BRADFORD WHITE®

WATER HEATERS

Building Management System Gateway Kit
Installation and Quick Start Guide

Table of Contents

Hardware

Software

DIN Rail Installation

1) Disconnect (unplug) the water heater from 120 volt power source.

2) Latches secure the black surround hood to the appliance body with swell-actuation type fasteners. When secured, the latches are in the horizontal position. To remove the surround, all latches must be in the vertical position (120T shown, Figure 1).

Figure 1

3) DIN Rail Installation.
   a. Determine the rail mounting location. For all 120T and Commander (UCG) models with serial numbers WG-------- and after, mounting holes should already be placed on the jacket head. Mounting locations should be verified with the mounting templates located in this guide; there are specific mounting templates for each heater. Cut the mounting templates at the specified locations to ensure that template is correctly aligned.
   WARNING: Incorrect alignment of mounting template can cause the DIN rail to sit incorrectly and the water heater to not reassemble correctly.
   b. Figure 2 shows the existing DIN rail mounting holes on 120T product. The mounting template for the 120T product is shown on the right.
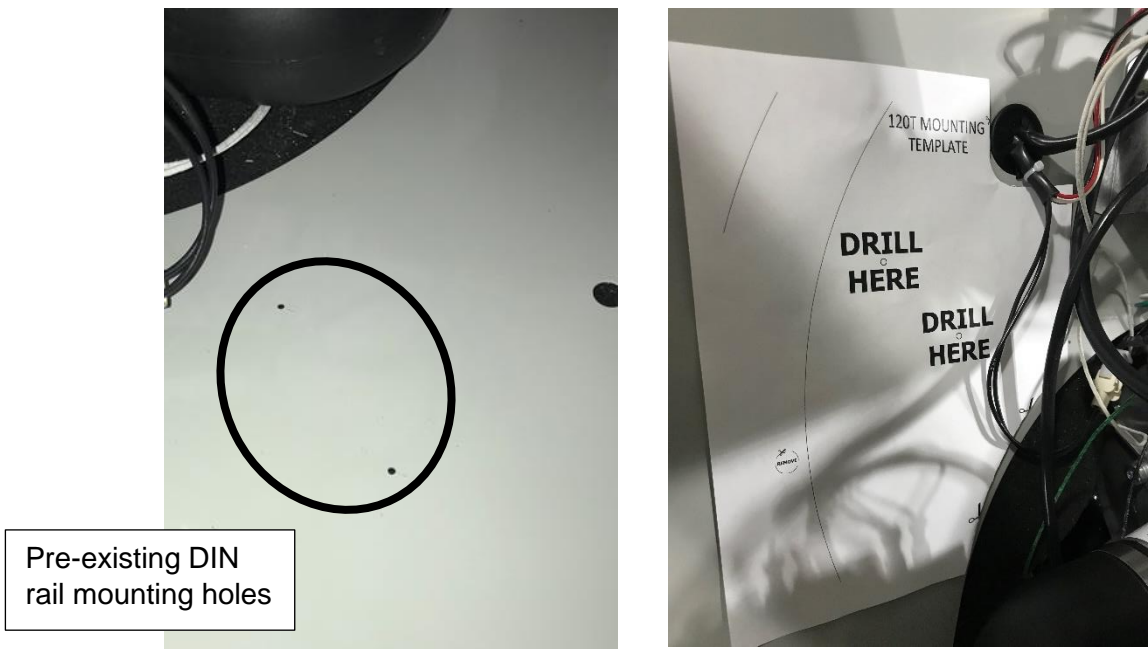   c. If mounting holes are needed, use the supplied screw to drill through the jacket head at the stated locations.
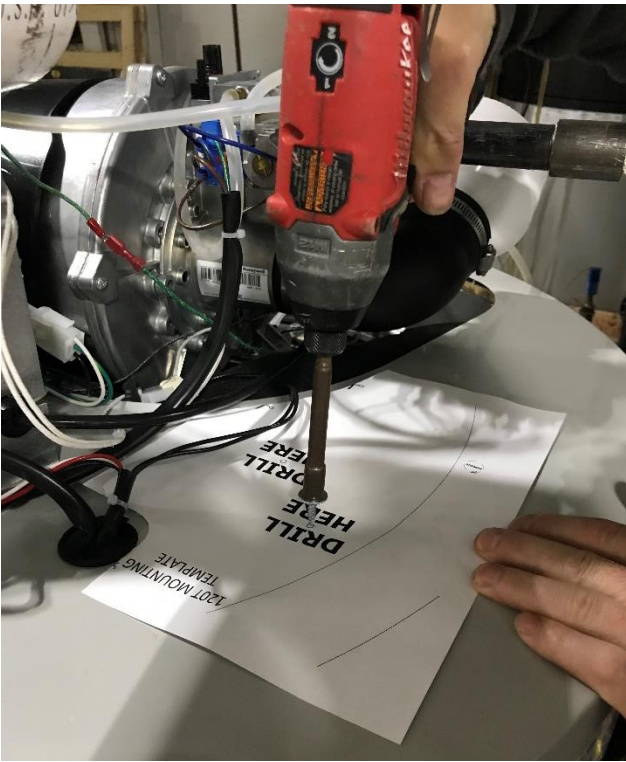

Pre-existing DIN rail mounting holes

Figure 2

Figure 3

d. Ensure that the mounting template is correctly lined up with the jacket head prior to drilling mounting locations (see Figure 3).
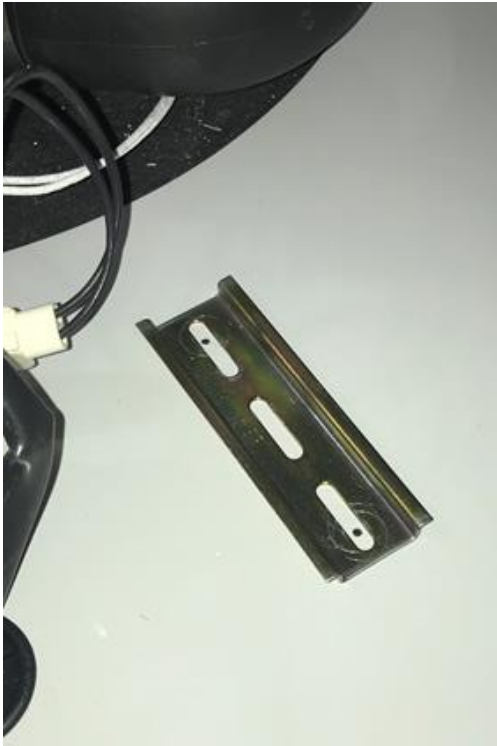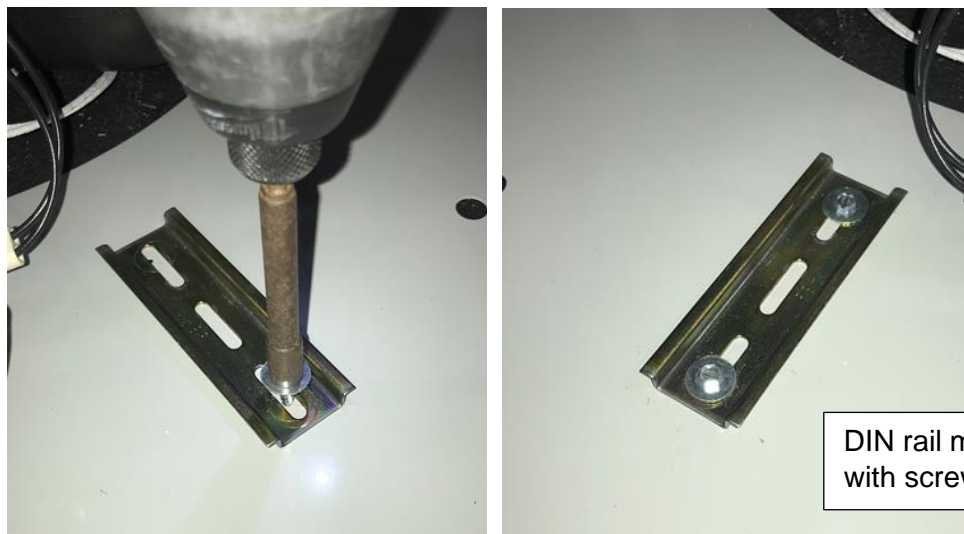e. Place the DIN rail over new or existing mounting locations.

Figure 4

f. The DIN rail correctly placed over mounting holes (see Figure 4).

g. Drive down supplied screws to complete the DIN rail mounting (see Figure 5).

Figure 5

DIN rail mounted
with screws

Protonode Installation

4) Install the ProtoNode on the DIN rail.
   a. Install the ProtoNode with the movable rail latch (circled, Figure 6) towards the back side of the water heater.

Figure 6

Front of
Water Heater

   b. Place the movable latch under the rail first (see Figure 7).

Figure 7

   c. After the rear latch is placed under the rail, bring the ProtoNode forward to latch under the front rail (see Figure 8).

Figure 8

d. The ProtoNode should now be correctly fastened to the DIN rail. The power connection (circled in white, Figure 9) should be facing towards the front of the water heater.

Figure 9

DIN Rail Installation

5) Disconnect (unplug) the water heater from 120 volt power source.

6) Latches secure the black lid to the appliance surround. Disconnect two latches and remove the lid.

