



Operating Manual

ProtoAir Start-up Guide

FPA-W44 (15117), FPA-C41 (15122), FPA-C42 (15123), FPA-C43 (15124)



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fieldserver

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1 About the ProtoAir

The ProtoAir is a high performance, multi-protocol IIoT gateway providing manufacturers Wi-Fi and cellular connectivity into the cloud and instant multi-protocol deployment of field protocols, enabling new or legacy devices to easily interface with other protocols.

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.

NOTE: For troubleshooting assistance refer to [Section 10 Troubleshooting](#), or any of the troubleshooting appendices in the related driver supplements. Check the MSA Safety website for technical support resources and documentation that may be of assistance.

The ProtoAir is cloud ready and connects with MSA Safety's Grid. See [Section 8.4.1 Accessing the FieldServer Manager](#) for further information.

2 Equipment Setup

2.1 Mounting

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



2.2 Attaching the Antenna(s)

Wi-Fi Antenna:

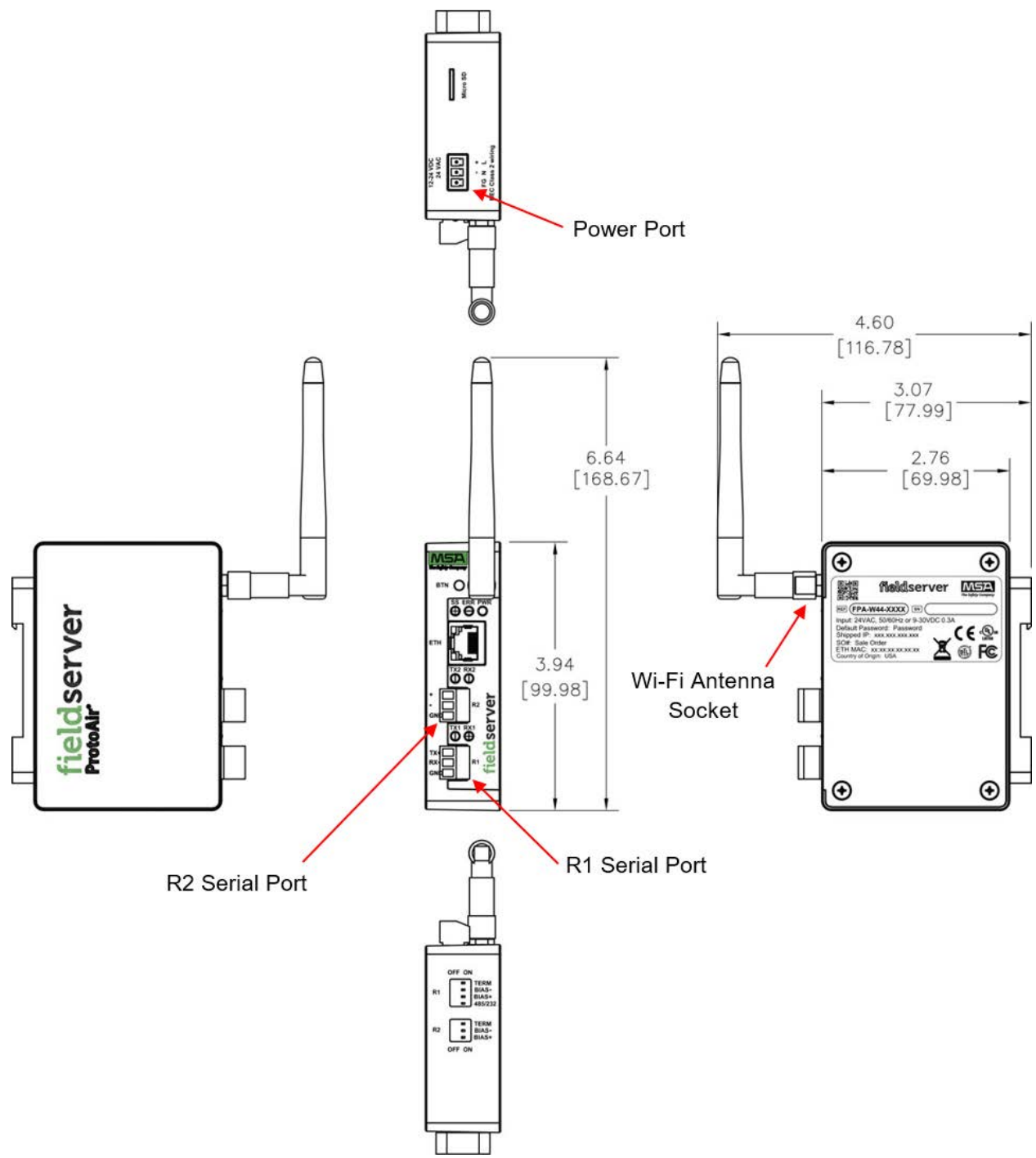
If using the FPA-W44 model, screw in the Wi-Fi antenna to the front of the unit as shown in [Section 2.3.1 FPA-W44 Drawing](#).

