8	02-Active Setpoint	effectsetpt_8	✓	AV:111	data float	72	nvoEffSetpt8	inc count (9)	Output (non-polled)	30017/8
8	03-Net Remote Setpt	setpt_8	✓	AV:112	data float	73	nviSetpt8	inc count (9)	Input (non-polling)	40001/8
8	05-Fire Rate In	boilerload_8	✓	AV:104	data float	75	nvoBlrLoad8	inc count (9)	Output (non-polled)	30018/8
8	06-Outlet Temp	localsuptemp_8	✓	AV:105	data float	76	nvoLocSupTmp8	inc count (9)	Output (non-polled)	30003/8
8	07-Display Code	dispcode_8	✓	AV:106	data float	77	nvoDispCode8	inc count (9)	Output (non-polled)	30001/8
8	08-Unit Status	unitstat_8	✓	AV:107	data float	78	nvoUnitStat8	inc count (9)	Output (non-polled)	30002/8
8	09-Run Cycles	runcycles_8	✓	AV:108	data float	79	nvoRunCycles8	51	Output (non-polled)	30012-30013/8
8	10-Run Hours	runhours_8	✓	AV:109	data float	80	nvoRunHours8	51	Output (non-polled)	30014-30015/8
8	11-Oxygen	o2level_8	✓	AV:168	data float	168	nvoO2Lev8	inc count (9)	Output (non-polled)	30010/8
8	12-Exhaust Temp	exhtemp_8	✓	AV:188	data float	188	nvoExhTmp8	inc count (9)	Output (non-polled)	30007/8
Blr Addr 9										
9	01-Fire Rate Out	boilerstate_9	✓	AV:120	data float	81	nvoBlrState9	inc count (9)	Output (non-polled)	30009/9

TABLE C-3: Twelve C-Mores and One ACS/BMS II/BMS										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/Unit Address**
9	02-Active Setpoint	effectsetpt_9	✓	AV:121	data float	82	nvoEffSetpt9	inc count (9)	Output (non-polled)	30017/9
9	03-Net Remote Setpt	setpt_9		AV:122	data float	83	nviSetpt9	inc count (9)	Input (non-polling)	40001/9
9	05-Fire Rate In	boilerload_9	✓	AV:114	data float	85	nvoBlrLoad9	inc count (9)	Output (non-polled)	30018/9
9	06-Outlet Temp	localsuptemp_9	✓	AV:115	data float	86	nvoLocSupTmp9	inc count (9)	Output (non-polled)	30003/9
9	07-Display Code	dispcode_9	✓	AV:116	data float	87	nvoDispCode9	inc count (9)	Output (non-polled)	30001/9
9	08-Unit Status	unitstat_9	✓	AV:117	data float	88	nvoUnitStat9	inc count (9)	Output (non-polled)	30002/9
9	09-Run Cycles	runcycles_9	✓	AV:118	data float	89	nvoRunCycles9	51	Output (non-polled)	30012-30013/9
9	10-Run Hours	runhours_9	✓	AV:119	data float	90	nvoRunHours9	51	Output (non-polled)	30014-30015/9
9	11-Oxygen	o2level_9	✓	AV:169	data float	169	nvoO2Lev9	inc count (9)	Output (non-polled)	30010/9
9	12-Exhaust Temp	exhtemp_9	✓	AV:189	data float	189	nvoExhTmp9	inc count (9)	Output (non-polled)	30007/9
Blr Addr 10										
10	01-Fire Rate Out	boilerstate_10	✓	AV:130	data float	91	nvoBlrState10	inc count (9)	Output (non-polled)	30009/10
10	02-Active Setpoint	effectsetpt_10	✓	AV:131	data float	92	nvoEffSetpt10	inc count (9)	Output (non-polled)	30017/10
10	03-Net Remote Setpt	setpt_10		AV:132	data float	93	nviSetpt10	inc count (9)	Input (non-polling)	40001/10
10	05-Fire Rate In	boilerload_10	✓	AV:124	data float	95	nvoBlrLoad10	inc count (9)	Output (non-polled)	30018/10
10	06-Outlet Temp	localsuptemp_10	✓	AV:125	data float	96	nvoLocSupTmp10	inc count (9)	Output (non-polled)	30003/10
10	07-Display Code	dispcode_10	✓	AV:126	data float	97	nvoDispCode10	inc count (9)	Output (non-polled)	30001/10

TABLE C-3: Twelve C-Mores and One ACS/BMS II/BMS										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/Unit Address**
10	08-Unit Status	unitstat_10	✓	AV:127	data float	98	nvoUnitStat10	inc count (9)	Output (non-polled)	30002/10
10	09-Run Cycles	runcycles_10	✓	AV:128	data float	99	nvoRunCycles10	51	Output (non-polled)	30012-30013/10
10	10-Run Hours	runhours_10	✓	AV:129	data float	100	nvoRunHours10	51	Output (non-polled)	30014-30015/10
10	11-Oxygen	o2level_10	✓	AV:170	data float	170	nvoO2Lev10	inc count (9)	Output (non-polled)	30010/10
10	12-Exhaust Temp	exhtemp_10	✓	AV:190	data float	190	nvoExhTmp10	inc count (9)	Output (non-polled)	30007/10
Blr Addr 11										
11	01-Fire Rate Out	boilerstate_11	✓	AV:140	data float	101	nvoBlrState11	inc count (9)	Output (non-polled)	30009/11
11	02-Active Setpoint	effectsetpt_11	✓	AV:141	data float	102	nvoEffSetpt11	inc count (9)	Output (non-polled)	30017/11
11	03-Net Remote Setpt	setpt_11		AV:142	data float	103	nviSetpt11	inc count (9)	Input (non-polling)	40001/11
11	05-Fire Rate In	boilerload_11	✓	AV:134	data float	105	nvoBlrLoad11	inc count (9)	Output (non-polled)	30018/11
11	06-Outlet Temp	localsuptemp_11	✓	AV:135	data float	106	nvoLocSupTmp11	inc count (9)	Output (non-polled)	30003/11
11	07-Display Code	dispcode_11	✓	AV:136	data float	107	nvoDispCode11	inc count (9)	Output (non-polled)	30001/11
11	08-Unit Status	unitstat_11	✓	AV:137	data float	108	nvoUnitStat11	inc count (9)	Output (non-polled)	30002/11
11	09-Run Cycles	runcycles_11	✓	AV:138	data float	109	nvoRunCycles11	51	Output (non-polled)	30012-30013/11
11	10-Run Hours	runhours_11	✓	AV:139	data float	110	nvoRunHours11	51	Output (non-polled)	30014-30015/11
11	11-Oxygen	o2level_11	✓	AV:171	data float	171	nvoO2Lev11	inc count (9)	Output (non-polled)	30010/11
11	12-Exhaust Temp	exhtemp_11	✓	AV:191	data float	191	nvoExhTmp11	inc count (9)	Output (non-polled)	30007/11
Blr Addr 12										

TABLE C-3: Twelve C-Mores and One ACS/BMS II/BMS										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/Unit Address**
12	01-Fire Rate Out	boilerstate_12	✓	AV:150	data float	111	nvoBlrState12	inc count (9)	Output (non-polled)	30009/12
12	02-Active Setpoint	effectsetpt_12	✓	AV:151	data float	112	nvoEffSetpt12	inc count (9)	Output (non-polled)	30017/12
12	03-Net Remote Setpt	setpt_12	✓	AV:152	data float	113	nviSetpt12	inc count (9)	Input (non-polling)	40001/12
12	05-Fire Rate In	boilerload_12	✓	AV:144	data float	115	nvoBlrLoad12	inc count (9)	Output (non-polled)	30018/12
12	06-Outlet Temp	localsuptemp_12	✓	AV:145	data float	116	nvoLocSupTmp12	inc count (9)	Output (non-polled)	30003/12
12	07-Display Code	dispcode_12	✓	AV:146	data float	117	nvoDispCode12	inc count (9)	Output (non-polled)	30001/12
12	08-Unit Status	unitstat_12	✓	AV:147	data float	118	nvoUnitStat12	inc count (9)	Output (non-polled)	30002/12
12	09-Run Cycles	runcycles_12	✓	AV:148	data float	119	nvoRunCycles12	51	Output (non-polled)	30012-30013/12
12	10-Run Hours	runhours_12	✓	AV:149	data float	120	nvoRunHours12	51	Output (non-polled)	30014-30015/12
12	11-Oxygen	o2level_12	✓	AV:172	data float	172	nvoO2Lev12	inc count (9)	Output (non-polled)	30010/12
12	12-Exhaust Temp	exhtemp_12	✓	AV:192	data float	192	nvoExhTmp12	inc count (9)	Output (non-polled)	30007/12
BMS Addr 128										
128	01-Fire Rate Out	boilerstate_13	✓	AV:31	data float	121	nvoBlrState	inc count (9)	Output (non-polled)	30005/128
128	02-Header Set Temp	effectsetpt_13	✓	AV:32	data float	122	nvoEffSetpt	inc count (9)	Output (non-polled)	30006/128
128	03-Net Header Set Temp	setpt_13		AV:33	data float	123	nviSetpt	inc count (9)	Input (non-polling)	40005/128
128	04-Header Temp	localsuptemp_13	✓	AV:34	data float	124	nvoLocSupTmp	inc count (9)	Output (non-polled)	30002/128

TABLE C-3: Twelve C-Mores and One ACS/BMS II/BMS										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/Unit Address**
128	05-Outside Air Temp	localoatemp_13	✓	AV:35	data float	125	nvoLocOATmp	inc count (9)	Output (non-polled)	30003/128
128	06-Display Code	dispcode_13	✓	AV:36	data float	126	nvoDispCode	inc count (9)	Output (non-polled)	30011/128
128	07-Num Boilers Fired	blrfired_13	✓	AV:37	data float	127	nvoBlrsFired	inc count (9)	Output (non-polled)	30008/128
128	08-Num Boilers Online	blronline_13	✓	AV:38	data float	128	nvoBlrsOnline	inc count (9)	Output (non-polled)	30009/128
128	09-Last Blr Fired	blrlast_13	✓	AV:39	data float	129	nvoLastBlrFired	inc count (9)	Output (non-polled)	30017/128
128	10-Boiler 1 Status	blr1stat_13	✓	AV:40	data float	130	nvoBlr1Stat	inc count (9)	Output (non-polled)	30018/128
128	11-Boiler 2 Status	blr2stat_13	✓	AV:41	data float	131	nvoBlr2Stat	inc count (9)	Output (non-polled)	30019/128
128	12-Boiler 3 Status	blr3stat_13	✓	AV:48	data float	132	nvoBlr3Stat	inc count (9)	Output (non-polled)	30020/128
128	13-Boiler 4 Status	blr4stat_13	✓	AV:1	data float	133	nvoBlr4Stat	inc count (9)	Output (non-polled)	30021/128
128	14-Boiler 5 Status	blr5stat_13	✓	AV:2	data float	134	nvoBlr5Stat	inc count (9)	Output (non-polled)	30022/128
128	15-Boiler 6 Status	blr6stat_13	✓	AV:3	data float	135	nvoBlr6Stat	inc count (9)	Output (non-polled)	30023/128
128	16-Boiler 7 Status	blr7stat_13	✓	AV:4	data float	136	nvoBlr7Stat	inc count (9)	Output (non-polled)	30024/128
128	17-Boiler 8 Status	blr8stat_13	✓	AV:5	data float	137	nvoBlr8Stat	inc count (9)	Output (non-polled)	30025/128
128	18-Net Blr 1 Status	blr9stat_13	✓	AV:6	data float	138	nvoNetBlr1Stat	inc count (9)	Output (non-polled)	30026/128
128	19-Net Blr 2 Status	blr10stat_13	✓	AV:7	data float	139	nvoNetBlr2Stat	inc count (9)	Output (non-polled)	30027/128
128	20-Net Blr 3 Status	blr11stat_13	✓	AV:8	data float	140	nvoNetBlr3Stat	inc count (9)	Output (non-polled)	30028/128
128	21-Net Blr 4 Status	blr12stat_13	✓	AV:9	data float	141	nvoNetBlr4Stat	inc count (9)	Output (non-polled)	30029/128

TABLE C-3: Twelve C-Mores and One ACS/BMS II/BMS										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/Unit Address**
128	22-Net Blr 5 Status	blr13stat_13	✓	AV:10	data float	142	nvoNetBlr5Stat	inc count (9)	Output (non-polled)	30030/128
128	23-Net Blr 6 Status	blr14stat_13	✓	AV:11	data float	143	nvoNetBlr6Stat	inc count (9)	Output (non-polled)	30031/128
128	24-Net Blr 7 Status	blr15stat_13	✓	AV:12	data float	144	nvoNetBlr7Stat	inc count (9)	Output (non-polled)	30032/128
128	25-Net Blr 8 Status	blr16stat_13	✓	AV:13	data float	145	nvoNetBlr8Stat	inc count (9)	Output (non-polled)	30033/128
128	26-Net Blr 9 Status	blr17stat_13	✓	AV:14	data float	146	nvoNetBlr9Stat	inc count (9)	Output (non-polled)	30034/128
128	27-Net Blr 10 Status	blr18stat_13	✓	AV:15	data float	147	nvoNetBlr10Stat	inc count (9)	Output (non-polled)	30035/128
128	28-Net Blr 11 Status	blr19stat_13	✓	AV:16	data float	148	nvoNetBlr11Stat	inc count (9)	Output (non-polled)	30036/128
128	29-Net Blr 12 Status	blr20stat_13	✓	AV:17	data float	149	nvoNetBlr12Stat	inc count (9)	Output (non-polled)	30037/128
128	30-Return Temp	localrettemp_13	✓	AV:173	data float	173	nvoLocRetTmp	inc count (9)	Output (non-polled)	30004/128

Appendix C.4: Four Modulex and One ACS/BMS II

Table C-4: Four Modulex and One ACS/BMS II

Equip	Point Name	Name	Read Only	BACnet Type:ID	N2 Type	N2 ID	Lon SNVT NAME	Lon SNVT	Lon Direction	ModBus/Unit Address
BMS Addr 128										
128	01-Fire Rate Out	boilerstate_5	✓	AV:31	data float	41	nvoBlrState	inc count (9)	Output (non-polled)	30005/128
128	02-Header Set Temp	effectsetpt_5	✓	AV:32	data float	42	nvoEffSetpt	inc count (9)	Output (non-polled)	30006/128
128	03-Net Header Set Temp	setpt_5		AV:33	data float	43	nviSetpt	inc count (9)	Input (non-polling)	40005/128
128	04-Header Temp	localsuptemp_5	✓	AV:34	data float	44	nvoLocSupTmp	inc count (9)	Output (non-polled)	30002/128
128	05-Outside Air Temp	localoatemp_5	✓	AV:35	data float	45	nvoLocOATmp	inc count (9)	Output (non-polled)	30003/128
128	06-Display Code	dispcode_5	✓	AV:36	data float	46	nvoDispCode	inc count (9)	Output (non-polled)	30011/128
128	07-Num Boilers Fired	blrfired_5	✓	AV:37	data float	47	nvoBlrsFired	inc count (9)	Output (non-polled)	30008/128
128	08-Num Boilers Online	blronline_5	✓	AV:38	data float	48	nvoBlrsOnline	inc count (9)	Output (non-polled)	30009/128
128	09-Last Blr Fired	blrlast_5	✓	AV:39	data float	49	nvoLastBlrFired	inc count (9)	Output (non-polled)	30017/128
128	18-Net Blr 1 Status	blr9stat_5	✓	AV:26	data float	58	nvoNetBlr1Stat	inc count (9)	Output (non-polled)	30026/128
128	19-Net Blr 2 Status	blr10stat_5	✓	AV:27	data float	59	nvoNetBlr2Stat	inc count (9)	Output (non-polled)	30027/128
128	20-Net Blr 3 Status	blr11stat_5	✓	AV:47	data float	60	nvoNetBlr3Stat	inc count (9)	Output (non-polled)	30028/128
128	21-Net Blr 4 Status	blr12stat_5	✓	AV:49	data float	61	nvoNetBlr4Stat	inc count (9)	Output (non-polled)	30029/128
128	22-Return Temp	localrettemp_5	✓	AV:173	data float	173	nvoLocRetTmp	inc count (9)	Output (non-polled)	30004/128
Mlx Addr 1										
1	01-Act Mod Lev	boilerstate_1	✓	AV:134	data float	62	nvoMlxState1	inc count (9)	Output (non-polled)	41009/1