7) DIN Rail Installation.
   a. Determine the rail mounting location. There are specific mounting templates for each heater located in the Appendix. Cut the mounting template at the specified locations to ensure that template is correctly aligned.
   WARNING: Incorrect alignment of mounting template can cause the DIN rail to sit incorrectly and the water heater to not reassemble correctly.
   b. Figure 10 shows how the mounting template is to be used to mount the DIN rail on the 60T/100T Product.
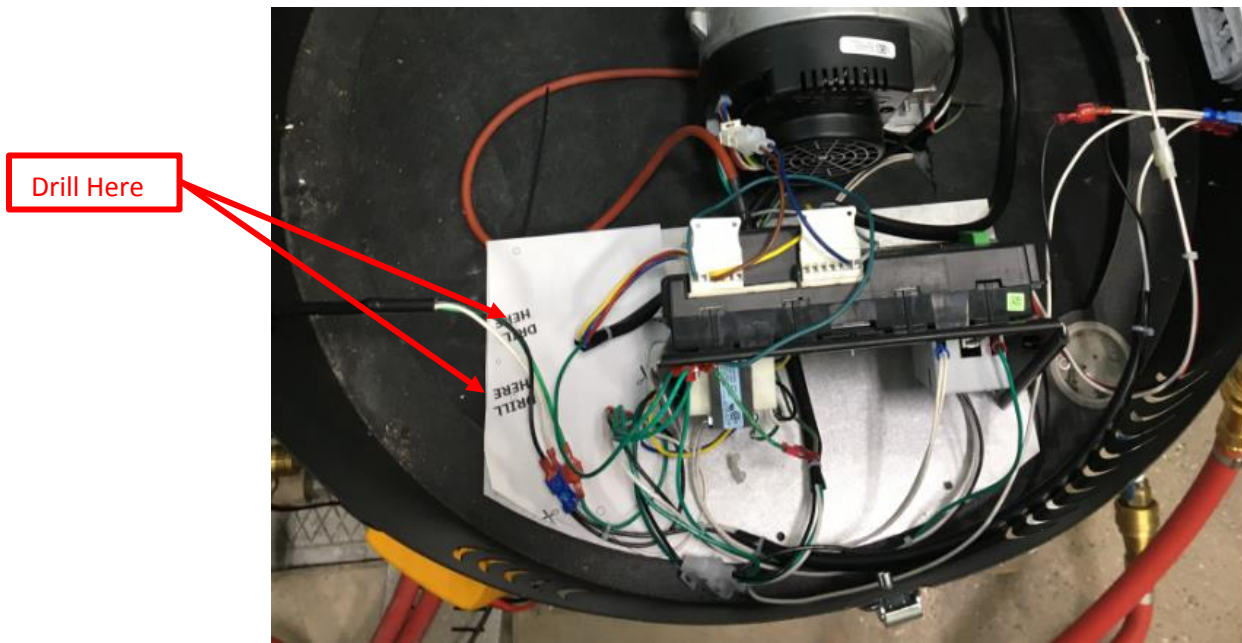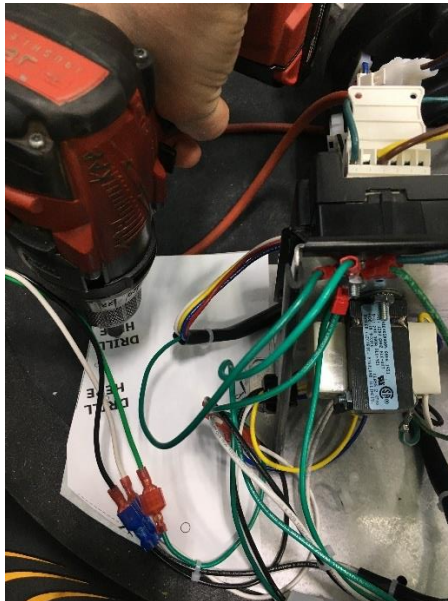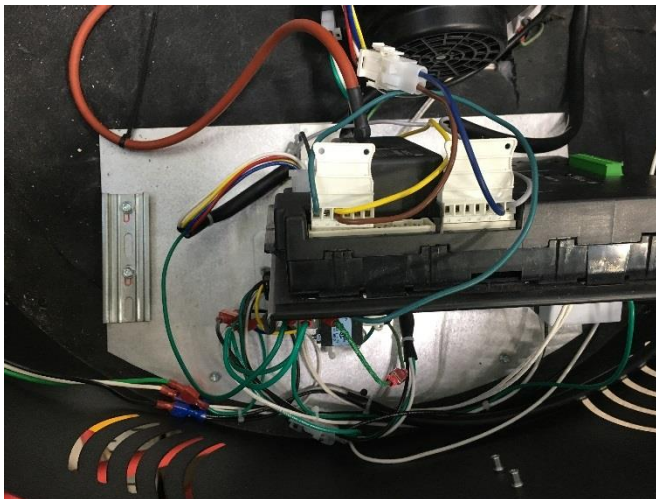   c. Use the supplied screws to drill through the control base at the stated locations.
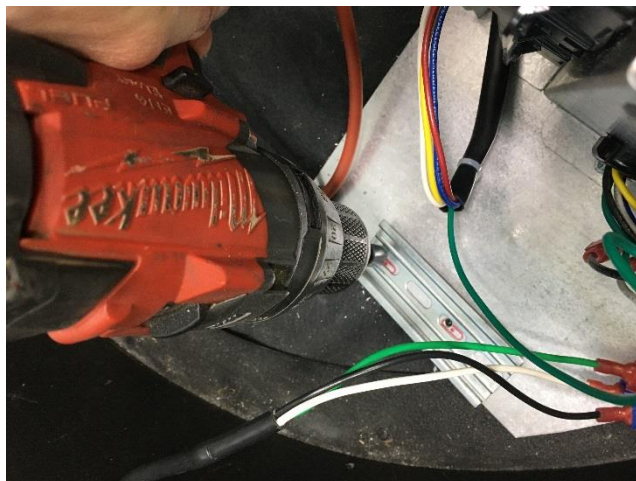

Figure 10

Figure 11

d. Ensure that the mounting template is correctly lined up with the control base prior to drilling mounting locations (see Figure 11). Removal of the base is not necessary to install DIN Rail.
e. Place the DIN rail over new mounting locations.

Figure 12

f. The DIN rail correctly placed over mounting holes (see Figure 12).
g. Drive down supplied screws to complete the DIN rail mounting (see Figure 13).

Figure 13

8) Install the ProtoNode on the DIN rail.
   a. Install the ProtoNode with the movable rail latch (circled, Figure 14) towards the SOLA controller

Figure 14

SOLA

b. Place the movable latch under the rail first (see Figure 15).

Figure 15

c. After the rear latch is placed under the rail, bring the ProtoNode forward to latch under the front rail (see Figure 16).

Figure 16

d. The ProtoNode should now be correctly fastened to the DIN rail. The power connection (circled in white, Figure 17) should be facing towards the SOLA controller. Mount the ProtoNode as far as possible from the spark cable.
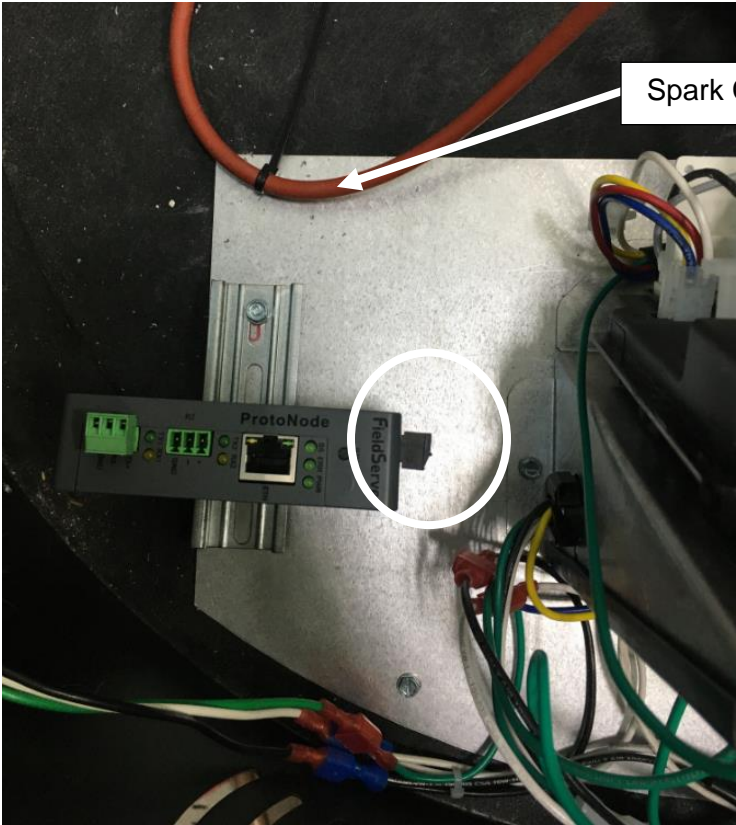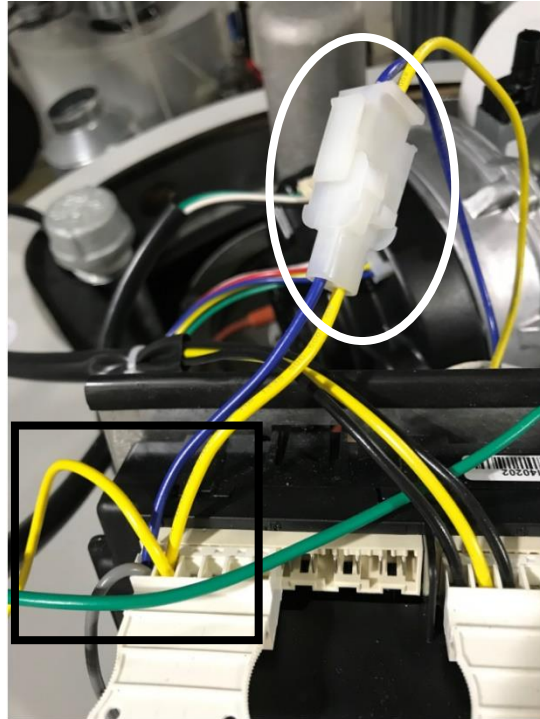
Figure 17
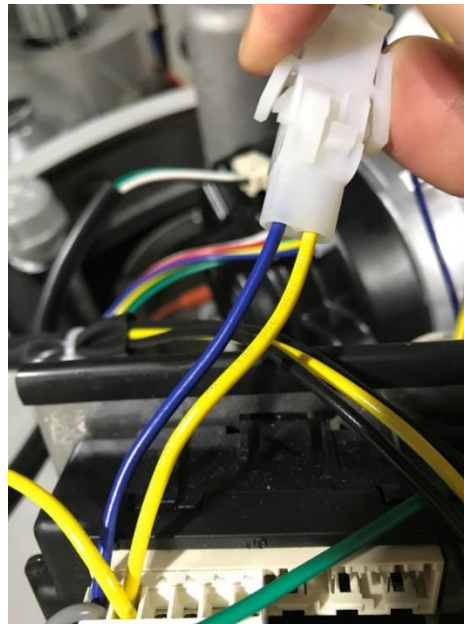

Spark Cable

ProtoNode Power and Communication

9) Install the Power Cord for ProtoNode.
   a. Find the connector (white circle, Figure 18) that connects the blue and yellow wires from the transformer to the SOLA control (black square, Figure 18).
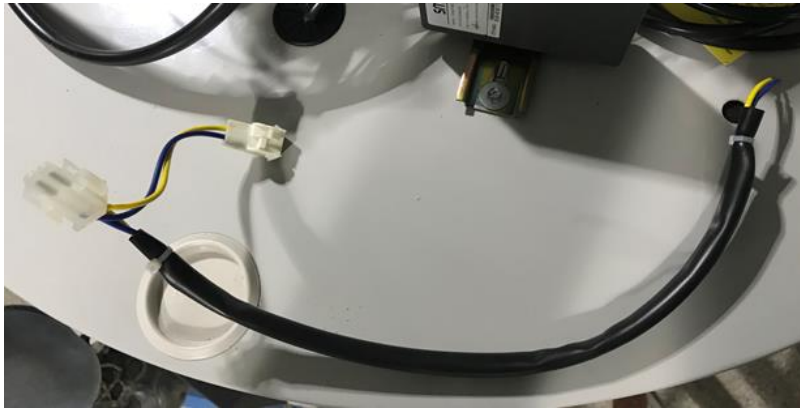
Figure 18

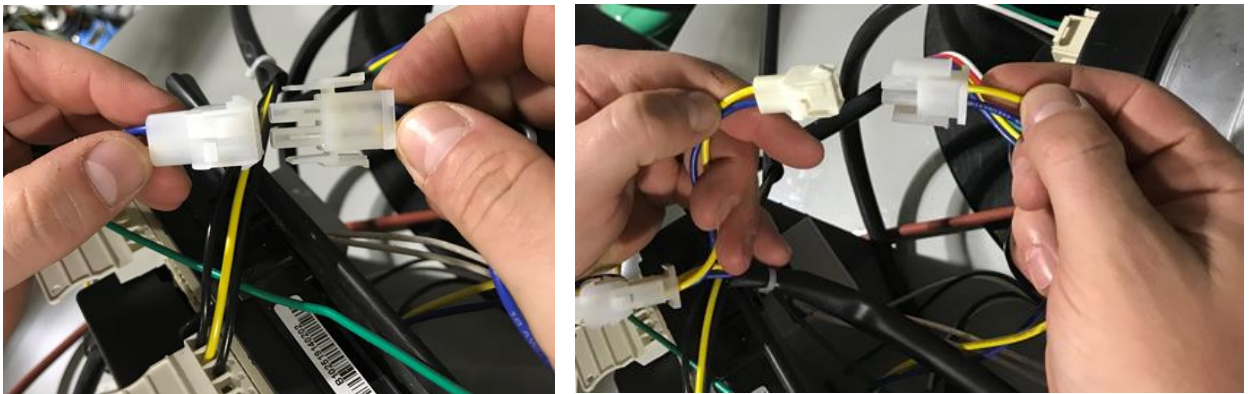b. Unplug the connector (see Figure 19).

Figure 19

c. Install the ProtoNode power harness, P/N: 239-53934-00, between this connector (see Figure 20).

