Installation & Operation Manual
Modbus/BACnet Gateway Start-up Guide

For Interfacing Navien Products:

To Building Automation Systems and SMC Cloud:
BACnet MS/TP, BACnet/IP and Modbus TCP/IP

APPLICABILITY & EFFECTIVITY

Explains Modbus/BACnet gateway and how to install it.

The instructions are effective for the above as of October 1, 2019.

Quick Start Guide

1. Record the information about the unit. (**Section 3.1**)

2. Set COM settings for the device that will be connected to gateway. (**Section 3.3**)

3. Connect the gateway 3 pin RS-485 R1 port to the RS-485 network connected to each of the devices. (**Section 4.1**)

4. Connect the gateway 3 pin RS-485 R2 port to the field protocol cabling. (**Section 4.2**)

5. Connect power to gateway's 3 pin connector. (**Section 4.5**)

6. Connect a PC to the gateway via Ethernet cable or by the gateway's Wi-Fi Access Point. (**Section 5**)

7. Use a web browser to access the gateway Web Configurator page to select the profile of the device attached to the gateway and enter any necessary device information. Once the device is selected, the gateway automatically builds and loads the appropriate configuration. (**Section 6**)

Contents

List of Figures

1. CERTIFICATION

1.1   BTL Mark – BACnet® Testing Laboratory

The BTL Mark on gateway is a symbol that indicates that a product has passed a series of rigorous tests conducted by an independent laboratory which verifies that the product correctly implements the BACnet features claimed in the listing. The mark is a symbol of a high-quality BACnet product.

Go to www.BACnetInternational.net for more information about the BACnet Testing Laboratory. Click here for the BACnet PIC Statement.

* BACnet is a registered trademark of ASHRAE

2. INTRODUCTION

2.1 Gateway

The wireless unit is an external, high performance **building automation multi-protocol gateway** that is preconfigured to automatically communicate between Navien's devices (hereafter simply called "device") connected to the gateway and automatically configures them for BACnet/IP, BACnet MS/TP and Modbus TCP/IP.

It is not necessary to download any configuration files to support the required applications. The gateway is pre-loaded with tested profiles/configurations for the supported devices.

Gateway Connectivity Diagram:

Local Network

Ethernet Field Protocol to Local Network

RS-485 Field Protocol to Local Network
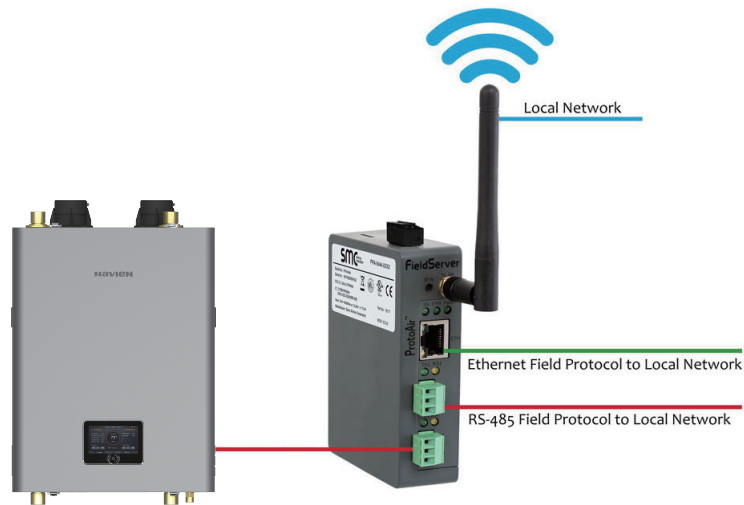
3. GATEWAY SETUP

3.1 Record Identification Data

Each gateway has a unique part number located on the side or the back of the unit. This number should be recorded, as it may be required for technical support. The numbers are as follows:

Model	Part Number
Modbus/BACnet Gateway	GXXX001932

Figure 1: Gateway Part Numbers

- GXXX001932 units have the following 3 ports: RS-485 + Ethernet + RS-485

3.2 Point Count Capacity and Registers per Device

The total number of registers presented the device(s) attached to the gateway cannot exceed:

Part number	Total Registers
GXXX001932	5,000

Figure 2: Supported Point Count Capacity

Devices	Registers Per Device
NFB-C Single Boiler	118
NFB-C Main 1 Sub 1 - Sub 31	113 - 1013

Figure 3: Registers per Device

3.3 Configuring Modbus Device Communications

3.3.1 Input COM Settings on Any Device Connected to the Gateway

- **Any connected serial device MUST have the same baud rate, data bits, stop bits, and parity settings as the gateway.**
- Figure 4 specifies the device serial port settings required to communicate with the gateway.

Port Setting	Device
Protocol	Modbus RTU
Baud Rate	9600
Parity	None
Data Bits	8
Stop Bits	1

Figure 4: COM Settings

3.3.2 Set Node-ID for Any Device Attached to the Gateway

- Set Node-ID for the device attached to gateway. The Node-ID needs to be uniquely assigned between 1 and 255.
- Document the Node-ID that is assigned. The Node-ID assigned is used for deriving the Device Instance for BACnet/IP and BACnet MS/TP (**Section 6.3**)

Note The Modbus TCP/IP field protocol Node-IDs are automatically set to be the same value as the Node-ID of the device.

3.4 Attaching the Antenna

Wi-Fi Antenna:

Screw in the Wi-Fi antenna to the front of the unit as shown in Figure 39.

Note Using an external antenna is also an option. An external antenna can be plugged into the SMA connector. The best antenna for the job depends on the range, topography and obstacles between the two radios.

4. INTERFACING GATEWAY TO DEVICES

4.1 NFB-301C/399C boiler Connections to Gateway

Connect the 3-pin Phoenix connector of the **R1** port (gateway) to the 3-pin terminal block located on the right side of the front panel (Boilers).

Note
- Make sure that the R1 Switch 4 is set to the OFF position.
- Use standard grounding principles for RS-485 GND.
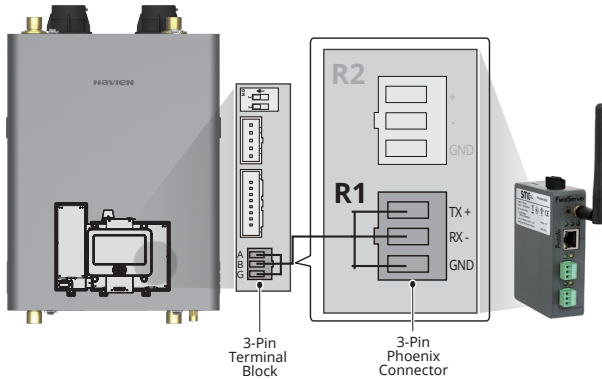
Boiler (Front Panel)	Gateway R1 Terminal	Pin Assignment
A	TX +	RS-485 +
B	RX -	RS-485 -
G	GND	RS-485 GND

Figure 5: RS-485 Connections from Boiler to the Gateway

4.2 Wiring Field Port to RS-485 Serial Network

- Connect the RS-485 network wires to the 3-pin RS-485 connector on the R2 port. (Figure 6)
  - Use standard grounding principles for RS-485 GND.
- See **Section 5** for information on connecting to an Ethernet network.

BMS Wiring	Gateway R2 Terminal	Pin Assignment
RS-485 +	+	RS-485 +
RS-485 -	-	RS-485 -
-	G	RS-485 GND
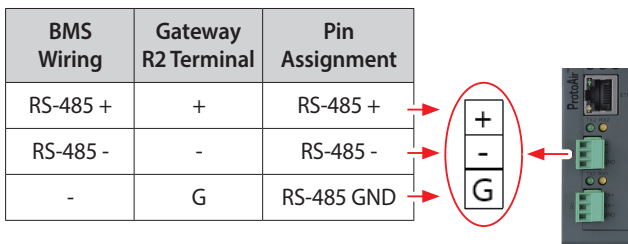
Figure 6: Connection from Gateway to RS-485 Field Network

4.3 Bias Resistors

R1 Bias Resistor DIP Switches (2 and 3)

R2 Bias Resistor DIP Switches (2 and 3)
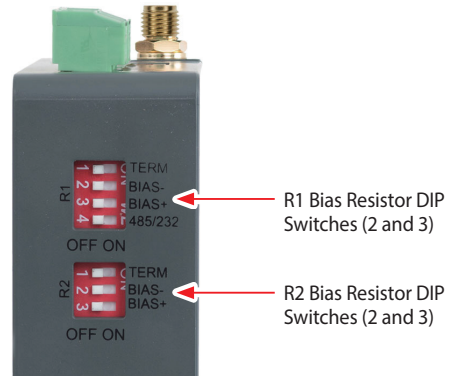
Figure 7: Bias Resistor DIP Switches

To enable Bias Resistors, move both the BIAS- and BIAS+ dip switches to the right as shown in Figure 7.

The gateway bias resistors are used to keep the RS-485 bus to a known state, when there is no transmission on the line (bus is idling), to help prevent false bits of data from being detected. The bias resistors typically pull one line high and the other low - far away from the decision point of the logic.

The bias resistor is 510 ohms which is in line with the BACnet spec. It should only be enabled at one point on the bus (for example, on the field port were there are very weak bias resistors of 100k). Since there are no jumpers, many gateways can be put on the network without running into the bias resistor limit which is < 500 ohms.

Note
- See www.ni.com/support/serial/resinfo.htm for additional pictures and notes.
- The R1 and R2 DIP Switches apply settings to the respective serial port.
- If the gateway is already powered on, DIP switch settings will not take effect unless the unit is power cycled.

4.4 Termination Resistor

R1 Termination Resistor DIP Switch (1)

R2 Termination Resistor DIP Switch (1)
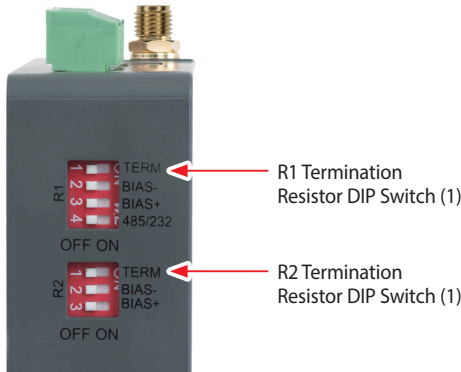
Figure 8: Termination Resistor DIP Switch

If the gateway is the last device on the serial trunk, then the End-Of-Line Termination Switch needs to be enabled. **To enable the Termination Resistor, move the TERM dip switch to the right as shown in Figure 8.**

Termination resistor is also used to reduce noise. It pulls the two lines of an idle bus together. However, the resistor would override the effect of any bias resistors if connected.

