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BTL BACnet TESTING LABORATORIES

Start-up Guide

ProtoNode FPC-N64

For Interfacing Hunter Fans Products

Document Revision: 2.B

Web Configurator

Technical Support

Thank you for purchasing the ProtoNode for Hunter Fans.

Please call Hunter Fans for technical support of the ProtoNode product.

MSA Safety does not provide direct support. If Hunter Fans needs to escalate the concern, they will contact MSA Safety for assistance.

Customer Service:

Phone: 1-888-830-1326

Online Inquiry Form: support.hunterfan.com/hc/en-us/requests/new

Website: www.hunterfan.com

Quick Start Guide

1. Record the information about the unit. (**Section 2.1**)
2. Check that the ProtoNode and customer device COM settings match. (**Section 2.3**)
3. **If using a serial field protocol:**
   Connect the ProtoNode 3 pin RS-485 R2 port to the field protocol cabling. (**Section 3.1**)
4. Connect power to ProtoNode 3 pin power port. (**Section 3.4**)
5. Connect a PC to the ProtoNode via Ethernet cable. (**Section 4**)
6. Setup Web Server Security and login via web browser. (**Section 5**)
7. Configure the ProtoNode to connect to the local network. (**Section 6**)
8. Integrate the ProtoNode with SMC Cloud or opt out. (**Section 7.1**)
9. 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. (**Section 8**)

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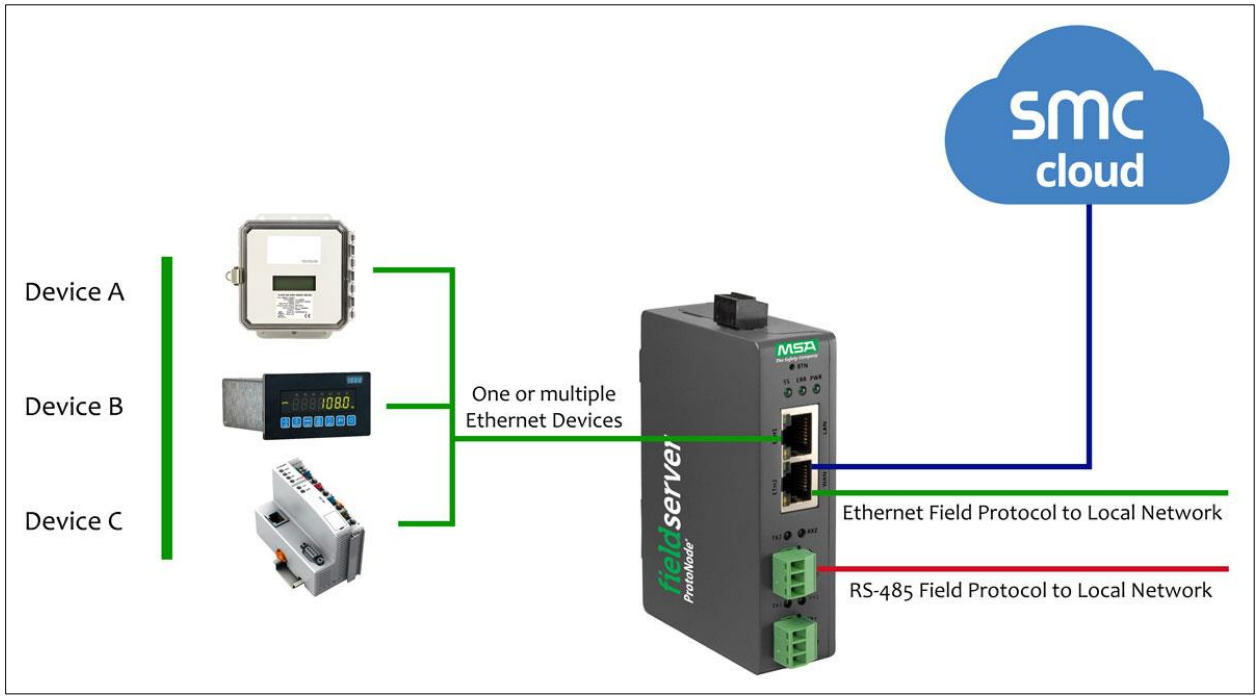
1 Introduction

1.1 ProtoNode Gateway

The ProtoNode is an external, high performance **building automation multi-protocol gateway** that is preconfigured to automatically communicate between Hunter Fans' devices (hereafter simply called "device") connected to the ProtoNode and automatically configures them for BACnet/IP, BACnet MS/TP, Modbus RTU and Metasys N2.

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.

FPC-N64 Connectivity Diagram:



The ProtoNode can connect with the SMC Cloud. The SMC Cloud allows technicians, the OEM's support team and MSA Safety's support team to remotely connect to the ProtoNode. The SMC Cloud provides the following capabilities for any registered devices in the field:

- Remotely monitor and control devices.
- Collect device data and view it on the SMC Cloud Dashboard and the SMC Smart Phone App.
- Create user defined device notifications (alarm, trouble and warning) via SMS and/or Email.
- Generate diagnostic captures (as needed for troubleshooting) without going to the site.

For more information about the SMC Cloud, refer to the SMC Cloud Start-up Guide.

2 Setup for ProtoNode

2.1 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:

Model	Part Number
ProtoNode	FPC-N64-2045

Figure 1: ProtoNode Part Numbers

- FPC-N64 units have the following 4 ports: RS-485 + 2 Ethernet + RS-485/RS-232

2.2 Point Count Capacity

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

Part number	Total Registers
FPC-N64-2045	1,500

Figure 2: Supported Point Count Capacity

Devices	Point Count Per Device
Yaskawa	19
Mitsubishi	57

Figure 3: Points per Device

2.3 Configuring Device Communications

2.3.1 Set Node-ID for Any Device Attached to the ProtoNode

- Set Node-ID for any device attached to 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, BACnet MS/TP and BACnet Ethernet. (**Section 8.2**)

NOTE: The Metasys N2 field protocol Node-ID is automatically set to be the same value as the Node-ID of the device.

2.3.2 Set IP Address for Any Ethernet Device Connected to the ProtoNode

- **Ensure any device is set to Modbus TCP/IP to communicate with the ProtoNode.**
- The device needs to be on the same IP subnet as the ProtoNode and the configuration PC.
- Record the following device information to start the setup:
  - IP Address
  - IP port
  - TCP_ID

NOTE: This information is required for Section 8.3.

3 Interfacing ProtoNode to Devices

3.1 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 4**)
  - Use standard grounding principles for RS-485 GND
- See **Section 4** for information on connecting to an Ethernet network.

BMS Wiring	ProtoNode Pin Label	Pin Assignment
RS-485 +	+	RS-485 +
RS-485 -	-	RS-485 -
-	GND	RS-485 GND

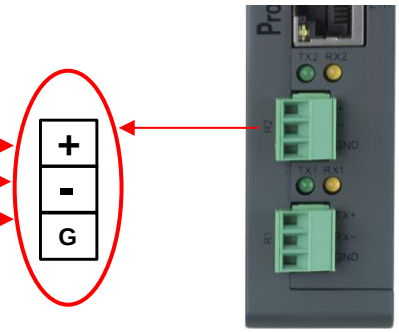


Figure 4: Connection from ProtoNode to RS-485 Field Network

3.2 Bias Resistors

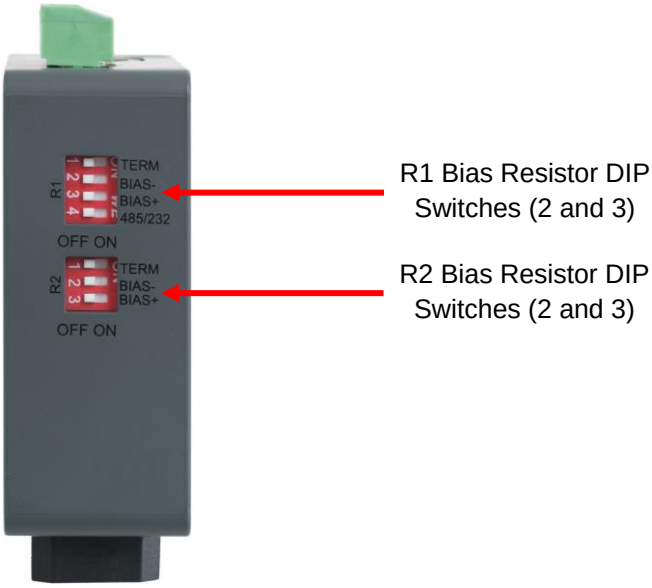


Figure 5: Bias Resistor DIP Switches

To enable Bias Resistors, move both the BIAS- and BIAS+ dip switches to the right as shown in Figure 5.

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.

3.3 Termination Resistor

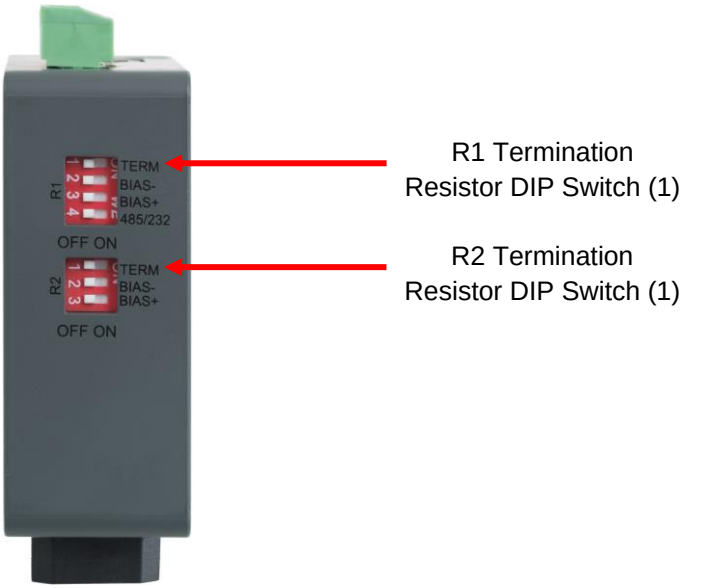


Figure 6: Termination Resistor DIP Switch

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 as shown in Figure 6.**

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.

3.4 Power-Up ProtoNode

Check power requirements in the table below:

Power Requirement for ProtoNode External Gateway		
	Current Draw Type	
ProtoNode Family	12VDC	24VDC/AC
FPC – N64 (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.		

Figure 7: Required Current Draw for the ProtoNode

Apply power to the ProtoNode as shown below in **Figure 8.** Ensure that the power supply used complies with the specifications provided in **Section 12**.

- 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 In (-)	N -	V -
Frame Ground	FG	FRAME GND

Figure 8: Power Connections

4 Connect the PC to the ProtoNode

4.1 Connecting to the Gateway via Ethernet

Connect a Cat-5 Ethernet cable (straight through or cross-over) between the local PC and ProtoNode ETH1 (LAN Port).

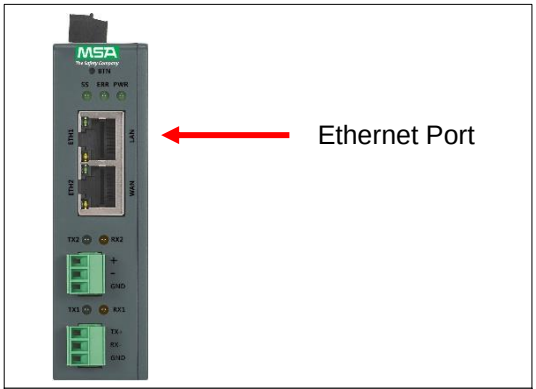


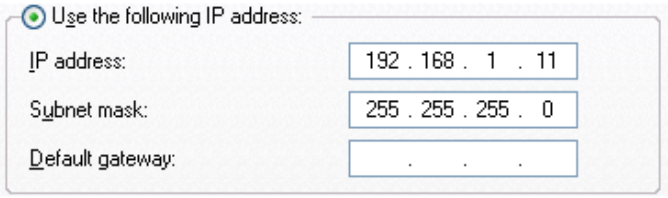
Figure 9: Ethernet Port Location

4.1.1 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 10:

- 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 Internet Protocol Version 4 (TCP/IPv4) and then click the Properties button.
- Select and enter a static IP Address on the same subnet. For example:



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

5 Setup Web Server Security

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

NOTE: If the IP Address of the ProtoNode has been changed, the assigned IP Address can be discovered using the FS Toolbox utility. See Section 9.1 for instructions.

5.1 Login to the FieldServer

The first time the FieldServer GUI is opened in a browser, the IP Address for the gateway will appear as untrusted. This will cause the following pop-up windows to appear.

- When the Web Server Security Unconfigured window appears, read the text and choose whether to move forward with HTTPS or HTTP.

Figure 10: Web Server Security Unconfigured Window

- When the warning that "Your connection is not private" appears, click the advanced button on the bottom left corner of the screen.

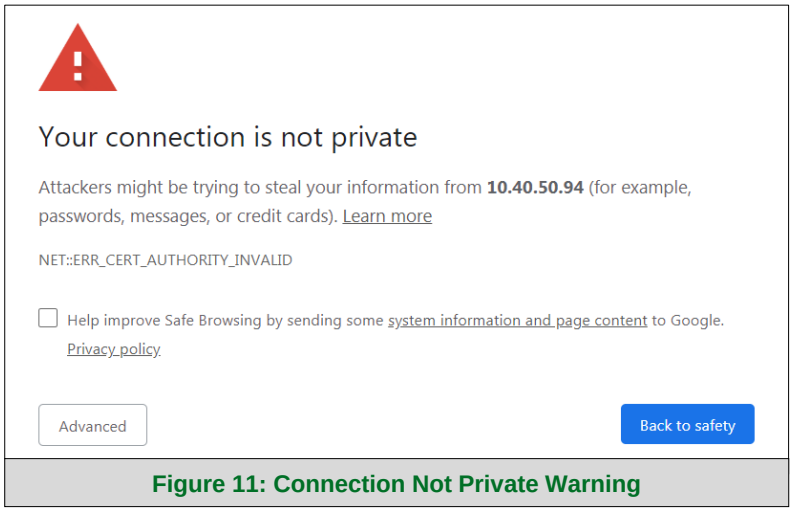


Figure 11: Connection Not Private Warning

- Additional text will expand below the warning, click the underlined text to go to the IP Address. In the **Figure 12** example this text is "Proceed to 10.40.50.94 (unsafe)".

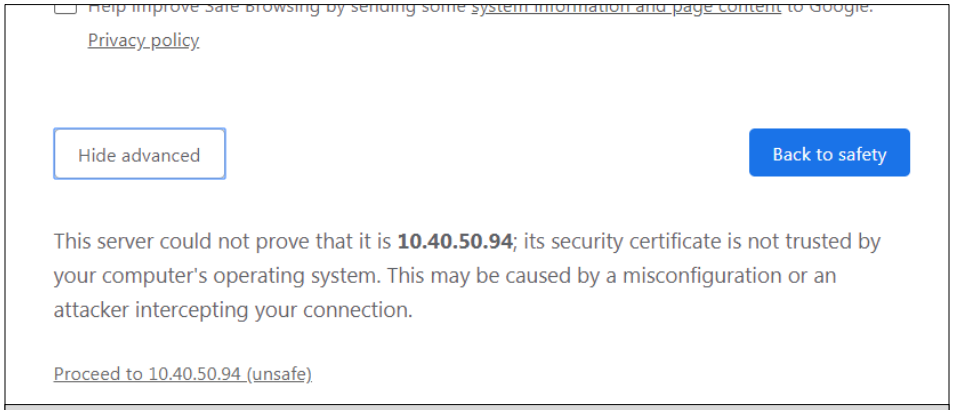


Figure 12: Warning Expanded Text

- When the login screen appears, put in the Username (default is "admin") and the Password (found on the label of the FieldServer).

NOTE: There is also a QR code in the top right corner of the FieldServer label that shows the default unique password when scanned.

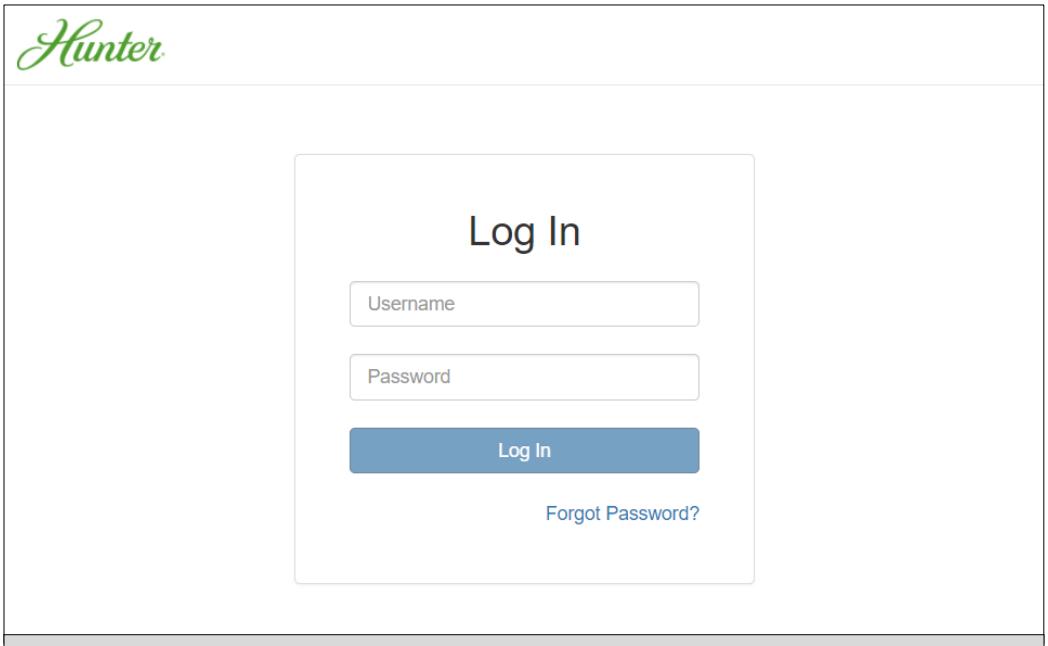


Figure 13: FieldServer Login

NOTE: A user has 5 attempts to login then there will be a 10-minute lockout. There is no timeout on the FieldServer to enter a password.

NOTE: To create individual user logins, go to Section 10.7.

5.2 Select the Security Mode

On the first login to the FieldServer, the following screen will appear that allows the user to select which mode the FieldServer should use.