Table C-4: Four Modulex and One ACS/BMS II										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/Unit Address**
1	02-Target Setpoint	effectsetpt_1	✓	AV:135	data float	63	nvoMlxSetpt1	inc count (9)	Output (non-polled)	41019/1
1	03-Req Outlet Temp	setpt_1		AV:136	data float	64	nviMlxSetptRq1	inc count (9)	Input (non-polling)	41005/1
1	04-Net Direct Drive	boilercmd_1		AV:137	data float	65	nviMlxCmd1	inc count (9)	Input (non-polling)	40002/1
1	05-Mod Lev In	boilerload_1	✓	AV:138	data float	66	nvoMlxLoad1	inc count (9)	Output (non-polled)	41201/1
1	06-Flow Sens Temp	localsuptemp_1	✓	AV:139	data float	67	nvoMlxSupTmp1	inc count (9)	Output (non-polled)	41003/1
1	07-Display Code	dispcode_1	✓	AV:140	data float	68	nvoMlxDispCode1	inc count (9)	Output (non-polled)	30001/1
1	11-Error Code	errcode_1	✓	AV:1	data float	69	nvoMlxErrCode1	51	Output (non-polled)	40001/1
1	08-Unit Status	unitstat_1	✓	AV:141	data float	150	nvoMlxStat1	inc count (9)	Output (non-polled)	30002/1
1	09-Ret Flow Temp	returntemp_1	✓	AV:2	data float	151	nvoMlxRetTmp1	inc count (9)	Output (non-polled)	41004/1
Mlx Addr 2										
2	01-Act Mod Lev	boilerstate_2	✓	AV:144	data float	153	nvoMlxState2	inc count (9)	Output (non-polled)	41009/2
2	02-Target Setpoint	effectsetpt_2	✓	AV:145	data float	154	nvoMlxSetpt2	inc count (9)	Output (non-polled)	41019/2
2	03-Req Outlet Temp	setpt_2		AV:146	data float	155	nviMlxSetptRq2	inc count (9)	Input (non-polling)	41005/2
2	04-Net Direct Drive	boilercmd_2		AV:147	data float	156	nviMlxCmd2	inc count (9)	Input (non-polling)	40002/2
2	05-Mod Lev In	boilerload_2	✓	AV:148	data float	157	nvoMlxLoad2	inc count (9)	Output (non-polled)	41201/2
2	06-Flow Sens Temp	localsuptemp_2	✓	AV:149	data float	158	nvoMlxSupTmp2	inc count (9)	Output (non-polled)	41003/2
2	07-Display Code	dispcode_2	✓	AV:150	data float	159	nvoMlxDispCode2	inc count (9)	Output (non-polled)	30001/2
2	11-Error Code	errcode_2	✓	AV:4	data float	160	nvoMlxErrCode2	51	Output (non-polled)	40001/2

Table C-4: Four Modulex and One ACS/BMS II										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/Unit Address**
2	08-Unit Status	unitstat_2	✓	AV:151	data float	161	nvoMlxStat2	inc count (9)	Output (non-polled)	30002/2
2	09-Ret Flow Temp	returntemp_2	✓	AV:5	data float	162	nvoMlxRetTmp2	inc count (9)	Output (non-polled)	41004/2
Mlx Addr 3										
3	01-Act Mod Lev	boilerstate_3	✓	AV:18	data float	164	nvoMlxState3	inc count (9)	Output (non-polled)	41009/3
3	02-Target Setpoint	effectsetpt_3	✓	AV:19	data float	165	nvoMlxSetpt3	inc count (9)	Output (non-polled)	41019/3
3	03-Req Outlet Temp	setpt_3		AV:20	data float	166	nviMlxSetptRq3	inc count (9)	Input (non-polling)	41005/3
3	04-Net Direct Drive	boilercmd_3		AV:21	data float	167	nviMlxCmd3	inc count (9)	Input (non-polling)	40002/3
3	05-Mod Lev In	boilerload_3	✓	AV:22	data float	168	nvoMlxLoad3	inc count (9)	Output (non-polled)	41201/3
3	06-Flow Sens Temp	localsuptemp_3	✓	AV:23	data float	169	nvoMlxSupTmp3	inc count (9)	Output (non-polled)	41003/3
3	07-Display Code	dispcode_3	✓	AV:24	data float	170	nvoMlxDispCode3	inc count (9)	Output (non-polled)	30001/3
3	11-Error Code	errcode_3	✓	AV:7	data float	171	nvoMlxErrCode3	51	Output (non-polled)	40001/3
3	08-Unit Status	unitstat_3	✓	AV:25	data float	172	nvoMlxStat3	inc count (9)	Output (non-polled)	30002/3
3	09-Ret Flow Temp	returntemp_3	✓	AV:8	data float	173	nvoMlxRetTmp3	inc count (9)	Output (non-polled)	41004/3
Mlx Addr 4										
4	01-Act Mod Lev	boilerstate_4	✓	AV:28	data float	175	nvoMlxState4	inc count (9)	Output (non-polled)	41009/4
4	02-Target Setpoint	effectsetpt_4	✓	AV:29	data float	176	nvoMlxSetpt4	inc count (9)	Output (non-polled)	41019/4
4	03-Req Outlet Temp	setpt_4		AV:30	data float	177	nviMlxSetptRq4	inc count (9)	Input (non-polling)	41005/4
4	04-Net Direct Drive	boilercmd_4		AV:42	data float	178	nviMlxCmd4	inc count (9)	Input (non-polling)	40002/4

Table C-4: Four Modulex and One ACS/BMS II										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/Unit Address**
4	05-Mod Lev In	boilerload_4	✓	AV:43	data float	179	nvoMlxLoad4	inc count (9)	Output (non-polled)	41201/4
4	06-Flow Sens Temp	localsuptemp_4	✓	AV:44	data float	180	nvoMlxSupTmp4	inc count (9)	Output (non-polled)	41003/4
4	07-Display Code	dispcode_4	✓	AV:45	data float	181	nvoMlxDispCode4	inc count (9)	Output (non-polled)	30001/4
4	11-Error Code	errcode_4	✓	AV:10	data float	182	nvoMlxErrCode4	51	Output (non-polled)	40001/4
4	08-Unit Status	unitstat_4	✓	AV:46	data float	183	nvoMlxStat4	inc count (9)	Output (non-polled)	30002/4
4	09-Ret Flow Temp	returntemp_4	✓	AV:11	data float	184	nvoMlxRetTmp4	inc count (9)	Output (non-polled)	41004/4

Appendix C.5: ECS and SmartPlate

Table C-5: ECS and SmartPlate

Equip	Point Name	Name	Read Only	BACnet Type:ID	N2 Type	N2 ID	Lon SNVT NAME	Lon SNVT	Lon Direction	ModBus/Unit Address
E Valve Addr 29										
29	01-Cntl Output Signal	boilerstate_1	✓	AV:11	data float	1	nvoEcsState29	inc count (9)	Output (non-polled)	30004/29
29	02-Setpoint	effectsetpt_1	✓	AV:80	data float	2	nvoEcsSetpt29	inc count (9)	Output (non-polled)	30006/29
29	03-RmSetpt	rmsetpt_1		AV:81	data float	3	nviEcsSetptRq29	inc count (9)	Input (non-polling)	40027/29
29	04-Outlet Temp	localsuptemp_1	✓	AV:84	data float	4	nvoEcsSupTmp29	inc count (9)	Output (non-polled)	30002/29
29	05-FBk Sensor Temp	localrettemp_1	✓	AV:1	data float	5	nvoEcsRetTmp29	inc count (9)	Output (non-polled)	30290/29
29	06-Over Temp Alarm	unitstat_1	✓	AV:86	data float	6	nvoEcsStat29	inc count (9)	Output (non-polled)	30075/29
29	07-Flow Rate	flowrate_1	✓	AV:2	data float	7	nvoEcsFlow29	inc count (9)	Output (non-polled)	30291/29
E Valve Addr 30										
30	01-Cntl Output Signal	boilerstate_2	✓	AV:12	data float	8	nvoEcsState30	inc count (9)	Output (non-polled)	30004/30
30	02-Setpoint	effectsetpt_2	✓	AV:3	data float	9	nvoEcsSetpt30	inc count (9)	Output (non-polled)	30006/30
30	03-RmSetpt	rmsetpt_2		AV:4	data float	10	nviEcsSetptRq30	inc count (9)	Input (non-polling)	40027/30
30	04-Outlet Temp	localsuptemp_2	✓	AV:5	data float	11	nvoEcsSupTmp30	inc count (9)	Output (non-polled)	30002/30
30	05-FBk Sensor Temp	localrettemp_2	✓	AV:6	data float	12	nvoEcsRetTmp30	inc count (9)	Output (non-polled)	30290/30
30	06-Over Temp Alarm	unitstat_2	✓	AV:7	data float	13	nvoEcsStat30	inc count (9)	Output (non-polled)	30075/30
30	07-Flow Rate	flowrate_2	✓	AV:8	data float	14	nvoEcsFlow30	inc count (9)	Output (non-polled)	30291/30
E Valve Addr 31										

Table C-5: ECS and SmartPlate										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/Unit Address**
31	01-Cntl Output Signal	boilerstate_3	✓	AV:9	data float	15	nvoEcsState31	inc count (9)	Output (non-polled)	30004/31
31	02-Setpoint	effectsetpt_3	✓	AV:150	data float	16	nvoEcsSetpt31	inc count (9)	Output (non-polled)	30006/31
31	03-RmSetpt	rmsetpt_3		AV:151	data float	17	nviEcsSetptRq31	inc count (9)	Input (non-polling)	40027/31
31	04-Outlet Temp	localsuptemp_3	✓	AV:152	data float	18	nvoEcsSupTmp31	inc count (9)	Output (non-polled)	30002/31
31	05-FBk Sensor Temp	localrettemp_3	✓	AV:153	data float	19	nvoEcsRetTmp31	inc count (9)	Output (non-polled)	30290/31
31	06-Over Temp Alarm	unitstat_3	✓	AV:154	data float	20	nvoEcsStat31	inc count (9)	Output (non-polled)	30075/31
31	07-Flow Rate	flowrate_3	✓	AV:155	data float	21	nvoEcsFlow31	inc count (9)	Output (non-polled)	30291/31
E Valve Addr 32										
32	01-Cntl Output Signal	boilerstate_4	✓	AV:10	data float	22	nvoEcsState32	inc count (9)	Output (non-polled)	30004/32
32	02-Setpoint	effectsetpt_4	✓	AV:158	data float	23	nvoEcsSetpt32	inc count (9)	Output (non-polled)	30006/32
32	03-RmSetpt	rmsetpt_4		AV:159	data float	24	nviEcsSetptRq32	inc count (9)	Input (non-polling)	40027/32
32	04-Outlet Temp	localsuptemp_4	✓	AV:160	data float	25	nvoEcsSupTmp32	inc count (9)	Output (non-polled)	30002/32
32	05-FBk Sensor Temp	localrettemp_4	✓	AV:161	data float	26	nvoEcsRetTmp32	inc count (9)	Output (non-polled)	30290/32
32	06-Over Temp Alarm	unitstat_4	✓	AV:156	data float	27	nvoEcsStat32	inc count (9)	Output (non-polled)	30075/32
32	07-Flow Rate	flowrate_4	✓	AV:157	data float	28	nvoEcsFlow32	inc count (9)	Output (non-polled)	30291/32

Appendix C.6: Twelve C-Mores, Six ECS/SmartPlate, Four Modulex and Two ACS/BMS II

Table C-6: Twelve C-Mores, Six ECS/SmartPlate, Four Modulex and Two ACS/BMS II

Equip	Point Name	Name	Read Only	BACnet Type:ID	N2 Type	N2 ID	Lon SNVT NAME	Lon SNVT	Lon Direction	ModBus/ Unit Address
Mlx Addr 1										
1	01-Act Mod Lev	boilerstate_1	✓	AV:121	data float	121	nvoMlxState1	inc count (9)	Output (non-polled)	41009/1
1	02-Target Setpoint	effectsetpt_1	✓	AV:122	data float	122	nvoMlxSetpt1	inc count (9)	Output (non-polled)	41019/1
1	03-Req Outlet Temp	setpt_1		AV:123	data float	123	nviMlxSetptRq1	inc count (9)	Input (non-polling)	41005/1
1	04-Net Direct Drive	boilercmd_1		AV:124	data float	124	nviMlxCmd1	inc count (9)	Input (non-polling)	40002/1
1	05-Mod Lev In	boilerload_1	✓	AV:125	data float	125	nvoMlxLoad1	inc count (9)	Output (non-polled)	41201/1
1	06-Flow Sens Temp	localsuptemp_1	✓	AV:126	data float	126	nvoMlxSupTmp1	inc count (9)	Output (non-polled)	41003/1
1	07-Display Code	dispcode_1	✓	AV:127	data float	127	nvoMlxDispCode1	inc count (9)	Output (non-polled)	30001/1
1	11-Error Code	errcode_1	✓	AV:128	data float	128	nvoMlxErrCode1	51	Output (non-polled)	40001/1
1	08-Unit Status	unitstat_1	✓	AV:129	data float	129	nvoMlxStat1	inc count (9)	Output (non-polled)	30002/1
1	09-Ret Flow Temp	returntemp_1	✓	AV:130	data float	130	nvoMlxRetTmp1	inc count (9)	Output (non-polled)	41004/1
Mlx Addr 2										
2	01-Act Mod Lev	boilerstate_2	✓	AV:131	data float	131	nvoMlxState2	inc count (9)	Output (non-polled)	41009/
2	02-Target Setpoint	effectsetpt_2	✓	AV:132	data float	132	nvoMlxSetpt2	inc count (9)	Output (non-polled)	41019/2
2	03-Req Outlet Temp	setpt_2		AV:133	data float	133	nviMlxSetptRq2	inc count (9)	Input (non-polling)	41005/2
2	04-Net Direct Drive	boilercmd_2		AV:134	data float	134	nviMlxCmd2	inc count (9)	Input (non-polling)	40002/2
2	05-Mod Lev In	boilerload_2	✓	AV:135	data float	135	nvoMlxLoad2	inc count (9)	Output (non-polled)	41201/2

