MSA The Safety Company | fieldserver

CHROMALOX
Advanced Thermal Technologies

BTL BACnet TESTED LABORATORIES

Start-up Guide

ProtoAir FPA-W44

For Interfacing Chromalox Products

Document Revision: 11.A

Web Configurator

Technical Support

Thank you for purchasing the ProtoAir for Chromalox.

Please call Chromalox for technical support of the ProtoAir product.

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

Support Contact Information:

Chromalox
1347 Heil Quaker Blvd.
Lavergne, TN 37086

Customer Service:
1-800-443-2640

Email: sales@chromalox.com

Website: www.chromalox.com

Quick Start Guide

1. Record the information about the unit. (**Section 2.1**)
2. Check that the ProtoAir and customer device COM settings match. (**Section 2.3**)
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 3.1)**
4. **If using a serial field protocol:**
   Connect the ProtoAir 3 pin RS-485 R2 port to the field protocol cabling. (**Section 3.2**)
5. Connect power to ProtoAir 3 pin power port. (**Section 3.5**)
6. Connect a PC to the ProtoAir via Ethernet cable. (**Section 4**)
7. Setup Web Server Security and login via web browser. (**Section 5**)
8. Configure the ProtoAir to connect to the local network. (**Section 6**)
9. Integrate the ProtoAir with the Grid or opt out. (**Section 7**)
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 8.3**)

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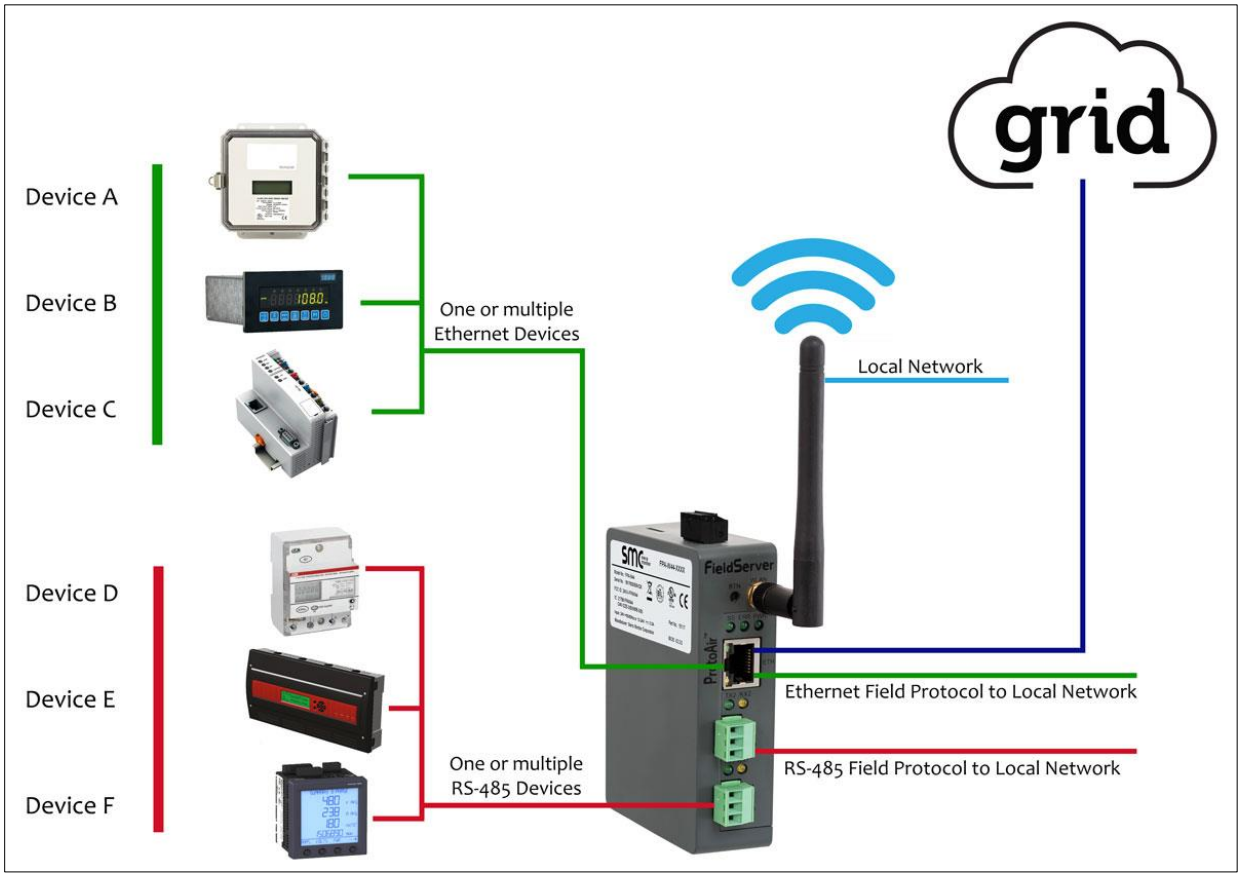
1 Introduction

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 Chromalox's devices (hereafter simply called "device") connected to the ProtoAir and automatically configures them for BACnet/IP, BACnet MS/TP, Modbus TCP/IP, Modbus RTU, EtherNet/IP and Metasys®[1] N2.

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

- Remotely monitor and control devices.
- Collect device data and view it on the Grid 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 about the Grid, refer to the MSA Grid Start-up Guide.

[1] Metasys is a registered trademark of Johnson Controls Inc.

1.2 Methods of Configuration

Devices	Communication
ITC1	Modbus RTU & Modbus TCP/IP
ITC2	Modbus RTU & Modbus TCP/IP
ITLS4	Modbus RTU & Modbus TCP/IP
ITLS6	Modbus RTU & Modbus TCP/IP
ITLS_2016	Modbus RTU & Modbus TCP/IP
40 Series	Modbus RTU & Modbus TCP/IP
50 Series	Modbus RTU & Modbus TCP/IP
6060	Modbus RTU & Modbus TCP/IP
4081_4082	Modbus RTU & Modbus TCP/IP
3340	Modbus RTU & Modbus TCP/IP
3380	Modbus RTU & Modbus TCP/IP
6020	Modbus RTU & Modbus TCP/IP
1020	Modbus RTU & Modbus TCP/IP
1040	Modbus RTU & Modbus TCP/IP
WM30-WM40	Modbus RTU & Modbus TCP/IP
1030	Modbus RTU & Modbus TCP/IP
MV	EtherNet/IP
ITLS_Snow	Modbus RTU & Modbus TCP/IP

Figure 1: Method of Configuration per Device

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-W44-1853

Figure 2: ProtoAir Part Numbers

- 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-W44-1853	5,000

Figure 3: Supported Point Count Capacity

Devices	Points Per Device
ITC1	29
ITC2	57
ITLS4	230
ITLS6 – ITLS72	152 – 1802
ITLS_2016	434
40 Series	45
50 Series	27
6060	103
4081_4082	105
3340	133
3380	201
6020	84
1020	118
1040	310
WM30-WM40	33
1030	118
MV	380
ITLS_Snow	188 – 2234

Figure 4: Points per Device

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.**
- **Figure 5** specifies the device serial port settings required to communicate with the ProtoAir.

Port Setting	Device
Protocol	Modbus RTU
Baud Rate	19200
Parity	Even
Data Bits	8
Stop Bits	1

Figure 5: COM Settings

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 8.3**)

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

2.3.3 Set IP Address for Any Ethernet Device Connected to the ProtoAir

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

NOTE: If using EtherNet/IP only the IP Address is required. This information is required for Section 8.3.

2.4 Attaching the Antenna

Wi-Fi Antenna:

Screw in the Wi-Fi antenna to the front of the unit as shown in **Figure 52**.

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.

3 Interfacing ProtoAir to Devices

3.1 Device Connections to ProtoAir

The ProtoAir has a 3-pin Phoenix connector for connecting RS-485 devices 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

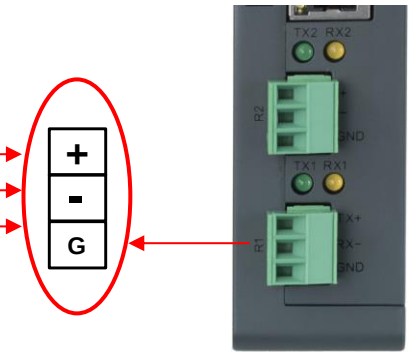


Figure 6: RS-485 Connections from Devices to the ProtoAir

3.2 Wiring Field Port to RS-485 Serial Network

- Connect the RS-485 network wires to the 3-pin RS-485 connector on the R2 port. (**Figure 7**)
  - Use standard grounding principles for RS-485 GND
- See **Section 4** for information on connecting to an Ethernet network.

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

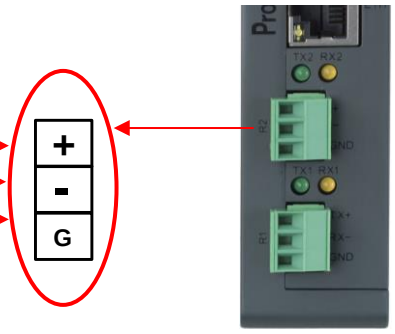


Figure 7: Connection from ProtoAir to RS-485 Field Network

3.3 Bias Resistors

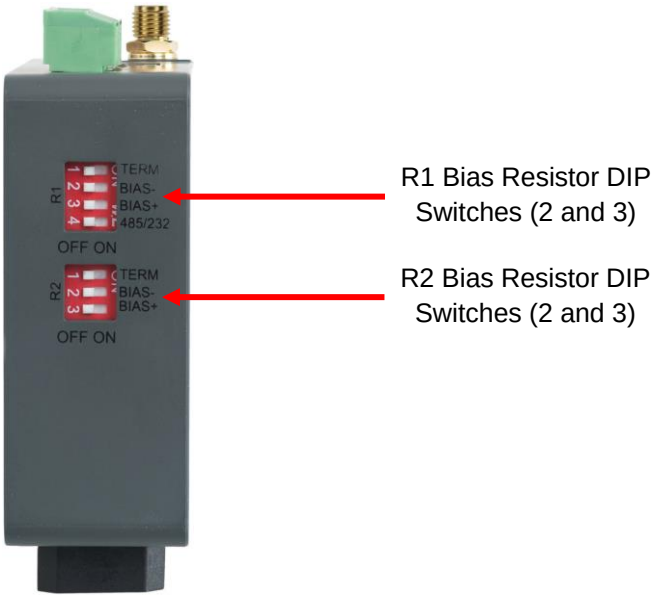


Figure 8: Bias Resistor DIP Switches

To enable Bias Resistors, move both the BIAS- and BIAS+ dip switches to the right as shown in Figure 8.

The ProtoAir 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.

3.4 Termination Resistor

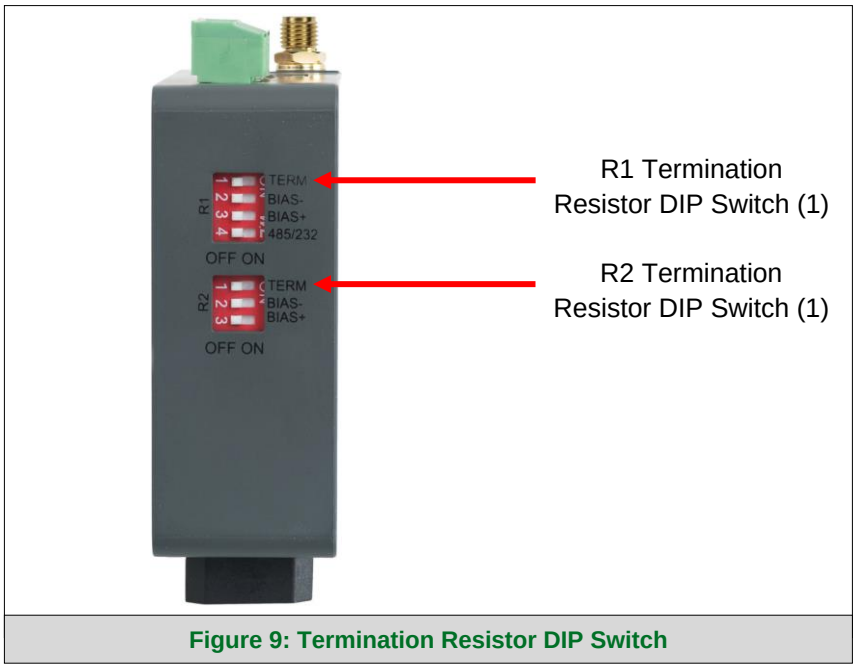


Figure 9: Termination Resistor DIP Switch

If the ProtoAir 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 9.**

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.

3.5 Power-Up ProtoAir

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.		

Figure 10: Required Current Draw for the ProtoAir

Apply power to the ProtoAir as shown below in **Figure 11.** Ensure that the power supply used complies with the specifications provided in **Section 12**.

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

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

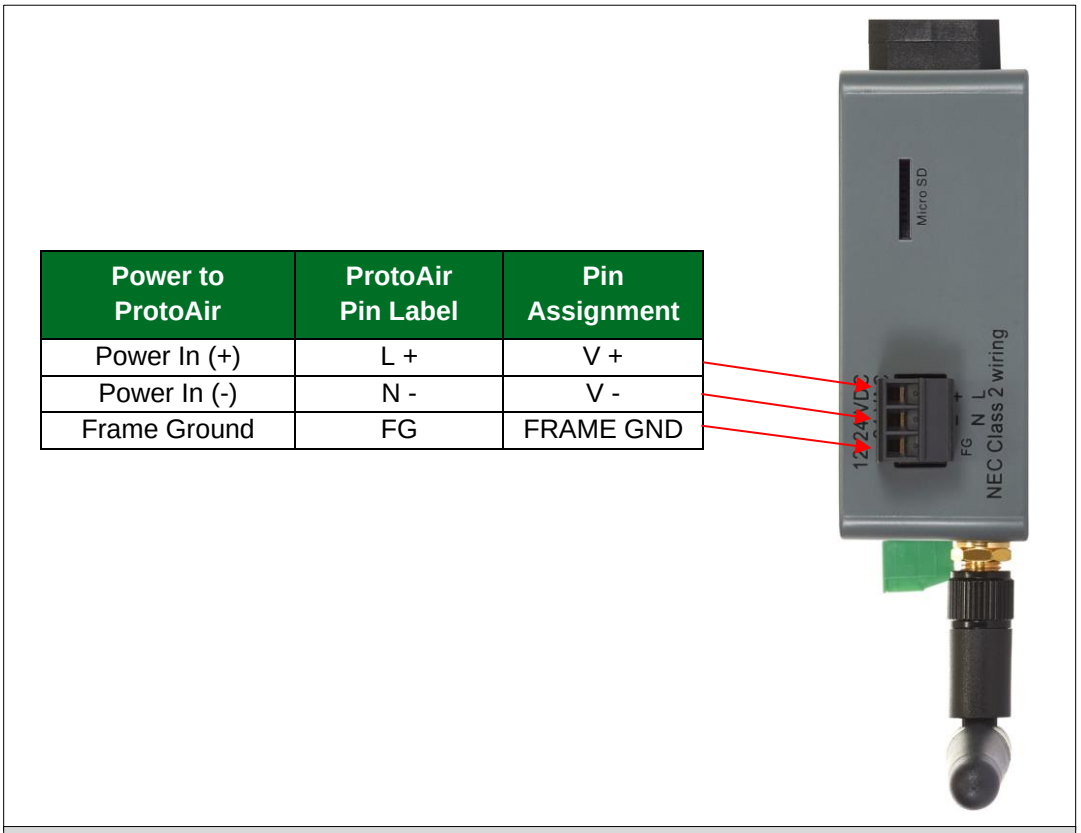


Figure 11: Power Connections

4 Connect the PC to the ProtoAir

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.

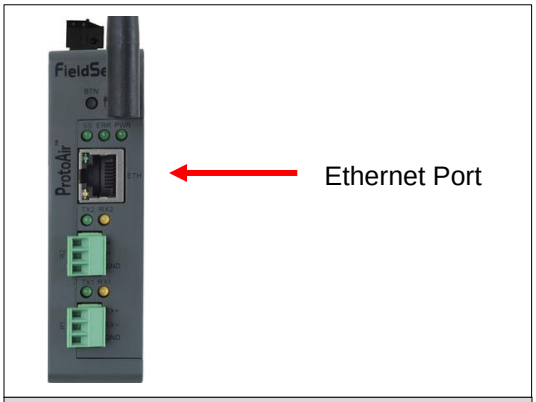


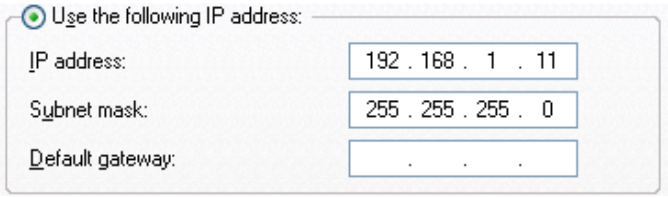
Figure 12: Ethernet Port Location

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:

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

NOTE: If the IP Address of the ProtoAir 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 13: Web Server Security Window

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

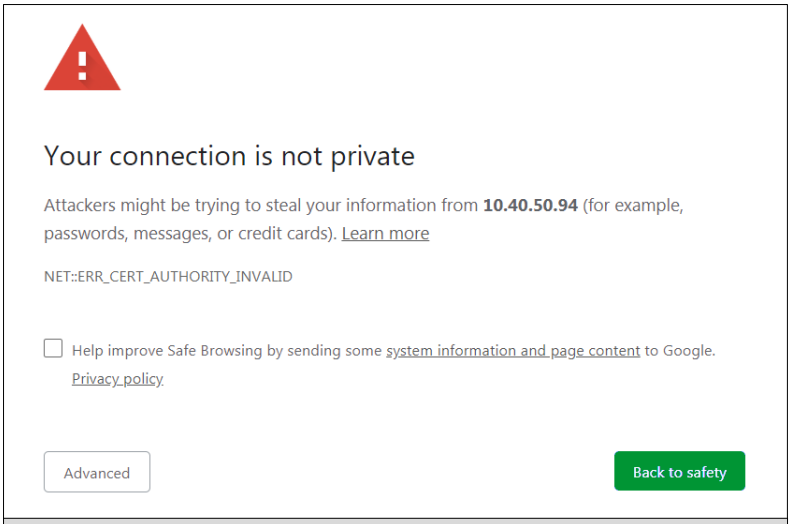


Figure 14: Connection Not Private Warning

- Additional text will expand below the warning, click the underlined text to go to the IP Address. In the **Figure 15** example this text is "Proceed to 10.40.50.94 (unsafe)".