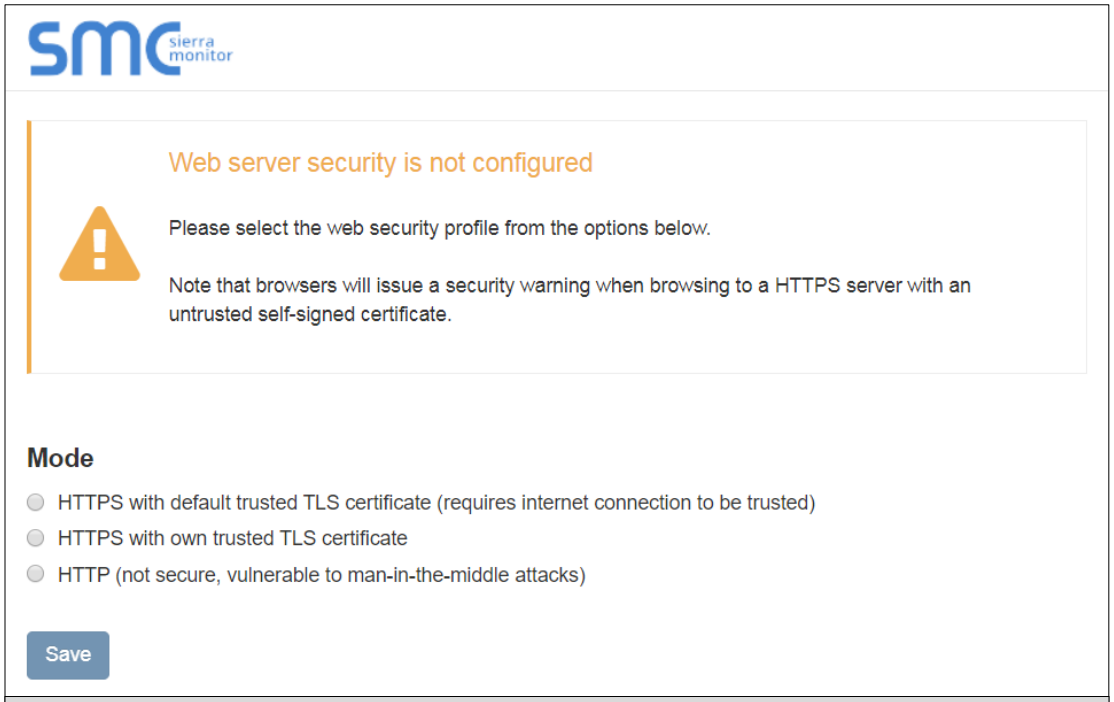


Figure 14: Security Mode Selection Screen

NOTE: Cookies are used for authentication.

NOTE: To change the web server security mode after initial setup, go to Section 10.1.

The sections that follow include instructions for assigning the different security modes.

5.2.1 HTTPS with Own Trusted TLS Certificate

This is the recommended selection and the most secure. **Please contact your IT department to find out if you can obtain a TLS certificate from your company before proceeding with the Own Trusted TLS Certificate option.**

- Once this option is selected, the Certificate, Private Key and Private Key Passphrase fields will appear under the mode selection.

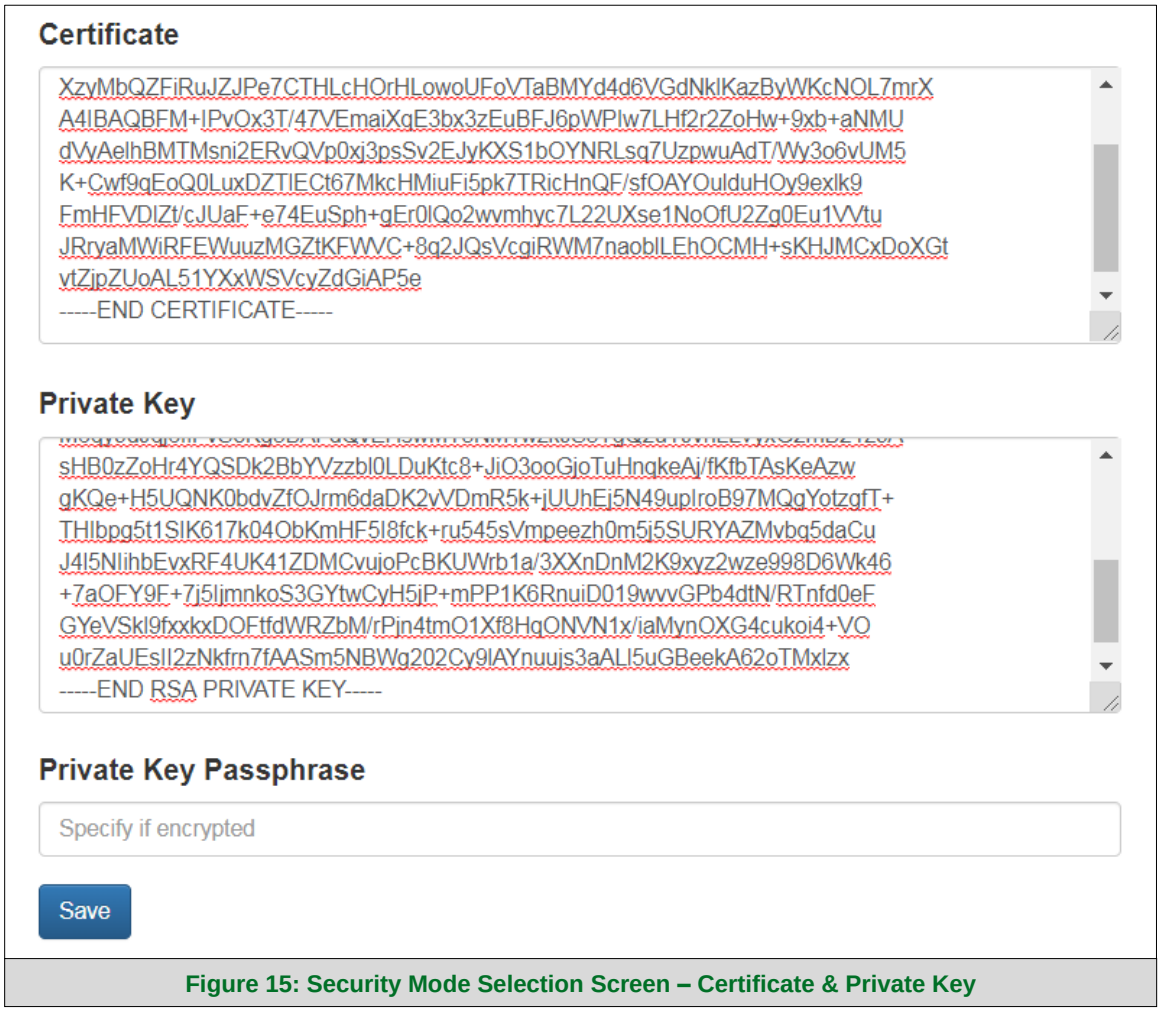


Figure 15: Security Mode Selection Screen – Certificate & Private Key

- Copy and paste the Certificate and Private Key text into their respective fields. If the Private Key is encrypted type in the associated Passphrase.
- Click Save.
- A “Redirecting” message will appear. After a short time, the FieldServer GUI will open.

5.2.2 HTTPS with Default Untrusted Self-Signed TLS Certificate or HTTP with Built-in Payload Encryption

- Select one of these options and click the Save button.
- A “Redirecting” message will appear. After a short time, the FieldServer GUI will open.

6 Configure Network Settings

6.1 Navigate to the Network Settings

- From the Web App landing page, click the Settings tab on the left side of the screen.

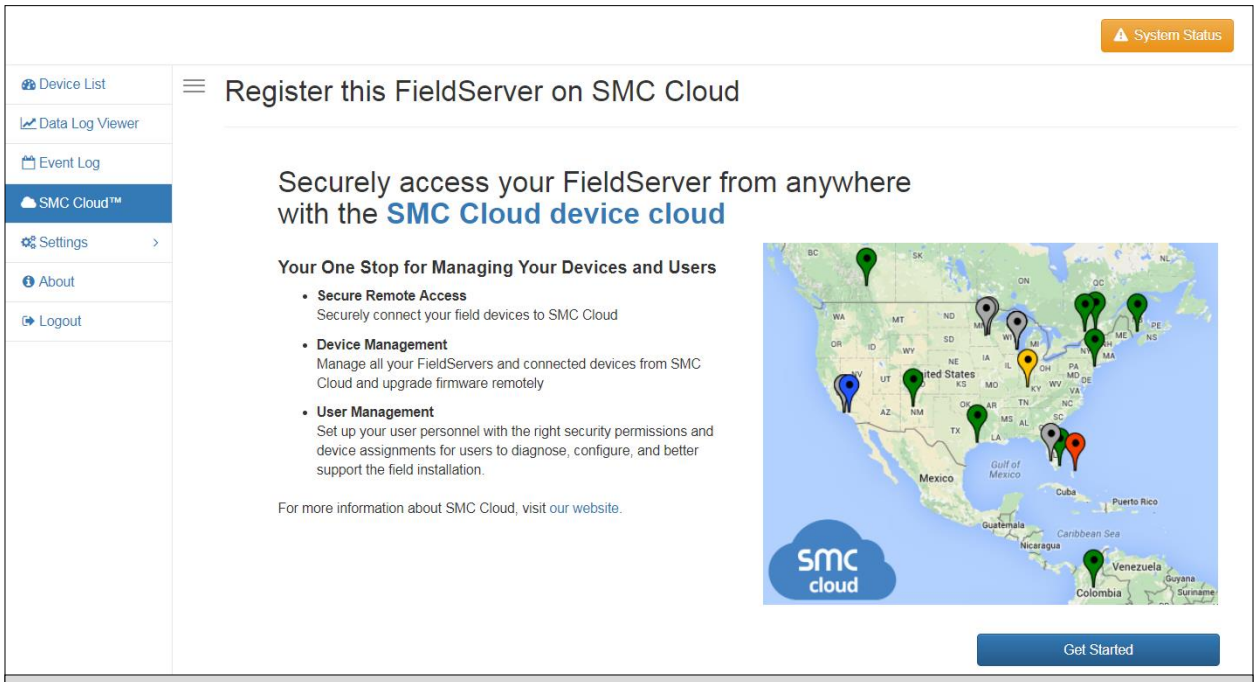


Figure 16: Generic Web App Landing Page

- Click the Network tab that appears to open the Network Settings page.

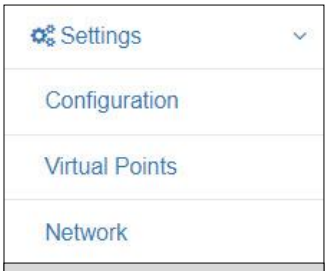


Figure 17: Settings Tabs

- A warning message will appear when performing the first-time setup, click the Exit Registration button to continue to the Network Settings page.

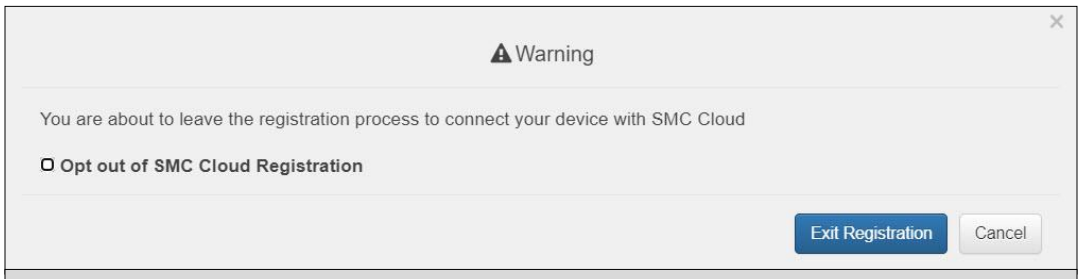


Figure 18: FS-GUI Landing Page

6.2 Change the ProtoNode IP Address

NOTE: For Routing settings go to Section 10.10.

6.2.1 Ethernet 1 Network Settings

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

NOTE: If the FieldServer is connected to a router, the IP Gateway of the FieldServer should be set to the same IP Address of the router.

- Click the Save button to activate the new settings.

NOTE: If the webpage was open in a browser, the browser will need to be pointed to the new IP Address of the ProtoNode before the webpage will be accessible again.

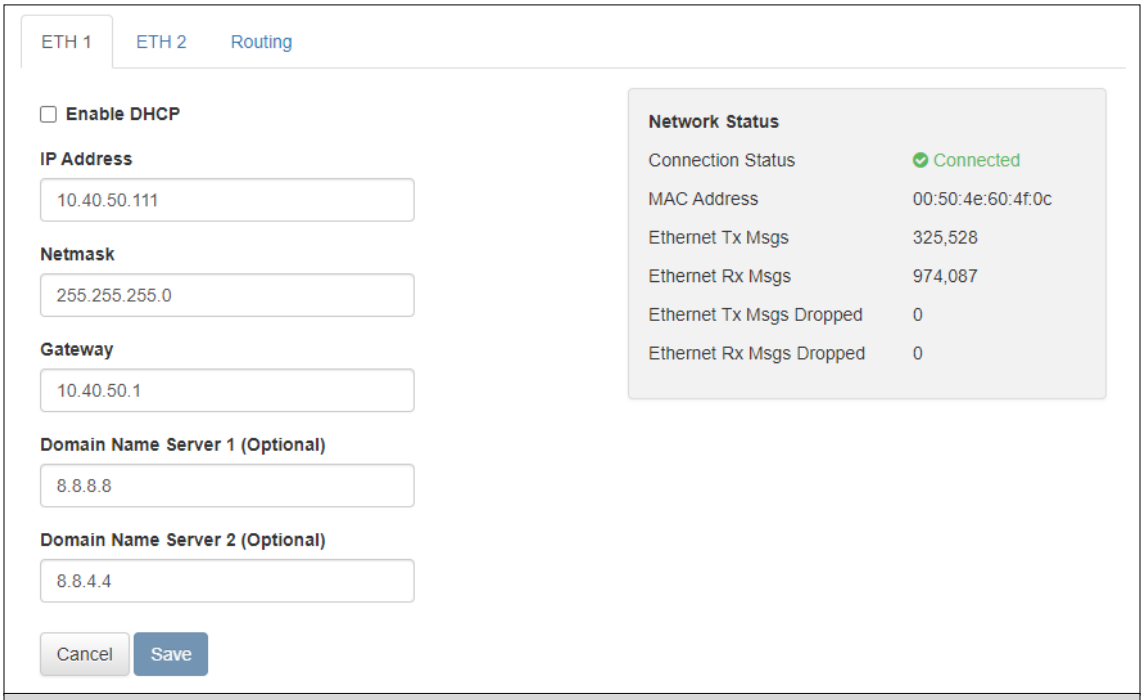


Figure 19: Ethernet 1 Port Network Settings

6.2.2 Ethernet 2 Network Settings – LAN Mode

- Check that the Mode is set to LAN, if not click LAN to change the ETH 2 port to LAN mode.
- Enable DHCP to automatically assign IP Settings or modify the IP Settings manually as needed, via these fields: IP Address, Netmask, Gateway, and Domain Name Server1/2.

NOTE: If the FieldServer is connected to a router, the IP Gateway of the FieldServer should be set to the same IP Address of the router.

- Click the Save button to activate the new settings.

NOTE: If the webpage was open in a browser, the browser will need to be pointed to the new IP Address of the ProtoNode before the webpage will be accessible again.

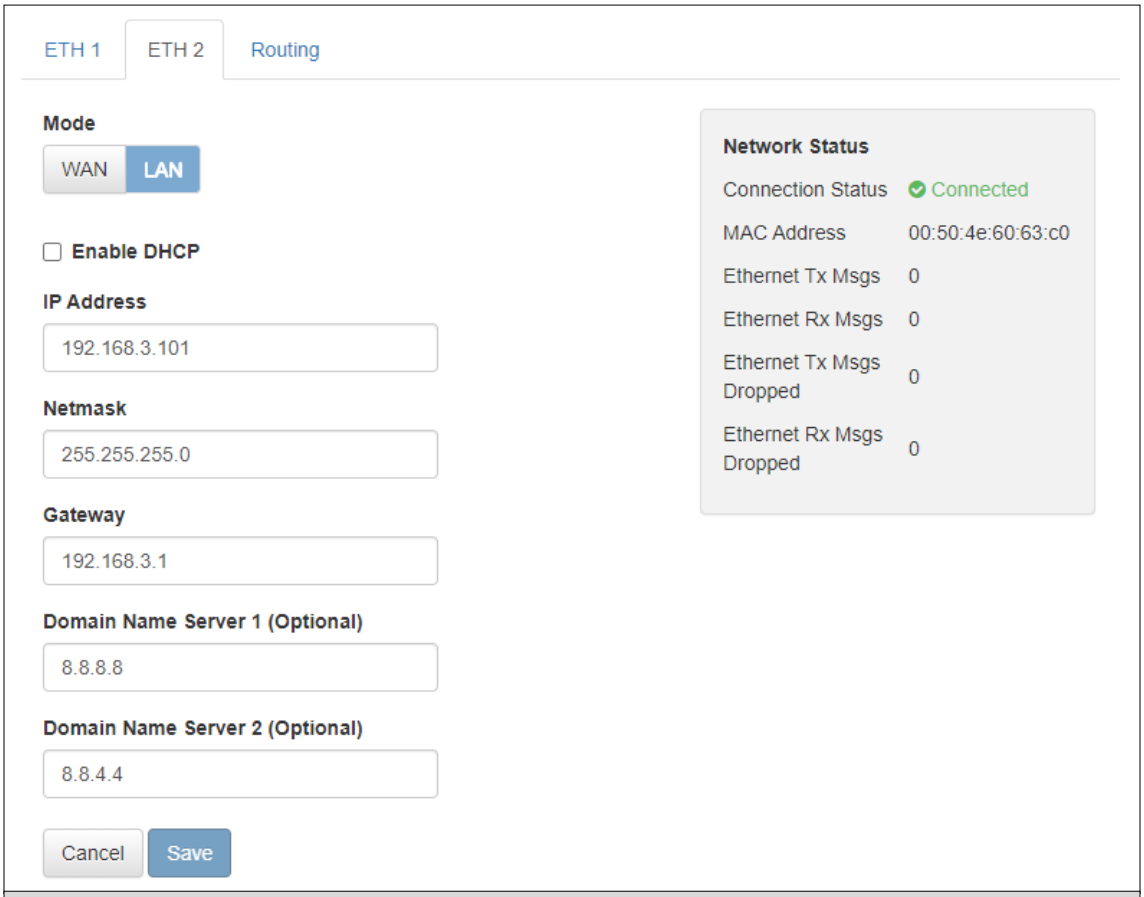


Figure 20: Ethernet 2 Port Network Settings

6.2.3 Ethernet 2 Network Settings – WAN Mode

- Click the WAN box to change the ETH 2 port to WAN mode.
  - This prevents all incoming traffic on the ETH 2 port but it allows a connection to the internet via port 80 & 443
- Scroll below the network settings to get to the firewall options with rules that allow specific incoming traffic (through setting rules) and outgoing options.

