Operating Manual

ProtoAir FPA-W44 for Interfacing Triangle Tube Products

Revision: 1.A

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Technical Support

Thank you for purchasing the ProtoAir for Triangle Tube.

Please contact Triangle Tube for technical support of the ProtoAir product.

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

Support Contact Information:

Triangle Tube
1240 Forest Parkway, Suite 100
West Deptford, NJ 08066

Customer Service:

Phone: (856) 228-8881

Website: https://triangletube.com/

Email: techsupport@triangletube.com

Quick Start Guide

1. Record the information about the unit. (**Section 2.1 Record Identification Data**)
2. Check that the ProtoAir and customer device COM settings match. (**Section 2.3 Configuring Device Communications**)
3. **If connecting to a serial device:**
   Connect the ProtoAir 3 pin RS-485 R1 port to the RS-485 network connected to each of the devices. (**Section 2.5 Device Connections to ProtoAir**)
4. **If using a serial field protocol:**
   Connect the ProtoAir 3 pin RS-485 R2 port to the field protocol cabling (**Section 2.6 Wiring Field Port to RS-485 Serial Network**).
5. Connect power to ProtoAir 3 pin power port. (**Section 3 Power up the Gateway**)
6. Connect a PC to the ProtoAir via Ethernet cable. (**Section 4 Connect the PC to the Gateway**)
7. Setup Web Server Security and login via web browser. (**Section 5 Setup Web Server Security**)
8. Configure the ProtoAir to connect to the local network. (**Section 6 Setup Network**)
9. Integrate the ProtoAir with the FieldServer Manager or opt out. (**Section 7.1 Choose Whether to Integrate the FieldServer Manager**)
10. Use a web browser to access the ProtoAir Web Configurator page to select the profile of the device attached to the ProtoAir and enter any necessary device information. Once the device is selected, the ProtoAir automatically builds and loads the appropriate configuration. (**Section 8 Configure the ProtoAir**)

Contents

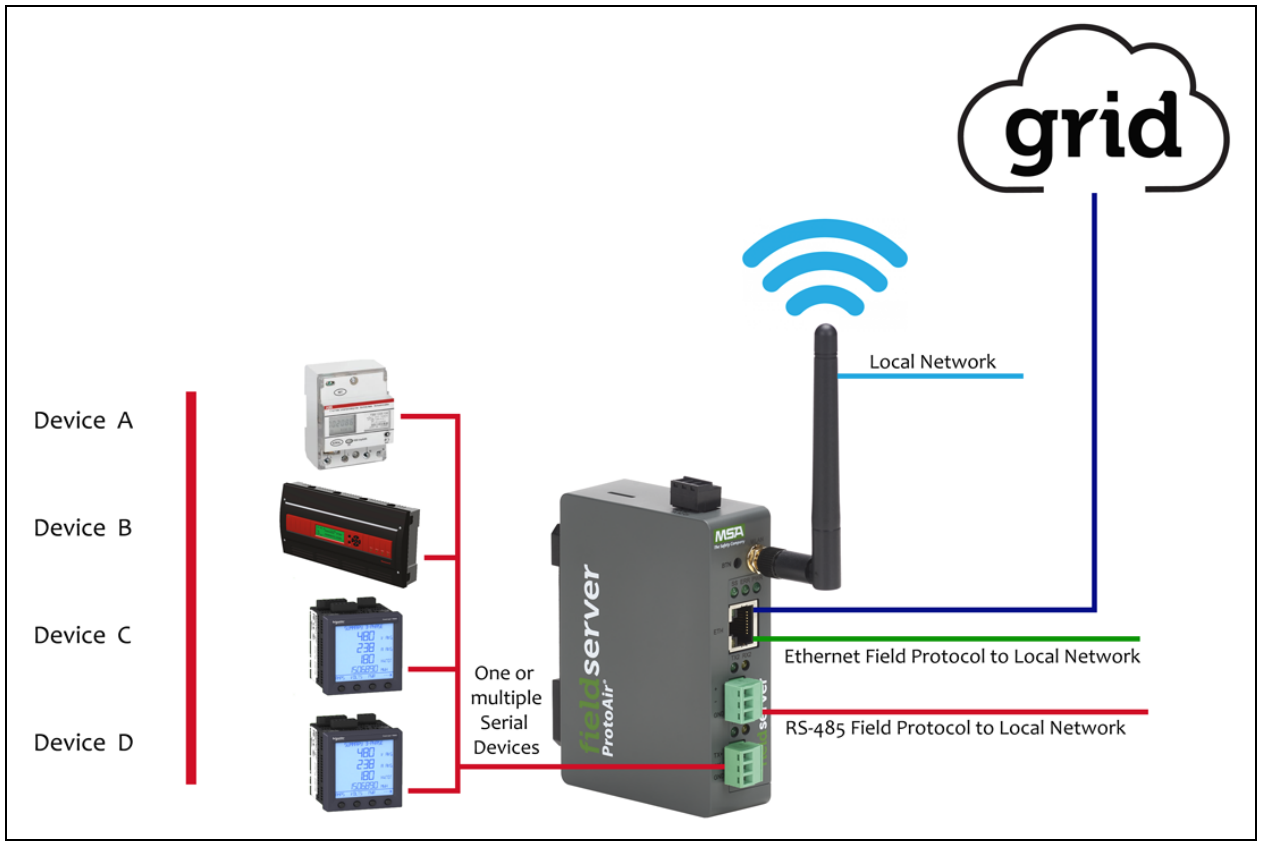
1 Introduction

1.1 ProtoAir Gateway

The ProtoAir wireless gateway is an external, high performance building automation multi-protocol gateway that is preconfigured to automatically communicate between Triangle Tube devices (hereafter simply called “device”) connected to the ProtoAir 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 ProtoAir is pre-loaded with tested profiles/configurations for the supported devices.

FPA-W44 Connectivity Diagram:



The ProtoAir can connect with the MSA Grid – FieldServer Manager. The FieldServer Manager allows technicians, the OEM's support team and MSA Safety's support team to remotely connect to the ProtoAir. The FieldServer Manager provides the following capabilities for any registered devices in the field:

- Remotely monitor and control devices.
- Collect device data and view it on the Dashboard and the MSA 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 on the FieldServer Manager, see the MSA Grid - FieldServer Manager Start-up Guide.

2 Setup for ProtoAir

2.1 Record Identification Data

Each ProtoAir 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
ProtoAir	FPA-W44-2222

- FPA-W44 units have the following 4 ports: Ethernet + Wi-Fi + RS-485 + RS-485/RS-232

2.2 Point Count Capacity and Registers per Device

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

Part number	Total Registers
FPA-W44-2222	1,500

Devices	Point Count Per Device
TriMax	24
Keystone	59
Iconic	635
Commodore	635

2.3 Configuring Device Communications

2.3.1 Confirm the Device and ProtoAir COM Settings Match

- Any connected serial devices MUST have the same baud rate, data bits, stop bits, and parity settings as the ProtoAir.
- The table below specifies the device serial port settings required to communicate with the ProtoAir.

Port Setting	TriMax & Keystone	Other Serial Devices
Protocol	Modbus RTU	Modbus RTU
Baud Rate	38400	9600
Parity	None	None
Data Bits	8	8
Stop Bits	1	1

2.3.2 Set Node-ID for Any Device Attached to the ProtoAir

- Set Node-ID for any device attached to ProtoAir. The Node-ID needs to be uniquely assigned between 1 and 255.
- Document the Node-ID that is assigned. The Node-ID assigned is used for deriving the Device Instance for BACnet/IP and BACnet MS/TP. (**Section 8.5 BACnet: Setting Node_Offset to Assign Specific Device Instances**)

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

2.4 Attaching the Antenna

Wi-Fi Antenna:
Screw in the Wi-Fi antenna to the front of the unit as shown in **Section 10.5 Physical Dimensions**.

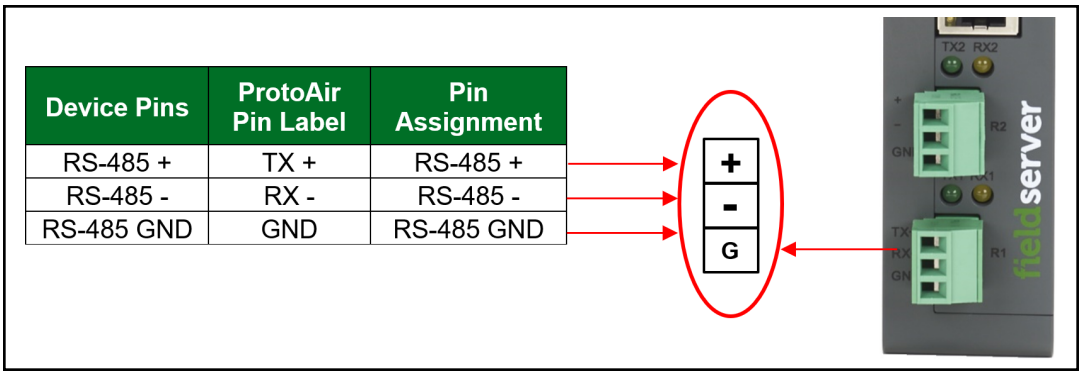
NOTE: Using an external antenna is also an option. An external antenna can be plugged into the SMA connector. The best antenna for the job depends on the range, topography and obstacles between the two radios.

2.5 Device Connections to ProtoAir

The ProtoAir has a 3-pin Phoenix connector for connecting RS-485devices on the R1 port.

NOTE: Use standard grounding principles for RS-485 GND.

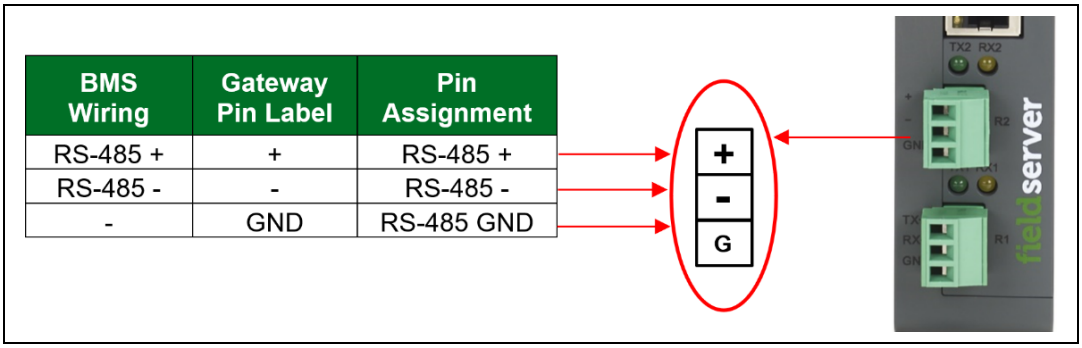
Device Pins	ProtoAir Pin Label	Pin Assignment
RS-485 +	TX +	RS-485 +
RS-485 -	RX -	RS-485 -
RS-485 GND	GND	RS-485 GND



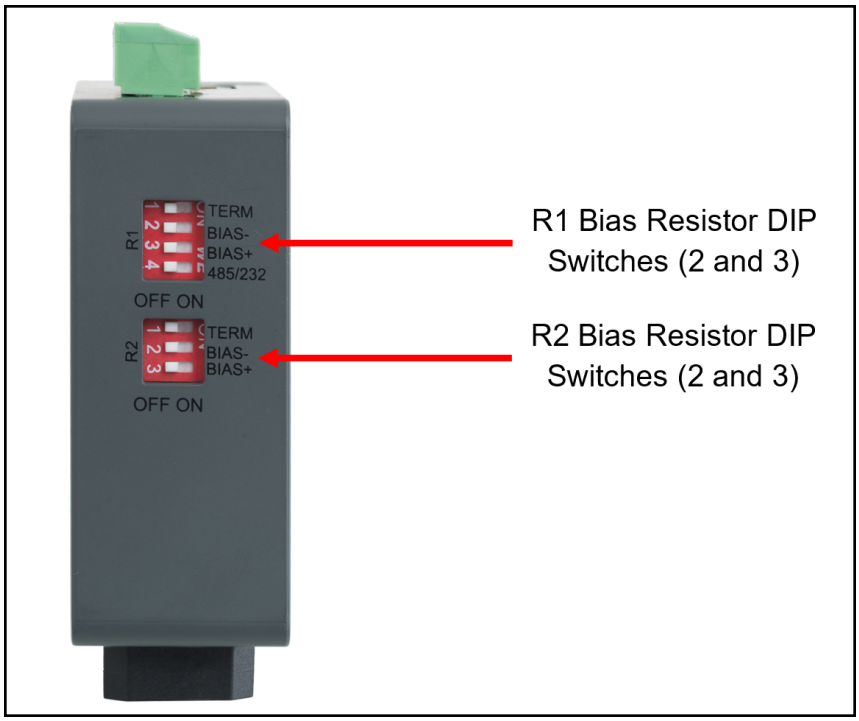
2.6 Wiring Field Port to RS-485 Serial Network

- Connect the RS-485 network wires to the 3-pin RS-485 connector on the R2 port.
  - RS-485 is part of the RS-485 interface and must be connected to the corresponding terminal on the BMS. If the cable is shielded, the shield must connected only at one end and to earth ground – it will help suppress the electromagnetic field interference. (Connecting the shield at both ends will likely produce current loops, which could produce noise or interference that the shield was intended to block).
- See **Section** **4.1 Connecting to the Gateway via Ethernet** for information on connecting to an Ethernet network.

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



2.7 Bias Resistors



To enable Bias Resistors, move the BIAS- and BIAS+ DIP switches to the right in the orientation shown above.

The 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.

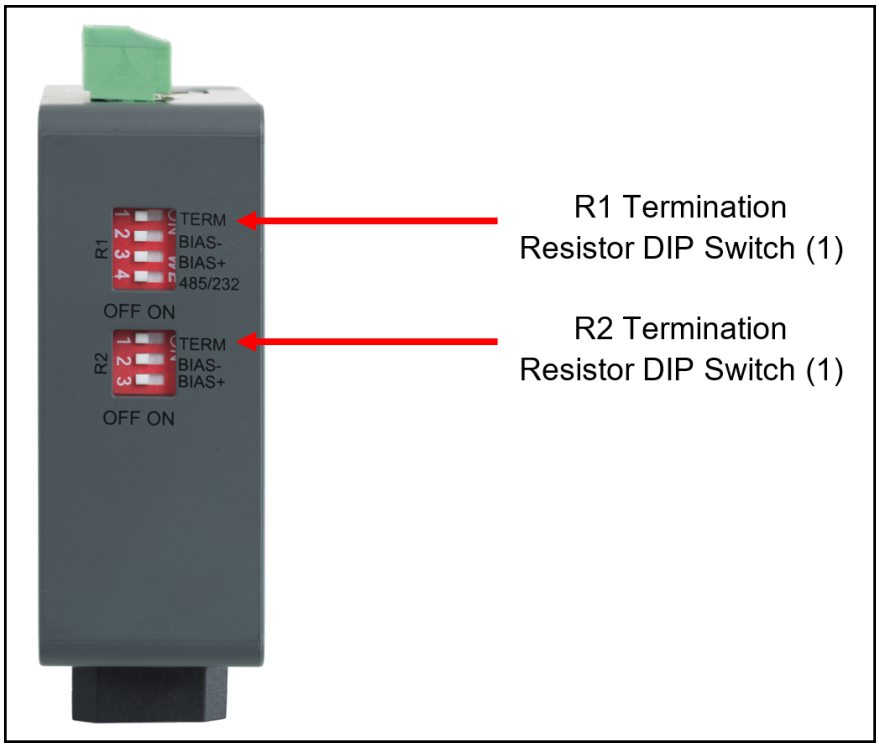
The bias resistor is 510 ohms which is in line with the BACnet spec. It should only be enabled at one point on the bus (for example, on the field port were there are very weak bias resistors of 100k). Since there are no jumpers, many ProtoAirs can be put on the network without running into the bias resistor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

NOTE: See the Termination and Bias Resistance Enote for additional information.

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

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

2.8 Termination Resistor



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

The 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. The R1 termination resistor is 120 Ohms.

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

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

3 Power up the Gateway

Check power requirements in the table below:

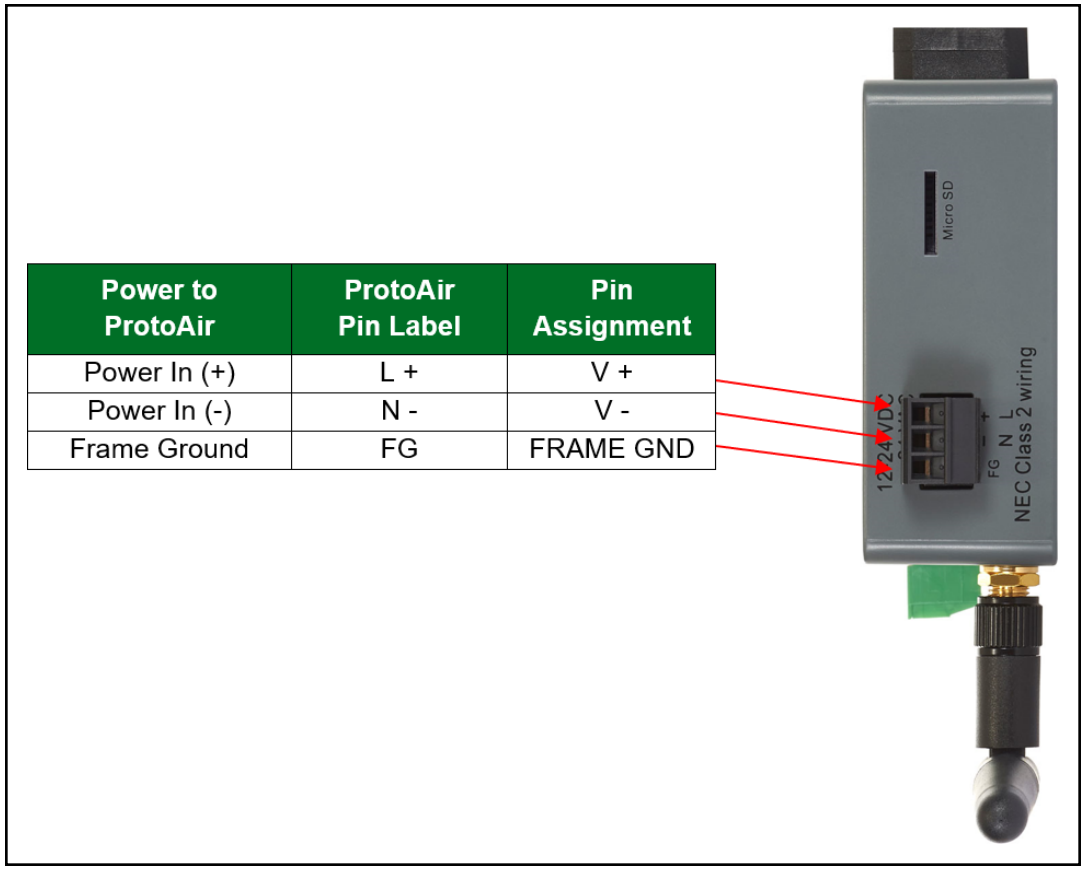
Power Requirement for ProtoAir External Gateway		
	Current Draw Type	
ProtoAir Family	12VDC	24VDC/AC
FPA –W44 (Typical)	250mA	125mA
NOTE: These values are 'nominal' and a safety margin should be added to the power supply of the host system. A safety margin of 25% is recommended.		

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

- The gateway accepts 12-24VDC or 24VAC on pins L+ and N-.
- Frame GND should be connected to ensure personnel safety and to limit material damages due to electrical faults. Ground planes are susceptible to transient events that cause sudden surges in current. The frame ground connection provides a safe and effective path to divert the excess current from the equipment to earth ground.

NOTE: Only Class 2 PSU's must be used to power FieldServers.

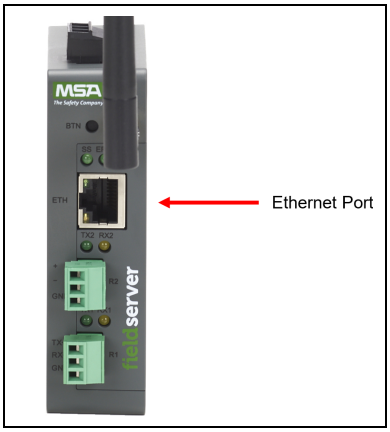
Power to ProtoAir	ProtoAir Pin Label	Pin Assignment
Power In (+)	L +	V +
Power In (-)	N -	V -
Frame Ground	FG	FRAME GND



4 Connect the PC to the Gateway

4.1 Connecting to the Gateway via Ethernet

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

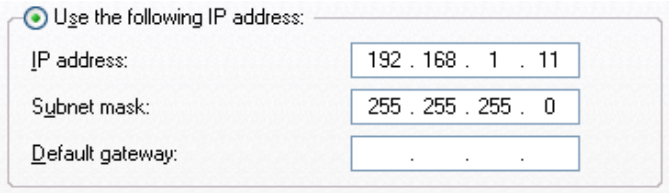


4.1.1 Changing the Subnet of the Connected PC

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

For Windows 10:

- Use the search field in the local computer's taskbar (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 click Close to exit the Ethernet Properties window.

4.2 Navigate to the Login Page

- Open a web browser and connect to the FieldServer's default IP Address. The default IP Address of the FieldServer is **192.168.1.24**, Subnet Mask is **255.255.255.0**.