Note
- The R1 and R2 DIP Switches apply settings to the respective serial port.
- If the gateway is already powered on, DIP switch settings will not take effect unless the unit is power cycled.

4.5 Power-Up Gateway

There are two ways to power the gateway. One method is to use the boiler PCB (printer circuit board). The other is to use the included power supply in the box.

Check power requirements in the table below:

Power Requirement for Gateway

Power Requirement for Gateway	Current Draw Type	
Navien Gateway Family	12 VDC	24 V DC/AC
GXXX001932 (Typical)	250 mA	125 mA
Note These values are 'nominal' and a safety margin should be added to the power supply of the host system. A safety margin of 25% is recommended.		

Figure 9: Required Current Draw for the Gateway

4.5.1 Power Up Using the PCB

Apply power to the Gateway as shown below in Figure 10.

- The gateway accepts 12-24 VDC or 24 VAC on pins 4 and 5.
- **Frame GND should be connected.**

Boiler Front Panel PCB

3 -Pin Connector
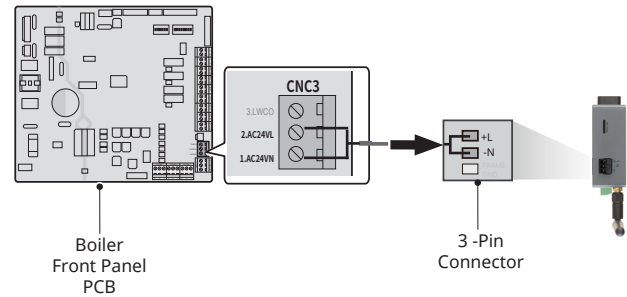
Boiler (controller)	Gateway Power Terminal	Pin Assignment
2. AC24VL	+L	V+
1. AC24VN	-N	V-
-	FG	FRAME GND

Figure 10: PCB Power Connections

4.5.2 Power Up Using the Power Supply

Apply power to the gateway power terminal pins +L and -N as shown below in Figure 11.

Power to Gateway	Gateway Pin Label	Pin Assignment	SMC Power Supply Wires
Power In (+)	+L	V+	White/ Black
Power In (-)	-N	V-	Black
Frame Ground	FG	FRAME GND	NA
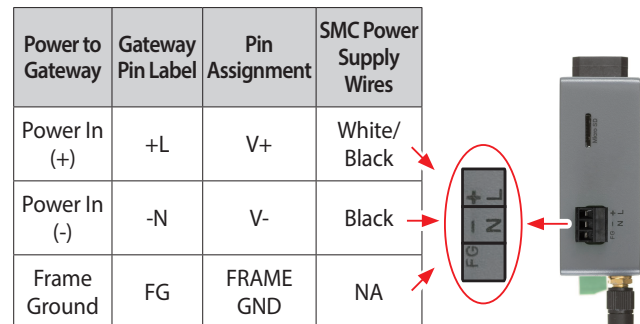
Figure 11: External Power Connections

5. CONNECT THE PC TO THE GATEWAY

There are two ways to connect the PC to the gateway, either by **Ethernet cable (Section 5.1)** or **Wi-Fi Access Point (Section 5.2)**.

5.1 Connecting to the Gateway via Ethernet

First, connect a Cat-5 Ethernet cable (straight through or cross-over) between the local PC and Gateway.
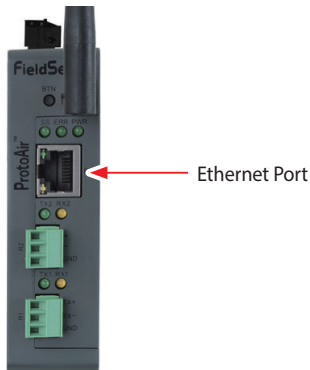
Figure 12: Ethernet Port Location

5.1.1 Enable Access Through the Local Browser

There are two methods to enable access to the Gateway in the local browser, either by changing the subnet of the connected PC (Section 5.1.1.1) or using the FieldServer Toolbox to change the IP Address of the gateway (Section 5.1.1.2).

Note Only perform one method or the other.

5.1.1.1 Changing the Subnet of the Connected PC

The default IP Address for the gateway is **192.168.1.24**, Subnet Mask is **255.255.255.0**. If the PC and gateway are on different IP networks, assign a static IP Address to the PC on the 192.168.1.xxx network.

For Windows 10:

1. Find the search field in the local computer's taskbar (usually to the right of the windows icon (▦) and type in "Control Panel".

2. Click "Control Panel", click "Network and Internet" and then click "Network and Sharing Center".

3. Click "Change adapter settings" on the left side of the window.

4. Right-click on "Local Area Connection" and select "Properties" from the dropdown menu.

5. Highlight ☑ ⊥ Internet Protocol Version 4 (TCP/IPv4) and then click the Properties button.

6. Select and enter a static IP Address on the same subnet. For example:

7. Click the Okay button to close the Internet Protocol window and the Close button to close the Ethernet Properties window.

5.2 Connecting to the Gateway Over Wi-Fi Access Point

When the gateway is first powered up, the Wi-Fi Access Point will be enabled allowing direct connection to the gateway with Wi-Fi.

To connect to the gateway Wi-Fi Access Point:

1. Click the icon (found in the bottom-right corner of the computer screen) to open the available Wireless Network Connections.

2. Select the desired gateway and click Connect.

3. Enter the Security key. The **default is Navien12345**.
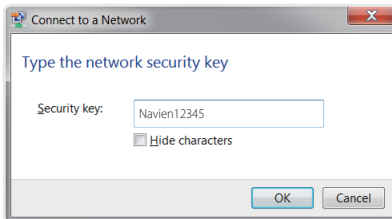
The available Wireless Network Connection menu should now show that the computer is connected to the gateway.
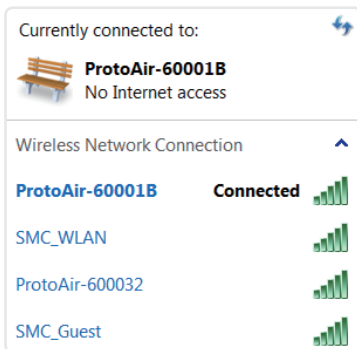
6. CONFIGURE THE GATEWAY

6.1 Accessing the Gateway Web Configurator

1. Navigate to the IP Address of the gateway on the local PC using one of two methods:
   - Open a web browser and enter the IP Address of the Gateway; the default Ethernet address is 192.168.1.24, the default Wi-Fi Access Point address is 192.168.50.1
   - If using the FieldServer Toolbox (**Section 5.1.1.2**), click the Connect button.

   Note

2. Once at the Web App splash page, click the Login button.
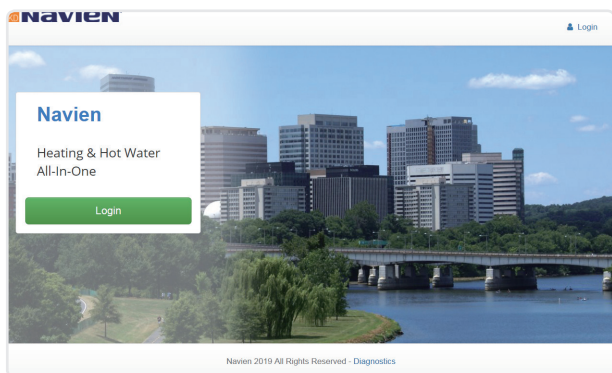
Figure 13: Web App Splash Page

3. Enter the previously set up or default username and password.

   Note The default username is "admin". The default password is "admin".
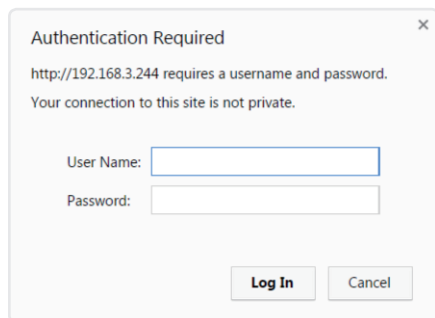
Figure 14: Login Window

4. From the Web App landing page (Figure 15), click the Configure tab.
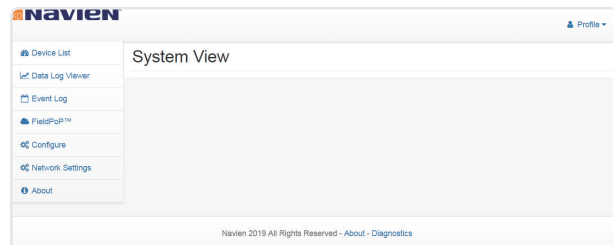
Figure 15: Web App Landing Page

5. Then, click the Profiles Configuration button to go to the Web Configurator page.
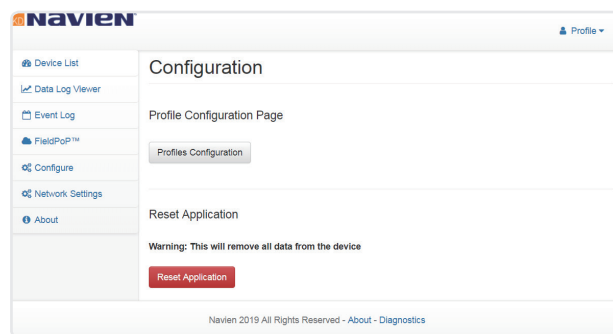
Figure 16: Configure Tab

6.2 Setting Gateway Configuration Parameters

1. Select the field protocol by entering the appropriate number into the Protocol Selector Value and clicking the Submit button. **Wait for the system to reset as the configuration is updated**.

2. In the Web Configurator, the Active Profiles are shown below the configuration parameters. The Active Profiles section lists the currently active device profiles, including previous Web Configurator additions. This list is empty for new installations, or after clearing all configurations. (Figure 17)

Figure 17: Web Configurator Showing no Active Profiles

3. To add an active profile to support a device, click the Add button under the Active Profiles heading. This will present a drop-down menu underneath the Current profile column that lists all the available profiles.

4. Once the Profile for the device has been selected from the drop-down list, enter the value of the device's Node-ID which was assigned in **Section 3.3.2**.