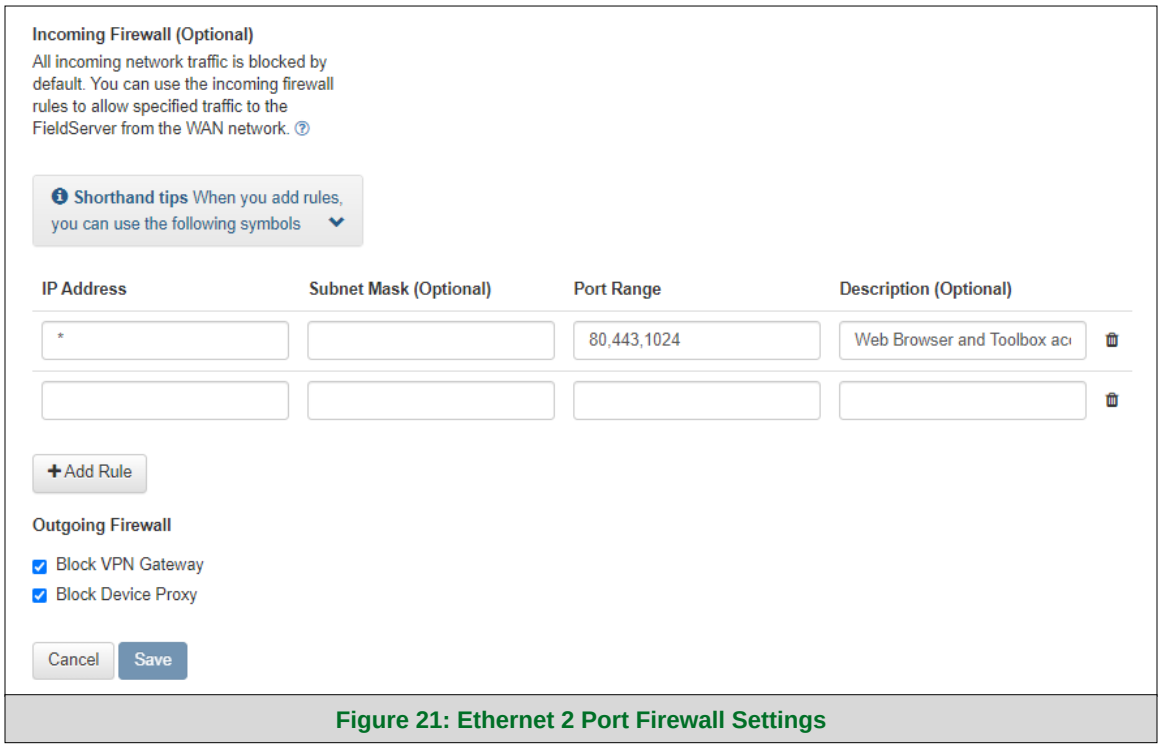


Figure 21: Ethernet 2 Port Firewall Settings

NOTE the following options for setting firewall rules:

- Add 1023 to the Port Range field to allow the FieldServer Toolbox access.
- Add 47808 to the Port Range field for BACnet access.
- Add 80 & 443 to the Port Range field for web browser access.
- Use a "*" as a wild card for IP Address.

7 SMC Cloud User Setup, Registration and Login

The SMC Cloud is MSA Safety's device cloud solution for IIoT. Integration with the SMC Cloud enables a secure remote connection to field devices through a FieldServer and hosts local applications for device configuration, management, as well as maintenance. For more information about the SMC Cloud, refer to the SMC Cloud Start-up Guide.

7.1 Choose Whether to Integrate SMC Cloud

When first logging onto the ProtoNode, the Web App will open on the SMC Cloud™ page.

NOTE: If a warning message appears instead, go to Section 10.8 to resolve the connection issue.

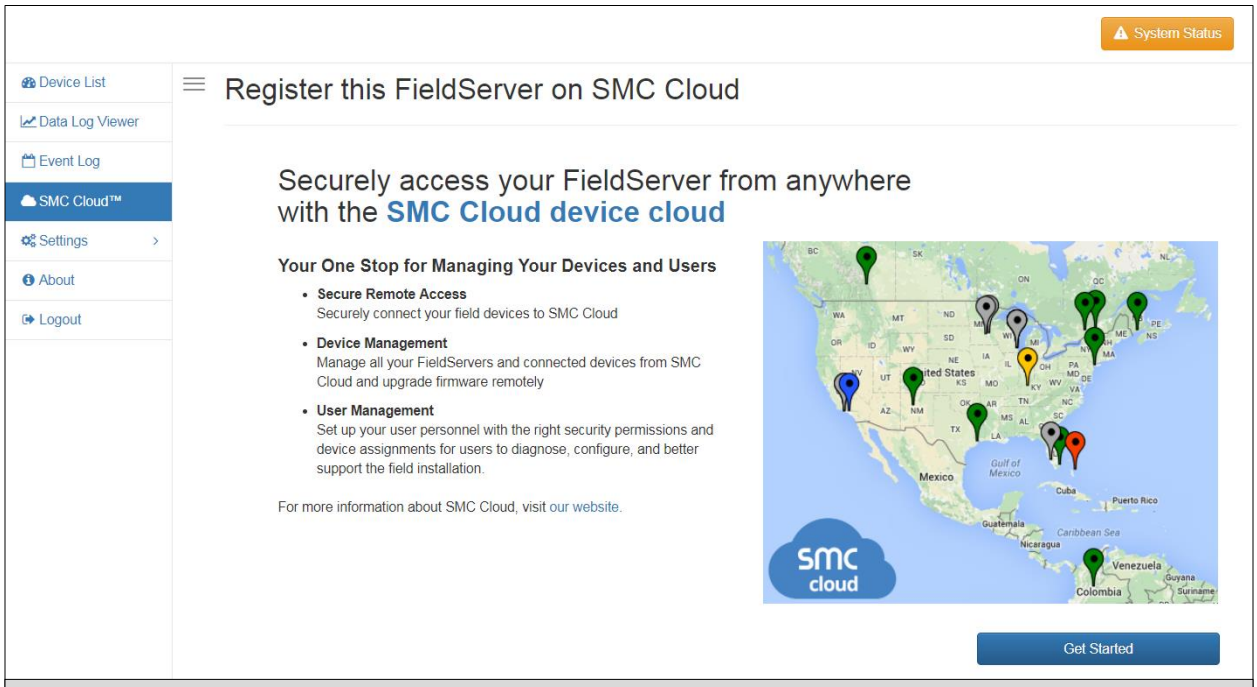


Figure 22: Generic Web App Page – First Login

- Either go through the SMC Cloud setup to integrate SMC Cloud functionality to the FieldServer or optout of SMC Cloud setup.
  - For SMC Cloud setup, continue with instructions in the following sections
  - To opt out of SMC Cloud, click on a tab other than the SMC Cloud™ tab

, click the checkbox next to “Opt out of SMC Cloud Registration” in the Warning window that appears and click the Exit Registration button (skip to **Section 8** to continue FieldServer configuration)
  - To ignore SMC Cloud setup until the next time the FieldServer Web App is opened, click a tab other than SMC Cloud™ and then click the Exit Registration button with the “Opt out” checkbox unchecked (skip to **Section 8** to continue FieldServer configuration)

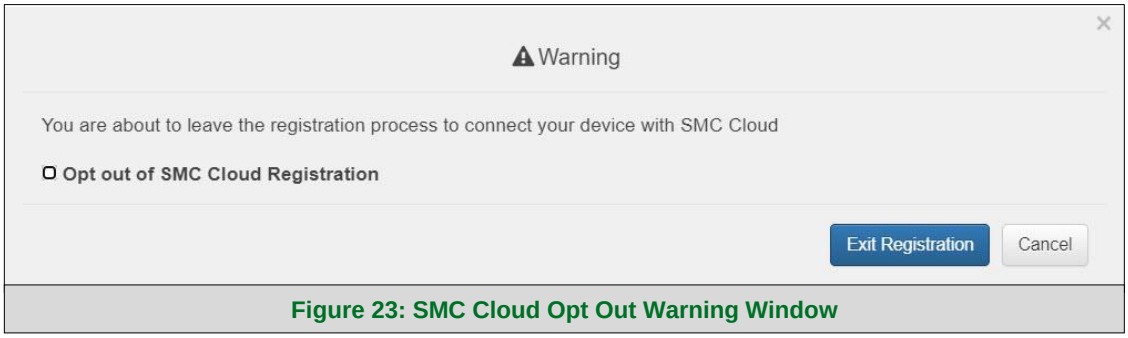


Figure 23: SMC Cloud Opt Out Warning Window

NOTE: If SMC Cloud integration with the ProtoNode is not desired, skip to Section 8 to continue gateway setup. If user setup is already complete go to Section 7.3.

7.2 User Setup

Before the gateway can be connected to SMC Cloud a user account must be created. Request an invitation to SMC Cloud from the manufacturer's support team and follow the instructions below to set up login details:

- The "Welcome to SMC Cloud" email will appear as shown below.

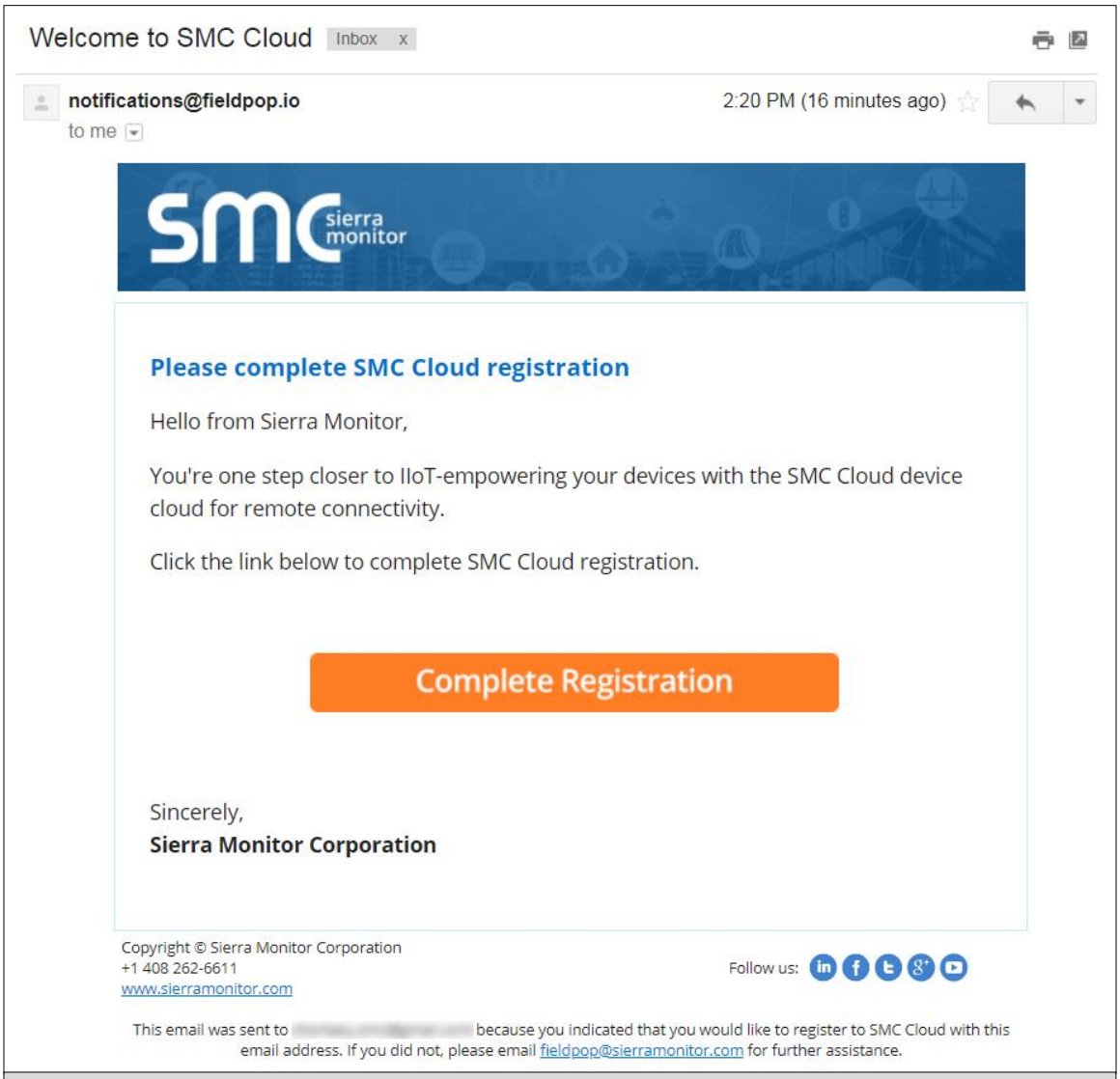


Figure 24: Welcome to SMC Cloud Email

NOTE: If no SMC Cloud email was received, check the spam/junk folder for an email from notification@fieldpop.io. Contact the manufacturer's support team if no email is found.

- Click the “Complete Registration” button and fill in user details accordingly.

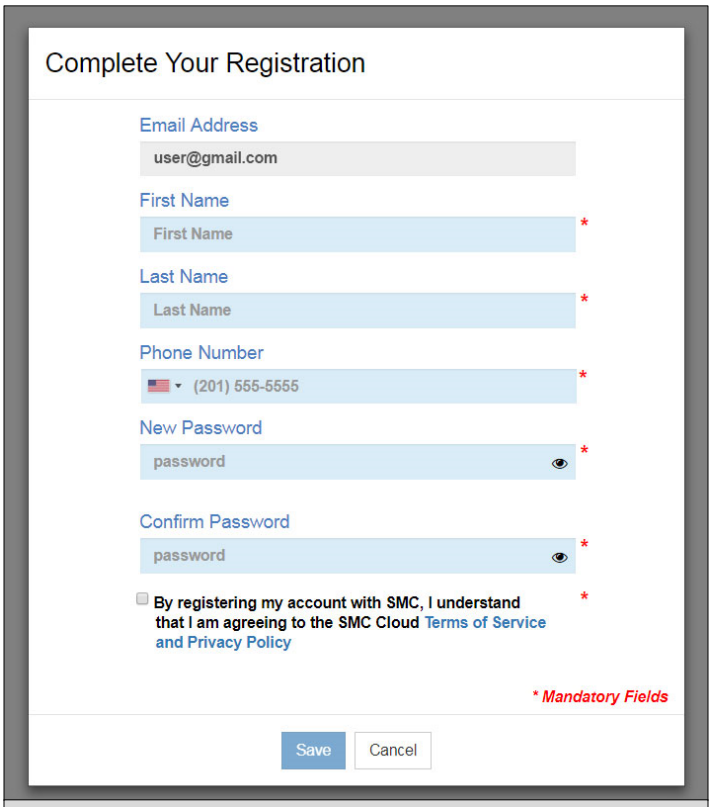


Figure 25: Setting User Details

- Fill in the name, phone number, password fields and click the checkbox to agree to the privacy policy and terms of service.

NOTE: If access to data logs using RESTful API is needed, do not include “#” in the password.

- Click “Save” to save the user details.
- Click “OK” when the Success message appears.
- Record the email account used and password for future use.

7.3 Registration Process

Once SMC Cloud user credentials have been generated, the ProtoNode can be registered onto the SMC Cloud server.

- When first logging onto the ProtoNode, the Web App will open on the SMC Cloud™ page.

NOTE: If a warning message appears instead, go to Section 10.8 to resolve the connection issue.

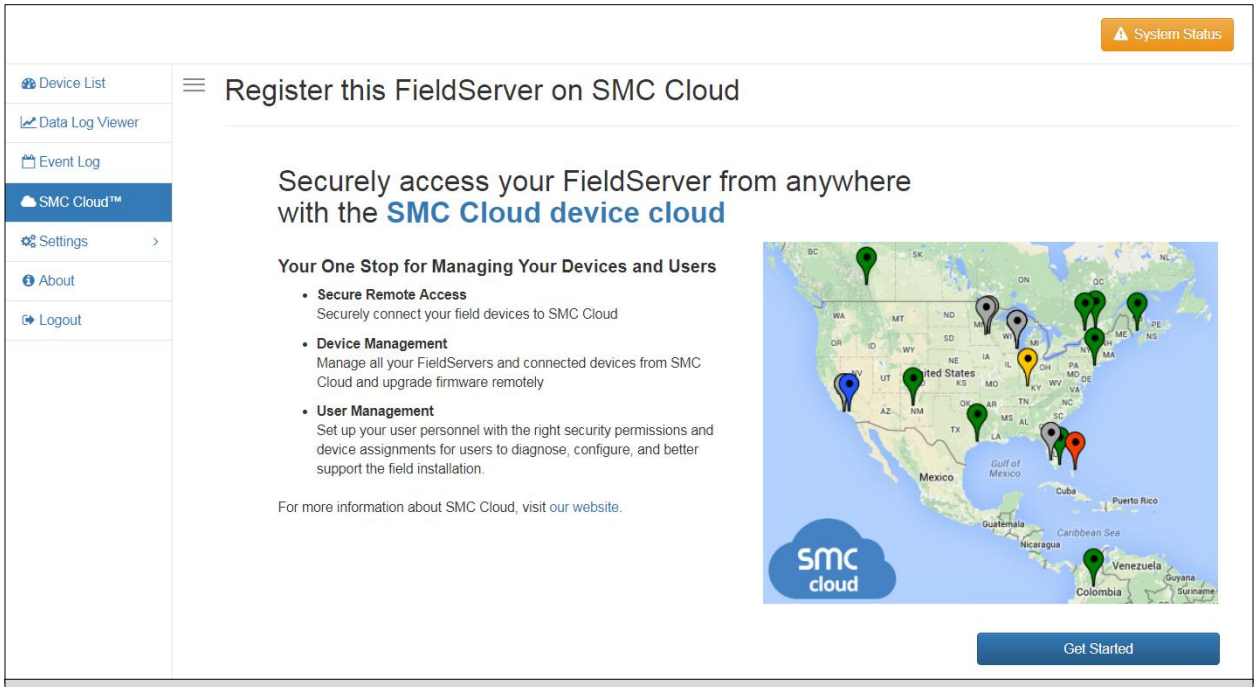


Figure 26: SMC Cloud Registration Message

- Click Get Started to view the SMC Cloud registration page.

NOTE: For information on the System Status button, go to Section 10.9.