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

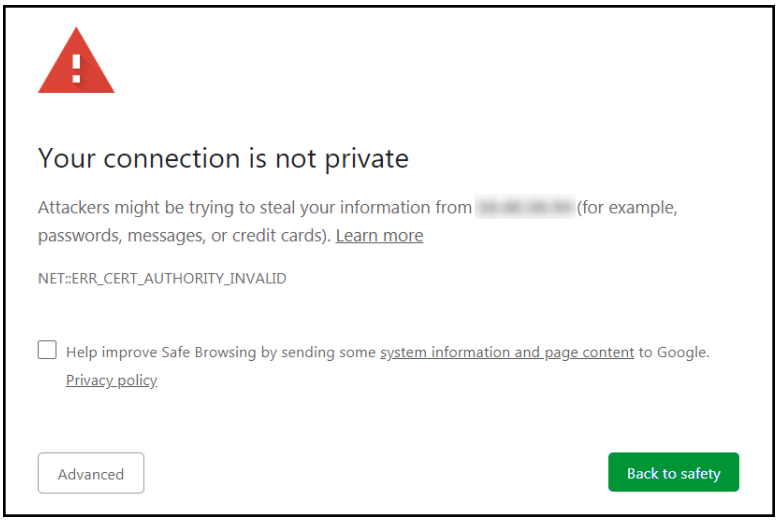
5 Setup Web Server Security

5.1 Login to the FieldServer

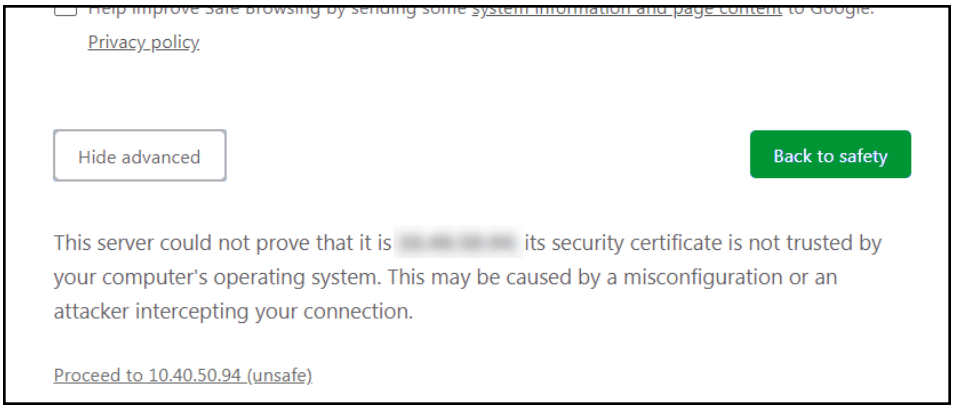
The first time the FieldServer GUI is opened in a browser, the IP Address for the gateway will appear as untrusted. This will cause the following pop-up windows to appear.

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

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

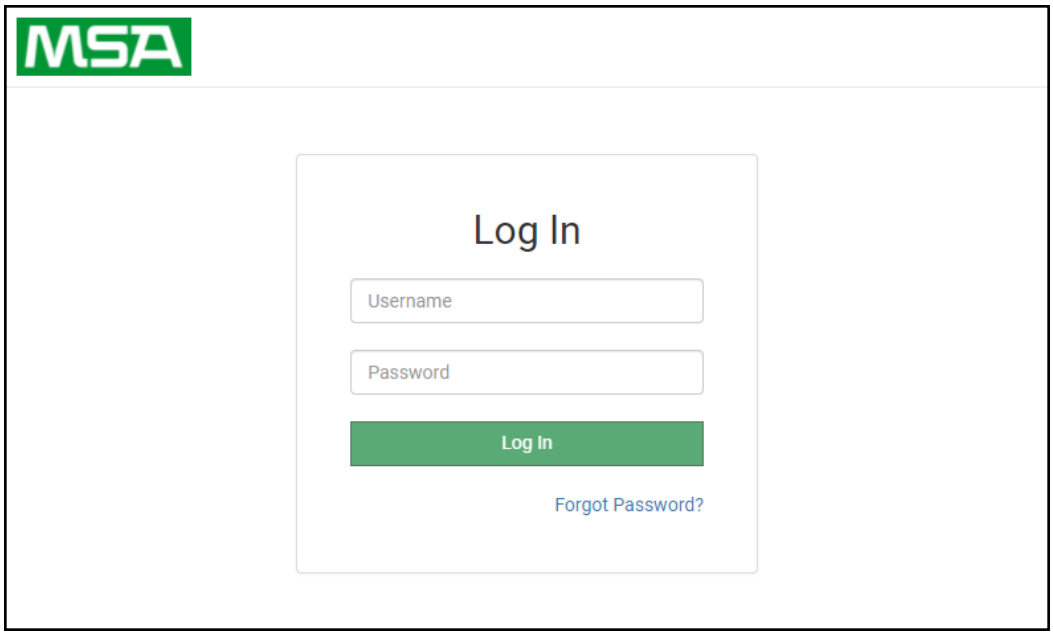


- Additional text will expand below the warning, click the underlined text to go to the IP Address. In the example below this text is "Proceed to <FieldServer IP> (unsafe)".



- 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.

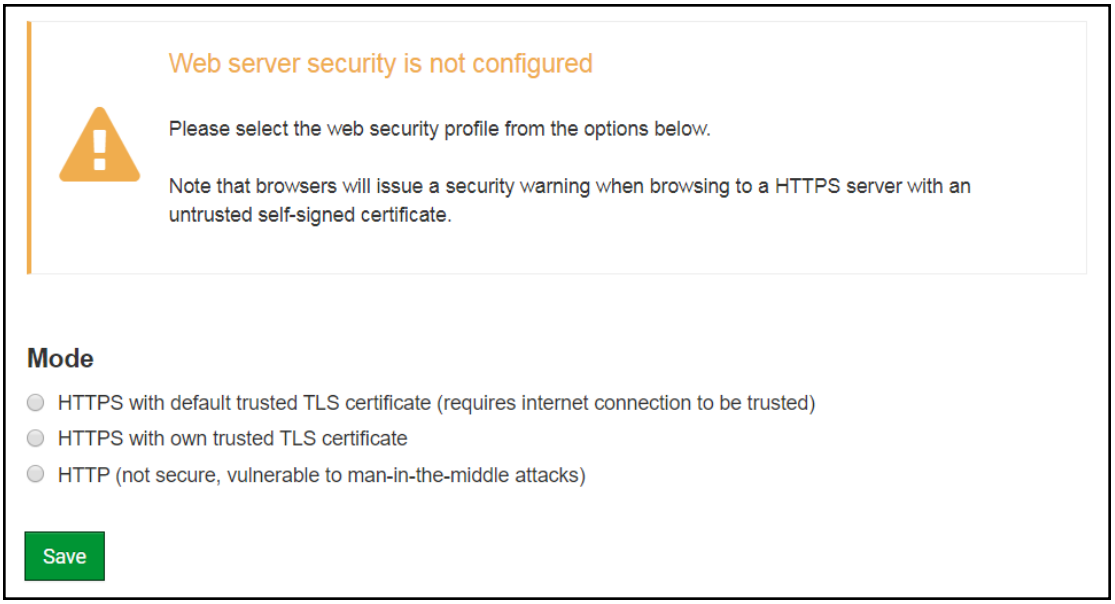


NOTE: A user has 5 attempts to login then there will be a 10-minute lockout. There is no timeout on the FieldServer to enter a password.

NOTE: To create individual user logins, go to Section 10.7 Change User Management Settings.

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.



NOTE: Cookies are used for authentication.

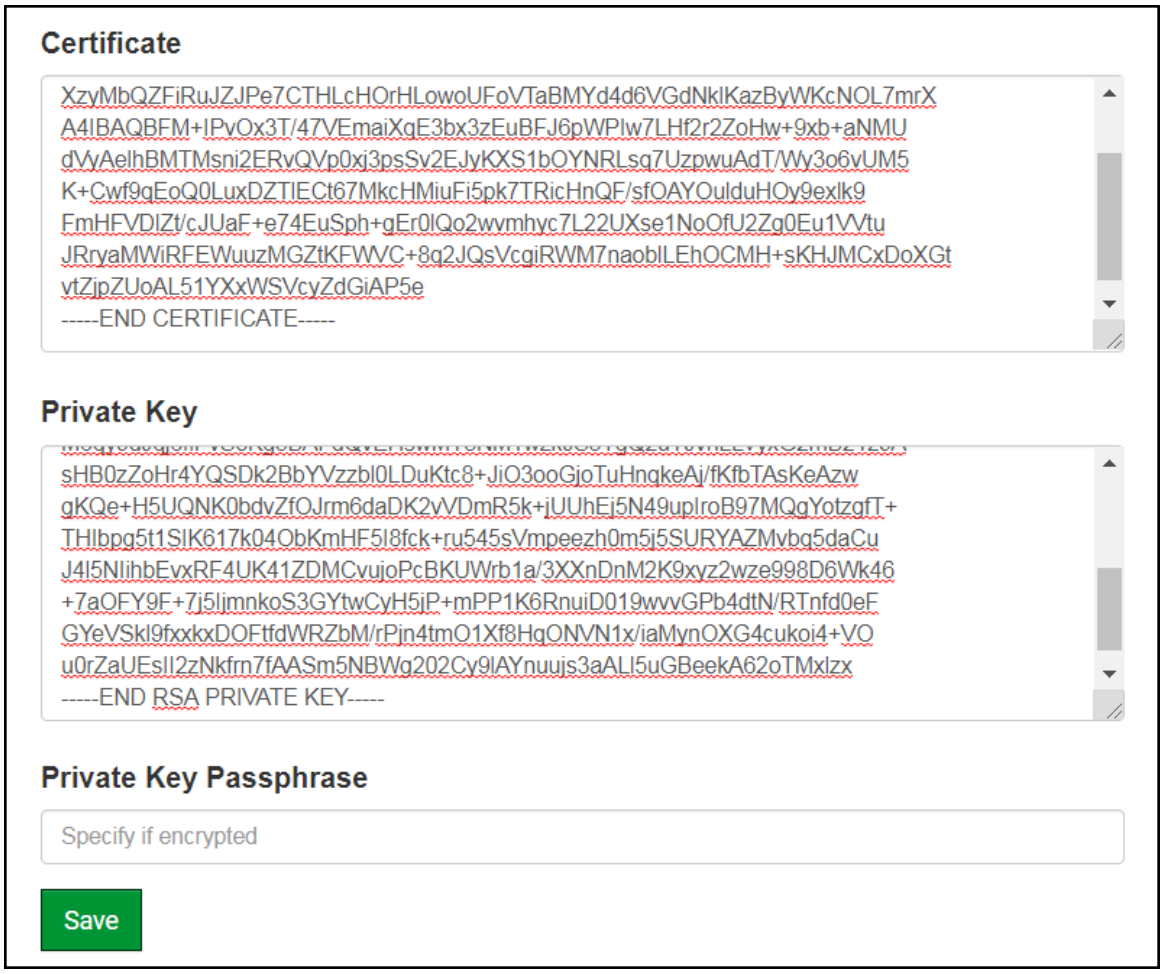
NOTE: To change the web server security mode after initial setup, go to Section 10.6 Change Web Server Security Settings After Initial Setup.

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.



- 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.

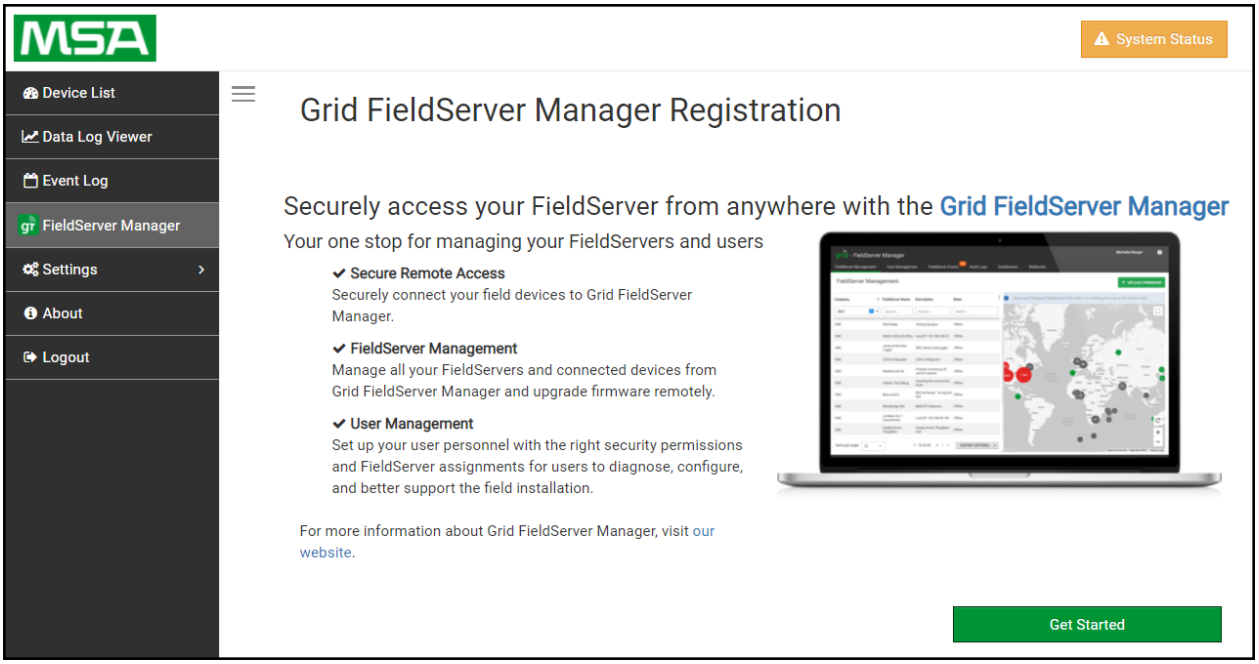
5.2.2 HTTPS with Default Untrusted Self-Signed TLS Certificate or HTTP with Built-in Payload Encryption

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

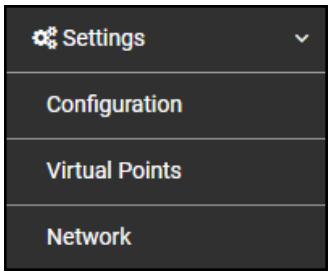
6 Setup Network

6.1 Navigate to the Network Settings

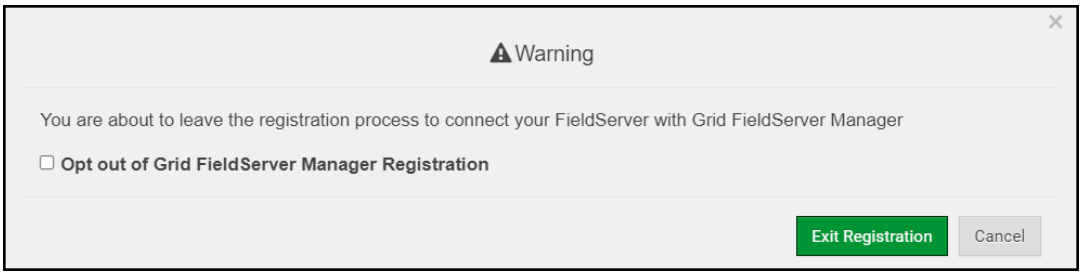
- From the Web App landing page, click the Settings tab on the left side of the screen.



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



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



6.2 Change the ProtoAir IP Address

Configure the IP settings of the ProtoAir using the following sections of the Network page:

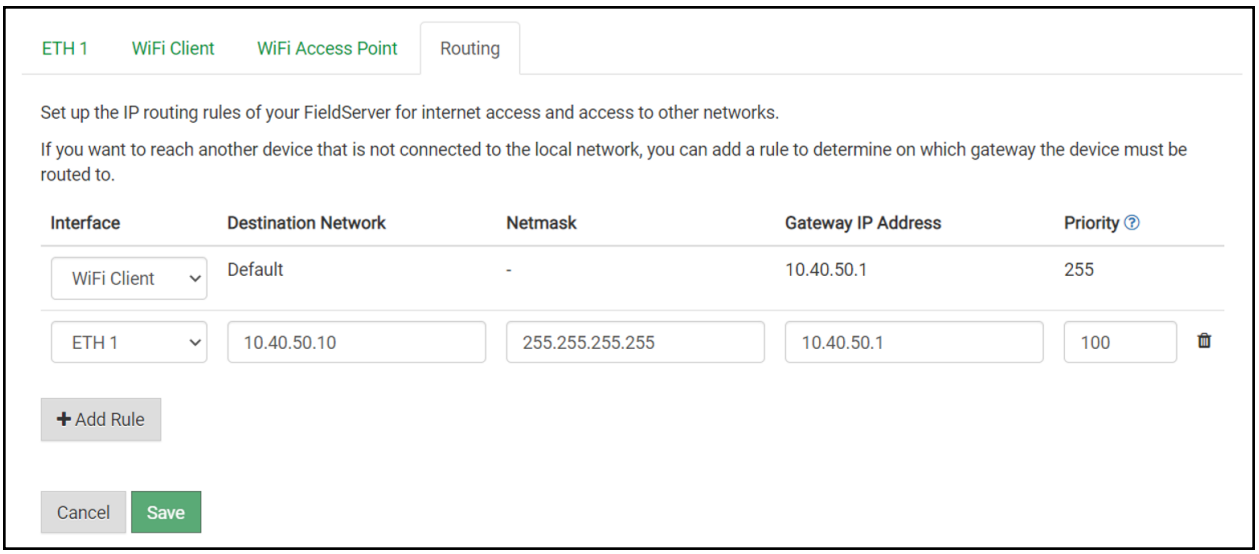
- If using the Ethernet port to connect to the local network, scroll to “ETH 1” **(Section 6.2.2 Ethernet 1**).
- If connecting the ProtoAir to a local wireless network, scroll to “WiFi Client Settings” (**Section 6.2.3 Wi-Fi Client Settings).**
- If updating Wi-Fi Access Point settings, scroll to “WiFi Access Point Settings” (**Section 6.2.4 Wi-Fi Access Point Settings**).

6.2.1 Routing Settings

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

- 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.

NOTE: If using Wi-Fi Client and not Ethernet, make the top priority rule a Wi-Fi Client connection.



6.2.2 Ethernet 1

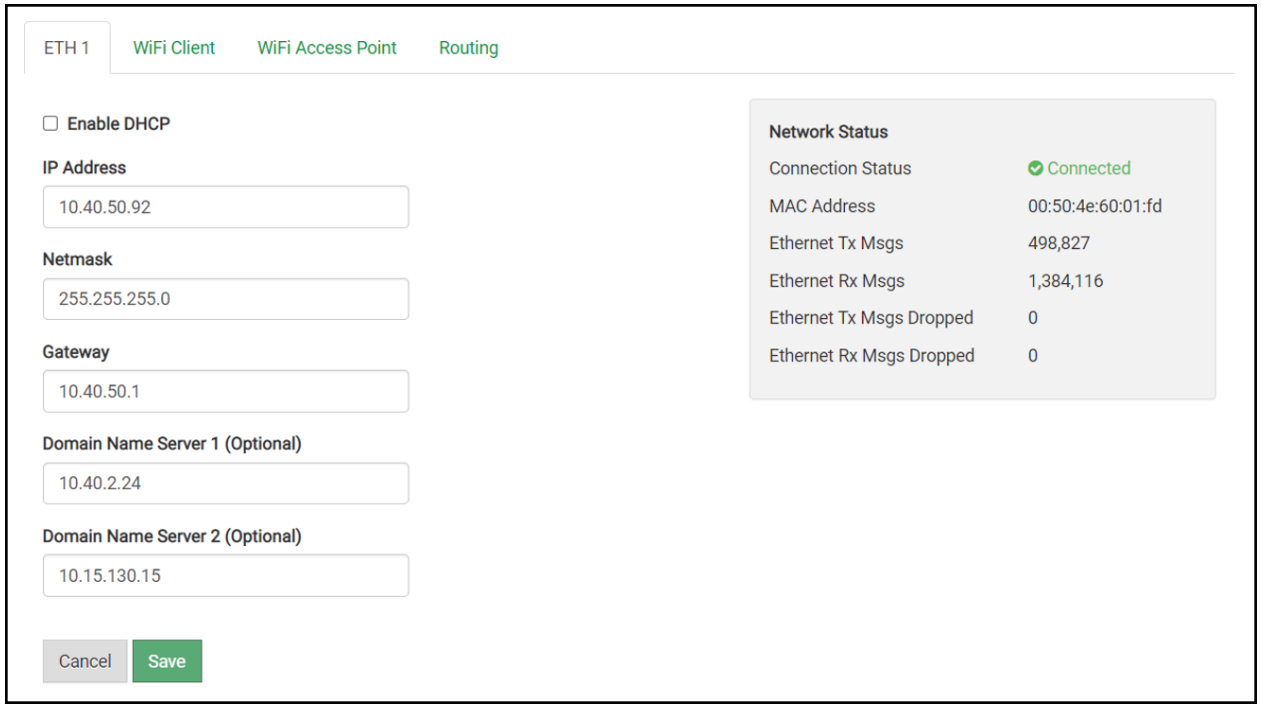
The ETH 1 section contains the wired network settings. To change the FieldServer IP Settings, follow these instructions:

- Enable DHCP to automatically assign IP Settings or modify the IP Settings manually as needed, via these fields: IP Address, Netmask, Default 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 Save to record and activate the new IP Address.
- Connect the FieldServer to the local network or router.

NOTE: The browser needs to be updated to the new IP Address of the FieldServer before the settings will be accessible again.

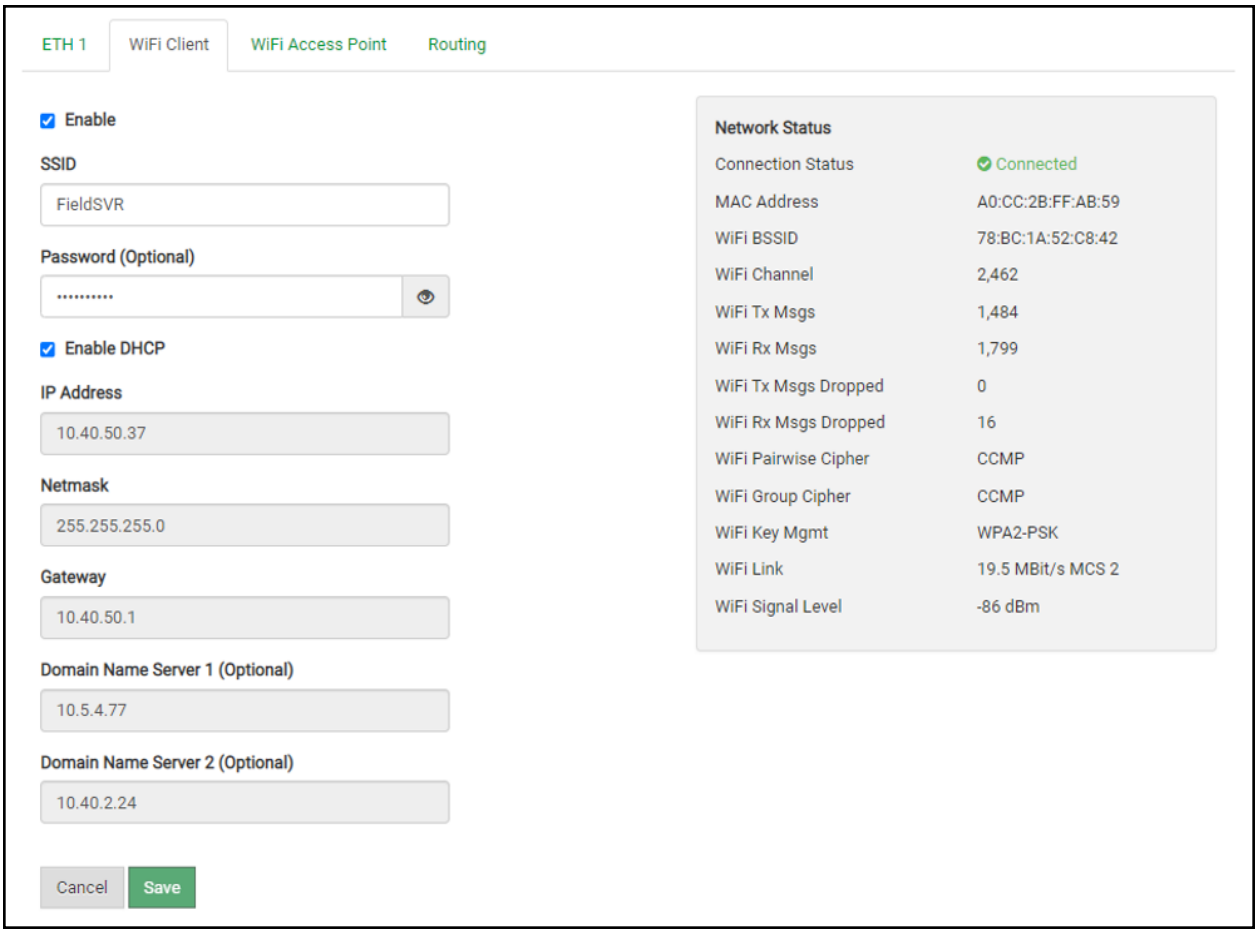


6.2.3 Wi-Fi Client Settings

- Set the Wi-Fi Status to ENABLED for the ProtoAir to communicate with other devices via Wi-Fi.
- Enter the Wi-Fi SSID and Wi-Fi Password for the local wireless access point.
- Enable DHCP to automatically assign all Wi-Fi Client Settings fields or modify the Settings manually, via the fields immediately below the note (IP Address, Network, etc.).