Table C-6: Twelve C-Mores, Six ECS/SmartPlate, Four Modulex and Two ACS/BMS II										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/ Unit Address**
2	06-Flow Sens Temp	localsuptemp_2	✓	AV:136	data float	136	nvoMlxSupTmp2	inc count (9)	Output (non-polled)	41003/2
2	07-Display Code	dispcode_2	✓	AV:137	data float	137	nvoMlxDispCode2	inc count (9)	Output (non-polled)	30001/2
2	11-Error Code	errcode_2	✓	AV:138	data float	138	nvoMlxErrCode2	51	Output (non-polled)	40001/2
2	08-Unit Status	unitstat_2	✓	AV:139	data float	139	nvoMlxStat2	inc count (9)	Output (non-polled)	30002/2
2	09-Ret Flow Temp	returntemp_2	✓	AV:140	data float	140	nvoMlxRetTmp2	inc count (9)	Output (non-polled)	41004/2
Mlx Addr 3										
3	01-Act Mod Lev	boilerstate_3	✓	AV:141	data float	141	nvoMlxState3	inc count (9)	Output (non-polled)	41009/3
3	02-Target Setpoint	effectsetpt_3	✓	AV:142	data float	142	nvoMlxSetpt3	inc count (9)	Output (non-polled)	41019/3
3	03-Req Outlet Temp	setpt_3		AV:143	data float	143	nviMlxSetptRq3	inc count (9)	Input (non-polling)	41005/3
3	04-Net Direct Drive	boilercmd_3		AV:144	data float	144	nviMlxCmd3	inc count (9)	Input (non-polling)	40002/3
3	05-Mod Lev In	boilerload_3	✓	AV:145	data float	145	nvoMlxLoad3	inc count (9)	Output (non-polled)	41201/3
3	06-Flow Sens Temp	localsuptemp_3	✓	AV:146	data float	146	nvoMlxSupTmp3	inc count (9)	Output (non-polled)	41003/3
3	07-Display Code	dispcode_3	✓	AV:147	data float	147	nvoMlxDispCode3	inc count (9)	Output (non-polled)	30001/3
3	11-Error Code	errcode_3	✓	AV:148	data float	148	nvoMlxErrCode3	51	Output (non-polled)	40001/3
3	08-Unit Status	unitstat_3	✓	AV:149	data float	149	nvoMlxStat3	inc count (9)	Output (non-polled)	30002/3
3	09-Ret Flow Temp	returntemp_3	✓	AV:150	data float	150	nvoMlxRetTmp3	inc count (9)	Output (non-polled)	41004/3
Mlx Addr 4										
4	01-Act Mod Lev	boilerstate_16	✓	AV:151	data float	151	nvoMlxState16	inc count (9)	Output (non-polled)	41009/16

Table C-6: Twelve C-Mores, Six ECS/SmartPlate, Four Modulex and Two ACS/BMS II										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/ Unit Address**
4	02-Target Setpoint	effectsetpt_16	✓	AV:152	data float	152	nvoMlxSetpt16	inc count (9)	Output (non-polled)	41019/16
4	03-Req Outlet Temp	setpt_16		AV:153	data float	153	nviMlxSetptRq16	inc count (9)	Input (non-polling)	41005/16
4	04-Net Direct Drive	boilercmd_4		AV:154	data float	154	nviMlxCmd4	inc count (9)	Input (non-polling)	40002/4
C-More Addr 5										
5	01-Fire Rate Out	boilerstate_5	✓	AV:41	data float	41	nvoBlrState5	inc count (9)	Output (non-polled)	30009/5
5	02-Active Setpoint	effectsetpt_5	✓	AV:42	data float	42	nvoEffSetpt5	inc count (9)	Output (non-polled)	30017/5
5	03-Net Remote Setpt	setpt_5		AV:43	data float	43	nviSetpt5	inc count (9)	Input (non-polling)	40001/5
5	05-Fire Rate In	boilerload_5	✓	AV:45	data float	45	nvoBlrLoad5	inc count (9)	Output (non-polled)	30018/5
5	06-Outlet Temp	localsuptemp_5	✓	AV:46	data float	46	nvoLocSupTmp5	inc count (9)	Output (non-polled)	30003/5
5	07-Display Code	dispcode_5	✓	AV:47	data float	47	nvoDispCode5	inc count (9)	Output (non-polled)	30001/5
5	08-Unit Status	unitstat_5	✓	AV:48	data float	48	nvoUnitStat5	inc count (9)	Output (non-polled)	30002/5
5	09-Run Cycles	runcycles_5	✓	AV:49	data float	49	nvoRunCycles5	51	Output (non-polled)	30012-30013/5
5	10-Run Hours	runhours_5	✓	AV:50	data float	50	nvoRunHours5	51	Output (non-polled)	30014-30015/5
C-More Addr 6										
6	01-Fire Rate Out	boilerstate_6	✓	AV:51	data float	51	nvoBlrState6	inc count (9)	Output (non-polled)	30009/6
6	02-Active Setpoint	effectsetpt_6	✓	AV:52	data float	52	nvoEffSetpt6	inc count (9)	Output (non-polled)	30017/6
6	03-Net Remote Setpt	setpt_6		AV:53	data float	53	nviSetpt6	inc count (9)	Input (non-polling)	40001/6
6	05-Fire Rate In	boilerload_6	✓	AV:55	data float	55	nvoBlrLoad6	inc count (9)	Output (non-polled)	30018/6

Table C-6: Twelve C-Mores, Six ECS/SmartPlate, Four Modulex and Two ACS/BMS II										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/ Unit Address**
6	06-Outlet Temp	localsuptemp_6	✓	AV:56	data float	56	nvoLocSupTmp6	inc count (9)	Output (non-polled)	30003/6
6	07-Display Code	dispcode_6	✓	AV:57	data float	57	nvoDispCode6	inc count (9)	Output (non-polled)	30001/6
6	08-Unit Status	unitstat_6	✓	AV:58	data float	58	nvoUnitStat6	inc count (9)	Output (non-polled)	30002/6
6	09-Run Cycles	runcycles_6	✓	AV:59	data float	59	nvoRunCycles6	51	Output (non-polled)	30012-30013/6
6	10-Run Hours	runhours_6	✓	AV:60	data float	60	nvoRunHours6	51	Output (non-polled)	30014-30015/6
C-More Addr 7										
7	01-Fire Rate Out	boilerstate_7	✓	AV:61	data float	61	nvoBlrState7	inc count (9)	Output (non-polled)	30009/7
7	02-Active Setpoint	effectsetpt_7	✓	AV:62	data float	62	nvoEffSetpt7	inc count (9)	Output (non-polled)	30017/7
7	03-Net Remote Setpt	setpt_7		AV:63	data float	63	nviSetpt7	inc count (9)	Input (non-polling)	40001/7
7	05-Fire Rate In	boilerload_7	✓	AV:65	data float	65	nvoBlrLoad7	inc count (9)	Output (non-polled)	30018/7
7	06-Outlet Temp	localsuptemp_7	✓	AV:66	data float	66	nvoLocSupTmp7	inc count (9)	Output (non-polled)	30003/7
7	07-Display Code	dispcode_7	✓	AV:67	data float	67	nvoDispCode7	inc count (9)	Output (non-polled)	30001/7
7	08-Unit Status	unitstat_7	✓	AV:68	data float	68	nvoUnitStat7	inc count (9)	Output (non-polled)	30002/7
7	09-Run Cycles	runcycles_7	✓	AV:69	data float	69	nvoRunCycles7	51	Output (non-polled)	30012-30013/7
7	10-Run Hours	runhours_7	✓	AV:70	data float	70	nvoRunHours7	51	Output (non-polled)	30014-30015/7
C-More Addr 8										
8	01-Fire Rate Out	boilerstate_8	✓	AV:71	data float	71	nvoBlrState8	inc count (9)	Output (non-polled)	30009/8
8	02-Active Setpoint	effectsetpt_8	✓	AV:72	data float	72	nvoEffSetpt8	inc count (9)	Output (non-polled)	30017/8

Table C-6: Twelve C-Mores, Six ECS/SmartPlate, Four Modulex and Two ACS/BMS II										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/ Unit Address**
8	03-Net Remote Setpt	setpt_8		AV:73	data float	73	nviSetpt8	inc count (9)	Input (non-polling)	40001/8
8	05-Fire Rate In	boilerload_8	✓	AV:75	data float	75	nvoBlrLoad8	inc count (9)	Output (non-polled)	30018/8
8	06-Outlet Temp	localsuptemp_8	✓	AV:76	data float	76	nvoLocSupTmp8	inc count (9)	Output (non-polled)	30003/8
8	07-Display Code	dispcode_8	✓	AV:77	data float	77	nvoDispCode8	inc count (9)	Output (non-polled)	30001/8
8	08-Unit Status	unitstat_8	✓	AV:78	data float	78	nvoUnitStat8	inc count (9)	Output (non-polled)	30002/8
8	09-Run Cycles	runcycles_8	✓	AV:79	data float	79	nvoRunCycles8	51	Output (non-polled)	30012-30013/8
8	10-Run Hours	runhours_8	✓	AV:80	data float	80	nvoRunHours8	51	Output (non-polled)	30014-30015/8
C-More Addr 9										
9	01-Fire Rate Out	boilerstate_9	✓	AV:81	data float	81	nvoBlrState9	inc count (9)	Output (non-polled)	30009/9
9	02-Active Setpoint	effectsetpt_9	✓	AV:82	data float	82	nvoEffSetpt9	inc count (9)	Output (non-polled)	30017/9
9	03-Net Remote Setpt	setpt_9		AV:83	data float	83	nviSetpt9	inc count (9)	Input (non-polling)	40001/9
9	05-Fire Rate In	boilerload_9	✓	AV:85	data float	85	nvoBlrLoad9	inc count (9)	Output (non-polled)	30018/9
9	06-Outlet Temp	localsuptemp_9	✓	AV:86	data float	86	nvoLocSupTmp9	inc count (9)	Output (non-polled)	30003/9
9	07-Display Code	dispcode_9	✓	AV:87	data float	87	nvoDispCode9	inc count (9)	Output (non-polled)	30001/9
9	08-Unit Status	unitstat_9	✓	AV:88	data float	88	nvoUnitStat9	inc count (9)	Output (non-polled)	30002/9
9	09-Run Cycles	runcycles_9	✓	AV:89	data float	89	nvoRunCycles9	51	Output (non-polled)	30012-30013/9
9	10-Run Hours	runhours_9	✓	AV:90	data float	90	nvoRunHours9	51	Output (non-polled)	30014-30015/9
C-More Addr 10										

Table C-6: Twelve C-Mores, Six ECS/SmartPlate, Four Modulex and Two ACS/BMS II										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/ Unit Address**
10	01-Fire Rate Out	boilerstate_10	✓	AV:91	data float	91	nvoBlrState10	inc count (9)	Output (non-polled)	30009/10
10	02-Active Setpoint	effectsetpt_10	✓	AV:92	data float	92	nvoEffSetpt10	inc count (9)	Output (non-polled)	30017/10
10	03-Net Remote Setpt	setpt_10		AV:93	data float	93	nviSetpt10	inc count (9)	Input (non-polling)	40001/10
10	05-Fire Rate In	boilerload_10	✓	AV:95	data float	95	nvoBlrLoad10	inc count (9)	Output (non-polled)	30018/10
10	06-Outlet Temp	localsuptemp_10	✓	AV:96	data float	96	nvoLocSupTmp10	inc count (9)	Output (non-polled)	30003/10
10	07-Display Code	dispcode_10	✓	AV:97	data float	97	nvoDispCode10	inc count (9)	Output (non-polled)	30001/10
10	08-Unit Status	unitstat_10	✓	AV:98	data float	98	nvoUnitStat10	inc count (9)	Output (non-polled)	30002/10
10	09-Run Cycles	runcycles_10	✓	AV:99	data float	99	nvoRunCycles10	51	Output (non-polled)	30012-30013/10
10	10-Run Hours	runhours_10	✓	AV:100	data float	100	nvoRunHours10	51	Output (non-polled)	30014-30015/10
C-More Addr 11										
11	01-Fire Rate Out	boilerstate_11	✓	AV:101	data float	101	nvoBlrState11	inc count (9)	Output (non-polled)	30009/11
11	02-Active Setpoint	effectsetpt_11	✓	AV:102	data float	102	nvoEffSetpt11	inc count (9)	Output (non-polled)	30017/11
11	03-Net Remote Setpt	setpt_11		AV:103	data float	103	nviSetpt11	inc count (9)	Input (non-polling)	40001/11
11	05-Fire Rate In	boilerload_11	✓	AV:105	data float	105	nvoBlrLoad11	inc count (9)	Output (non-polled)	30018/11
11	06-Outlet Temp	localsuptemp_11	✓	AV:106	data float	106	nvoLocSupTmp11	inc count (9)	Output (non-polled)	30003/11
11	07-Display Code	dispcode_11	✓	AV:107	data float	107	nvoDispCode11	inc count (9)	Output (non-polled)	30001/11
11	08-Unit Status	unitstat_11	✓	AV:108	data float	108	nvoUnitStat11	inc count (9)	Output (non-polled)	30002/11

Table C-6: Twelve C-Mores, Six ECS/SmartPlate, Four Modulex and Two ACS/BMS II										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/ Unit Address**
11	09-Run Cycles	runcycles_11	✓	AV:109	data float	109	nvoRunCycles11	51	Output (non-polled)	30012-30013/11
11	10-Run Hours	runhours_11	✓	AV:110	data float	110	nvoRunHours11	51	Output (non-polled)	30014-30015/11
C-More Addr 12										
12	01-Fire Rate Out	boilerstate_12	✓	AV:111	data float	111	nvoBlrState12	inc count (9)	Output (non-polled)	30009/12
12	02-Active Setpoint	effectsetpt_12	✓	AV:112	data float	112	nvoEffSetpt12	inc count (9)	Output (non-polled)	30017/12
12	03-Net Remote Setpt	setpt_12		AV:113	data float	113	nviSetpt12	inc count (9)	Input (non-polling)	40001/12
12	05-Fire Rate In	boilerload_12	✓	AV:115	data float	115	nvoBlrLoad12	inc count (9)	Output (non-polled)	30018/12
12	06-Outlet Temp	localsuptemp_12	✓	AV:116	data float	116	nvoLocSupTmp12	inc count (9)	Output (non-polled)	30003/12
12	07-Display Code	dispcode_12	✓	AV:117	data float	117	nvoDispCode12	inc count (9)	Output (non-polled)	30001/12
12	08-Unit Status	unitstat_12	✓	AV:118	data float	118	nvoUnitStat12	inc count (9)	Output (non-polled)	30002/12
12	09-Run Cycles	runcycles_12	✓	AV:119	data float	119	nvoRunCycles12	51	Output (non-polled)	30012-30013/12
12	10-Run Hours	runhours_12	✓	AV:120	data float	120	nvoRunHours12	51	Output (non-polled)	30014-30015/12
C-More Addr 13										
13	01-Fire Rate Out	boilerstate_13	✓	AV:1	data float	1	nvoBlrState13	inc count (9)	Output (non-polled)	30009/13
13	02-Active Setpoint	effectsetpt_13	✓	AV:2	data float	2	nvoEffSetpt13	inc count (9)	Output (non-polled)	30017/13
13	03-Net Remote Setpt	setpt_13		AV:3	data float	3	nviSetpt13	inc count (9)	Input (non-polling)	40001/13
13	05-Fire Rate In	boilerload_13	✓	AV:5	data float	5	nvoBlrLoad13	inc count (9)	Output (non-polled)	30018/13
13	06-Outlet Temp	localsuptemp_13	✓	AV:6	data float	6	nvoLocSupTmp13	inc count (9)	Output (non-polled)	30003/13