- To register, fill in the user details, site details, gateway details and SMC Cloud account credentials.
  - Enter user details and click Next

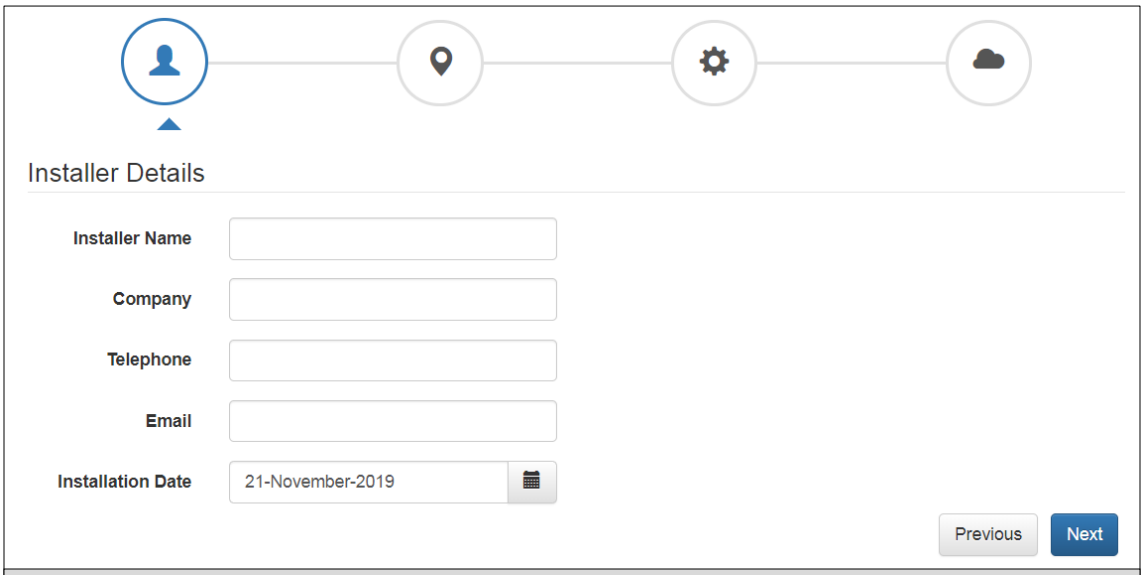


Figure 27: SMC Cloud Registration – Installer Details

  - Enter the site details by entering the physical address fields or the latitude and longitude then click Next

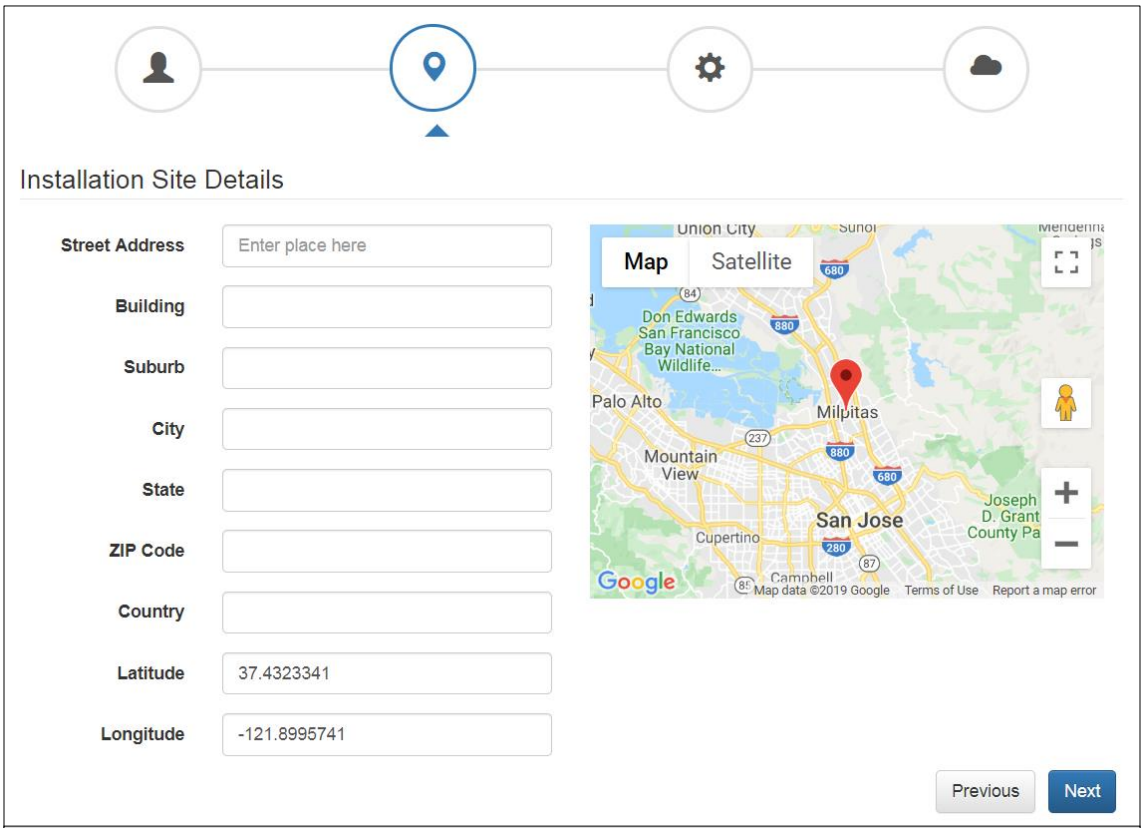


Figure 28: SMC Cloud Registration – Site Details

- Enter Name and Description (required) then click Next

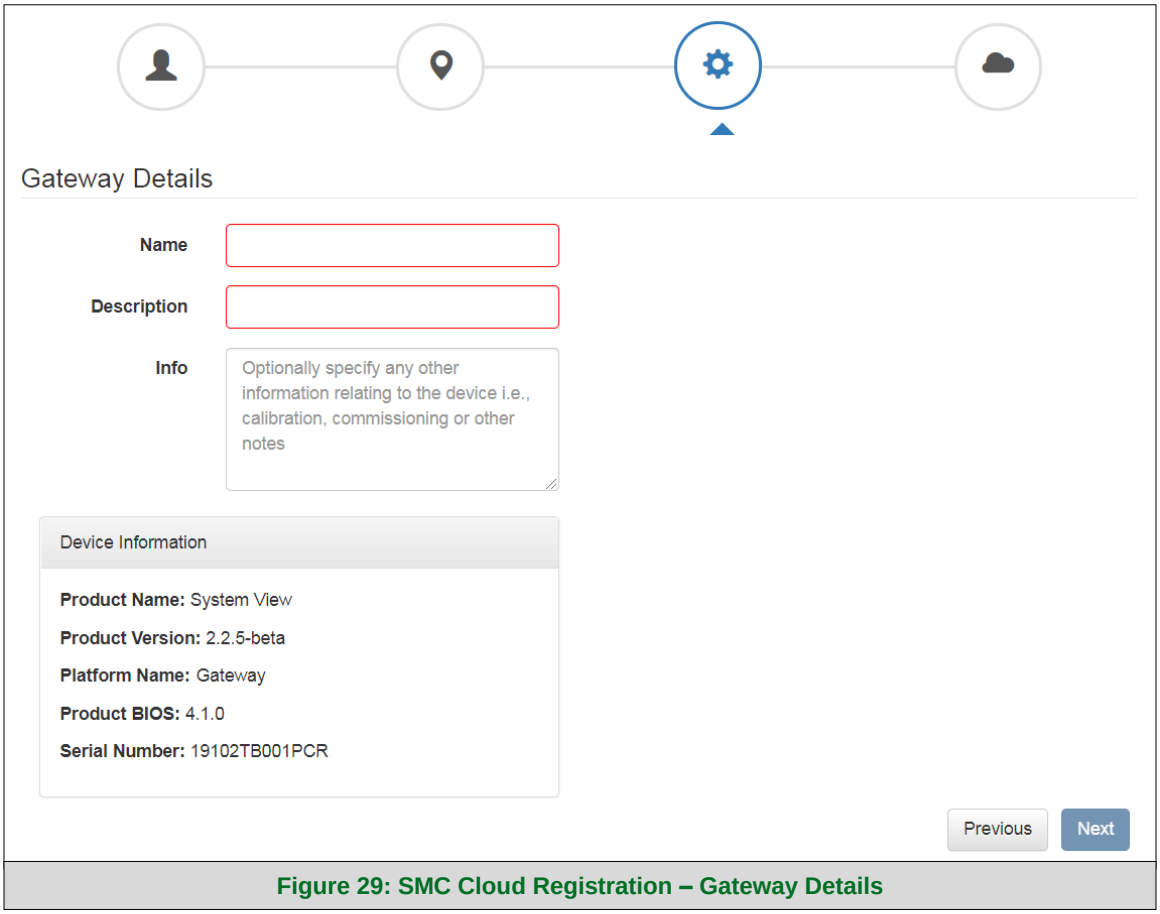


Figure 29: SMC Cloud Registration – Gateway Details

- Enter user credentials and click Register Device

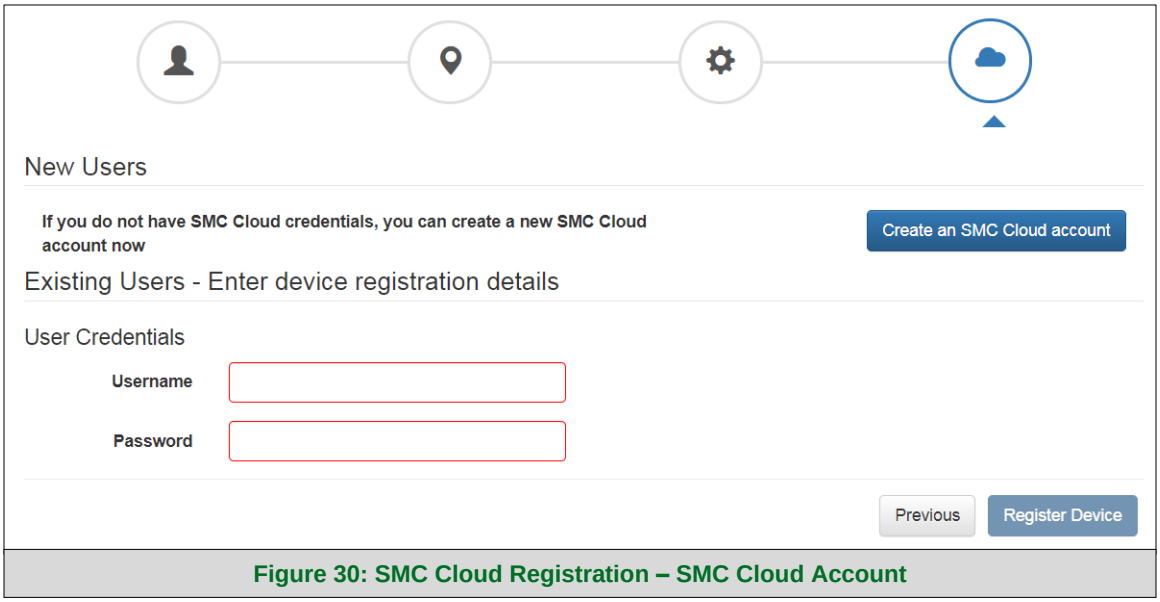


Figure 30: SMC Cloud Registration – SMC Cloud Account

- Once the device has successfully been registered, a confirmation window will appear. Click the Close button and the following screen will appear listing the device details and additional information auto-populated by the ProtoNode.

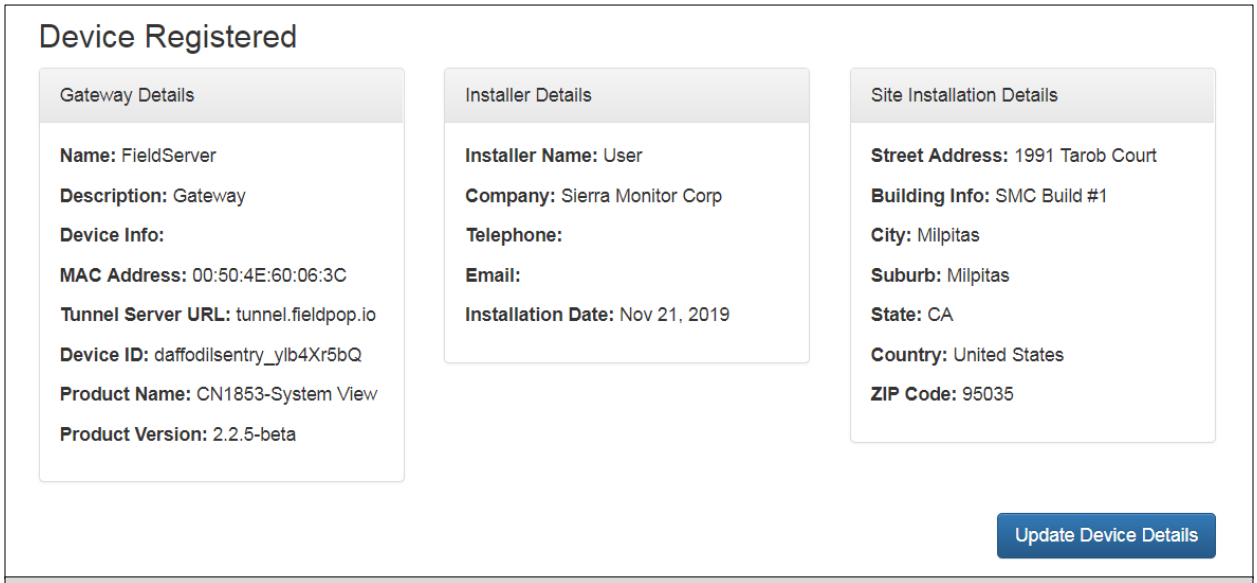


Figure 31: Device Registered for SMC Cloud

NOTE: Update these details at any time by going to the SMC Cloud™ tab and clicking the Update Device Details button.

7.4 Login to SMC Cloud

After the ProtoNode is registered, go to www.smccloud.net and type in the appropriate login information as per registration credentials.

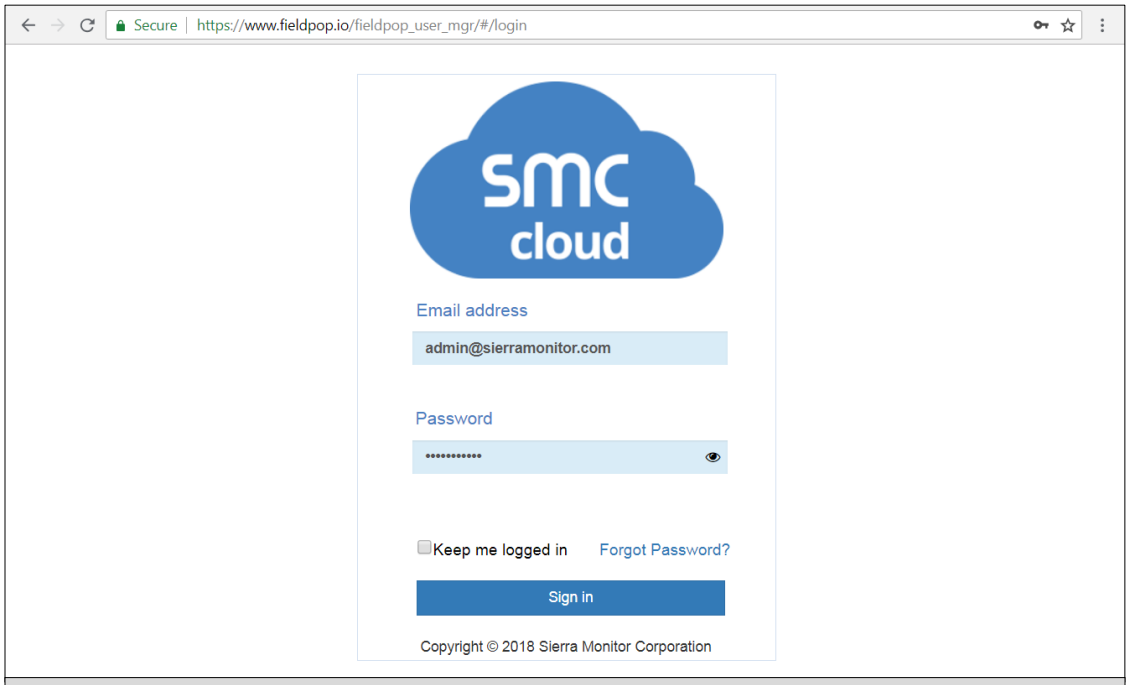


Figure 32: SMC Cloud Login Page

NOTE: If the login password is lost, see the SMC Cloud Start-up Guide for recovery instructions.

On first login, the Privacy Policy window will appear. Read the Terms of Service, click the checkbox to accept the terms and then click the Continue button to access SMC Cloud.

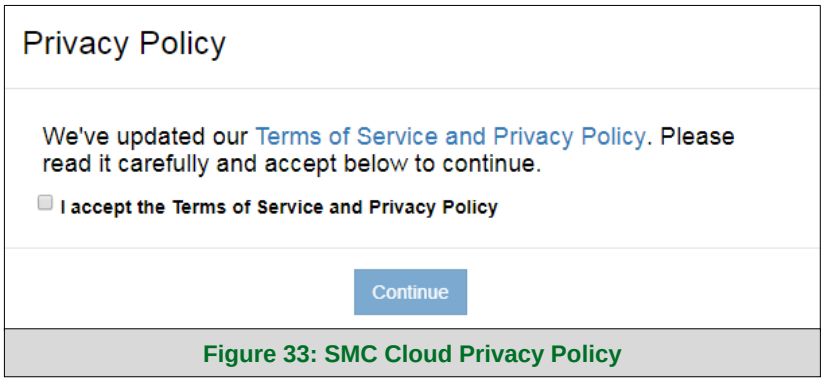


Figure 33: SMC Cloud Privacy Policy

NOTE: For additional SMC Cloud instructions see the SMC Cloud Start-up Guide.

Figure 34: SMC Cloud Landing Page

8 Configure the ProtoNode

8.1 Navigate to the ProtoNode Web Configurator

- From the Web App landing page (**Figure 35**), click the Settings tab and then click Configuration.

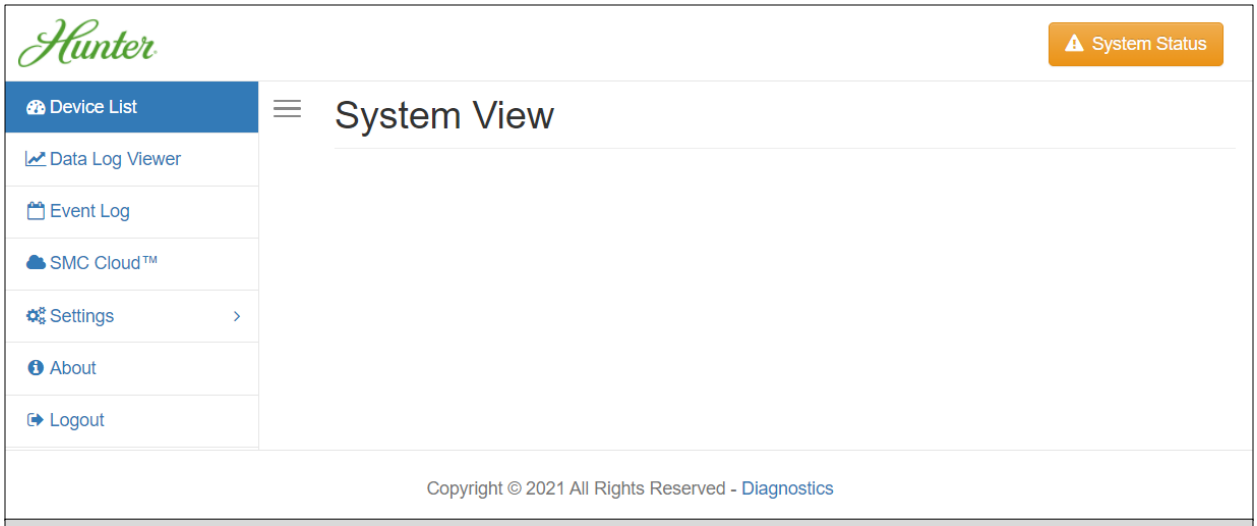


Figure 35: Web App Landing Page

NOTE: For information on the System Status button, go to Section 10.9.