Cellular Antenna:

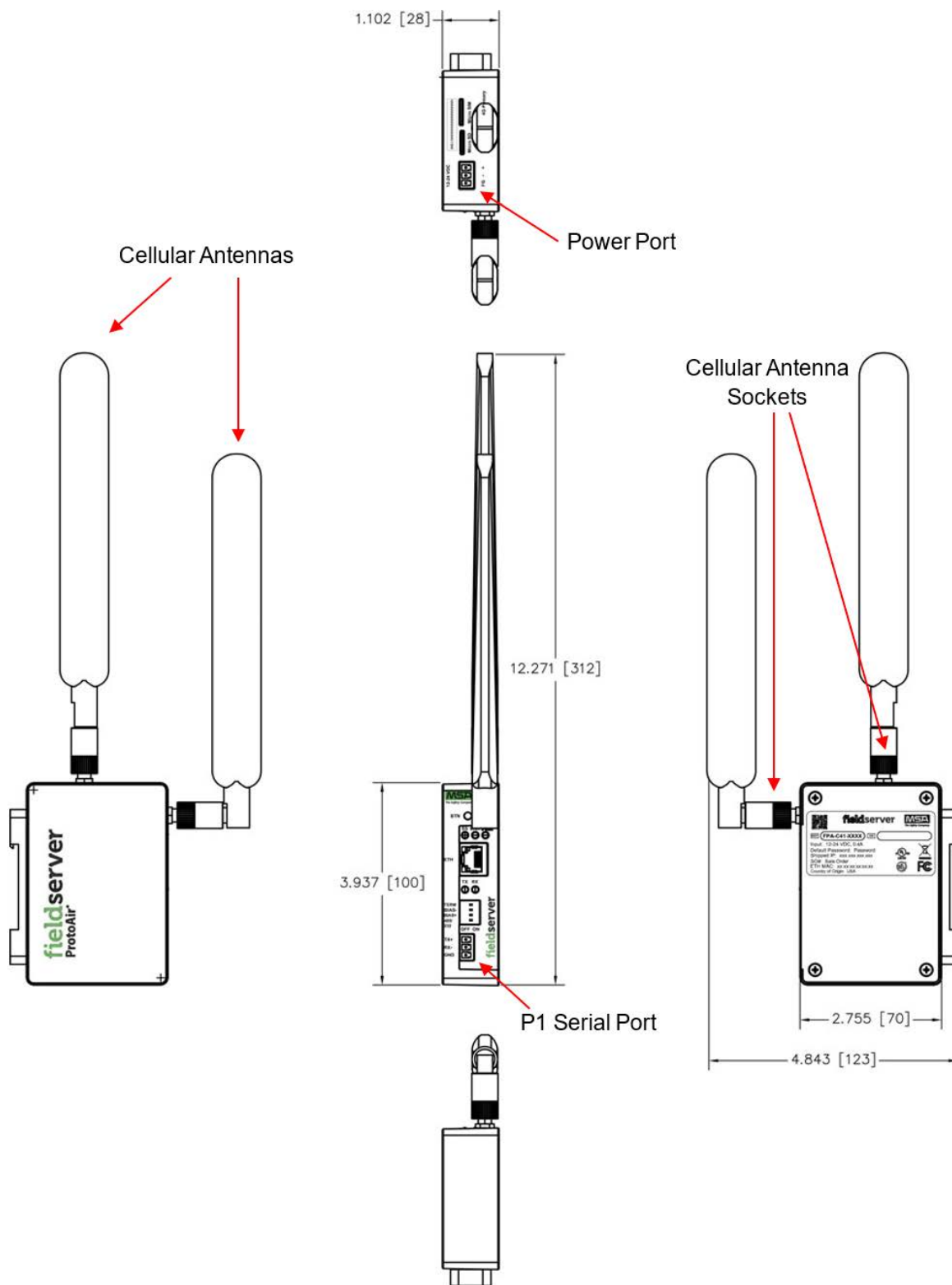
If using the FPA-C4X model, screw in the two cellular antennas. One antenna is screwed into the socket on the top of the unit and one is screwed into the socket on the side as shown in [Section 2.3.2 FPA-C4X Drawing](#).

2.3 Physical Dimensions

2.3.1 FPA-W44 Drawing



2.3.2 FPA-C4X Drawing



3 Installation

WARNING!

- The device must be professionally installed. Installation must be controlled and requires special training.
- All installation and wiring must be performed in accordance with applicable local electrical codes and regulations. It is the responsibility of the installer to ensure that the installation complies with all relevant safety and legal requirements. Failure to adhere to these codes may result in unsafe operation, equipment damage, or violation of local laws.
- This product is not intended for use by the general public. It is generally intended for industry/commercial use.
- The connector is within the transmitter enclosure and can only be accessed by disassembly of the transmitter that is not normally required. The user has no access to the connector.

Failure to follow this warning can result in serious personal injury or death.

3.1 DIP Switch Settings for FPA-C4X

3.1.1 Bias Resistors



To enable Bias Resistors, move both 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 where 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: If the gateway is already powered on, DIP switch settings will not take effect unless the unit is power cycled.