Table C-6: Twelve C-Mores, Six ECS/SmartPlate, Four Modulex and Two ACS/BMS II										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/ Unit Address**
13	07-Display Code	dispcode_13	✓	AV:7	data float	7	nvoDispCode13	inc count (9)	Output (non-polled)	30001/13
13	08-Unit Status	unitstat_13	✓	AV:8	data float	8	nvoUnitStat13	inc count (9)	Output (non-polled)	30002/13
13	09-Run Cycles	runcycles_13	✓	AV:9	data float	9	nvoRunCycles13	51	Output (non-polled)	30012-30013/13
13	10-Run Hours	runhours_13	✓	AV:10	data float	10	nvoRunHours13	51	Output (non-polled)	30014-30015/13
C-More Addr 14										
14	01-Fire Rate Out	boilerstate_14	✓	AV:11	data float	11	nvoBlrState14	inc count (9)	Output (non-polled)	30009/14
14	02-Active Setpoint	effectsetpt_14	✓	AV:12	data float	12	nvoEffSetpt14	inc count (9)	Output (non-polled)	30017/14
14	03-Net Remote Setpt	setpt_14		AV:13	data float	13	nviSetpt14	inc count (9)	Input (non-polling)	40001/14
14	05-Fire Rate In	boilerload_14	✓	AV:15	data float	15	nvoBlrLoa14	inc count (9)	Output (non-polled)	30018/14
14	06-Outlet Temp	localsuptemp_14	✓	AV:16	data float	16	nvoLocSupTmp14	inc count (9)	Output (non-polled)	30003/14
14	07-Display Code	dispcode_14	✓	AV:17	data float	17	nvoDispCode14	inc count (9)	Output (non-polled)	30001/14
14	08-Unit Status	unitstat_14	☐	AV:18	data float	18	nvoUnitStat14	inc count (9)	Output (non-polled)	30002/14
14	09-Run Cycles	runcycles_14	✓	AV:19	data float	19	nvoRunCycles14	51	Output (non-polled)	30012-30013/14
14	10-Run Hours	runhours_14	✓	AV:20	data float	20	nvoRunHours14	51	Output (non-polled)	30014-30015/14
C-More Addr 15										
15	01-Fire Rate Out	boilerstate_15	✓	AV:21	data float	21	nvoBlrState15	inc count (9)	Output (non-polled)	30009/15
15	02-Active Setpoint	effectsetpt_15	✓	AV:22	data float	22	nvoEffSetpt15	inc count (9)	Output (non-polled)	30017/15
15	03-Net Remote Setpt	setpt_15		AV:23	data float	23	nviSetpt15	inc count (9)	Input (non-polling)	40001/15

Table C-6: Twelve C-Mores, Six ECS/SmartPlate, Four Modulex and Two ACS/BMS II										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/ Unit Address**
15	05-Fire Rate In	boilerload_15	✓	AV:25	data float	25	nvoBlrLoad15	inc count (9)	Output (non-polled)	30018/15
15	06-Outlet Temp	localsuptemp_15	✓	AV:26	data float	26	nvoLocSupTmp15	inc count (9)	Output (non-polled)	30003/15
15	07-Display Code	dispcode_15	✓	AV:27	data float	27	nvoDispCode15	inc count (9)	Output (non-polled)	30001/15
15	08-Unit Status	unitstat_15	✓	AV:28	data float	28	nvoUnitStat15	inc count (9)	Output (non-polled)	30002/15
15	09-Run Cycles	runcycles_15	✓	AV:29	data float	29	nvoRunCycles15	51	Output (non-polled)	30012-30013/15
15	10-Run Hours	runhours_15	✓	AV:30	data float	30	nvoRunHours15	51	Output (non-polled)	30014-30015/15
C-More Addr 16										
16	01-Fire Rate Out	boilerstate_16	✓	AV:31	data float	31	nvoBlrState16	inc count (9)	Output (non-polled)	30009/16
16	02-Active Setpoint	effectsetpt_16	✓	AV:32	data float	32	nvoEffSetpt16	inc count (9)	Output (non-polled)	30017/16
16	03-Net Remote Setpt	setpt_16		AV:33	data float	33	nviSetpt16	inc count (9)	Input (non-polling)	40001/16
16	05-Fire Rate In	boilerload_16	✓	AV:35	data float	35	nvoBlrLoad16	inc count (9)	Output (non-polled)	30018/16
16	06-Outlet Temp	localsuptemp_16	✓	AV:36	data float	36	nvoLocSupTmp16	inc count (9)	Output (non-polled)	30003/16
16	07-Display Code	dispcode_16	✓	AV:37	data float	37	nvoDispCode16	inc count (9)	Output (non-polled)	30001/16
16	08-Unit Status	unitstat_16	✓	AV:38	data float	38	nvoUnitStat16	inc count (9)	Output (non-polled)	30002/16
16	09-Run Cycles	runcycles_16	✓	AV:39	data float	39	nvoRunCycles16	51	Output (non-polled)	30012-30013/16
16	10-Run Hours	runhours_16	✓	AV:40	data float	40	nvoRunHours16	51	Output (non-polled)	30014-30015/16
E Valve Addr 17										
17	01-Cntl Output Signal	boilerstate_17	✓	AV:171	data float	171	nvoEcsState17	inc count (9)	Output (non-polled)	30004/17

Table C-6: Twelve C-Mores, Six ECS/SmartPlate, Four Modulex and Two ACS/BMS II										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/ Unit Address**
17	02-Setpoint	effectsetpt_17	✓	AV:172	data float	172	nvoEcsSetpt17	inc count (9)	Output (non-polled)	30006/17
17	03-RmSetpt	rmsetpt_17		AV:173	data float	173	nviEcsSetptRq17	inc count (9)	Input (non-polling)	40027/17
17	04-Outlet Temp	localsuptemp_17	✓	AV:174	data float	174	nvoEcsSupTmp17	inc count (9)	Output (non-polled)	30002/17
17	05-FBk Sensor Temp	localrettemp_17	✓	AV:175	data float	175	nvoEcsRetTmp17	inc count (9)	Output (non-polled)	30170/17
17	06-Over Temp Alarm	unitstat_17	✓	AV:176	data float	176	nvoEcsStat17	inc count (9)	Output (non-polled)	30075/17
17	07-Flow Rate	flowrate_17	✓	AV:177	data float	177	nvoEcsFlow17	inc count (9)	Output (non-polled)	30171/17
E Valve Addr 18										
18	01-Cntl Output Signal	boilerstate_18	✓	AV:181	data float	181	nvoEcsState18	inc count (9)	Output (non-polled)	18004/18
18	02-Setpoint	effectsetpt_18	✓	AV:182	data float	182	nvoEcsSetpt18	inc count (9)	Output (non-polled)	18006/18
18	03-RmSetpt	rmsetpt_18		AV:183	data float	183	nviEcsSetptRq18	inc count (9)	Input (non-polling)	40027/18
18	04-Outlet Temp	localsuptemp_18	✓	AV:184	data float	184	nvoEcsSupTmp18	inc count (9)	Output (non-polled)	18002/18
18	05-FBk Sensor Temp	localrettemp_18	✓	AV:185	data float	185	nvoEcsRetTmp18	inc count (9)	Output (non-polled)	18290/18
18	06-Over Temp Alarm	unitstat_18	✓	AV:186	data float	186	nvoEcsStat18	inc count (9)	Output (non-polled)	18075/18
18	07-Flow Rate	flowrate_18	✓	AV:187	data float	187	nvoEcsFlow18	inc count (9)	Output (non-polled)	18291/18
E Valve Addr 19										
19	01-Cntl Output Signal	boilerstate_19	✓	AV:191	data float	191	nvoEcsState19	inc count (9)	Output (non-polled)	30004/19
19	02-Setpoint	effectsetpt_19	✓	AV:192	data float	192	nvoEcsSetpt19	inc count (9)	Output (non-polled)	30006/19
19	03-RmSetpt	rmsetpt_19		AV:193	data float	193	nviEcsSetptRq19	inc count (9)	Input (non-polling)	40027/19

Table C-6: Twelve C-Mores, Six ECS/SmartPlate, Four Modulex and Two ACS/BMS II

Equip	Point Name	Name	Read Only	BACnet Type:ID	N2 Type	N2 ID	Lon SNVT NAME	Lon SNVT	Lon Direction	ModBus/ Unit Address
19	04-Outlet Temp	localsuptemp_19	✓	AV:194	data float	194	nvoEcsSupTmp19	inc count (9)	Output (non-polled)	30002/19
19	05-FBk Sensor Temp	localrettemp_19	✓	AV:195	data float	195	nvoEcsRetTmp19	inc count (9)	Output (non-polled)	30290/19
19	06-Over Temp Alarm	unitstat_19	✓	AV:196	data float	196	nvoEcsStat19	inc count (9)	Output (non-polled)	30075/19
19	07-Flow Rate	flowrate_19	✓	AV:197	data float	197	nvoEcsFlow19	inc count (9)	Output (non-polled)	30291/19
E Valve Addr 20										
20	01-Cntl Output Signal	boilerstate_20	✓	AV:201	data float	201	nvoEcsState20	inc count (9)	Output (non-polled)	30004/20
20	02-Setpoint	effectsetpt_20	✓	AV:202	data float	202	nvoEcsSetpt20	inc count (9)	Output (non-polled)	30006/20
20	03-RmSetpt	rmsetpt_20		AV:203	data float	203	nviEcsSetptRq20	inc count (9)	Input (non-polling)	40027/20
20	04-Outlet Temp	localsuptemp_20	✓	AV:204	data float	204	nvoEcsSupTmp20	inc count (9)	Output (non-polled)	30002/20
20	05-FBk Sensor Temp	localrettemp_20	✓	AV:205	data float	205	nvoEcsRetTmp20	inc count (9)	Output (non-polled)	30290/20
20	06-Over Temp Alarm	unitstat_20	✓	AV:206	data float	206	nvoEcsStat20	inc count (9)	Output (non-polled)	30075/20
20	07-Flow Rate	flowrate_20	✓	AV:207	data float	207	nvoEcsFlow20	inc count (9)	Output (non-polled)	30291/20
E Valve Addr 21										
21	01-Cntl Output Signal	boilerstate_21	✓	AV:211	data float	211	nvoEcsState21	inc count (9)	Output (non-polled)	30004/21
21	02-Setpoint	effectsetpt_21	✓	AV:212	data float	212	nvoEcsSetpt21	inc count (9)	Output (non-polled)	30006/21
21	03-RmSetpt	rmsetpt_21		AV:213	data float	213	nviEcsSetptRq21	inc count (9)	Input (non-polling)	40027/21
21	04-Outlet Temp	localsuptemp_21	✓	AV:214	data float	214	nvoEcsSupTmp21	inc count (9)	Output (non-polled)	30002/21
21	05-FBk Sensor Temp	localrettemp_21	✓	AV:215	data float	215	nvoEcsRetTmp21	inc count (9)	Output (non-polled)	30290/21

Table C-6: Twelve C-Mores, Six ECS/SmartPlate, Four Modulex and Two ACS/BMS II										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/ Unit Address**
21	06-Over Temp Alarm	unitstat_21	✓	AV:216	data float	216	nvoEcsStat21	inc count (9)	Output (non-polled)	30075/21
21	07-Flow Rate	flowrate_21	✓	AV:217	data float	217	nvoEcsFlow21	inc count (9)	Output (non-polled)	30291/21
E Valve Addr 22										
22	01-Cntl Output Signal	boilerstate_22	✓	AV:221	data float	221	nvoEcsState22	inc count (9)	Output (non-polled)	30004/22
22	02-Setpoint	effectsetpt_22	✓	AV:222	data float	222	nvoEcsSetpt22	inc count (9)	Output (non-polled)	30006/22
22	03-RmSetpt	rmsetpt_22		AV:223	data float	223	nviEcsSetptRq22	inc count (9)	Input (non-polling)	40027/22
22	04-Outlet Temp	localsuptemp_22	✓	AV:224	data float	224	nvoEcsSupTmp22	inc count (9)	Output (non-polled)	30002/22
22	05-FBk Sensor Temp	localrettemp_22	✓	AV:225	data float	225	nvoEcsRetTmp22	inc count (9)	Output (non-polled)	30290/22
22	06-Over Temp Alarm	unitstat_22	✓	AV:226	data float	226	nvoEcsStat22	inc count (9)	Output (non-polled)	30075/22
22	07-Flow Rate	flowrate_22	✓	AV:227	data float	227	nvoEcsFlow22	inc count (9)	Output (non-polled)	30291/22
BMS Addr 128 – for C-More Controller Interface										
128	01-Fire Rate Out	boilerstate_128	✓	AV:260	data float	228	nvoBlrState128	inc count (9)	Output (non-polled)	30005/128
128	02-Header Set Temp	effectsetpt_128	✓	AV:261	data float	229	nvoEffSetpt128	inc count (9)	Output (non-polled)	30006/128
128	03-Net Header Set Temp	setpt_128		AV:262	data float	230	nviSetpt128	inc count (9)	Input (non-polling)	40005/128
128	04-Header Temp	localsuptemp_128	✓	AV:263	data float	231	nvoLocSupTmp128	inc count (9)	Output (non-polled)	30002/128
128	05-Outside Air Temp	localoatemp_128	✓	AV:264	data float	232	nvoLocOATmp128	inc count (9)	Output (non-polled)	30003/128
128	06-Display Code	dispcode_128	✓	AV:265	data float	233	nvoDispCode128	inc count (9)	Output (non-polled)	30011/128

Table C-6: Twelve C-Mores, Six ECS/SmartPlate, Four Modulex and Two ACS/BMS II										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/ Unit Address**
128	07-Num Boilers Fired	blrfired_128	✓	AV:266	data float	234	nvoBlrsFired128	inc count (9)	Output (non-polled)	30008/128
128	08-Num Boilers Online	blronline_128	✓	AV:267	data float	235	nvoBlrsOnline128	inc count (9)	Output (non-polled)	30009/128
128	09-Last Blr Fired	blrlast_128	✓	AV:268	data float	236	nvoLastBlrFired128	inc count (9)	Output (non-polled)	30017/128
128	10-Boiler 1 Status	blr1stat_128	✓	AV:269	data float	237	nvoBlr1Stat128	inc count (9)	Output (non-polled)	30018/128
128	11-Boiler 2 Status	blr2stat_128	✓	AV:270	data float	238	nvoBlr2Stat128	inc count (9)	Output (non-polled)	30019/128
128	12-Boiler 3 Status	blr3stat_128	✓	AV:271	data float	239	nvoBlr3Stat128	inc count (9)	Output (non-polled)	30020/128
128	13-Boiler 4 Status	blr4stat_128	✓	AV:272	data float	240	nvoBlr4Stat128	inc count (9)	Output (non-polled)	30021/128
128	14-Boiler 5 Status	blr5stat_128	✓	AV:273	data float	241	nvoBlr5Stat128	inc count (9)	Output (non-polled)	30022/128
128	15-Boiler 6 Status	blr6stat_128	✓	AV:274	data float	242	nvoBlr6Stat128	inc count (9)	Output (non-polled)	30023/128
128	16-Boiler 7 Status	blr7stat_128	✓	AV:275	data float	243	nvoBlr7Stat128	inc count (9)	Output (non-polled)	30024/128
128	17-Boiler 8 Status	blr8stat_128	✓	AV:276	data float	244	nvoBlr8Stat128	inc count (9)	Output (non-polled)	30025/128
128	18-Net Blr 1 Status	blr9stat_128	✓	AV:277	data float	245	nvoNetBlr1Stat128	inc count (9)	Output (non-polled)	30026/128
128	19-Net Blr 2 Status	blr10stat_128	✓	AV:278	data float	246	nvoNetBlr2Stat128	inc count (9)	Output (non-polled)	30027/128
128	20-Net Blr 3 Status	blr11stat_128	✓	AV:279	data float	247	nvoNetBlr3Stat128	inc count (9)	Output (non-polled)	30028/128
128	21-Net Blr 4 Status	blr12stat_128	✓	AV:280	data float	248	nvoNetBlr4Stat128	inc count (9)	Output (non-polled)	30029/128
128	22-Net Blr 5 Status	blr13stat_128	✓	AV:281	data float	249	nvoNetBlr5Stat128	inc count (9)	Output (non-polled)	30030/128
128	23-Net Blr 6 Status	blr14stat_128	✓	AV:282	data float	250	nvoNetBlr6Stat128	inc count (9)	Output (non-polled)	30031/128