Figure 18: Profile Selection Menu

5. Then press the "Submit" button to add the Profile to the list of devices to be configured.

6. Repeat this process until all the devices have been added.

7. Completed additions are listed under "Active profiles" as shown in Figure 19.

Figure 19: Web Configurator Showing Active Profile Additions

> **Note** If multiple devices are connected to the Gateway, set the BACnet Virtual Server Nodes field to "Yes"; otherwise leave the field on the default "No" setting.

6.2.1 Verify Device Communications

1. **Check that the port R1 TX1 and RX1 LEDs are rapidly flashing.** See **Appendix A.4** for additional information and images.

2. Confirm the software shows communication without errors. Go to **Appendix A.2** for instructions.

6.3   BACnet: Setting Node_Offset to Assign Specific Device Instances

1. Follow the steps outlined in **Section 6.1** to access the gateway Web Configurator.

   The Node_Offset field shows the current value (default = 50,000).
   - The values allowed for a BACnet Device Instance can range from 1 to 4,194,303

2. To assign a specific Device Instance (or range); change the Node_Offset value as needed using the calculation below:

   Device Instance (desired) = Node_Offset + Node_ID

   For example, if the desired Device Instance for the device is 50,001 and the following is true:
   - Device has a Node-ID of 1

   Then plug the device's information into the formula to find the desired Node_Offset:

   50,001 = Node_Offset + 1
   - **50,000 = Node_Offset**

   Once the Node_Offset value is input, it will be applied to all devices as shown below:
   - Device Instance = 50,000 + Node_ID = 50,000 + 1 = 50,001

3. Click "Submit" once the desired value is entered.

Figure 20: Web Configurator Node Offset Field

Figure 21: Active Profiles

6.4   How to Start the Installation Over: Clearing Profiles

1. Follow the steps outlined in **Section 6.1** to access the gateway Web Configurator.

2. At the bottom-left of the page, click the "Clear Profiles and Restart" button.

   Once restart is complete, all past profiles discovered and/or added via Web configurator are deleted. The unit can now be reinstalled.

7. NETWORK SETTINGS

7.1 Navigate to the FS-GUI Network Settings

1. Open the FS-GUI page.
   - From the Web App landing page, click the word "Diagnostics" found in blue at the bottom of the screen.
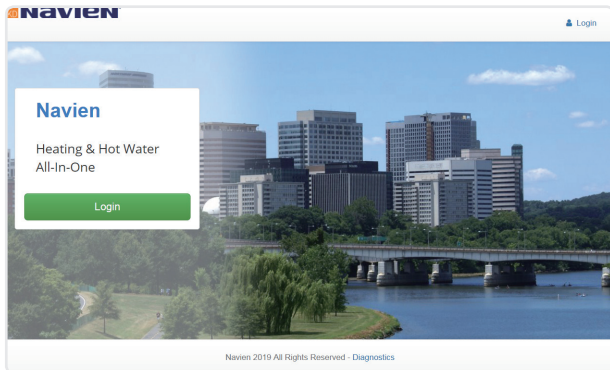
Figure 22: Web App Landing Page

   - From the Web Configurator page, click on the blue "Diagnostics & Debugging" button in the bottom right corner of the screen.
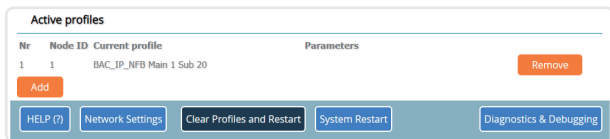
Figure 23: Web Configurator Page – Diagnostics Button
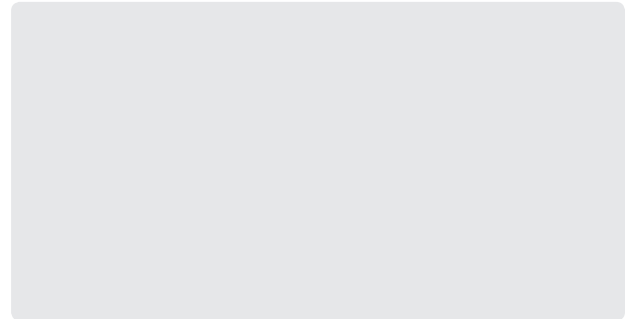
Figure 24: FS-GUI Landing Page

3. Click the orange arrow next to the gateway CN number and title to expand the tree.

4. Click on the orange arrow next to Setup to expand the tree.

5. Click on Network Settings.
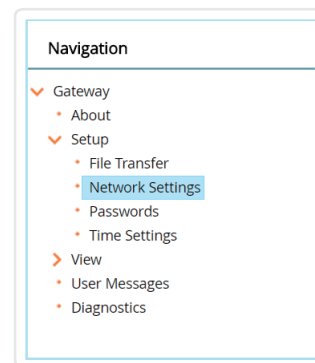
Figure 25: Generic FS-GUI Navigation Panel – Network Settings

7.2 Change the Gateway IP Address

Configure the IP settings of the gateway in the following methods:

- When using the Ethernet port to connect to the local network (**Section 7.2.1**).
- When connecting the gateway to a local wireless access point, configure the Wi-Fi Client Settings in the gateway (**Section 7.2.2**).

Note For Wi-Fi Access Point network information see **Appendix B.4**.

7.2.1 Update Wired Network Settings

IP Settings tab is the landing page when selecting Network Settings on the navigation tree. To change the IP settings, follow these instructions:

1. Enable DHCP Client State to automatically assign IP Settings or modify the settings manually as needed, via these fields: IP Address, Netmask, Default Gateway and Domain Name Server1/2.

   Note If connected to a router, set the Default Gateway to the same IP Address as the router.

2. Click Update IP Settings, then click on System Restart to restart the gateway and activate the new IP Address.

3. Connect the gateway to the local network or router.

   Note If the FS-GUI was open in a browser, the browser will need to be pointed to the new IP Address of the gateway before the FS-GUI will be accessible again.
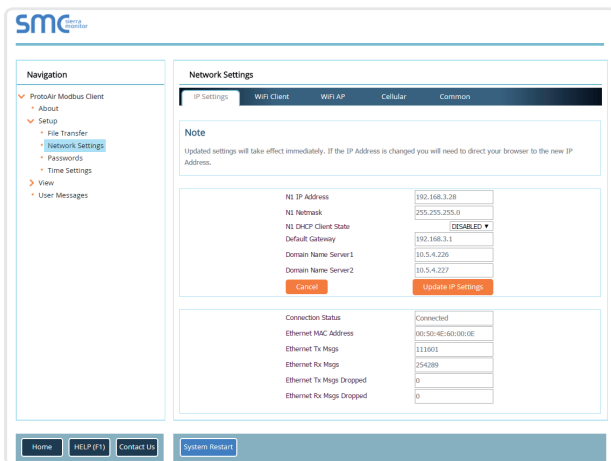
Figure 26: FS-GUI Ethernet Port Network Settings

IP Setting Fields	Definition
Connection Status	Status of connection
MAC Address	Ethernet MAC Address
Tx/Rx Msgs	Number of transmitted and received messages
Tx/Rx Msgs Dropped	Number of unanswered Tx or Rx messages

7.2.2 Update Wi-Fi Client Settings

From the FS-GUI Network Settings landing page, click on the Wi-Fi Client tab. To change the Wi-Fi client settings, follow these instructions:

1. Set the Wi-Fi Status to ENABLED for the gateway to communicate with other devices via Wi-Fi.

2. Enter the Wi-Fi SSID and Wi-Fi Password for the local wireless access point.

3. Enable DHCP to automatically assign all Wi-Fi Client network settings or manually modify the setting using the fields immediately below (IP Address, Network, etc.).

   Note If connected to a router, set the IP gateway to the same IP Address as the router.

4. Click Update Wi-Fi Settings, then click on System Restart to restart the gateway and activate Wi Fi Client settings.

5. **Go to Common settings (Section 7.2.3) to set the Primary Connection to Wi-Fi Client.**

Figure 27: FS-GUI Wi-Fi Client Network Settings

Wi-Fi Client Fields	Definition
Connection Status	Status of connection
MAC Address, BSSID, Channel	Wi-Fi Client MAC Address, BSSID, and Channel
Tx/Rx Msgs	Number of transmitted and received messages
Tx/Rx Msgs Dropped	Number of unanswered Tx or Rx messages
Pairwise Cipher	Type of encryption used for unicast traffic
Group Cipher	Identifies the type of encryption used for multicast / broadcast traffic
Key Mgmt	Encryption type
Link	Connection speed
Signal Level	Signal level in dBm (see **Appendix A.6**)

7.2.3 Common Settings

From the FS-GUI Network Settings landing page, click on the Common tab.

Note   Default is Primary Connection is Ethernet.

To change the primary connection when both Ethernet and Wi-Fi Client connections are available:

1. Select the desired option from the drop-down menu on the right.

2. Click Update Common Settings, then click on System Restart to restart the gateway and activate the new settings.

    Note   If using Wi-Fi Client and not Ethernet, change Primary Connection to Wi-Fi.

Figure 28: FS-GUI Common Network Settings

Note   The fields below the update button show the settings as they were set in the IP Settings or Wi-Fi Client pages. They are not editable on the Common page.

Appendix A. Troubleshooting

Appendix A.1 Lost or Incorrect IP Address

1. Ensure that FieldServer Toolbox is loaded onto the local PC. Otherwise, download the FieldServer Toolbox.zip via the Sierra Monitor website's Software Downloads.

2. Extract the executable file and complete the installation.
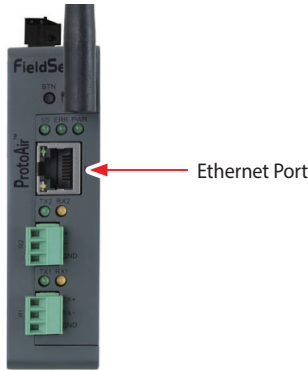
Ethernet Port

Figure 29: Ethernet Port Location

3. Connect a standard Cat-5 Ethernet cable between the user's PC and Gateway.

4. Double click on the FS Toolbox Utility and click Discover Now on the splash page.

5. Check for the IP Address of the desired gateway.
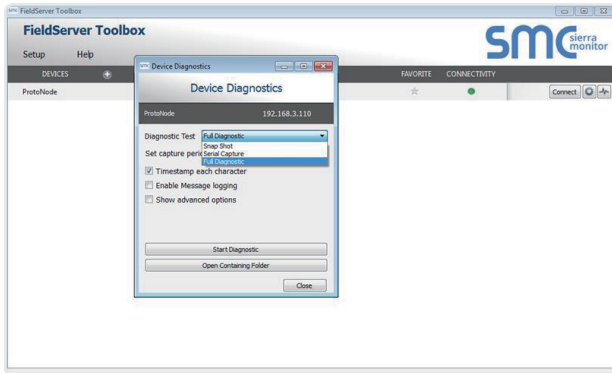
6. If correcting the IP Address of the gateway: click the settings icon ⚙ on the same row as the gateway, then click Network Settings, change the IP Address and click Update IP Settings to save.