3.1.2 Termination Resistor



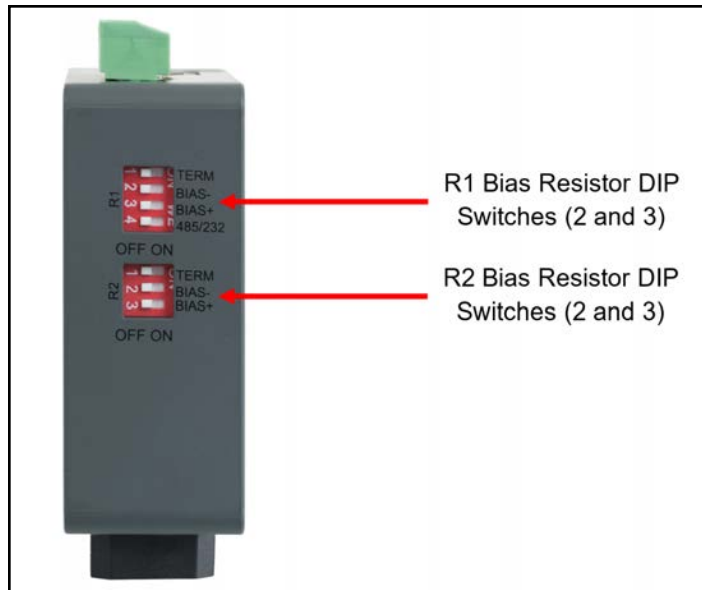
If the gateway is the last device on the serial trunk, then the End-Of-Line Termination Switch needs to be enabled. **To enable the Termination Resistor, move the TERM dip switch to the right in the orientation shown in above.**

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

3.2 DIP Switch Settings for FPA-W44

3.2.1 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.

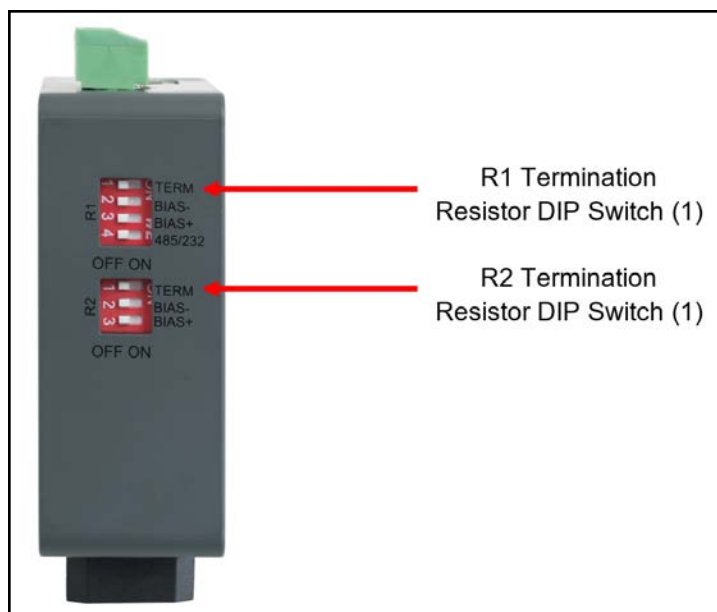
The bias resistor is 510 ohms which is in line with the BACnet spec. It should only be enabled at one point on the bus (for example, on the field port where there are very weak bias resistors of 100k). Since there are no jumpers, many ProtoAirs can be put on the network without running into the bias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

3.2.2 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.

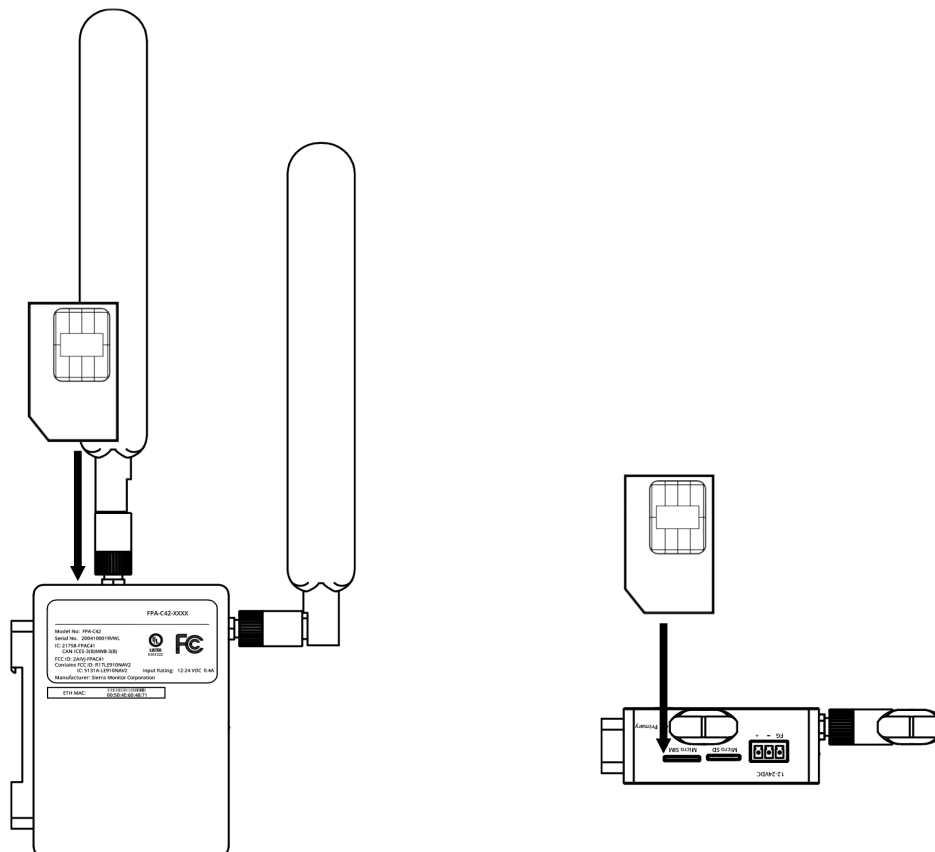
NOTE: The R1 and R2 DIP Switches apply settings to the respective serial port.