Figure 20

d. Install the ProtoNode power harness male and female connectors into yellow and blue power harness between the Transformer and SOLA control (see Figure 21).

Figure 21

e. Install the stripped ends of the ProtoNode power harness into the ProtoNode power connector. Blue wire connects to +24VAC, ProtoNode pin Label L+. Yellow wire connects to neutral, ProtoNode pin label N- (see Figure 22).

Figure 22

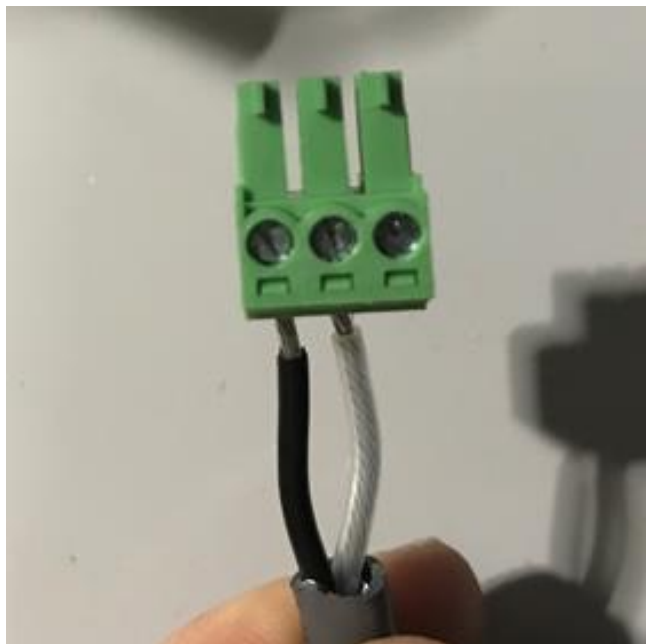f. Install the black connector to the ProtoNode (see Figure 23).

Figure 23

10) Install Communication Cable, P/N: 264-53959-00, between ProtoNode R1 port and SOLA Control (J3 port).
   a. The black wire is attached to the TX+ port (far left). The clear wire is attached to the RX- port (middle) (see Figure 24).

Figure 24

b. Plug harness into the R1 port on the ProtoNode (see Figure 25).

Figure 25

c. Unplug the green connector from J3 location on the SOLA control. The connector is circled in white (see Figure 26).

Figure 26

d. Connect the other end of the communication harness to the SOLA control. The black wire connects to the MB1 A terminal (bottom). The clear wire connects to the MB1 B terminal (2nd from bottom) (see Figure 27).

Figure 27

e. Reconnect the green SOLA connector once the ProtoNode cable has been installed (see Figure 28).

Figure 28

11) The ProtoNode should now be successfully connected. Reconnect the 120 volt power source and continue through the remainder of the start-up guide for instruction of connecting to the Building Management System.

12) (60T/100T ONLY) When routing communication cables to outside of the heater, refer to Figure 29. Route them around the inside of the shroud and out through the cut for the intake. DO NOT route communication cables over the shroud where they could be damaged when the water heater top is re-installed.
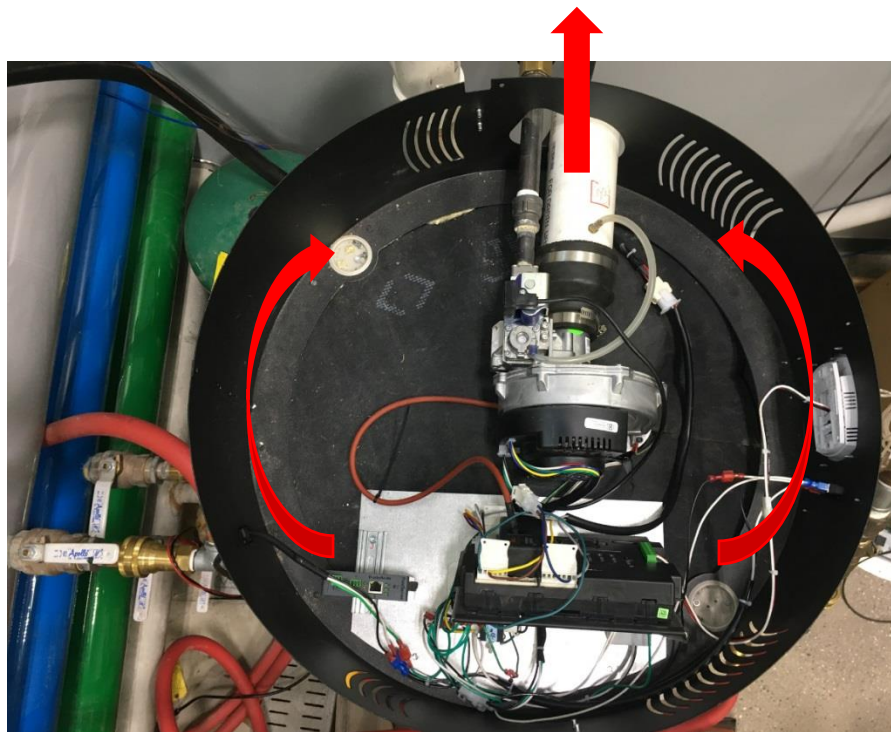

Figure 29

Software

Certification

BTL Mark – BACnet®1 Testing Laboratory

The BTL Mark on the ProtoNode 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.

Software Quick Start Guide

1. Record the information about the unit (Record Identification Data, pg 18).

2. Check that the ProtoNode and customer device COM settings match (Configuring Modbus Device Communications, pg 19).

3. Connect the ProtoNode 3 pin RS-485 R1 port to the RS-485 network connected to each of the devices (Device Connections to ProtoNode, pg 19).

4. **If using a serial field protocol:** Connect the ProtoNode 3 pin RS-485 R2 port to the field protocol cabling (Wiring Field Port to RS-485 Serial Network, pg 19).

5. Connect power to the ProtoNode 3 pin power port (Power-Up ProtoNode, pg 21).

6. Connect a PC to the ProtoNode via Ethernet cable (Connect the PC to the ProtoNode, pg 21).

7. Use a web browser to access the ProtoNode Web Configurator page to select the profile of the device attached to the ProtoNode and enter any necessary device information. Once the device is selected, the ProtoNode automatically builds and loads the appropriate configuration (Configure the ProtoNode, pg 22).

8. Ethernet Network: If using an Ethernet field protocol, use a web browser to access the ProtoNode Web Configurator page to change the IP Address (Ethernet Network: Setting IP Address for the Field Network, pg 27).

Software Introduction

ProtoNode Gateway

The ProtoNode is an external, high performance **building automation multi-protocol gateway** that is preconfigured to automatically communicate between Bradford White's devices (hereafter simply called "device") connected to the ProtoNode 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 ProtoNode is pre-loaded with tested profiles/configurations for the supported devices.

ProtoNode Setup

Record Identification Data

Each ProtoNode 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:

Table 1	
Model	**Part Number**
ProtoNode	FPC-N54-1797

Point Count Capacity and Registers per Device

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

Table 2	
Part Number	**Total Registers**
FPC-N54-1797	1,500

Table 3	
Devices	**Registers per Device**
SOLA	20

Configuring Modbus Device Communications

Confirm the Device and ProtoNode COM Settings match.

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

Table 4	
Port Setting	**Device**
Protocol	Modbus RTU
Baud Rate	38400
Parity	None
Data Bits	8
Stop Bits	1

Set Node-ID for any Device Attached to the ProtoNode

- 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.

NOTE: The Modbus TCP/IP field protocol Node-ID is automatically set to be the same value as the Node-ID of the device.

Interfacing ProtoNode to Devices

Device Connections to ProtoNode

The ProtoNode has a 3-pin Phoenix connector for connecting RS-485 devices on the R1 port (Figure 30).
NOTE: Use standard grounding principles for RS-485 GND.

Device Pins	ProtoNode Pin Label	Pin Assignment
RS-485 +	TX +	RS-485 +
RS-485 -	TX -	RS-485 -
RS-485 GND	GND	RS-485 GND
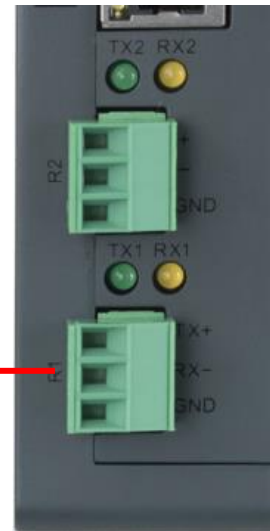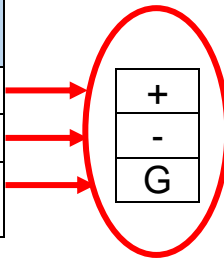
Figure 30

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 31).
    - Use standard grounding principles for RS-485 GND.
- See Connect the PC to the ProtoNode (pg 21) for information on connecting to the Ethernet network.

BMS Wiring	ProtoNode Pin Label	Pin Assignment
RS-485 +	TX +	RS-485 +
RS-485 -	TX -	RS-485 -
-	GND	RS-485 GND
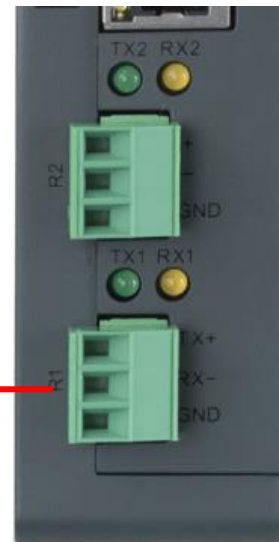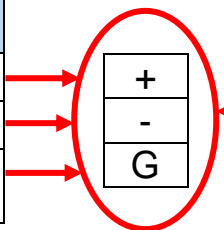
Figure 31

Bias Resistors

To enable Bias Resistors, move both the BIAS- and BIAS+ dip switches to the right as shown in Figure 32.

The ProtoNode 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.

NOTE: The R1 and R2 DIP switches
apply settings to the respective serial
port.

NOTE: If the gateway is already
powered on, DIP switch settings will
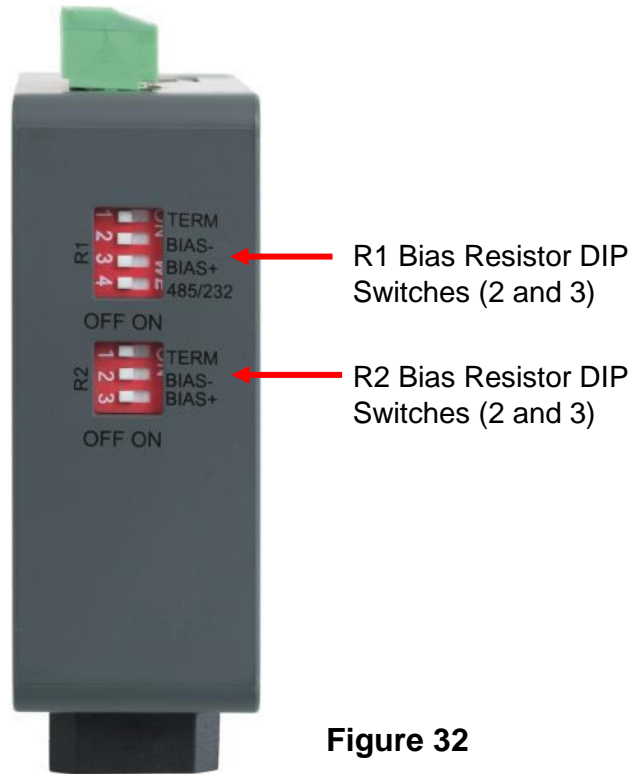not take effect unless the unit is power
cycled.

R1 Bias Resistor DIP
Switches (2 and 3)

R2 Bias Resistor DIP
Switches (2 and 3)

Figure 32

Termination Resistor

If the ProtoNode 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 in
the orientation shown in Figure 33.**

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.