Appendix A.2 Viewing Diagnostic Information

1. Type the IP Address of the gateway into the web browser or use the FieldServer Toolbox to connect to the gateway.

2. Click on Diagnostics Button, then click on view, and then on connections.

3. If there are any errors showing on the Connections page, refer to **Appendix A.3** to check the wiring and settings.
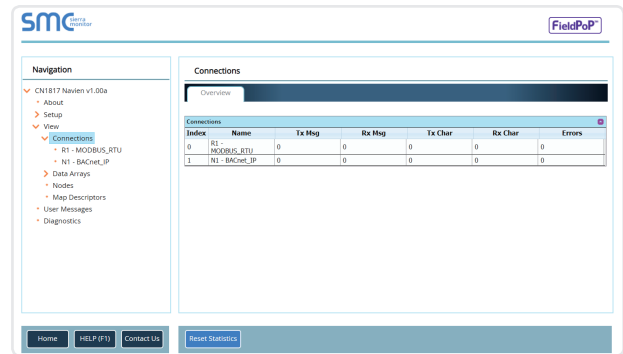
Figure 30: Error Messages Screen

Appendix A.3 Checking Wiring and Settings

- No COMS on Modbus RTU side. If the Tx/Rx LEDs are not flashing rapidly then there is a COM issue. To fix this, check the following:
  - Visual observations of LEDs on gateway (**Appendix A.4**)
  - Check baud rate, parity, data bits, stop bits
  - Check Detector ID matches the correct device
  - Verify wiring
  - Verify the device was listed under the Web Configurator Active Profiles (**Section 6**)
- Field COM problems:
  - Visual observations of LEDs on the gateway (**Appendix A.4**)
  - Verify IP Address setting
  - Verify wiring

Note If the problem still exists, a Diagnostic Capture needs to be taken and sent to technical support. (**Appendix A.5**)

Appendix A.4   LED Diagnostics for Communications Between Gateway and Devices

See the diagram below for gateway LED Locations.

Diagnostic LEDs
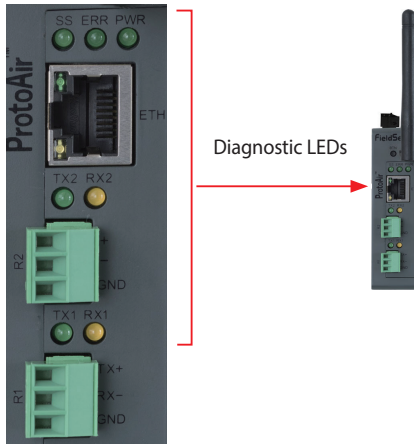
Tag	Description
SS	The SS LED will light if the unit is not getting a response from one or more of the configured devices.
ERR	The SYS ERR LED will go on solid indicating there is a system error. If this occurs, immediately report the related "system error" shown in the error screen of the FS-GUI interface to support for evaluation.
PWR	This is the power light and should always show steady green when the unit is powered.
TX	The TX LED will flash when a message is received on the serial port on the 3-pin connector. **If the serial port is not used, this LED is non-operational**. TX1 applies to the R1 connection while TX2 applies to the R2 connection.
RX	The RX LED will flash when a message is sent on the serial port on the 3-pin connector. **If the serial port is not used, this LED is non-operational**. RX1 applies to the R1 connection while RX2 applies to the R2 connection.

Figure 31: Diagnostic LEDs

Appendix A.5   Taking a FieldServer Diagnostic Capture

When there is a problem on-site that cannot easily be resolved, perform a diagnostic capture before contacting support so that support can quickly solve the problem. There are two methods for taking diagnostic captures:

- **FieldServer Toolbox:**

  This method requires installation of the FS Toolbox program. A FS Toolbox diagnostic capture takes a snapshot of the loaded configuration files and a log of all the communications on the serial ports over a specified period of time. If the problem occurs over an Ethernet connection, then take a Wire Shark capture.

- **Gateway's FS-GUI Page:**

  This method doesn't require downloading software. The diagnostic capture utilities are embedded in the FS-GUI web interface. Starting a diagnostic capture takes a snapshot of the loaded configuration files and a log of all the communications over a specified period of time. This works for both serial and Ethernet connections.

Note   The information in the zipped files contains everything support needs to quickly resolve problems that occur on-site.

1.
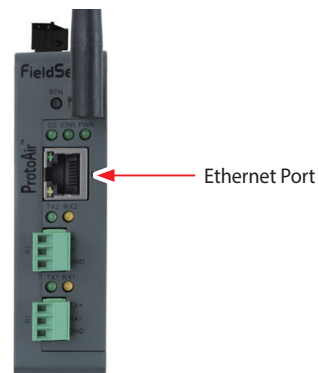
Ethernet Port

Figure 32: Ethernet Port Location

3.   Connect a standard Cat-5 Ethernet cable between the PC and gateway.

4. Double click on the FS Toolbox Utility.

5. **Step 1**: Take a Log

    a. Click on the diagnose icon ⎍ of the desired device.
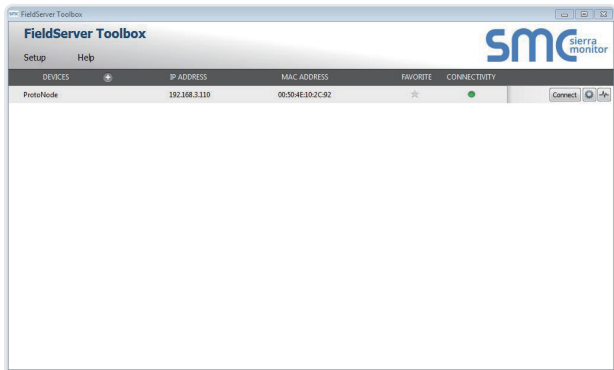
    b. Ensure "Full Diagnostic" is selected (this is the default).
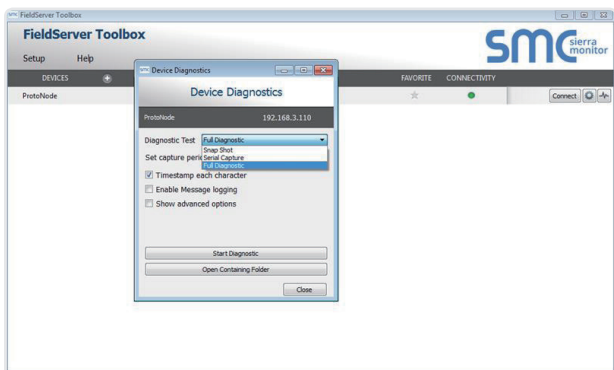
    Note   If desired, the default capture period can be changed.

    c. Click on "Start Diagnostic".
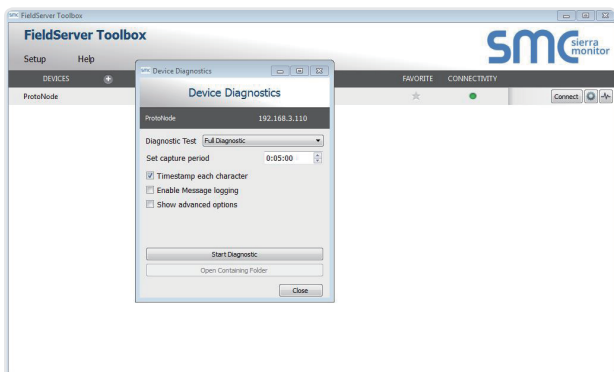
    d. Wait for Capture period to finish, then the Diagnostic Test Complete window will appear.

6. **Step 2**: Send Log

    a. Once the Diagnostic test is complete, a .zip file is saved on the PC.
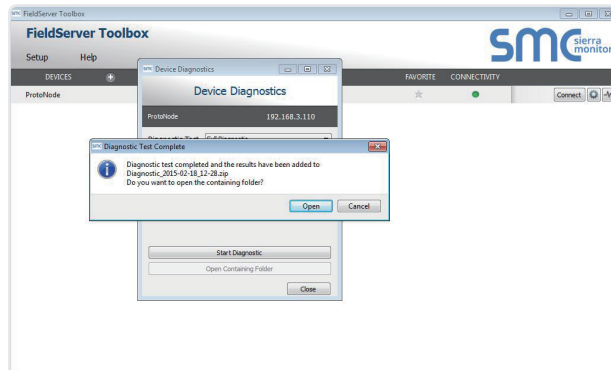
    b. Choose "Open" to launch explorer and have it point directly at the correct folder.

    c. Send the Diagnostic zip file to technical support.

Appendix A.5.2   Using FS-GUI

Diagnostic Capture via FS-GUI is only available on FieldServers with a bios updated/released on November 2017 or later. Completing a Diagnostic Capture through the FieldServer allows network connections (such as Ethernet and Wi-Fi) to be captured.

Once the Diagnostic Capture is complete, email it to technical support. The Diagnostic Capture will accelerate diagnosis of the problem.

1. Open the FieldServer FS-GUI page.

2. Click on Diagnostics in the Navigation panel.
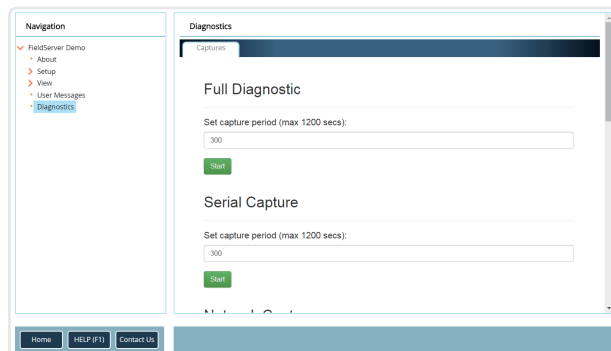
3. Go to Full Diagnostic and select the capture period.

4. Click the Start button under the Full Diagnostic heading to start the capture.
   - When the capture period is finished, a Download button will appear next to the Start button.

Full Diagnostic

Set capture period (max 1200 secs):

300

100% Complete

Start　Download

5. Click Download for the capture to be downloaded to the local PC.

6. Send the diagnostic zip file to technical support.

Note Diagnostic captures of BACnet MS/TP communication are output in a ".PCAP" file extension which is compatible with Wireshark.