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

- Click the Save button to activate the new settings.
- Go to Routing (**Section 6.2.1 Routing Settings**) to set the default connection to Wi-Fi Client.



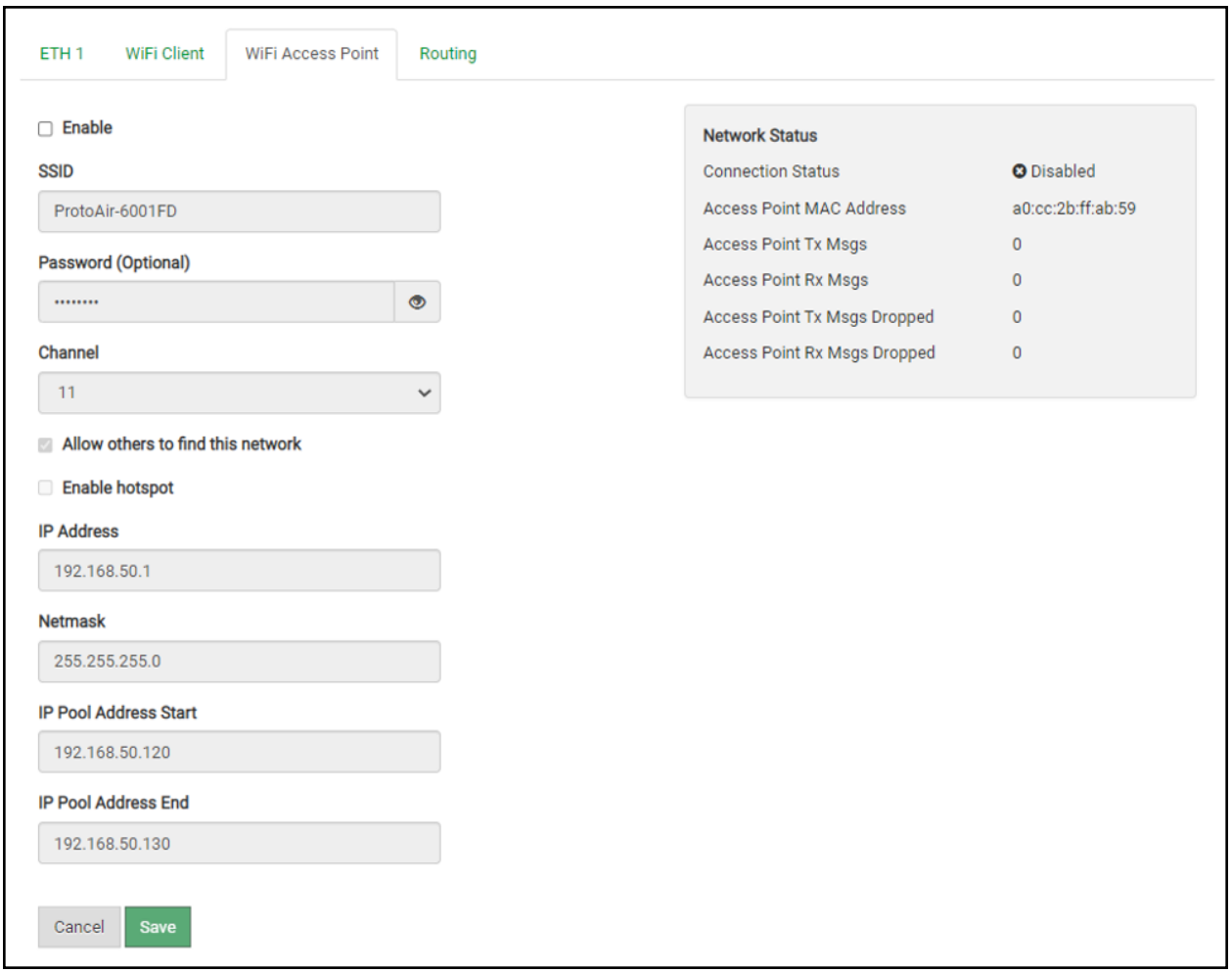
6.2.4 Wi-Fi Access Point Settings

- Check the Enable tick box to allow connecting to the ProtoAir via Wi-Fi Access Point.
- Modify the Settings manually as needed, via these fields: SSID, Password, Channel, IP Address, Netmask, IP Pool Address Start, and IP Pool Address End.

NOTE: The default channel is 11. The default IP Address is 192.168.50.1.

- Click the Save button to activate the new settings.

NOTE: If the webpage was open in a browser via Wi-Fi, the browser will need to be updated with the new Wi-Fi details before the webpage will be accessible again.



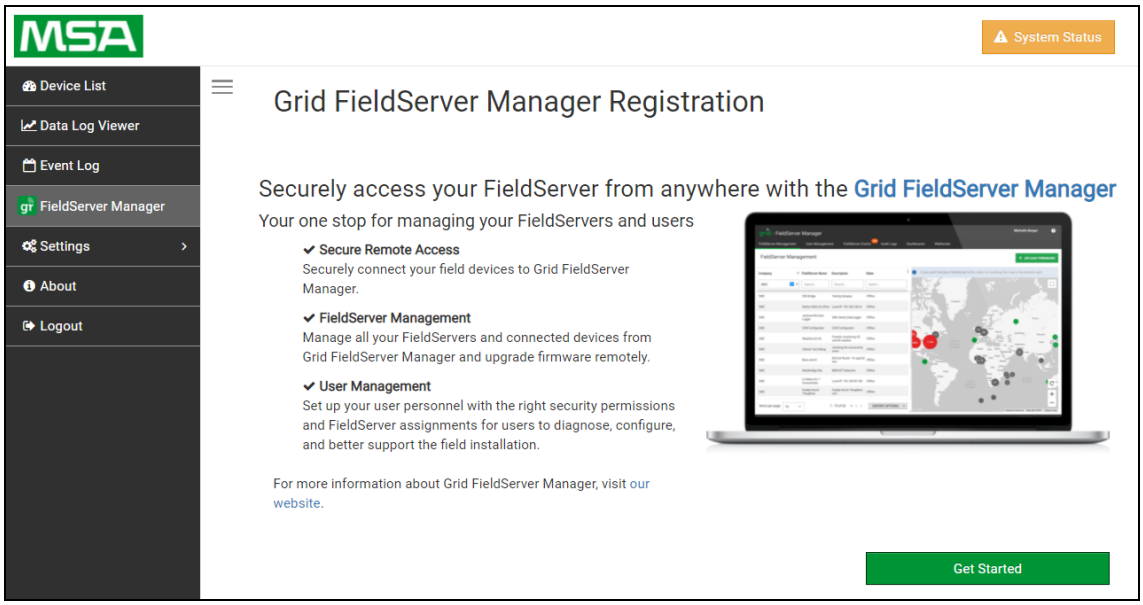
7 MSA Grid - FieldSever Manager Setup

The MSA Grid is MSA Safety's device cloud solution for IIoT. Integration with the MSA Grid - FieldServer Manager enables the 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 FieldServer Manager, refer to the MSA Grid - FieldServer Manager Start-up Guide.

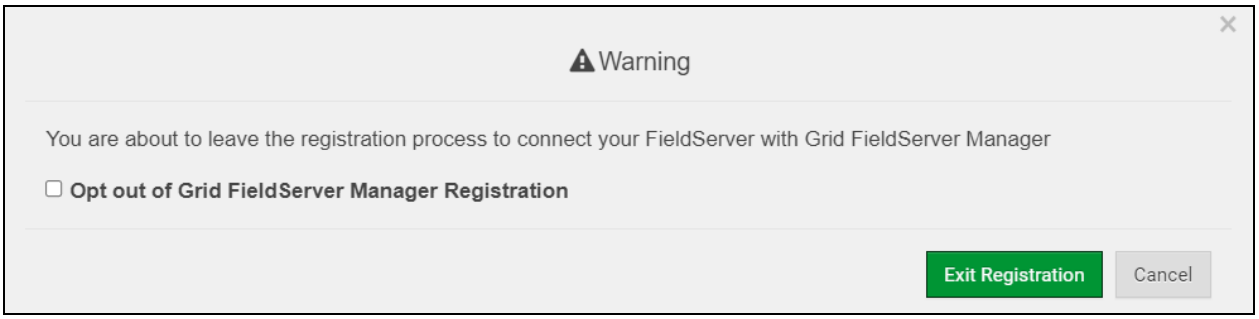
7.1 Choose Whether to Integrate the FieldServer Manager

When first logging onto the ProtoAir, the Web App will open on the FieldServer Manager page.

NOTE: If a warning message appears instead, go to Section 10.8 FieldServer Manager Connection Warning Message to resolve the conneqsction issue.



- Either go through the FieldServer Manager setup to integrate cloud functionality to the FieldServer or opt out.
  - For FieldServer Manager setup, continue with instructions in the following sections
  - To opt out of the FieldServer Manager, click on a tab other than the Grid FieldServer Manger tab, click the checkbox next to "Opt out of Grid FieldServer Manager Registration" in the Warning window that appears and click the Exit Registration button
  - To ignore FieldServer Manager setup until the next time the Web App is opened, click a tab other than Grid FieldServer Manager and then click the Exit Registration button with the "Opt out" checkbox unchecked

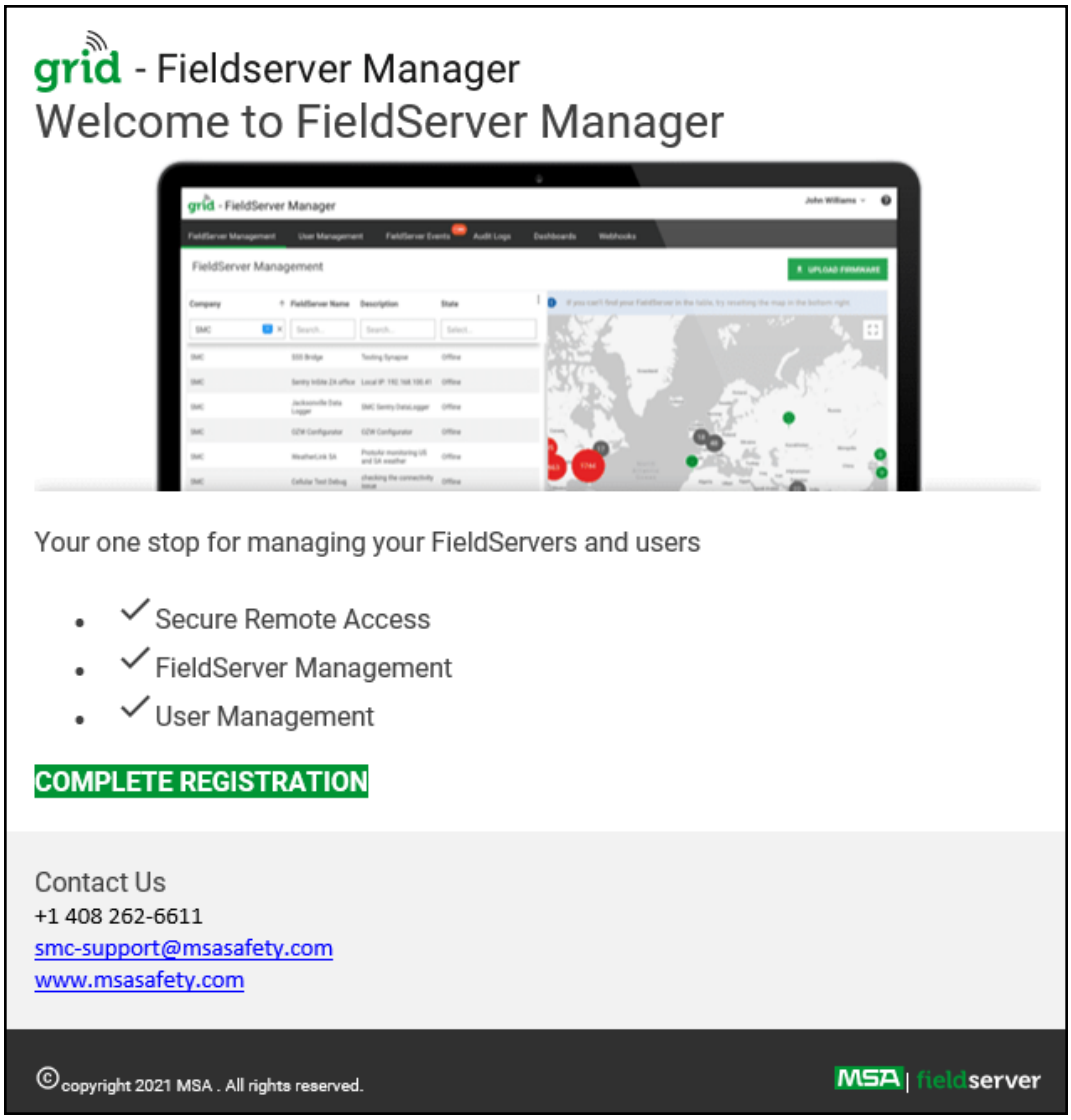


NOTE: If user setup is already complete go to Section 7.3 Registration Process.

7.2 User Setup

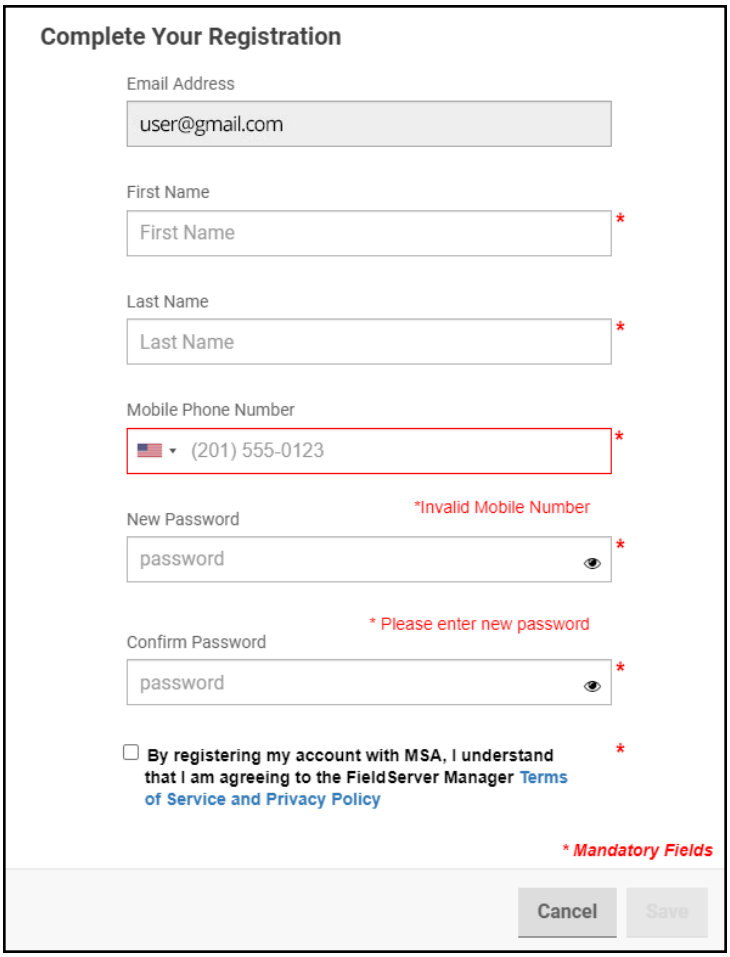
Before the gateway can be connected to the FieldServer Manager, a user account must be created. Once an invitation has been requested, follow the instructions below to set up login details:

- The “Welcome to the MSA Grid - FieldServer Manager” email will appear as shown below.



NOTE: If no 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.



- 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.

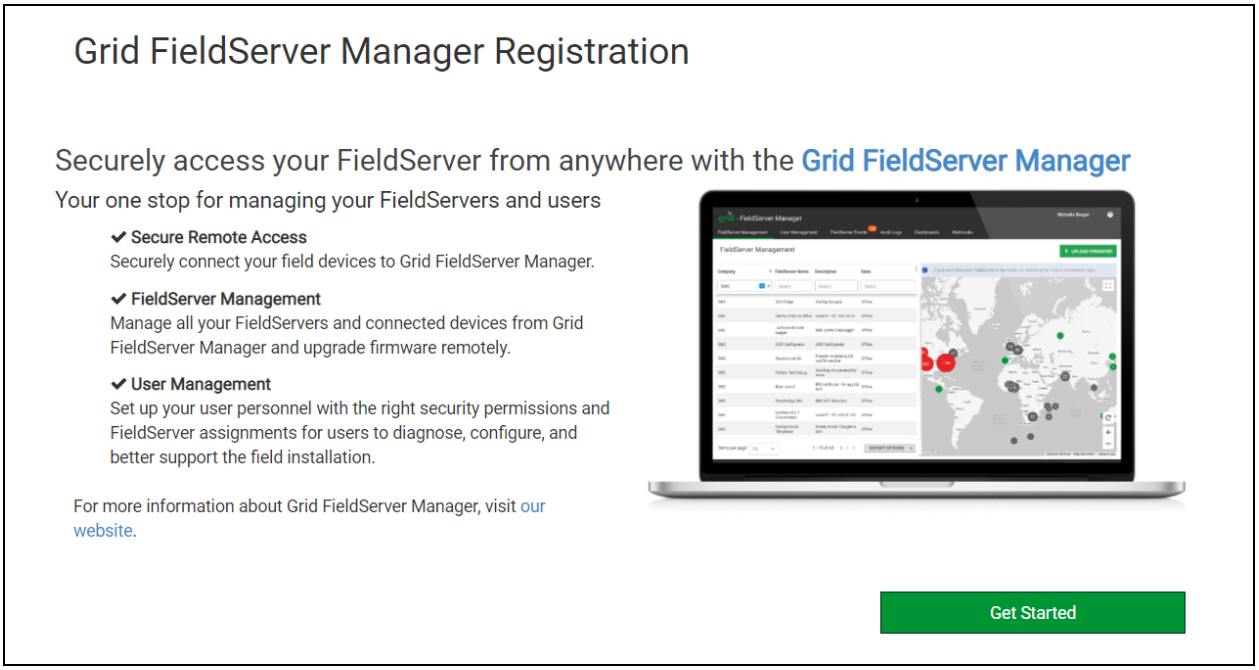
- Click “Save” to save the user details.
- Click “OK” when the Success message appears.
- Record the email account used and password for future use.

7.3 Registration Process

Once the FieldServer Manager user credentials have been generated, the ProtoAir can be registered onto the server.

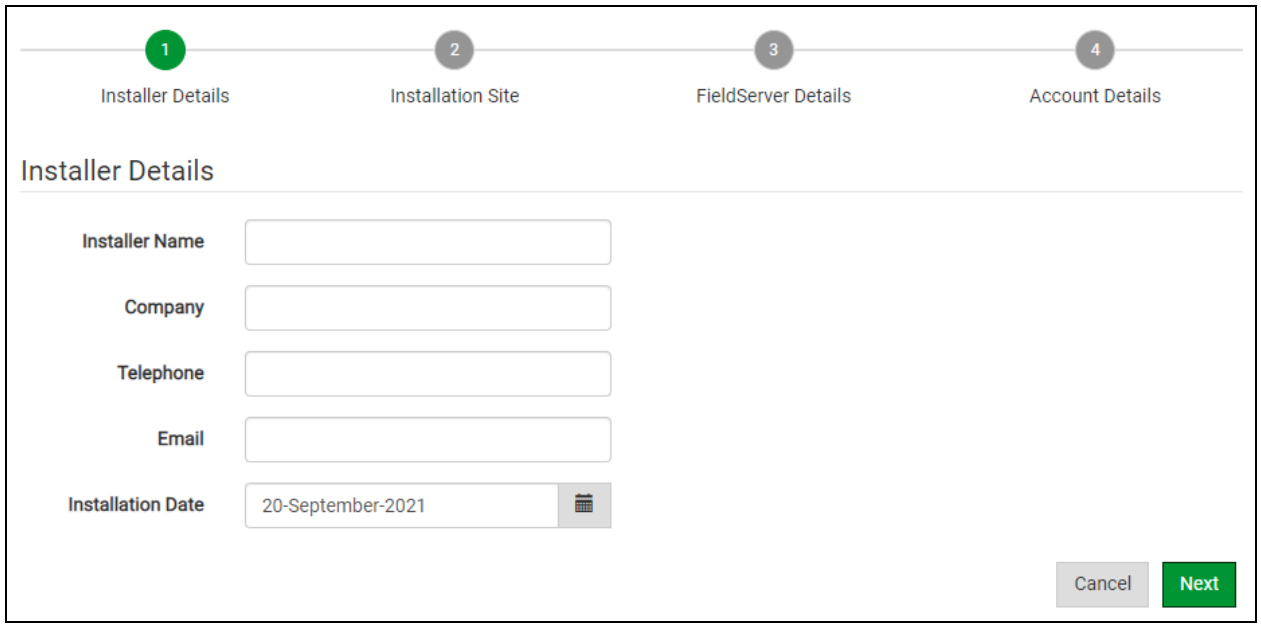
- Click the FieldServer Manager tab.

NOTE: If a warning message appears instead, go to Section 10.8 FieldServer Manager Connection Warning Message to resolve the connection issue.