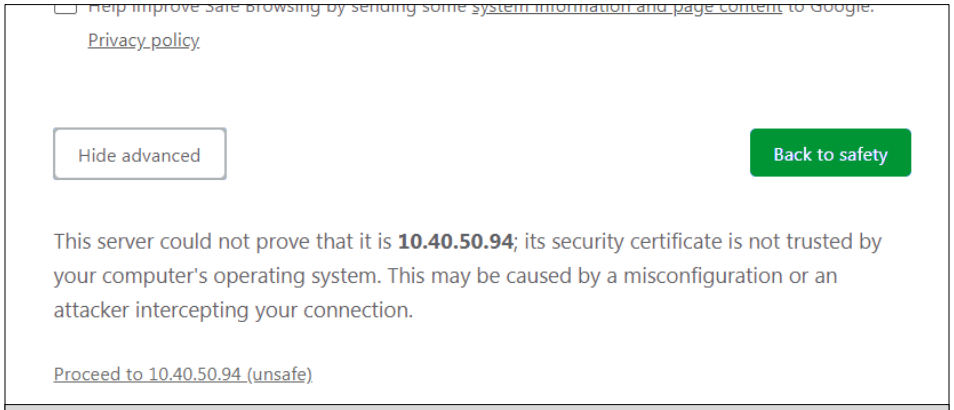


Figure 15: Warning Expanded Text

- 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.

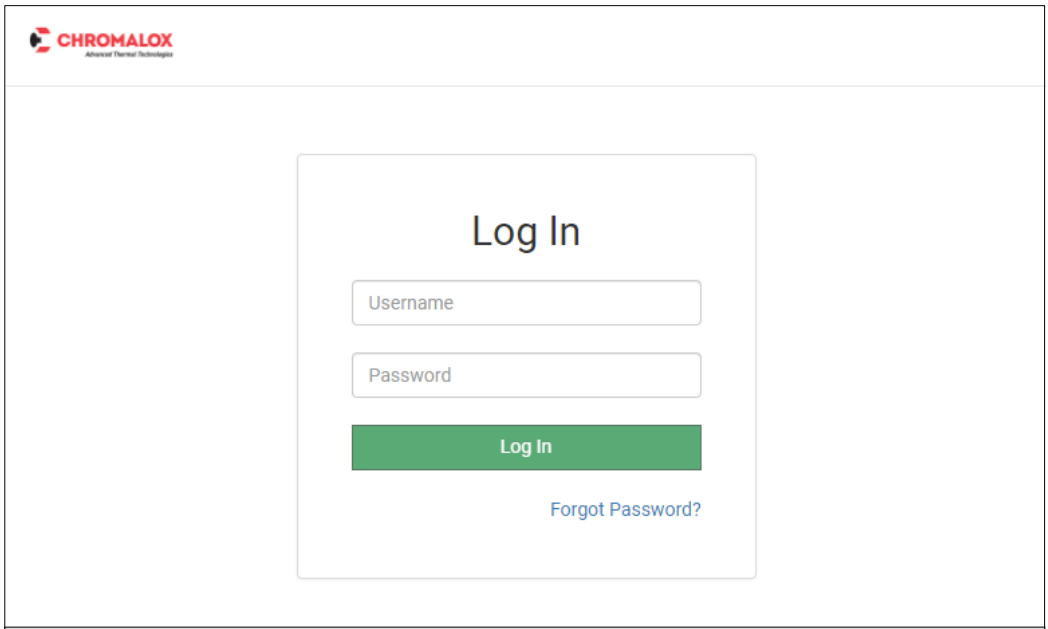


Figure 16: FieldServer Login

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.

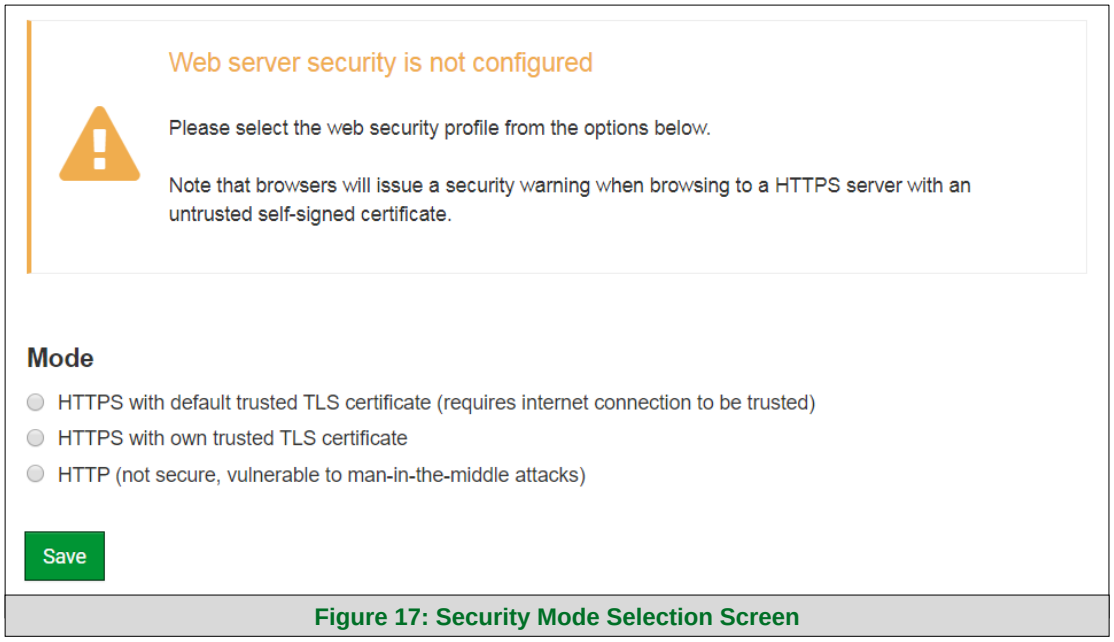


Figure 17: Security Mode Selection Screen

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.

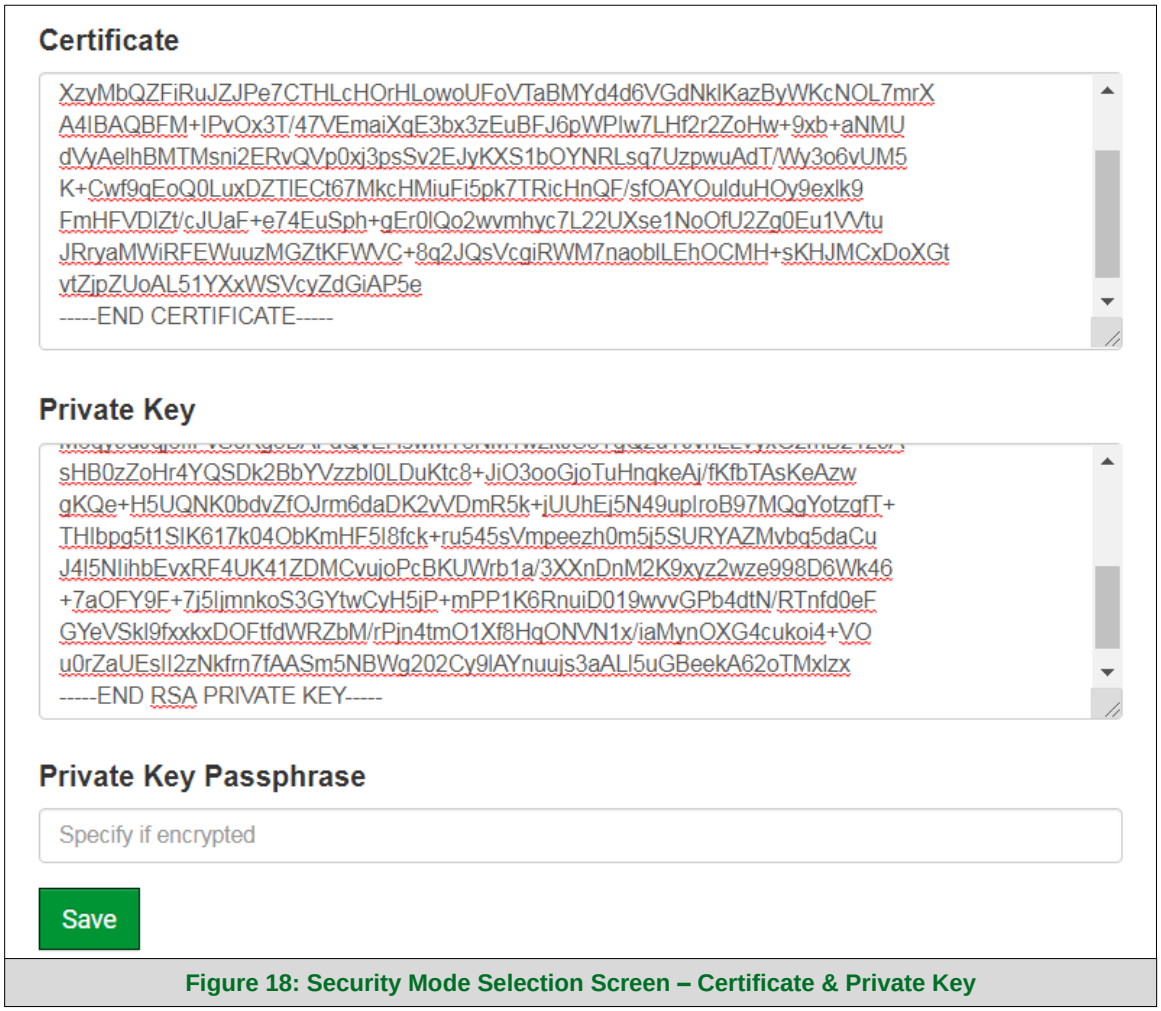


Figure 18: Security Mode Selection Screen – Certificate & Private Key

- 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 Settings

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

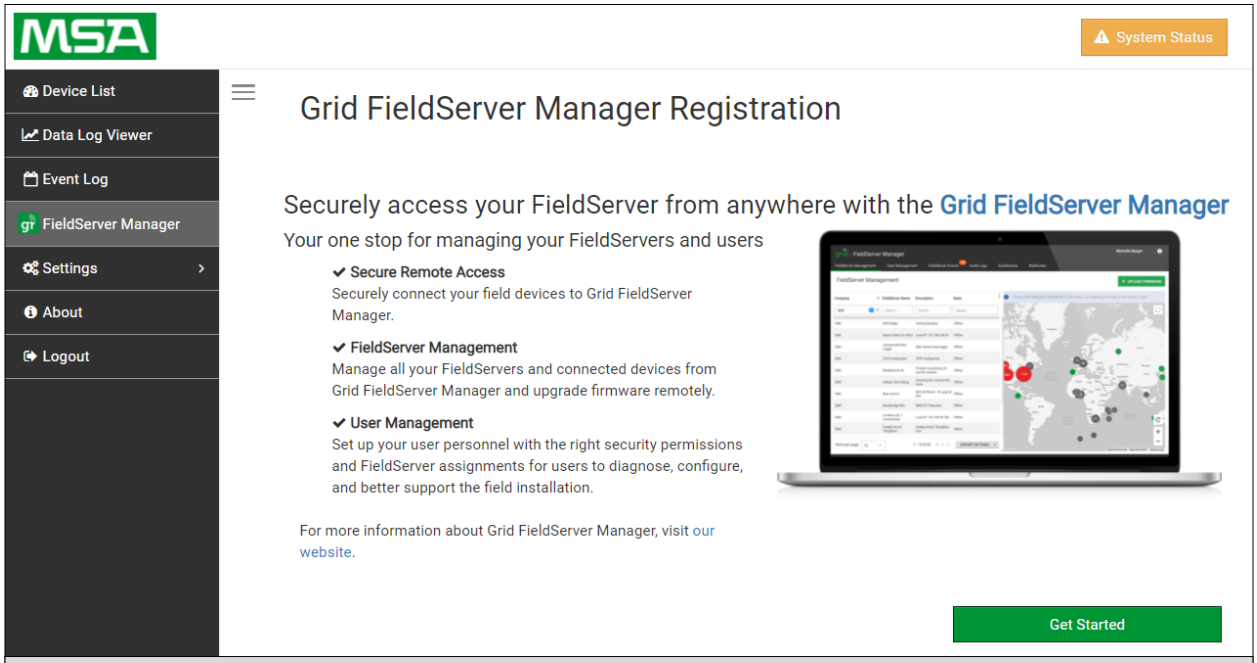


Figure 19: Generic Web App Landing Page

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

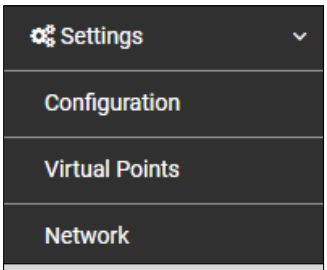


Figure 20: Settings Tabs

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

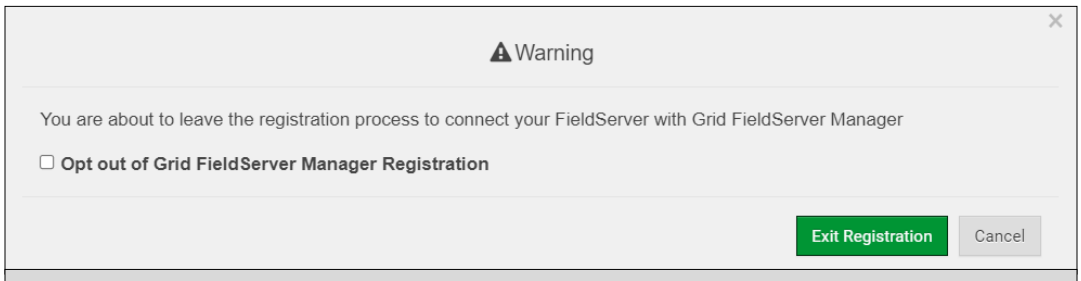


Figure 21: Registration Warning Window

6.2 Change the ProtoAir IP Address

Configure the IP settings of the ProtoAir using the following tabs on the Network page:

- If using the Ethernet port to connect to the local network, go to “ETH 1” (**Section 6.2.1**).
- If connecting the ProtoAir to a local wireless network, go to “WiFi Client” (**Section 6.2.2**).
- If updating Wi-Fi Access Point settings, go to “WiFi Access Point” (**Section 6.2.3**).

6.2.1 ETH 1

The ETH 1 tab is the landing page when selecting the Network Settings tab. 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 connected to a router, set the Gateway to the same IP Address as 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 before the webpage will be accessible again.

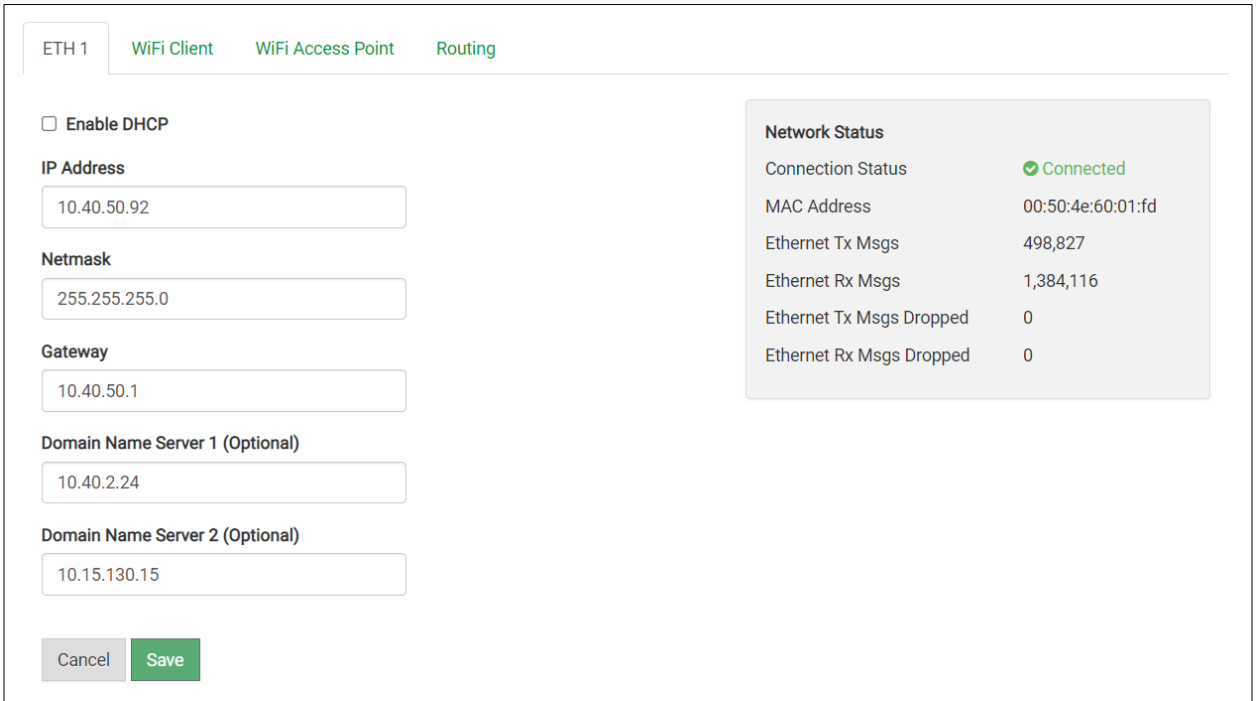


Figure 22: ETH 1 Port Network Settings

6.2.2 Wi-Fi Client

- 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 Router settings (**Section 6.2.4**) to set the default connection to Wi-Fi Client.