Appendix A.6　Wi-Fi Signal Strength

Wi-Fi
<60dBm – Excellent
<70dBm – Very good
<80dBm – Good
>80dBm – Weak

Figure 33: Wi-Fi Signal Strength Listing

Note If the signal is weak or spotty, try to improve the signal strength by checking the antenna and the gateway position.

Appendix B. Additional Information

Appendix B.1 Updating Firmware

To load a new version of the firmware, follow these instructions:

1. Extract and save the new file onto the local PC.

2. Open a web browser and type the IP Address of the FieldServer in the address bar.
   - Default IP Address is 192.168.1.24.
   - Use the FS Toolbox utility if the IP Address is unknown (**Appendix A.1**).

3. Click on the "Diagnostics & Debugging" button.

4. In the Navigation Tree on the left-hand side, do the following:
   a. Click on "Setup".
   b. Click on "File Transfer".
   c. Click on the "General" tab.

5. In the General tab, click on "Choose Files" and select the web. img file extracted in step 1.

6. Click on the orange "Submit" button.

7. When the download is complete, click on the "System Restart" button.

Appendix B.2 BACnet: Setting Network_Number for More Than One Gateway on the Subnet

For both BACnet MS/TP and BACnet/IP, if more than one gateway is connected to the same subnet, they must be assigned unique Network_Number values.

On the main Web Configuration screen, update the BACnet Network Number field and click submit. The default value is 50.

Figure 34: Web Configurator – Network Number Field
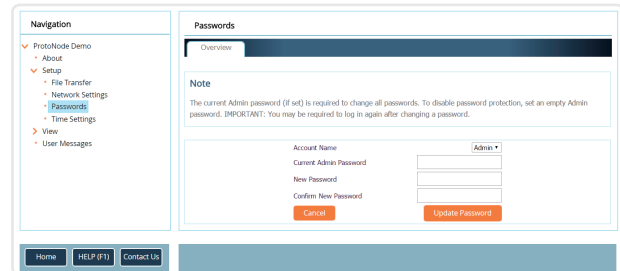
Appendix B.3 Securing Gateway with Passwords

Access to the gateway can be restricted by enabling a password on the FS-GUI Passwords page – click Setup and then Passwords in the navigation panel. There are 2 access levels defined by 2 account names: Admin and User.

- The Admin account has unrestricted access to the gateway.
- The User account can view any gateway information but cannot make any changes or restart the gateway.
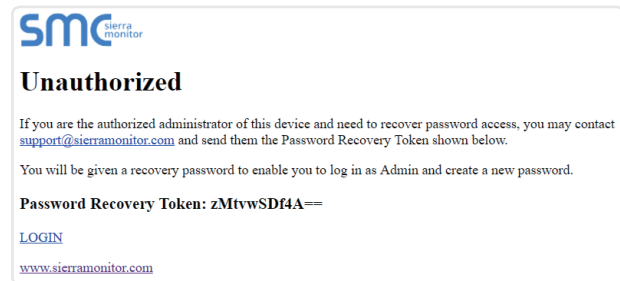
The password needs to be a minimum of eight characters and is case sensitive.

If the password is lost, click cancel on the password authentication popup window, and email the password recovery token to technical support to receive a temporary password from the customer support team. Access the gateway to set a new password.

Figure 35: FS-GUI Passwords Page

Figure 36: Password Recovery Page

Appendix B.4   Wi-Fi Access Point Network Settings

From the FS-GUI Network Settings landing page, click on the Wi-Fi AP tab. To change the Wi-Fi AP settings, follow these instructions:

1. The Access Point Status Field must be ENABLED to allow connecting to the Gateway via Wi-Fi.

2. Modify the Settings manually as needed, via these fields: Access Point SSID, Access Point Password, SSID Broadcast, and Channel.

    Note   The default channel is 11.

3. Click Update Wi-Fi Settings, then click on the System Restart to restart the gateway and activate the Wi-Fi settings.

    Note   If the FS-GUI was open in a browser via Wi-Fi, the browser will need to be updated with the new Wi-Fi details before the Gateway FS-GUI will be accessible again.

Figure 37: FS-GUI Wi-Fi AP Network Settings

Wi-Fi AP Fields	Definition
Connection Status	Status of connection
MAC Address	Access point's MAC Address
Tx/Rx Msgs	Number of transmitted and received messages
Tx/Rx Msgs Dropped	Number of unanswered Tx or Rx messages

Appendix B.5   Mounting

The gateway can be mounted using the DIN rail mounting bracket on the back of the unit.

Figure 38: DIN Rail

Appendix B.6   Physical Dimension Drawing
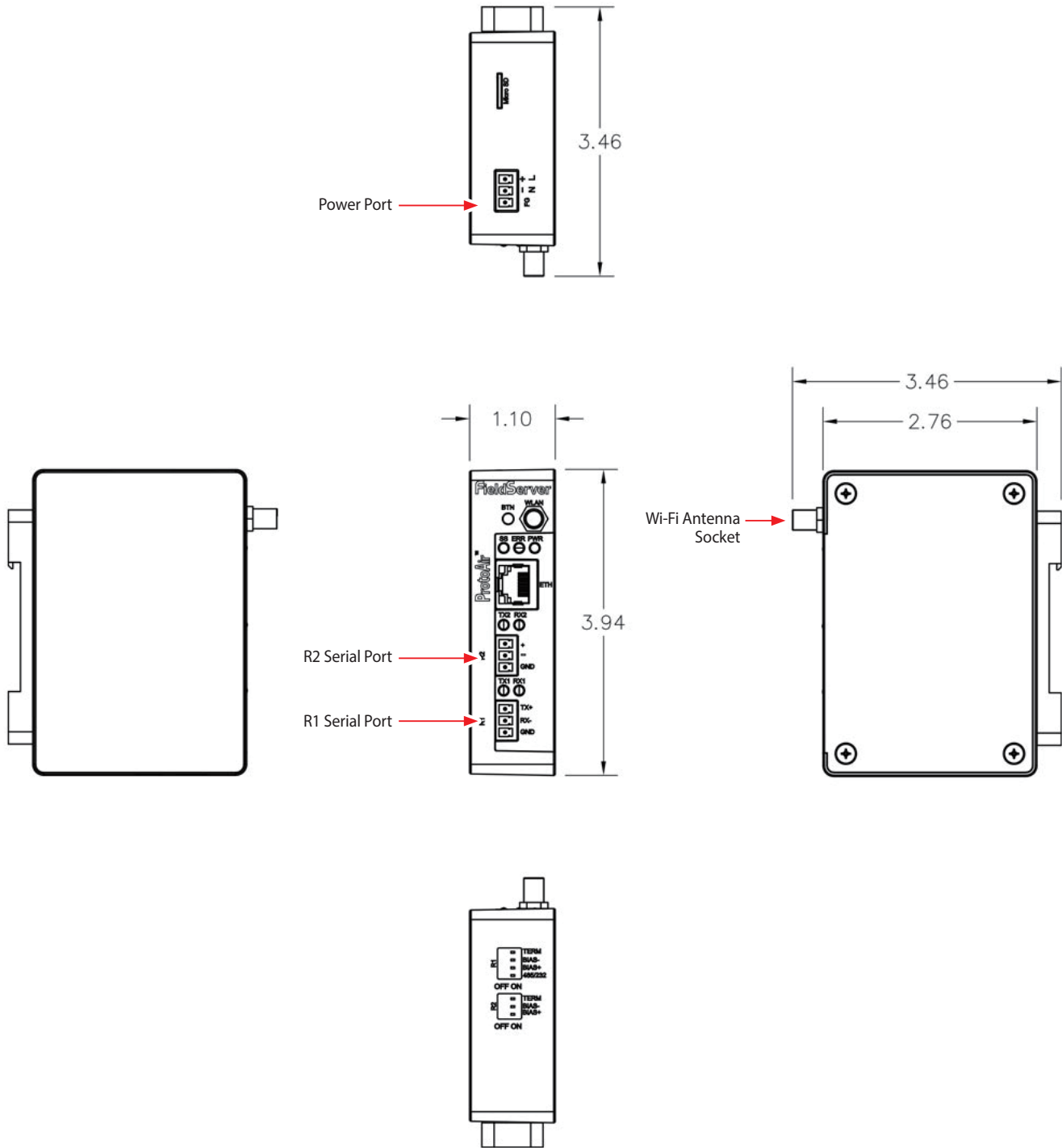
Figure 39: Modbus/BACnet Gateway Part Number GXXX001932 Dimensions

Appendix C.   Vendor Information – Navien

Appendix C.1   NFB-C Single Boiler Modbus RTU Mappings to BACnet/IP and BACnet MS/TP

Point Name	BACnet Object Type	BACnet Object ID
SH operation on/off control	BV	1
Outdoor reset curve usage enable	BV	2
WWSD enable	BV	3
DHW operation ON/OFF control	BV	4
Burner operation state	BI	1
SH operation state	BI	2
DHW tank mode operation state	BI	4
Error state	BI	5
Boiler enable status	BI	7
Boiler pump Operation Status	BI	8
DHW/Zone1 pump Operation Status	BI	9
Zone2 pump status Operation Status	BI	10
System/Zone3 pump Operation Status	BI	11
SH1 Thermostat input Status	BI	12
SH2 Thermostat input Status	BI	13
SH3 Thermostat input Status	BI	14
DHW call signal	BI	15
DHW Thermostat input Status	BI	16
LWCO input status	BI	17
Frozen protection mode	BI	24
Main Error code	AI	1
Sub Error code	AI	2
Current Heat capacity	AI	3
Supply temperature	AI	4
Return temperature	AI	5
System Supply temperature	AI	6
System Return temperature	AI	7
Water pressure	AI	8
Exhaust temperature	AI	9
DHW Tank temperature	AI	10
Outdoor temperature	AI	11
Boiler Operation Status	AI	12