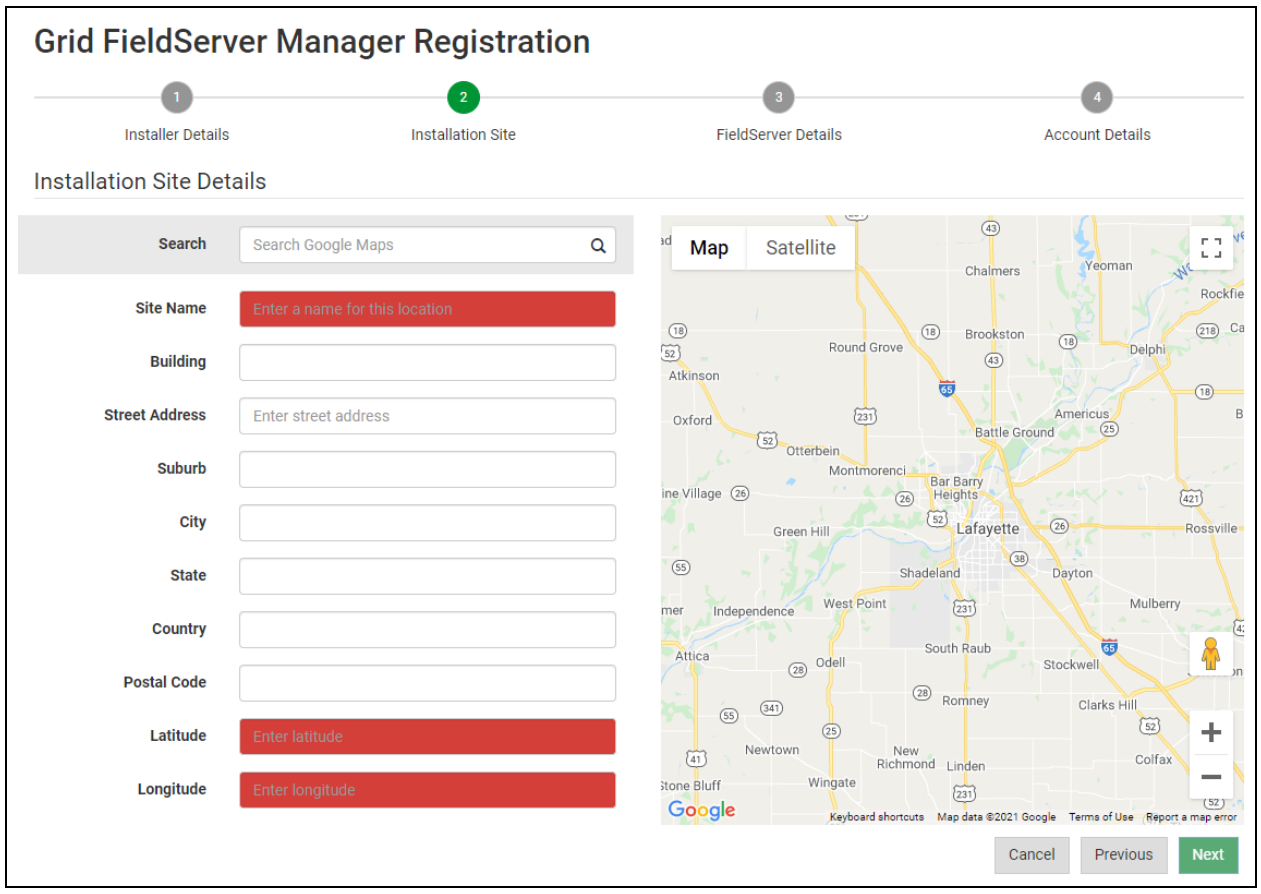


- Click Get Started to view the FieldServer Manager registration page.

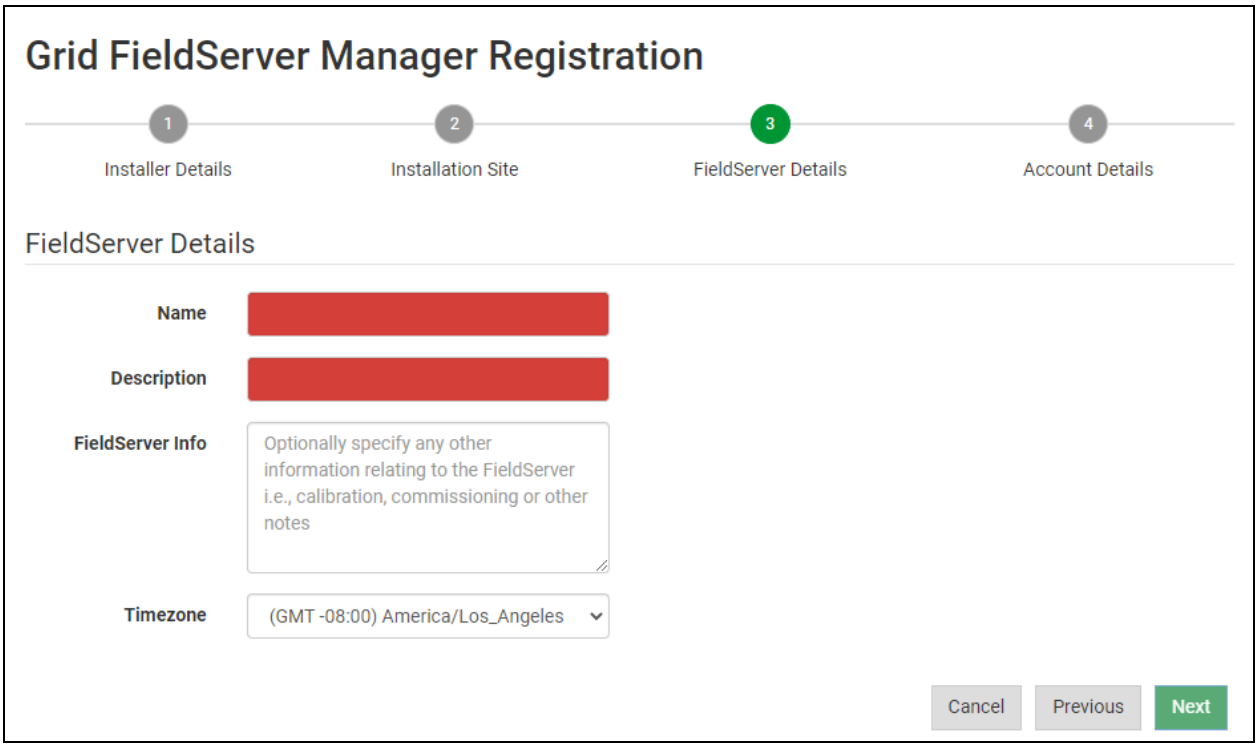
- To register, fill in the user details, site details, gateway details and FieldServer Manager account credentials.
  - Enter user details and click Next



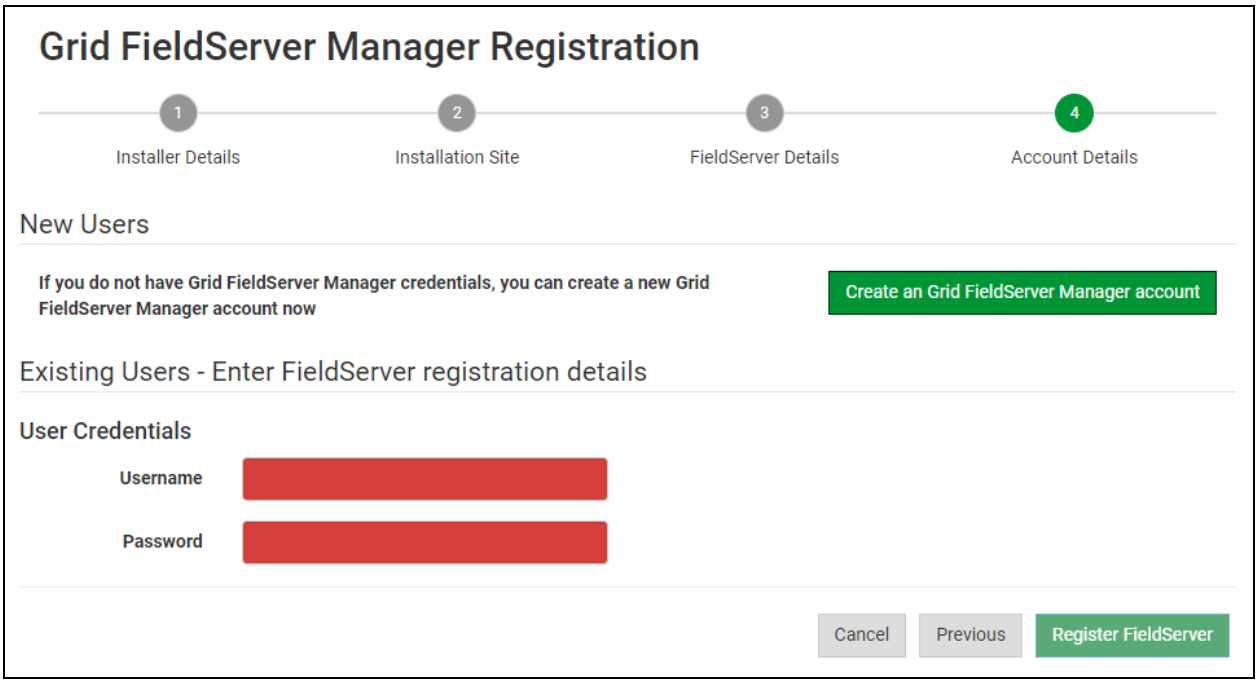
  - Enter the site details by entering the physical address fields or the latitude and longitude then click Next



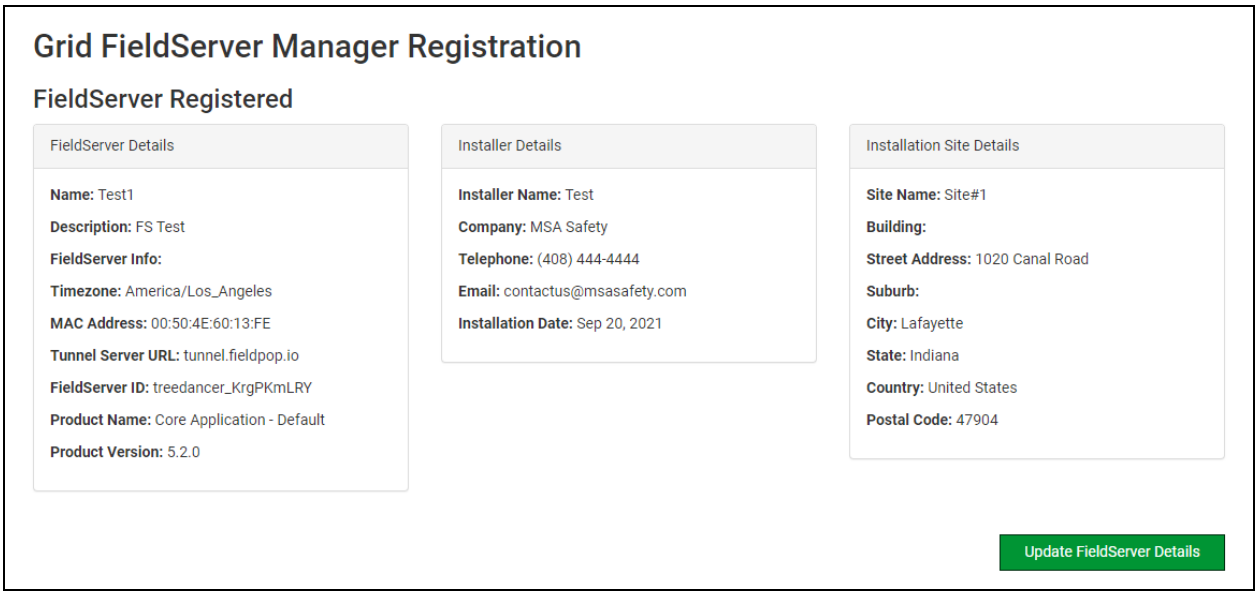
- Enter Name and Description (required) then click Next



- Click the “Create an Grid FieldServer Manager account” button and enter a valid email to send a “Welcome to MSA Grid – FieldServer Manager” invite to the email address entered



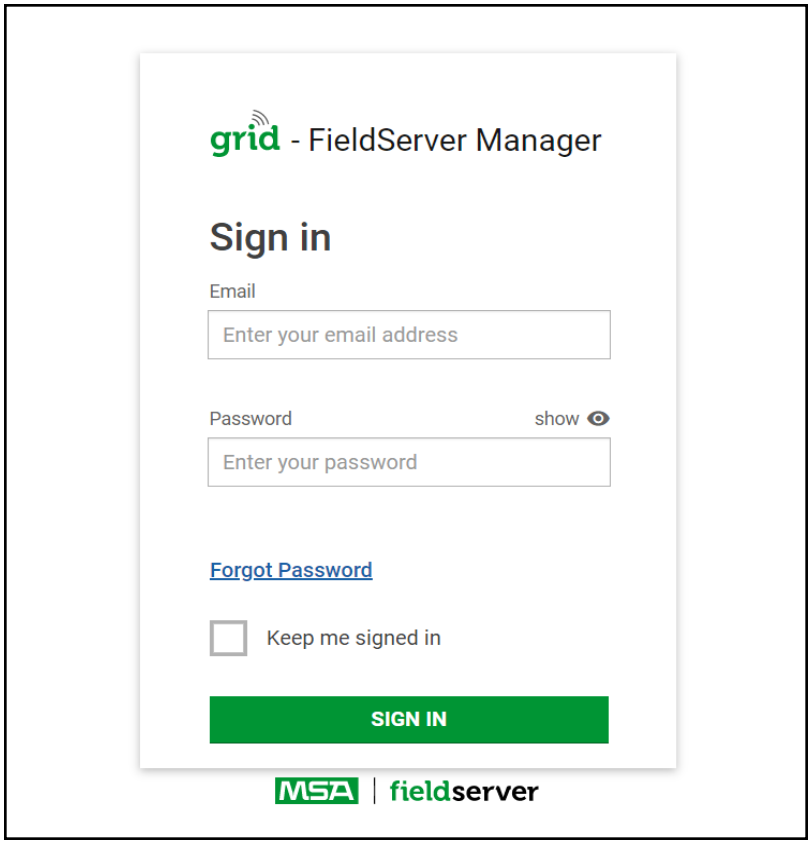
- Once the device has successfully been registered, a confirmation window will appear. Click the Close button and the following screen will appear listing the device details and additional information auto-populated by the ProtoAir.



NOTE: Update these details at any time by going to the FieldServer Manager tab and clicking the Update FieldServer Details button.

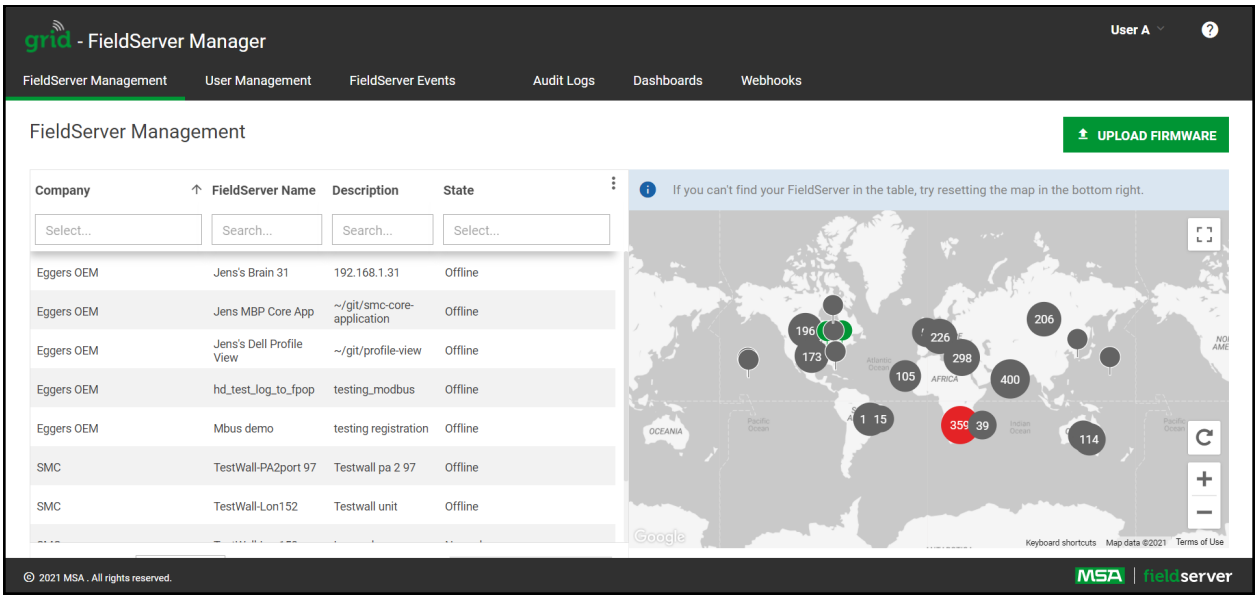
7.4 Login to the FieldServer Manager

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



NOTE: If the login password is lost, see the MSA Grid - FieldServer Manager Start-up Guide for recovery instructions.

NOTE: For additional FieldServer Manager instructions see the MSA Grid - FieldServer Manager Start-up Guide.

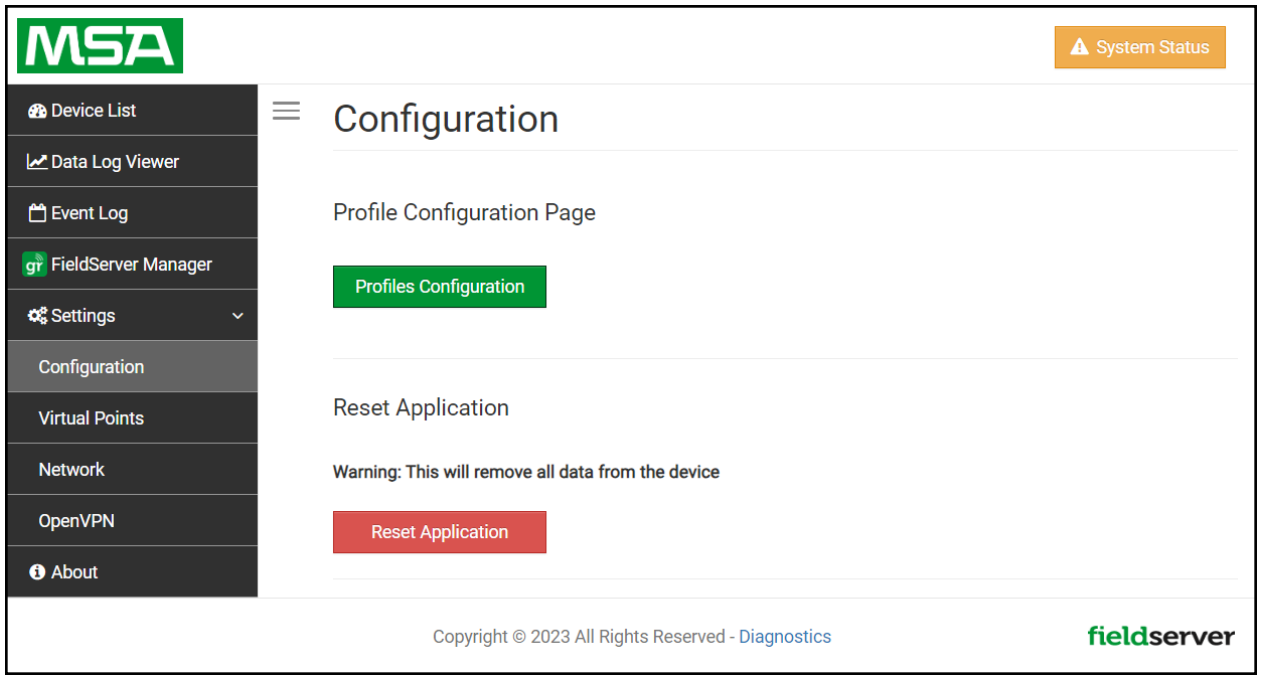


8 Configure the ProtoAir

8.1 Navigate to the ProtoAir Web Configurator

- From the Web App Device List page, click the Settings tab and then click Configuration.

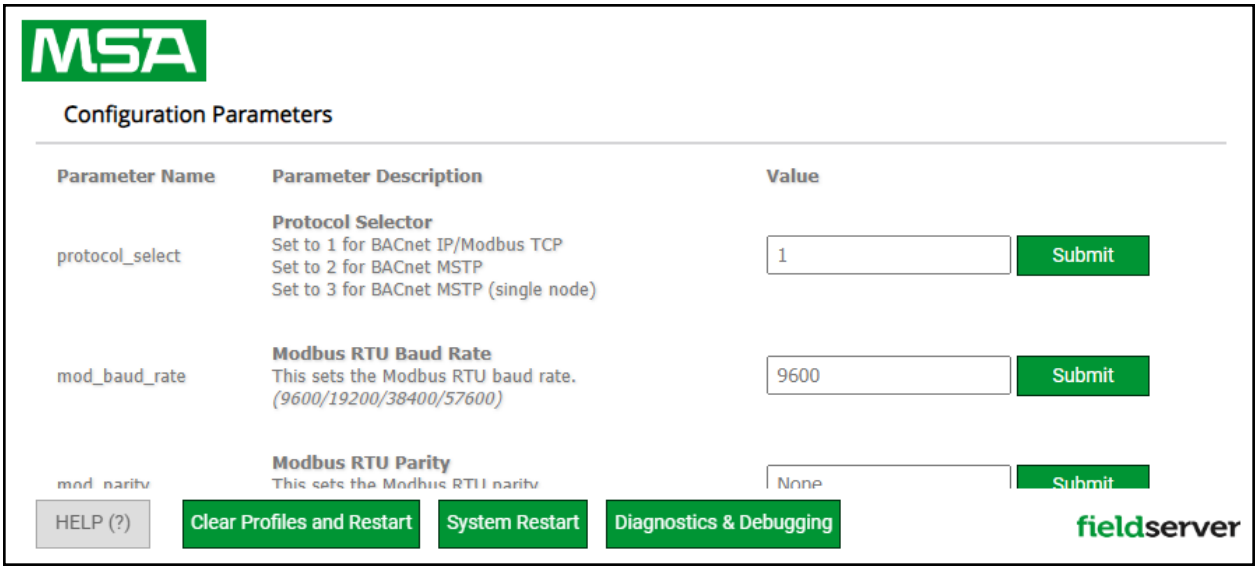
- Then click the Profiles Configuration button to go to the Web Configurator page.