NOTE: If the gateway is already powered on, DIP switch settings will not take effect unless the unit is
power cycled.

R1 Termination Resistor
DIP Switch (1)

R2 Termination Resistor
DIP Switch (1)
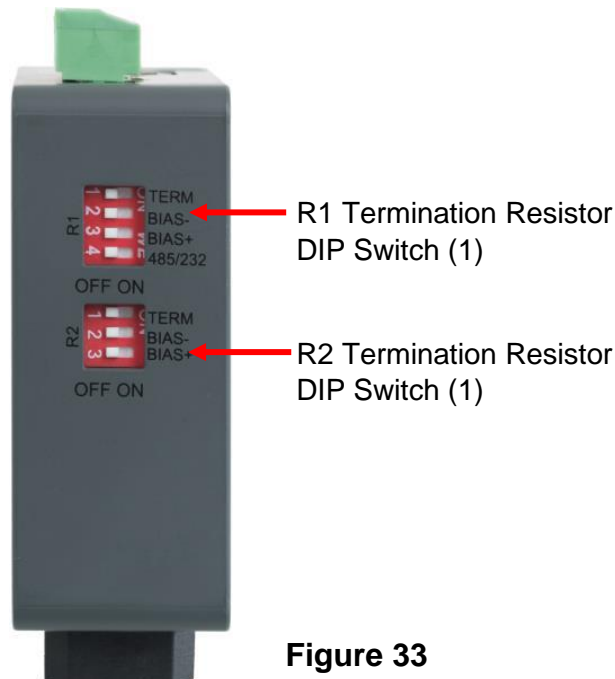
Figure 33

Power-Up ProtoNode

Check power requirements in Table 5:

Table 5		
Power Requirement for ProtoNode External Gateway		
	Current Draw Type	
ProtoNode Family	12VDC	24VDC/AC
FPC – N54 (Typical)	250mA	125mA
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.		

Apply power to the ProtoNode as shown in **Figure 34.** Ensure that the power supply used complies with the specifications provided in **Appendix D.1**.

- The ProtoNode accepts 9-30VDC or 24VAC on pins L+ and N-.
- Frame GND should be connected.

Power to ProtoNode	ProtoNode Pin Label	Pin Assignment
Power in (+)	L +	V +
Power out (-)	N -	V -
Frame Ground	FG	FRAME GND
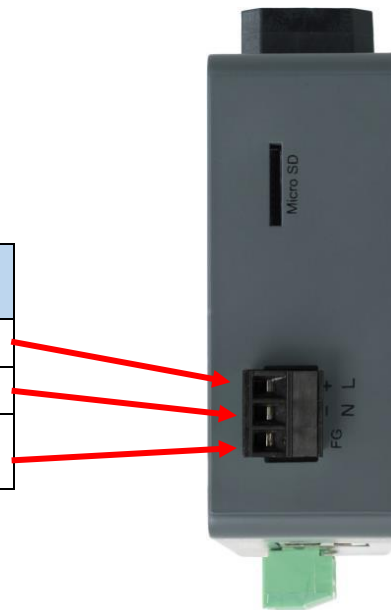
Figure 34

Connect a PC to the ProtoNode

Connecting to the ProtoNode via Ethernet
Connect a Cat-5 Ethernet cable (straight through or cross-over) between the local PC and ProtoNode.

Ethernet Port
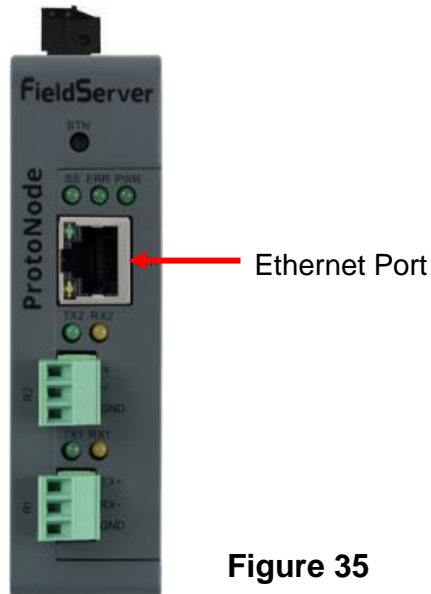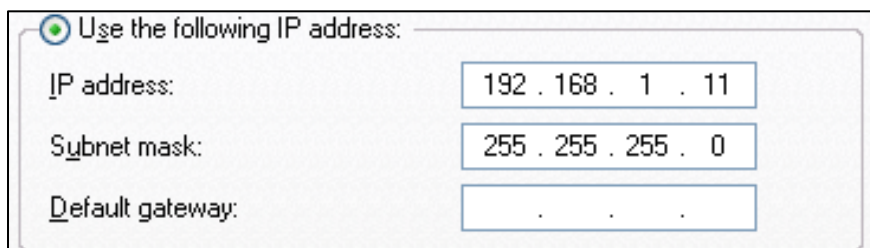
Figure 35

Changing the Subnet of the Connected PC

The default IP Address for the 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:
- Find the search field in the local computer's taskbar (usually to the right of the windows icon) and type in "Control Panel".
- Click Control Panel, click Network and Internet, and then click Network and Sharing Center.
- Click Change Adapter Settings on the left side of the window.
- Right-click on Local Area Connection and select Properties from the dropdown menu.
- Highlight and then click the Properties button.
- Select and enter a static IP Address on the same subnet. For example:

Figure 36

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

ProtoNode Configuration

Accessing the ProtoNode Web Configurator
- Navigate to the IP Address of the ProtoAir on the local PC by opening a web browser and entering the IP Address of the ProtoAir; the default Ethernet address is 192.168.1.24.

NOTE: If the IP Address of the ProtoNode has been changed, the IP Address can be discovered using the FS Toolbox utility. See Appendix A.1 for instructions.

- Once at the Web App splash page, click the Login button.
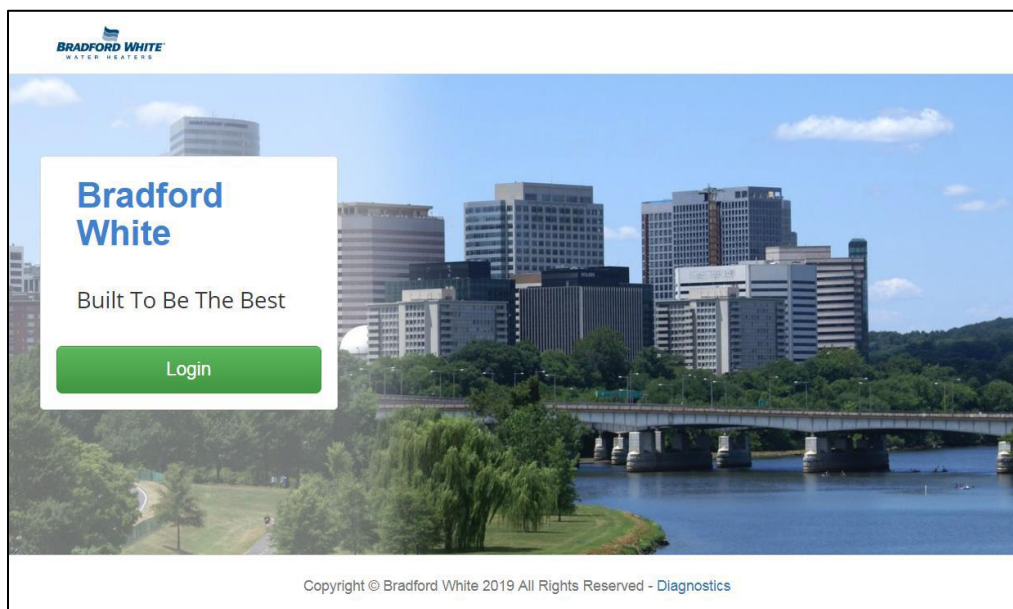
Figure 37

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

NOTE: The default username is "admin". The default password is "admin".

Figure 38

Authentication Required

http://192.168.3.244 requires a username and password.
Your connection to this site is not private.

User Name:

Password:

Log In   Cancel
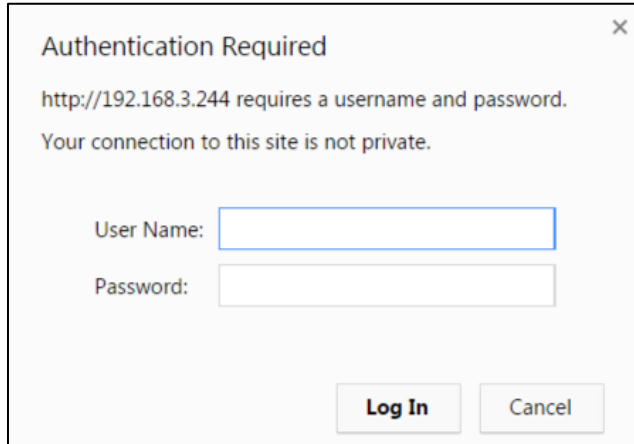
- From the Web App landing page (Figure 39), click the Settings tab and then click Configuration.

Figure 39

- Then click the Profiles Configuration button to go to the Web Configurator page (Figure 40).
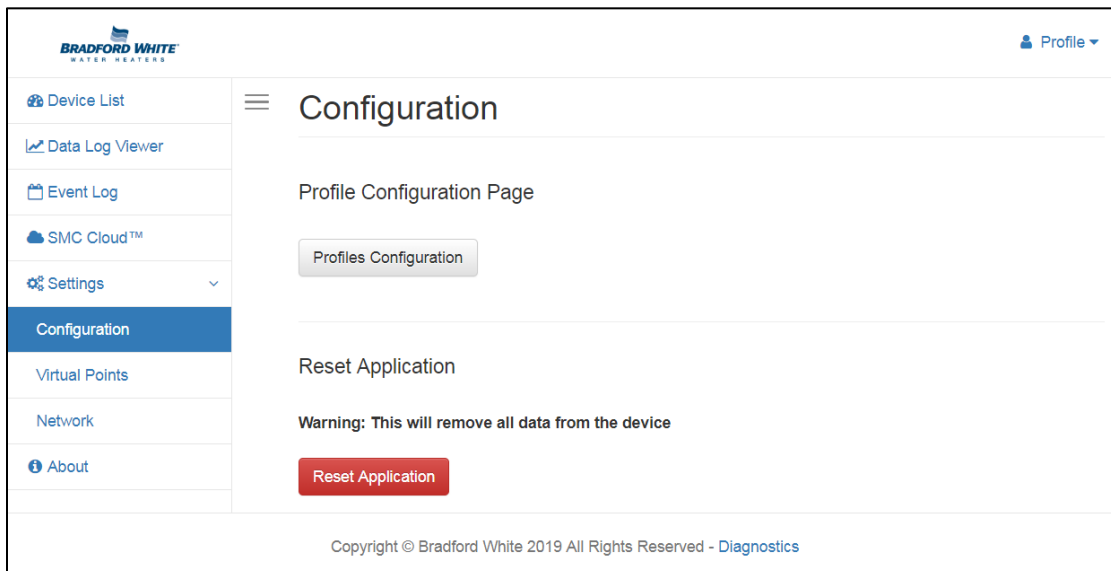
Figure 40

Select Field Protocol and Set Configuration Parameters

- On the Web Configurator page, the first configuration parameter is the Protocol Selector.

Figure 41

- Select the field protocol by entering the appropriate number into the Protocol Selector Value. Click the Submit button. Click the System Restart button to save the updated configuration.

NOTE: Protocol specific parameters are only visible when the associated protocol is selected.

NOTE: If Modbus TCP/IP was selected and is used for the field protocol, skip Setting ProtoNode Active Profiles (pg 25). Device profiles are NOT used for Modbus TCP/IP.

- Ensure that all parameters are entered for successful operation of the gateway. Find the legal value options for each parameter under the Parameter Description in parentheses.