Point Name	BACnet Object Type	BACnet Object ID
Maximum Heat capacity	AI	13
Total time of CH operation	AI	14
Number of CH operation	AI	15
Total time after installation	AI	16
Maximum outdoor temperature status	AI	27
Minimum outdoor temperature status	AI	28
CH supply minimum temperature	AI	29
CH supply maximum temperature	AI	30
CH return minimum temperature	AI	31
CH return maximum temperature	AI	32
DHW minimum temperature	AI	33
DHW maximum temperature	AI	34
SH control method	AI	35
DHW control method	AI	36
Gas type	AI	38
Current amount of gas	AI	41
Total amount of gas	AI	42
Boiler On/Off command	AV	1
SH supply setpoint setting	AV	2
SH return setpoint setting	AV	3
DHW setpoint setting	AV	4
Error reset command	AV	5
Boiler setpoint in DHW operation	AV	7
Outdoor reset curve heatload setting	AV	9
Maximum outdoor temperature setting	AV	10
Minimum outdoor temperature setting	AV	11
WWSD temperature setting	AV	12
WWSD On differential setting	AV	13
Boost interval time setting	AV	14
Cascade Initial op units setting	AV	15
CH supply min temperature setting	AV	16
CH supply max temperature setting	AV	17
CH return min temperature setting	AV	18
CH return max temperature setting	AV	19

Appendix C.2   NFB-C Main 1 Sub 1 - Sub 31 Modbus RTU Mappings to BACnet/IP and BACnet MS/TP

Point Name	BACnet Object Type	BACnet Object ID
SH operation on/off control	BV	1
Outdoor reset curve usage enable	BV	2
WWSD enable	BV	3
DHW operation ON/OFF control	BV	4
Cascade system enable state	BI	101
Cascade burning state	BI	102
Cascade SH operation state	BI	103
Main Burner op state	BI	1
Main Frozen protection mode	BI	2
Main Error state	BI	6
Main Boiler enable status	BI	7
Main Boiler pump op Status	BI	8
Sub01 Burner op state	BI	1001
Sub01 Frozen protection mode	BI	1002
Sub01 Error state	BI	1006
Sub01 Boiler enable status	BI	1007
Sub01 Boiler pump op Status	BI	1008
Sub02 Burner op state	BI	2001
Sub02 Frozen protection mode	BI	2002
Sub02 Error state	BI	2006
Sub02 Boiler enable status	BI	2007
Sub02 Boiler pump op Status	BI	2008
Sub03 Burner op state	BI	3001
Sub03 Frozen protection mode	BI	3002
Sub03 Error state	BI	3006
Sub03 Boiler enable status	BI	3007
Sub03 Boiler pump op Status	BI	3008
Sub04 Burner op state	BI	4001
Sub04 Frozen protection mode	BI	4002
Sub04 Error state	BI	4006
Sub04 Boiler enable status	BI	4007
Sub04 Boiler pump op Status	BI	4008

Point Name	BACnet Object Type	BACnet Object ID
Sub05 Burner op state	BI	5001
Sub05 Frozen protection mode	BI	5002
Sub05 Error state	BI	5006
Sub05 Boiler enable status	BI	5007
Sub05 Boiler pump op Status	BI	5008
Sub06 Burner op state	BI	6001
Sub06 Frozen protection mode	BI	6002
Sub06 Error state	BI	6006
Sub06 Boiler enable status	BI	6007
Sub06 Boiler pump op Status	BI	6008
Sub07 Burner op state	BI	7001
Sub07 Frozen protection mode	BI	7002
Sub07 Error state	BI	7006
Sub07 Boiler enable status	BI	7007
Sub07 Boiler pump op Status	BI	7008
Sub08 Burner op state	BI	8001
Sub08 Frozen protection mode	BI	8002
Sub08 Error state	BI	8006
Sub08 Boiler enable status	BI	8007
Sub08 Boiler pump op Status	BI	8008
Sub09 Burner op state	BI	9001
Sub09 Frozen protection mode	BI	9002
Sub09 Error state	BI	9006
Sub09 Boiler enable status	BI	9007
Sub09 Boiler pump op Status	BI	9008
Sub10 Burner op state	BI	10001
Sub10 Frozen protection mode	BI	10002
Sub10 Error state	BI	10006
Sub10 Boiler enable status	BI	10007
Sub10 Boiler pump op Status	BI	10008
Sub11 Burner op state	BI	11001
Sub11 Frozen protection mode	BI	11002
Sub11 Error state	BI	11006
Sub11 Boiler enable status	BI	11007
Sub11 Boiler pump op Status	BI	11008

Point Name	BACnet Object Type	BACnet Object ID	Point Name	BACnet Object Type	BACnet Object ID
Sub12 Burner op state	BI	12001	Sub19 Burner op state	BI	19001
Sub12 Frozen protection mode	BI	12002	Sub19 Frozen protection mode	BI	19002
Sub12 Error state	BI	12006	Sub19 Error state	BI	19006
Sub12 Boiler enable status	BI	12007	Sub19 Boiler enable status	BI	19007
Sub12 Boiler pump op Status	BI	12008	Sub19 Boiler pump op Status	BI	19008
Sub13 Burner op state	BI	13001	Sub20 Burner op state	BI	20001
Sub13 Frozen protection mode	BI	13002	Sub20 Frozen protection mode	BI	20002
Sub13 Error state	BI	13006	Sub20 Error state	BI	20006
Sub13 Boiler enable status	BI	13007	Sub20 Boiler enable status	BI	20007
Sub13 Boiler pump op Status	BI	13008	Sub20 Boiler pump op Status	BI	20008
Sub14 Burner op state	BI	14001	Sub21 Burner op state	BI	21001
Sub14 Frozen protection mode	BI	14002	Sub21 Frozen protection mode	BI	21002
Sub14 Error state	BI	14006	Sub21 Error state	BI	21006
Sub14 Boiler enable status	BI	14007	Sub21 Boiler enable status	BI	21007
Sub14 Boiler pump op Status	BI	14008	Sub21 Boiler pump op Status	BI	21008
Sub15 Burner op state	BI	15001	Sub22 Burner op state	BI	22001
Sub15 Frozen protection mode	BI	15002	Sub22 Frozen protection mode	BI	22002
Sub15 Error state	BI	15006	Sub22 Error state	BI	22006
Sub15 Boiler enable status	BI	15007	Sub22 Boiler enable status	BI	22007
Sub15 Boiler pump op Status	BI	15008	Sub22 Boiler pump op Status	BI	22008
Sub16 Burner op state	BI	16001	Sub23 Burner op state	BI	23001
Sub16 Frozen protection mode	BI	16002	Sub23 Frozen protection mode	BI	23002
Sub16 Error state	BI	16006	Sub23 Error state	BI	23006
Sub16 Boiler enable status	BI	16007	Sub23 Boiler enable status	BI	23007
Sub16 Boiler pump op Status	BI	16008	Sub23 Boiler pump op Status	BI	23008
Sub17 Burner op state	BI	17001	Sub24 Burner op state	BI	24001
Sub17 Frozen protection mode	BI	17002	Sub24 Frozen protection mode	BI	24002
Sub17 Error state	BI	17006	Sub24 Error state	BI	24006
Sub17 Boiler enable status	BI	17007	Sub24 Boiler enable status	BI	24007
Sub17 Boiler pump op Status	BI	17008	Sub24 Boiler pump op Status	BI	24008
Sub18 Burner op state	BI	18001	Sub25 Burner op state	BI	25001
Sub18 Frozen protection mode	BI	18002	Sub25 Frozen protection mode	BI	25002
Sub18 Error state	BI	18006	Sub25 Error state	BI	25006
Sub18 Boiler enable status	BI	18007	Sub25 Boiler enable status	BI	25007
Sub18 Boiler pump op Status	BI	18008	Sub25 Boiler pump op Status	BI	25008

Point Name	BACnet Object Type	BACnet Object ID		Point Name	BACnet Object Type	BACnet Object ID
Sub26 Burner op state	BI	26001		Primary total flow	AI	106
Sub26 Frozen protection mode	BI	26002		Average primary Supply temperature	AI	107
Sub26 Error state	BI	26006		Average primary return temperature	AI	108
Sub26 Boiler enable status	BI	26007		System Supply temperature	AI	109
Sub26 Boiler pump op Status	BI	26008		System Return temperature	AI	110
Sub27 Burner op state	BI	27001		Error occurrence unit number	AI	111
Sub27 Frozen protection mode	BI	27002		Main Error code	AI	112
Sub27 Error state	BI	27006		Main Operation Status	AI	1
Sub27 Boiler enable status	BI	27007		Main Error code	AI	2
Sub27 Boiler pump op Status	BI	27008		Main Current Heat capacity	AI	4
Sub28 Burner op state	BI	28001		Main Supply temperature	AI	5
Sub28 Frozen protection mode	BI	28002		Main Return temperature	AI	6
Sub28 Error state	BI	28006		Main Maximum Heat capacity	AI	8
Sub28 Boiler enable status	BI	28007		Main Exhaust temperature	AI	9
Sub28 Boiler pump op Status	BI	28008		Main Total time after installation	AI	10
Sub29 Burner op state	BI	29001		Main Number of CH operation	AI	11
Sub29 Frozen protection mode	BI	29002		Main Total time of CH operation	AI	12
Sub29 Error state	BI	29006		Main Current amount of gas	AI	13
Sub29 Boiler enable status	BI	29007		Main Total amount of gas	AI	14
Sub29 Boiler pump op Status	BI	29008		Sub01 Operation Status	AI	1001
Sub30 Burner op state	BI	30001		Sub01 Main Error code	AI	1002
Sub30 Frozen protection mode	BI	30002		Sub01 Current Heat capacity	AI	1004
Sub30 Error state	BI	30006		Sub01 Supply temperature	AI	1005
Sub30 Boiler enable status	BI	30007		Sub01 Return temperature	AI	1006
Sub30 Boiler pump op Status	BI	30008		Sub01 Maximum Heat capacity	AI	1008
Sub31 Burner op state	BI	31001		Sub01 Exhaust temperature	AI	1009
Sub31 Frozen protection mode	BI	31002		Sub01 Total time after installation	AI	1010
Sub31 Error state	BI	31006		Sub01 Number of CH operation	AI	1011
Sub31 Boiler enable status	BI	31007		Sub01 Total time of CH operation	AI	1012
Sub31 Boiler pump op Status	BI	31008		Sub01 Current amount of gas	AI	1013
Cascade total units	AI	101		Sub01 Total amount of gas	AI	1014
Cascade Operating units	AI	102		Sub02 Operation Status	AI	2001
Cascade On/Off state	AI	103		Sub02 Main Error code	AI	2002
CC Average Heating capacity	AI	104		Sub02 Current Heat capacity	AI	2004
CC Maximum Heating capacity	AI	105		Sub02 Supply temperature	AI	2005