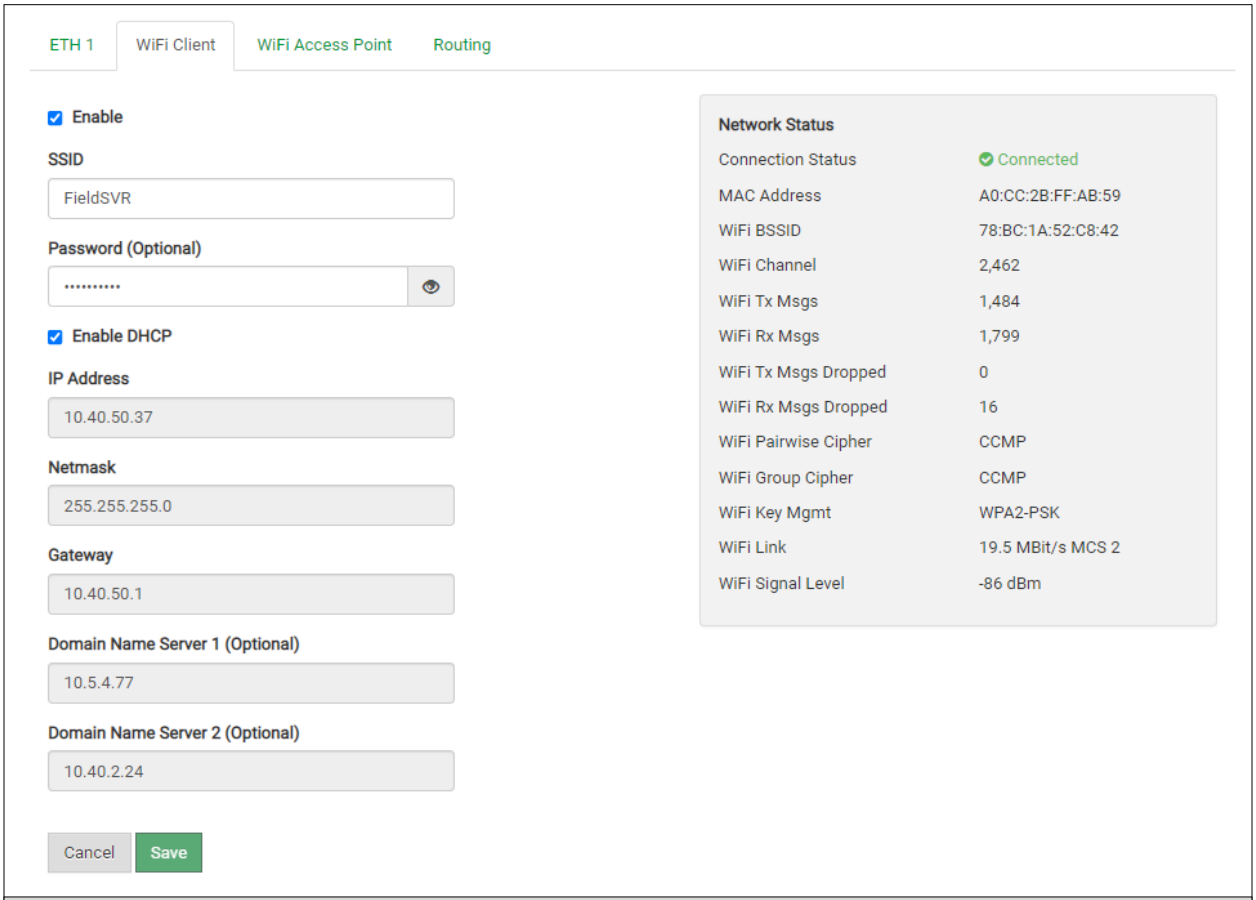


Figure 23: Wi-Fi Client Network Settings

6.2.3 Wi-Fi Access Point

- 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.

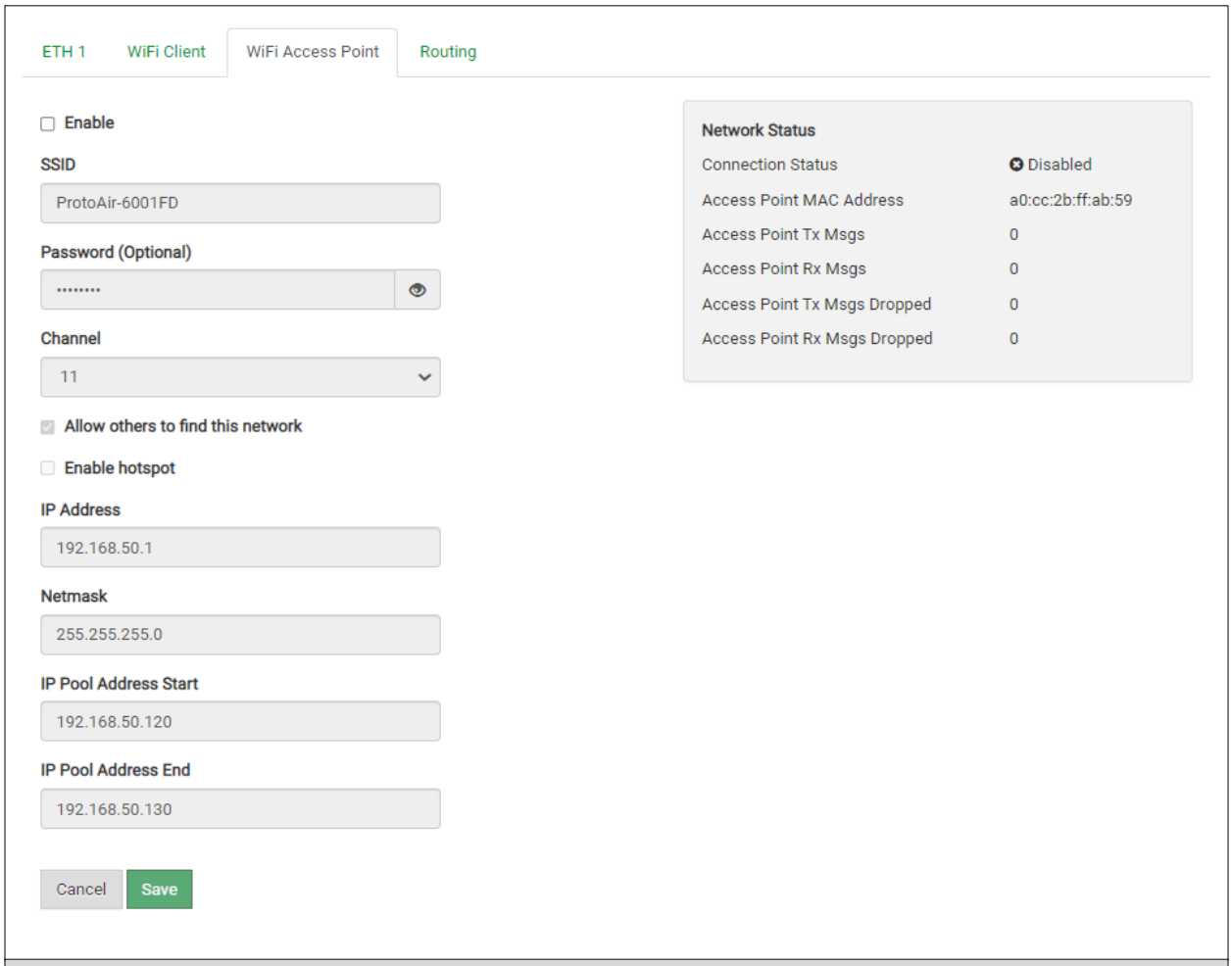


Figure 24: Wi-Fi AP Network Settings

6.2.4 Routing

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.
- 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.

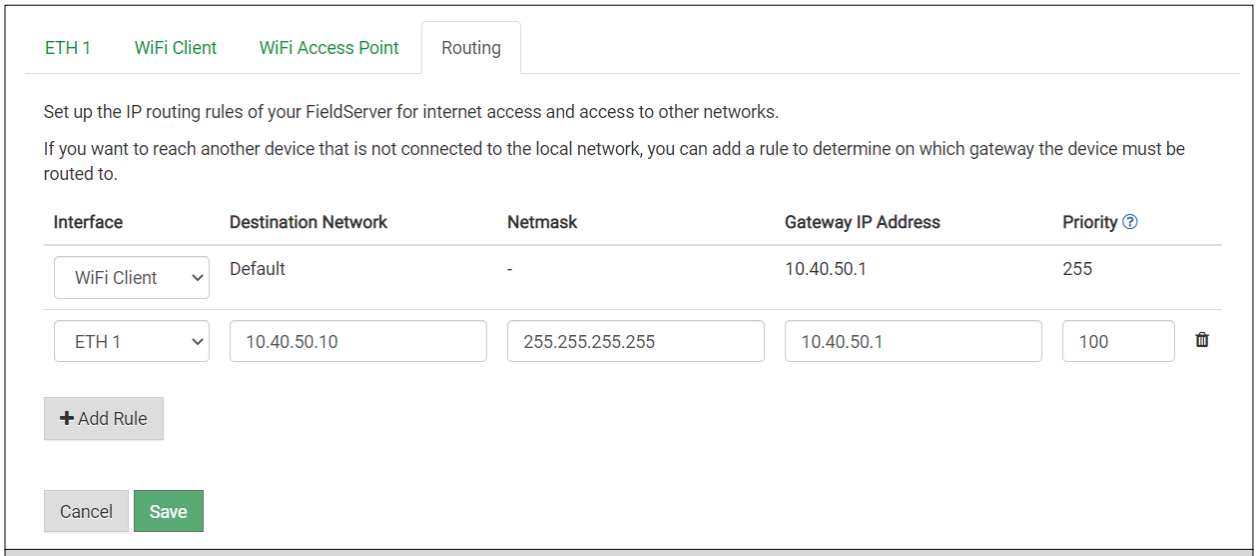


Figure 25: Routing Network Settings

7 Grid User Setup, Registration and Login

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

7.1 Choose Whether to Integrate the Grid

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

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

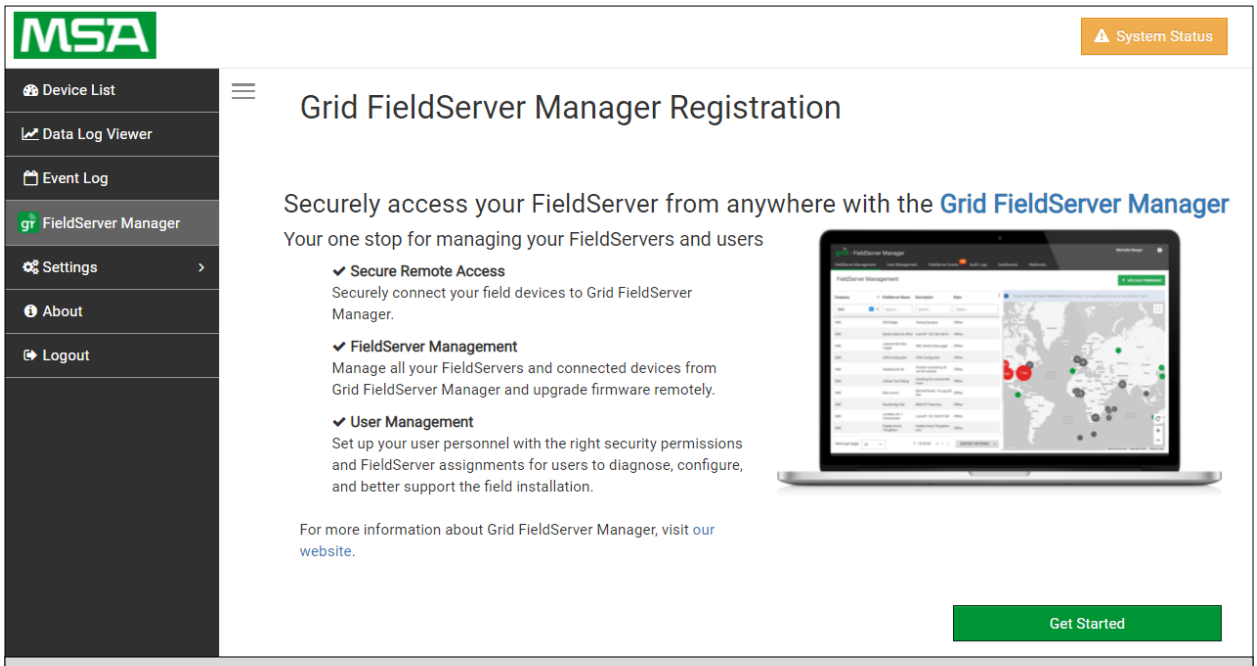


Figure 26: Generic Web App Page – First Login

- Either go through the Grid setup to integrate cloud functionality to the FieldServer or optout of Grid FieldServer Manager setup.
  - For Grid setup, continue with instructions in the following sections
  - To opt out of the Grid, 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 (skip to **Section 8** to continue FieldServer configuration)
  - To ignore Grid setup until the next time the FieldServer 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 (skip to **Section 8** to continue FieldServer configuration)

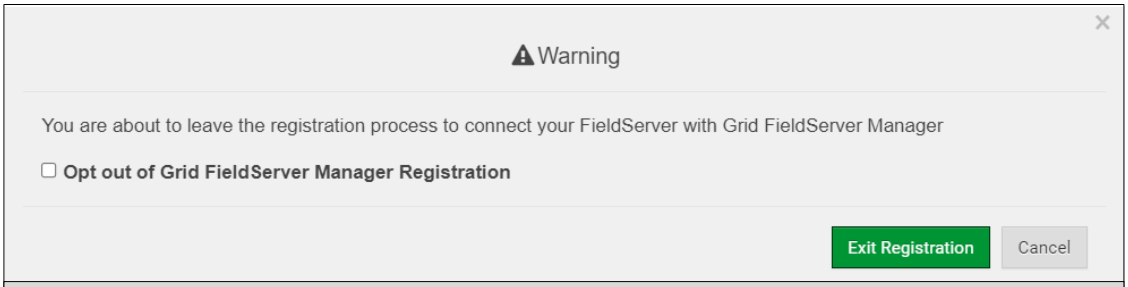


Figure 27: Grid Opt Out Warning Window

NOTE: If Grid integration with the ProtoAir 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 the Grid a user account must be created. Request an invitation to the Grid from the manufacturer's support team and follow the instructions below to set up login details:

- The "Welcome to the MSA Grid" email will appear as shown below.