- Then click the Profiles Configuration button to go to the Web Configurator page.

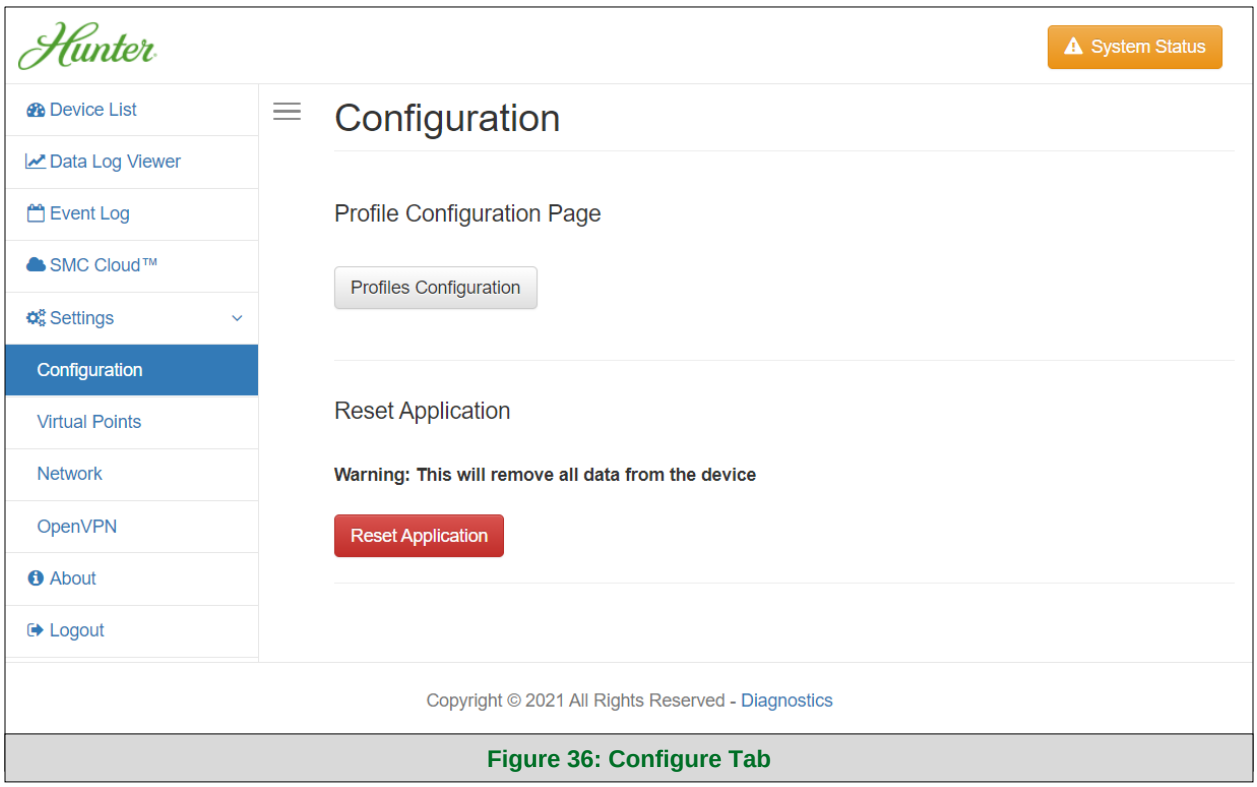


Figure 36: Configure Tab

NOTE: For Web App instructions to the System View, Data Log Viewer, Event Logger and Virtual Points functions, see the SMC Cloud Start-up Guide.

8.2 Select Field Protocol and Set Configuration Parameters

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

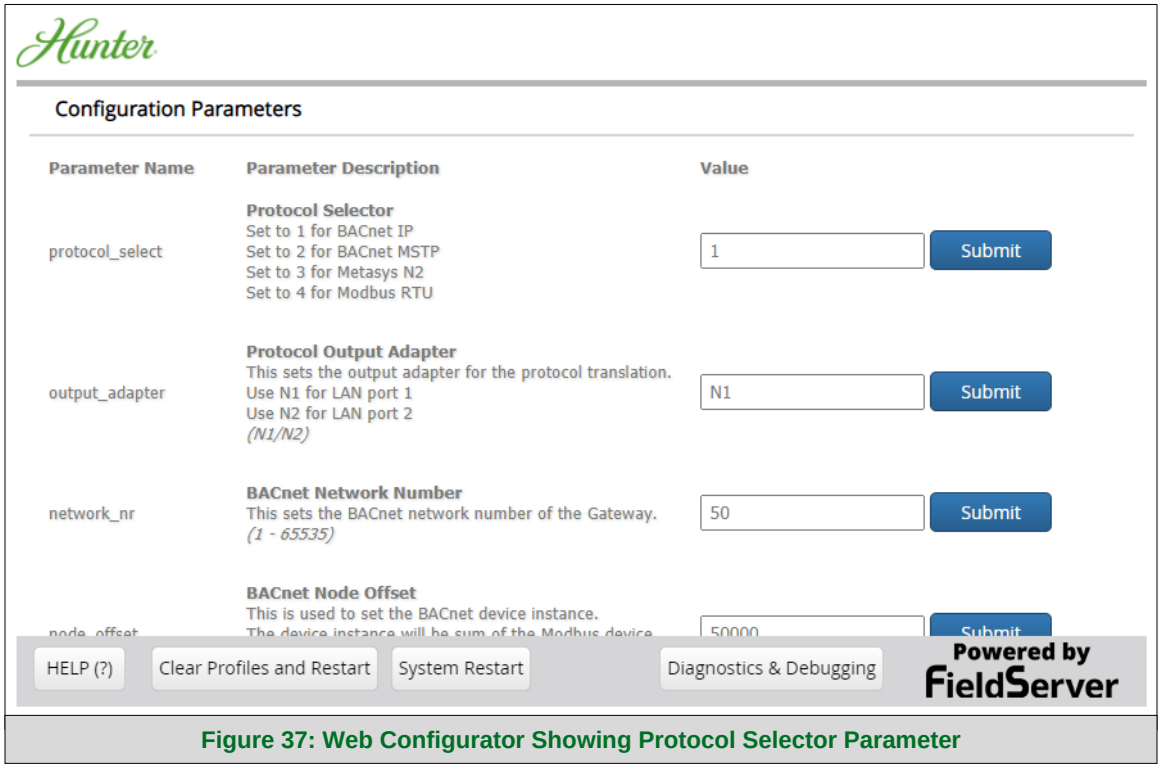


Figure 37: Web Configurator Showing Protocol Selector Parameter

- 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.

- 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 ProtoNode, set the BACnet Virtual Server Nodes field to "Yes"; otherwise leave the field on the default "No" setting.

8.3 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 38**)

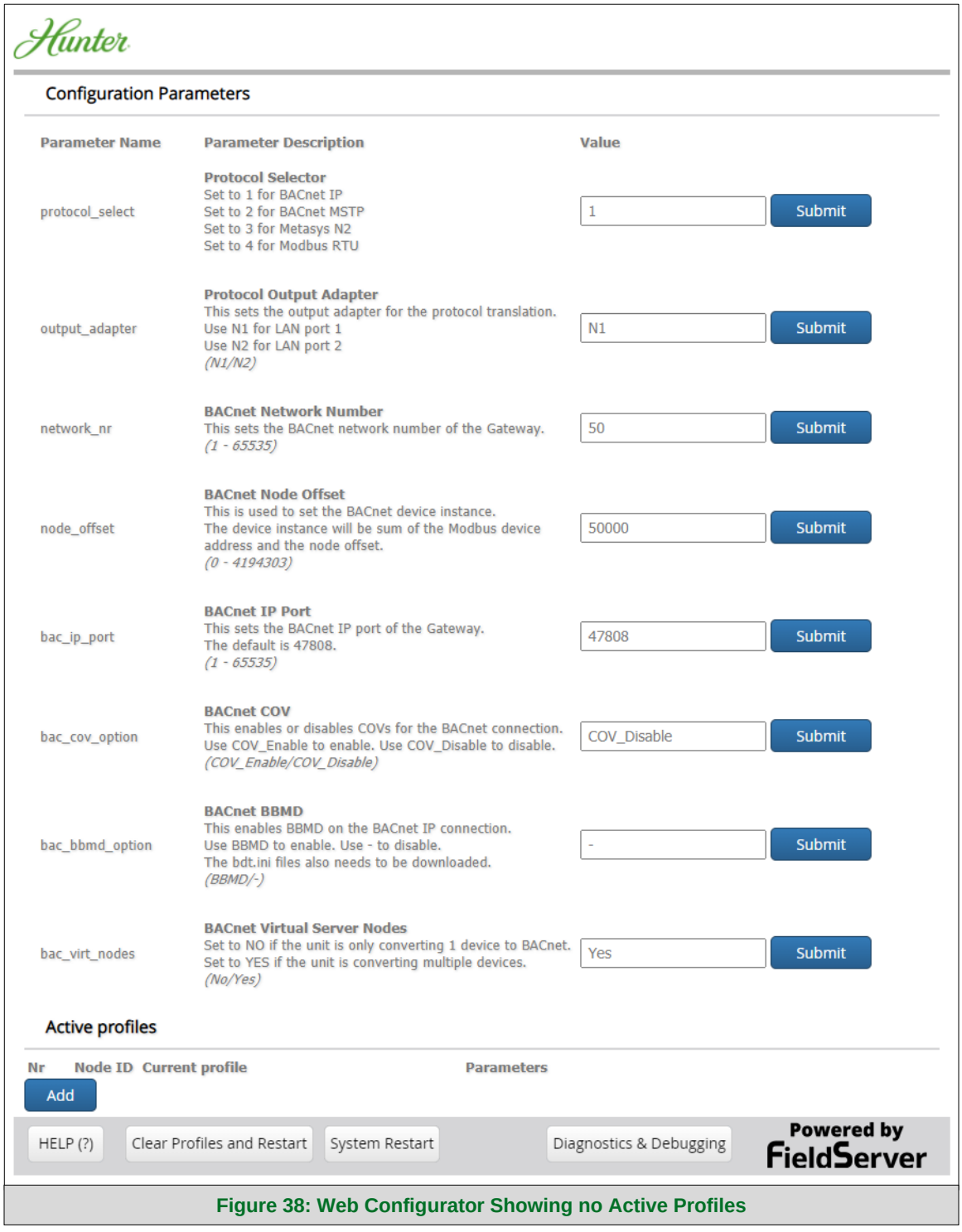


Figure 38: Web Configurator Showing no Active Profiles

- 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.

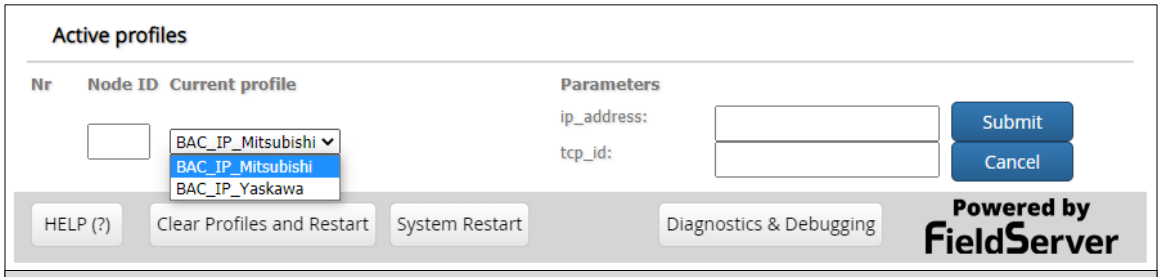


Figure 39: Profile Selection Menu

- 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 2.3.1**.
- If the device is connected via Modbus TCP/IP, enter the "ip_address" and "tcp_id" under the Parameters heading. These are gathered from settings on the device and correspond to the device IP Address and TCP_ID. (**Section 2.3.2**)
- 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 40**.

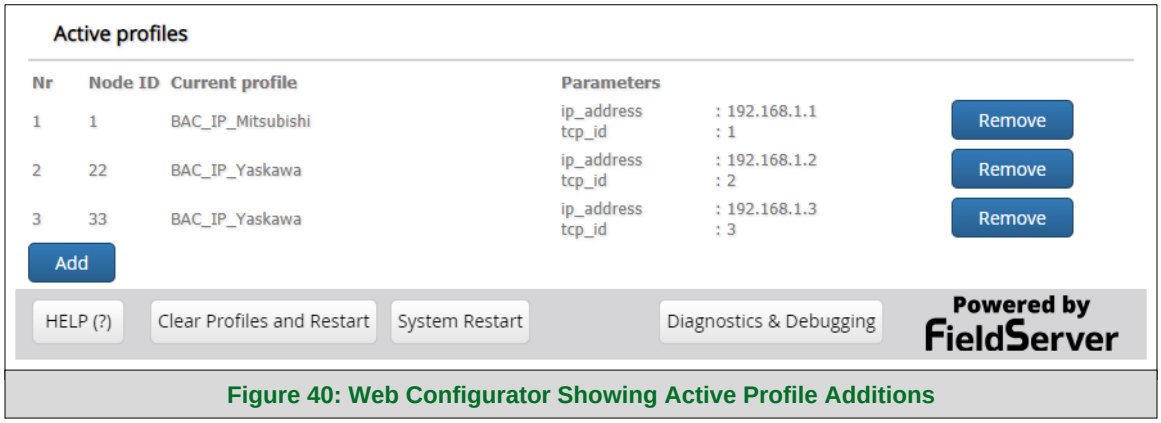


Figure 40: Web Configurator Showing Active Profile Additions

8.4 Verify Device Communications

- **If using a serial connection, check that the port R1 TX1 and RX1 LEDs are rapidly flashing**. See **Section 9.4** for additional LED information and images.
- Confirm the software shows good communications without errors (**Section 9.2**).

8.5 BACnet: Setting Node_Offset to Assign Specific Device Instances

- Follow the steps outlined in **Section 5.1** to access the ProtoNode 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 calculation below:

  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 below:
  - 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 "Submit" once the desired value is entered.

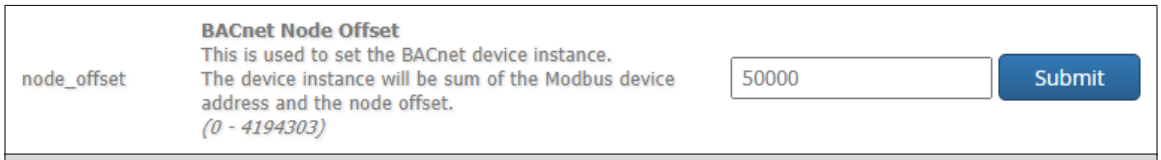


Figure 41: Web Configurator Node Offset Field

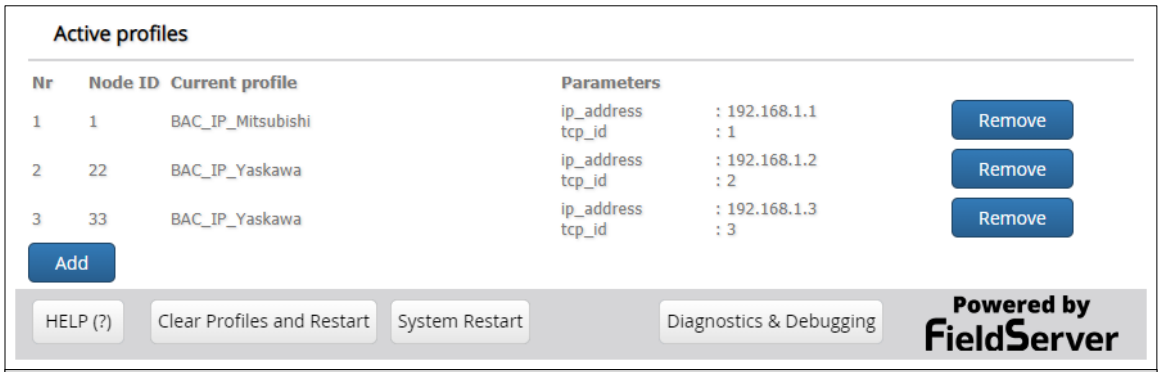


Figure 42: Active Profiles

8.6 How to Start the Installation Over: Clearing Profiles

- Follow the steps outlined in **Section 5.1** 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.

9 Troubleshooting

9.1 Lost or Incorrect IP Address

- Ensure that FieldServer Toolbox is loaded onto the local PC. Otherwise, download the FieldServer-Toolbox.zip via the MSA Safety website.
- Extract the executable file and complete the installation.

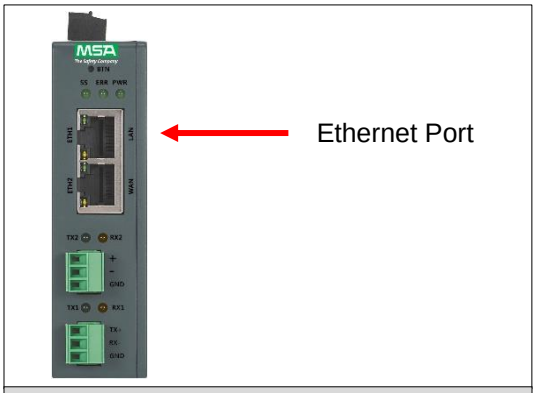
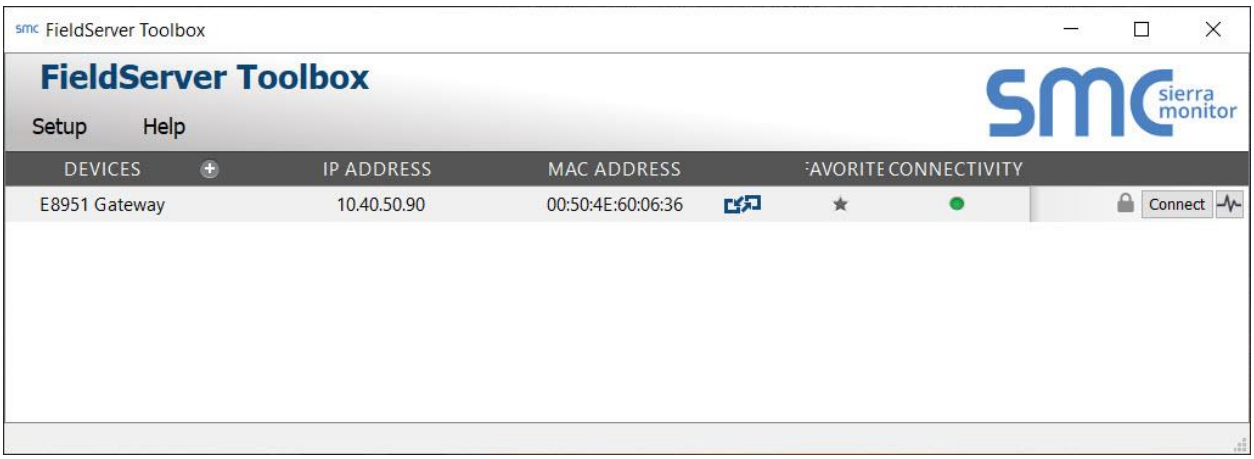


Figure 43: Ethernet Port Location

- 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.