Table C-6: Twelve C-Mores, Six ECS/SmartPlate, Four Modulex and Two ACS/BMS II										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/ Unit Address**
128	24-Net Blr 7 Status	blr15stat_128	✓	AV:283	data float	251	nvoNetBlr7Stat128	inc count (9)	Output (non-polled)	30032/128
128	25-Net Blr 8 Status	blr16stat_128	✓	AV:284	data float	252	nvoNetBlr8Stat128	inc count (9)	Output (non-polled)	30033/128
128	26-Net Blr 9 Status	blr17stat_128	✓	AV:285	data float	253	nvoNetBlr9Stat128	inc count (9)	Output (non-polled)	30034/128
128	27-Net Blr 10 Status	blr18stat_128	✓	AV:286	data float	254	nvoNetBlr10Stat128	inc count (9)	Output (non-polled)	30035/128
128	28-Net Blr 11 Status	blr19stat_128	✓	AV:287	data float	255	nvoNetBlr11Stat128	inc count (9)	Output (non-polled)	30036/128
128	29-Net Blr 12 Status	blr20stat_128	✓	AV:288	data float	256	nvoNetBlr12Stat128	inc count (9)	Output (non-polled)	30037/128
BMS Addr 228 – for Modulex BCM Interface										
228	01-Fire Rate Out	boilerstate_228	✓	AV:300	data float	161	nvoBlrState228	inc count (9)	Output (non-polled)	30005/228
228	02-Header Set Temp	effectsetpt_228	✓	AV:301	data float	162	nvoEffSetpt228	inc count (9)	Output (non-polled)	30006/228
228	03-Net Header Set Temp	setpt_228		AV:302	data float	163	nviSetpt228	inc count (9)	Input (non-polling)	40005/228
228	04-Header Temp	localsuptemp_228	✓	AV:303	data float	164	nvoLocSupTmp228	inc count (9)	Output (non-polled)	30002/228
228	05-Outside Air Temp	localoatemp_228	✓	AV:304	data float	165	nvoLocOATmp228	inc count (9)	Output (non-polled)	30003/228
228	06-Display Code	dispcode_228	✓	AV:305	data float	166	nvoDispCode228	inc count (9)	Output (non-polled)	30011/228
228	07-Num Boilers Fired	blrfired_228	✓	AV:306	data float	167	nvoBlrsFired228	inc count (9)	Output (non-polled)	30008/228
228	08-Num Boilers Online	blronline_228	✓	AV:307	data float	168	nvoBlrsOnline228	inc count (9)	Output (non-polled)	30009/228
228	09-Last Blr Fired	blrlast_228	✓	AV:308	data float	169	nvoLastBlrFired228	inc count (9)	Output (non-polled)	30017/228
228	18-Net Blr 1 Status	blr9stat_228	✓	AV:309	data float	170	nvoNetBlr1Stat228	inc count (9)	Output (non-polled)	30026/228

Table C-6: Twelve C-Mores, Six ECS/SmartPlate, Four Modulex and Two ACS/BMS II										
Equip	**Point Name**	**Name**	**Read Only**	**BACnet Type:ID**	**N2 Type**	**N2 ID**	**Lon SNVT NAME**	**Lon SNVT**	**Lon Direction**	**ModBus/ Unit Address**
228	19-Net Blr 2 Status	blr10stat_228	✓	AV:310	data float	178	nvoNetBlr2Stat228	inc count (9)	Output (non-polled)	30027/228
228	20-Net Blr 3 Status	blr11stat_228	✓	AV:311	data float	179	nvoNetBlr3Stat228	inc count (9)	Output (non-polled)	30028/228
228	21-Net Blr 4 Status	blr12stat_228	✓	AV:312	data float	180	nvoNetBlr4Stat228	inc count (9)	Output (non-polled)	30029/228

Appendix C.7: Eight C-More Boilers/Heaters and BST/WHM Master

Table C-7: Eight C-More Boilers/Heaters and BST/WHM Master

Equip	Point Name	Name	Read Only	BACnet Type:ID	N2 Type	N2 ID	Lon SNVT NAME	Lon SNVT	Lon Direction	ModBus Address
Blr Addr 1										
1	Comm Address	SMD_BAS_IP_HTR_01_[0]	✓	AV:300	Data Float	46	nvoHTR_01_1	inc count (9)	Output (non-polled)	30300
1	Unit Status	SMD_BAS_IP_HTR_01_[1]	✓	AV:301	Data Float	47	nvoHTR_01_2	inc count (9)	Output (non-polled)	30301
1	Fault Code	SMD_BAS_IP_HTR_01_[2]	✓	AV:302	Data Float	48	nvoHTR_01_3	inc count (9)	Output (non-polled)	30302
1	Outlet Temp	SMD_BAS_IP_HTR_01_[3]	✓	AV:303	Data Float	49	nvoHTR_01_4	inc count (9)	Output (non-polled)	30303
1	FFWD Temp	SMD_BAS_IP_HTR_01_[4]	✓	AV:304	Data Float	50	nvoHTR_01_5	inc count (9)	Output (non-polled)	30304
1	Inlet Temp	SMD_BAS_IP_HTR_01_[5]	✓	AV:305	Data Float	51	nvoHTR_01_6	inc count (9)	Output (non-polled)	30305
1	Exhaust Temp	SMD_BAS_IP_HTR_01_[6]	✓	AV:306	Data Float	52	nvoHTR_01_7	inc count (9)	Output (non-polled)	30306
1	Air Temp	SMD_BAS_IP_HTR_01_[7]	✓	AV:307	Data Float	53	nvoHTR_01_8	inc count (9)	Output (non-polled)	30307
1	Flame Strength	SMD_BAS_IP_HTR_01_[8]	✓	AV:308	Data Float	54	nvoHTR_01_9	inc count (9)	Output (non-polled)	30308
1	Fire Rate In	SMD_BAS_IP_HTR_01_[9]	✓	AV:309	Data Float	55	nvoHTR_01_10	inc count (9)	Output (non-polled)	30309
1	Fire Rate Out	SMD_BAS_IP_HTR_01_[10]	✓	AV:310	Data Float	56	nvoHTR_01_11	inc count (9)	Output (non-polled)	30310
1	Unit Type	SMD_BAS_IP_HTR_01_[11]	✓	AV:311	Data Float	57	nvoHTR_01_12	inc count (9)	Output (non-polled)	30311
1	Unit Size	SMD_BAS_IP_HTR_01_[12]	✓	AV:312	Data Float	58	nvoHTR_01_13	inc count (9)	Output (non-polled)	30312
1	Value State	SMD_BAS_IP_HTR_01_[13]	✓	AV:313	Data Float	59	nvoHTR_01_14	inc count (9)	Output (non-polled)	30313
1	Net Remote Setpt	SMD_BAS_IP_HTR_01_[14]	✓	AV:314	Data Float	60	nvoHTR_01_15	inc count (9)	Output (non-polled)	30314
1	Run Cycles Upper	SMD_BAS_IP_HTR_01_[15]	✓	AV:315	Data Float	61	nvoHTR_01_16	inc count (9)	Output (non-polled)	30315
1	Run Cycles Lower	SMD_BAS_IP_HTR_01_[16]	✓	AV:316	Data Float	62	nvoHTR_01_17	inc count (9)	Output (non-polled)	30316
1	Run Hours Upper	SMD_BAS_IP_HTR_01_[17]	✓	AV:317	Data Float	63	nvoHTR_01_18	inc count (9)	Output (non-polled)	30317
1	Run Hours Lower	SMD_BAS_IP_HTR_01_[18]	✓	AV:318	Data Float	64	nvoHTR_01_19	inc count (9)	Output (non-polled)	30318
1	Oxygen Level	SMD_BAS_IP_HTR_01_[19]	✓	AV:319	Data Float	65	nvoHTR_01_20	inc count (9)	Output (non-polled)	30319

Table C-7: Eight C-More Boilers/Heaters and BST/WHM Master

Equip	Point Name	Name	Read Only	BACnet Type:ID	N2 Type	N2 ID	Lon SNVT NAME	Lon SNVT	Lon Direction	ModBus Address
Blr Addr 2										
2	Comm Address	SMD_BAS_IP_HTR_02_[0]	✓	AV:400	Data Float	66	nvoHTR_02_1	inc count (9)	Output (non-polled)	30400
2	Unit Status	SMD_BAS_IP_HTR_02_[1]	✓	AV:401	Data Float	67	nvoHTR_02_2	inc count (9)	Output (non-polled)	30401
2	Fault Code	SMD_BAS_IP_HTR_02_[2]	✓	AV:402	Data Float	68	nvoHTR_02_3	inc count (9)	Output (non-polled)	30402
2	Outlet Temp	SMD_BAS_IP_HTR_02_[3]	✓	AV:403	Data Float	69	nvoHTR_02_4	inc count (9)	Output (non-polled)	30403
2	FFWD Temp	SMD_BAS_IP_HTR_02_[4]	✓	AV:404	Data Float	70	nvoHTR_02_5	inc count (9)	Output (non-polled)	30404
2	Inlet Temp	SMD_BAS_IP_HTR_02_[5]	✓	AV:405	Data Float	71	nvoHTR_02_6	inc count (9)	Output (non-polled)	30405
2	Exhaust Temp	SMD_BAS_IP_HTR_02_[6]	✓	AV:406	Data Float	72	nvoHTR_02_7	inc count (9)	Output (non-polled)	30406
2	Air Temp	SMD_BAS_IP_HTR_02_[7]	✓	AV:407	Data Float	73	nvoHTR_02_8	inc count (9)	Output (non-polled)	30407
2	Flame Strength	SMD_BAS_IP_HTR_02_[8]	✓	AV:408	Data Float	74	nvoHTR_02_9	inc count (9)	Output (non-polled)	30408
2	Fire Rate In	SMD_BAS_IP_HTR_02_[9]	✓	AV:409	Data Float	75	nvoHTR_02_10	inc count (9)	Output (non-polled)	30409
2	Fire Rate Out	SMD_BAS_IP_HTR_02_[10]	✓	AV:410	Data Float	76	nvoHTR_02_11	inc count (9)	Output (non-polled)	30410
2	Unit Type	SMD_BAS_IP_HTR_02_[11]	✓	AV:411	Data Float	77	nvoHTR_02_12	inc count (9)	Output (non-polled)	30411
2	Unit Size	SMD_BAS_IP_HTR_02_[12]	✓	AV:412	Data Float	78	nvoHTR_02_13	inc count (9)	Output (non-polled)	30412
2	Value State	SMD_BAS_IP_HTR_02_[13]	✓	AV:413	Data Float	79	nvoHTR_02_14	inc count (9)	Output (non-polled)	30413
2	Net Remote Setpt	SMD_BAS_IP_HTR_02_[14]	✓	AV:414	Data Float	80	nvoHTR_02_15	inc count (9)	Output (non-polled)	30414
2	Run Cycles Upper	SMD_BAS_IP_HTR_02_[15]	✓	AV:415	Data Float	81	nvoHTR_02_16	inc count (9)	Output (non-polled)	30415
2	Run Cycles Lower	SMD_BAS_IP_HTR_02_[16]	✓	AV:416	Data Float	82	nvoHTR_02_17	inc count (9)	Output (non-polled)	30416
2	Run Hours Upper	SMD_BAS_IP_HTR_02_[17]	✓	AV:417	Data Float	83	nvoHTR_02_18	inc count (9)	Output (non-polled)	30417
2	Run Hours Lower	SMD_BAS_IP_HTR_02_[18]	✓	AV:418	Data Float	84	nvoHTR_02_19	inc count (9)	Output (non-polled)	30418
2	Oxygen Level	SMD_BAS_IP_HTR_02_[19]	✓	AV:419	Data Float	85	nvoHTR_02_20	inc count (9)	Output (non-polled)	30419
Blr Addr 3										
3	Comm Address	SMD_BAS_IP_HTR_03_[0]	✓	AV:500	Data Float	86	nvoHTR_03_1	inc count (9)	Output (non-polled)	30500
3	Unit Status	SMD_BAS_IP_HTR_03_[1]	✓	AV:501	Data Float	87	nvoHTR_03_2	inc count (9)	Output (non-polled)	30501
3	Fault Code	SMD_BAS_IP_HTR_03_[2]	✓	AV:502	Data Float	88	nvoHTR_03_3	inc count (9)	Output (non-polled)	30502