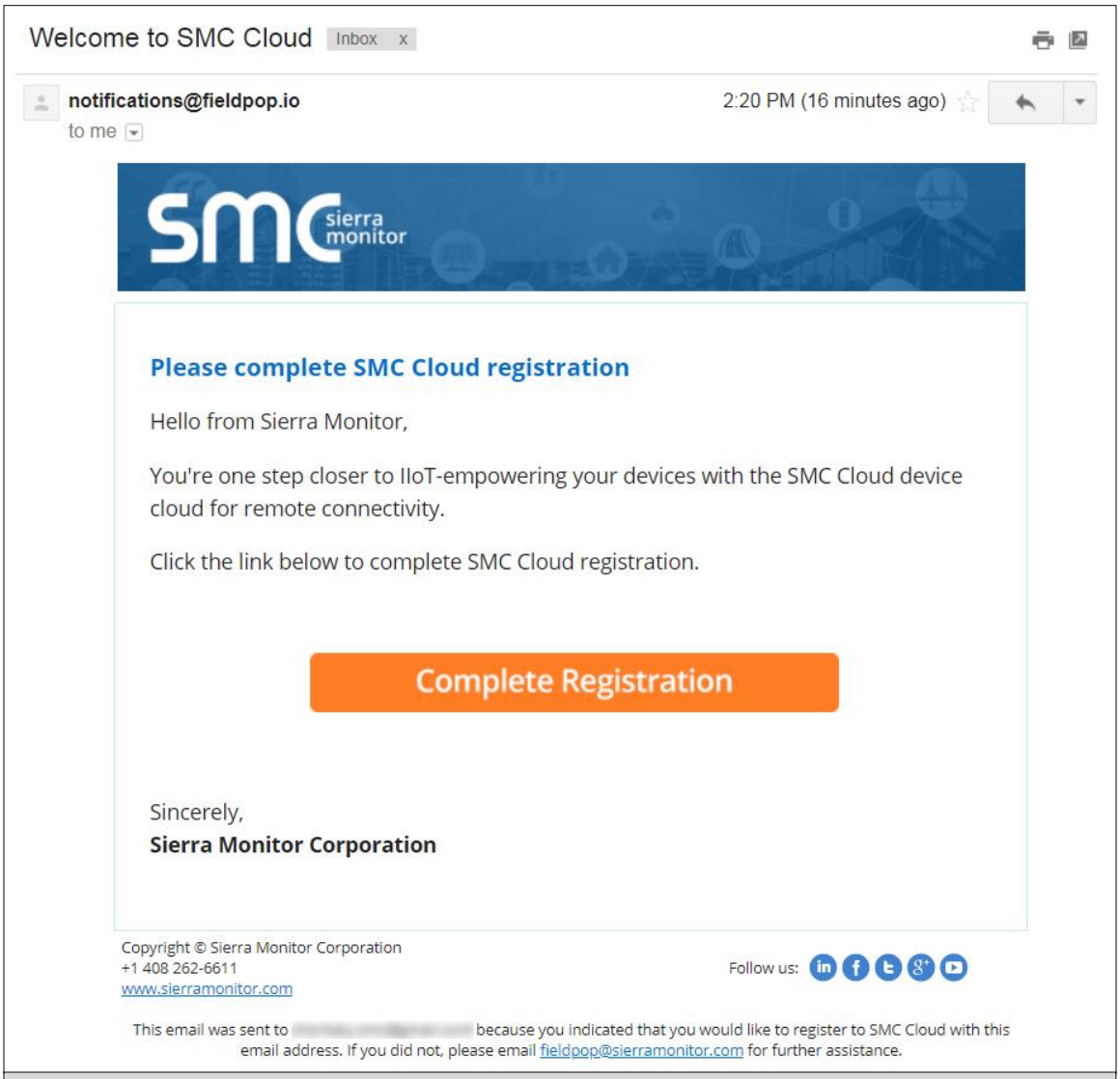


Figure 28: Welcome to the MSA Grid Email

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.

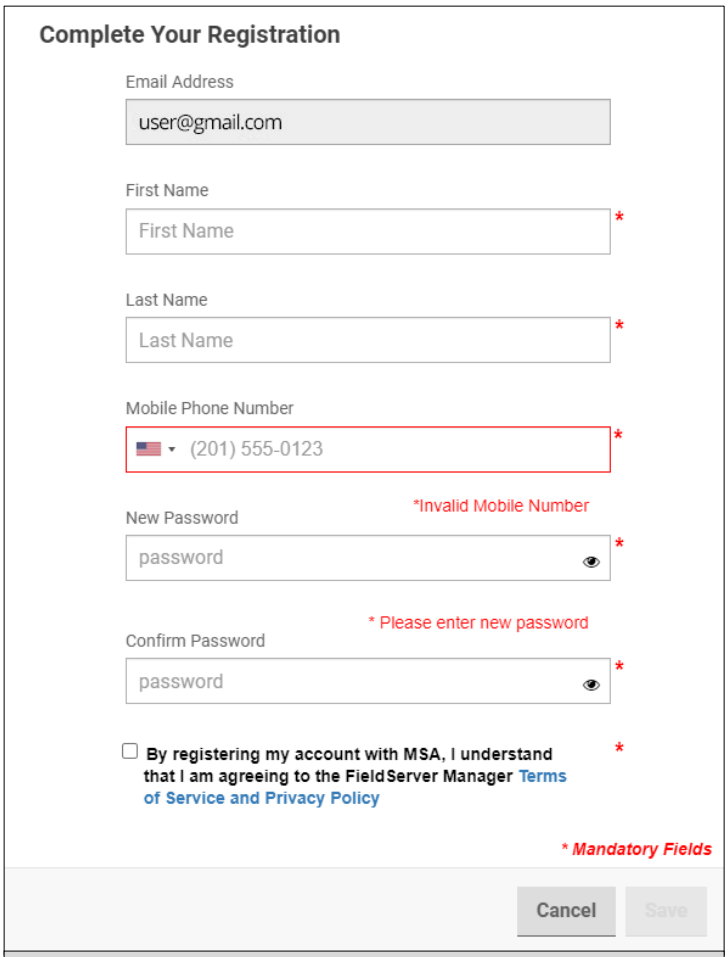


Figure 29: Setting User Details

- 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 Grid user credentials have been generated, the ProtoAir can be registered onto the Grid server.

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

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

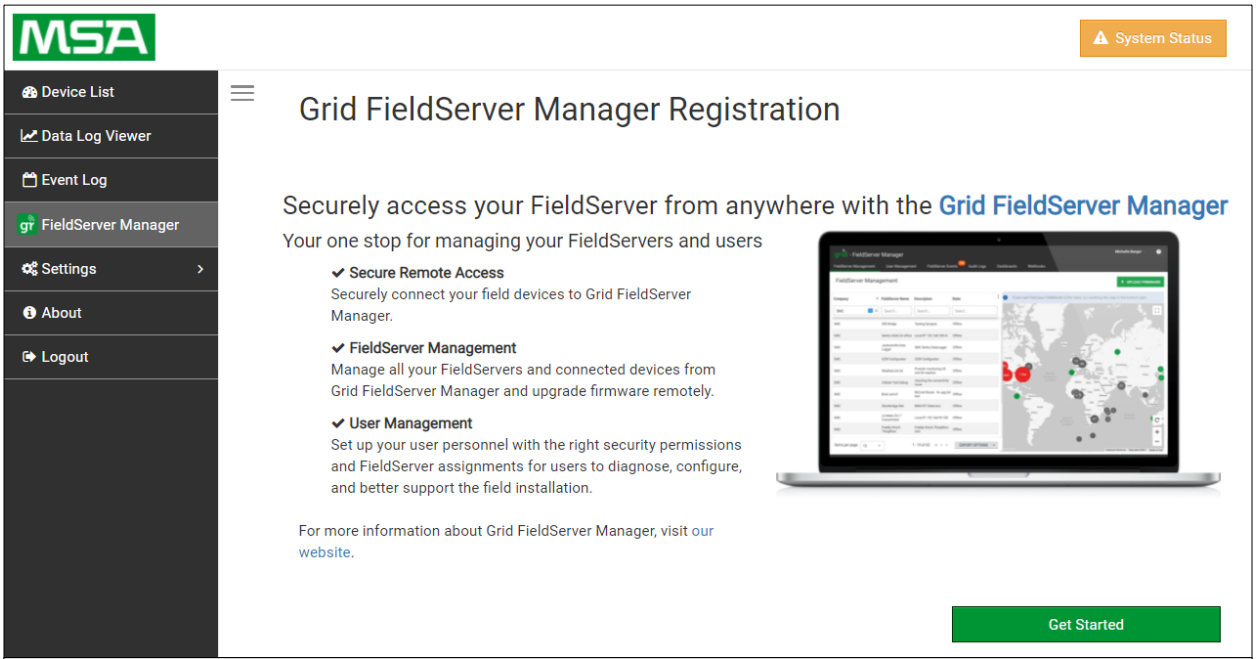


Figure 30: Grid Registration Message

- Click Get Started to view the Grid 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 Grid account credentials.
  - Enter user details and click Next

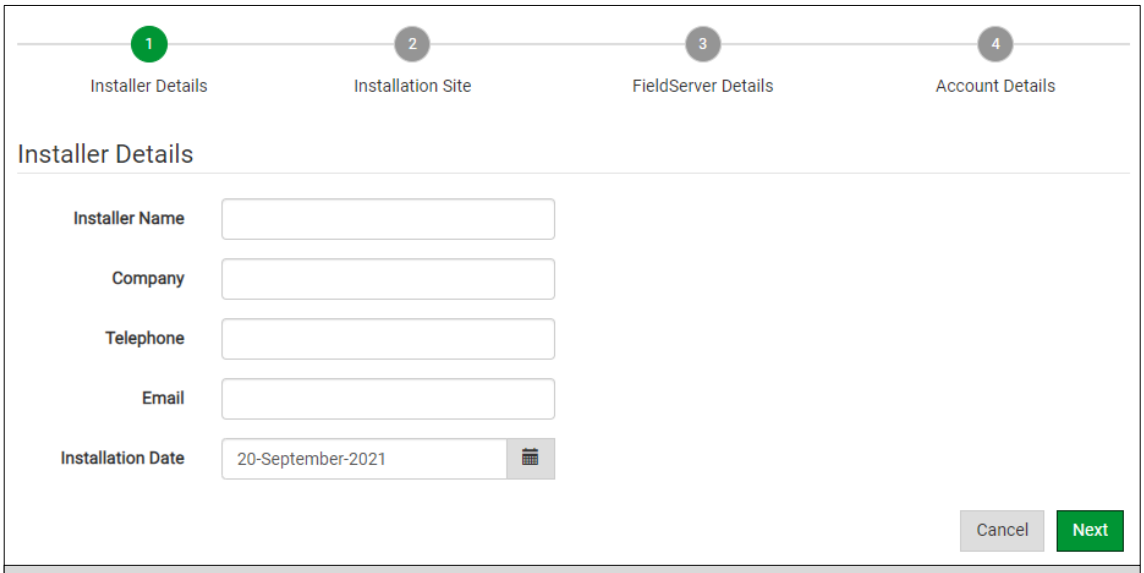


Figure 31: Grid Registration – Installer Details

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

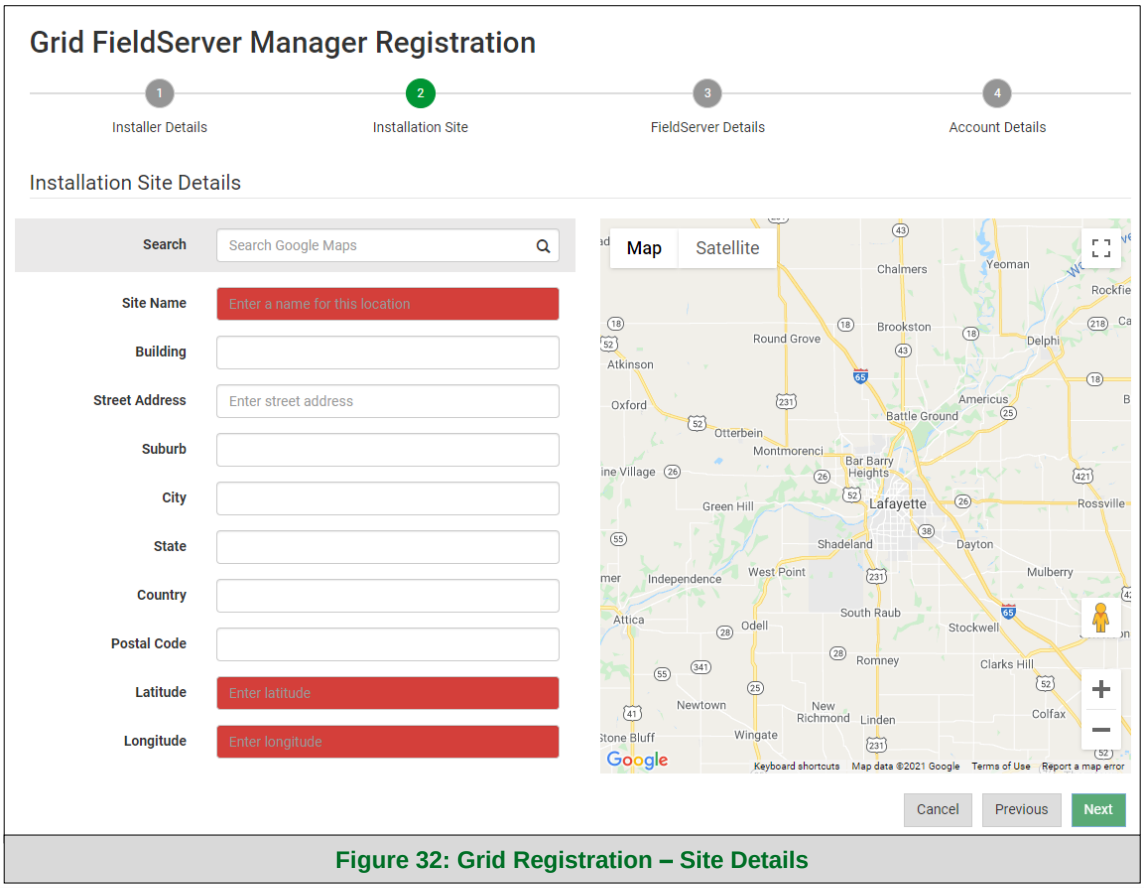


Figure 32: Grid Registration – Site Details

- Enter Name and Description (required) then click Next

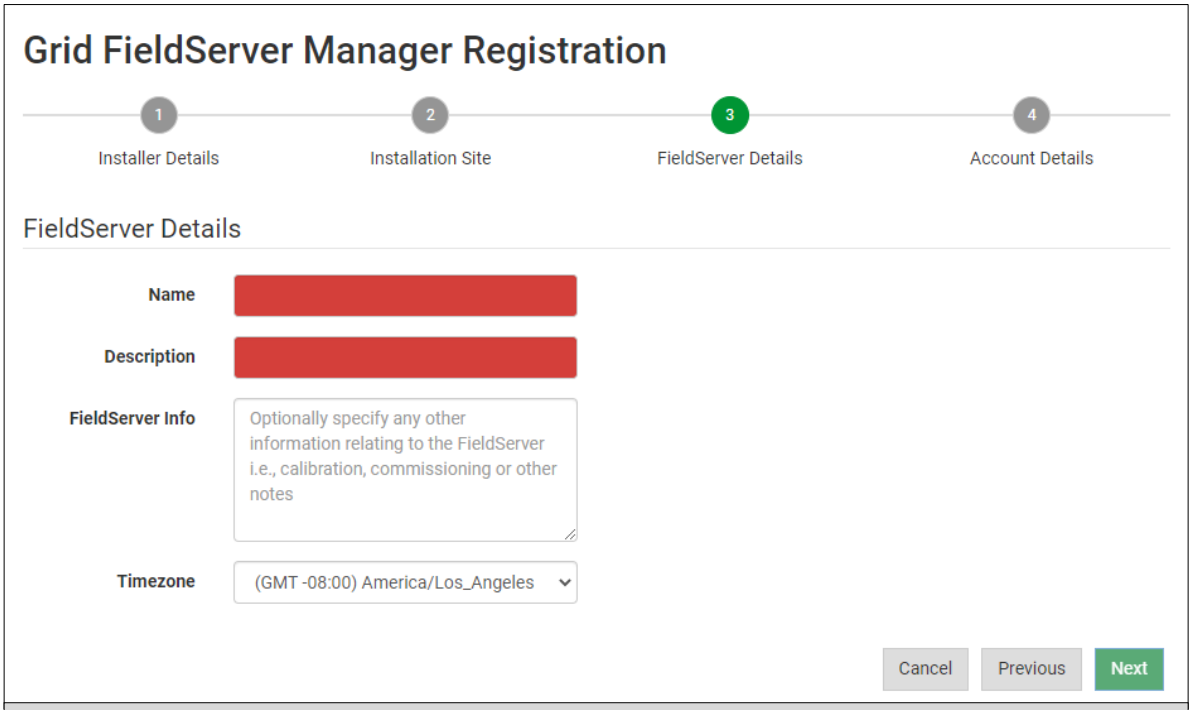


Figure 33: Grid Registration – Gateway Details

- Enter user credentials and click Register Device

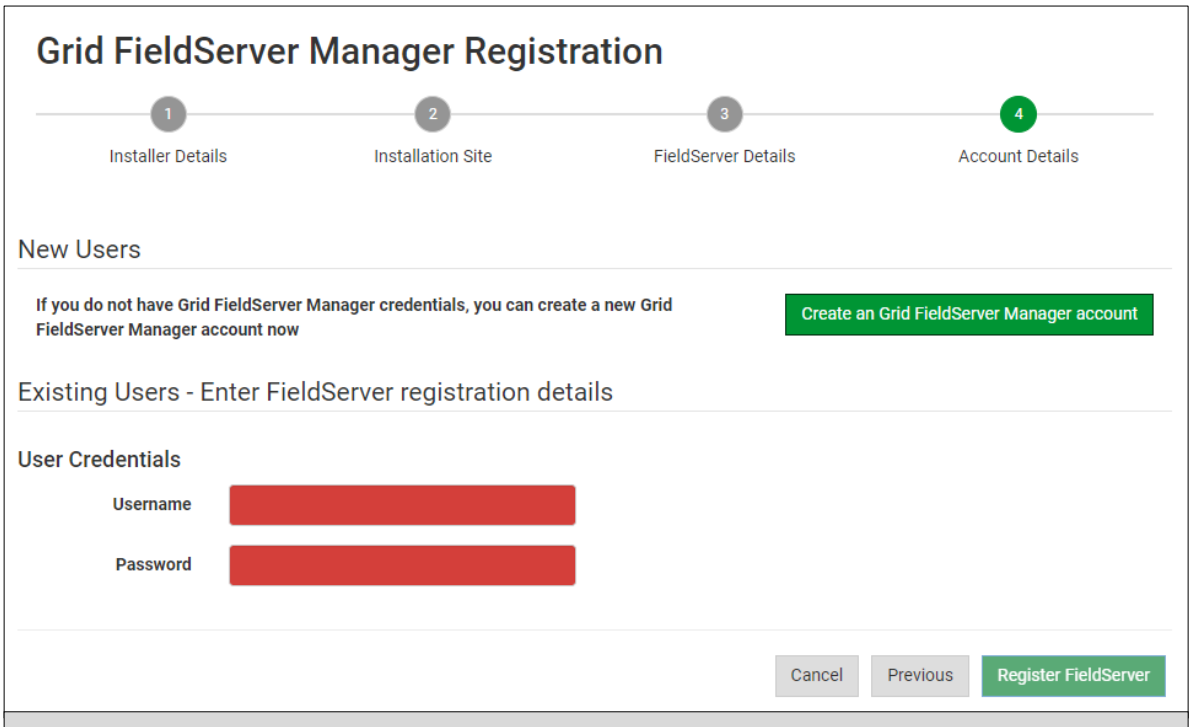


Figure 34: Grid Registration – Grid Account

- 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 ProtoAir.