NOTE: If multiple devices are connected to the ProtoAir, set the BACnet Virtual Server Nodes field to "Yes," otherwise leave the field on the default "No" setting.

Setting ProtoNode Active Profiles

- 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 42).

Figure 42

- To add an active profile to support a device, click the Add button under the Active Profiles heading. This will present a profile drop-down menu underneath the Current profile column.
- 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 Set Node-ID for any Device Attached to the ProtoNode, (pg 19).
- Then press the Submit button to add the Profile to the list of devices to be configured.
- Repeat this process until all the devices have been added.
- Completed additions are listed under "Active profiles" as shown in Figure 43.

Figure 43

Verify Device Communication

- **Check that the port R1 TX1 and RX1 LEDs are rapidly flashing**. See Appendix A.4 for additional LED information and images (pg 32).
- Confirm the software shows good communications without errors (Appendix A.2, pg 31).

Ethernet Network: Setting IP Address for the Field Network

- Follow the steps outlined in Accessing the ProtoNode Web Configurator (pg 22) to access the ProtoAir Web Configurator.
- To access the FS-GUI, click on the Diagnostics & Debugging button in the bottom right corner of the page (Figure 44).

Figure 44

- From the FS-GUI landing page, click on "Setup" to expand the navigation tree and then select "Network Settings" to access the IP Settings menu (Figure 45).
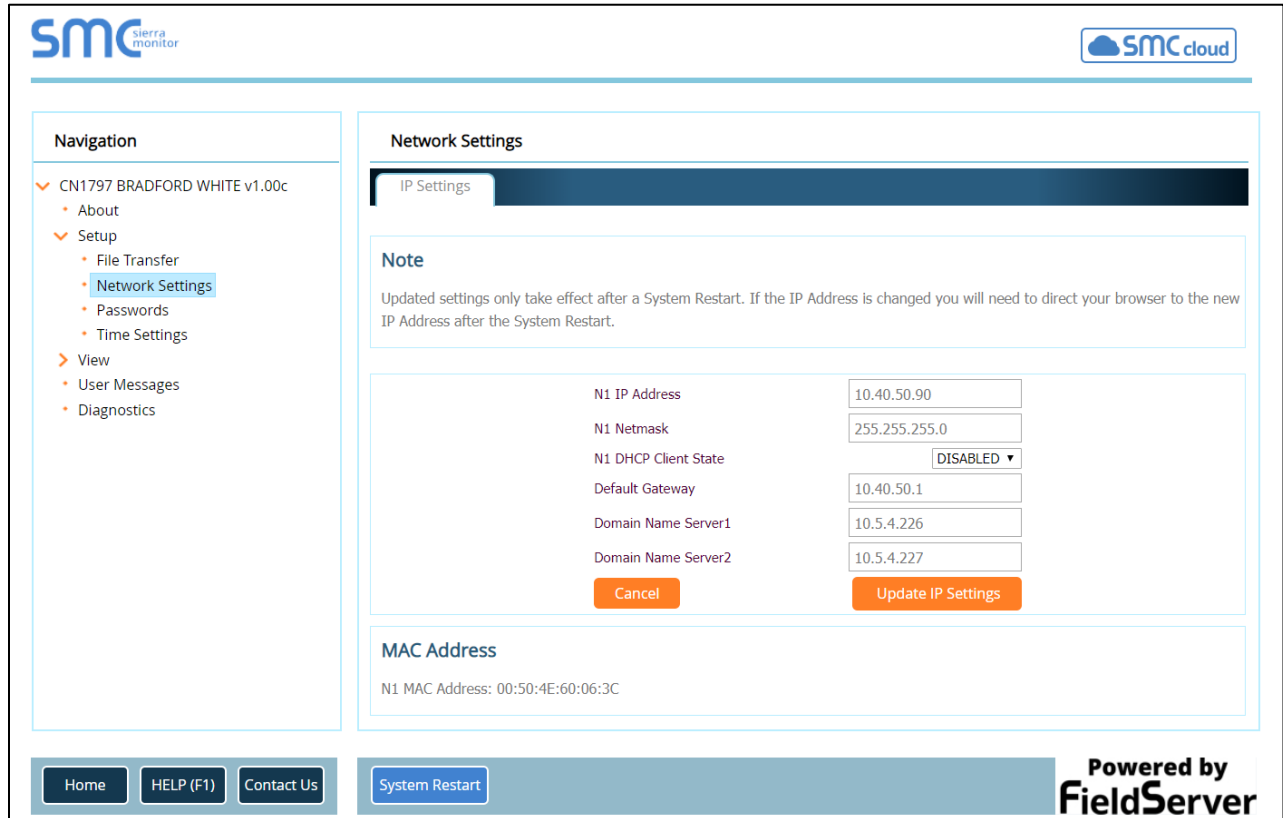
Figure 45

- Modify the IP Address (N1 IP Address field) of the ProtoNode Ethernet port.
- If necessary, change the Netmask (N1 Netmask field).
- If necessary, change the IP Gateway (Default Gateway field).

NOTE: If the ProtoNode is connected to a managed switch/router, the IP Gateway of the ProtoNode should be set to the IP Address of that managed switch/router.

- Click the System Restart button at the bottom of the page to apply changes and restart the ProtoNode.
- Unplug Ethernet cable from PC and connect it to the network switch or router.
- Record the IP Address assigned to the ProtoNode for future reference.

BACnet: Setting Node_Offset to Assign Specific Device Instances

- Follow the steps outlined in Accessing the ProtoNode Web Configurator (pg 22) to access the ProtoAir Web Configurator.
- 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.
- To assign a specific Device Instance (or range); change the Node_Offset value as needed using the following calculation: **Device Instance (desired) = Node_Offset + Node_ID**
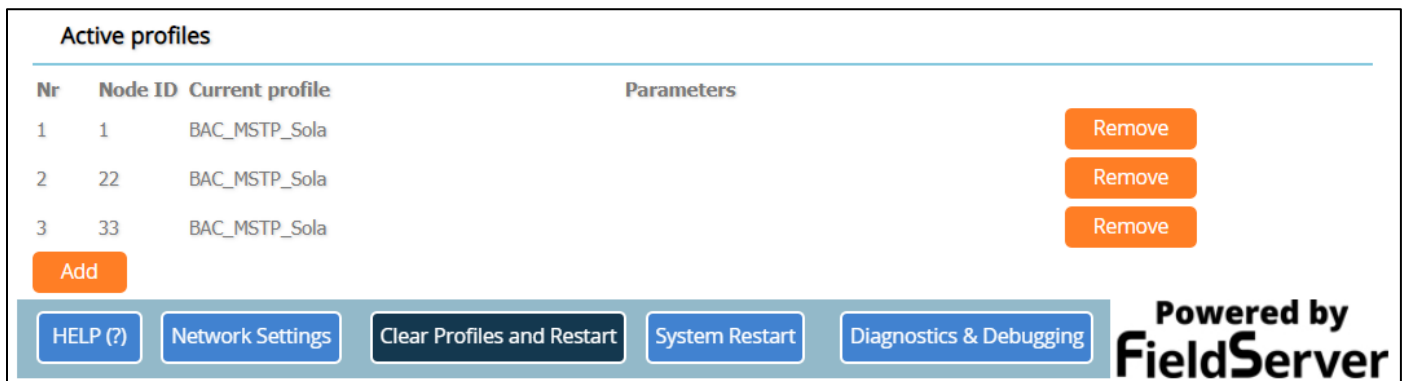
For example, if the desired Device Instance for the device 1 is 50,001 and the following is true:
- Device 1 has a Node-ID of 1
- Device 2 has a Node-ID of 22
- Device 3 has a Node-ID of 33

- Then plug the device 1'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 as shown:
    - Device 1 Instance = 50,000 + Node_ID = 50,000 + 1 = 50,001
    - Device 2 Instance = 50,000 + Node_ID = 50,000 + 22 = 50,022
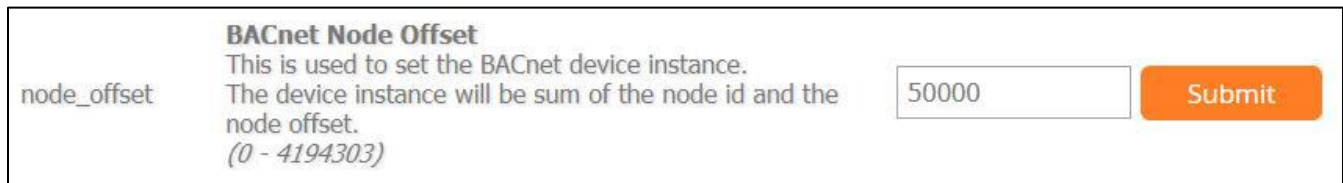   - Device 3 Instance = 50,000 + Node_ID = 50,000 + 33 = 50,033
- Click the Submit button once the desired value is entered.

Figure 46

Figure 47

How to Start the Installation Over: Clearing Profiles

- Follow the steps outlined in Accessing the ProtoNode Web Configurator (pg 22) to access the ProtoNode Web Configurator.
- 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.

Appendix A: Troubleshooting

Appendix A.1 – Lost or Incorrect IP Address

- Ensure that the FieldServer Toolbox is loaded onto the local PC. Otherwise, download the FieldServer-Toolbox.zip via the Sierra Monitor website's Software Downloads.
- Extract the executable file and complete the installation.

Ethernet Port
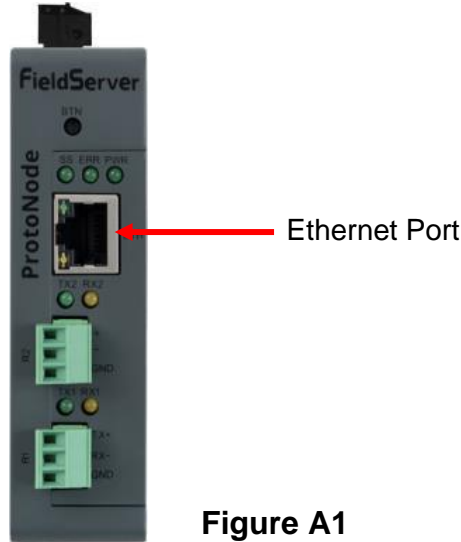
Figure A1

- Connect a standard Cat-5 Ethernet cable between the user's PC and ProtoNode.
- Double click on the FS Toolbox Utility and click Discover Now on the splash page.
- Check for the IP Address of the desired gateway.