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

3.3 FPA-C4X: Inserting the SIM Card

NOTE: A micro 4G SIM card must be purchased from an AT&T or Verizon cellular provider to set up cellular functionality and create a data plan for the FieldServer. SIM card vendor contact information is available at the end of the section.

Insert the SIM card into the Micro SIM card slot with the chip on the SIM card facing away from the cellular antenna as shown below.



See [Section 7.1.5 FPA-C4X: Cellular Settings](#) to complete cellular setting configuration.

The table below shows cellular usage examples to forecast data usage on the chosen cellular plan.

Number of Data Points	Logging Frequency	Data Usage per Hour	Data Usage per Month
10	40 sec	0.75 Mb	547 Mb
10	900 sec	0.55 Mb	400 Mb
50	40 sec	1.24 Mb	900 Mb
50	900 sec	0.90 Mb	657 Mb
100	40 sec	3.00 Mb	2.2 Gb
100	900 sec	1.26 Mb	900 Mb
500	40 sec	10.86 Mb	7.8 Gb
500	900 sec	0.55 Mb	1.5 Gb

SIM Card Vendor Contact Information:

Verizon

A business contract is required to purchase a Verizon SIM card. The IMEI of the ProtoAir is required to purchase the Verizon SIM card.

AT&T

Please call AT&T Customer Service at 800.331.0500 or find the nearest AT&T store.

3.4 FPA-C4X: Connecting the P1 Port

Switch between RS-485 and RS-232 by moving the number 4 DIP Switch left for RS-485 and right for RS-232. Connect to the 3-pin connector as shown below.



The following baud rates are supported on the P1 Port:
9600, 19200, 38400, 57600, 76800, 115000

NOTE: Not all baud rates listed are supported by all protocols. Check the specific protocol driver manual for a list of the supported baud rates.

3.4.1 Wiring

RS-485		RS-232	
OEM Device orBMS RS-485 Wiring	Gateway Pin Assignment	OEM Device orBMS RS-485 Wiring	Gateway Pin Assignment
RS-485 +	TX +	RS-232 -	TX +
RS-485 -	RX -	RS-232 +	RX -
GND	GND	GND	GND

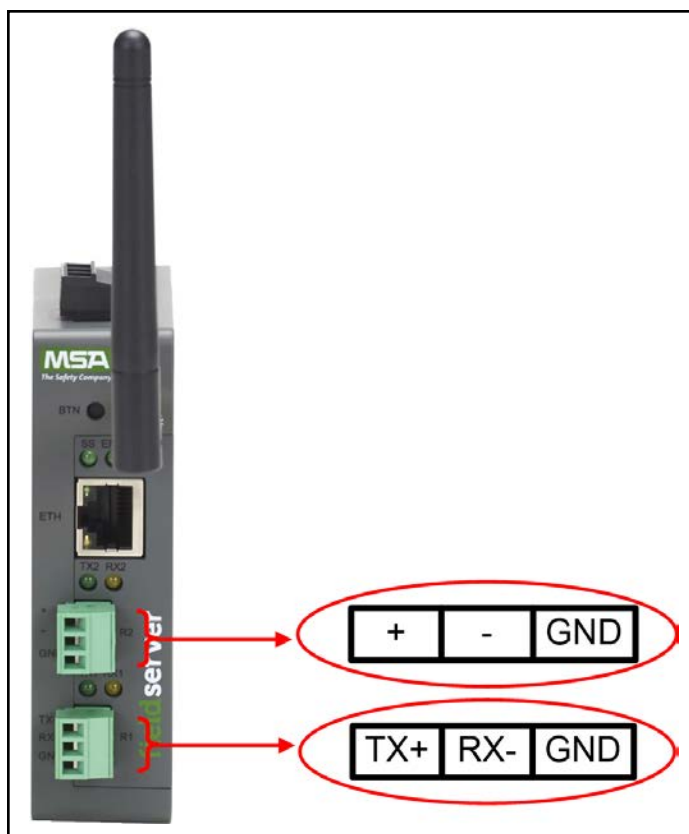
NOTE: The RS-485/RS-232 is part of the RS-485/RS-232 interface and must be connected to the corresponding terminal on the BMS. If the cable is shielded, the shield must connected only at one end and to earth ground – it will help suppress the electromagnetic field interference. (Connecting the shield at both ends will likely produce current loops, which could produce noise or interference that the shield was intended to block).

3.5 FPA-W44: Connecting the R1 & R2 Ports

For the R1 Port only: Switch between RS-485 and RS-232 by moving the number 4 DIP Switch left for RS-485 and right for RS-232 (see images in [Section 3.2 DIP Switch Settings for FPA-W44](#)).

The R2 Port is RS-485.

Connect to the 3-pin connector(s) as shown below.



The following baud rates are supported on the R1 and R2 Ports:
9600, 19200, 38400, 57600, 76800, 115000

NOTE: Not all baud rates listed are supported by all protocols. Check the specific protocol driver manual for a list of the supported baud rates.