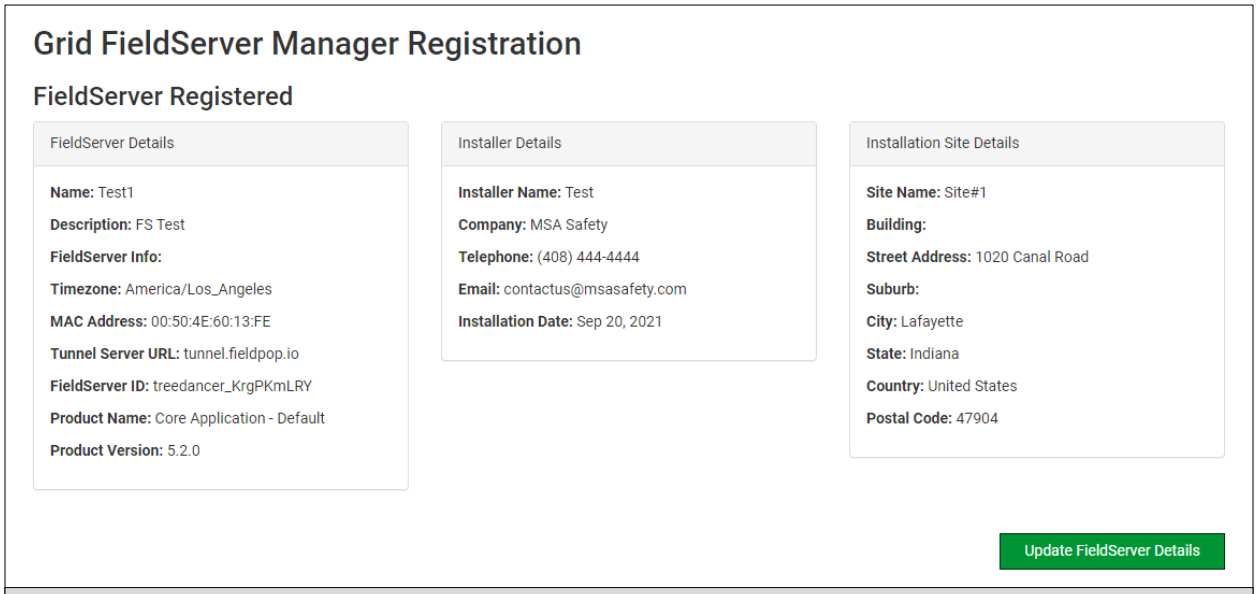


Figure 35: Device Registered for the Grid

NOTE: Update these details at any time by going to the device's FS-GUI webpage, clicking the FieldServer Manager button and then clicking the Update FieldServer Details button.

7.4 Login to the Grid

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

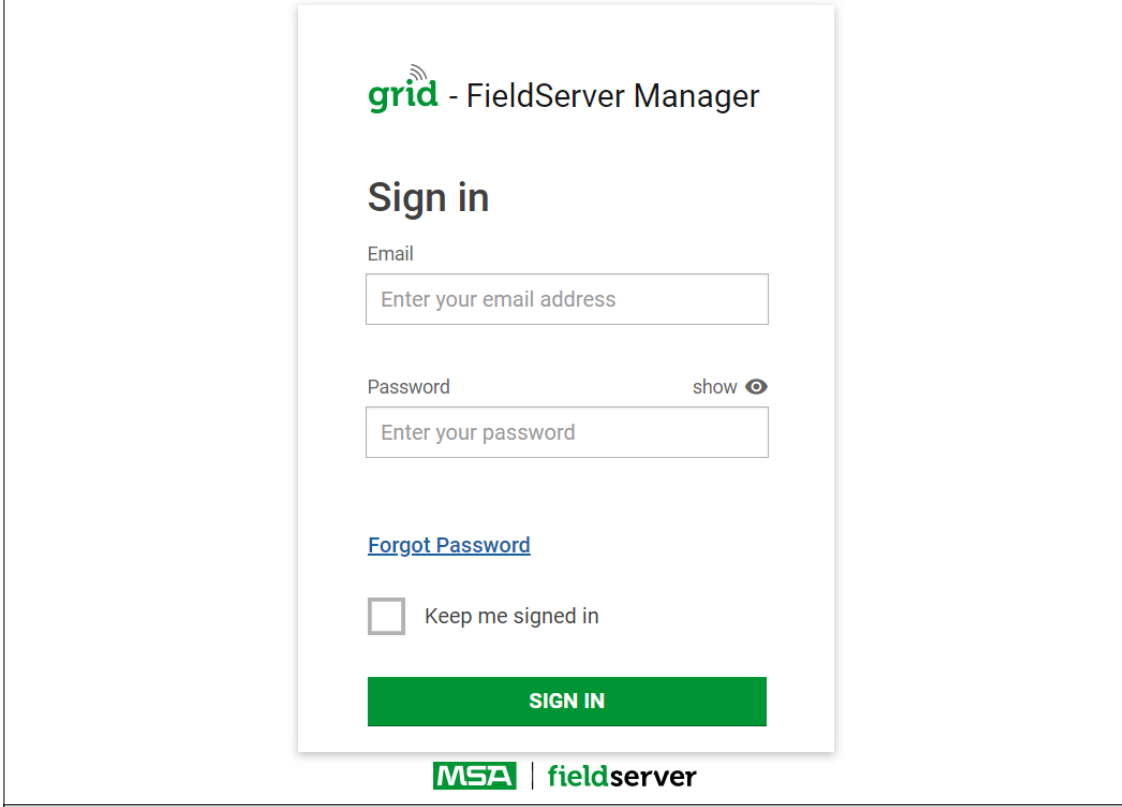


Figure 36: Grid Login Page

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

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

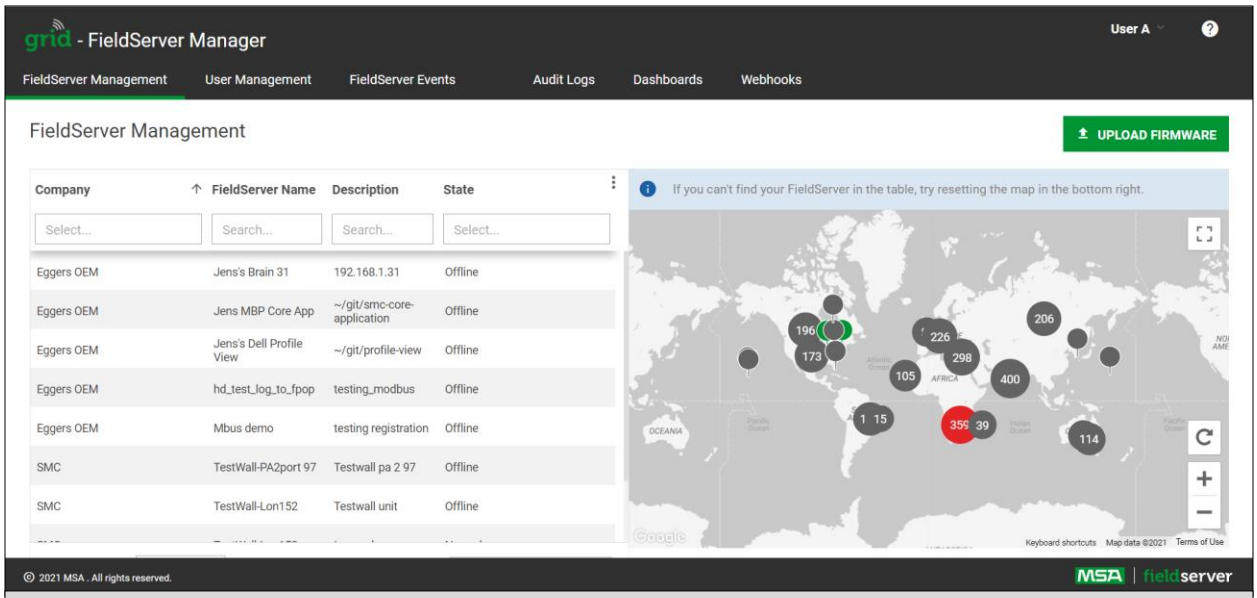


Figure 37: Grid Landing Page

8 Configure the ProtoAir

8.1 Navigate to the ProtoAir Web Configurator

- From the Web App landing page (**Figure 38**), click the Settings tab and then click Configuration.

Figure 38: 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.

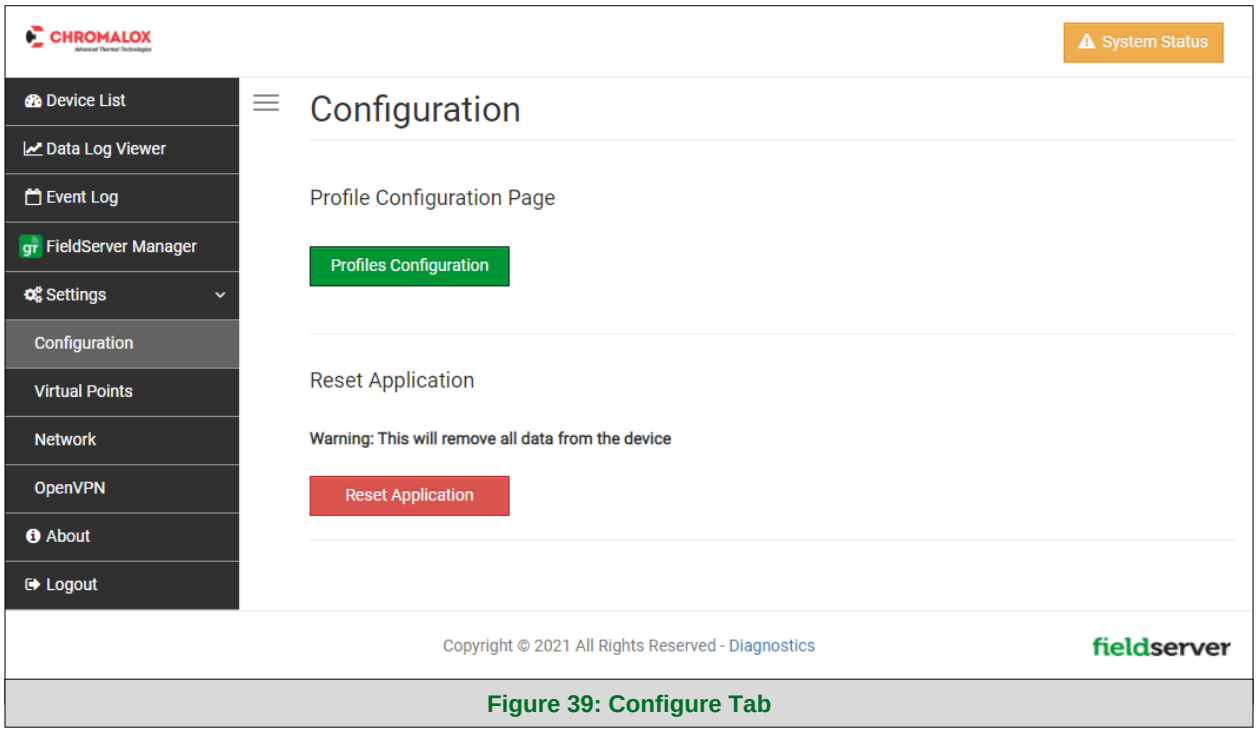


Figure 39: Configure Tab

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

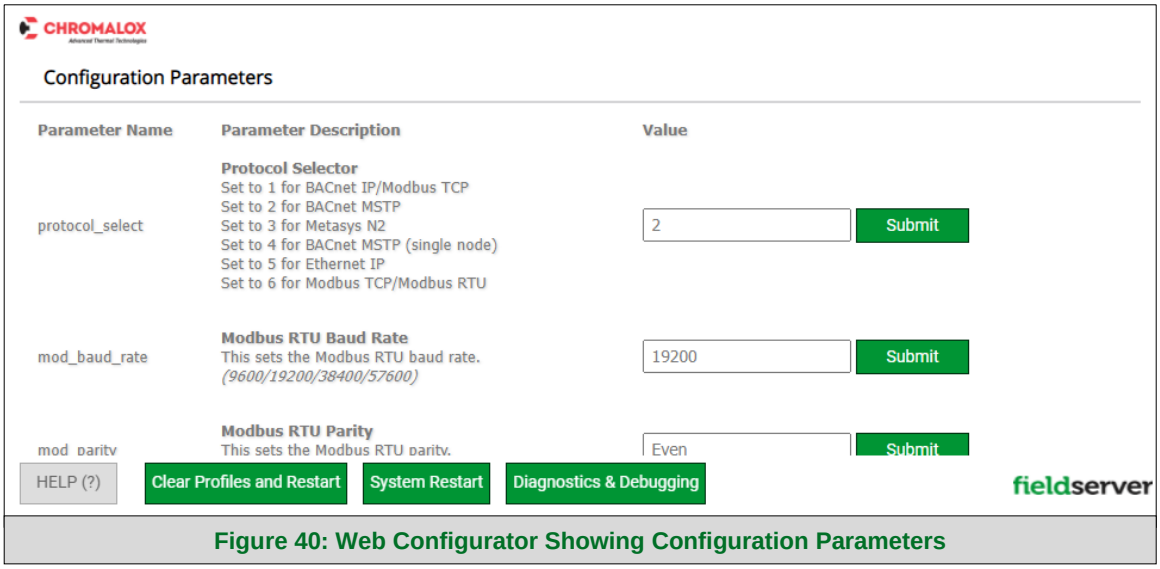


Figure 40: Web Configurator Showing Configuration Parameters

- 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. 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 ProtoAir 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 41**)

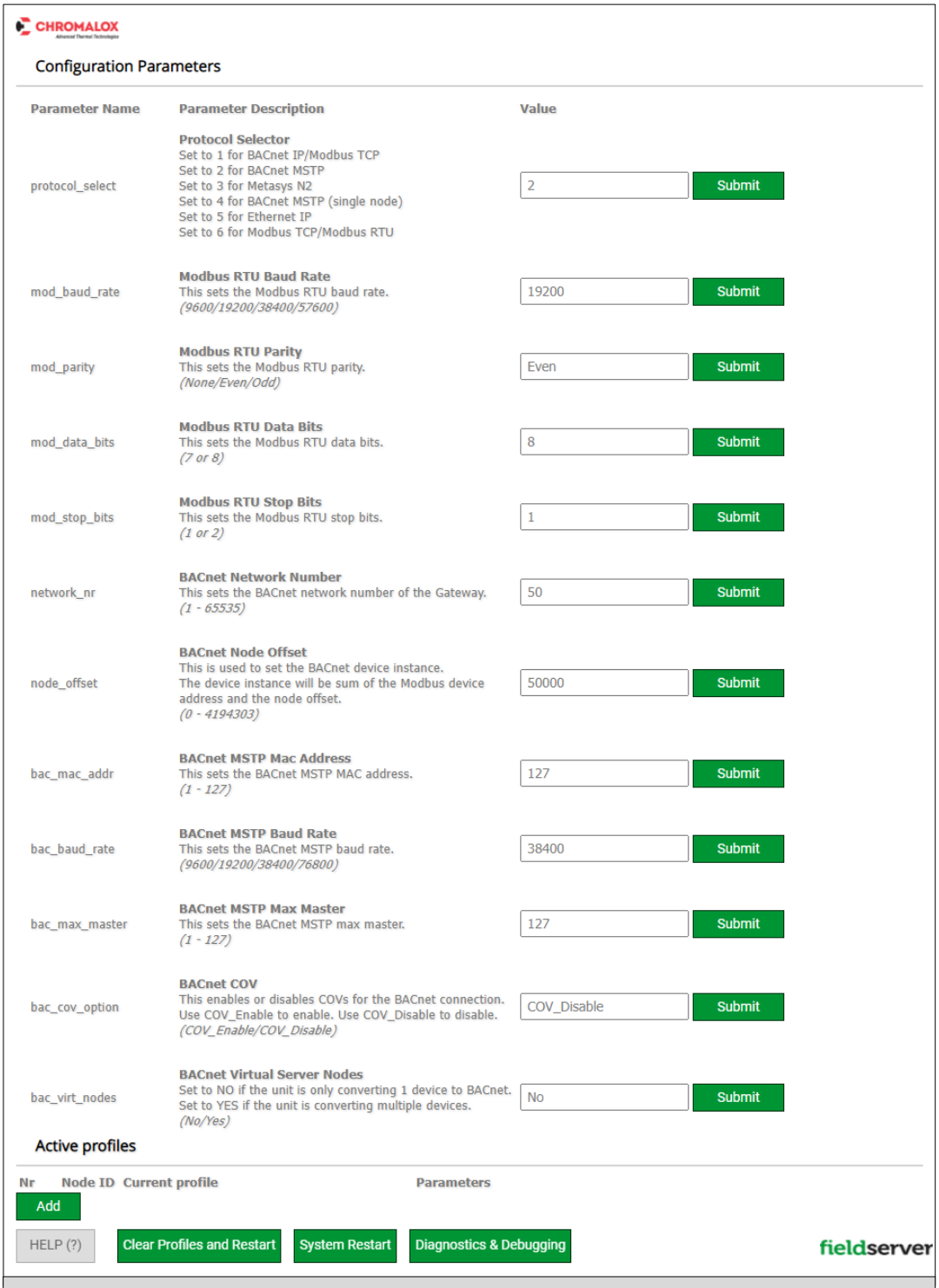


Figure 41: Web Configurator Showing no Active Profiles

- 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.
- 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**.
- If the device is connected via Modbus TCP/IP, the "ip_address" and "tcp_id" under the Parameters heading must be gathered from settings on the device. These correspond to the device IP Address and Node-ID. (**Section 2.3.3**)
- If the device is connected via EtherNet/IP, the "ip_address" under the Parameters heading. These are gathered from settings on the device and correspond to the device IP Address. (**Section 2.3.3**)
- 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 42**.