9.2 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 and Debugging Button, then click on view, and then on connections.
- If there are any errors showing on the Connection page, refer to **Section 9.3** for the relevant wiring and settings.

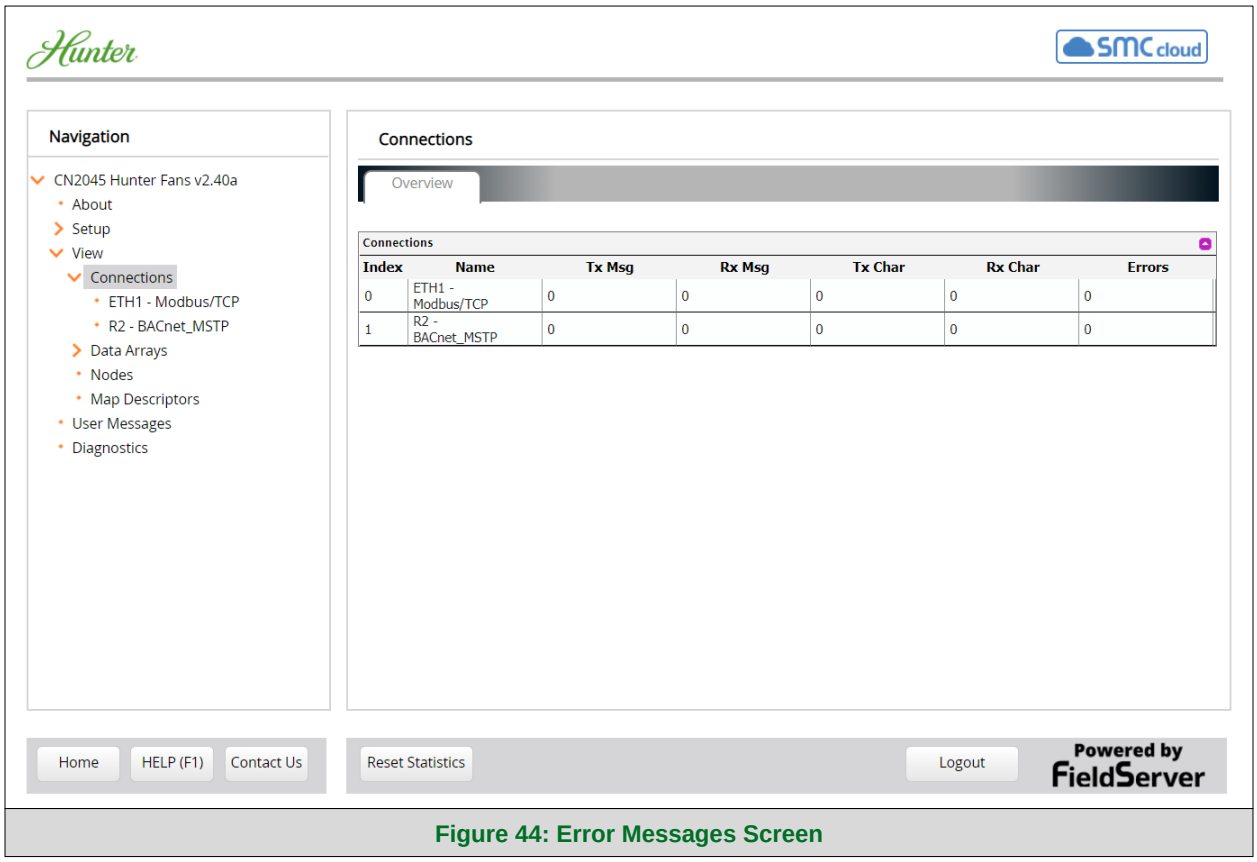


Figure 44: Error Messages Screen

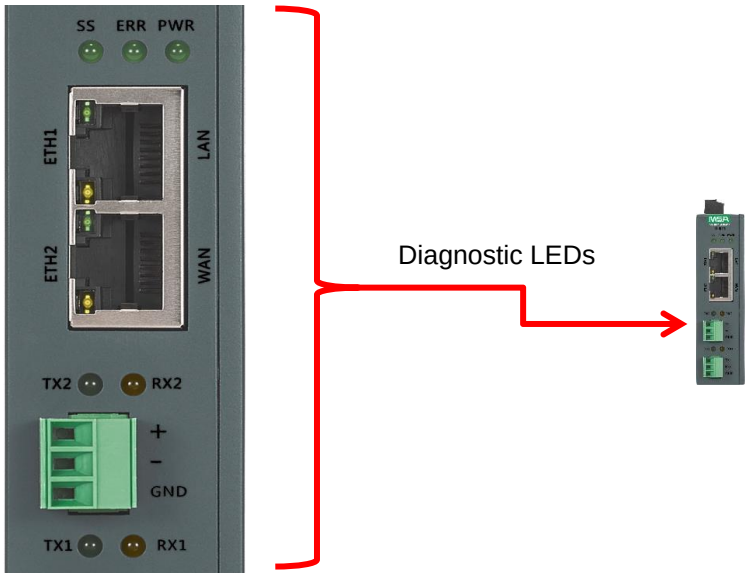
9.3 Checking Wiring and Settings

- No COMS on Modbus TCP/IP side. To fix, check the following:
  - Visual observations of LEDs on the ProtoNode (**Section 9.4**)
  - Check device address
  - Verify wiring
- Field COM problems:
  - Visual observations of LEDs on the ProtoNode (**Section 9.4**)
  - Verify IP Address setting
  - Verify wiring

NOTE: If the problem persists, a Diagnostic Capture needs to be taken and sent to support. (Section 9.5)

9.4 LED Diagnostics for Communications Between ProtoNode and Devices

See the diagram below for ProtoNode LED Locations.



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	The power light should always show steady green when connected to a functioning power source.
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. R**X1 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.

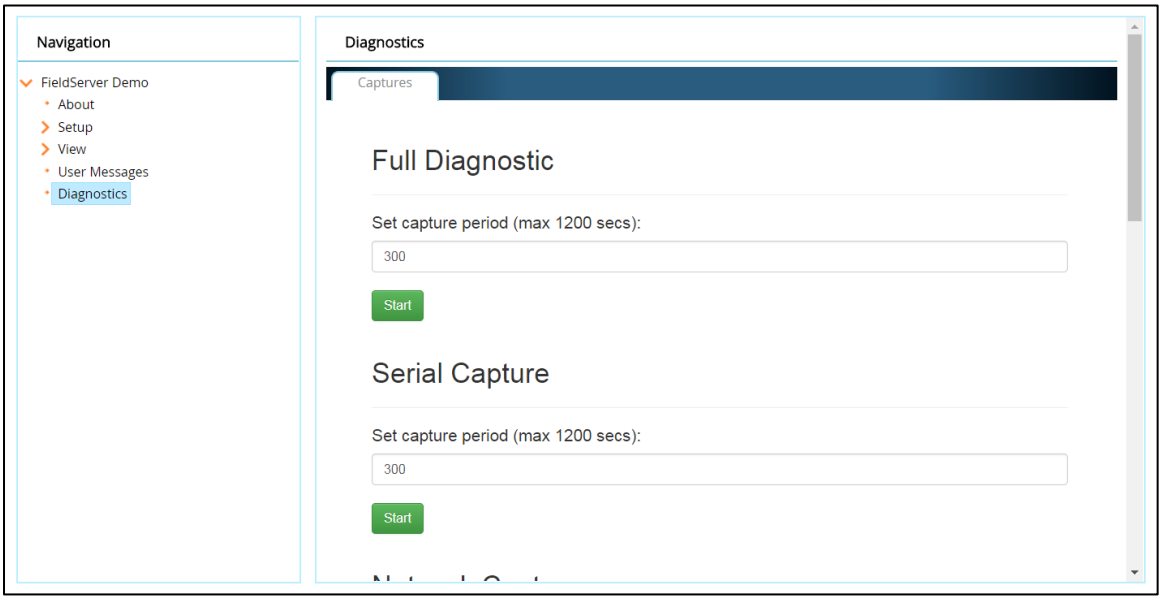
Figure 45: Diagnostic LEDs

9.5 Taking a FieldServer Diagnostic Capture

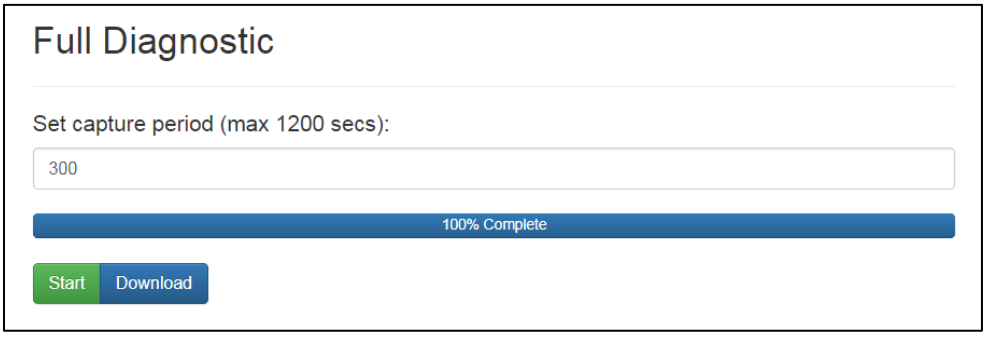
When there is a problem on-site that cannot easily be resolved, perform a Diagnostic Capture before contacting support. Once the Diagnostic Capture is complete, email it to technical support. The Diagnostic Capture will accelerate diagnosis of the problem.

If the FieldServer bios is updated/released on November 2017 or later then the Diagnostic Capture is performed via the gateway's on-board system.

- Access the FieldServer Diagnostics page via one of the following methods:
  - Open the FieldServer FS-GUI page and click on Diagnostics in the Navigation panel
  - Open the FieldServer Toolbox software and click the diagnose icon of the desired device



- 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 finished, a Download button will appear next to the Start button



- Click Download for the capture to be downloaded to the local PC.
- Email 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.

9.5.1 Taking a Capture with Older Firmware

If the FieldServer firmware is from before November 2017, the Diagnostic Capture can be done by downloading the FieldServer Toolbox software but network connections (such as Ethernet and Wi-Fi) cannot be captured (if a network diagnostic is needed take a Wire Shark capture).

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

- Ensure that FieldServer Toolbox is loaded onto the local PC. Otherwise, download the FieldServer-Toolbox.zip via the MSA Safety website.
- Extract the executable file and complete the installation.

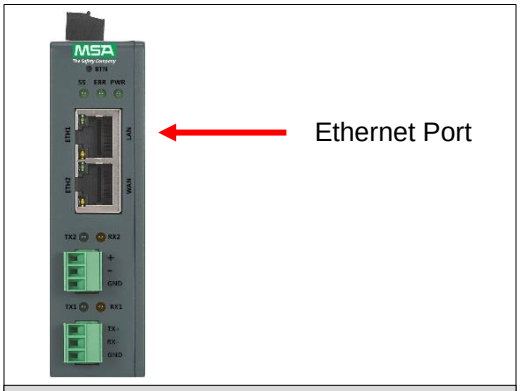
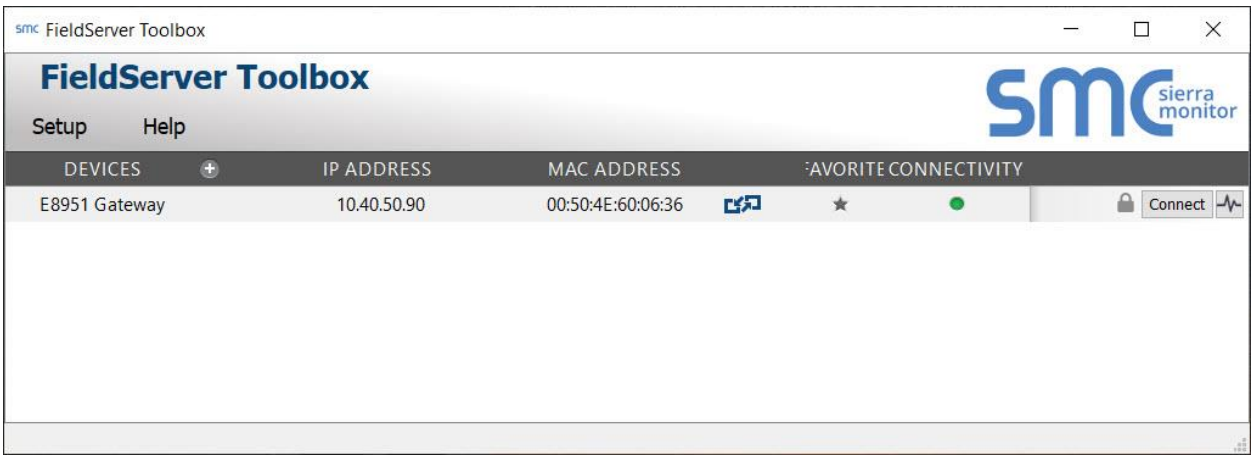


Figure 46: Ethernet Port Location

- 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 for the desired device



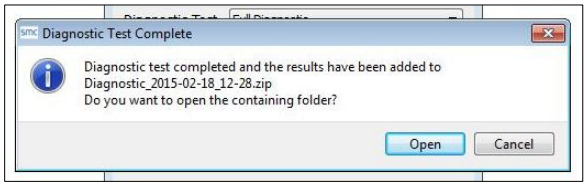
- Select “Full Diagnostic" from the drop down menu

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

- Click on the Start Diagnostic button

- Wait for the capture period to finish and the Diagnostic Test Complete window will appear

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



  - Choose “Open” to launch explorer and have it point directly at the correct folder
  - Send the Diagnostic zip file to technical support

9.6 Factory Reset Instructions

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

9.7 Internet Browsers Not Supported

The following web browsers are supported:

- Chrome Rev. 57 and higher
- Firefox Rev. 35 and higher
- Microsoft Edge Rev. 41 and higher
- Safari Rev. 3 and higher

NOTE: Internet Explorer is no longer supported as recommended by Microsoft.

NOTE: Computer and network firewalls must be opened for Port 80 to allow FieldServer GUI to function.

10 Additional Information

10.1 Update 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 (**Section 9.1**)
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.

10.2 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 50.

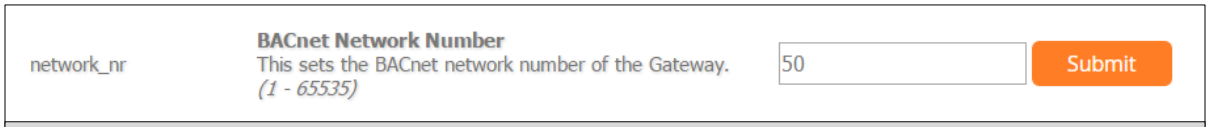


Figure 47: Web Configurator – Network Number Field

10.3 Mounting

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

Figure 48: DIN Rail

10.4 Certification

10.4.1 BTL Mark – BACnet® Testing Laboratory

The BTL Mark on 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. Click here for the BACnet PIC Statement.

NOTE: BACnet is a registered trademark of ASHRAE.

10.5 Physical Dimension Drawing

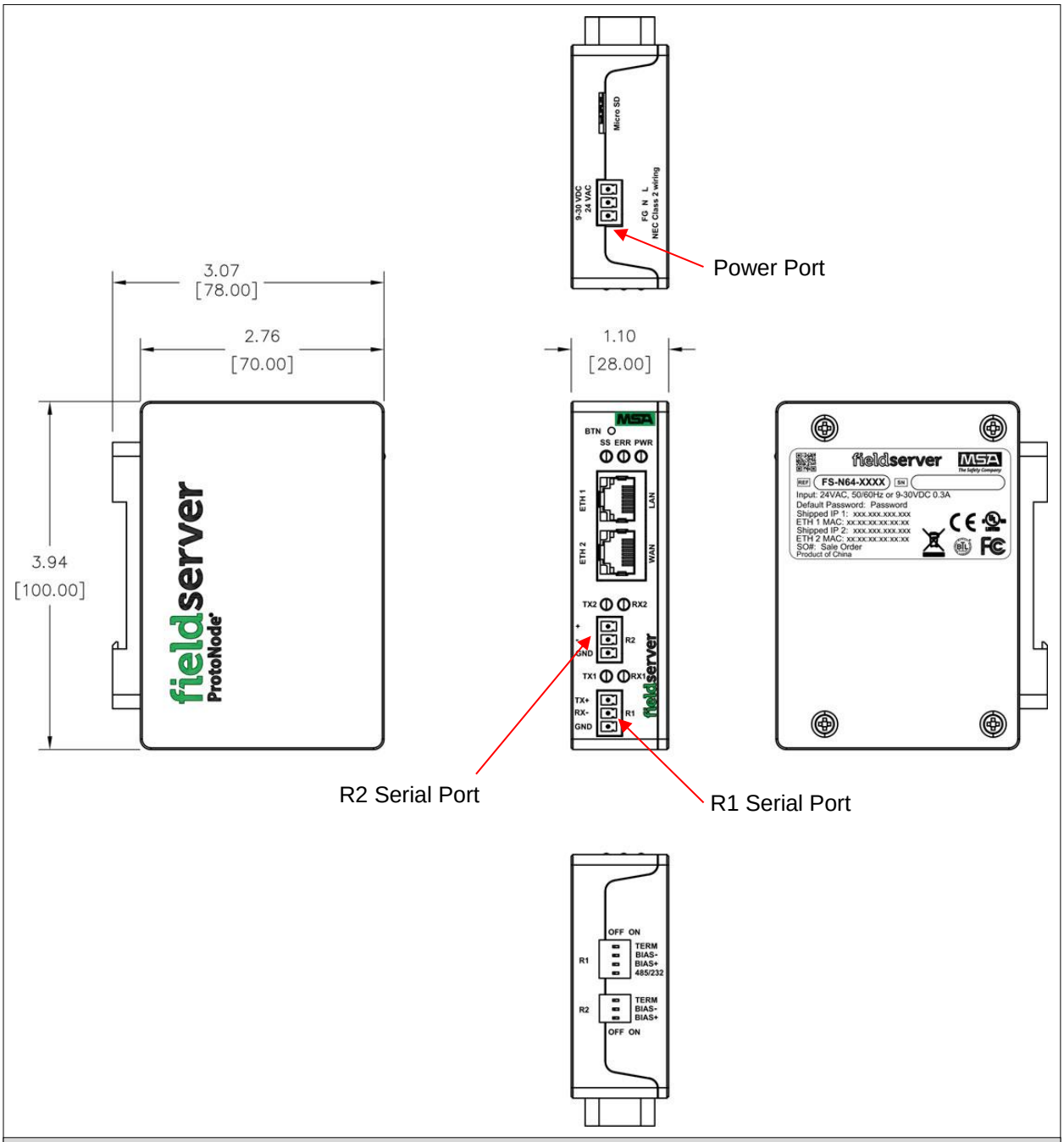


Figure 49: ProtoNode FPC-N64 Dimensions

10.6 Change Web Server Security Settings After Initial Setup

NOTE: Any changes will require a FieldServer reboot to take effect.