Figure A2

DEVICES		IP ADDRESS	MAC ADDRESS	FAVORITE	CONNECTIVITY	
ProtoNode		192.168.3.110	00:50:4E:10:2C:92	★	●	Connect
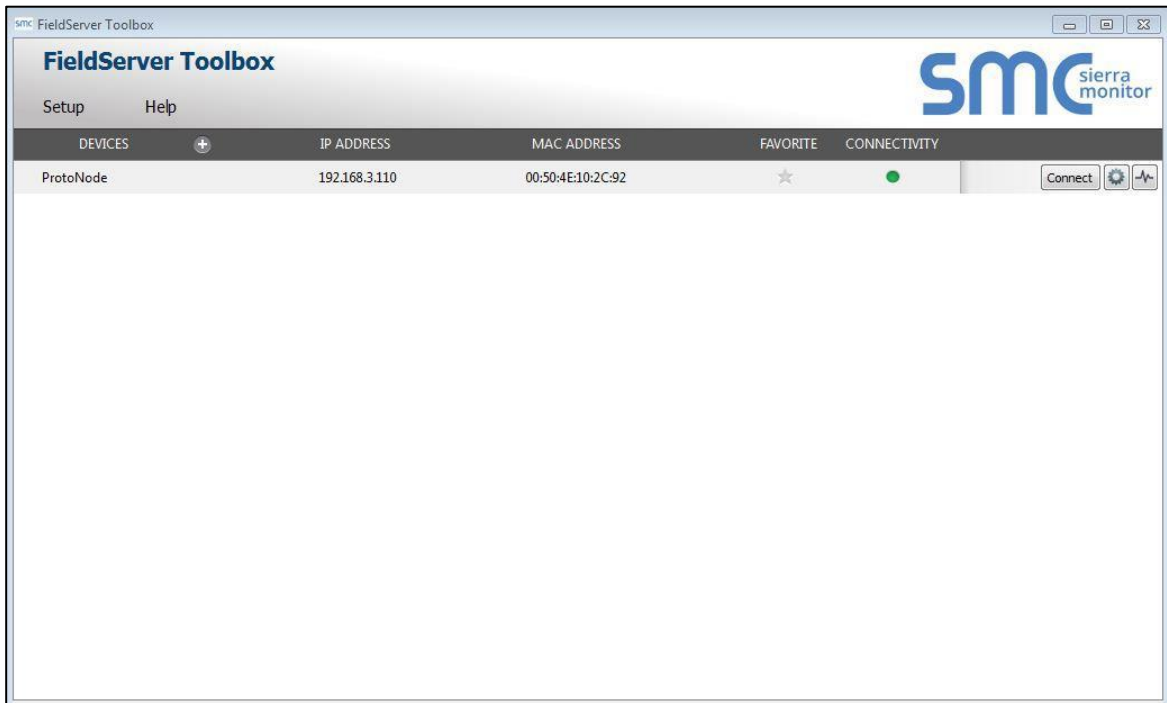
- If correcting the IP Address of the gateway: click the settings icon on the same row as the gateway, then click Network Settings, change the IP Address and click Update IP Settings to save.

Appendix A.2 – Viewing Diagnostic Information

- Type the IP address of the ProtoNode into the web browser or use the FieldServer Toolbox to connect to the ProtoNode.
- Click on Diagnostics button, then click on view, and then on connections.
- If there are any errors showing on the Connections page, refer to Appendix A.3 (pg 31) to check the wiring and settings.

Figure A3

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 ProtoNode (see Appendix A.4, pg 32).
  - 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 (see Setting ProtoNode Active Profiles, pg 25).
- Field COM problems:
  - Visual observations of LEDs on the ProtoNode (Appendix A.4, pg 32).
  - Verify IP address setting.
  - Verify wiring.

NOTE: If the problem still exists, a Diagnostic Capture needs to be taken and sent to technical support (see Appendix A.5, pg 33).

Appendix A.4 – LED Diagnostics for Communications Between ProtoNode and Devices

See Figure 51 for ProtoNode FPC-N54 LED locations.

FPC-N54
Diagnostic LEDS
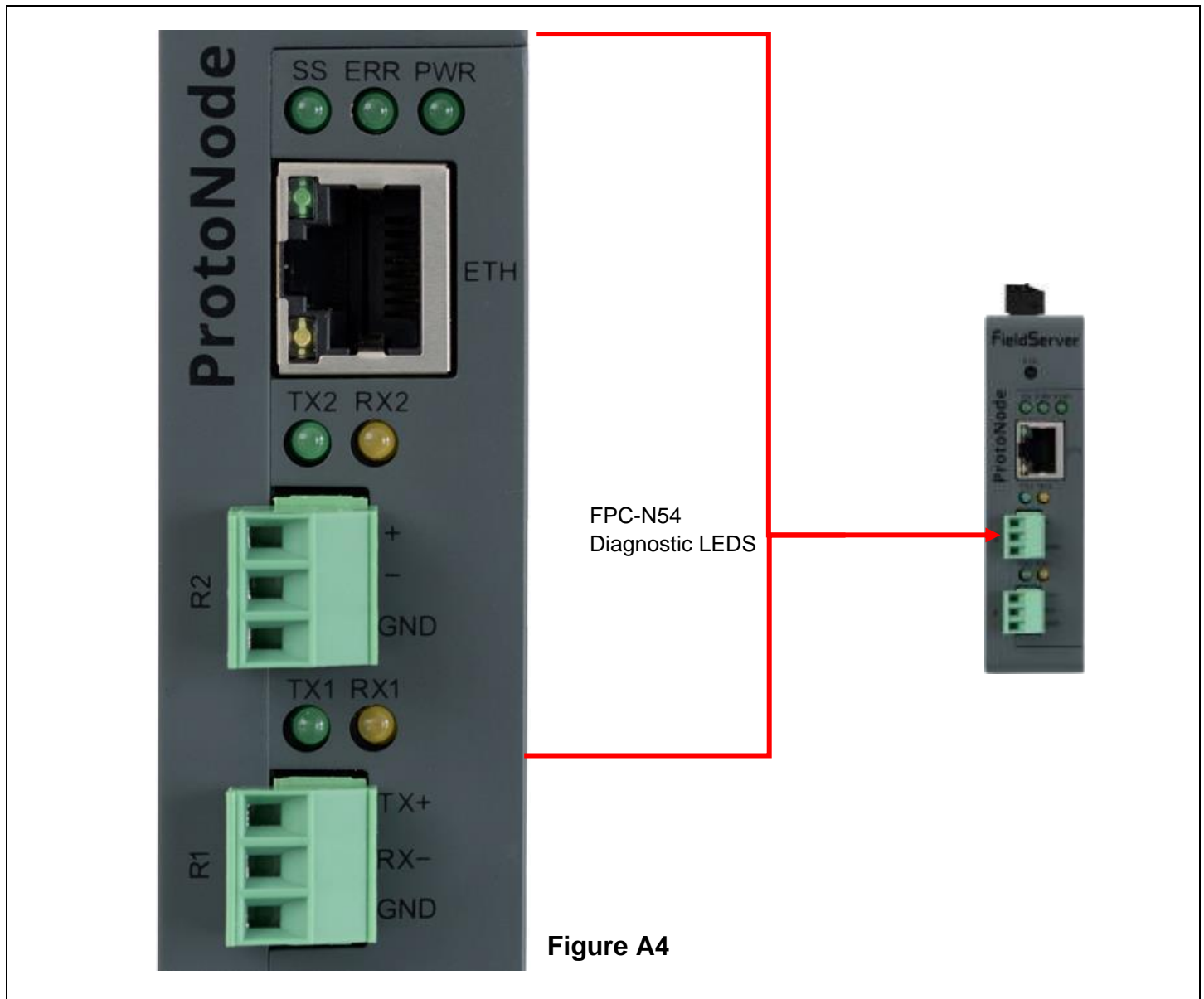
Figure A4

Tag	Description
SS	The SS LED will flash once a second to indicate that the bridge is in operation.
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.
RX	The RX 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.** RX1 applies to the R1 connection while RX2 applies to the R2 connection.
TX	The TX 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.** TX1 applies to the R1 connection while TX2 applies to the R2 connection.

Appendix A.5 – Take 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.

Appendix A.5.1 – Using the FieldServer Toolbox

Once the Diagnostic Capture is complete, email it to SMC Technical Support. The Diagnostic Capture will accelerate diagnosis of the problem.
Note: SMC Technical Services are open Monday-Friday, 7 a.m. to 5 p.m. Pacific Time.

- Ensure that the FieldServer Toolbox is loaded onto the local PC. Otherwise, download the FieldServer-Toolbox.zip via the Sierra Monitor website's Software Downloads.
- Extract the executable file and complete the installation.

Ethernet Port
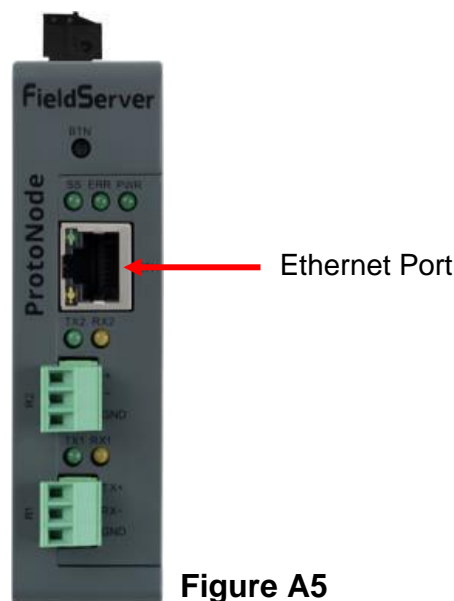
Figure A5

- Connect a standard Cat-5 Ethernet cable between the PC and ProtoNode.
- Double click on the FS Toolbox Utility.

- **Step 1:** Take a Log
  - Click on the diagnose icon of the desired device.
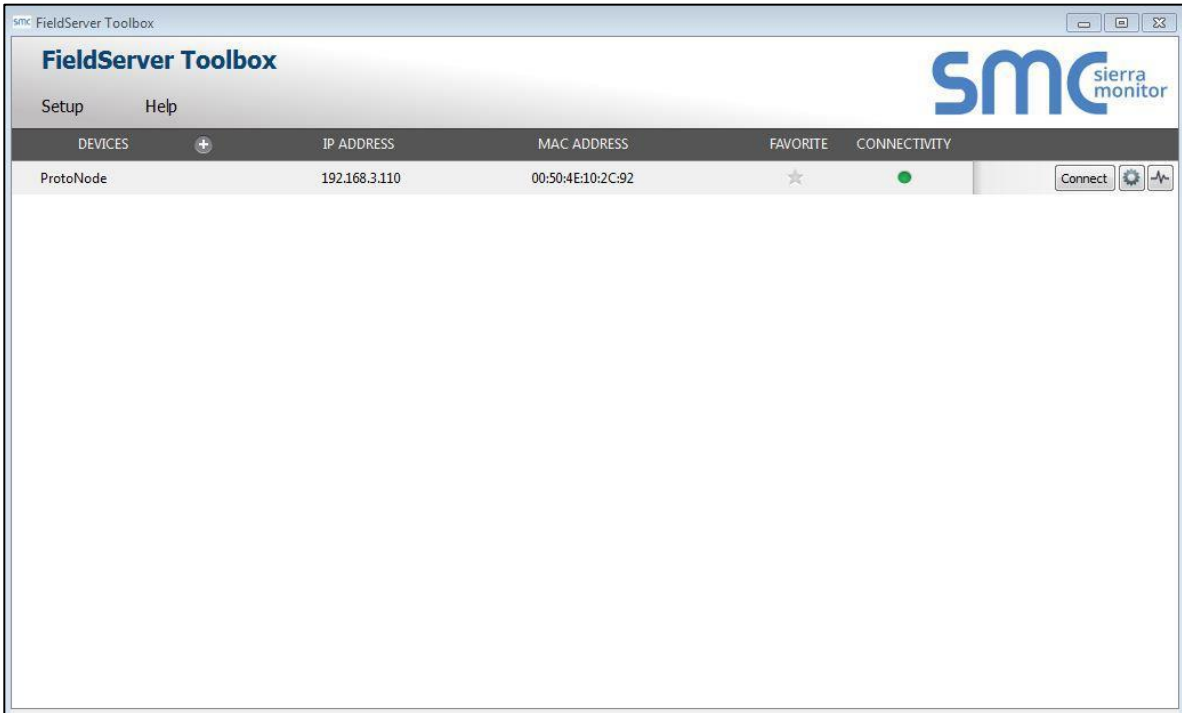
Figure A6