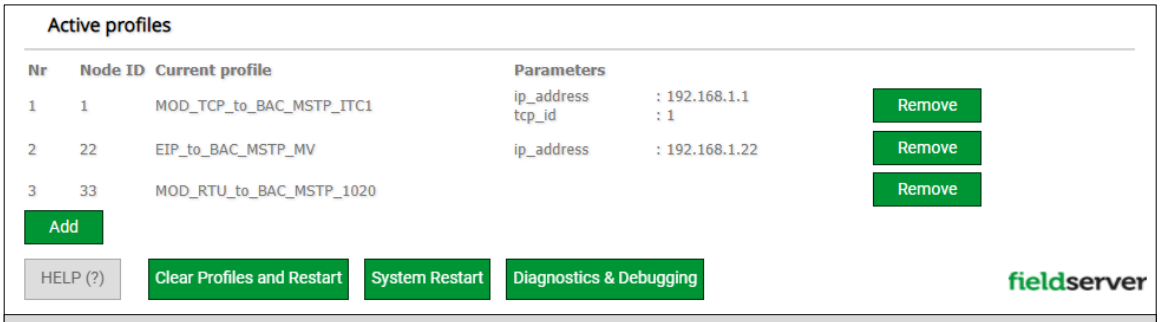


Figure 42: Web Configurator Showing Active Profile Additions

8.4 Verify Device Communications

- **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 ProtoAir Web Configurator.
- Node_Offset field shows the current value (default = 50,000).
  - The values allowed for a BACnet Device Instance can range from 1 to 4,194,303
- To assign a specific Device Instance (or range); change the Node_Offset value as needed using the 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.

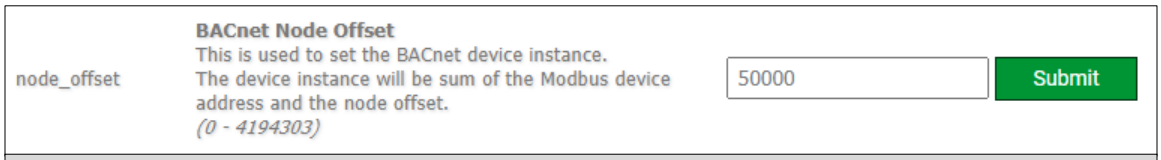


Figure 43: Web Configurator Node Offset Field

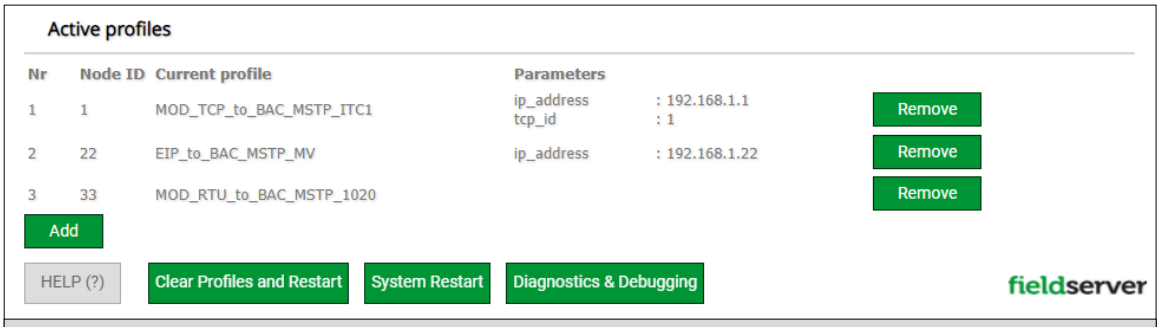


Figure 44: Active Profiles

8.6 How to Start the Installation Over: Clearing Profiles

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

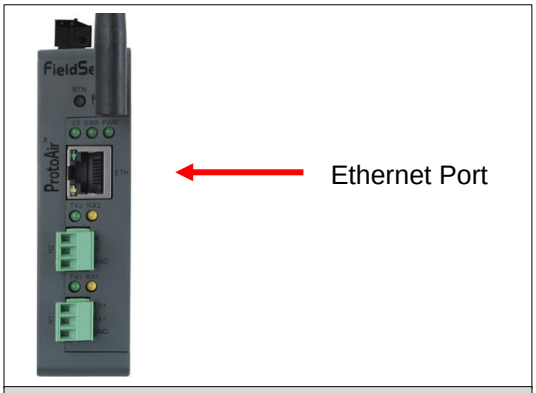
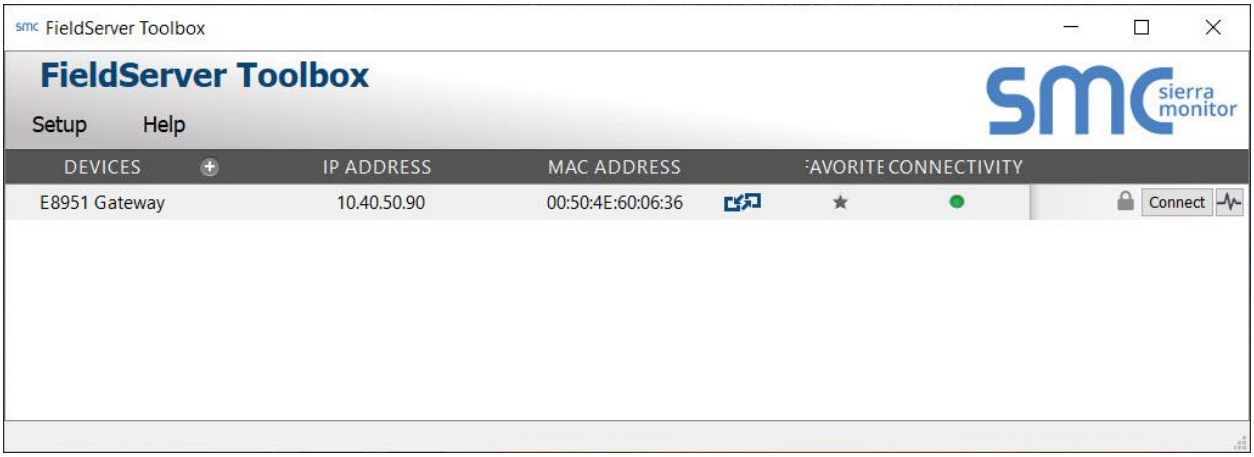


Figure 45: Ethernet Port Location

- 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 ProtoAir into the web browser or use the FieldServer Toolbox to connect to the ProtoAir.
- 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.

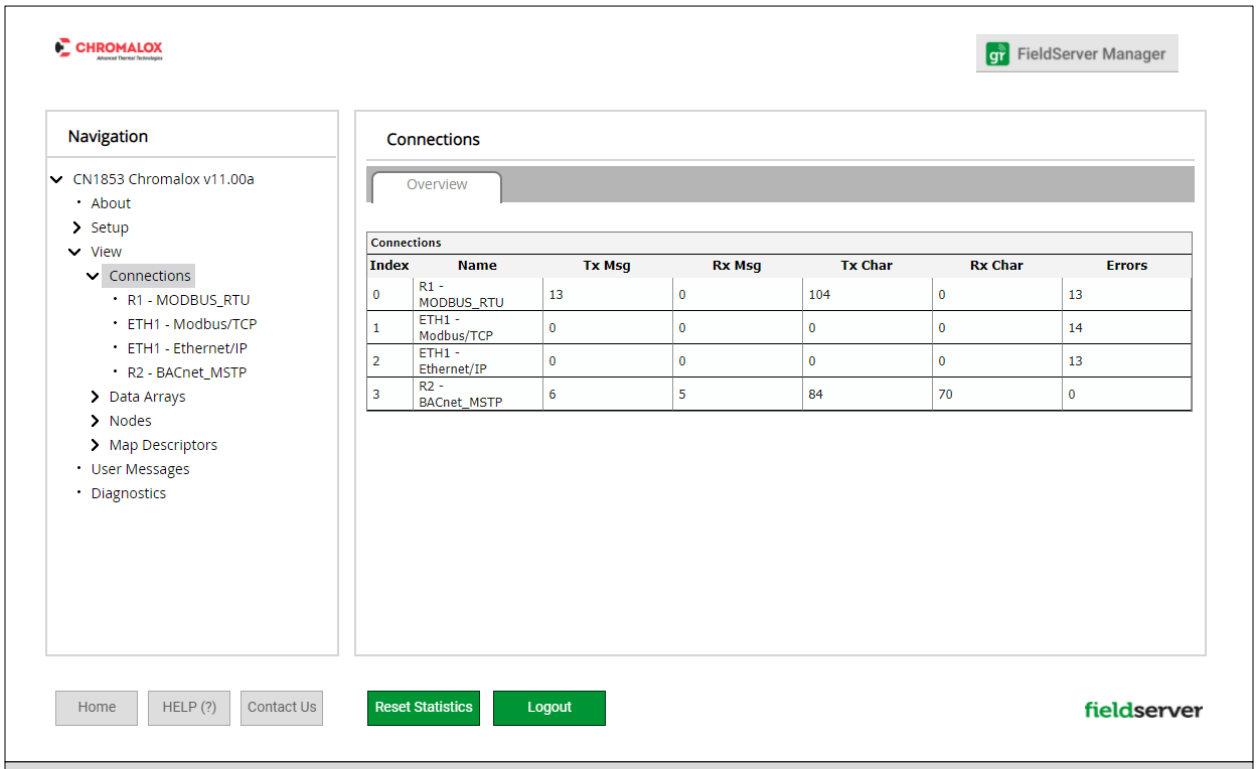


Figure 46: Error Messages Screen

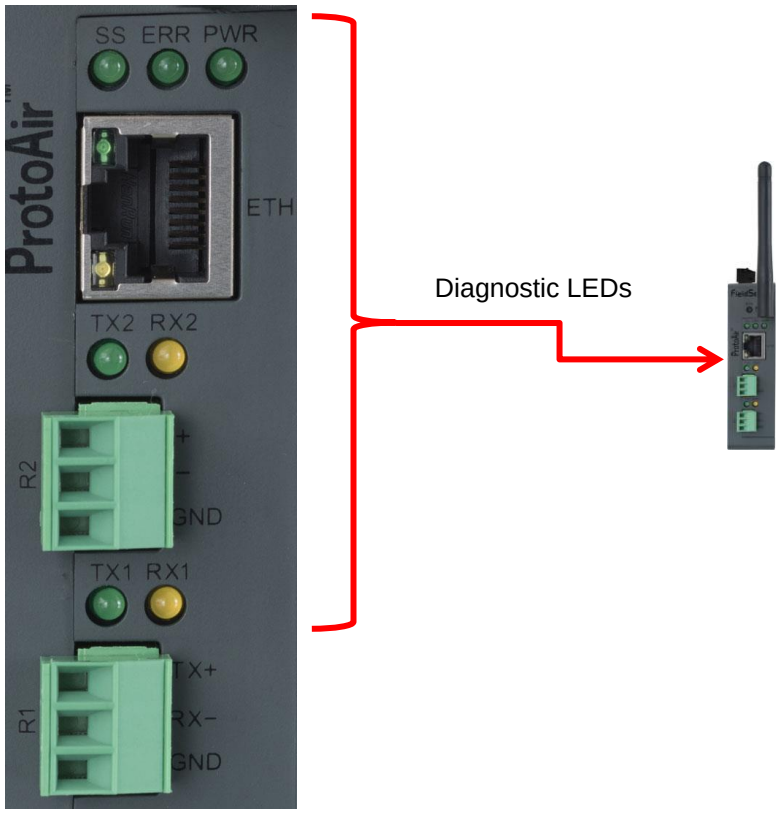
9.3 Checking Wiring and Settings

- No COMS on Modbus RTU side. If the Tx/Rx LEDs are not flashing rapidly then there is a COM issue. To fix this, check the following:
  - Visual observations of LEDs on ProtoAir (**Section 9.4**)
  - 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**)
- No COMS on the Modbus TCP/IP or EtherNet/IP side. To fix, check the following:
  - Visual observations of LEDs on ProtoAir (**Section 9.4**)
  - Check device address
  - Verify wiring
  - Verify the device was listed in the Web Configurator (**Section 8.3**)
- Field COM problems:
  - Visual observations of LEDs on the ProtoAir (**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 ProtoAir and Devices

See the diagram below for ProtoAir LED Locations.



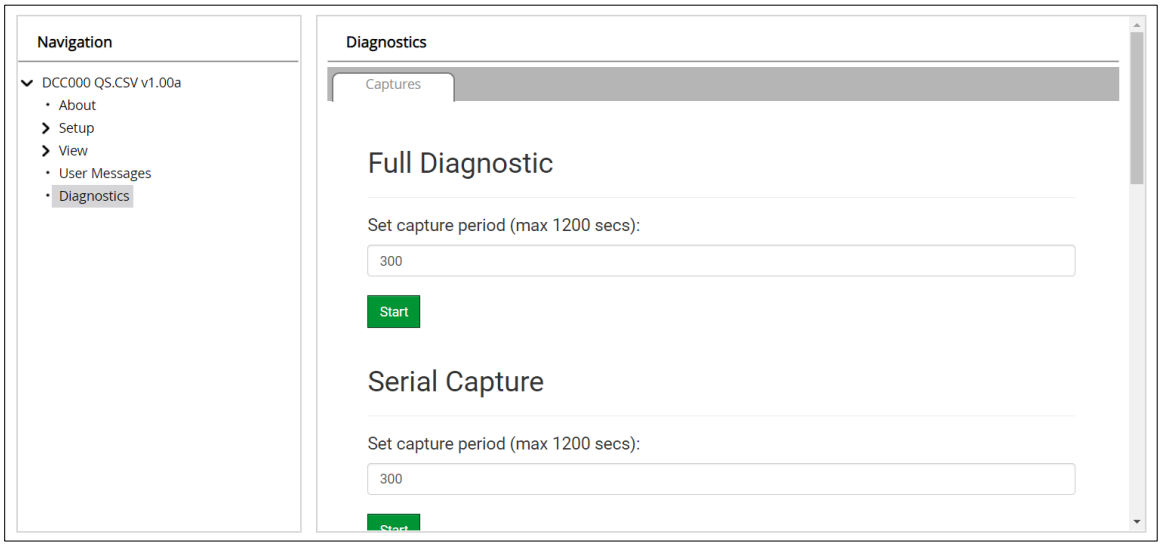
Tag	Description
SS	The SS LED will flash once a second to indicate that the bridge is in operation.
ERR	The SYS ERR LED will go on solid indicating there is a system error. If this occurs, immediately report the related “system error” shown in the error screen of the FS-GUI interface to support for evaluation.
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 47: 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.