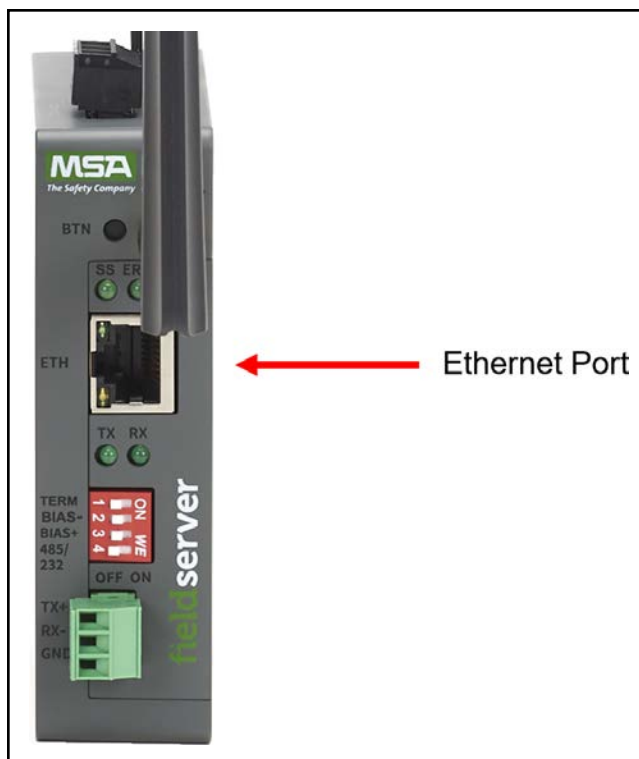
3.5.1 Wiring

RS-485		RS-232	
OEM Device orBMS RS-485 Wiring	Gateway Pin Assignment	OEM Device orBMS RS-485 Wiring	Gateway Pin Assignment
RS-485 +	TX +	RS-232 -	TX +
RS-485 -	RX -	RS-232 +	RX -
GND	GND	GND	GND

NOTE: The RS-485/RS-232 is part of the RS-485/RS-232 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).

3.6 10/100 Ethernet Connection Port

NOTE: Do not use shielded Ethernet cables. The Ethernet shield is connected to the internal 0V (digital ground) of the FieldServer. Using shielded Ethernet cables could potentially create ground loops with a possibility of damaging the Fieldserver or equipment connected to it.



The Ethernet Port is used both for Ethernet protocol communications and for configuring the gateway via the Web App. To connect the gateway, either connect the PC to the router's Ethernet port or connect the router and PC to an Ethernet switch. Use Cat-5 cables for the connection.

NOTE: The Default IP Address of the gateway is 192.168.1.24, Subnet Mask is 255.255.255.0.

3.7 Antenna Selection and Installation

Antennas must be of the same type and with lower or equal gain per the following table.

Frequency (MHz)	Antenna Type	Max Antenna Gain
2402-2480	Linear vertical Omnidirectional	2
2412-2462	Linear vertical Omnidirectional	2

For more details, visit www.MSASafety.com

4 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
FPA –W44 (Maximum)	315mA	180mA
ProtoAir Family	12VDC	24VDC
FPA –C4X (Typical)	320mA	185mA
FPA –C4X (Maximum)	670mA	390mA

⚠ WARNING!

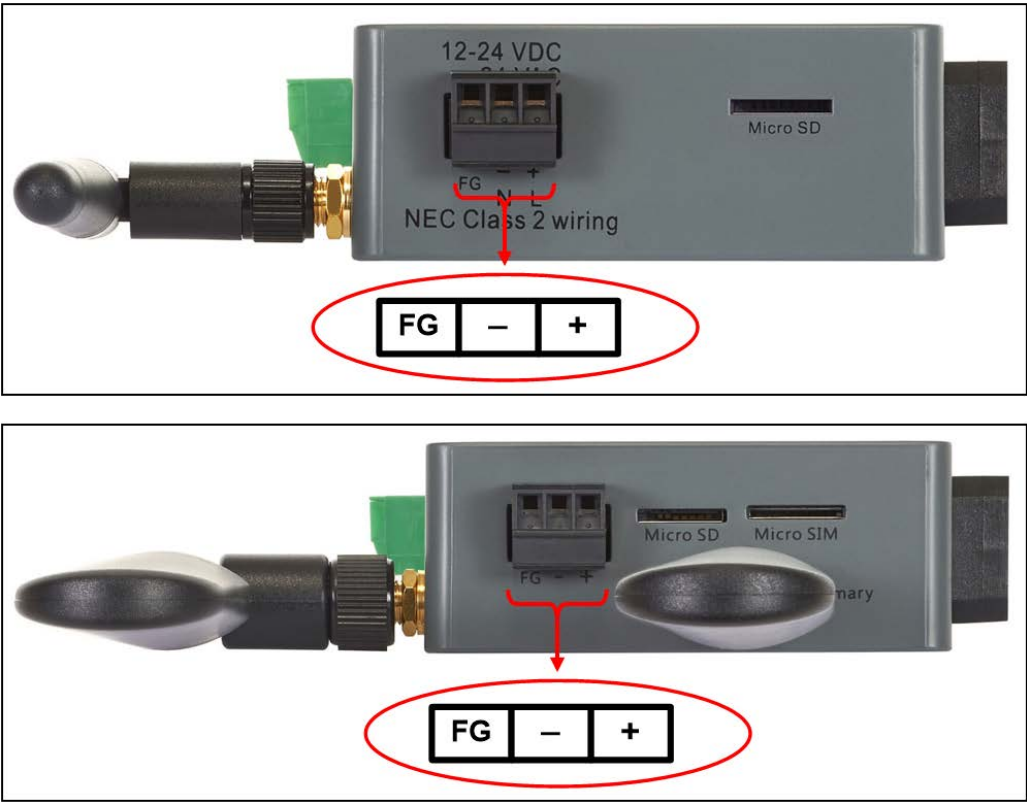
- Ensure that the power supply used complies with the specifications provided in **Section 11.7 Specifications**.
- Ensure that the cable is grounded using the FG or “Frame GND” terminal.
- Frame GND should be connected to ensure personnel safety and to limit material damages due to electrical faults. 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.