- From the FS-GUI page, click Setup in the Navigation panel.

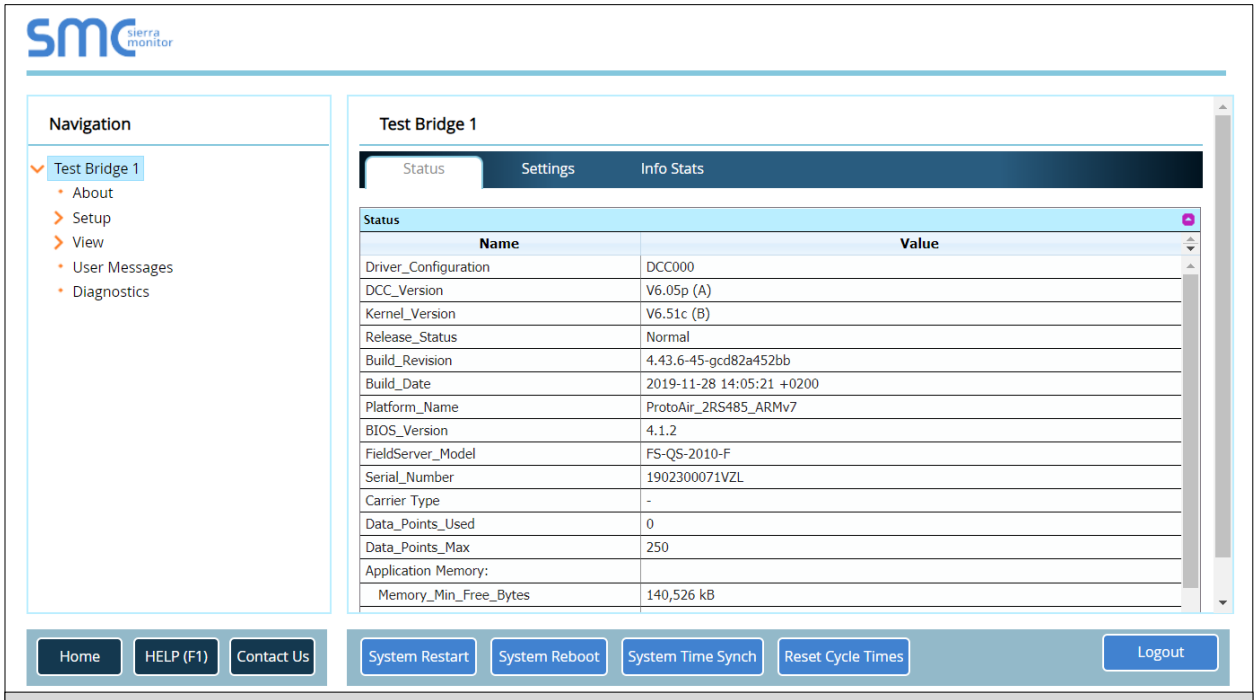


Figure 50: FS-GUI Page

10.6.1 Change Security Mode

- Click Security in the Navigation panel.

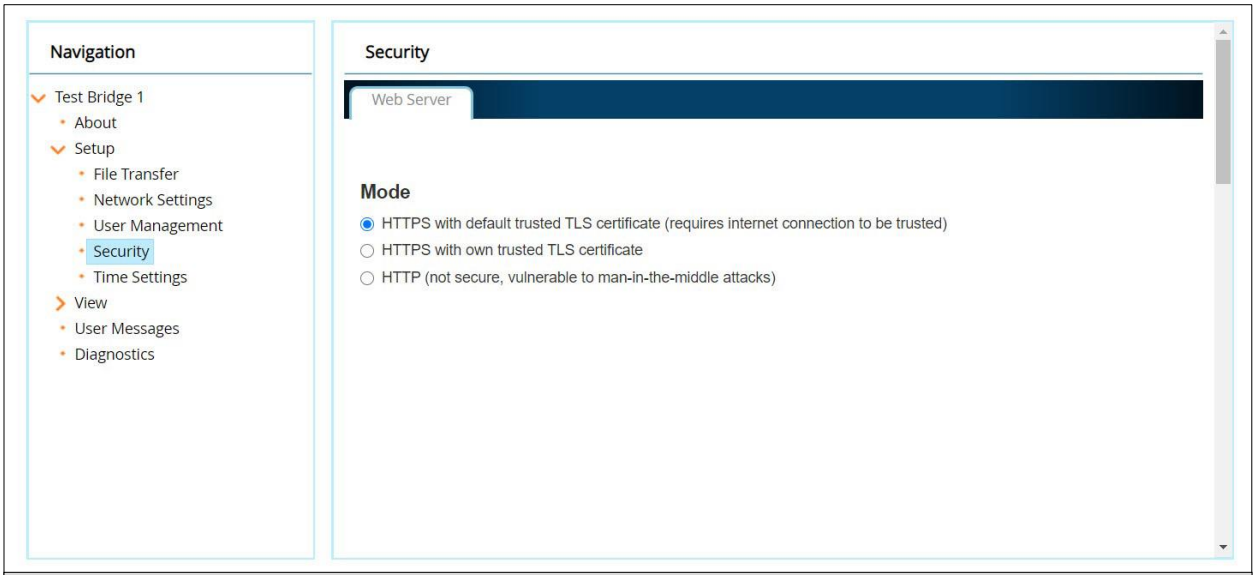


Figure 51: FS-GUI Security Setup

- Click the Mode desired.
  - If HTTPS with own trusted TLS certificate is selected, follow instructions in **Section 5.2.1**
- Click the Save button.

10.6.2 Edit the Certificate Loaded onto the FieldServer

NOTE: A loaded certificate will only be available if the security mode was previously setup as HTTPS with own trusted TLS certificate.

- Click Security in the Navigation panel.

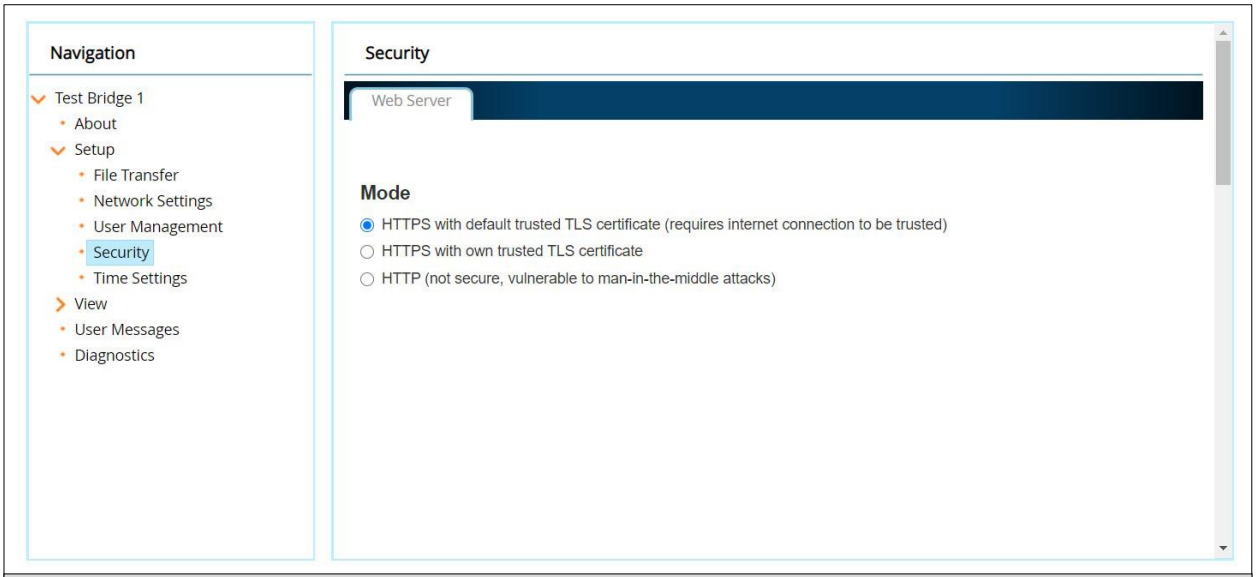


Figure 52: FS-GUI Security Setup – Certificate Loaded

- Click the Edit Certificate button to open the certificate and key fields.
- Edit the loaded certificate or key text as needed.
- Click Save.

10.7 Change User Management Settings

- From the FS-GUI page, click Setup in the Navigation panel.
- Click User Management in the navigation panel.

NOTE: If the passwords are lost, the unit can be reset to factory settings to reinstate the default unique password on the label. For ProtoNode, ProtoCessor or ProtoCarrier recovery instructions, see the FieldServer Recovery Instructions document. For ProtoNode FPC-N54, ProtoNode FPC-N64 or ProtoAir recovery instructions, see the FieldServer Next Gen Recovery document. If the default unique password is lost, then the unit must be mailed back to the factory.

NOTE: Any changes will require a FieldServer reboot to take effect.

- Check that the Users tab is selected.

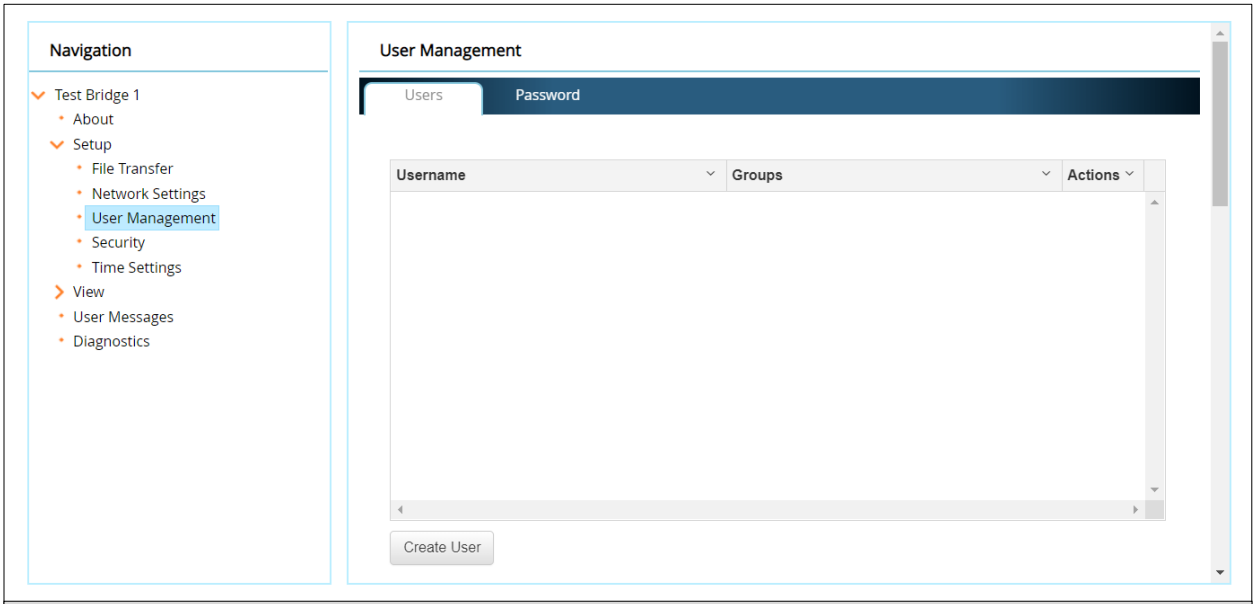


Figure 53: FS-GUI User Management

User Types:

Admin – Can modify and view any settings on the FieldServer.

Operator – Can modify and view any data in the FieldServer array(s).

Viewer – Can only view settings/readings on the FieldServer.

10.7.1 Create Users

- Click the Create User button.

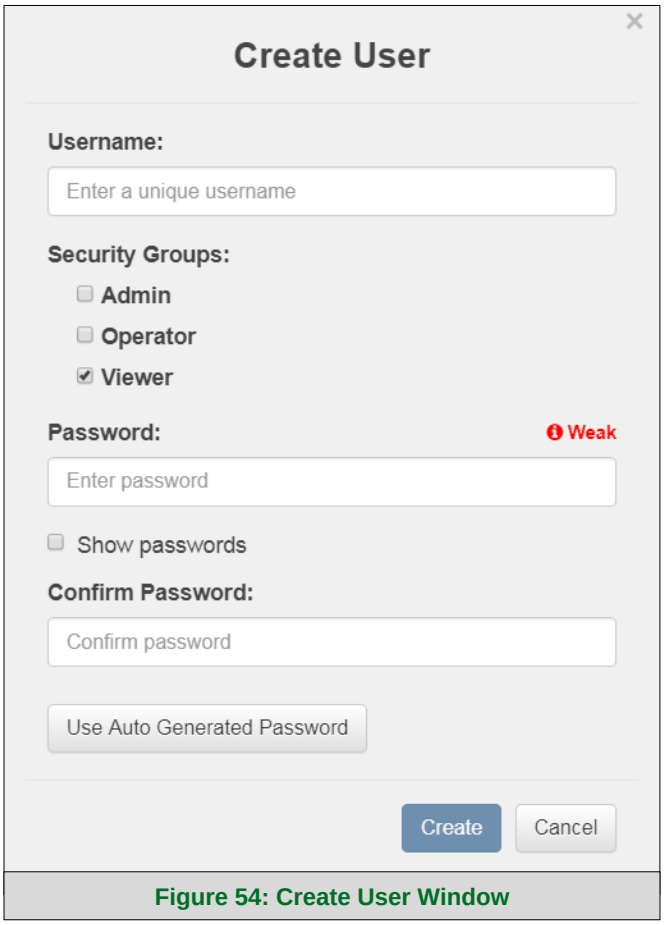


Figure 54: Create User Window

- Enter the new User fields: Name, Security Group and Password.
  - **User details are hashed and salted**

NOTE: The password must meet the minimum complexity requirements. An algorithm automatically checks the password entered and notes the level of strength on the top right of the Password text field.

- Click the Create button.
- Once the Success message appears, click OK.

10.7.2 Edit Users

- Click the pencil icon next to the desired user to open the User Edit window.

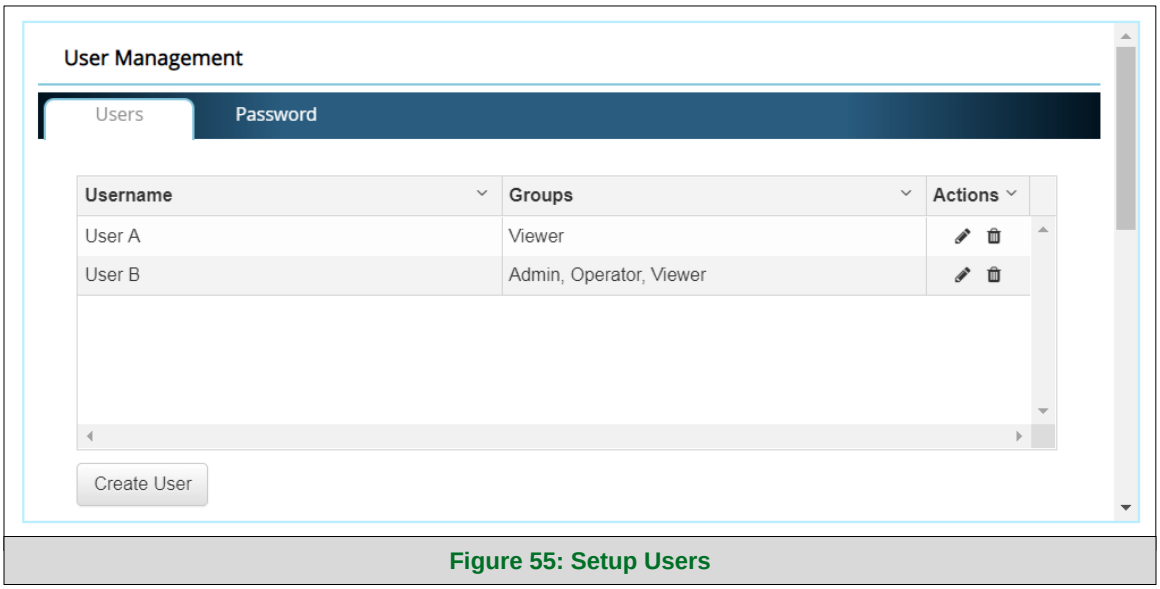


Figure 55: Setup Users

- Once the User Edit window opens, change the User Security Group and Password as needed.

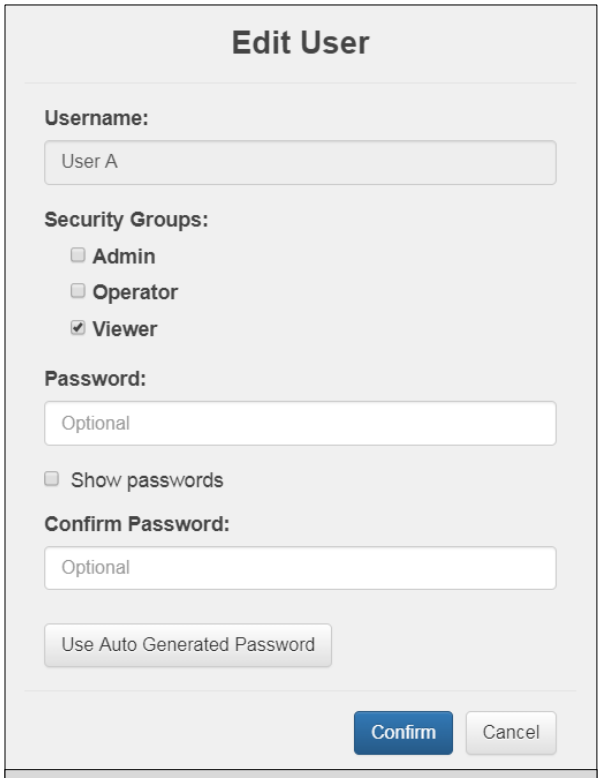


Figure 56: Edit User Window

- Click Confirm.
- Once the Success message appears, click OK.

10.7.3 Delete Users

- Click the trash can icon next to the desired user to delete the entry.