Table C-7: Eight C-More Boilers/Heaters and BST/WHM Master

Equip	Point Name	Name	Read Only	BACnet Type:ID	N2 Type	N2 ID	Lon SNVT NAME	Lon SNVT	Lon Direction	ModBus Address
3	Outlet Temp	SMD_BAS_IP_HTR_03_[3]	✓	AV:503	Data Float	89	nvoHTR_03_4	inc count (9)	Output (non-polled)	30503
3	FFWD Temp	SMD_BAS_IP_HTR_03_[4]	✓	AV:504	Data Float	90	nvoHTR_03_5	inc count (9)	Output (non-polled)	30504
3	Inlet Temp	SMD_BAS_IP_HTR_03_[5]	✓	AV:505	Data Float	91	nvoHTR_03_6	inc count (9)	Output (non-polled)	30505
3	Exhaust Temp	SMD_BAS_IP_HTR_03_[6]	✓	AV:506	Data Float	92	nvoHTR_03_7	inc count (9)	Output (non-polled)	30506
3	Air Temp	SMD_BAS_IP_HTR_03_[7]	✓	AV:507	Data Float	93	nvoHTR_03_8	inc count (9)	Output (non-polled)	30507
3	Flame Strength	SMD_BAS_IP_HTR_03_[8]	✓	AV:508	Data Float	94	nvoHTR_03_9	inc count (9)	Output (non-polled)	30508
3	Fire Rate In	SMD_BAS_IP_HTR_03_[9]	✓	AV:509	Data Float	95	nvoHTR_03_10	inc count (9)	Output (non-polled)	30509
3	Fire Rate Out	SMD_BAS_IP_HTR_03_[10]	✓	AV:510	Data Float	96	nvoHTR_03_11	inc count (9)	Output (non-polled)	30510
3	Unit Type	SMD_BAS_IP_HTR_03_[11]	✓	AV:511	Data Float	97	nvoHTR_03_12	inc count (9)	Output (non-polled)	30511
3	Unit Size	SMD_BAS_IP_HTR_03_[12]	✓	AV:512	Data Float	98	nvoHTR_03_13	inc count (9)	Output (non-polled)	30512
3	Value State	SMD_BAS_IP_HTR_03_[13]	✓	AV:513	Data Float	99	nvoHTR_03_14	inc count (9)	Output (non-polled)	30513
3	Net Remote Setpt	SMD_BAS_IP_HTR_03_[14]	✓	AV:514	Data Float	100	nvoHTR_03_15	inc count (9)	Output (non-polled)	30514
3	Run Cycles Upper	SMD_BAS_IP_HTR_03_[15]	✓	AV:515	Data Float	101	nvoHTR_03_16	inc count (9)	Output (non-polled)	30515
3	Run Cycles Lower	SMD_BAS_IP_HTR_03_[16]	✓	AV:516	Data Float	102	nvoHTR_03_17	inc count (9)	Output (non-polled)	30516
3	Run Hours Upper	SMD_BAS_IP_HTR_03_[17]	✓	AV:517	Data Float	103	nvoHTR_03_18	inc count (9)	Output (non-polled)	30517
3	Run Hours Lower	SMD_BAS_IP_HTR_03_[18]	✓	AV:518	Data Float	104	nvoHTR_03_19	inc count (9)	Output (non-polled)	30518
3	Oxygen Level	SMD_BAS_IP_HTR_03_[19]	✓	AV:519	Data Float	105	nvoHTR_03_20	inc count (9)	Output (non-polled)	30519
Blr Addr 4										
4	Comm Address	SMD_BAS_IP_HTR_04_[0]	✓	AV:600	Data Float	106	nvoHTR_04_1	inc count (9)	Output (non-polled)	30600
4	Unit Status	SMD_BAS_IP_HTR_04_[1]	✓	AV:601	Data Float	107	nvoHTR_04_2	inc count (9)	Output (non-polled)	30601
4	Fault Code	SMD_BAS_IP_HTR_04_[2]	✓	AV:602	Data Float	108	nvoHTR_04_3	inc count (9)	Output (non-polled)	30602
4	Outlet Temp	SMD_BAS_IP_HTR_04_[3]	✓	AV:603	Data Float	109	nvoHTR_04_4	inc count (9)	Output (non-polled)	30603
4	FFWD Temp	SMD_BAS_IP_HTR_04_[4]	✓	AV:604	Data Float	110	nvoHTR_04_5	inc count (9)	Output (non-polled)	30604
4	Inlet Temp	SMD_BAS_IP_HTR_04_[5]	✓	AV:605	Data Float	111	nvoHTR_04_6	inc count (9)	Output (non-polled)	30605
4	Exhaust Temp	SMD_BAS_IP_HTR_04_[6]	✓	AV:606	Data Float	112	nvoHTR_04_7	inc count (9)	Output (non-polled)	30606

Table C-7: Eight C-More Boilers/Heaters and BST/WHM Master

Equip	Point Name	Name	Read Only	BACnet Type:ID	N2 Type	N2 ID	Lon SNVT NAME	Lon SNVT	Lon Direction	ModBus Address
4	Air Temp	SMD_BAS_IP_HTR_04_[7]	✓	AV:607	Data Float	113	nvoHTR_04_8	inc count (9)	Output (non-polled)	30607
4	Flame Strength	SMD_BAS_IP_HTR_04_[8]	✓	AV:608	Data Float	114	nvoHTR_04_9	inc count (9)	Output (non-polled)	30608
4	Fire Rate In	SMD_BAS_IP_HTR_04_[9]	✓	AV:609	Data Float	115	nvoHTR_04_10	inc count (9)	Output (non-polled)	30609
4	Fire Rate Out	SMD_BAS_IP_HTR_04_[10]	✓	AV:610	Data Float	116	nvoHTR_04_11	inc count (9)	Output (non-polled)	30610
4	Unit Type	SMD_BAS_IP_HTR_04_[11]	✓	AV:611	Data Float	117	nvoHTR_04_12	inc count (9)	Output (non-polled)	30611
4	Unit Size	SMD_BAS_IP_HTR_04_[12]	✓	AV:612	Data Float	118	nvoHTR_04_13	inc count (9)	Output (non-polled)	30612
4	Value State	SMD_BAS_IP_HTR_04_[13]	✓	AV:613	Data Float	119	nvoHTR_04_14	inc count (9)	Output (non-polled)	30613
4	Net Remote Setpt	SMD_BAS_IP_HTR_04_[14]	✓	AV:614	Data Float	120	nvoHTR_04_15	inc count (9)	Output (non-polled)	30614
4	Run Cycles Upper	SMD_BAS_IP_HTR_04_[15]	✓	AV:615	Data Float	121	nvoHTR_04_16	inc count (9)	Output (non-polled)	30615
4	Run Cycles Lower	SMD_BAS_IP_HTR_04_[16]	✓	AV:616	Data Float	122	nvoHTR_04_17	inc count (9)	Output (non-polled)	30616
4	Run Hours Upper	SMD_BAS_IP_HTR_04_[17]	✓	AV:617	Data Float	123	nvoHTR_04_18	inc count (9)	Output (non-polled)	30617
4	Run Hours Lower	SMD_BAS_IP_HTR_04_[18]	✓	AV:618	Data Float	124	nvoHTR_04_19	inc count (9)	Output (non-polled)	30618
4	Oxygen Level	SMD_BAS_IP_HTR_04_[19]	✓	AV:619	Data Float	125	nvoHTR_04_20	inc count (9)	Output (non-polled)	30619
Blr Addr 5										
5	Comm Address	SMD_BAS_IP_HTR_05_[0]	✓	AV:700	Data Float	126	nvoHTR_05_1	inc count (9)	Output (non-polled)	30700
5	Unit Status	SMD_BAS_IP_HTR_05_[1]	✓	AV:701	Data Float	127	nvoHTR_05_2	inc count (9)	Output (non-polled)	30701
5	Fault Code	SMD_BAS_IP_HTR_05_[2]	✓	AV:702	Data Float	128	nvoHTR_05_3	inc count (9)	Output (non-polled)	30702
5	Outlet Temp	SMD_BAS_IP_HTR_05_[3]	✓	AV:703	Data Float	129	nvoHTR_05_4	inc count (9)	Output (non-polled)	30703
5	FFWD Temp	SMD_BAS_IP_HTR_05_[4]	✓	AV:704	Data Float	130	nvoHTR_05_5	inc count (9)	Output (non-polled)	30704
5	Inlet Temp	SMD_BAS_IP_HTR_05_[5]	✓	AV:705	Data Float	131	nvoHTR_05_6	inc count (9)	Output (non-polled)	30705
5	Exhaust Temp	SMD_BAS_IP_HTR_05_[6]	✓	AV:706	Data Float	132	nvoHTR_05_7	inc count (9)	Output (non-polled)	30706
5	Air Temp	SMD_BAS_IP_HTR_05_[7]	✓	AV:707	Data Float	133	nvoHTR_05_8	inc count (9)	Output (non-polled)	30707
5	Flame Strength	SMD_BAS_IP_HTR_05_[8]	✓	AV:708	Data Float	134	nvoHTR_05_9	inc count (9)	Output (non-polled)	30708
5	Fire Rate In	SMD_BAS_IP_HTR_05_[9]	✓	AV:709	Data Float	135	nvoHTR_05_10	inc count (9)	Output (non-polled)	30709
5	Fire Rate Out	SMD_BAS_IP_HTR_05_[10]	✓	AV:710	Data Float	136	nvoHTR_05_11	inc count (9)	Output (non-polled)	30710

Table C-7: Eight C-More Boilers/Heaters and BST/WHM Master

Equip	Point Name	Name	Read Only	BACnet Type:ID	N2 Type	N2 ID	Lon SNVT NAME	Lon SNVT	Lon Direction	ModBus Address
5	Unit Type	SMD_BAS_IP_HTR_05_[11]	✓	AV:711	Data Float	137	nvoHTR_05_12	inc count (9)	Output (non-polled)	30711
5	Unit Size	SMD_BAS_IP_HTR_05_[12]	✓	AV:712	Data Float	138	nvoHTR_05_13	inc count (9)	Output (non-polled)	30712
5	Value State	SMD_BAS_IP_HTR_05_[13]	✓	AV:713	Data Float	139	nvoHTR_05_14	inc count (9)	Output (non-polled)	30713
5	Net Remote Setpt	SMD_BAS_IP_HTR_05_[14]	✓	AV:714	Data Float	140	nvoHTR_05_15	inc count (9)	Output (non-polled)	30714
5	Run Cycles Upper	SMD_BAS_IP_HTR_05_[15]	✓	AV:715	Data Float	141	nvoHTR_05_16	inc count (9)	Output (non-polled)	30715
5	Run Cycles Lower	SMD_BAS_IP_HTR_05_[16]	✓	AV:716	Data Float	142	nvoHTR_05_17	inc count (9)	Output (non-polled)	30716
5	Run Hours Upper	SMD_BAS_IP_HTR_05_[17]	✓	AV:717	Data Float	143	nvoHTR_05_18	inc count (9)	Output (non-polled)	30717
5	Run Hours Lower	SMD_BAS_IP_HTR_05_[18]	✓	AV:718	Data Float	144	nvoHTR_05_19	inc count (9)	Output (non-polled)	30718
5	Oxygen Level	SMD_BAS_IP_HTR_05_[19]	✓	AV:719	Data Float	145	nvoHTR_05_20	inc count (9)	Output (non-polled)	30719
Blr Addr 6										
6	Comm Address	SMD_BAS_IP_HTR_06_[0]	✓	AV:800	Data Float	146	nvoHTR_06_1	inc count (9)	Output (non-polled)	30800
6	Unit Status	SMD_BAS_IP_HTR_06_[1]	✓	AV:801	Data Float	147	nvoHTR_06_2	inc count (9)	Output (non-polled)	30801
6	Fault Code	SMD_BAS_IP_HTR_06_[2]	✓	AV:802	Data Float	148	nvoHTR_06_3	inc count (9)	Output (non-polled)	30802
6	Outlet Temp	SMD_BAS_IP_HTR_06_[3]	✓	AV:803	Data Float	149	nvoHTR_06_4	inc count (9)	Output (non-polled)	30803
6	FFWD Temp	SMD_BAS_IP_HTR_06_[4]	✓	AV:804	Data Float	150	nvoHTR_06_5	inc count (9)	Output (non-polled)	30804
6	Inlet Temp	SMD_BAS_IP_HTR_06_[5]	✓	AV:805	Data Float	151	nvoHTR_06_6	inc count (9)	Output (non-polled)	30805
6	Exhaust Temp	SMD_BAS_IP_HTR_06_[6]	✓	AV:806	Data Float	152	nvoHTR_06_7	inc count (9)	Output (non-polled)	30806
6	Air Temp	SMD_BAS_IP_HTR_06_[7]	✓	AV:807	Data Float	153	nvoHTR_06_8	inc count (9)	Output (non-polled)	30807
6	Flame Strength	SMD_BAS_IP_HTR_06_[8]	✓	AV:808	Data Float	154	nvoHTR_06_9	inc count (9)	Output (non-polled)	30808
6	Fire Rate In	SMD_BAS_IP_HTR_06_[9]	✓	AV:809	Data Float	155	nvoHTR_06_10	inc count (9)	Output (non-polled)	30809
6	Fire Rate Out	SMD_BAS_IP_HTR_06_[10]	✓	AV:810	Data Float	156	nvoHTR_06_11	inc count (9)	Output (non-polled)	30810
6	Unit Type	SMD_BAS_IP_HTR_06_[11]	✓	AV:811	Data Float	157	nvoHTR_06_12	inc count (9)	Output (non-polled)	30811
6	Unit Size	SMD_BAS_IP_HTR_06_[12]	✓	AV:812	Data Float	158	nvoHTR_06_13	inc count (9)	Output (non-polled)	30812
6	Value State	SMD_BAS_IP_HTR_06_[13]	✓	AV:813	Data Float	159	nvoHTR_06_14	inc count (9)	Output (non-polled)	30813
6	Net Remote Setpt	SMD_BAS_IP_HTR_06_[14]	✓	AV:814	Data Float	160	nvoHTR_06_15	inc count (9)	Output (non-polled)	30814

Table C-7: Eight C-More Boilers/Heaters and BST/WHM Master

Equip	Point Name	Name	Read Only	BACnet Type:ID	N2 Type	N2 ID	Lon SNVT NAME	Lon SNVT	Lon Direction	ModBus Address
6	Run Cycles Upper	SMD_BAS_IP_HTR_06_[15]	✓	AV:815	Data Float	161	nvoHTR_06_16	inc count (9)	Output (non-polled)	30815
6	Run Cycles Lower	SMD_BAS_IP_HTR_06_[16]	✓	AV:816	Data Float	162	nvoHTR_06_17	inc count (9)	Output (non-polled)	30816
6	Run Hours Upper	SMD_BAS_IP_HTR_06_[17]	✓	AV:817	Data Float	163	nvoHTR_06_18	inc count (9)	Output (non-polled)	30817
6	Run Hours Lower	SMD_BAS_IP_HTR_06_[18]	✓	AV:818	Data Float	164	nvoHTR_06_19	inc count (9)	Output (non-polled)	30818
6	Oxygen Level	SMD_BAS_IP_HTR_06_[19]	✓	AV:819	Data Float	165	nvoHTR_06_20	inc count (9)	Output (non-polled)	30819
Blr Addr 7										
7	Comm Address	SMD_BAS_IP_HTR_07_[0]	✓	AV:900	Data Float	166	nvoHTR_07_1	inc count (9)	Output (non-polled)	30900
7	Unit Status	SMD_BAS_IP_HTR_07_[1]	✓	AV:901	Data Float	167	nvoHTR_07_2	inc count (9)	Output (non-polled)	30901
7	Fault Code	SMD_BAS_IP_HTR_07_[2]	✓	AV:902	Data Float	168	nvoHTR_07_3	inc count (9)	Output (non-polled)	30902
7	Outlet Temp	SMD_BAS_IP_HTR_07_[3]	✓	AV:903	Data Float	169	nvoHTR_07_4	inc count (9)	Output (non-polled)	30903
7	FFWD Temp	SMD_BAS_IP_HTR_07_[4]	✓	AV:904	Data Float	170	nvoHTR_07_5	inc count (9)	Output (non-polled)	30904
7	Inlet Temp	SMD_BAS_IP_HTR_07_[5]	✓	AV:905	Data Float	171	nvoHTR_07_6	inc count (9)	Output (non-polled)	30905
7	Exhaust Temp	SMD_BAS_IP_HTR_07_[6]	✓	AV:906	Data Float	172	nvoHTR_07_7	inc count (9)	Output (non-polled)	30906
7	Air Temp	SMD_BAS_IP_HTR_07_[7]	✓	AV:907	Data Float	173	nvoHTR_07_8	inc count (9)	Output (non-polled)	30907
7	Flame Strength	SMD_BAS_IP_HTR_07_[8]	✓	AV:908	Data Float	174	nvoHTR_07_9	inc count (9)	Output (non-polled)	30908
7	Fire Rate In	SMD_BAS_IP_HTR_07_[9]	✓	AV:909	Data Float	175	nvoHTR_07_10	inc count (9)	Output (non-polled)	30909
7	Fire Rate Out	SMD_BAS_IP_HTR_07_[10]	✓	AV:910	Data Float	176	nvoHTR_07_11	inc count (9)	Output (non-polled)	30910
7	Unit Type	SMD_BAS_IP_HTR_07_[11]	✓	AV:911	Data Float	177	nvoHTR_07_12	inc count (9)	Output (non-polled)	30911
7	Unit Size	SMD_BAS_IP_HTR_07_[12]	✓	AV:912	Data Float	178	nvoHTR_07_13	inc count (9)	Output (non-polled)	30912
7	Value State	SMD_BAS_IP_HTR_07_[13]	✓	AV:913	Data Float	179	nvoHTR_07_14	inc count (9)	Output (non-polled)	30913
7	Net Remote Setpt	SMD_BAS_IP_HTR_07_[14]	✓	AV:914	Data Float	180	nvoHTR_07_15	inc count (9)	Output (non-polled)	30914
7	Run Cycles Upper	SMD_BAS_IP_HTR_07_[15]	✓	AV:915	Data Float	181	nvoHTR_07_16	inc count (9)	Output (non-polled)	30915
7	Run Cycles Lower	SMD_BAS_IP_HTR_07_[16]	✓	AV:916	Data Float	182	nvoHTR_07_17	inc count (9)	Output (non-polled)	30916
7	Run Hours Upper	SMD_BAS_IP_HTR_07_[17]	✓	AV:917	Data Float	183	nvoHTR_07_18	inc count (9)	Output (non-polled)	30917
7	Run Hours Lower	SMD_BAS_IP_HTR_07_[18]	✓	AV:918	Data Float	184	nvoHTR_07_19	inc count (9)	Output (non-polled)	30918