Failure to follow these warnings can result in serious personal injury or death.

Apply power to the ProtoAir as shown below.

- The ProtoAir FPA-W44 is powered by 12-24VDC or 24VAC.
 - Supports both Full-Wave and Half-Wave AC
- The ProtoAir FPA-C4X is powered by 12-24VDC.

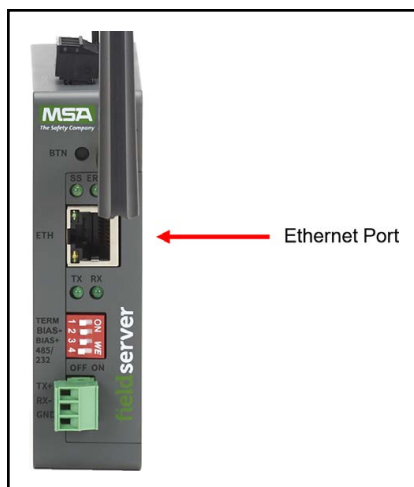
NOTE: Only Class 2 Power Supply Units (PSUs) must be used to power FieldServers.



5 Connect the PC to the Gateway

5.1 Connecting to the Gateway via Ethernet

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



5.1.1 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:

☒ Use the following IP address:

IP address:	192 . 168 . 1 . 11
Subnet mask:	255 . 255 . 255 . 0
Default gateway:	. . .

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

5.2 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**.
- If the PC and the FieldServer are on different IP networks, assign a static IP Address to the PC on the 192.168.X.X network.

NOTE: If the IP Address of the ProtoAir has been changed, the IP Address can be discovered using the FS Toolbox utility. See [Section 10.2 Lost or Incorrect IP Address](#) for instructions.

6 Setup Web Server Security

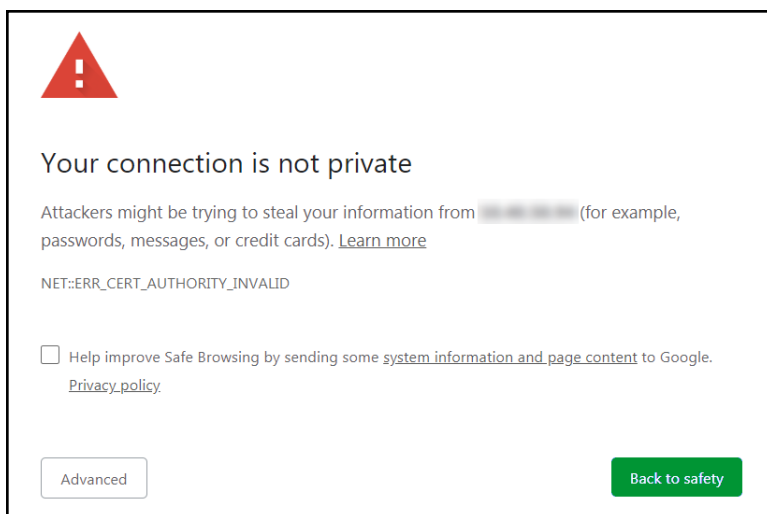
6.1 Login to the FieldServer

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.

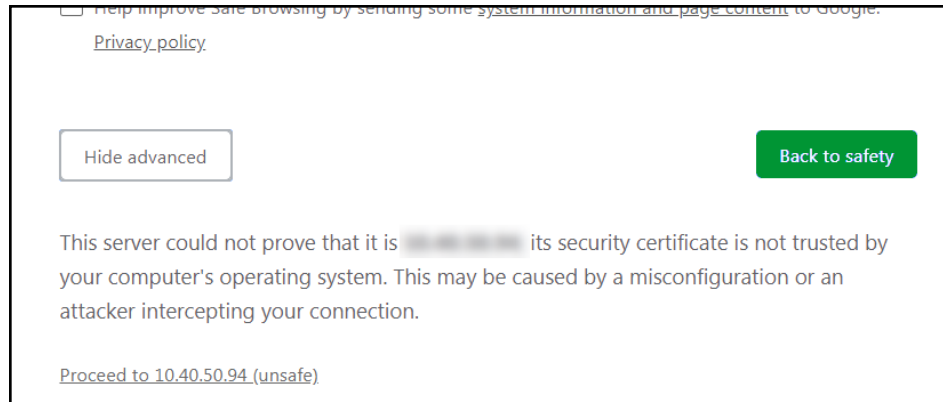
- When the Web Server Security Unconfigured window appears, read the text and choose whether to move forward with HTTPS or HTTP.