NOTE: For Web App instructions to the System View, Data Log Viewer, Event Logger and Virtual Points functions, see the MSA Grid - FieldServer Manager 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.



- 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.

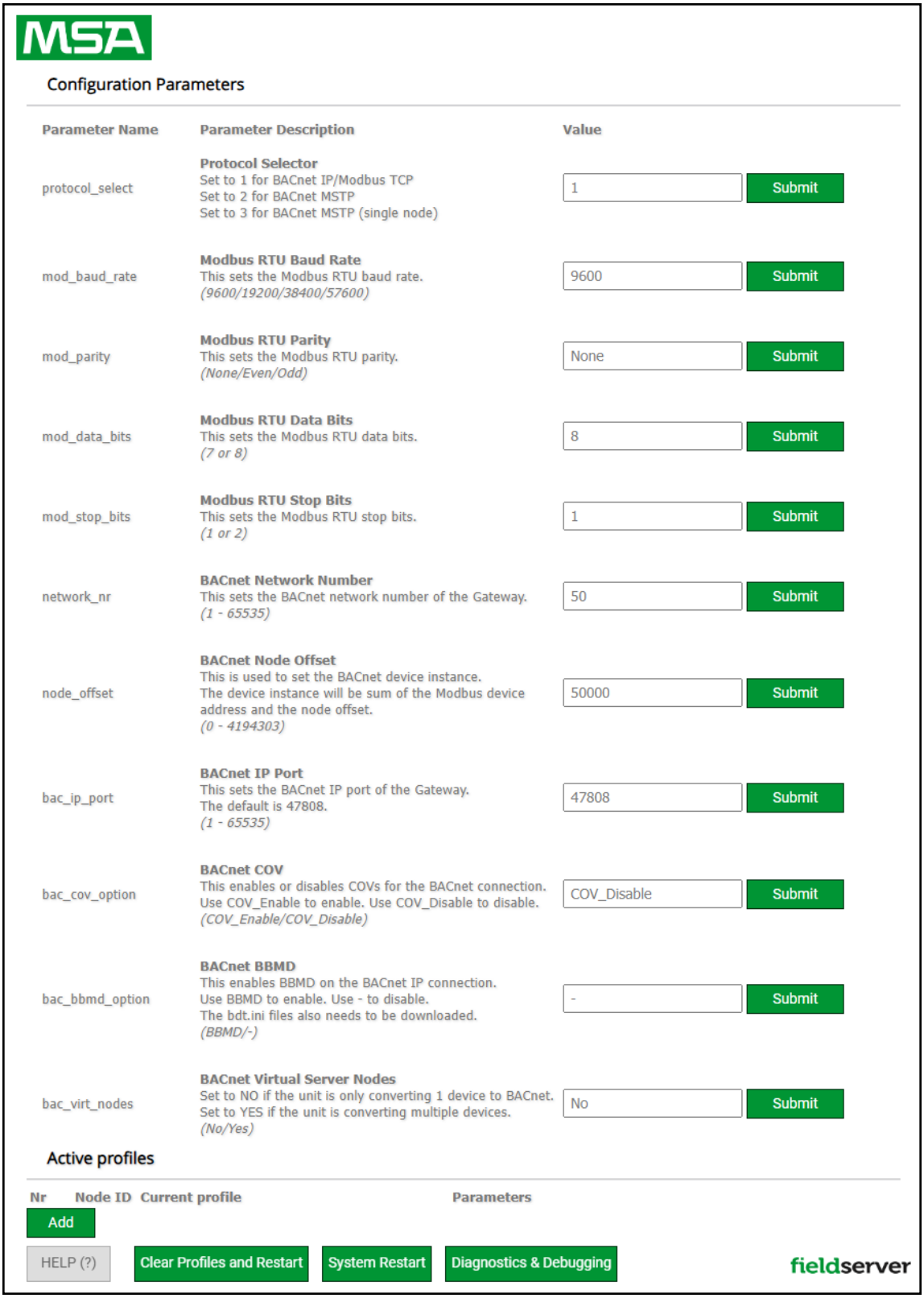
NOTE: If Modbus TCP/IP was selected and is used for the field protocol, skip Section 8.3 Setting Active Profiles. Device profiles are NOT used for Modbus TCP/IP.

- 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.

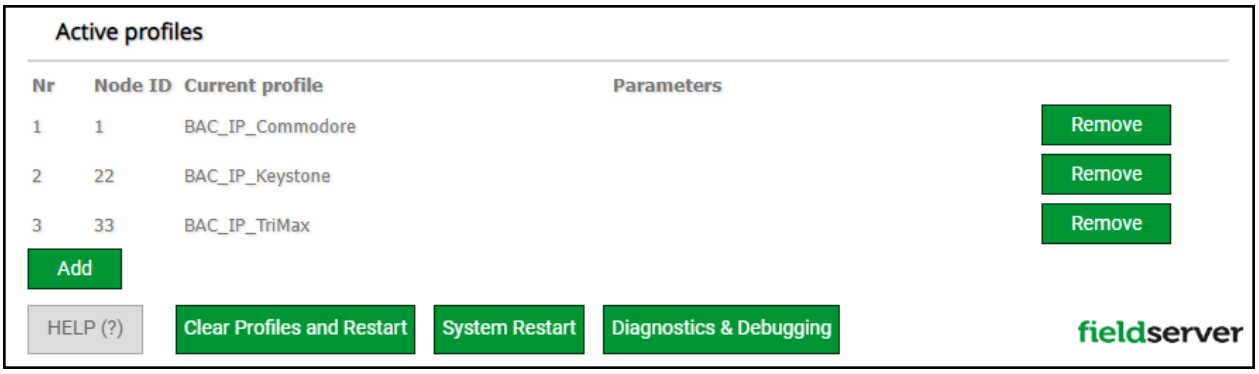
NOTE: If multiple devices are connected to the ProtoAir, set the BACnet Virtual Server Nodes field to "Yes"; otherwise leave the field on the default "No" setting.

8.3 Setting 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. This list is empty for new installations, or after clearing all configurations.



- To add an active profile to support a device, click the Add button under the Active Profiles heading. This will present a drop-down menu underneath the Current profile column.
- 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 2.3.2 Set Node-ID for Any Device Attached to the ProtoAir**.
- 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 below.



8.4 Verify Device Communications

- If using a serial connection, check that TX and RX LEDs are rapidly flashing (**Section 9.4 LED Functions**).
- Confirm the software shows good communications without errors (**Section 9.2 Viewing Diagnostic Information**).

8.5 BACnet: Setting Node_Offset to Assign Specific Device Instances

- Follow the steps outlined in **Section 5 Setup Web Server Security** to access the ProtoAir Web Configurator.
- The Node_Offset field shows the current value (default = 50,000).
  - The values allowed for a BACnet Device Instance can range from 1 to 4,194,303
- 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:

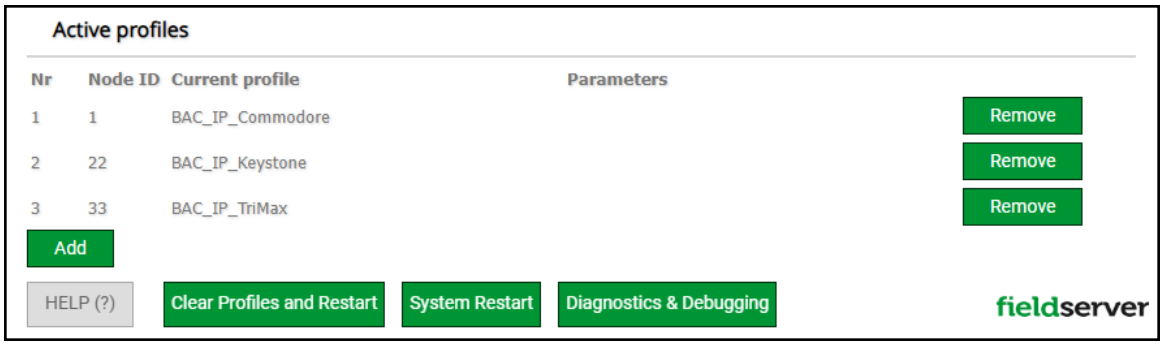
50,001 = Node_Offset + 1

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.



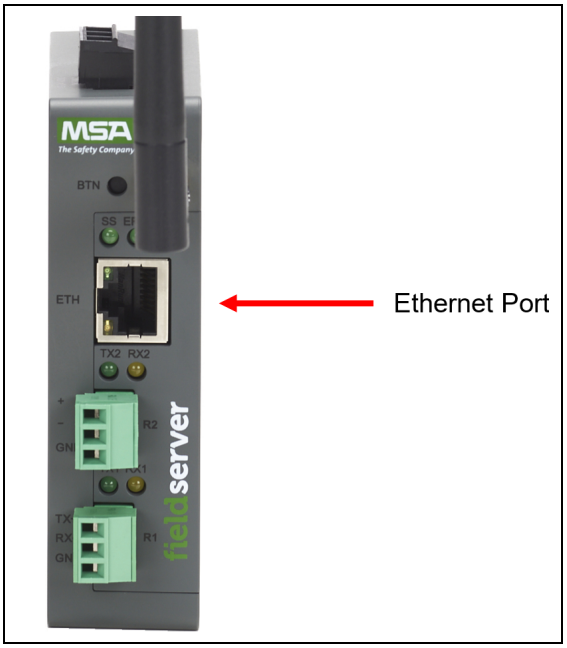
8.6 How to Start the Installation Over: Clearing Profiles

- Follow the steps outlined in **Section 5 Setup Web Server Security** to access the ProtoAir 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.

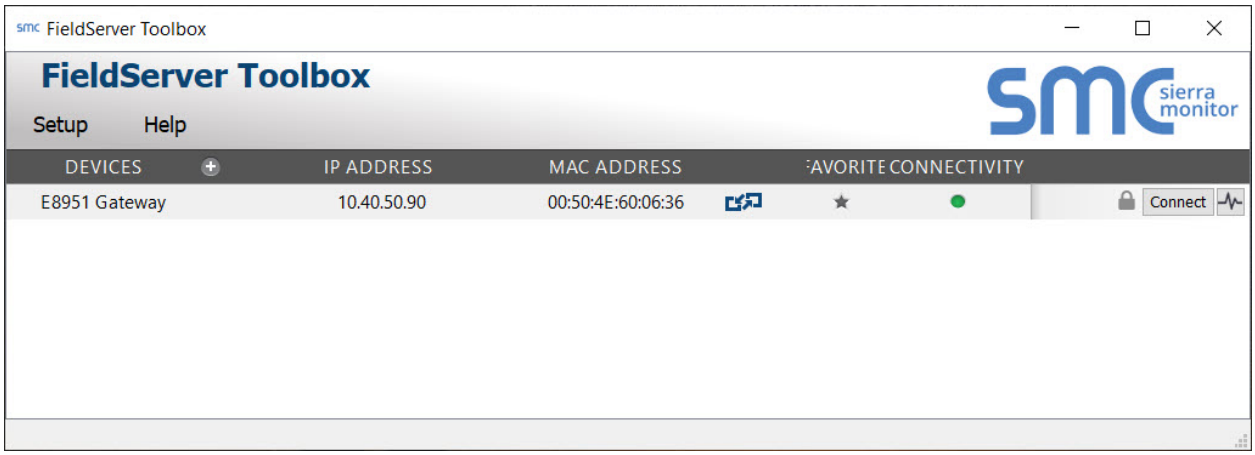
9 Troubleshooting

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.

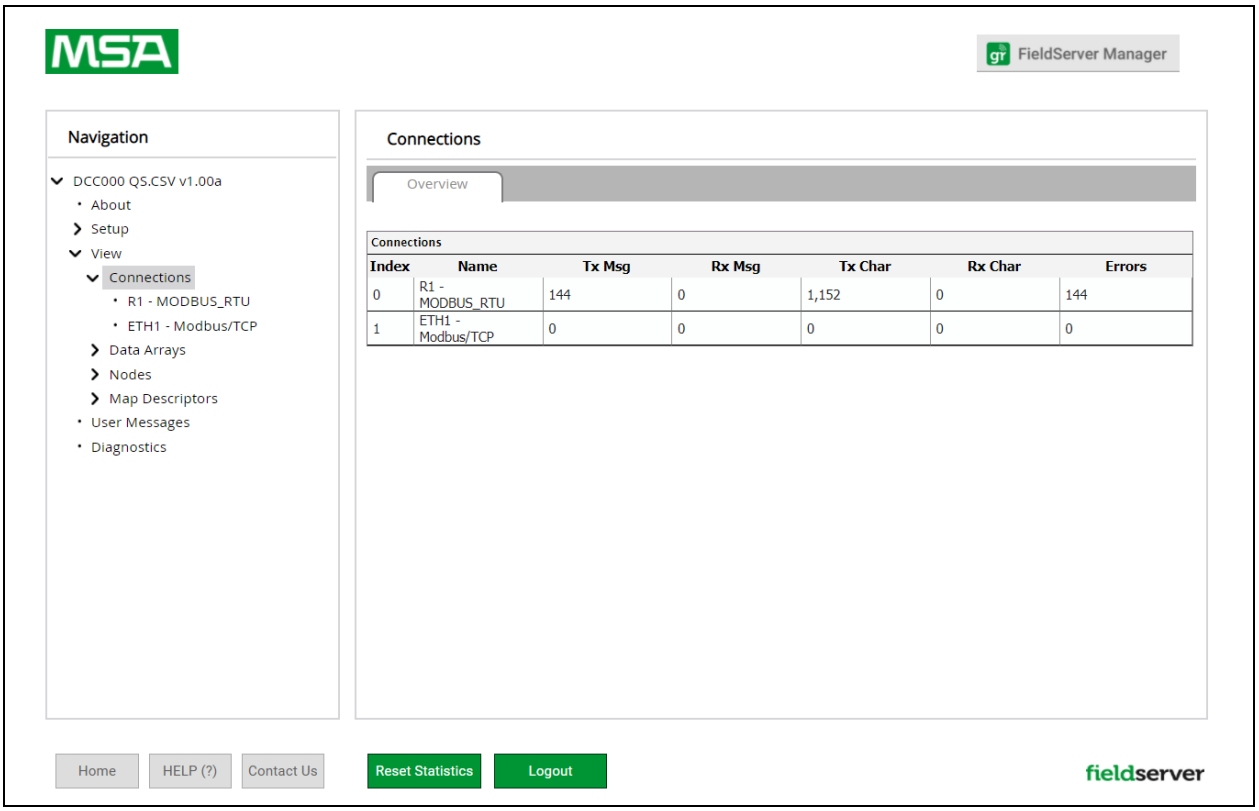


- Connect a standard Cat-5 Ethernet cable between the user's PC and ProtoAir.
- Double click on the FS Toolbox Utility and click Discover Now on the splash page.
- Check for the IP Address of the desired gateway.



9.2 Viewing Diagnostic Information

- Type the IP Address of the FieldServer into the web browser or use the FieldServer Toolbox to connect to the FieldServer.
- 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 Checking Wiring and Settings** for the relevant wiring and settings.



9.3 Checking Wiring and Settings

No COMS on the Serial side. If the Tx/Rx LEDs are not flashing rapidly then there is a COM issue. To fix this problem, check the following:

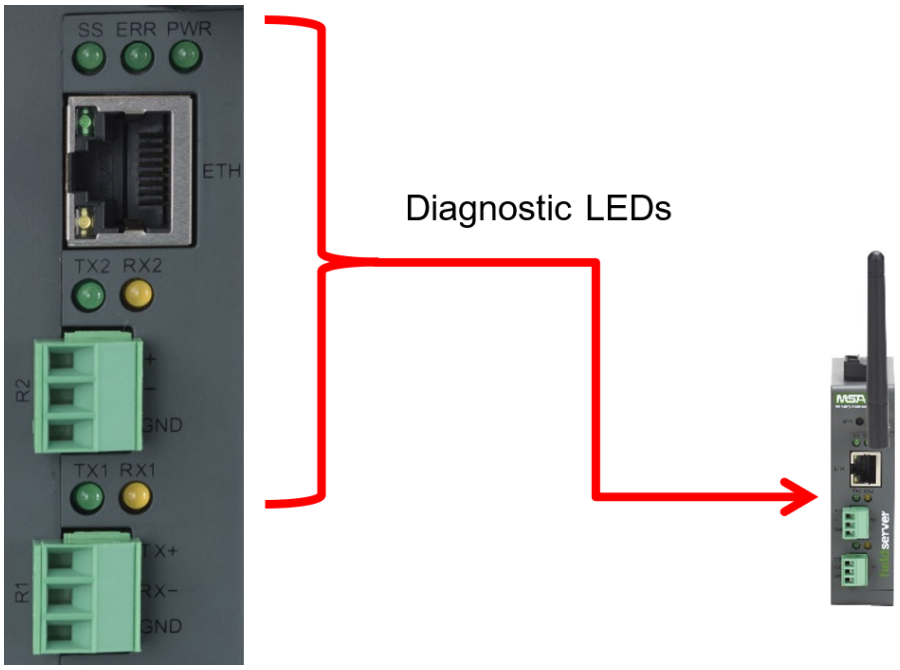
- Visual observations of LEDs on the ProtoAir. (**Section 9.4 LED Functions**)
- Check baud rate, parity, data bits, stop bits.
- Check device address.
- Verify wiring.
- Verify the device was listed in the Web Configurator (**Section 8.3 Setting Active Profiles**).

Field COM problems:

- Visual observations of LEDs on the ProtoAir. (**Section 9.4 LED Functions**)
- Verify wiring.
- Verify IP Address setting.

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

9.4 LED Functions

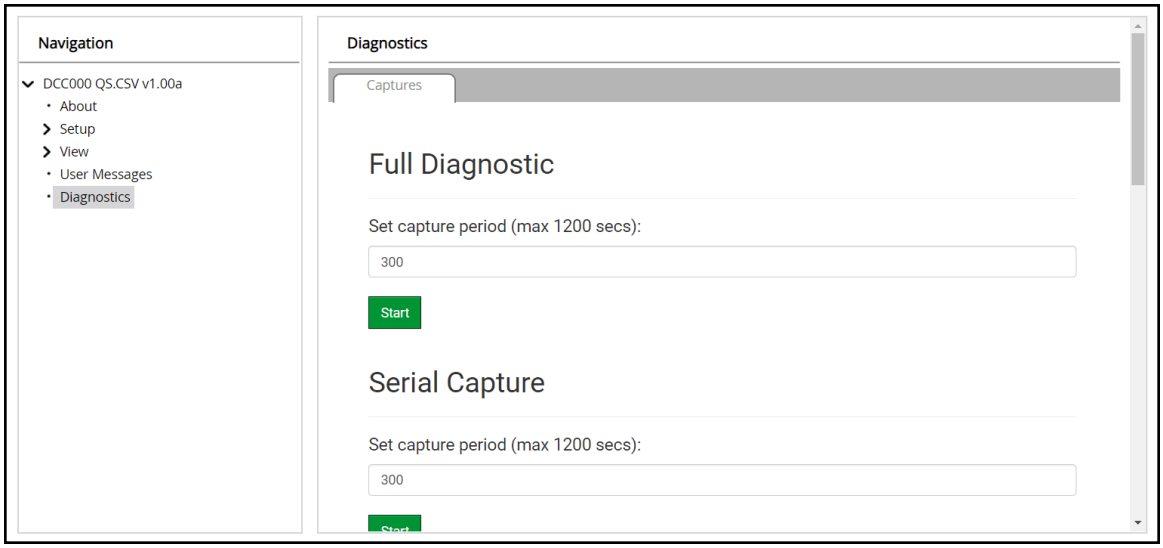


Tag	Description
SS	The SS LED will flash once a second to indicate that the bridge is in operation.
ERR	The SYS ERR LED will go on solid indicating there is a system error. If this occurs, immediately report the related “system error” shown in the error screen of the FS-GUI interface to support for evaluation.
PWR	This is the power light and should always be 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.

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.

- 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 (smc-support.emea@msasafety.com).

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

9.6 Wi-Fi Signal Strength

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

NOTE: If the signal is weak or spotty, try to improve the signal strength by checking the antenna and the FieldServer position.

9.7 Factory Reset Instructions

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

9.8 Internet Browser Software Support

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.

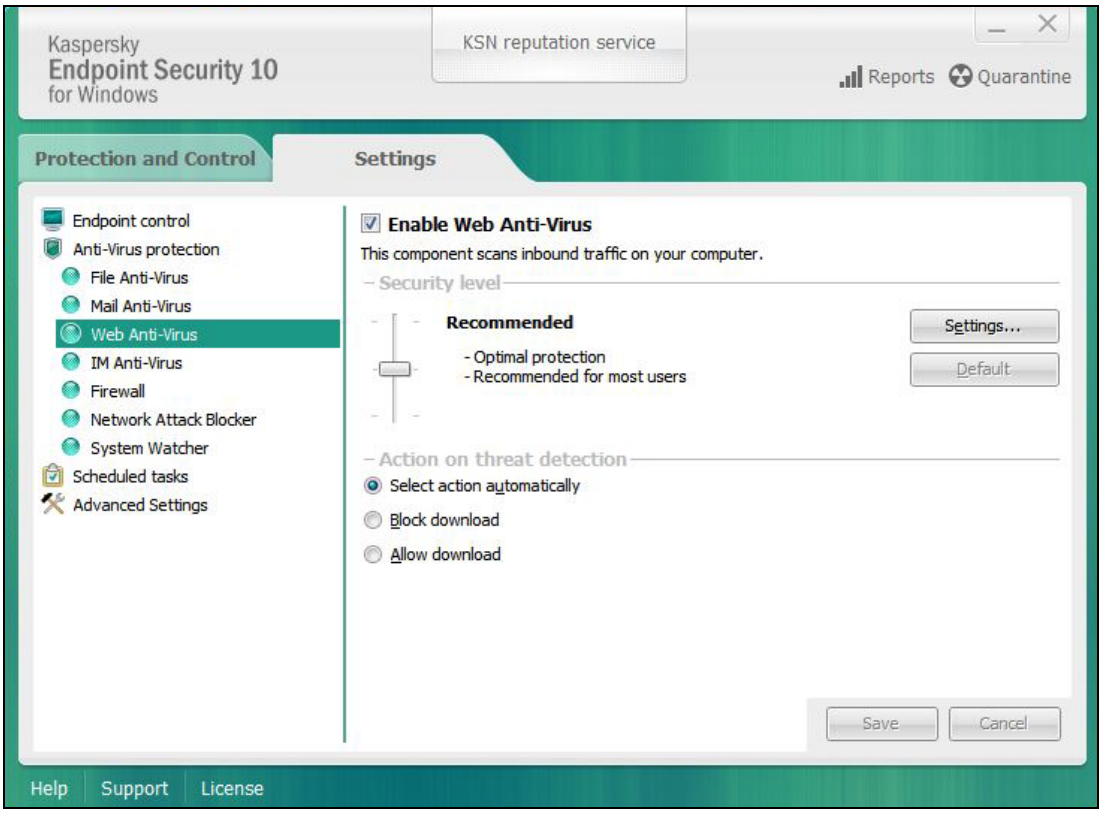
NOTE: Computer and network firewalls must be opened for Port 80 to allow FieldServer GUI to function.