  - Ensure "Full Diagnostic" is selected (this is the default).
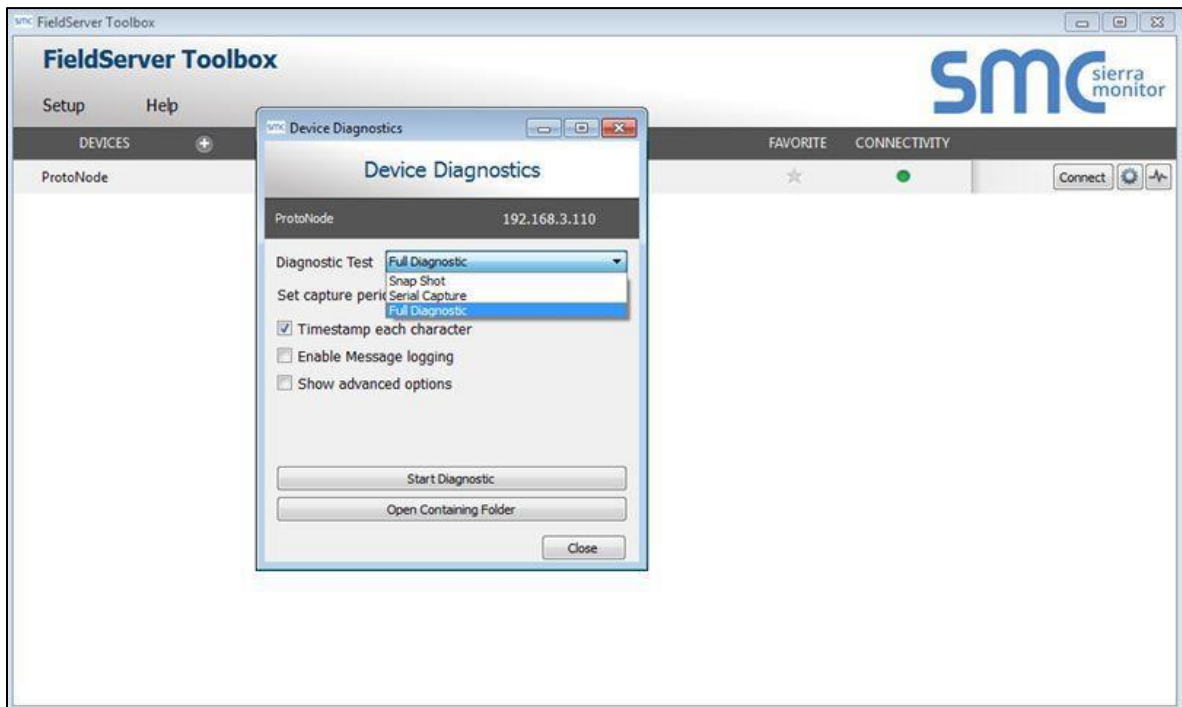
Figure A7

  NOTE: If desired, the default capture period can be changed.

  - Click on "Start Diagnostic" (see next page).

Figure A8
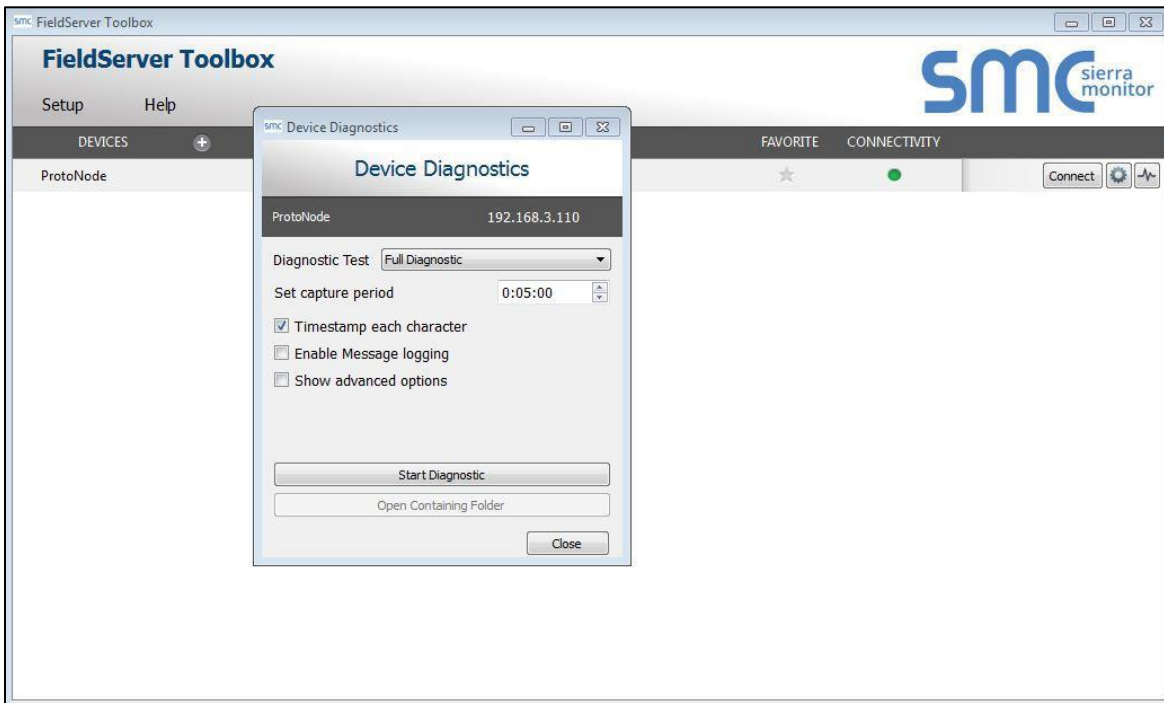
o Wait for Capture period to finish, then the Diagnostic Test Complete window will appear.

- **Step 2**: Send Log
  o Once the Diagnostic test is complete, a .zip file is saved on the PC.

Figure A9
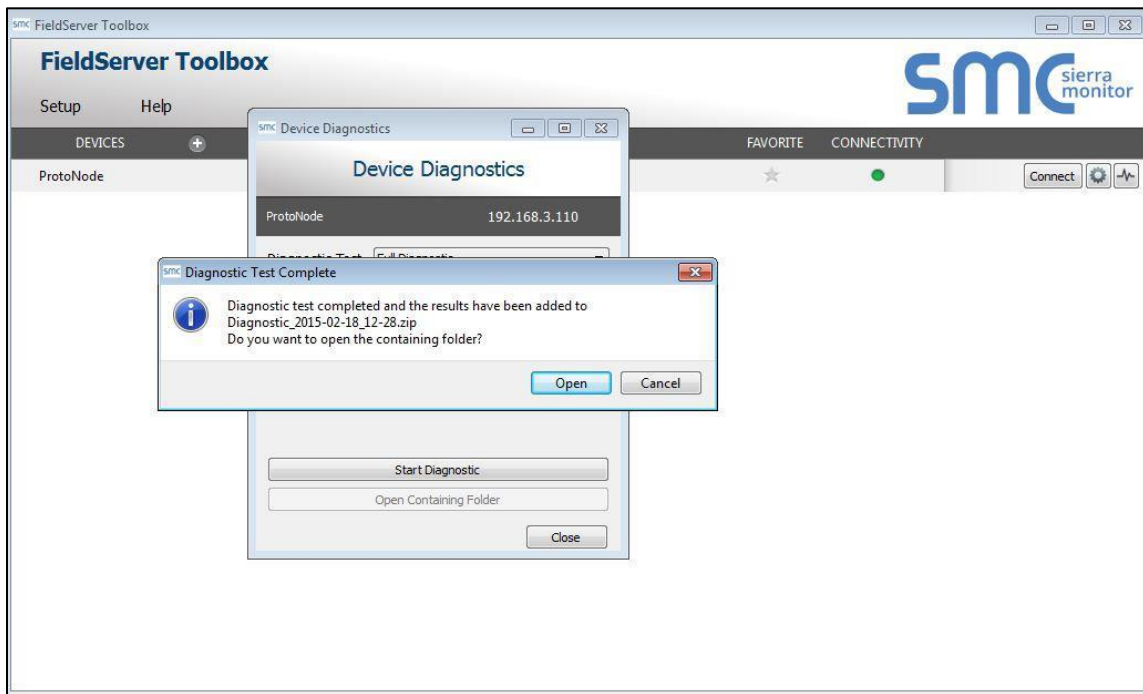
o Choose "Open" to launch explorer and have it point directly at the correct folder.
o Email the diagnostic zip file to SMC Technical Support.

Diagnostic_2014-07-17_20-15.zip   2014/07/17 20:16   zip Archive   676 KB

Appendix A.5.2 – Using FS-GUI

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 SMC Technical Support. The Diagnostic Capture will accelerate diagnosis of the problem.**

- Open the FieldServer FS-GUI page.
- Click on Diagnostics in the Navigation panel.
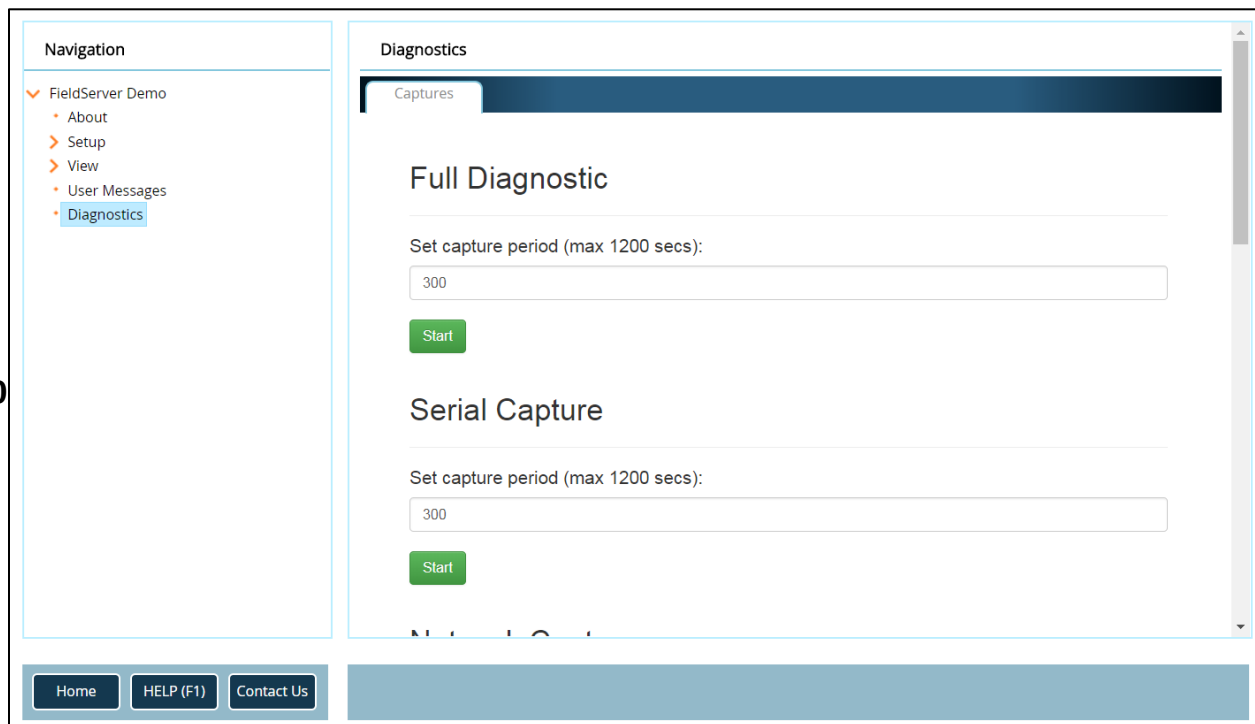
Figure A10

- Go to Full Diagnostic and select the capture period.
- Click the Start button under the Full Diagnostic heading to start the capture.
  - When the capture period is ended, a Download button will appear next to the Start button.
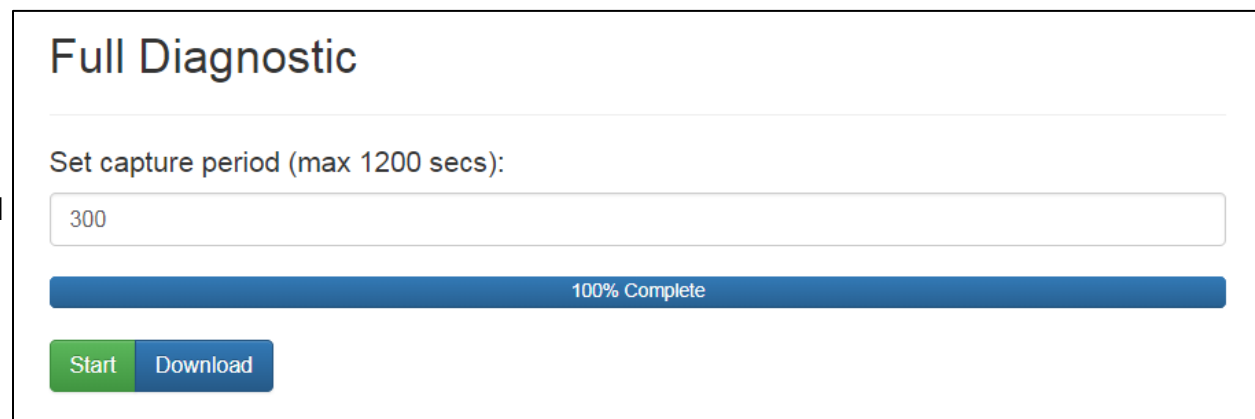
Figure A11

- Click the Download button for the capture to be downloaded to the local PC.
- Email the diagnostic zip file to SMC Technical Support.