Table C-7: Eight C-More Boilers/Heaters and BST/WHM Master

Equip	Point Name	Name	Read Only	BACnet Type:ID	N2 Type	N2 ID	Lon SNVT NAME	Lon SNVT	Lon Direction	ModBus Address
7	Oxygen Level	SMD_BAS_IP_HTR_07_[19]	✓	AV:919	Data Float	185	nvoHTR_07_20	inc count (9)	Output (non-polled)	30919
Blr Addr 8										
8	Comm Address	SMD_BAS_IP_HTR_08_[0]	✓	AV:1000	Data Float	186	nvoHTR_08_1	inc count (9)	Output (non-polled)	31000
8	Unit Status	SMD_BAS_IP_HTR_08_[1]	✓	AV:1001	Data Float	187	nvoHTR_08_2	inc count (9)	Output (non-polled)	31001
8	Fault Code	SMD_BAS_IP_HTR_08_[2]	✓	AV:1002	Data Float	188	nvoHTR_08_3	inc count (9)	Output (non-polled)	31002
8	Outlet Temp	SMD_BAS_IP_HTR_08_[3]	✓	AV:1003	Data Float	189	nvoHTR_08_4	inc count (9)	Output (non-polled)	31003
8	FFWD Temp	SMD_BAS_IP_HTR_08_[4]	✓	AV:1004	Data Float	190	nvoHTR_08_5	inc count (9)	Output (non-polled)	31004
8	Inlet Temp	SMD_BAS_IP_HTR_08_[5]	✓	AV:1005	Data Float	191	nvoHTR_08_6	inc count (9)	Output (non-polled)	31005
8	Exhaust Temp	SMD_BAS_IP_HTR_08_[6]	✓	AV:1006	Data Float	192	nvoHTR_08_7	inc count (9)	Output (non-polled)	31006
8	Air Temp	SMD_BAS_IP_HTR_08_[7]	✓	AV:1007	Data Float	193	nvoHTR_08_8	inc count (9)	Output (non-polled)	31007
8	Flame Strength	SMD_BAS_IP_HTR_08_[8]	✓	AV:1008	Data Float	194	nvoHTR_08_9	inc count (9)	Output (non-polled)	31008
8	Fire Rate In	SMD_BAS_IP_HTR_08_[9]	✓	AV:1009	Data Float	195	nvoHTR_08_10	inc count (9)	Output (non-polled)	31009
8	Fire Rate Out	SMD_BAS_IP_HTR_08_[10]	✓	AV:1010	Data Float	196	nvoHTR_08_11	inc count (9)	Output (non-polled)	31010
8	Unit Type	SMD_BAS_IP_HTR_08_[11]	✓	AV:1011	Data Float	197	nvoHTR_08_12	inc count (9)	Output (non-polled)	31011
8	Unit Size	SMD_BAS_IP_HTR_08_[12]	✓	AV:1012	Data Float	198	nvoHTR_08_13	inc count (9)	Output (non-polled)	31012
8	Value State	SMD_BAS_IP_HTR_08_[13]	✓	AV:1013	Data Float	199	nvoHTR_08_14	inc count (9)	Output (non-polled)	31013
8	Net Remote Setpt	SMD_BAS_IP_HTR_08_[14]	✓	AV:1014	Data Float	200	nvoHTR_08_15	inc count (9)	Output (non-polled)	31014
8	Run Cycles Upper	SMD_BAS_IP_HTR_08_[15]	✓	AV:1015	Data Float	201	nvoHTR_08_16	inc count (9)	Output (non-polled)	31015
8	Run Cycles Lower	SMD_BAS_IP_HTR_08_[16]	✓	AV:1016	Data Float	202	nvoHTR_08_17	inc count (9)	Output (non-polled)	31016
8	Run Hours Upper	SMD_BAS_IP_HTR_08_[17]	✓	AV:1017	Data Float	203	nvoHTR_08_18	inc count (9)	Output (non-polled)	31017
8	Run Hours Lower	SMD_BAS_IP_HTR_08_[18]	✓	AV:1018	Data Float	204	nvoHTR_08_19	inc count (9)	Output (non-polled)	31018
8	Oxygen Level	SMD_BAS_IP_HTR_08_[19]	✓	AV:1019	Data Float	205	nvoHTR_08_20	inc count (9)	Output (non-polled)	31019

Table C-7: Eight C-More Boilers/Heaters and BST/WHM Master

Equip	Point Name	Name	Read Only	BACnet Type:ID	N2 Type	N2 ID	Lon SNVT NAME	Lon SNVT	Lon Direction	ModBus Address
Master Addr 247										
Master Control Values										
247	Write Cntrl Val to BST/WHM	SMD_BAS_IP_Ctrl_[1]	write "1" to send Value to WHM	AV:51	Data Float	2	nvoCtrl_2	inc count (9)	Input/Output	40051
247	BST/WHM Timeout	SMD_BAS_IP_Ctrl_[3]	**Read Only**, 0=WHM Present, 1=WHM Absent	AV:53	Data Float	4	nvoCtrl_4	inc count (9)	Input/Output	40053
Read Master Operating Values										
247	Mode	SMD_BAS_IP_OpVal_[0]	✓	AV:100	Data Float	6	nvoOpVal_1	inc count (9)	Output (non-polled)	30100
247	Setpoint	SMD_BAS_IP_OpVal_[1]	✓	AV:101	Data Float	7	nvoOpVal_2	inc count (9)	Output (non-polled)	30101
247	Setback Setpt	SMD_BAS_IP_OpVal_[2]	✓	AV:102	Data Float	8	nvoOpVal_3	inc count (9)	Output (non-polled)	30102
247	Setback Start	SMD_BAS_IP_OpVal_[3]	✓	AV:103	Data Float	9	nvoOpVal_4	inc count (9)	Output (non-polled)	30103
247	Setback End	SMD_BAS_IP_OpVal_[4]	✓	AV:104	Data Float	10	nvoOpVal_5	inc count (9)	Output (non-polled)	30104
247	Auto Master	SMD_BAS_IP_OpVal_[5]	✓	AV:105	Data Float	11	nvoOpVal_6	inc count (9)	Output (non-polled)	30105
247	Avg Outlet Temp	SMD_BAS_IP_OpVal_[6]	✓	AV:106	Data Float	12	nvoOpVal_7	inc count (9)	Output (non-polled)	30106
247	Units Active	SMD_BAS_IP_OpVal_[7]	✓	AV:107	Data Float	13	nvoOpVal_8	inc count (9)	Output (non-polled)	30107
247	Units Faulted	SMD_BAS_IP_OpVal_[8]	✓	AV:108	Data Float	14	nvoOpVal_9	inc count (9)	Output (non-polled)	30108
247	Master Addr	SMD_BAS_IP_OpVal_[9]	✓	AV:109	Data Float	15	nvoOpVal_10	inc count (9)	Output (non-polled)	30109
247	Header Temp	SMD_BAS_IP_OpVal_[10]	✓	AV:110	Data Float	16	nvoOpVal_11	inc count (9)	Output (non-polled)	30110
247	Outdoor Temp	SMD_BAS_IP_OpVal_[11]	✓	AV:111	Data Float	17	nvoOpVal_12	inc count (9)	Output (non-polled)	30111
247	Percent Output	SMD_BAS_IP_OpVal_[12]	✓	AV:112	Data Float	18	nvoOpVal_13	inc count (9)	Output (non-polled)	30112
247	Number of Units Firing	SMD_BAS_IP_OpVal_[13]	✓	AV:113	Data Float	19	nvoOpVal_14	inc count (9)	Output (non-polled)	30113
247	Master Active Setpoint	SMD_BAS_IP_OpVal_[14]	✓	AV:114	Data Float	20	nvoOpVal_15	inc count (9)	Output (non-polled)	30114

Table C-7: Eight C-More Boilers/Heaters and BST/WHM Master

Equip	Point Name	Name	Read Only	BACnet Type:ID	N2 Type	N2 ID	Lon SNVT NAME	Lon SNVT	Lon Direction	ModBus Address
247	Next Turn-On Percent	SMD_BAS_IP_OpVal_[15]	✓	AV:115	Data Float	21	nvoOpVal_16	inc count (9)	Output (non-polled)	30115
247	Header High Limit	SMD_BAS_IP_OpVal_[16]	✓	AV:116	Data Float	22	nvoOpVal_17	inc count (9)	Output (non-polled)	30116
247	Header Low Limit	SMD_BAS_IP_OpVal_[17]	✓	AV:117	Data Float	23	nvoOpVal_18	inc count (9)	Output (non-polled)	30117
247	Header Temp High Limit	SMD_BAS_IP_OpVal_[18]	✓	AV:118	Data Float	24	nvoOpVal_19	inc count (9)	Output (non-polled)	30118
247	Header Setpoint Mode	SMD_BAS_IP_OpVal_[19]	✓	AV:119	Data Float	25	nvoOpVal_20	inc count (9)	Output (non-polled)	30119
Write Master Operating Values										
247	Setpt	SMD_BAS_IP_CtrlVal_[0]		AV:200	Data Float	26	nvoCtrlVal_1	inc count (9)	Input (non-polling)	40200
247	Setback Setpt	SMD_BAS_IP_CtrlVal_[1]		AV:201	Data Float	27	nvoCtrlVal_2	inc count (9)	Input (non-polling)	40201
247	Setback Start	SMD_BAS_IP_CtrlVal_[2]		AV:202	Data Float	28	nvoCtrlVal_3	inc count (9)	Input (non-polling)	40202
247	Setback End	SMD_BAS_IP_CtrlVal_[3]		AV:203	Data Float	29	nvoCtrlVal_4	inc count (9)	Input (non-polling)	40203

Appendix D: C-MORE STATUS AND FAULT MESSAGES

Appendix D: C-More Status and Fault Messages			
Code	Message		Description
1	**DISABLED HH:MM pm MM/DD/YY**		Displayed if ON/OFF switch is set to OFF. The display also shows the time and date that the unit was disabled.
2	**STANDBY**		Displayed when ON/OFF switch is in the ON position, but there is no demand for heat. The time and date are also displayed.
3	**DEMAND DELAY XX sec**		Displayed if Demand Delay is active.
4	**PURGING XX sec**		Displayed during the purge cycle during startup. The duration of the purge cycle counts up in seconds.
5	**IGNITION TRIAL XX sec**		Displayed during ignition trial of startup sequence. The duration of cycle counts up in seconds.
6	**FLAME PROVEN**		Displayed after flame has been detected for a period of 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.
7	**WARMUP XX sec**		Displayed for 2 minutes during the initial warm-up only.
8	**HIGH WATER TEMP SWITCH OPEN**		The High Water Temperature Limit Switch is open.
9	**LOW WATER LEVEL**		The Water Level Control board is indicating low water level.
10	**LOW GAS PRESSURE**	**GAS PRESSURE FAULT**	The Low Gas Pressure Limit Switch is open.
11	**HIGH GAS PRESSURE**	**GAS PRESSURE FAULT**	The High Gas Pressure Limit Switch is open.
12	**INTERLOCK OPEN**		The Remote Interlock is open.
13	**DELAYED INTERLOCK OPEN**		The Delayed Interlock is open.
14	**AIRFLOW FAULT DURING PURGE**		The Blower Proof Switch opened during purge.
15	**SSOV FAULT DURING PURGE**		The SSOV switch opened during purge.
16	**PRG SWTCH OPEN DURING PURGE**		The Purge Position Limit switch on the Air/Fuel valve opened during purge.

Appendix D: C-More Status and Fault Messages		
Code	Message	Description
17	**IGN SWTCH OPEN DURING IGNITION**	The Ignition Position Limit switch on the Air/Fuel valve opened during ignition.
18	**AIRFLOW FAULT DURING IGN**	The Blower Proof Switch opened during ignition.
19	**AIRFLOW FAULT DURING RUN**	The Blower Proof Switch opened during run.
20	**SSOV FAULT DURING IGN**	The SSOV switch closed or failed to open during ignition.
21	**SSOV FAULT DURING RUN**	The SSOV switch closed for more than 15 seconds during run.
22	**FLAME LOSS DURING IGN**	The Flame signal was not seen during ignition or lost within 5 seconds after ignition.
23	**FLAME LOSS DURING RUN**	The Flame signal was lost during run.
24	**HIGH EXHAUST TEMPERATURE**	The High Exhaust Temperature Limit Switch is closed.
25	**LOSS OF POWER**	A power loss occurred. The time and date when power was restored is displayed.
26	**LOSS OF SENSOR**	Not Currently Used
27	**LOSS OF SIGNAL**	Not Currently Used
28	**HIGH O2 LEVEL**	Not Currently Used
29	**LOW O2 LEVEL**	Not Currently Used
30	**HIGH CO LEVEL**	Not Currently Used
31	**SSOV RELAY FAILURE**	A failure has been detected in one of the relays that control the SSOV.
32	**RESIDUAL FLAME**	The Flame signal was seen for more than 60 seconds during standby.
33	**HEAT DEMAND FAILURE**	The Heat Demand Relays on the Ignition board failed to activate when commanded.
34	**IGN SWTCH CLOSED DURING PURGE**	The Ignition Position Limit switch on the Air/Fuel valve closed during purge.
35	**PRG SWTCH CLOSED DURING IGNITION**	The Purge Position Limit switch on the Air/Fuel valve closed during ignition.
36	**SSOV SWITCH OPEN**	The SSOV switch opened during standby.
37	**IGNITION BOARD COMM FAULT**	Communication fault between the Ignition board and the CPU board.
38	**WAIT**	Prompts the operator to wait.