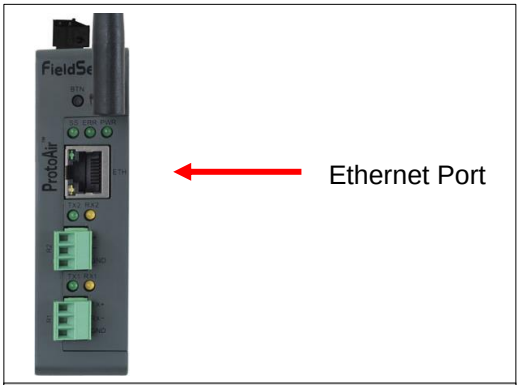
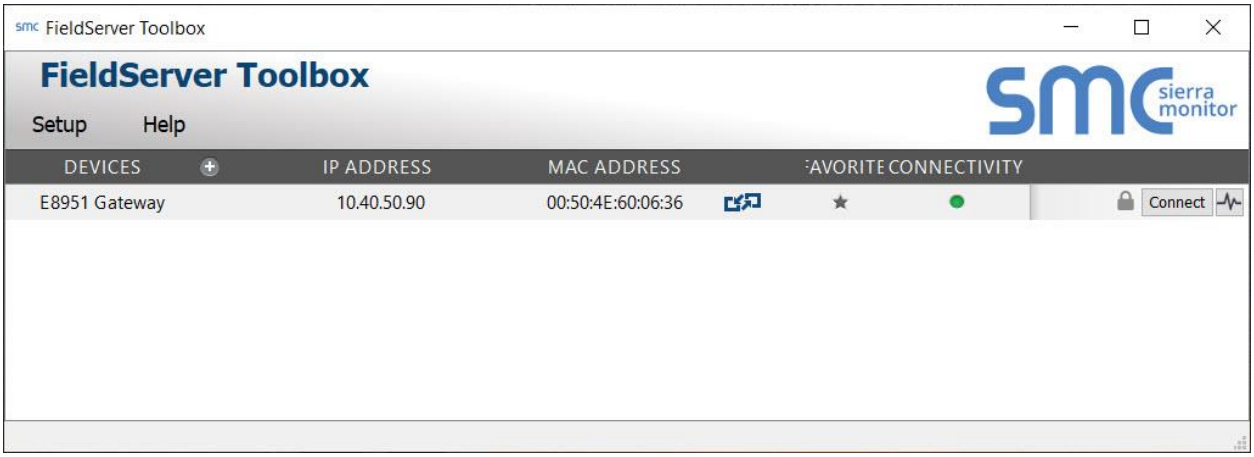


Figure 48: Ethernet Port Location

- Connect a standard Cat-5 Ethernet cable between the PC and ProtoAir.
- Double click on the FS Toolbox Utility.
- **Step 1:** Take a Log
  - Click on the diagnose icon for the desired device



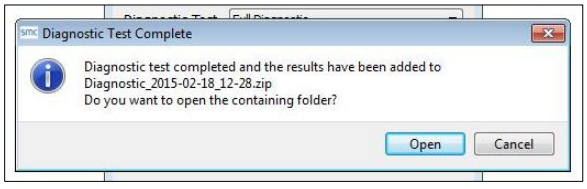
- Select “Full Diagnostic" from the drop down menu

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 Wi-Fi Signal Strength

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

Figure 49: Wi-Fi Signal Strength Listing

NOTE: If the signal is weak or spotty, try to improve the signal strength by checking the antenna and the ProtoAir 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 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 “Firmware” tab
5. In the Firmware tab, click on “Choose Files” and select the firmware 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 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.

Figure 50: Web Configurator – Network Number Field

10.3 Mounting

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

Figure 51: DIN Rail

10.4 Certification

10.4.1 BTL Mark – BACnet® Testing Laboratory

The BTL Mark on ProtoAir 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

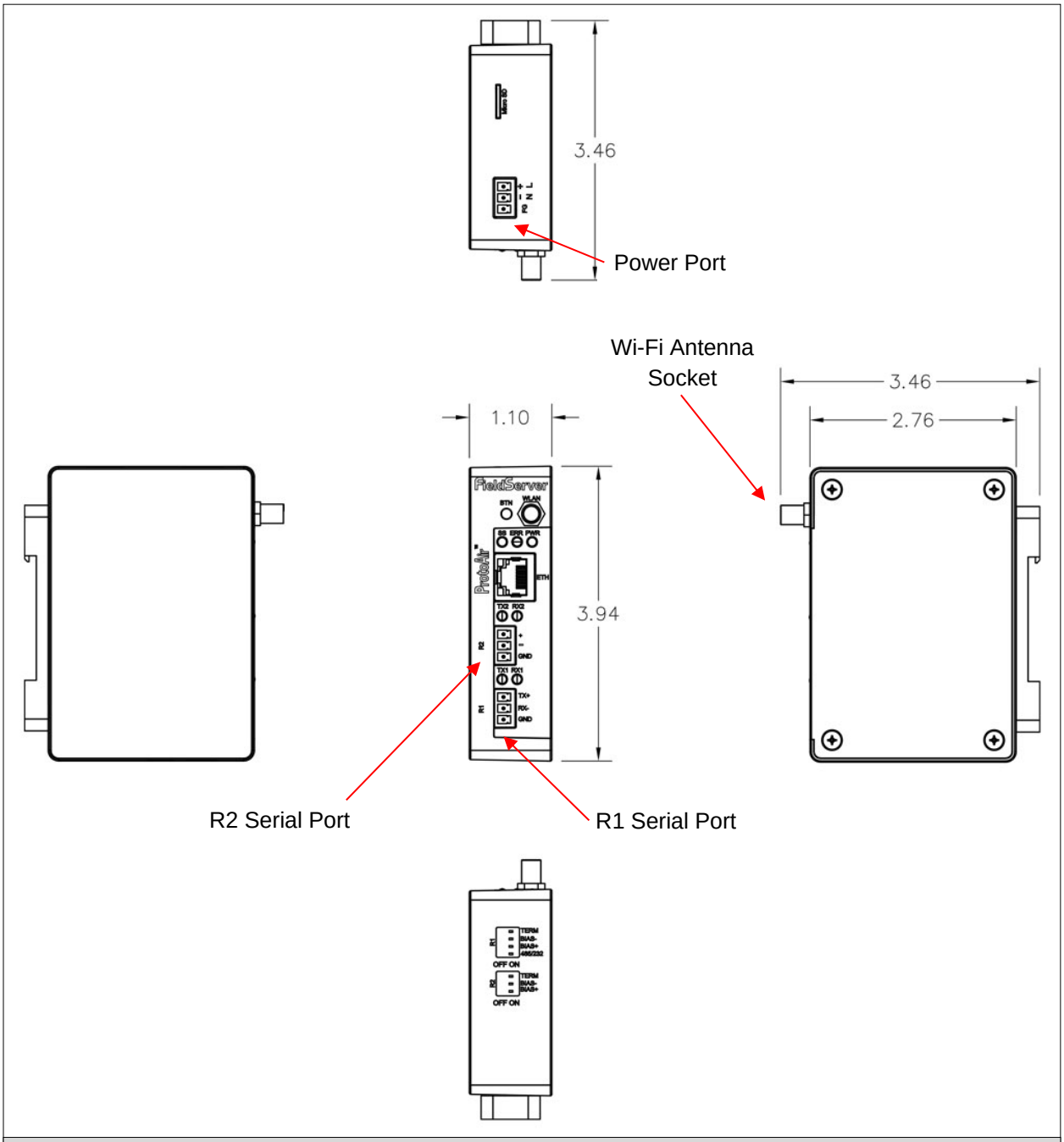


Figure 52: ProtoAir FPA-W44 Dimensions

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.

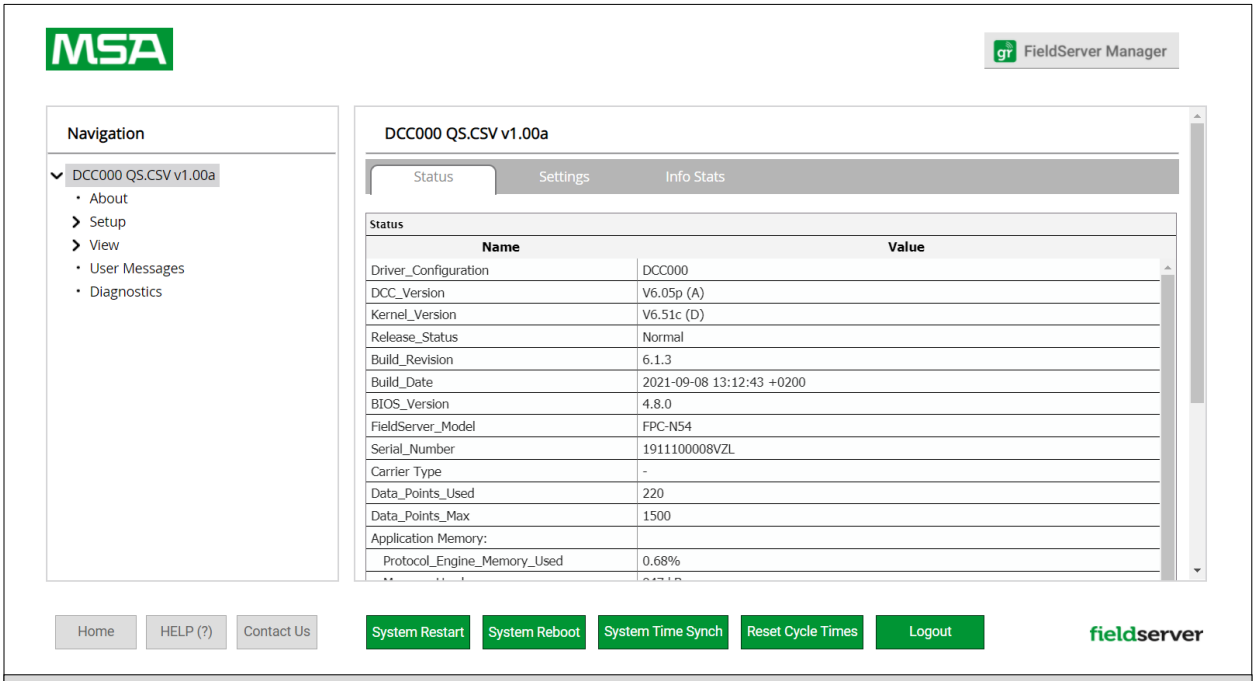


Figure 53: FS-GUI Page

10.6.1 Change Security Mode

- Click Security in the Navigation panel.

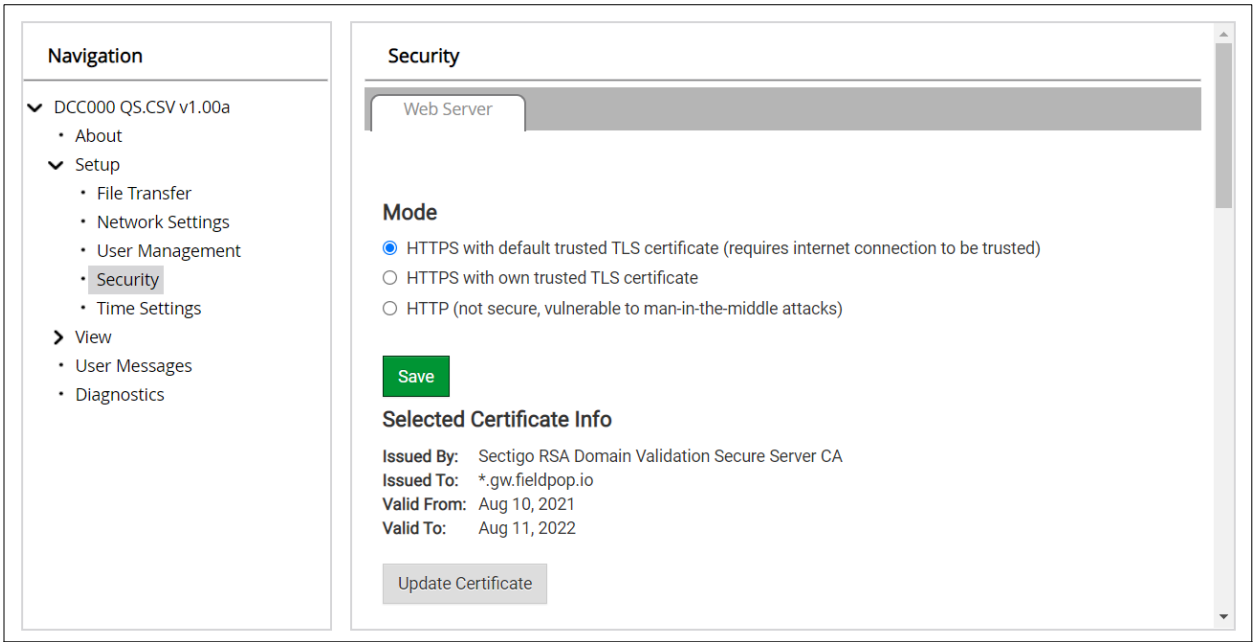


Figure 54: FS-GUI Security Setup

- 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.

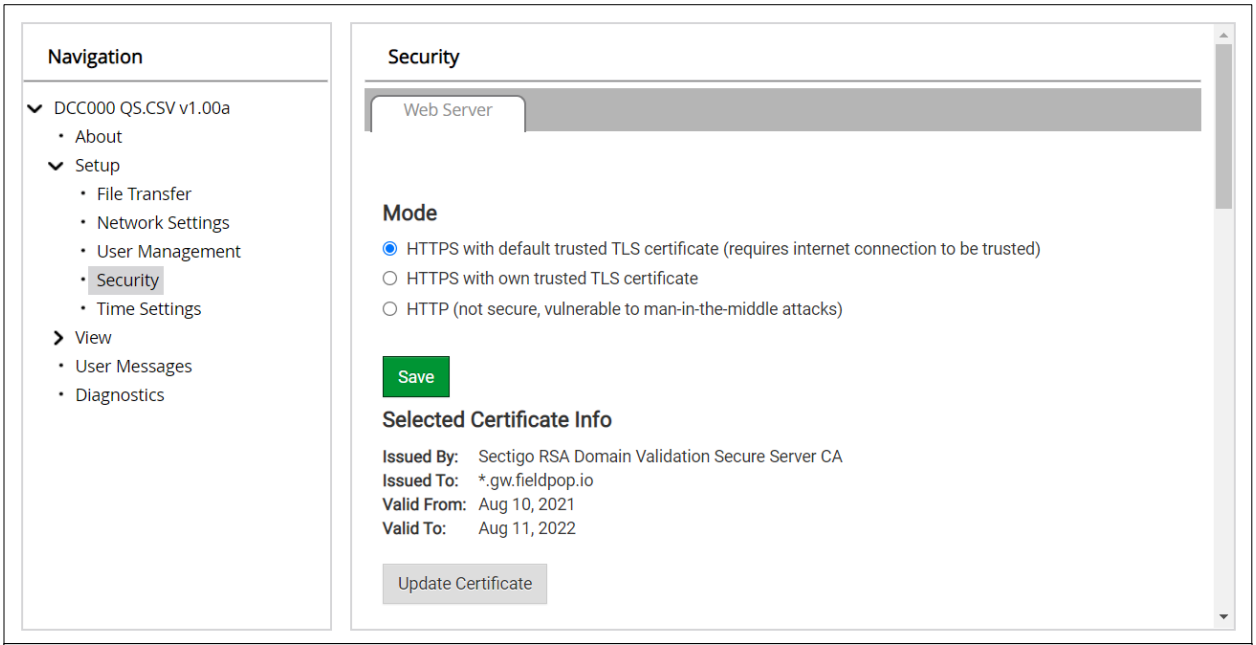


Figure 55: FS-GUI Security Setup – Certificate Loaded

- 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.

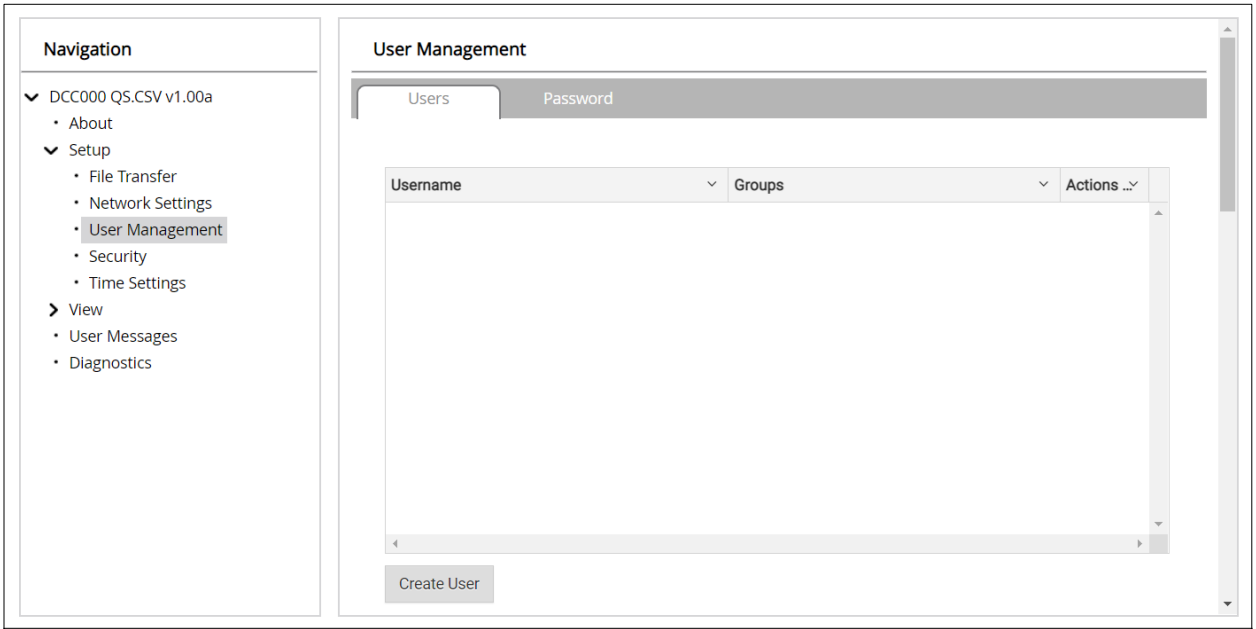


Figure 56: FS-GUI User Management

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.