Point Name	BACnet Object Type	BACnet Object ID	Point Name	BACnet Object Type	BACnet Object ID
Sub02 Return temperature	AI	2006	Sub05 Supply temperature	AI	5005
Sub02 Maximum Heat capacity	AI	2008	Sub05 Return temperature	AI	5006
Sub02 Exhaust temperature	AI	2009	Sub05 Maximum Heat capacity	AI	5008
Sub02 Total time after installation	AI	2010	Sub05 Exhaust temperature	AI	5009
Sub02 Number of CH operation	AI	2011	Sub05 Total time after installation	AI	5010
Sub02 Total time of CH operation	AI	2012	Sub05 Number of CH operation	AI	5011
Sub02 Current amount of gas	AI	2013	Sub05 Total time of CH operation	AI	5012
Sub02 Total amount of gas	AI	2014	Sub05 Current amount of gas	AI	5013
Sub03 Operation Status	AI	3001	Sub05 Total amount of gas	AI	5014
Sub03 Main Error code	AI	3002	Sub06 Operation Status	AI	6001
Sub03 Current Heat capacity	AI	3004	Sub06 Main Error code	AI	6002
Sub03 Supply temperature	AI	3005	Sub06 Current Heat capacity	AI	6004
Sub03 Return temperature	AI	3006	Sub06 Supply temperature	AI	6005
Sub03 Maximum Heat capacity	AI	3008	Sub06 Return temperature	AI	6006
Sub03 Exhaust temperature	AI	3009	Sub06 Maximum Heat capacity	AI	6008
Sub03 Total time after installation	AI	3010	Sub06 Exhaust temperature	AI	6009
Sub03 Number of CH operation	AI	3011	Sub06 Total time after installation	AI	6010
Sub03 Total time of CH operation	AI	3012	Sub06 Number of CH operation	AI	6011
Sub03 Current amount of gas	AI	3013	Sub06 Total time of CH operation	AI	6012
Sub03 Total amount of gas	AI	3014	Sub06 Current amount of gas	AI	6013
Sub04 Operation Status	AI	4001	Sub06 Total amount of gas	AI	6014
Sub04 Main Error code	AI	4002	Sub07 Operation Status	AI	7001
Sub04 Current Heat capacity	AI	4004	Sub07 Main Error code	AI	7002
Sub04 Supply temperature	AI	4005	Sub07 Current Heat capacity	AI	7004
Sub04 Return temperature	AI	4006	Sub07 Supply temperature	AI	7005
Sub04 Maximum Heat capacity	AI	4008	Sub07 Return temperature	AI	7006
Sub04 Exhaust temperature	AI	4009	Sub07 Maximum Heat capacity	AI	7008
Sub04 Total time after installation	AI	4010	Sub07 Exhaust temperature	AI	7009
Sub04 Number of CH operation	AI	4011	Sub07 Total time after installation	AI	7010
Sub04 Total time of CH operation	AI	4012	Sub07 Number of CH operation	AI	7011
Sub04 Current amount of gas	AI	4013	Sub07 Total time of CH operation	AI	7012
Sub04 Total amount of gas	AI	4014	Sub07 Current amount of gas	AI	7013
Sub05 Operation Status	AI	5001	Sub07 Total amount of gas	AI	7014
Sub05 Main Error code	AI	5002	Sub08 Operation Status	AI	8001
Sub05 Current Heat capacity	AI	5004	Sub08 Main Error code	AI	8002

Point Name	BACnet Object Type	BACnet Object ID	Point Name	BACnet Object Type	BACnet Object ID
Sub08 Current Heat capacity	AI	8004	Sub11 Main Error code	AI	11002
Sub08 Supply temperature	AI	8005	Sub11 Current Heat capacity	AI	11004
Sub08 Return temperature	AI	8006	Sub11 Supply temperature	AI	11005
Sub08 Maximum Heat capacity	AI	8008	Sub11 Return temperature	AI	11006
Sub08 Exhaust temperature	AI	8009	Sub11 Maximum Heat capacity	AI	11008
Sub08 Total time after installation	AI	8010	Sub11 Exhaust temperature	AI	11009
Sub08 Number of CH operation	AI	8011	Sub11 Total time after installation	AI	11010
Sub08 Total time of CH operation	AI	8012	Sub11 Number of CH operation	AI	11011
Sub08 Current amount of gas	AI	8013	Sub11 Total time of CH operation	AI	11012
Sub08 Total amount of gas	AI	8014	Sub11 Current amount of gas	AI	11013
Sub09 Operation Status	AI	9001	Sub11 Total amount of gas	AI	11014
Sub09 Main Error code	AI	9002	Sub12 Operation Status	AI	12001
Sub09 Current Heat capacity	AI	9004	Sub12 Main Error code	AI	12002
Sub09 Supply temperature	AI	9005	Sub12 Current Heat capacity	AI	12004
Sub09 Return temperature	AI	9006	Sub12 Supply temperature	AI	12005
Sub09 Maximum Heat capacity	AI	9008	Sub12 Return temperature	AI	12006
Sub09 Exhaust temperature	AI	9009	Sub12 Maximum Heat capacity	AI	12008
Sub09 Total time after installation	AI	9010	Sub12 Exhaust temperature	AI	12009
Sub09 Number of CH operation	AI	9011	Sub12 Total time after installation	AI	12010
Sub09 Total time of CH operation	AI	9012	Sub12 Number of CH operation	AI	12011
Sub09 Current amount of gas	AI	9013	Sub12 Total time of CH operation	AI	12012
Sub09 Total amount of gas	AI	9014	Sub12 Current amount of gas	AI	12013
Sub10 Operation Status	AI	10001	Sub12 Total amount of gas	AI	12014
Sub10 Main Error code	AI	10002	Sub13 Operation Status	AI	13001
Sub10 Current Heat capacity	AI	10004	Sub13 Main Error code	AI	13002
Sub10 Supply temperature	AI	10005	Sub13 Current Heat capacity	AI	13004
Sub10 Return temperature	AI	10006	Sub13 Supply temperature	AI	13005
Sub10 Maximum Heat capacity	AI	10008	Sub13 Return temperature	AI	13006
Sub10 Exhaust temperature	AI	10009	Sub13 Maximum Heat capacity	AI	13008
Sub10 Total time after installation	AI	10010	Sub13 Exhaust temperature	AI	13009
Sub10 Number of CH operation	AI	10011	Sub13 Total time after installation	AI	13010
Sub10 Total time of CH operation	AI	10012	Sub13 Number of CH operation	AI	13011
Sub10 Current amount of gas	AI	10013	Sub13 Total time of CH operation	AI	13012
Sub10 Total amount of gas	AI	10014	Sub13 Current amount of gas	AI	13013
Sub11 Operation Status	AI	11001	Sub13 Total amount of gas	AI	13014

Point Name	BACnet Object Type	BACnet Object ID	Point Name	BACnet Object Type	BACnet Object ID
Sub14 Operation Status	AI	14001	Sub16 Total amount of gas	AI	16014
Sub14 Main Error code	AI	14002	Sub17 Operation Status	AI	17001
Sub14 Current Heat capacity	AI	14004	Sub17 Main Error code	AI	17002
Sub14 Supply temperature	AI	14005	Sub17 Current Heat capacity	AI	17004
Sub14 Return temperature	AI	14006	Sub17 Supply temperature	AI	17005
Sub14 Maximum Heat capacity	AI	14008	Sub17 Return temperature	AI	17006
Sub14 Exhaust temperature	AI	14009	Sub17 Maximum Heat capacity	AI	17008
Sub14 Total time after installation	AI	14010	Sub17 Exhaust temperature	AI	17009
Sub14 Number of CH operation	AI	14011	Sub17 Total time after installation	AI	17010
Sub14 Total time of CH operation	AI	14012	Sub17 Number of CH operation	AI	17011
Sub14 Current amount of gas	AI	14013	Sub17 Total time of CH operation	AI	17012
Sub14 Total amount of gas	AI	14014	Sub17 Current amount of gas	AI	17013
Sub15 Operation Status	AI	15001	Sub17 Total amount of gas	AI	17014
Sub15 Main Error code	AI	15002	Sub18 Operation Status	AI	18001
Sub15 Current Heat capacity	AI	15004	Sub18 Main Error code	AI	18002
Sub15 Supply temperature	AI	15005	Sub18 Current Heat capacity	AI	18004
Sub15 Return temperature	AI	15006	Sub18 Supply temperature	AI	18005
Sub15 Maximum Heat capacity	AI	15008	Sub18 Return temperature	AI	18006
Sub15 Exhaust temperature	AI	15009	Sub18 Maximum Heat capacity	AI	18008
Sub15 Total time after installation	AI	15010	Sub18 Exhaust temperature	AI	18009
Sub15 Number of CH operation	AI	15011	Sub18 Total time after installation	AI	18010
Sub15 Total time of CH operation	AI	15012	Sub18 Number of CH operation	AI	18011
Sub15 Current amount of gas	AI	15013	Sub18 Total time of CH operation	AI	18012
Sub15 Total amount of gas	AI	15014	Sub18 Current amount of gas	AI	18013
Sub16 Operation Status	AI	16001	Sub18 Total amount of gas	AI	18014
Sub16 Main Error code	AI	16002	Sub19 Operation Status	AI	19001
Sub16 Current Heat capacity	AI	16004	Sub19 Main Error code	AI	19002
Sub16 Supply temperature	AI	16005	Sub19 Current Heat capacity	AI	19004
Sub16 Return temperature	AI	16006	Sub19 Supply temperature	AI	19005
Sub16 Maximum Heat capacity	AI	16008	Sub19 Return temperature	AI	19006
Sub16 Exhaust temperature	AI	16009	Sub19 Maximum Heat capacity	AI	19008
Sub16 Total time after installation	AI	16010	Sub19 Exhaust temperature	AI	19009
Sub16 Number of CH operation	AI	16011	Sub19 Total time after installation	AI	19010
Sub16 Total time of CH operation	AI	16012	Sub19 Number of CH operation	AI	19011
Sub16 Current amount of gas	AI	16013	Sub19 Total time of CH operation	AI	19012