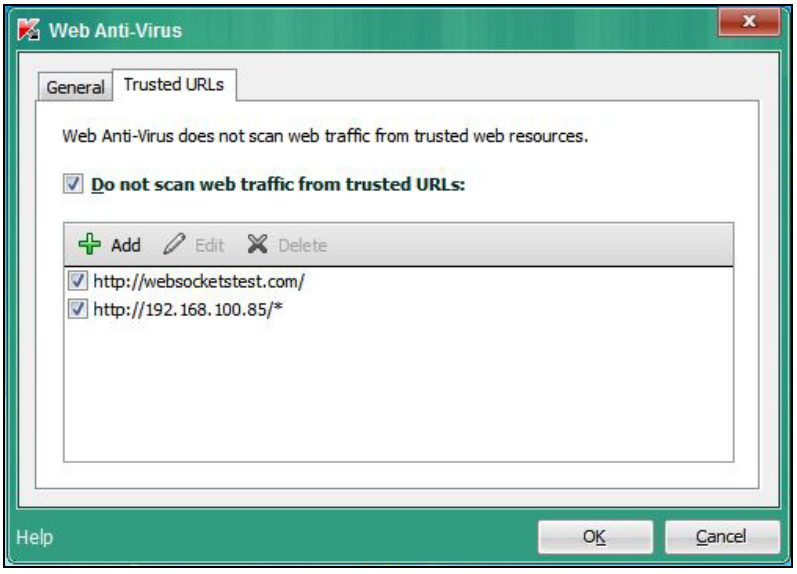
9.9 Kaspersky Endpoint Security 10

If Kaspersky Endpoint Security 10 is installed on the user's PC, the software needs to be modified to allow the PC to register bridges on the FieldServer Manager.

NOTE: This problem is specific to KES10, Kaspersky 2017 does not have this problem.

To fix the problem, the ProtoAir (see http://192.168.100.85/* in the 2nd image below) must be set as a trusted URL to the "Web Anti-Virus"->"Settings" as shown below.





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 Lost or Incorrect IP Address**)
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.

NOTE: Contact Triangle Tube to receive any firmware updates.

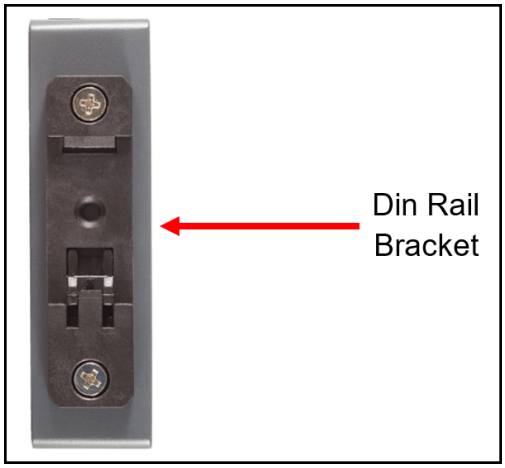
10.2 BACnet: Setting Network_Number for More Than One ProtoAir on the Subnet

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

10.3 Mounting

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



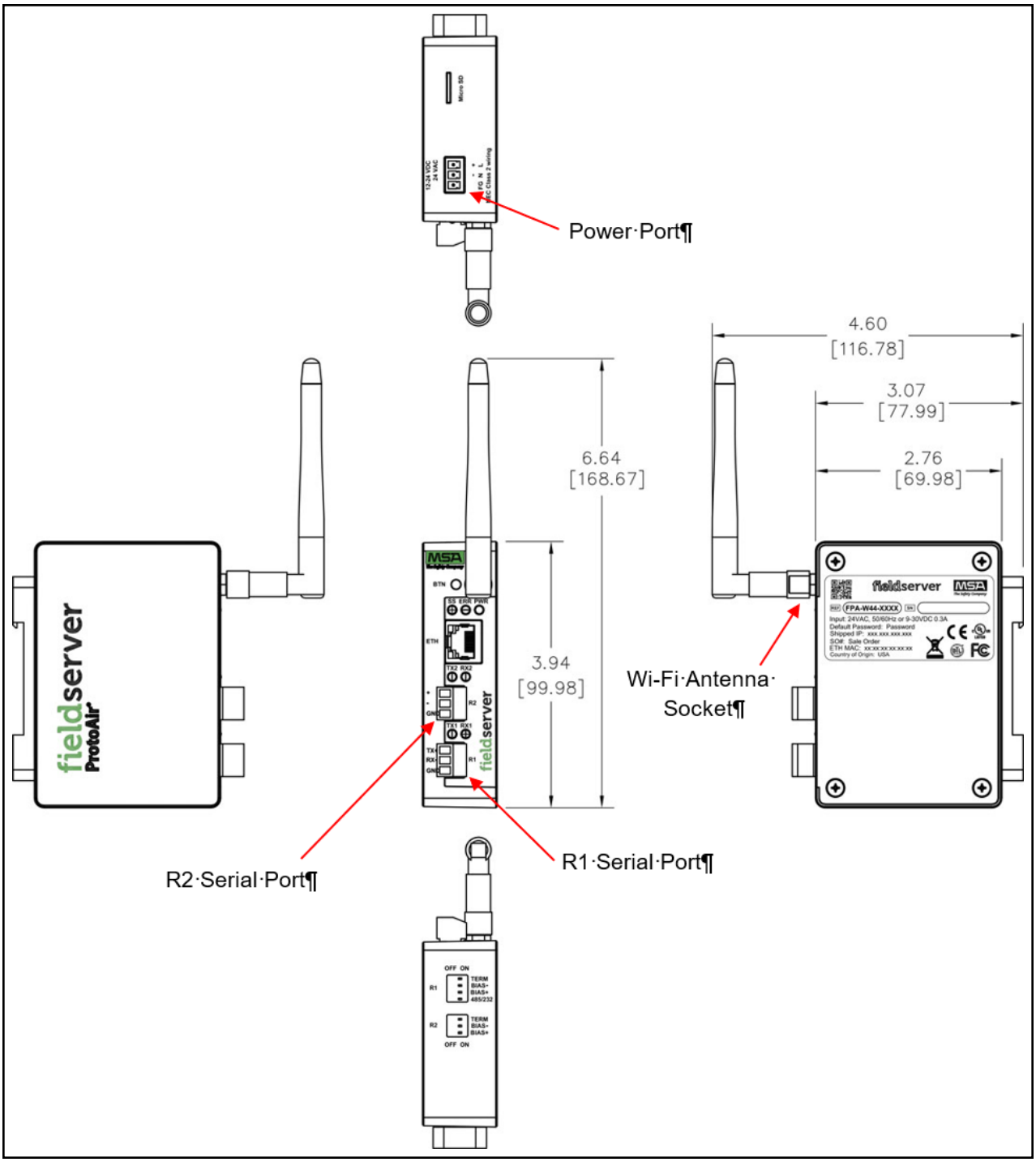
10.4 Certification

BTL Mark – BACnet Testing Laboratory

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

Go to www.BACnetInternational.net for more information about the BACnet Testing Laboratory. Click here for the BACnet PIC Statement. *BACnet is a registered trademark of ASHRAE*.

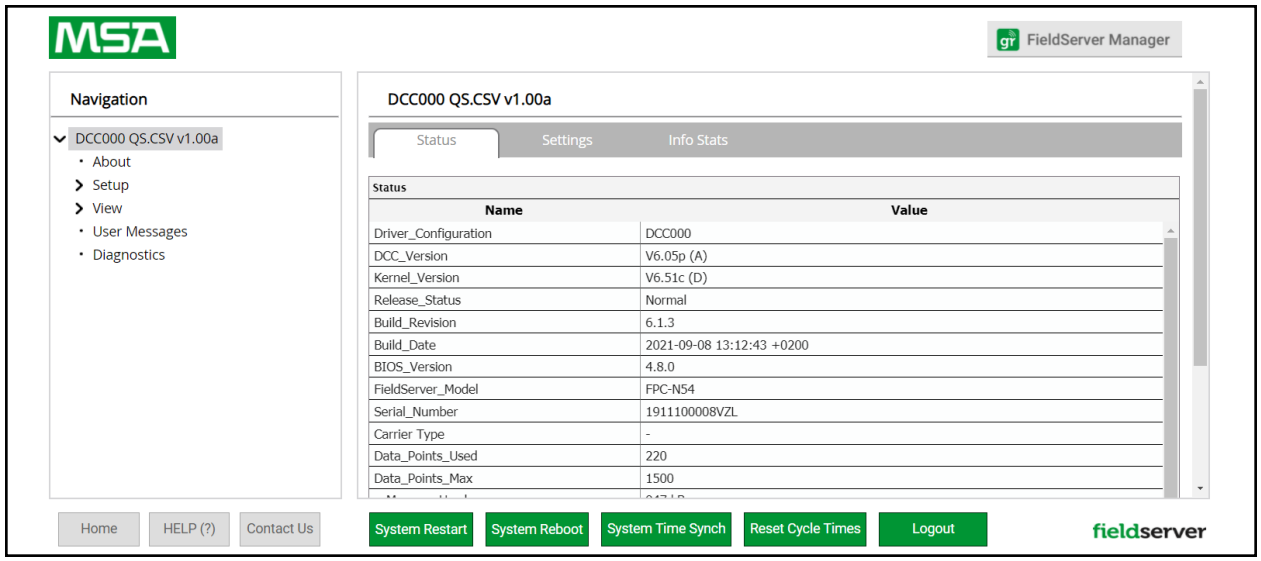
10.5 Physical Dimensions



10.6 Change Web Server Security Settings After Initial Setup

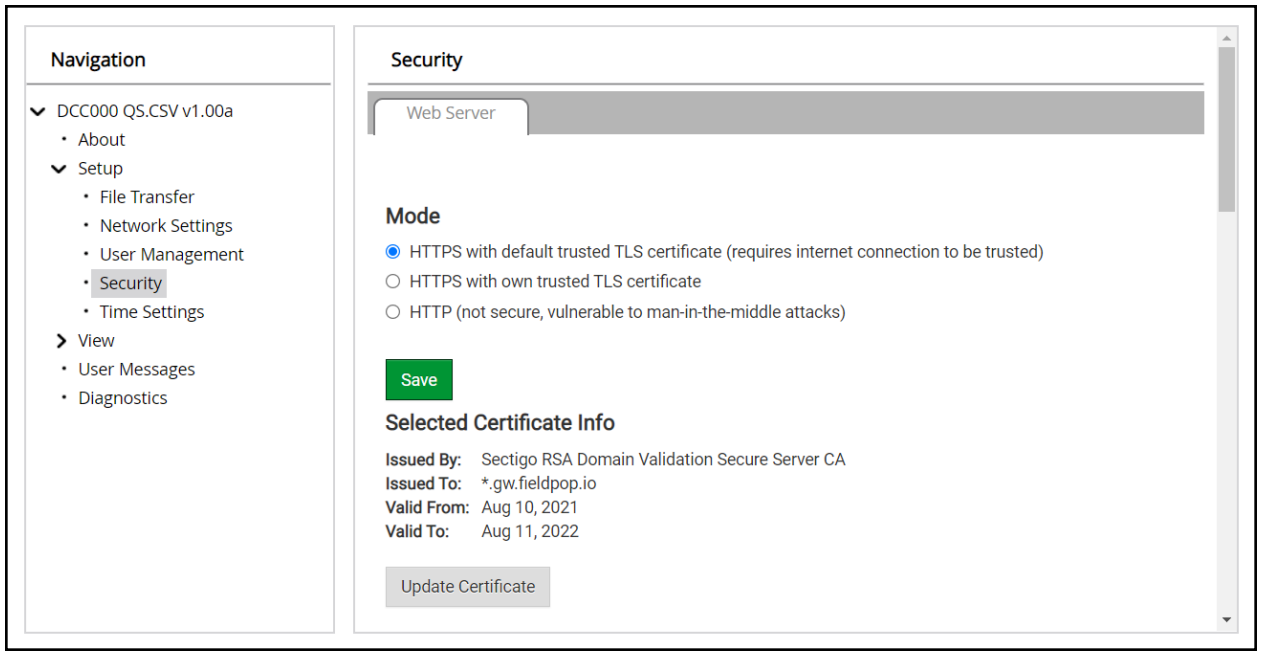
NOTE: Any changes will require a FieldServer reboot to take effect.

- Navigate to the FS-GUI page.
- Click Setup in the Navigation panel.



10.6.1 Change Security Mode

- Click Security in the Navigation panel.

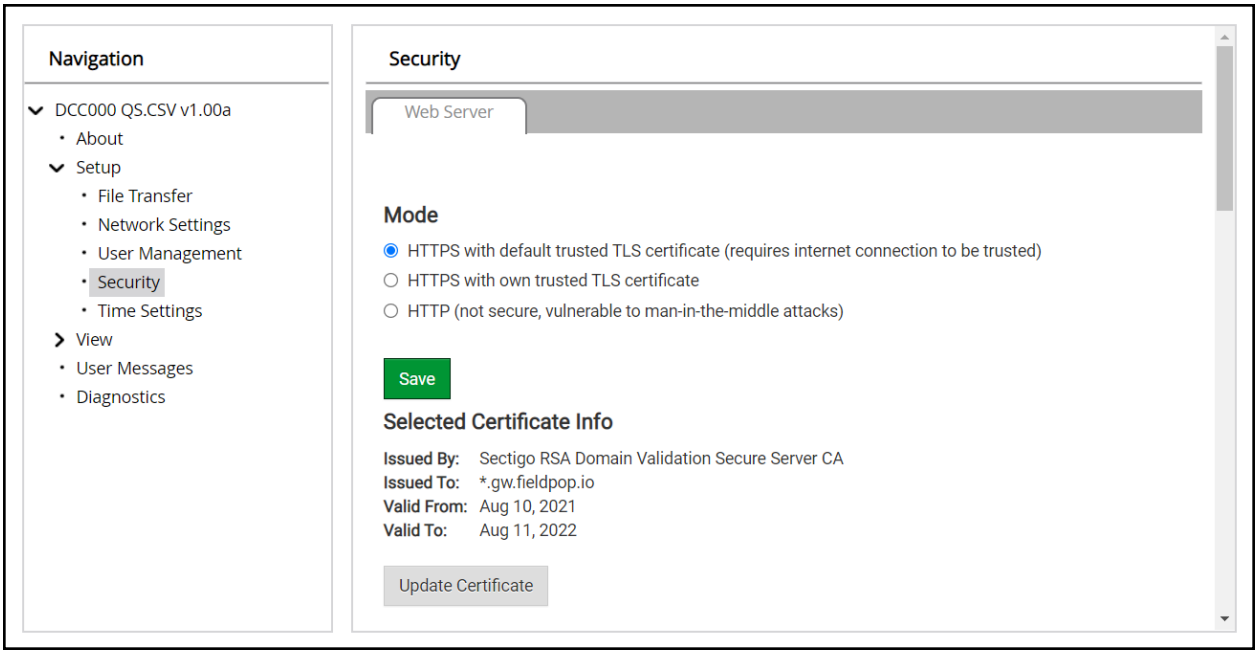


- Click the Mode desired.
  - If HTTPS with own trusted TLS certificate is selected, follow instructions in **Section 5.2.1 HTTPS with Own Trusted TLS Certificate**
- Click the Save button.

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.



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

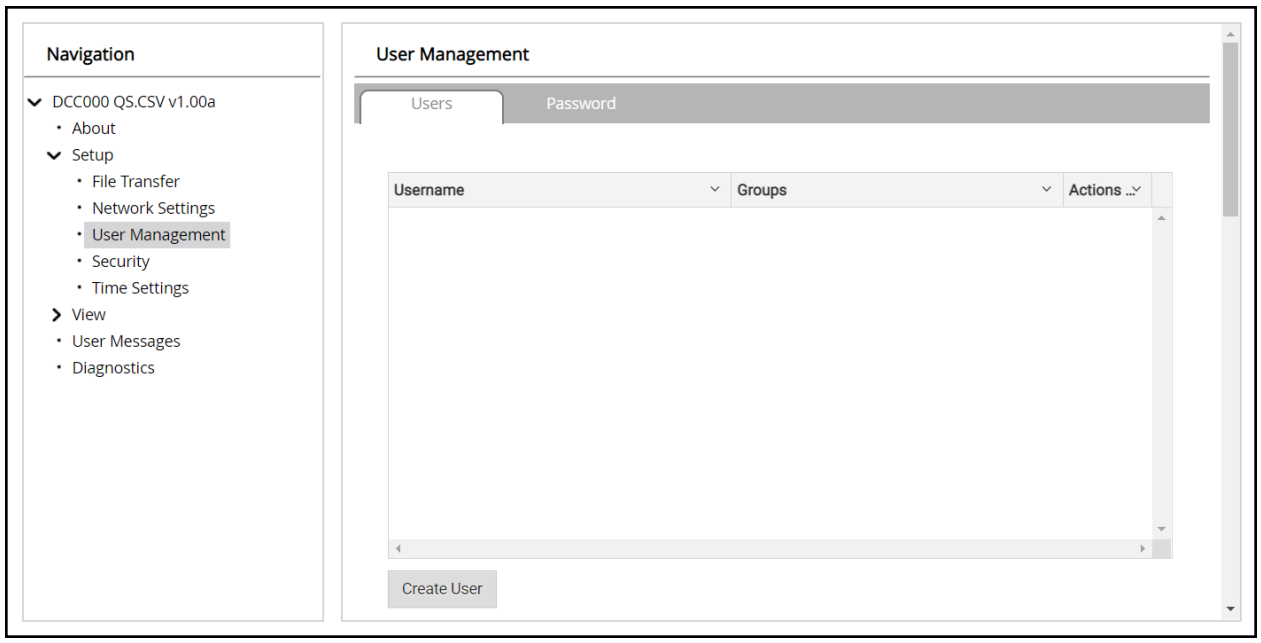
10.7 Change User Management Settings

- 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 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.



User Types:

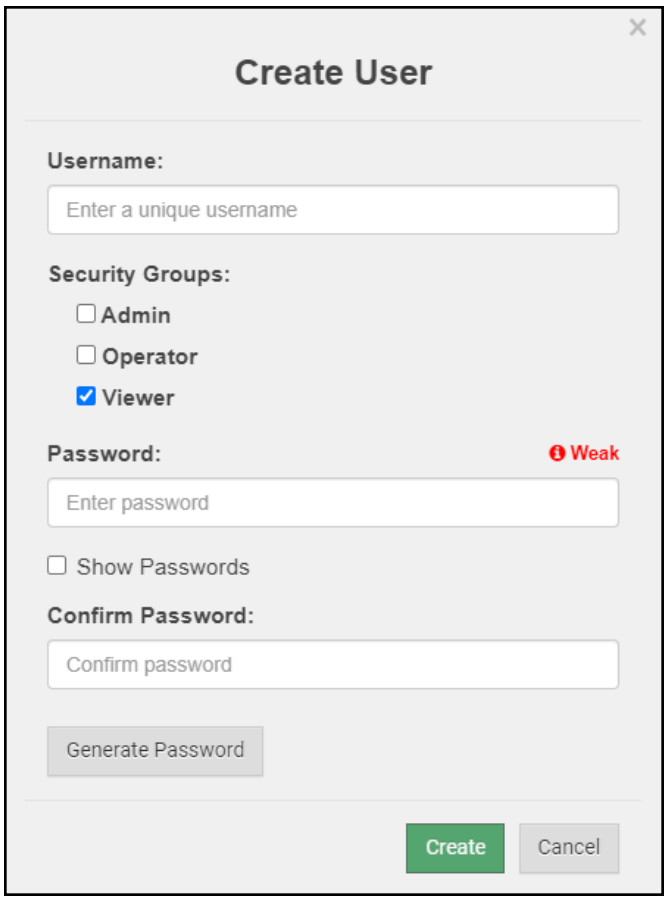
Admin – Can modify and view any settings on the FieldServer.

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.



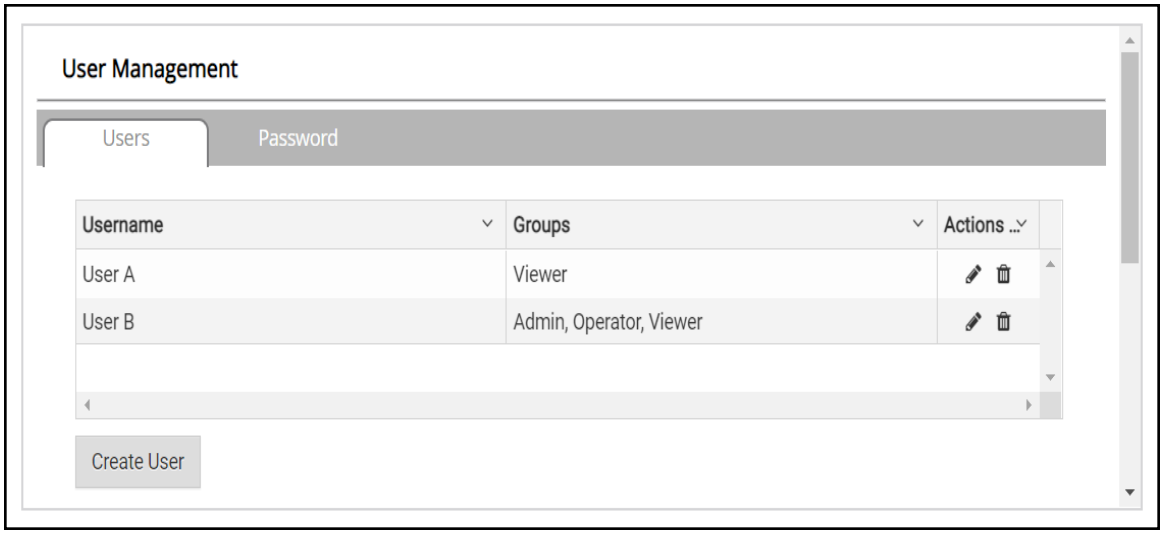
- Enter the new User fields: Name, Security Group and Password.
  - **User details are hashed and salted**

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.