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

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.
    a. Default IP Address is 192.168.1.24
    b. Use the FS Toolbox utility if the IP Address is unknown (see Appendix A.1, pg 30).
3. Click the Diagnostics & Debugging button.
4. In the Navigation Tree on the left-hand side, do the following:
    a. Click the Setup button.
    b. Click the File Transfer button.
    c. Click on the General tab.
5. In the General tab, click the Choose Files button and select the web.img file extracted in Step 1.
6. Click on the orange Submit button.
7. When the download is complete, click the System Restart button.

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

For both BACnet MS/TP and BACnet/IP, if more than one ProtoNode 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 50001.

| network_nr | **BACnet Network Number**
This sets the BACnet network number of the Gateway.
(1 - 65535) | 50001 | Submit |

Figure B1

Appendix B.3 – Securing ProtoNode with Passwords

Access to the ProtoNode can be restricted by enabling a password on the FS-GUI Passwords page – click on 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 ProtoNode.
- The User account can view any ProtoNode information but cannot make any changes or restart the ProtoNode.

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 SMC Technical Support to receive a temporary password from the customer support team. Access the ProtoNode to set a new password.

Figure B2

Figure B3

Appendix B.4 – Factory Reset Instructions

For instructions on how to reset a FieldServer back to its factory released state, see ENOTE - FieldServer Next Gen Recovery.

Appendix B.5 – Internet Browsers Not Supported

Internet Explorer 11 and prior versions.

Appendix B.6 – Mounting

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

← DIN Rail Bracket

Figure B4

Appendix B.7 – Physical Dimension Drawing
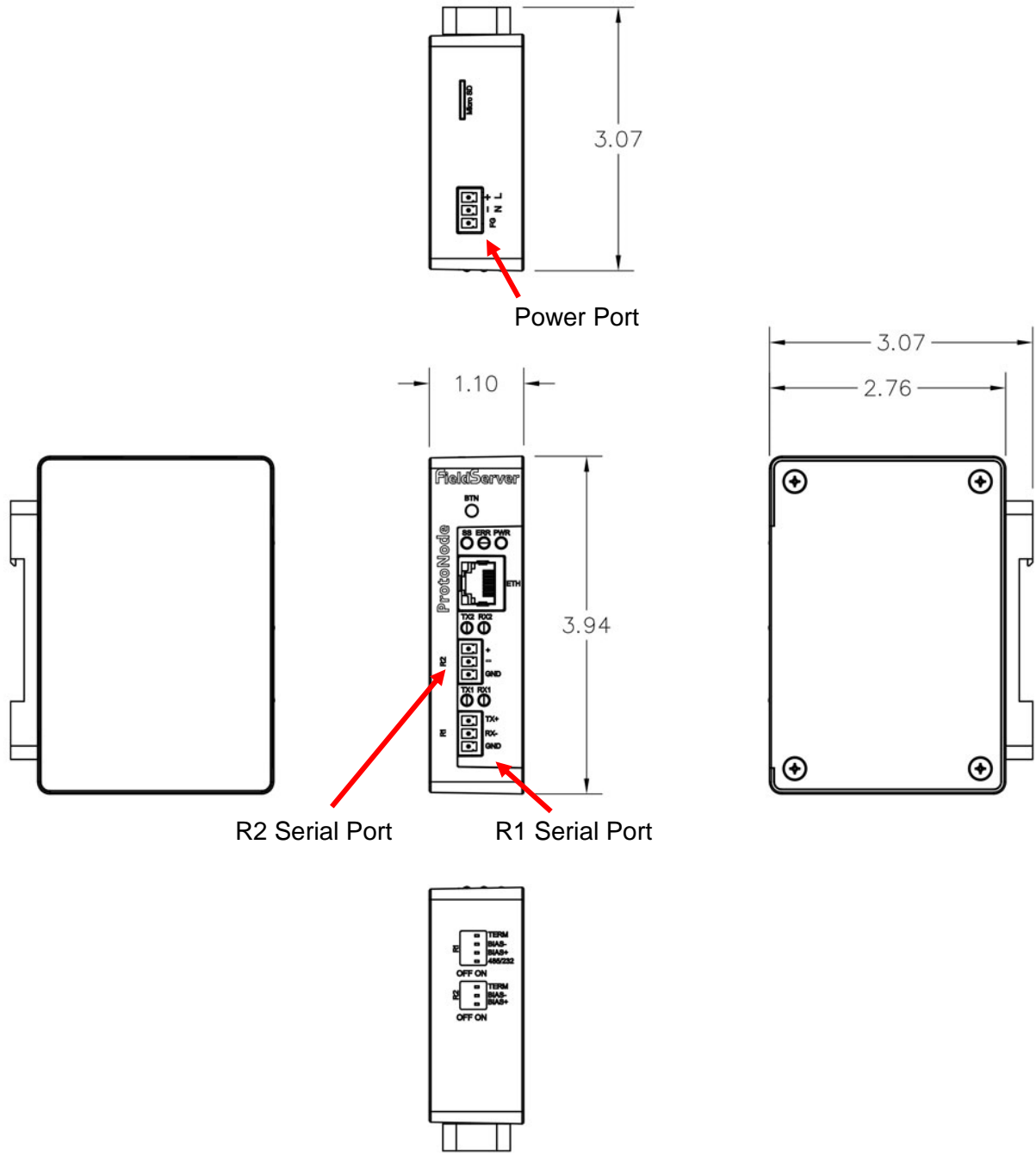
Power Port

R2 Serial Port

R1 Serial Port

Figure B5

Appendix C: Vendor Information – Bradford White

NOTE: All Modbus TCP/IP registers are the same as the Modbus RTU registers for the serial device. If this point list is needed, contact technical support. The Modbus TCP/IP node address of the device is also the same as the Modbus RTU node address.

Appendix C.1 – Sola Modbus RTU Mappings to BACnet

Map Descriptor Name	Modbus Register	Read/Write	BACnet Object ID	Note
Demand source	00006	Read	001	Current demand source: 0= Unknown 1= No source demand 2= CH 3= DHW 4= Lead Lag slave 5= Lead Lag master 6= CH frost protection 7= DHW frost protection 8= No demand due to burner switch (register 199) turned off 9= DHW storage 10= Reserved 11= Warm weather shutdown 12= Hot standby
Firing rate	00008	Read	002	Actual firing rate (% or RPM)
Fan speed	00009	Read	003	RPM
Flame signal	00010	Read	004	0.01V or 0.01µA precision (0.00-50.00V)
Tank temperature sensor	00012	Read	005	-40°-130° (0.1°C precision)
Appliance setpoint	00017	Read	006	-40°-130° (0.1°C precision)
Burner status	00032	Read	007	0= Disabled 1= Locked out 2-3= Reserved 4= Anti-short cycle 5= Unconfigured safety data 6-33= Reserved 34= Standby Hold 35= Standby Delay
Lockout code	00034	Read	008	0= No lockout 1-4096
Appliance status	00080	Read	009	0= Unknown 1= Disabled 2= Normal 3= Suspended
DHW priority count	00082	Read	010	Countdown of time when DHW has priority over CH (secs). Applicable when DHW priority time is enabled.
Burner run time	00130/00131	Read	011	Hours
Controller cycle count	00142/00145	Read	012	0-999,999
Controller run time	00144/00145	Read	013	Hours
Alarm reason	0035	Read	014	0= None 1= Lockout 2= Alert 3= Other
DHW setpoint	0453	Read/Write	015	40°-130° (0.1°C precision)

Appendix D: Reference

Appendix D.1 – Specifications

Table 6	
ProtoNode FPC-N542	
Electrical Connections	One 3-pin Phoenix connector with: RS-485/RS-232 (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:* 9-30VDC or 24VAC *Current draw:* 24VAC 0.125A 9-30VDC .25A @12VDC *Max Power:* 3 Watts
Approvals	CE and FCC class B & C part 15, UL 60950, WEEE compliant, IC Canada, RoHS compliant, DNP 3.0 conformance tested.
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	-4°F to158°F (-20°C to 70°C)
Humidity	10-95% RH non-condensing

Appendix D.1.1 – Compliance with UL Regulations

For UL compliance, the following instructions must be met when operating 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:
  o Comply with local electrical code.
  o Be suited to the expected operating temperature range.
  o Meet the current and voltage rating for ProtoNode.
- Furthermore, the interconnecting power cable shall:
  o Be of length not exceeding 118.3 in (.05 m).
  o 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 149°F (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.

120T MOUNTING TEMPLATE

REMOVE
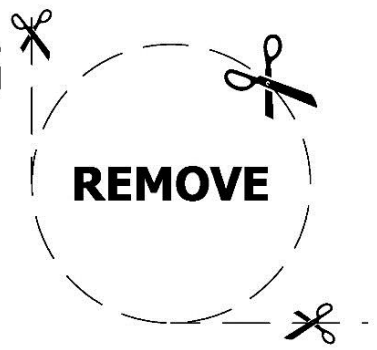
DRILL
○
HERE

DRILL
○
HERE
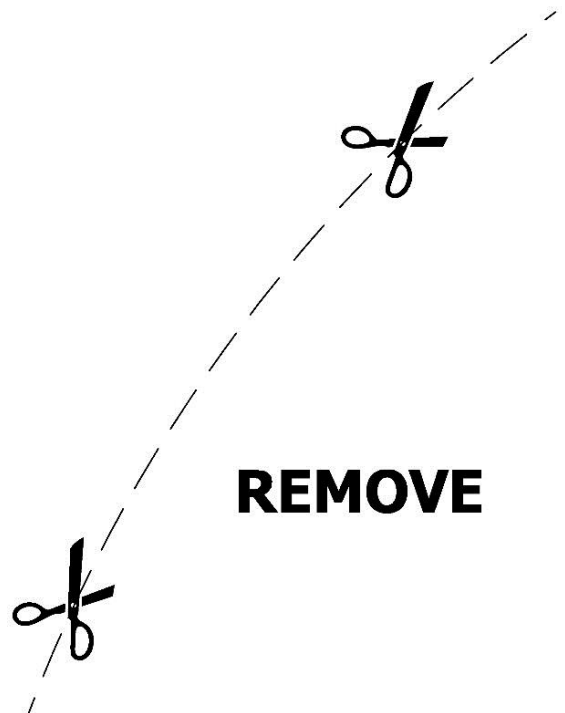
REMOVE

REMOVE

COMMANDER (UCG)
MOUNTING TEMPLATE

REMOVE

DRILL
○
HERE

DRILL
○
HERE

REMOVE

EF60 & EF100
MOUNTING TEMPLATE

Notes

CONTROL
PANEL

DRILL HERE

DRILL HERE

Notes

46