Appendix D: C-More Status and Fault Messages		
Code	Message	Description
39	**DIRECT DRIVE SIGNAL FAULT**	The direct drive signal is not present or is out of range.
40	**REMOTE SETPT SIGNAL FAULT**	The remote setpoint signal is not present or is out of range.
41	**OUTDOOR TEMP SENSOR FAULT**	The temperature measured by the Outdoor Air Sensor is out of range.
42	**OUTLET TEMP SENSOR FAULT**	The temperature measured by the Outlet Sensor is out of range.
43	**FFWD TEMP SENSOR FAULT**	The temperature measured by the FFWD Sensor is out of range.
44	**HIGH WATER TEMPERATURE**	The temperature measured by the Outlet Sensor exceeded the Temp Hi Limit setting.
45	**LINE VOLTAGE OUT OF PHASE**	The High AC voltage is out of phase from the low AC voltage.
46	**STEPPER MOTOR FAILURE**	The stepper motor failed to move the valve to the desired position.
47	**SETPT LIMITING ACTIVE**	Setpoint temperature has exceeded the maximum allowable setting.
48	**MODBUS COMM FAULT**	The RS485 (Modbus) network information is not present or is corrupted.
49	**WAIT IGNITION RETRY**	Retrial for ignition.
50	**WAIT FAULT PURGE**	Fault while purging.
51	**WAIT RETRY PAUSE**	Pause before retrial for ignition.
52	**EXHAUST TEMP SENSOR SHORT**	Exhaust temperature sensor is shorted.
53	**EXHAUST TEMP SENSOR OPEN**	Exhaust temperature sensor is open or missing.
54	**WARNING EXHAUST TEMP HIGH**	Exhaust temperature is getting high.
55	**EXHAUST TEMP HIGH**	Exhaust temperature is too high.
56	**INLET WATER TEMP SENSOR SHORT**	Inlet water temperature sensor is shorted.
57	**INLET WATER TEMP SENSOR OPEN**	Inlet water temperature sensor is open or missing.

Appendix D: C-More Status and Fault Messages		
Code	Message	Description
58	**WARNING IN WTR TEMP HIGH**	Inlet water temperature is getting too high.
59	**WARNING IN WTR TEMP HIGH**	Inlet water temperature is getting too low.
60	**INLET GAS PRESS SENSOR OPEN**	Inlet gas pressure switch is open.
61	**GAS PLATE DP SENSOR OPEN**	Gas plate differential pressure switch is open.
62	**O2 PERCENTAGE LOW**	Oxygen level is too low.
63	**O2 SENSOR MALFUNCTION**	Oxygen sensor reading is out of range.
64	**WARNING O2 LEVEL HIGH**	Oxygen level is too high.
65	**RECIRC PUMP FAILURE**	Heater recirculation pump has malfunctioned.
66	**IGNITION MONITOR X SEC**	Waiting for proof of ignition.
67	**NO FLOW SAFETY LOCKOUT**	Flow input not registering when boiler is starting up.
68	**IGNITION SPARK FAULT**	No ignition current measured when igniter is energized.
69	**PRE IGNITION X SEC**	Waiting for SSOV to prove open.
70	**CLEANING IGNITER X SEC**	Ignition transformer is energized with SSOV closed.
71	**TOO MANY CYCLES IN 24 HOURS**	The number of cycles in 24 hour period has been exceeded.
72	**TOO MANY OVRTMPS IN 24 HOURS**	The number of over temperature events in 24 hour period has been exceeded.
73	**AIR SENSOR FAULT**	The inlet air sensor is out of range.
74	**Auto Diagnostic Mode ACTIVE**	Informational message.
75	**Auto Diagnostic Mode COMPLETED**	Informational message.
76	**Auto Diagnostic Mode ABORTED**	Informational message.
77	**DHW HEATING ACTIVE**	Domestic Hot Water is enabled. Message shows when in combo mode with a fault in the drive signal.
78	**Cooling Heat Exchanger**	Informational message during slow shutdown mode.
79	**BST NETWORK TEMP SENSOR FAULT**	The BST Modbus header temperature sensor is out of range.
80	**BST NETWORK TEMP COM FAULT**	The BST Modbus failed to read the header temperature sensor.
81	**BST LOCAL HEADER SENSOR FAULT**	The BST direct connected header temperature sensor is out of range.

82	**BST NET OUTDOOR SENSOR FAULT**	The BST Modbus connected outdoor air temperature sensor is out of range.
83	**BST NET OUTDOOR COM FAULT**	The BST Modbus device failed to read the outdoor air sensor.
84	**BST LOCAL OUTDR SENSOR FAULT**	The BST direct connected outdoor air temperature sensor is out of range.
85	**FAULT ACTIVE**	Temporary status message while the system is determining actual fault.

Appendix E: CONVERSION EQUATIONS FOR TEMPERATURE VARIABLES

Table E-1: Conversion Equations for Temperature Variables (Variable Counts to Temp)

Register Variable Type	Degrees Fahrenheit (°F)	Degrees Celsius (°C)
DEGREES_1	$\text{Temp(F)} = \left[\frac{(\text{RegVar}) * (230) + 500}{1000}\right] + 20$	$\text{Temp(C)} = \left[\frac{(\text{RegVar}) * (128) + 500}{1000}\right] - 7$
DEGREES_2	$\text{Temp(F)} = \left[\frac{(\text{RegVar}) * (220) + 500}{1000}\right] - 80$	$\text{Temp(C)} = \left[\frac{(\text{RegVar}) * (183) + 500}{1000}\right] - 62$
DEGREES_3	$\text{Temp(F)} = \left[\frac{(\text{RegVar}) * (520) + 500}{1000}\right] + 40$	$\text{Temp(C)} = \left[\frac{(\text{RegVar}) * (289) + 500}{1000}\right] - 4$
ABS_DEG_1	For (RegVar≥0): $\text{Temp(F)} = \left[\frac{(\text{RegVar}) * (230) + 500}{1000}\right]$ For (RegVar<0): $\text{Temp(F)} = \left[\frac{(\text{RegVar}) * (230) - 500}{1000}\right]$	For (RegVar≥ 0): $\text{Temp(C)} = \left[\frac{(\text{RegVar}) * (128) + 500}{1000}\right]$ For (RegVar< 0): $\text{Temp(C)} = \left[\frac{(\text{RegVar}) * (128) - 500}{1000}\right]$

Table E-2: Conversion Equations for Temperature Variables (Temp to Variable Counts)

Register Variable Type	Degrees Fahrenheit (°F)	Degrees Celsius (°C)
DEGREES_1	$\text{RegVar} = \left[\frac{(\text{degF} - 20) * (1000) + 115}{230}\right]$	$\text{RegVar} = \left[\frac{(\text{degC} + 7) * (1000) + 64}{128}\right]$
DEGREES_2	$\text{RegVar} = \left[\frac{(\text{degF} - 80) * (1000) + 110}{220}\right]$	$\text{RegVar} = \left[\frac{(\text{degC} + 62) * (1000) + 91.5}{183}\right]$
DEGREES_3	$\text{RegVar} = \left[\frac{(\text{degF} + 40) * (1000) + 300}{600}\right]$	$\text{RegVar} = \left[\frac{(\text{degC} - 4) * (1000) + 144.5}{289}\right]$
ABS_DEG_1	For (degF>0): $\text{RegVar} = \left[\frac{(\text{degF}) * (1000) + 115}{230}\right]$ For (degF<0): $\text{RegVar} = \left[\frac{(\text{degF}) * (1000) - 115}{230}\right]$	For (degC> 0): $\text{RegVar} = \left[\frac{(\text{degC}) * (1000) - 115}{128}\right]$ For (degC<0): $\text{RegVar} = \left[\frac{(\text{degC}) * (1000) - 64}{128}\right]$

Appendix F: BCM AND BMM FAULT CODES FOR MODULEX E8 CONTROLLER

Appendix F.1: BCM and BMM Fault Code Conversion Table

Table F-1, below, shows how to interpret the displayed fault code in the E8 Controller display, while Table F-2, on the next page, shows a description of the fault and troubleshooting tips associated with the BMMs. Table F-3, following, is for BCM faults.

In order to derive the correct error code from what is shown in the E8 Controller display, use Table F-1, below, to determine the working error code. To use the table, identify the displayed number from the first column, identify the affected module from the second column, apply the formula from the third column, and identify the Error Table to reference from the fourth column.

Table F-1: BCM and BMM Fault Code Conversion Table

Observed Code	Observed Code	Code to Look Up in	Table
Code = **0**	N/A	No Fault	-
Code between **1** and **255**	BMM #0 Fault	Look up code	F-2
Code between **256** and **511**	BMM #1 Fault	Subtract **256** from reading	F-2
Code between **512** and **767**	BMM #2 Fault	Subtract **512** from reading	F-2
Code between **768** and **1023**	BMM #3 Fault	Subtract **768** from reading	F-2
Code between **1024** and **1279**	BMM #4 Fault	Subtract **1024** from reading	F-2
Code between **1280** and **1535**	BMM #5 Fault	Subtract **1280** from reading	F-2
Code between **1536** and **1791**	BMM #6 Fault	Subtract **1536** from reading	F-2
Code between **1792** and **2047**	BMM #7 Fault	Subtract **1792** from reading	F-2
Code between **2048** and **65279**	N/A	Invalid Codes	-
Code above **65280**	BCM Fault	Subtract **65280** from reading	F-2

Example:

Based on the above, a code reading of “261” means the fault occurred on BMM #1. The fault code is (261 – 256 =) 5. An Error Code of 5 from the BMM Fault Codes table means “Flame Loss During Run”.

Appendix F.2: BMM Fault Code Table

The table below lists the fault codes and troubleshooting tips associated with the BMM.

Table F-2: BMM Fault Code Table

Code	Description	Effect	Correction	Reset
1	High Limit (STB) Thermostat activated	All burners turned OFF and Pump ON at maximum speed.	Check FlowSensor thermal connection to boiler.	MANUAL - push reset switch when temperature goes below limit.
2	Low Gas Pressure	All burners turned OFF.	Check gas pressure or gas pressure switch.	AUTOMATIC - when gas pressure switch closes.
4	No flame detected at burner start	Burner control lockout.	Check flame rod or combustion.	MANUAL - push reset switch or cycle power.
5	Flame loss during run.	Ignition retry.	Check combustion and wiring.	MANUAL - push reset switch or cycle power.
6	High outlet temperature. FlowSensor temperature > 203°F.	All burners turned OFF and Pump ON at maximum speed.	Check Flow Sensor or system pump.	AUTOMATIC - when FlowSensor < 176°F.
10	Internal Failure	Ignition is inhibited.	Contact Factory for new BCM.	MANUAL - cycle the power.
11	Flame signal detected before ignition.	Ignition is inhibited.	Disconnect flame rod wire from BMM. If problem goes away change flame rod and/or wire. If problem does not go away change BMM.	MANUAL - push reset switch or cycle power.
12	FlowSensor fault.	All burners turned OFF.	Check flow sensor or wiring.	AUTOMATIC
13	Aux Sensor fault	The boiler will operate from the FlowSensor without the AuxSensor.	Check aux sensor or wiring.	AUTOMATIC

Table F-2: BMM Fault Code Table (Cont.)				
Code	Description	Effect	Correction	Reset
14	Return Sensor fault	All burners turned OFF.	Check return sensor or wiring.	AUTOMATIC
15	Maximum Δ-temperature protection. Flow temperature - Return Temperature > Water Δ-Temp Protection + 50°F	All burners turned OFF and Pump ON at maximum speed.	Check the system installation.	AUTOMATIC - when Δ-temperature < Water Δ-Temp Protection.
16	Boiler Pipe is frozen. FlowSensor temperature is 36°F or less.	Ignition is inhibited. Pump runs for 5 min at max speed.	Carefully defrost boiler.	AUTOMATIC - when FlowSensor is greater than 41°F.
20	Flame signal detected after burner is OFF.	Ignition is inhibited.	Disconnect gas valve wire from BMM. If failure goes away, check wiring or change BMM. If failure remains check or change gas valve.	MANUAL - push reset switch or cycle power.
22	No air flow at burner after fan started for 30 seconds.	Ignition retry after 60 second delay and failure remains until we have a successful burner operation.	If fan is stopped, check supply voltage and fan wiring. If OK try another fan. If still not working change the BMM. If fan is not stopped, check the exhaust gas outlet for blockage. If OK then check the air pressure switch wiring. If still not working try another air pressure switch. If still not working, change the BMM.	AUTOMATIC/ MANUAL
23	The air pressure switch doesn't switch off.	Ignition is inhibited.	Disconnect the air proving switch. If problem goes away install a new switch. If not, check the wiring. If wiring OK then change BMM.	AUTOMATIC

Table F-2: BMM Fault Code Table (Cont.)				
Code	Description	Effect	Correction	Reset
24	Fan speed out of control: It doesn't reach pre-purge speed within 30 seconds.	Ignition retry after 60 second delay and failure remains until we have a successful burner operation.	Check fan wiring.	AUTOMATIC/ MANUAL
26	Fan speed out of control: It doesn't stop within 30 seconds after turned OFF.	Ignition is inhibited.	Check fan wiring.	AUTOMATIC
27	Air flow failure during ignition.	Restart pre-purge timer. The failure remains until we have a successful burner operation.	Check fan and wiring. Check air proving switch and wiring.	AUTOMATIC
28	Flue/Chimney Obstruction	Ignition is inhibited.	Check flue/chimney	
29	Water inside the combustion chamber.	Ignition is inhibited.	Check for water in the exhaust manifold	
30	Settings Corrupted	Ignition is inhibited. Pump runs for 5 min at max speed.	Re-program the settings. Contact Factory	MANUAL - cycle the power or send reset message.
32	Line voltage too low. (<96 VAC)	Wait for proper line voltage. (>102 VAC)	Check input voltage else try another BMM.	AUTOMATIC
40	Low Water Flow. Low water flow switch activated.	Burners turned OFF.	Check water flow or check switch.	AUTOMATIC

Appendix F.3: BCM Fault Code Table

The table below lists the fault codes and troubleshooting tips associated with the BCM.

Table F-3: BCM Fault Code Table

Code	Description	Effect	Correction	Reset
17	Boiler Pipe is frozen. FlowSensor temp. is 36°F or less.	Ignition is inhibited. Pump runs for 5 min at max speed.	Carefully defrost boiler	AUTOMATIC - when FlowSensor is greater than 41°F.
18	Maximum Δ-temperature protection. Flow temperature - Return Temperature > Water Δ-Temp Protection + 50°F	All burners turned OFF and Pump ON at maximum speed.	Check the system installation.	AUTOMATIC - when Δ-temperature < Water Δ-Temp Protection.
19	High outlet temperature. FlowSensor temperature > 203°F.	All burners turned OFF and Pump ON at maximum speed.	Check Flow Sensor or system pump	AUTOMATIC - when FlowSensor < 176°F.
37	Crash	Ignition is inhibited	Change the BCM	MANUAL – push reset switch to cycle power
38	Settings Corrupted	Ignition is inhibited. Pump runs for 5 min at max speed.	Re-program the settings. Contact Factory	MANUAL - push reset switch or cycle power.
50	Internal Failure	Ignition is inhibited.	Contact Factory for new BCM.	MANUAL - cycle the power.
56	Standby. No remote control detected and Request input is open.	Ignition is inhibited.	Close Request input for Manual operation.	MANUAL - push reset switch or cycle power.
57	No BMM detected.	Ignition is not possible.	Check the BMM eBus wiring.	MANUAL - push reset switch or cycle power.
58	FlowSensor fault.	All burners turned OFF.	Check flow sensor or wiring.	AUTOMATIC

Change Log

Date	Description	Changed By
05/12/2014	Rev G: Corrected references to ACS, BMS and BST in text, tables and graphics; added new graphic to section 7.4.2	Chris Blair
11/06/2014	Rev H PIRs: **934-107**: Changed Points Definition "Communication Error Count" to "Valve State" in Appendix B.4, page 60. **934-122**: Specify that SSD profiles must be used with WHM and BST systems, p. 12 & 61.	Chris Blair

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