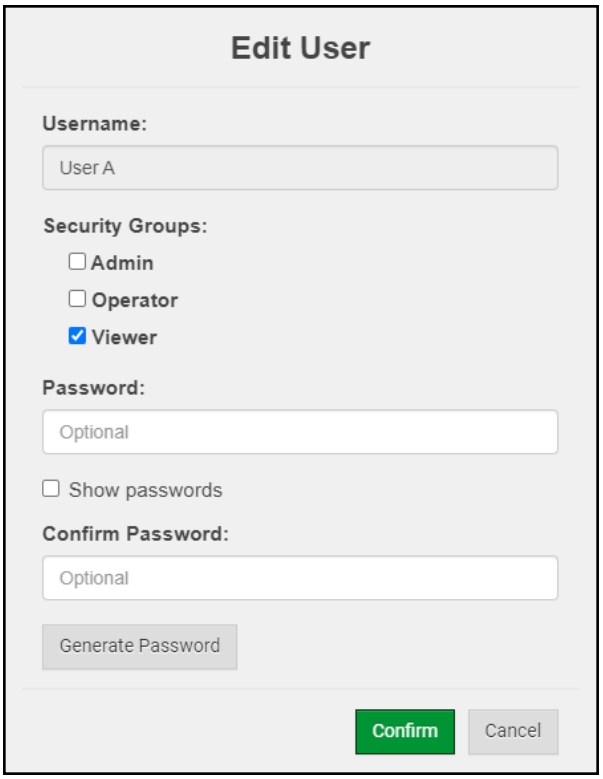
- Click the Create button.
- Once the Success message appears, click OK.

10.7.2 Edit Users

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



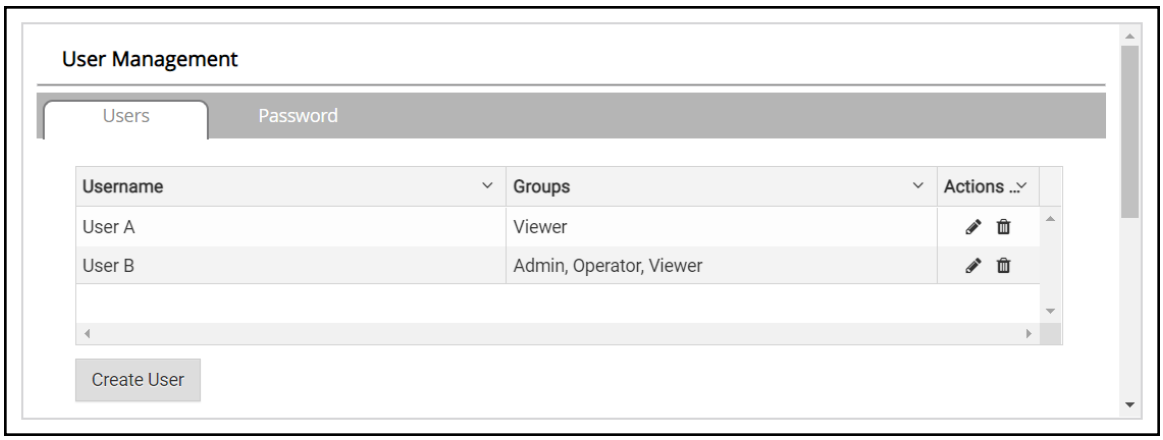
- Once the User Edit window opens, change the User Security Group and Password as needed.



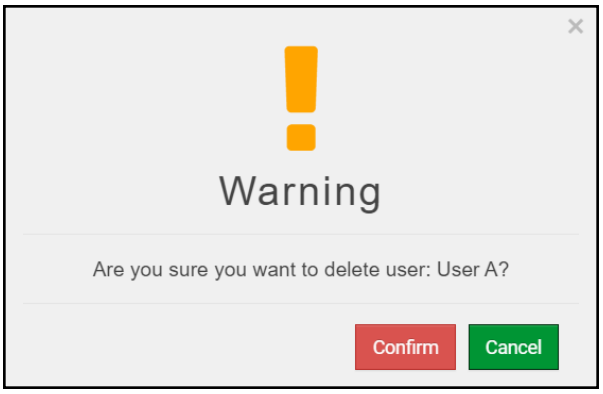
- Click Confirm.
- Once the Success message appears, click OK.

10.7.3 Delete Users

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

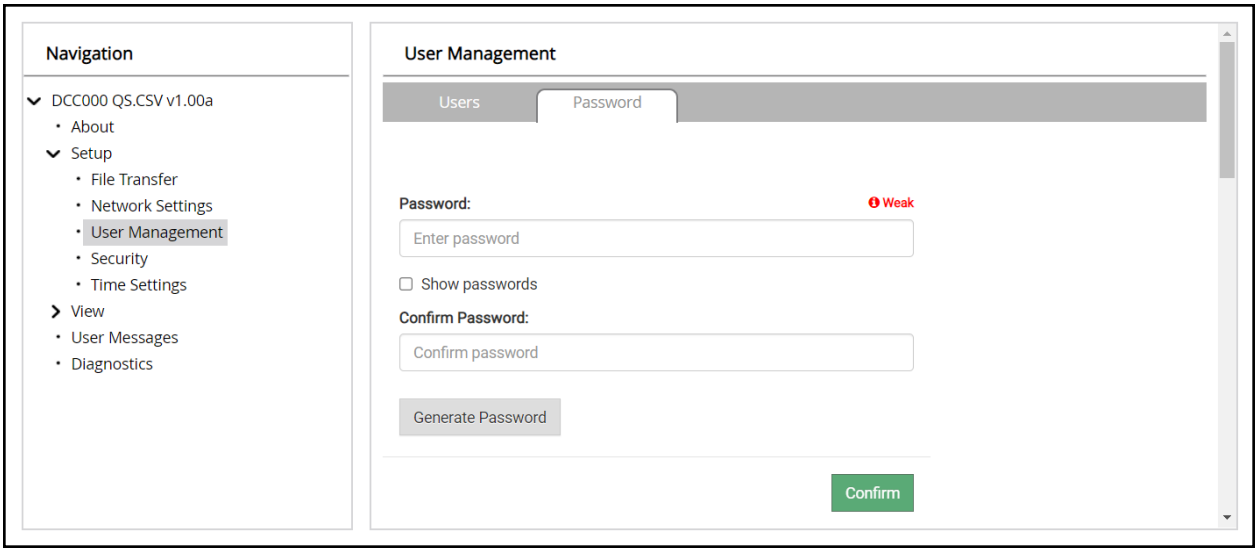


- When the warning message appears, click Confirm.



10.7.4 Change FieldServer Password

- Click the Password tab.



- 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 FieldServer Manager Connection Warning Message

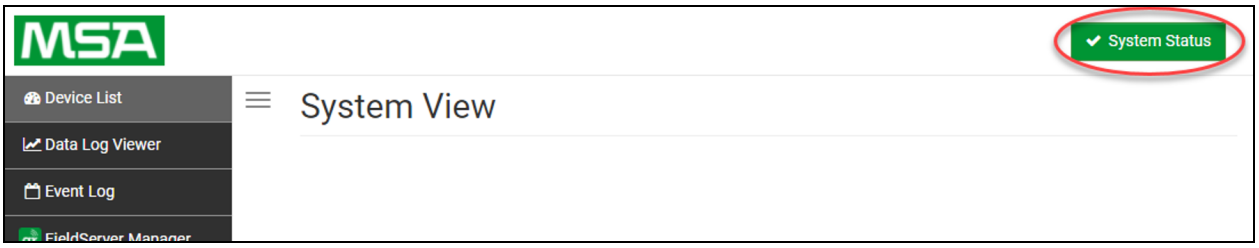
- If a warning message appears instead of the page as shown below, follow the suggestion that appears on screen.
  - If the FieldServer cannot reach the server, the following message will appear

- 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 FieldServer 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, connectivity and device alert level.



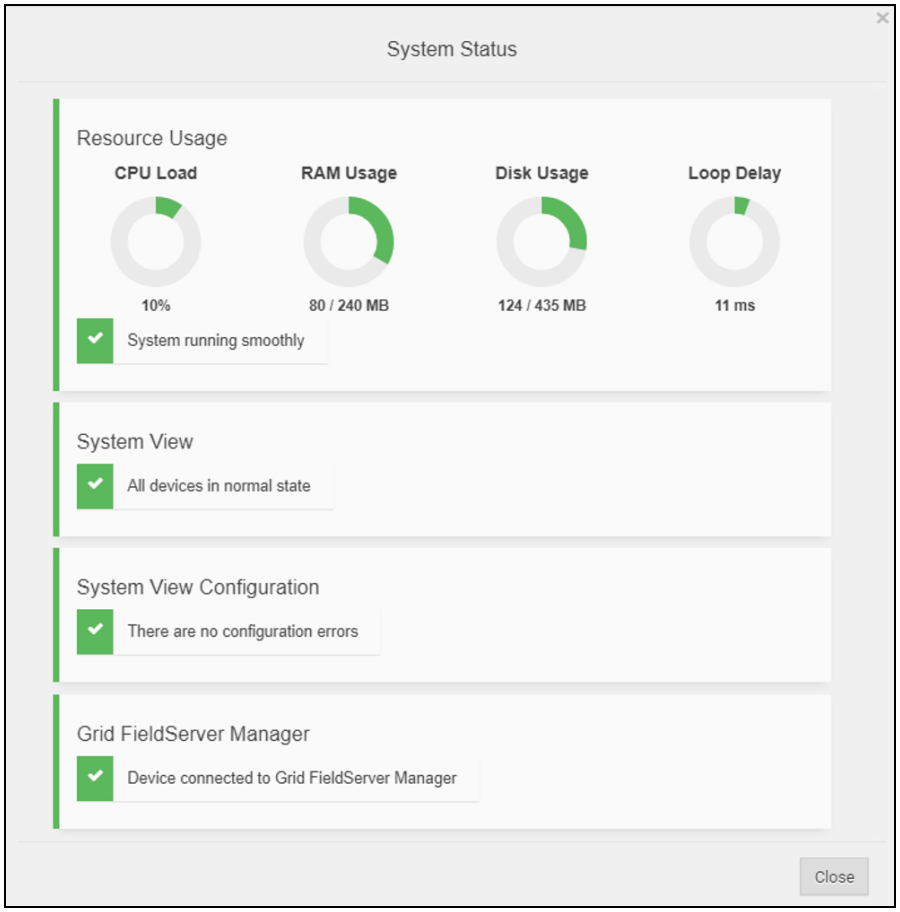
The color of the button represents the status of one to all three systems:

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 the FieldServer Manager, the Grid FieldServer Manager status will not appear in the System Status window. This means the status will show as green even if the gateway is not connected to the FieldServer Manager.

11 Vendor Information – Triangle Tube

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.

11.1 TriMax Mappings to BACnet

Point Name	BACnet Object Type	BACnet Object ID
CH Demand	AV	1
Maximum Firing Rate	AV	2
CH1 Setpoint	AV	3
CH1 Max Setpoint	AI	4
DHW Storage Setpoint	AI	5
PC Manual Mode	BI	6
DHW Mode	BI	7
CH Mode	BI	8
Freeze Protection Mode	BI	9
Flame Present	BI	10
CH(1) Pump	BI	11
DHW Pump	BI	12
System / CH2 Pump	BI	13
Lockout Code Type	AI	14
Lockout Code	AI	15
Lockout Status	AI	16
Boiler Supply Temp / Sys Temp	AI	17
Boiler Return Temp	AI	18
DHW Storage Temp	AI	19
Boiler Flue Temp	AI	20
Outdoor Temp	AI	21
Flame Ionization Current	AI	22
Boiler / Cascade Firing Rate	AI	23
Boiler Setpoint	AI	24

11.2 Keystone Mappings to BACnet

Point Name	BACnet Object Type	BACnet Object ID
Demand source	AI	1
Outlet sensor	AI	2
Firing rate	AI	3
Fan speed	AI	4
Flame signal	AI	5
Inlet sensor	AI	6
DHW sensor	AI	7
Stack sensor	AI	8
Active CH setpoint	AI	9
Active DHW setpoint	AI	10
Active LL setpoint	AI	11
Analog modulation input	AI	12
Burner control status	AI	13
Lockout code	AI	14
Alarm reason	AI	15
Hold code	AI	16
CH status	AI	17
CH setpoint source	AI	18
CH heat demand	AI	19
CH burner demand	AI	20

Point Name	BACnet Object Type	BACnet Object ID
DHW status	AI	21
DHW Priority Count	AI	22
DHW heat demand	AI	23
DHW burner demand	AI	24
DHW pump status	AI	25
DHW Pump Idle Days Count	AI	26
System pump status	AI	27
System Pump Idle Days Count	AI	28
Boiler pump status	AI	29
Boiler Pump Idle Days Count	AI	30
Burner run time	AV	31
Lead lag master status	AI	32
Lead lag slave status	AI	33
Lead Lag Master Setpoint Source	AI	34
Outdoor temperature	AI	35
System Sensor	AI	36
CH setpoint	AV	37
Lead Lag setpoint	AV	38
Warm weather shutdown setpoint	AV	39
Lead Lag active service	AI	40
Slave 1 State	AI	41
Slave 1 firing rate	AI	42
Slave 2 State	AI	43
Slave 2 firing rate	AI	44
Slave 3 State	AI	45
Slave 3 firing rate	AI	46
Slave 4 State	AI	47
Slave 4 firing rate	AI	48
Slave 5 State	AI	49
Slave 5 firing rate	AI	50
Slave 6 State	AI	51
Slave 6 firing rate	AI	52
Slave 7 State	AI	53
Slave 7 firing rate	AI	54
Slave 8 State	AI	55
Slave 8 firing rate	AI	56
Master firing rate	AI	57
CH Enable	BV	58
Lead Lag Operation Switch	BV	59

11.3 Iconic-Commodore Mappings to BACnet

Point Name	BACnet Object Type	BACnet Object ID
Group Number	AI	1
Modbus Version	AI	2
Modbus Device Type Table	AI	3
Unit Selection Temp	BV	4
Unit Selection Pressure	BV	5
Control Register Write Enable	BV	6
Control Register Ctrl Reset	BV	7
State 1	MI	8
State 2	MI	9
Error Code	AI	10
Actual Calculated Ch Setpoint	AI	11
CH Pump	AI	12

Point Name	BACnet Object Type	BACnet Object ID
DHW Pump	AI	13
General Pump	AI	14
Supply Temperature	AI	15
Return Temperature	AI	16
Dhw Temperature	AI	17
Flue Gas Temperature	AI	18
System (Heat Exchanger) Temp	AI	19
Outside Temperature	AI	20
Firing Rate (Power Output)	AI	21
Flame (Ionization) Current	AI	22
Water Pressure	AI	23
Ignit Success	AI	24
Ignit Failed	AI	25
Flame Failed	AI	26
Burn Hours CH	AI	27
Burn Hours DHW	AI	28
Lockout History Boiler 01	AI	29
Lockout History Boiler 02	AI	30
Lockout History Boiler 03	AI	31
Lockout History Boiler 04	AI	32
Lockout History Boiler 05	AI	33
Lockout History Boiler 06	AI	34
Lockout History Boiler 07	AI	35
Lockout History Boiler 08	AI	36
Lockout History Boiler 09	AI	37
Lockout History Boiler 10	AI	38
Lockout History Boiler 11	AI	39
Lockout History Boiler 12	AI	40
Lockout History Boiler 13	AI	41
Lockout History Boiler 14	AI	42
Lockout History Boiler 15	AI	43
Lockout History Boiler 16	AI	44
Lockout Time Boiler 01	AI	45
Lockout Time Boiler 02	AI	46
Lockout Time Boiler 03	AI	47
Lockout Time Boiler 04	AI	48
Lockout Time Boiler 05	AI	49
Lockout Time Boiler 06	AI	50
Lockout Time Boiler 07	AI	51
Lockout Time Boiler 08	AI	52
Lockout Time Boiler 09	AI	53
Lockout Time Boiler 10	AI	54
Lockout Time Boiler 11	AI	55
Lockout Time Boiler 12	AI	56
Lockout Time Boiler 13	AI	57
Lockout Time Boiler 14	AI	58
Lockout Time Boiler 15	AI	59
Lockout Time Boiler 16	AI	60
Blocking History Boiler 01	AI	61
Blocking History Boiler 02	AI	62
Blocking History Boiler 03	AI	63
Blocking History Boiler 04	AI	64
Blocking History Boiler 05	AI	65
Blocking History Boiler 06	AI	66

Point Name	BACnet Object Type	BACnet Object ID
Blocking History Boiler 07	AI	67
Blocking History Boiler 08	AI	68
Blocking History Boiler 09	AI	69
Blocking History Boiler 10	AI	70
Blocking History Boiler 11	AI	71
Blocking History Boiler 12	AI	72
Blocking History Boiler 13	AI	73
Blocking History Boiler 14	AI	74
Blocking History Boiler 15	AI	75
Blocking History Boiler 16	AI	76
Blocking Time Boiler 01	AI	77
Blocking Time Boiler 02	AI	78
Blocking Time Boiler 03	AI	79
Blocking Time Boiler 04	AI	80
Blocking Time Boiler 05	AI	81
Blocking Time Boiler 06	AI	82
Blocking Time Boiler 07	AI	83
Blocking Time Boiler 08	AI	84
Blocking Time Boiler 09	AI	85
Blocking Time Boiler 10	AI	86
Blocking Time Boiler 11	AI	87
Blocking Time Boiler 12	AI	88
Blocking Time Boiler 13	AI	89
Blocking Time Boiler 14	AI	90
Blocking Time Boiler 15	AI	91
Blocking Time Boiler 16	AI	92
CH Mode	AV	93
DHW Mode	AV	94
CH Setpoint	AV	95
DHW Setpoint	AV	96
Reset Curve Boiler Design	AV	97
Reset Curve Boiler Mild Weather	AV	98
Reset Curve Outdoor Mild Weather	AV	99
Reset Curve Outdoor Design	AV	100
Warm Weather Shutdown	AV	101
Reset Curve Boiler Maximum	AV	102
Reset Curve Boiler Minimum	AV	103
Night Setback	AV	104
CH Enable	BV	105
DHW Enable	BV	106
DHW Store Setpoint	AV	107
Power Level For The Boiler	AI	108
Boiler Supply Setpoint	AI	109
Boiler Supply Temperature	AI	110
DHW Temperature	AI	111
System Pump Status	BI	112
DHW Pump Status	BI	113
Burning Hours (Total Of All Boilers)	AI	114
Module 01 Available / Present	BI	115
Module 02 Available / Present	BI	116
Module 03 Available / Present	BI	117
Module 04 Available / Present	BI	118
Module 05 Available / Present	BI	119
Module 06 Available / Present	BI	120

Point Name	BACnet Object Type	BACnet Object ID
Module 07 Available / Present	BI	121
Module 08 Available / Present	BI	122
Module 09 Available / Present	BI	123
Module 10 Available / Present	BI	124
Module 11 Available / Present	BI	125
Module 12 Available / Present	BI	126
Module 13 Available / Present	BI	127
Module 14 Available / Present	BI	128
Module 15 Available / Present	BI	129
Module 16 Available / Present	BI	130
Module 01 Burning	BI	131
Module 02 Burning	BI	132
Module 03 Burning	BI	133
Module 04 Burning	BI	134
Module 05 Burning	BI	135
Module 06 Burning	BI	136
Module 07 Burning	BI	137
Module 08 Burning	BI	138
Module 09 Burning	BI	139
Module 10 Burning	BI	140
Module 11 Burning	BI	141
Module 12 Burning	BI	142
Module 13 Burning	BI	143
Module 14 Burning	BI	144
Module 15 Burning	BI	145
Module 16 Burning	BI	146
DHW Setpoint	AV	147
Module Address	AV	148
Expected Number Of Burners	AV	149
Current Time: Seconds	AV	150
Current Time: Minutes	AV	151
Current Time: Hours	AV	152
Current Time: Day	AV	153
Current Time: Month	AV	154
Current Time: Year	AV	155
Current Time: Time Zone	AV	156
Current Time: Daylight Saving Time	AV	157
Hours Since Last Service	AI	158
Hours Till Service Is Required	AI	159
Reset Service Reminder	AV	160
Service Hour Counter Setting	BV	161
Service Interval	AV	162
Last Error Index	AI	163
Error Number	AI	164
Boiler Id	AI	165
Timestamp: Day Of Week	AI	166
Timestamp: Day Of Month	AI	167
Timestamp: Month	AI	168
Timestamp: Year	AI	169
Timestamp: Hour	AI	170
Timestamp: Minute	AI	171
M01 Status	AI	1001
M01 Error Number	AI	1002

Point Name	BACnet Object Type	BACnet Object ID
M01 Module Supply Setpoint	AI	1003
M01 Power Level	AI	1004
M01 CHPump Status	BI	1005
M01 DHW Pump Status	BI	1006
M01 General Pump Status	BI	1007
M01 Ionization	AI	1008
M01 Water Pressure	AI	1009
M01 Flow Rate DHW	AI	1010
M01 Target Fan Speed	AI	1011
M01 Actual Fan Speed	AI	1012
M01 Minimum Fan Speed	AI	1013
M01 Maximum Fan Speed	AI	1014
M01 Ignition Fan Speed	AV	1015
M01 Supply Sensor Temperature	AI	1016
M01 Return Sensor Temperature	AI	1017
M01 DHW Sensor Temperature	AI	1018
M01 Flue Sensor Temperature	AI	1019
M01 Outside Sensor Temperature	AI	1020
M01 Burning Hours CH	AI	1021
M01 Burning Hours DHW	AI	1022
M01 Burning Hours Total	AI	1023
M01 Operational Days	AI	1024
M01 Successful Ignitions	AI	1025
M01 Failed Ignitions	AI	1026
M01 Flame Failures	AI	1027
M01 Reset	AV	1028
M01 System Test	AV	1029
M02 Status	AI	2001
M02 Error Number	AI	2002
M02 Module Supply Setpoint	AI	2003
M02 Power Level	AI	2004
M02 CHPump Status	BI	2005
M02 DHW Pump Status	BI	2006
M02 General Pump Status	BI	2007
M02 Ionization	AI	2008
M02 Water Pressure	AI	2009
M02 Flow Rate DHW	AI	2010
M02 Target Fan Speed	AI	2011
M02 Actual Fan Speed	AI	2012
M02 Minimum Fan Speed	AI	2013
M02 Maximum Fan Speed	AI	2014
M02 Ignition Fan Speed	AV	2015
M02 Supply Sensor Temperature	AI	2016
M02 Return Sensor Temperature	AI	2017
M02 DHW Sensor Temperature	AI	2018
M02 Flue Sensor Temperature	AI	2019
M02 Outside Sensor Temperature	AI	2020
M02 Burning Hours CH	AI	2021
M02 Burning Hours DHW	AI	2022
M02 Burning Hours Total	AI	2023
M02 Operational Days	AI	2024
M02 Successful Ignitions	AI	2025
M02 Failed Ignitions	AI	2026