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

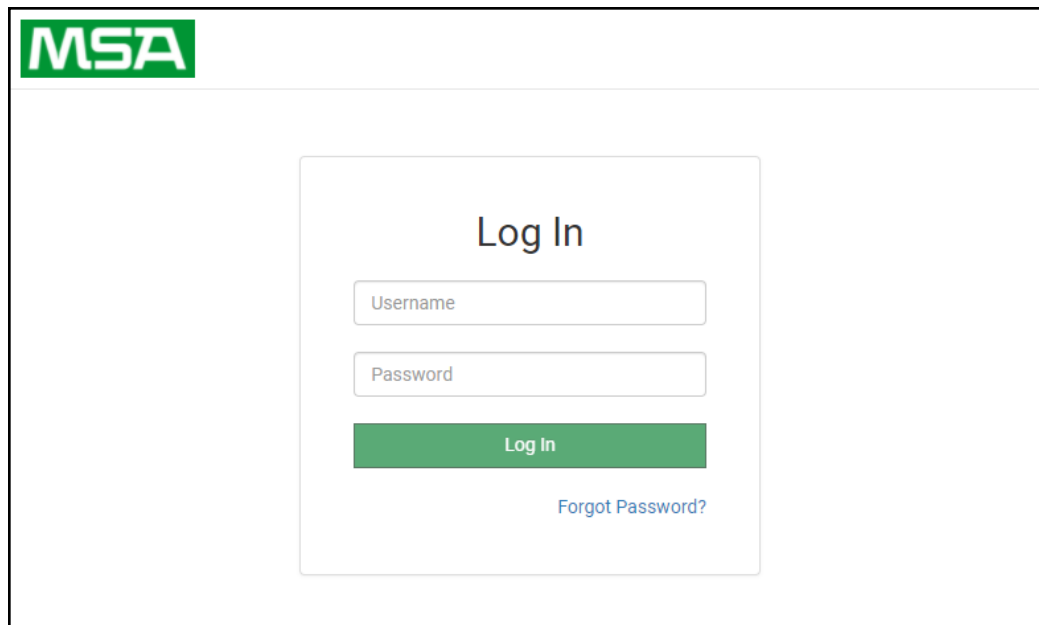


- Additional text will expand below the warning, click the underlined text to go to the IP Address. In the example below this text is “[Proceed to <FieldServer IP> \(unsafe\)](#)”.



- 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 [11.2 Change User Management Settings](#).

6.2 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.

Web server security is not configured



Please select the web security profile from the options below.

Note that browsers will issue a security warning when browsing to a HTTPS server with an untrusted self-signed certificate.

Mode

☐ HTTPS with default trusted TLS certificate (requires internet connection to be trusted)

☐ HTTPS with own trusted TLS certificate

☐ HTTP (not secure, vulnerable to man-in-the-middle attacks)

Save

NOTE: Cookies are used for authentication.

NOTE: To change the web server security mode after initial setup, go to [Section 11.1 Change Web Server Security Settings After Initial Setup](#).

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

6.2.1 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.

Certificate

```
XzyMbQZFIRuJZJPe7CTHLcHOrHLowoUFoVTaBMYd4d6VGdNklKazByWKcNOL7mrX
A4IBAQBFBM+IPvOx3T/47VEmaiXqE3bx3zEuBFJ6pWPlw7LHf2r2ZoHw+9xb+aNMU
dVyAelhBMTMsni2ERvQVp0xj3psSv2EJyKXS1bOYNRLsq7UzpwuAdT/Wy3o6vUM5
K+Cwf9qEoQ0LuxDZTIECt67MkcHMiuFi5pk7TRicHnQF/sfOAYOulduHOy9exlk9
FmHFVDIZt/cJUaF+e74EuSph+gEr0lQo2wvmhyc7L22UXse1NoOfU2Zg0Eu1VVtu
JRryaMwIRFEWuuzMGZtKFWWC+8q2JQsVcqiRWM7naoblEhOCMH+sKHJMCxDoXGt
vtZjpZUoAL51YXxWSVcyZdGiAP5e
-----END CERTIFICATE-----
```

Private Key

```
sHB0zZoHr4YQSDk2BbYVzzbl0LDuKtc8+JiO3ooGjoTuHnqkeAj/fKfbTAsKeAzw
gKQe+H5UQNK0bdvZfOJrm6daDK2vVDmR5k+jUUhEj5N49uplroB97MQgYotzgfT+
THlbpq5t1SIK617k04ObKmHF5l8fck+ru545sVmpeeZh0m5j5SURYAZMvbg5daCu
J4l5NlihbEvxRF4UK41ZDMCvujioPcBKUWrb1a/3XXnDnM2K9xyz2wze998D6Wk46
+7aOFY9F+7j5ljinakoS3GYtwCyH5jP+mPP1K6RnuiD019wwwGPb4dtN/RTnfd0eF
GYeVSkI9fxxkxDOFtfdWRZbM/rPin4tmO1Xf8HqONVN1x/iaMynOXG4cukoi4+VO
u0rZaUEsII2zNkfm7faASm5NBWg202Cy9IAYnuujs3aALi5uGBeekA62oTMxlzx
-----END RSA PRIVATE KEY-----
```

Private Key Passphrase

Specify if encrypted

Save

- 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.

6.2.2 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.

7 Setup Network

7.1 Using FS-GUI to Input Network Settings

To navigate from the FS-GUI page to the Network Settings page follow the below instructions:

- Find the Navigation tree across the left side of the screen.
- Click the arrow next to the FieldServer title/CN number to expand the tree.

The screenshot shows the MSA FieldServer Manager interface. On the left is a 'Navigation' panel with a tree structure. The main area displays the 'DCC000 QS.CSV v1.00a' status page, which includes a table of system information and several action buttons at the bottom.