Point Name	BACnet Object Type	BACnet Object ID	Point Name	BACnet Object Type	BACnet Object ID
Sub19 Current amount of gas	AI	19013	Sub22 Total time of CH operation	AI	22012
Sub19 Total amount of gas	AI	19014	Sub22 Current amount of gas	AI	22013
Sub20 Operation Status	AI	20001	Sub22 Total amount of gas	AI	22014
Sub20 Main Error code	AI	20002	Sub23 Operation Status	AI	23001
Sub20 Current Heat capacity	AI	20004	Sub23 Main Error code	AI	23002
Sub20 Supply temperature	AI	20005	Sub23 Current Heat capacity	AI	23004
Sub20 Return temperature	AI	20006	Sub23 Supply temperature	AI	23005
Sub20 Maximum Heat capacity	AI	20008	Sub23 Return temperature	AI	23006
Sub20 Exhaust temperature	AI	20009	Sub23 Maximum Heat capacity	AI	23008
Sub20 Total time after installation	AI	20010	Sub23 Exhaust temperature	AI	23009
Sub20 Number of CH operation	AI	20011	Sub23 Total time after installation	AI	23010
Sub20 Total time of CH operation	AI	20012	Sub23 Number of CH operation	AI	23011
Sub20 Current amount of gas	AI	20013	Sub23 Total time of CH operation	AI	23012
Sub20 Total amount of gas	AI	20014	Sub23 Current amount of gas	AI	23013
Sub21 Operation Status	AI	21001	Sub23 Total amount of gas	AI	23014
Sub21 Main Error code	AI	21002	Sub24 Operation Status	AI	24001
Sub21 Current Heat capacity	AI	21004	Sub24 Main Error code	AI	24002
Sub21 Supply temperature	AI	21005	Sub24 Current Heat capacity	AI	24004
Sub21 Return temperature	AI	21006	Sub24 Supply temperature	AI	24005
Sub21 Maximum Heat capacity	AI	21008	Sub24 Return temperature	AI	24006
Sub21 Exhaust temperature	AI	21009	Sub24 Maximum Heat capacity	AI	24008
Sub21 Total time after installation	AI	21010	Sub24 Exhaust temperature	AI	24009
Sub21 Number of CH operation	AI	21011	Sub24 Total time after installation	AI	24010
Sub21 Total time of CH operation	AI	21012	Sub24 Number of CH operation	AI	24011
Sub21 Current amount of gas	AI	21013	Sub24 Total time of CH operation	AI	24012
Sub21 Total amount of gas	AI	21014	Sub24 Current amount of gas	AI	24013
Sub22 Operation Status	AI	22001	Sub24 Total amount of gas	AI	24014
Sub22 Main Error code	AI	22002	Sub25 Operation Status	AI	25001
Sub22 Current Heat capacity	AI	22004	Sub25 Main Error code	AI	25002
Sub22 Supply temperature	AI	22005	Sub25 Current Heat capacity	AI	25004
Sub22 Return temperature	AI	22006	Sub25 Supply temperature	AI	25005
Sub22 Maximum Heat capacity	AI	22008	Sub25 Return temperature	AI	25006
Sub22 Exhaust temperature	AI	22009	Sub25 Maximum Heat capacity	AI	25008
Sub22 Total time after installation	AI	22010	Sub25 Exhaust temperature	AI	25009
Sub22 Number of CH operation	AI	22011	Sub25 Total time after installation	AI	25010

Point Name	BACnet Object Type	BACnet Object ID	Point Name	BACnet Object Type	BACnet Object ID
Sub25 Number of CH operation	AI	25011	Sub28 Total time after installation	AI	28010
Sub25 Total time of CH operation	AI	25012	Sub28 Number of CH operation	AI	28011
Sub25 Current amount of gas	AI	25013	Sub28 Total time of CH operation	AI	28012
Sub25 Total amount of gas	AI	25014	Sub28 Current amount of gas	AI	28013
Sub26 Operation Status	AI	26001	Sub28 Total amount of gas	AI	28014
Sub26 Main Error code	AI	26002	Sub29 Operation Status	AI	29001
Sub26 Current Heat capacity	AI	26004	Sub29 Main Error code	AI	29002
Sub26 Supply temperature	AI	26005	Sub29 Current Heat capacity	AI	29004
Sub26 Return temperature	AI	26006	Sub29 Supply temperature	AI	29005
Sub26 Maximum Heat capacity	AI	26008	Sub29 Return temperature	AI	29006
Sub26 Exhaust temperature	AI	26009	Sub29 Maximum Heat capacity	AI	29008
Sub26 Total time after installation	AI	26010	Sub29 Exhaust temperature	AI	29009
Sub26 Number of CH operation	AI	26011	Sub29 Total time after installation	AI	29010
Sub26 Total time of CH operation	AI	26012	Sub29 Number of CH operation	AI	29011
Sub26 Current amount of gas	AI	26013	Sub29 Total time of CH operation	AI	29012
Sub26 Total amount of gas	AI	26014	Sub29 Current amount of gas	AI	29013
Sub27 Operation Status	AI	27001	Sub29 Total amount of gas	AI	29014
Sub27 Main Error code	AI	27002	Sub30 Operation Status	AI	30001
Sub27 Current Heat capacity	AI	27004	Sub30 Main Error code	AI	30002
Sub27 Supply temperature	AI	27005	Sub30 Current Heat capacity	AI	30004
Sub27 Return temperature	AI	27006	Sub30 Supply temperature	AI	30005
Sub27 Maximum Heat capacity	AI	27008	Sub30 Return temperature	AI	30006
Sub27 Exhaust temperature	AI	27009	Sub30 Maximum Heat capacity	AI	30008
Sub27 Total time after installation	AI	27010	Sub30 Exhaust temperature	AI	30009
Sub27 Number of CH operation	AI	27011	Sub30 Total time after installation	AI	30010
Sub27 Total time of CH operation	AI	27012	Sub30 Number of CH operation	AI	30011
Sub27 Current amount of gas	AI	27013	Sub30 Total time of CH operation	AI	30012
Sub27 Total amount of gas	AI	27014	Sub30 Current amount of gas	AI	30013
Sub28 Operation Status	AI	28001	Sub30 Total amount of gas	AI	30014
Sub28 Main Error code	AI	28002	Sub31 Operation Status	AI	31001
Sub28 Current Heat capacity	AI	28004	Sub31 Main Error code	AI	31002
Sub28 Supply temperature	AI	28005	Sub31 Current Heat capacity	AI	31004
Sub28 Return temperature	AI	28006	Sub31 Supply temperature	AI	31005
Sub28 Maximum Heat capacity	AI	28008	Sub31 Return temperature	AI	31006
Sub28 Exhaust temperature	AI	28009	Sub31 Maximum Heat capacity	AI	31008

Point Name	BACnet Object Type	BACnet Object ID
Sub31 Exhaust temperature	AI	31009
Sub31 Total time after installation	AI	31010
Sub31 Number of CH operation	AI	31011
Sub31 Total time of CH operation	AI	31012
Sub31 Current amount of gas	AI	31013
Sub31 Total amount of gas	AI	31014
Boiler On/Off command	AV	1
SH supply setpoint setting	AV	2
SH return setpoint setting	AV	3
DHW setpoint setting	AV	4
Error reset command	AV	5
Boiler setpoint in DHW operation	AV	7
Outdoor reset curve heatload setting	AV	9
Maximum outdoor temperature setting	AV	10
Minimum outdoor temperature setting	AV	11
WWSD temperature setting	AV	12
WWSD On differential setting	AV	13
Boost interval time setting	AV	14
Cascade Initial op units setting	AV	15
CH supply min temperature setting	AV	16
CH supply max temperature setting	AV	17
CH return min temperature setting	AV	18
CH return max temperature setting	AV	19

Appendix D.   Reference

Appendix D.1   Specifications

	Gateway Part Number GXXX001932
Electrical Connections	One 3-pin Phoenix connector with: RS-485/RS-232 port (TX+/RX-/gnd) One 3-pin Phoenix connector with: RS-485 (Tx+/Rx-/gnd) One 3-pin Phoenix connector with: Power port (+/-/Frame-gnd) One Ethernet 10/100 BaseT port
Power Requirements	Input Voltage: 12-24 VDC or 24 VAC Current draw: 24 VAC 125 mA Max Power: 3 Watts 12-24 VDC 250 mA @12 VDC
Approvals	CE and FCC Class B & C Part 15, UL 60950, WEEE compliant, IC Canada, RoHS compliant
Physical Dimensions	4 x 1.1 x 2.7 in (10.16 x 2.8 x 6.8 cm)
Weight	0.4 lbs (0.2 Kg)
Operating Temperature	-20°C to 70°C (-4°F to158°F)
Humidity	10-95% RH non-condensing
Wi-Fi 802.11 b/g/n	Frequency: 2.4 GHz Channels: 1 to 11 (inclusive) Antenna Type: SMA Encryption: TKIP, WPA & AES

(Specifications subject to change without notice)

Figure 40: Specifications

Appendix D.1.1   Compliance with UL Regulations

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

- 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 gateway.
- Furthermore, the interconnecting power cable shall:
  - Be of length not exceeding 3.05 m (118.3").
  - Be constructed of materials rated VW-1, 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 E.   Limited 2 Year Warranty

Sierra Monitor Corporation warrants its products to be free from defects in workmanship or material under normal use and service for two years after date of shipment. Sierra Monitor Corporation will repair or replace any equipment found to be defective during the warranty period. Final determination of the nature and responsibility for defective or damaged equipment will be made by Sierra Monitor Corporation personnel.

All warranties hereunder are contingent upon proper use in the application for which the product was intended and do not cover products which have been modified or repaired without Sierra Monitor Corporation's approval or which have been subjected to accident, improper maintenance, installation or application, or on which original identification marks have been removed or altered. This Limited Warranty also will not apply to interconnecting cables or wires, consumables or to any damage resulting from battery leakage.

In all cases Sierra Monitor Corporation's responsibility and liability under this warranty shall be limited to the cost of the equipment. The purchaser must obtain shipping instructions for the prepaid return of any item under this warranty provision and compliance with such instruction shall be a condition of this warranty.

Except for the express warranty stated above, Sierra Monitor Corporation disclaims all warranties with regard to the products sold hereunder including all implied warranties of merchantability and fitness and the express warranties stated herein are in lieu of all obligations or liabilities on the part of Sierra Monitor Corporation for damages including, but not limited to, consequential damages arising out of/or in connection with the use or performance of the product.

Memo

Memo

Installation & Operation Manual
Modbus/BACnet Gateway Start-up Guide
Part Number GXXX001932

Technical Support

Thank you for purchasing the Navien building automation system interface designed to convert boiler performance data to BACnet MS/TP, BACnet/IP and Modbus TCP/IP protocols.

For technical support please contact us at 800-519-8794.

T H E   L E A D E R   I N   C O N D E N S I N G   T E C H N O L O G Y