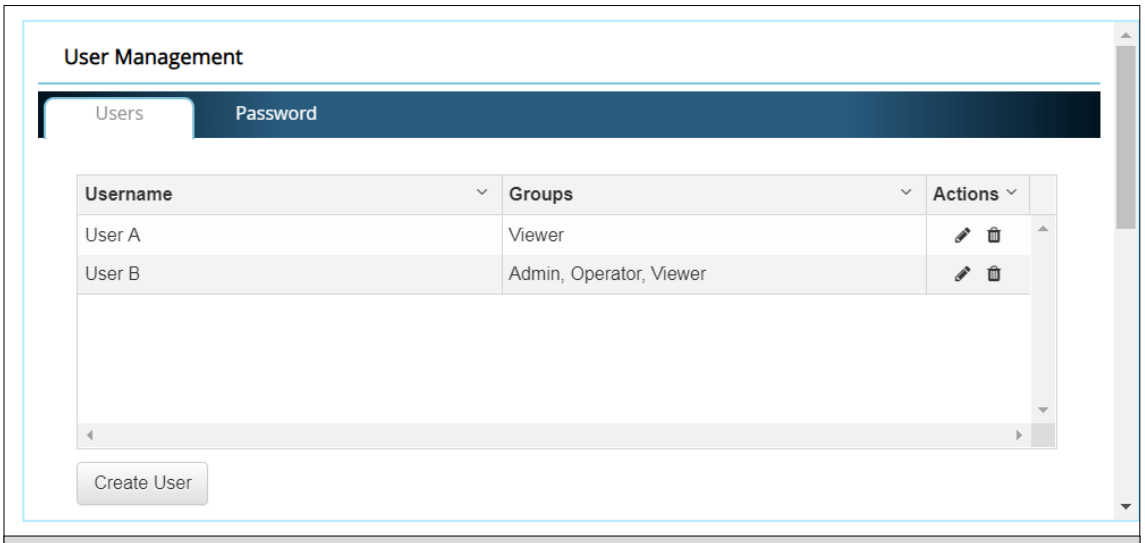


Figure 57: Setup Users

- When the warning message appears, click Confirm.

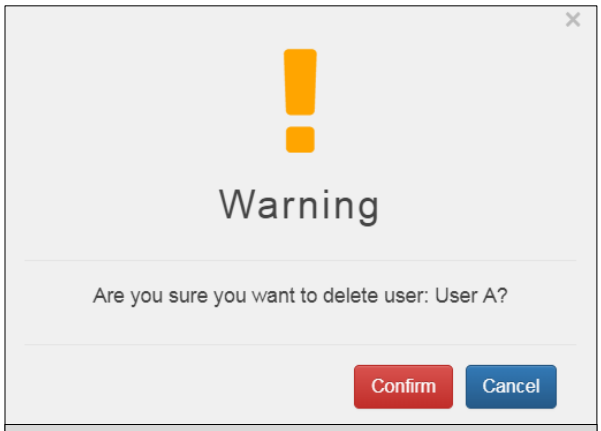


Figure 58: User Delete Warning

10.7.4 Change FieldServer Password

- Click the Password tab.

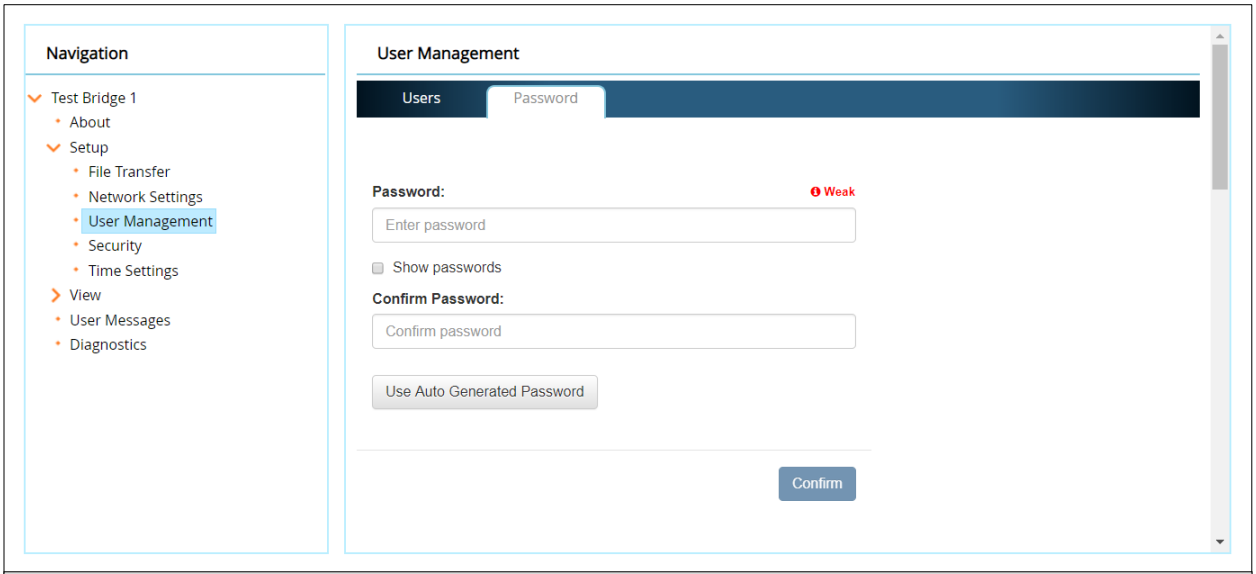


Figure 59: FieldServer Password Update via FS-GUI

- Change the general login password for the FieldServer as needed.

NOTE: The password must meet the minimum complexity requirements. An algorithm automatically checks the password entered and notes the level of strength on the top right of the Password text field.

10.8 SMC Cloud Connection Warning Message

- If a warning message appears instead of the page as shown in **Figure 26**, follow the suggestion that appears on screen.
    - If the ProtoNode cannot reach the SMC Cloud server, the following message will appear

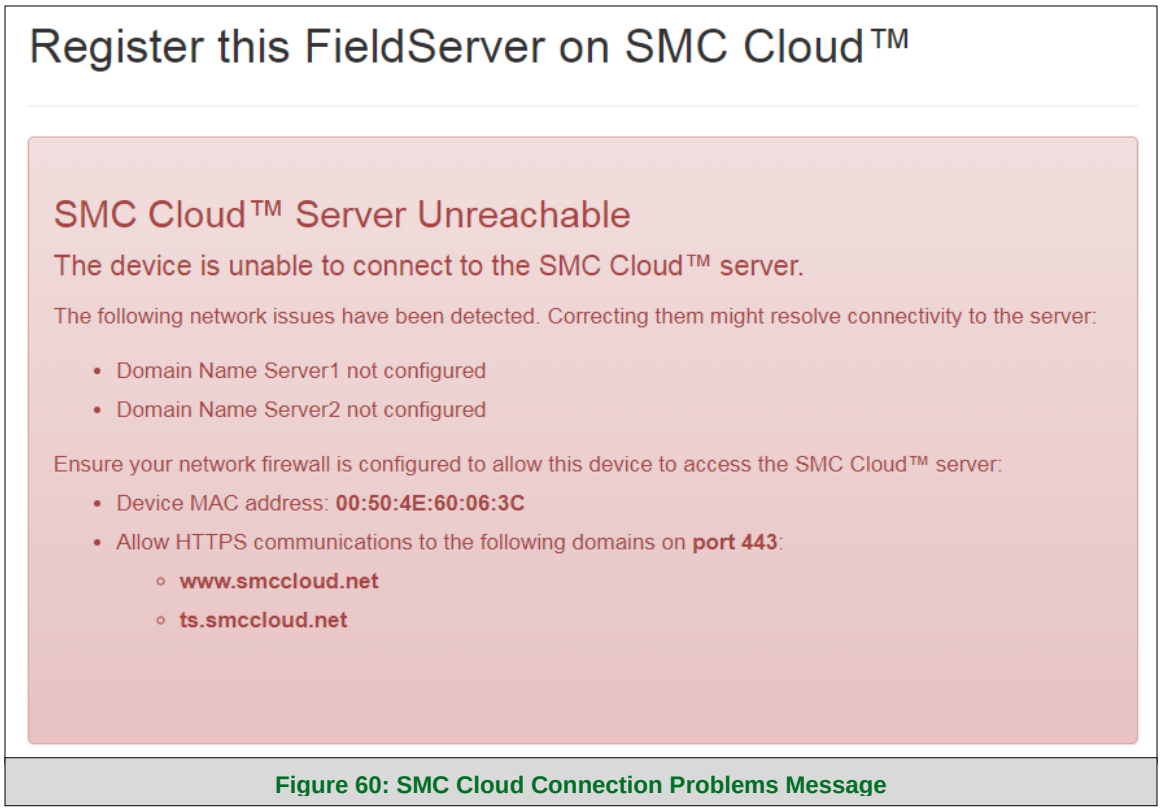


Figure 60: SMC Cloud Connection Problems Message

- Follow the directions presented in the warning message.
    - Go to the network settings by clicking the Settings tab and then click the Network tab
    - Check with the site's IT support that the DNS settings are setup correctly
    - Ensure that the ProtoNode is properly connected to the Internet

NOTE: If changes to the network settings are done, remember to click the Save button. Then power cycle the FieldServer by clicking on the Confirm button in the window and click on the bolded "Restart" text in the yellow pop-up box that appears in the upper right corner of the screen.

10.9 System Status Button

The System Status Button can be found on any page of the web apps. This shows the level of alert/functionality for the customer device. This is an aggregate of the Web App page's resource usage upon the local PC or mobile device, SMC Cloud connectivity and device alert level.

The color of the button represents the status of one to all three systems:

Green – Normal status

Yellow – Warning status

Red – Alarm status

Click on the System Status Button to open the System Status window, showing more details on the status of each system.

NOTE: If it was selected to opt out of SMC Cloud (Figure 23), the SMC Cloud status will not show in the System Status window. This means the status will show as green even if the gateway is not connected to SMC Cloud.

10.10 Routing Settings

The Routing settings make it possible to set up the IP routing rules for the FieldServer's internet and network connections.

NOTE: The default connection is ETH1.

- Select the default connection in the first row as either ETH 1 or ETH 2.
- Click the Add Rule button to add a new row and set a new Destination Network, Netmask and Gateway IP Address as needed.
- Set the Priority for each connection (1-255 with 1 as the highest priority and 255 as the lowest).
- Click the Save button to activate the new settings.

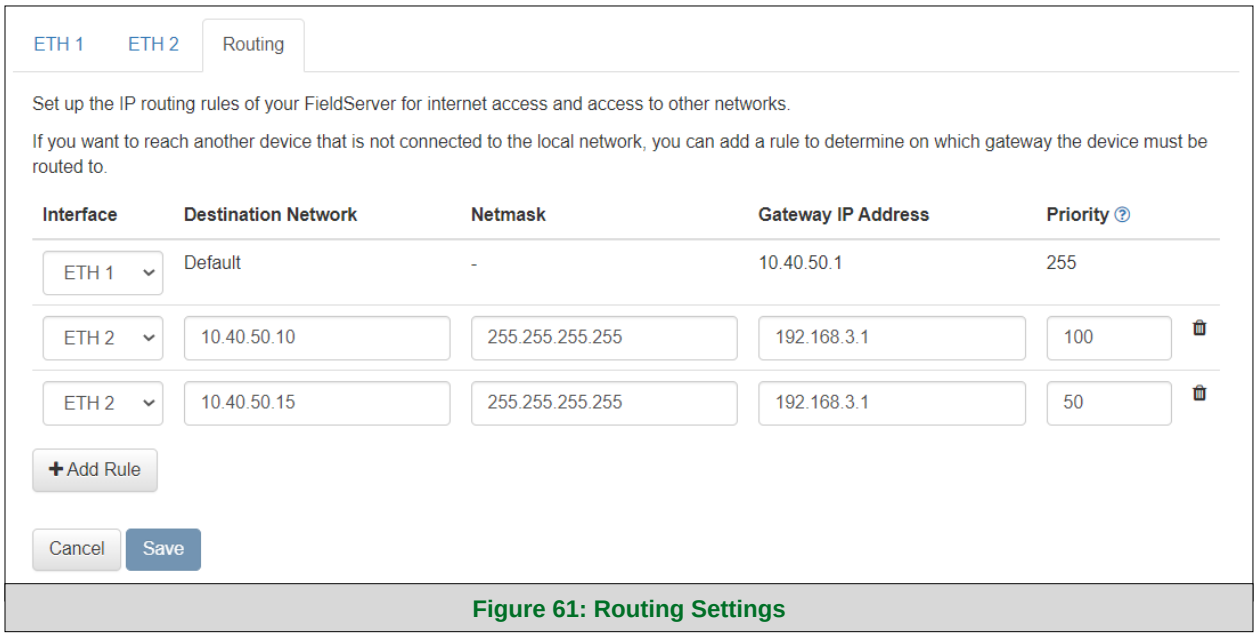


Figure 61: Routing Settings

11 Vendor Information – Hunter Fans

11.1 Yaskawa Modbus TCP/IP Mappings to BACnet, Metasys N2 and Modbus RTU

Point Name	BACnet Object Type	BACnet Object ID	N2 Data Type	N2 Address	Modbus Register
CommandXXX	AV	1	AO	1	1
SpeedCmdXXX	AV	2	AO	2	2
SpeedMonXXX	AI	3	AI	3	65
FaultMonXXX	AI	4	AI	4	128
FanXXX/CommLossTimeout	AV	5	AO	5	1012
FanXXX/Current	AI	6	AI	6	8199
FanXXX/FireRelay	BI	7	DI	7	43.2
FanXXX/FireRelayFunction	AV	8	AO	8	1024
FanXXX/FreqRefSel	AV	9	AO	9	384
FanXXX/ip1	AV	10	AO	10	997
FanXXX/ip2	AV	11	AO	11	998
FanXXX/ip3	AV	12	AO	12	999
FanXXX/ip4	AV	13	AO	13	1000
FanXXX/RunCmdSel	AV	14	AO	14	385
FanXXX/sn1	AV	15	AO	15	1001
FanXXX/sn2	AV	16	AO	16	1002
FanXXX/sn3	AV	17	AO	17	1003
FanXXX/sn4	AV	18	AO	18	1004
FanXXX/Write	AV	19	AO	19	2304

11.2 Mitsubishi Modbus TCP/IP Mappings to BACnet, Metasys N2 and Modbus RTU

Point Name	BACnet Object Type	BACnet Object ID	N2 Data Type	N2 Address	Modbus Register
InvXXX Inverter Reset	AV	1	AO	1	40002
InvXXX Parameter Clear	AV	2	AO	2	40003
InvXXX All Parameter Clear	AV	3	AO	3	40004
InvXXX Parameter Clear	AV	4	AO	4	40006
InvXXX All Parameter Clear	AV	5	AO	5	40007
InvXXX Inverter Status Run/Stop	BV	6	DO	6	40009.0
InvXXX Inverter Status Forward Rot	BV	7	DO	7	40009.1
InvXXX Inverter Status Reverse Rot	BV	8	DO	8	40009.2
InvXXX Inverter Status SL/RH	BV	9	DO	9	40009.3
InvXXX Inverter Status OL/RM	BV	10	DO	10	40009.4
InvXXX Inverter Status IPF/RL	BV	11	DO	11	40009.5
InvXXX Inverter Status FU/JOG	BV	12	DO	12	40009.6
InvXXX Inverter Status ABC1/RT	BV	13	DO	13	40009.7
InvXXX Inverter Status ABC2/AU	BV	14	DO	14	40009.8
InvXXX Inverter Status CS	BV	15	DO	15	40009.9
InvXXX Inverter Status MRS	BV	16	DO	16	40009.10
InvXXX Inverter Status STOP	BV	17	DO	17	40009.11
InvXXX Inverter Status RES	BV	18	DO	18	40009.12
InvXXX Op Mode/Inverter Set	AV	19	AO	19	40010
InvXXX Running Freq (RAM Value)	AV	20	AO	20	40014
InvXXX Running Freq (EEPROM Value)	AV	21	AO	21	40015
InvXXX Output Frequency/Speed	AI	22	AI	22	40201
InvXXX Output Current	AI	23	AI	23	40202
InvXXX Output Voltage	AI	24	AI	24	40203
InvXXX Freq Setting Value/Spd Set	AI	25	AI	25	40205
InvXXX Running Speed	AI	26	AI	26	40206
InvXXX Converter Output Voltage	AI	27	AI	27	40208
InvXXX Regenerative Brake Duty	AI	28	AI	28	40209
InvXXX Elec Thrm Rel Func Load Fac	AI	29	AI	29	40210
InvXXX Output Current Peak Value	AI	30	AI	30	40211
InvXXX Conv Output Volt Peak Value	AI	31	AI	31	40212
InvXXX Input Power	AI	32	AI	32	40213
InvXXX Output Power	AI	33	AI	33	40214

InvXXX Input Terminal Status	AI	34	AI	34	40215
InvXXX Output Terminal Status	AI	35	AI	35	40216
InvXXX Load Meter	AI	36	AI	36	40217
InvXXX Cum energization Time	AI	37	AI	37	40220
InvXXX Actual Operation Time	AI	38	AI	38	40223
InvXXX Motor Load Factor	AI	39	AI	39	40224
InvXXX Cumulative Power	AI	40	AI	40	40225
InvXXX Power Saving Effect	AI	41	AI	41	40250
InvXXX Cumulative Saving Power	AI	42	AI	42	40251
InvXXX PID Setpoint	AI	43	AI	43	40252
InvXXX PID Measured Value	AI	44	AI	44	40253
InvXXX PID Deviation	AI	45	AI	45	40254
InvXXX PTC Thermistor Resistance	AI	46	AI	46	40264
InvXXX Cumulative Power U32	AI	47	AI	47	40277/40278
InvXXX Cumulative Power Flt	AI	48	AI	48	40279/40280
InvXXX Fault History 1	AI	49	AI	49	40501
InvXXX Fault History 2	AI	50	AI	50	40502
InvXXX Fault History 3	AI	51	AI	51	40503
InvXXX Fault History 4	AI	52	AI	52	40504
InvXXX Fault History 5	AI	53	AI	53	40505
InvXXX Fault History 6	AI	54	AI	54	40506
InvXXX Fault History 7	AI	55	AI	55	40507
InvXXX Fault History 8	AI	56	AI	56	40508
InvXXX Inverter Status Fault Occur	BI	57	BI	57	40009.15

12 Specifications

	ProtoNode FPC-N64[1]
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) Two Ethernet 10/100 BaseT ports
Power Requirements	*Input Voltage:* 9-30VDC or 24VAC *Current draw:* 24VAC 0.125A *Max Power:* 3 Watts 9-30VDC .25A @12VDC
Approvals	CE and FCC class B & C part 15, UL 62368-1, WEEE compliant, IC Canada, RoHS3 compliant, DNP 3.0 conformance tested, REACH 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

Figure 62: Specifications

12.1.1 Compliance with UL Regulations

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

- The units shall be powered by listed LPS or Class 2 power supply suited to the expected operating temperature range.
- The interconnecting power connector and power cable shall:
  - Comply with local electrical code
  - Be suited to the expected operating temperature range
  - Meet the current and voltage rating for the ProtoNode
- Furthermore, the interconnecting power cable shall:
  - Be of length not exceeding 3.05m (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.

[1] Specifications subject to change without notice.

13 Limited 2 Year Warranty

MSA Safety warrants its products to be free from defects in workmanship or material under normal use and service for two years after date of shipment. MSA Safety 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 MSA Safety 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 MSA Safety'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 MSA Safety'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, MSA Safety 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 MSA Safety for damages including, but not limited to, consequential damages arising out of/or in connection with the use or performance of the product.