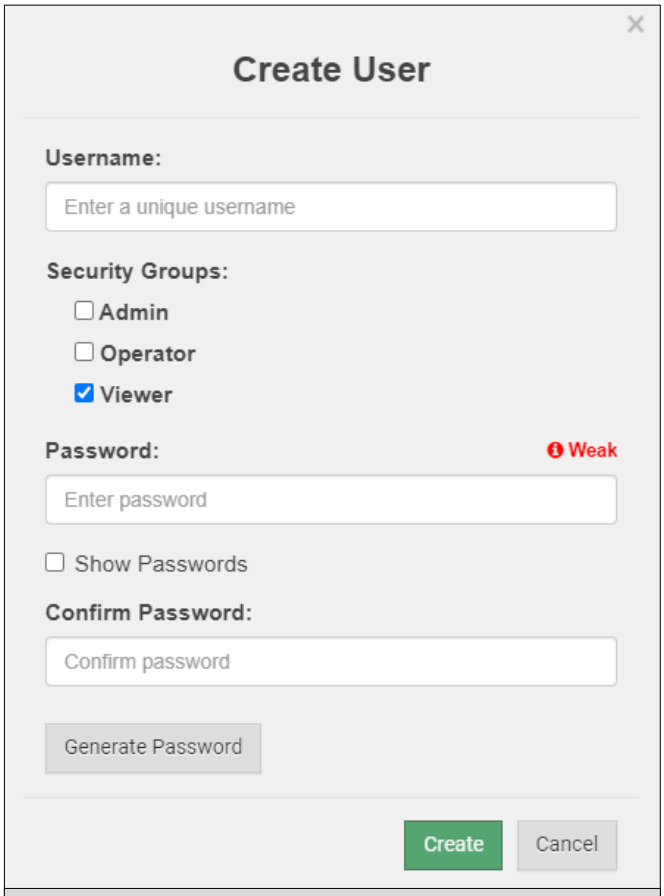


Figure 57: Create User Window

- 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.

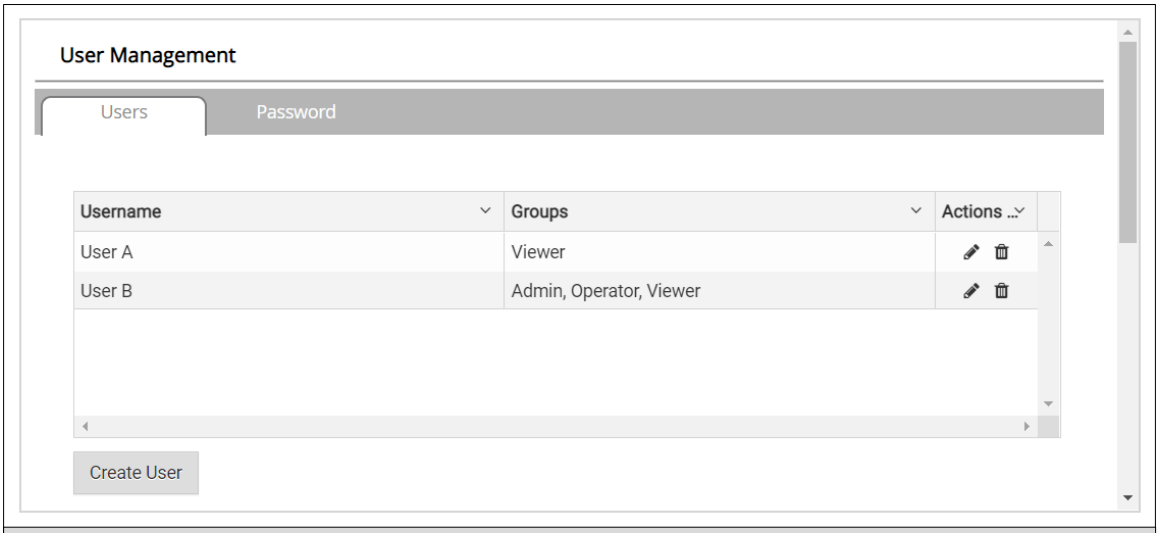


Figure 58: Setup Users

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

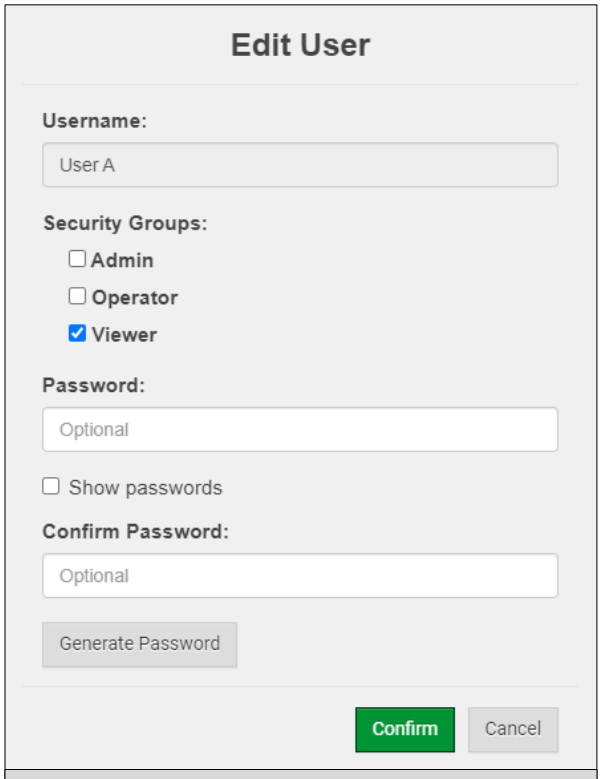


Figure 59: Edit User Window

- 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.

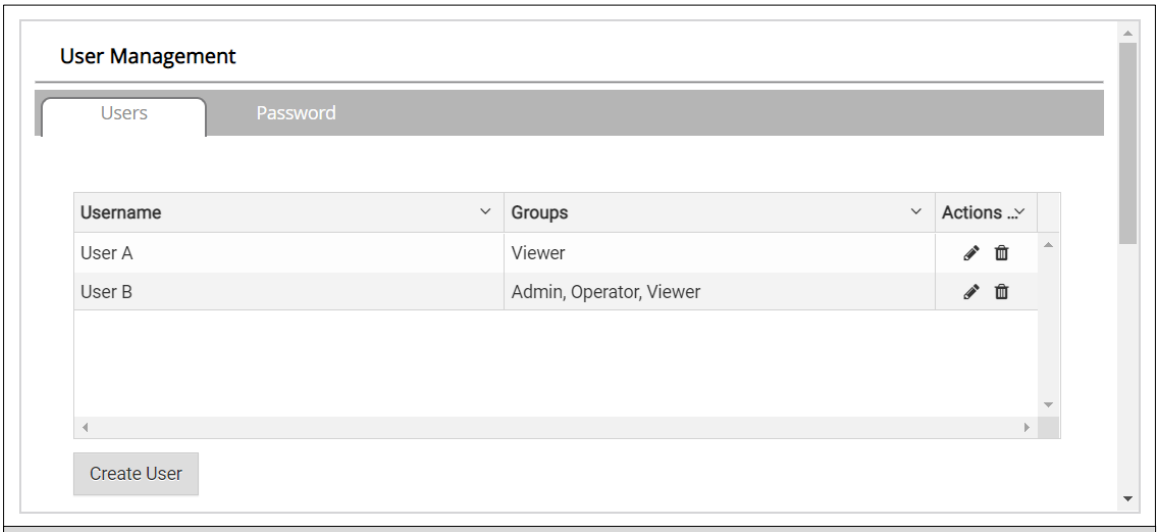


Figure 60: Setup Users

- When the warning message appears, click Confirm.

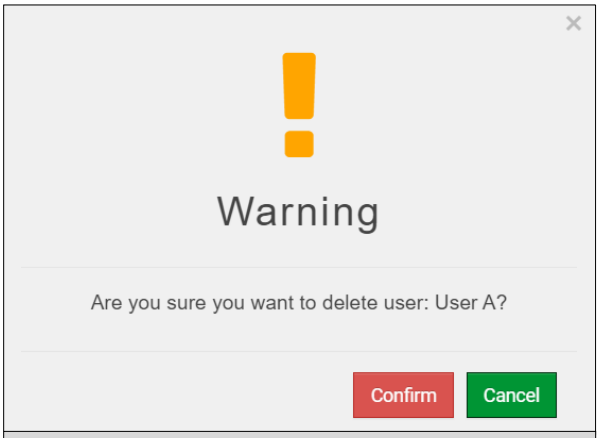


Figure 61: User Delete Warning

10.7.4 Change FieldServer Password

- Click the Password tab.

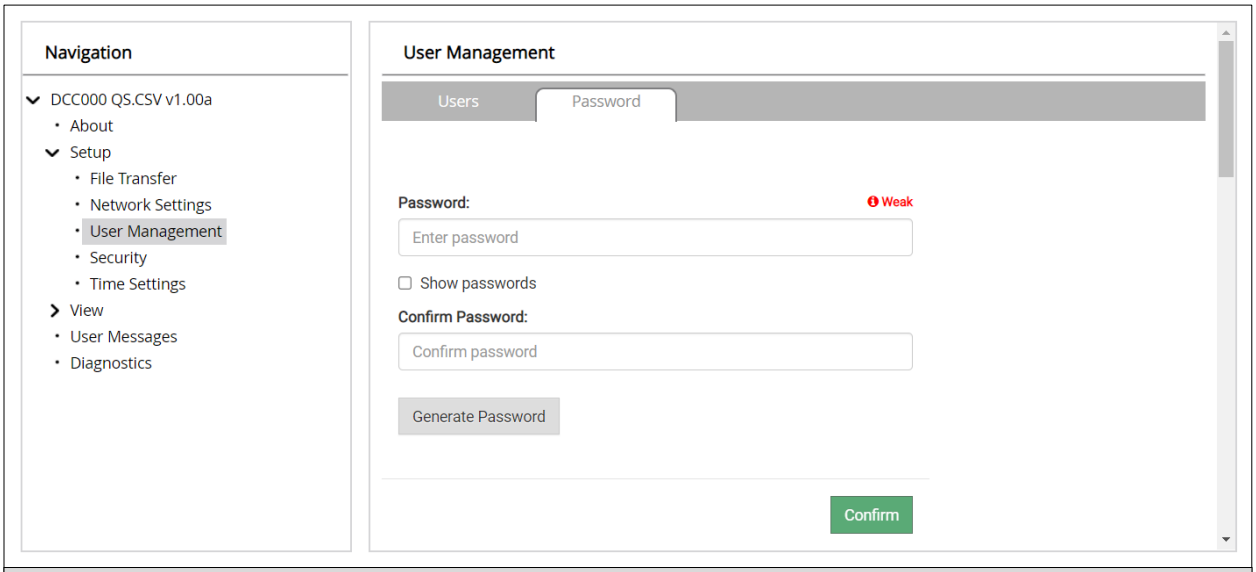


Figure 62: FieldServer Password Update via FS-GUI

- 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 Grid Connection Warning Message

- If a warning message appears instead of the page as shown in **Figure 30**, follow the suggestion that appears on screen.
    - If the ProtoAir cannot reach the Grid server, the following message will appear

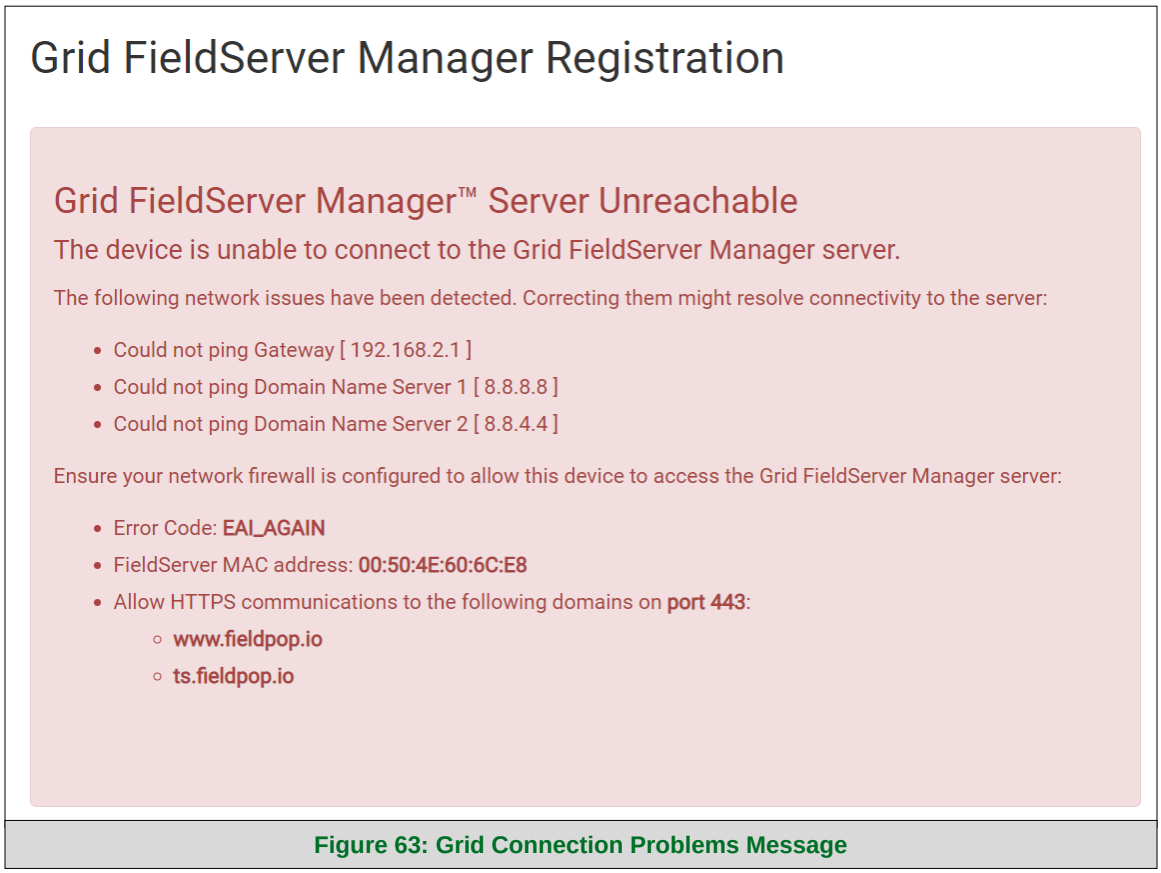


Figure 63: Grid Connection Problems Message

- 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 ProtoAir 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, Grid connectivity and device alert level.

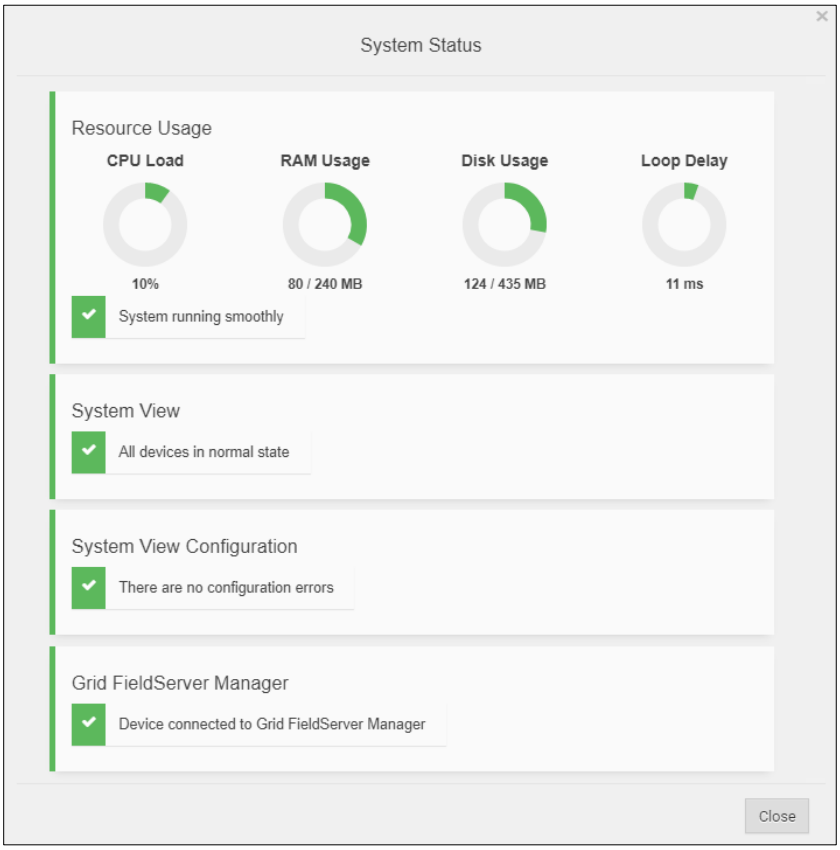
The color of the button represents the status of one to all three systems:

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 Grid (Figure 27), the Grid FieldServer 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 the Grid.

11 Vendor Information – Chromalox

See document “Chromalox Vendor Mappings” for the complete point list for all the devices referenced in this manual. Only the protocols listed as supported for this FieldServer are supported (see **Section 1.1**). Ignore all points referring to unsupported protocols when using this FieldServer.

12 Specifications

	ProtoAir FPA-W44[2]
Electrical Connections	One 3-pin Phoenix connector with: RS-485/RS-232 port (TX+/RX-/gnd) One 3-pin Phoenix connector with: RS-485 (Tx+/Rx-/gnd) One 3-pin Phoenix connector with: Power port (+/-/Frame-gnd) One Ethernet 10/100 BaseT port
Power Requirements	*Input Voltage:* 9-30VDC or 24VAC *Current draw:* 24VAC 0.125A *Max Power:* 3 Watts 9-30VDC 0.25A @12VDC
Approvals	CE and FCC Class B & C Part 15, UL 60950-1, WEEE compliant, IC Canada, RoHS3 compliant, 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 to 158°F)
Humidity	10-95% RH non-condensing
Wi-Fi 802.11 b/g/n	*Frequency:* 2.4 GHz *Channels:* 1 to 11 (inclusive) *Antenna Type:* SMA *Encryption:* TKIP, WPA & AES

Figure 64: Specifications

12.1.1 Compliance with UL Regulations

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

- 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 ProtoAir
- 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.

[2] 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.