Point Name	BACnet Object Type	BACnet Object ID
M02 Flame Failures	AI	2027
M02 Reset	AV	2028
M02 System Test	AV	2029
M03 Status	AI	3001
M03 Error Number	AI	3002
M03 Module Supply Setpoint	AI	3003
M03 Power Level	AI	3004
M03 CHPump Status	BI	3005
M03 DHW Pump Status	BI	3006
M03 General Pump Status	BI	3007
M03 Ionization	AI	3008
M03 Water Pressure	AI	3009
M03 Flow Rate DHW	AI	3010
M03 Target Fan Speed	AI	3011
M03 Actual Fan Speed	AI	3012
M03 Minimum Fan Speed	AI	3013
M03 Maximum Fan Speed	AI	3014
M03 Ignition Fan Speed	AV	3015
M03 Supply Sensor Temperature	AI	3016
M03 Return Sensor Temperature	AI	3017
M03 DHW Sensor Temperature	AI	3018
M03 Flue Sensor Temperature	AI	3019
M03 Outside Sensor Temperature	AI	3020
M03 Burning Hours CH	AI	3021
M03 Burning Hours DHW	AI	3022
M03 Burning Hours Total	AI	3023
M03 Operational Days	AI	3024
M03 Successful Ignitions	AI	3025
M03 Failed Ignitions	AI	3026
M03 Flame Failures	AI	3027
M03 Reset	AV	3028
M03 System Test	AV	3029
M04 Status	AI	4001
M04 Error Number	AI	4002
M04 Module Supply Setpoint	AI	4003
M04 Power Level	AI	4004
M04 CHPump Status	BI	4005
M04 DHW Pump Status	BI	4006
M04 General Pump Status	BI	4007
M04 Ionization	AI	4008
M04 Water Pressure	AI	4009
M04 Flow Rate DHW	AI	4010
M04 Target Fan Speed	AI	4011
M04 Actual Fan Speed	AI	4012
M04 Minimum Fan Speed	AI	4013
M04 Maximum Fan Speed	AI	4014
M04 Ignition Fan Speed	AV	4015
M04 Supply Sensor Temperature	AI	4016
M04 Return Sensor Temperature	AI	4017
M04 DHW Sensor Temperature	AI	4018
M04 Flue Sensor Temperature	AI	4019
M04 Outside Sensor Temperature	AI	4020

Point Name	BACnet Object Type	BACnet Object ID
M04 Burning Hours CH	AI	4021
M04 Burning Hours DHW	AI	4022
M04 Burning Hours Total	AI	4023
M04 Operational Days	AI	4024
M04 Successful Ignitions	AI	4025
M04 Failed Ignitions	AI	4026
M04 Flame Failures	AI	4027
M04 Reset	AV	4028
M04 System Test	AV	4029
M05 Status	AI	5001
M05 Error Number	AI	5002
M05 Module Supply Setpoint	AI	5003
M05 Power Level	AI	5004
M05 CHPump Status	BI	5005
M05 DHW Pump Status	BI	5006
M05 General Pump Status	BI	5007
M05 Ionization	AI	5008
M05 Water Pressure	AI	5009
M05 Flow Rate DHW	AI	5010
M05 Target Fan Speed	AI	5011
M05 Actual Fan Speed	AI	5012
M05 Minimum Fan Speed	AI	5013
M05 Maximum Fan Speed	AI	5014
M05 Ignition Fan Speed	AV	5015
M05 Supply Sensor Temperature	AI	5016
M05 Return Sensor Temperature	AI	5017
M05 DHW Sensor Temperature	AI	5018
M05 Flue Sensor Temperature	AI	5019
M05 Outside Sensor Temperature	AI	5020
M05 Burning Hours CH	AI	5021
M05 Burning Hours DHW	AI	5022
M05 Burning Hours Total	AI	5023
M05 Operational Days	AI	5024
M05 Successful Ignitions	AI	5025
M05 Failed Ignitions	AI	5026
M05 Flame Failures	AI	5027
M05 Reset	AV	5028
M05 System Test	AV	5029
M06 Status	AI	6001
M06 Error Number	AI	6002
M06 Module Supply Setpoint	AI	6003
M06 Power Level	AI	6004
M06 CHPump Status	BI	6005
M06 DHW Pump Status	BI	6006
M06 General Pump Status	BI	6007
M06 Ionization	AI	6008
M06 Water Pressure	AI	6009
M06 Flow Rate DHW	AI	6010
M06 Target Fan Speed	AI	6011
M06 Actual Fan Speed	AI	6012
M06 Minimum Fan Speed	AI	6013
M06 Maximum Fan Speed	AI	6014

Point Name	BACnet Object Type	BACnet Object ID
M06 Ignition Fan Speed	AV	6015
M06 Supply Sensor Temperature	AI	6016
M06 Return Sensor Temperature	AI	6017
M06 DHW Sensor Temperature	AI	6018
M06 Flue Sensor Temperature	AI	6019
M06 Outside Sensor Temperature	AI	6020
M06 Burning Hours CH	AI	6021
M06 Burning Hours DHW	AI	6022
M06 Burning Hours Total	AI	6023
M06 Operational Days	AI	6024
M06 Successful Ignitions	AI	6025
M06 Failed Ignitions	AI	6026
M06 Flame Failures	AI	6027
M06 Reset	AV	6028
M06 System Test	AV	6029
M07 Status	AI	7001
M07 Error Number	AI	7002
M07 Module Supply Setpoint	AI	7003
M07 Power Level	AI	7004
M07 CHPump Status	BI	7005
M07 DHW Pump Status	BI	7006
M07 General Pump Status	BI	7007
M07 Ionization	AI	7008
M07 Water Pressure	AI	7009
M07 Flow Rate DHW	AI	7010
M07 Target Fan Speed	AI	7011
M07 Actual Fan Speed	AI	7012
M07 Minimum Fan Speed	AI	7013
M07 Maximum Fan Speed	AI	7014
M07 Ignition Fan Speed	AV	7015
M07 Supply Sensor Temperature	AI	7016
M07 Return Sensor Temperature	AI	7017
M07 DHW Sensor Temperature	AI	7018
M07 Flue Sensor Temperature	AI	7019
M07 Outside Sensor Temperature	AI	7020
M07 Burning Hours CH	AI	7021
M07 Burning Hours DHW	AI	7022
M07 Burning Hours Total	AI	7023
M07 Operational Days	AI	7024
M07 Successful Ignitions	AI	7025
M07 Failed Ignitions	AI	7026
M07 Flame Failures	AI	7027
M07 Reset	AV	7028
M07 System Test	AV	7029
M08 Status	AI	8001
M08 Error Number	AI	8002
M08 Module Supply Setpoint	AI	8003
M08 Power Level	AI	8004
M08 CHPump Status	BI	8005
M08 DHW Pump Status	BI	8006
M08 General Pump Status	BI	8007
M08 Ionization	AI	8008

Point Name	BACnet Object Type	BACnet Object ID
M08 Water Pressure	AI	8009
M08 Flow Rate DHW	AI	8010
M08 Target Fan Speed	AI	8011
M08 Actual Fan Speed	AI	8012
M08 Minimum Fan Speed	AI	8013
M08 Maximum Fan Speed	AI	8014
M08 Ignition Fan Speed	AV	8015
M08 Supply Sensor Temperature	AI	8016
M08 Return Sensor Temperature	AI	8017
M08 DHW Sensor Temperature	AI	8018
M08 Flue Sensor Temperature	AI	8019
M08 Outside Sensor Temperature	AI	8020
M08 Burning Hours CH	AI	8021
M08 Burning Hours DHW	AI	8022
M08 Burning Hours Total	AI	8023
M08 Operational Days	AI	8024
M08 Successful Ignitions	AI	8025
M08 Failed Ignitions	AI	8026
M08 Flame Failures	AI	8027
M08 Reset	AV	8028
M08 System Test	AV	8029
M09 Status	AI	9001
M09 Error Number	AI	9002
M09 Module Supply Setpoint	AI	9003
M09 Power Level	AI	9004
M09 CHPump Status	BI	9005
M09 DHW Pump Status	BI	9006
M09 General Pump Status	BI	9007
M09 Ionization	AI	9008
M09 Water Pressure	AI	9009
M09 Flow Rate DHW	AI	9010
M09 Target Fan Speed	AI	9011
M09 Actual Fan Speed	AI	9012
M09 Minimum Fan Speed	AI	9013
M09 Maximum Fan Speed	AI	9014
M09 Ignition Fan Speed	AV	9015
M09 Supply Sensor Temperature	AI	9016
M09 Return Sensor Temperature	AI	9017
M09 DHW Sensor Temperature	AI	9018
M09 Flue Sensor Temperature	AI	9019
M09 Outside Sensor Temperature	AI	9020
M09 Burning Hours CH	AI	9021
M09 Burning Hours DHW	AI	9022
M09 Burning Hours Total	AI	9023
M09 Operational Days	AI	9024
M09 Successful Ignitions	AI	9025
M09 Failed Ignitions	AI	9026
M09 Flame Failures	AI	9027
M09 Reset	AV	9028
M09 System Test	AV	9029
M10 Status	AI	10001
M10 Error Number	AI	10002

Point Name	BACnet Object Type	BACnet Object ID
M10 Module Supply Setpoint	AI	10003
M10 Power Level	AI	10004
M10 CHPump Status	BI	10005
M10 DHW Pump Status	BI	10006
M10 General Pump Status	BI	10007
M10 Ionization	AI	10008
M10 Water Pressure	AI	10009
M10 Flow Rate DHW	AI	10010
M10 Target Fan Speed	AI	10011
M10 Actual Fan Speed	AI	10012
M10 Minimum Fan Speed	AI	10013
M10 Maximum Fan Speed	AI	10014
M10 Ignition Fan Speed	AV	10015
M10 Supply Sensor Temperature	AI	10016
M10 Return Sensor Temperature	AI	10017
M10 DHW Sensor Temperature	AI	10018
M10 Flue Sensor Temperature	AI	10019
M10 Outside Sensor Temperature	AI	10020
M10 Burning Hours CH	AI	10021
M10 Burning Hours DHW	AI	10022
M10 Burning Hours Total	AI	10023
M10 Operational Days	AI	10024
M10 Successful Ignitions	AI	10025
M10 Failed Ignitions	AI	10026
M10 Flame Failures	AI	10027
M10 Reset	AV	10028
M10 System Test	AV	10029
M11 Status	AI	11001
M11 Error Number	AI	11002
M11 Module Supply Setpoint	AI	11003
M11 Power Level	AI	11004
M11 CHPump Status	BI	11005
M11 DHW Pump Status	BI	11006
M11 General Pump Status	BI	11007
M11 Ionization	AI	11008
M11 Water Pressure	AI	11009
M11 Flow Rate DHW	AI	11010
M11 Target Fan Speed	AI	11011
M11 Actual Fan Speed	AI	11012
M11 Minimum Fan Speed	AI	11013
M11 Maximum Fan Speed	AI	11014
M11 Ignition Fan Speed	AV	11015
M11 Supply Sensor Temperature	AI	11016
M11 Return Sensor Temperature	AI	11017
M11 DHW Sensor Temperature	AI	11018
M11 Flue Sensor Temperature	AI	11019
M11 Outside Sensor Temperature	AI	11020
M11 Burning Hours CH	AI	11021
M11 Burning Hours DHW	AI	11022
M11 Burning Hours Total	AI	11023
M11 Operational Days	AI	11024
M11 Successful Ignitions	AI	11025
M11 Failed Ignitions	AI	11026

Point Name	BACnet Object Type	BACnet Object ID
M11 Flame Failures	AI	11027
M11 Reset	AV	11028
M11 System Test	AV	11029
M12 Status	AI	12001
M12 Error Number	AI	12002
M12 Module Supply Setpoint	AI	12003
M12 Power Level	AI	12004
M12 CHPump Status	BI	12005
M12 DHW Pump Status	BI	12006
M12 General Pump Status	BI	12007
M12 Ionization	AI	12008
M12 Water Pressure	AI	12009
M12 Flow Rate DHW	AI	12010
M12 Target Fan Speed	AI	12011
M12 Actual Fan Speed	AI	12012
M12 Minimum Fan Speed	AI	12013
M12 Maximum Fan Speed	AI	12014
M12 Ignition Fan Speed	AV	12015
M12 Supply Sensor Temperature	AI	12016
M12 Return Sensor Temperature	AI	12017
M12 DHW Sensor Temperature	AI	12018
M12 Flue Sensor Temperature	AI	12019
M12 Outside Sensor Temperature	AI	12020
M12 Burning Hours CH	AI	12021
M12 Burning Hours DHW	AI	12022
M12 Burning Hours Total	AI	12023
M12 Operational Days	AI	12024
M12 Successful Ignitions	AI	12025
M12 Failed Ignitions	AI	12026
M12 Flame Failures	AI	12027
M12 Reset	AV	12028
M12 System Test	AV	12029
M13 Status	AI	13001
M13 Error Number	AI	13002
M13 Module Supply Setpoint	AI	13003
M13 Power Level	AI	13004
M13 CHPump Status	BI	13005
M13 DHW Pump Status	BI	13006
M13 General Pump Status	BI	13007
M13 Ionization	AI	13008
M13 Water Pressure	AI	13009
M13 Flow Rate DHW	AI	13010
M13 Target Fan Speed	AI	13011
M13 Actual Fan Speed	AI	13012
M13 Minimum Fan Speed	AI	13013
M13 Maximum Fan Speed	AI	13014
M13 Ignition Fan Speed	AV	13015
M13 Supply Sensor Temperature	AI	13016
M13 Return Sensor Temperature	AI	13017
M13 DHW Sensor Temperature	AI	13018
M13 Flue Sensor Temperature	AI	13019
M13 Outside Sensor Temperature	AI	13020

Point Name	BACnet Object Type	BACnet Object ID
M13 Burning Hours CH	AI	13021
M13 Burning Hours DHW	AI	13022
M13 Burning Hours Total	AI	13023
M13 Operational Days	AI	13024
M13 Successful Ignitions	AI	13025
M13 Failed Ignitions	AI	13026
M13 Flame Failures	AI	13027
M13 Reset	AV	13028
M13 System Test	AV	13029
M14 Status	AI	14001
M14 Error Number	AI	14002
M14 Module Supply Setpoint	AI	14003
M14 Power Level	AI	14004
M14 CHPump Status	BI	14005
M14 DHW Pump Status	BI	14006
M14 General Pump Status	BI	14007
M14 Ionization	AI	14008
M14 Water Pressure	AI	14009
M14 Flow Rate DHW	AI	14010
M14 Target Fan Speed	AI	14011
M14 Actual Fan Speed	AI	14012
M14 Minimum Fan Speed	AI	14013
M14 Maximum Fan Speed	AI	14014
M14 Ignition Fan Speed	AV	14015
M14 Supply Sensor Temperature	AI	14016
M14 Return Sensor Temperature	AI	14017
M14 DHW Sensor Temperature	AI	14018
M14 Flue Sensor Temperature	AI	14019
M14 Outside Sensor Temperature	AI	14020
M14 Burning Hours CH	AI	14021
M14 Burning Hours DHW	AI	14022
M14 Burning Hours Total	AI	14023
M14 Operational Days	AI	14024
M14 Successful Ignitions	AI	14025
M14 Failed Ignitions	AI	14026
M14 Flame Failures	AI	14027
M14 Reset	AV	14028
M14 System Test	AV	14029
M15 Status	AI	15001
M15 Error Number	AI	15002
M15 Module Supply Setpoint	AI	15003
M15 Power Level	AI	15004
M15 CHPump Status	BI	15005
M15 DHW Pump Status	BI	15006
M15 General Pump Status	BI	15007
M15 Ionization	AI	15008
M15 Water Pressure	AI	15009
M15 Flow Rate DHW	AI	15010
M15 Target Fan Speed	AI	15011
M15 Actual Fan Speed	AI	15012
M15 Minimum Fan Speed	AI	15013
M15 Maximum Fan Speed	AI	15014

Point Name	BACnet Object Type	BACnet Object ID
M15 Ignition Fan Speed	AV	15015
M15 Supply Sensor Temperature	AI	15016
M15 Return Sensor Temperature	AI	15017
M15 DHW Sensor Temperature	AI	15018
M15 Flue Sensor Temperature	AI	15019
M15 Outside Sensor Temperature	AI	15020
M15 Burning Hours CH	AI	15021
M15 Burning Hours DHW	AI	15022
M15 Burning Hours Total	AI	15023
M15 Operational Days	AI	15024
M15 Successful Ignitions	AI	15025
M15 Failed Ignitions	AI	15026
M15 Flame Failures	AI	15027
M15 Reset	AV	15028
M15 System Test	AV	15029
M16 Status	AI	16001
M16 Error Number	AI	16002
M16 Module Supply Setpoint	AI	16003
M16 Power Level	AI	16004
M16 CHPump Status	BI	16005
M16 DHW Pump Status	BI	16006
M16 General Pump Status	BI	16007
M16 Ionization	AI	16008
M16 Water Pressure	AI	16009
M16 Flow Rate DHW	AI	16010
M16 Target Fan Speed	AI	16011
M16 Actual Fan Speed	AI	16012
M16 Minimum Fan Speed	AI	16013
M16 Maximum Fan Speed	AI	16014
M16 Ignition Fan Speed	AV	16015
M16 Supply Sensor Temperature	AI	16016
M16 Return Sensor Temperature	AI	16017
M16 DHW Sensor Temperature	AI	16018
M16 Flue Sensor Temperature	AI	16019
M16 Outside Sensor Temperature	AI	16020
M16 Burning Hours CH	AI	16021
M16 Burning Hours DHW	AI	16022
M16 Burning Hours Total	AI	16023
M16 Operational Days	AI	16024
M16 Successful Ignitions	AI	16025
M16 Failed Ignitions	AI	16026
M16 Flame Failures	AI	16027
M16 Reset	AV	16028
M16 System Test	AV	16029

12 Specifications

	ProtoAir FPA-W44	
Electrical Connections	One 3-pin Phoenix connector with: RS-485/RS-232 (Tx+ / Rx- / gnd) One 3-pin Phoenix connector with: RS-485 (+ / - / gnd) One 3-pin Phoenix connector with: Power port (+ / - / Frame-gnd) One Ethernet 10/100 BaseT port	
Power Requirements	*Input Voltage:*12-24VDC or 24VAC *Max Power:* 3 Watts	*Current draw:* 24VAC 0.125A 12-24VDC 0.25A @12VDC
Approvals	FCC Part 15 C, IEC 62368-1, CAN/CSA C22.2 No. 60950-1, EN IEC 62368-1:2020+A11:2020, DNP 3.0 and Modbus conformance tested, BTL marked, WEEE compliant, RoHS compliant, REACH compliant, UKCA and CE compliant, ODVA conformant, CAN ICES-003(B) / NMB-003(B)	
Physical Dimensions	4 x 1.1 x 2.7 in (10.16 x 2.8 x 6.8 cm)	
Weight	0.4 lbs (0.2 Kg)	
Operating Temperature	-20°C to 70°C (-4°F to158°F)	
Humidity	10-95% RH non-condensing	
Wi-Fi 802.11 b/g/n	*Frequency:* 2.4 GHz *Antenna Type:* SMA	*Channels:* 1 to 11 (inclusive) *Encryption:* TKIP, WPA2 & AES

NOTE: Specifications subject to change without notice.

12.1 Compliance with EN IEC 62368-1

For EN IEC compliance, the following instructions must be met when operating the ProtoAir.

- 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 FieldServer
- 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.

12.2 Warnings for FCC and IC

Waste Disposal

It is recommended to disassemble the device before abandoning it in conformity with local regulations. Please ensure that the abandoned batteries are disposed according to local regulations on waste disposal. Do not throw batteries into fire (explosive) or put in common waste canister. Products or product packages with the sign of “explosive” should not be disposed like household waste but delivered to specialized electrical & electronic waste recycling/disposal center. Proper disposal of this sort of waste helps avoiding harm and adverse effect upon surroundings and people’s health. Please contact local organizations or recycling/disposal center for more recycling/disposal methods of related products.

Comply with the following safety tips:

Do Not use in Combustible and Explosive Environment

Keep away from combustible and explosive environment for fear of danger.

Keep away from all energized circuits.

Operators should not remove enclosure from the device. Only the group or person with factory certification is permitted to open the enclosure to adjust and replace the structure and components of the device. Do not change components unless the power cord is removed. In some cases, the device may still have residual voltage even if the power cord is removed. Therefore, it is a must to remove and fully discharge the device before contact so as to avoid injury.

Unauthorized Changes to this Product or its Components are Prohibited

In the aim of avoiding accidents as far as possible, it is not allowed to replace the system or change components unless with permission and certification. Please contact the technical department of Vantron or local branches for help.

Pay Attention to Caution Signs

Caution signs in this manual remind of possible danger. Please comply with relevant safety tips below each sign. Meanwhile, you should strictly conform to all safety tips for operation environment.

Notice

Considering that reasonable efforts have been made to assure accuracy of this manual, Vantron assumes no responsibility of possible missing contents and information, errors in contents, citations, examples, and source programs.

Vantron reserves the right to make necessary changes to this manual without prior notice. No part of this manual may be reprinted or publicly released.

FCC Warning

This device complies with FCC Rules. Operation is subject to the following conditions.

This device may not cause harmful interference.

This device must accept any interference received, including interference that may cause undesired operation.

This device complies with Part 15C of the FCC Rules

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Any modification to the product is not permitted unless authorized by MSA Safety. It's not allowed to disassemble the product; it is not allowed to replace the system or change components unless with permission and certification. Please contact the FieldServer technical support department or local branches for help.

IC Statement

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:

- This device may not cause interference, and
- This device must accept any interference, including interference that may cause undesired operation of the device.

Warning! This class B digital apparatus complies with Canadian ICES-003.

Industry Canada ICES-003 Compliance Label:

CAN ICES-3 (B)/NMB-3(B)

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts.

L'exploitation est autorisée aux deux conditions suivantes:

- l'appareil ne doit pas produire de brouillage, et
- l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

RF Exposure Warning

This equipment must be installed and operated in accordance with provide instructions and the antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operation in conjunction with any other antenna or transmitter. End-users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

For product compliance test FCC and IC, all the technical documentation is submitted by MSA Safety, who is the customer or importer of the ProtoAir.

ProtoAir radios have been approved to be used with antennas that have a maximum gain of 3 dBi. Any antennas with a gain greater than 3 dBi are strictly prohibited for use with this device.

Power Output

Frequency Range Output Power:

Wi-Fi

2402.0 – 2480 MHz 0.004 W

2412.0 – 2462.0 MHz 0.0258 W

The Output Power listed is conducted. The device should be professionally installed to ensure compliance with power requirements. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and not be co-located with any other transmitters except in accordance with multi-transmitter product procedures. This device supports 20MHz and 40MHz bandwidth.

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.