Navigation Panel:

- ▼ DCC000 QS.CSV v1.00a
 - About
 - Setup
 - View
 - User Messages
 - Diagnostics

Status Page (DCC000 QS.CSV v1.00a):

Name	Value
Driver_Configuration	DCC000
DCC_Version	V6.05p (A)
Kernel_Version	V6.51c (D)
Release_Status	Normal
Build_Revision	6.1.3
Build_Date	2021-09-08 13:12:43 +0200
BIOS_Version	4.8.0
FieldServer_Model	FPC-N54
Serial_Number	1929600190VZL
Carrier_Type	-
Data_Points_Used	220
Data_Points_Max	1500

Action Buttons: Home, HELP (?), Contact Us, System Restart, System Reboot, System Time Synch, Reset Cycle Times, Logout.

- Click on the arrow next to Setup to expand the tree.
- Click on Network Settings.

This close-up shows the 'Navigation' panel with the 'Setup' option expanded, revealing a list of sub-options. 'Network Settings' is highlighted with a grey background.

Navigation Panel:

- ▼ DCC000 QS.CSV v1.00a
 - About
 - ▼ Setup
 - File Transfer
 - Network Settings
 - User Management
 - Security
 - Time Settings
 - View
 - User Messages
 - Diagnostics

7.1.1 Ethernet 1

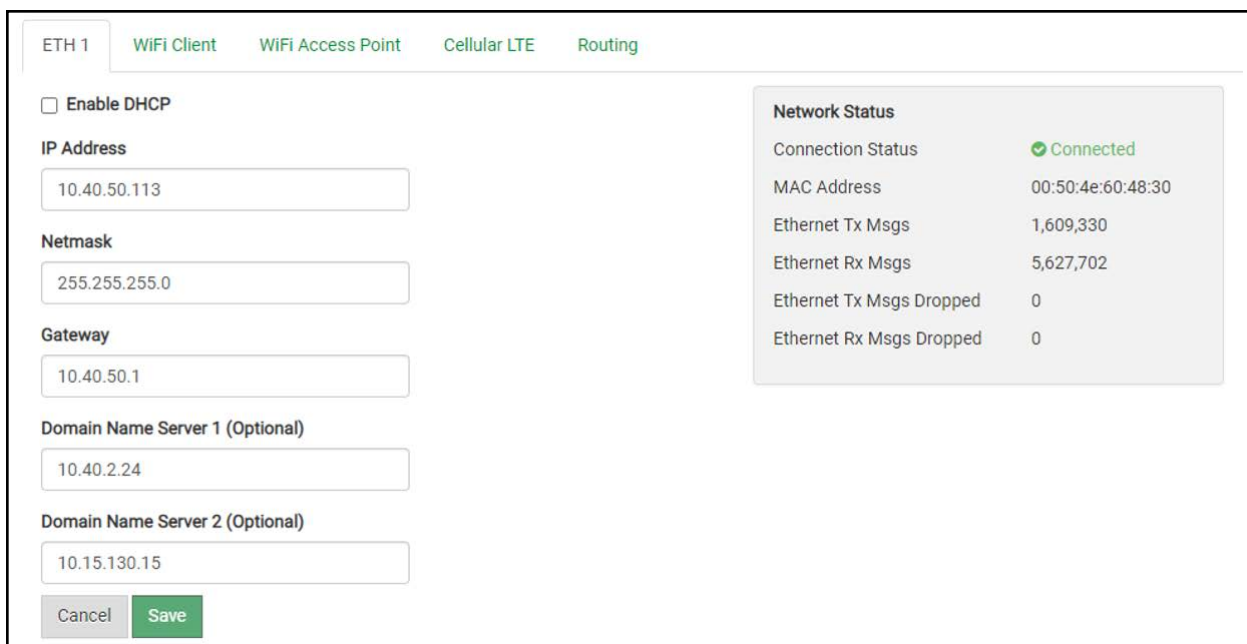
The ETH 1 section contains the wired network settings. To change the FieldServer IP Settings, follow these instructions:

- 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.



NOTE: The Rx is recieved andTx is transmitted.

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

7.1.2 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 7.1.4 Routing Settings](#)) to set the default connection to Wi-Fi Client.

ETH 1

WiFi Client

WiFi Access Point

Cellular LTE

Routing

☒ Enable

SSID

Password (Optional)

☒ Enable DHCP

IP Address

Netmask

Gateway

Domain Name Server 1 (Optional)

Domain Name Server 2 (Optional)

Network Status

Connection Status ✔ Connected
 MAC Address D4:53:83:55:07:04
 WiFi BSSID 78:BC:1A:52:C8:42
 WiFi Channel 2,462
 WiFi Tx Msgs 15
 WiFi Rx Msgs 47
 WiFi Tx Msgs Dropped 0
 WiFi Rx Msgs Dropped 0
 WiFi Pairwise Cipher CCMP
 WiFi Group Cipher CCMP
 WiFi Key Mgmt WPA2-PSK
 WiFi Link 72.2 MBit/s MCS 7 short GI
 WiFi Signal Level -56 dBm

Wi-Fi Client Fields	Definition
Connection Status	Status of connection
MAC Address, BSSID, Channel	Wi-Fi Client MAC Address, BSSID, and Channel
Tx/Rx Msgs	Number of transmitted and received messages
Tx/Rx Msgs Dropped	Number of unanswered Tx or Rx messages
Pairwise Cipher	Type of encryption used for unicast traffic
Group Cipher	Identifies the type of encryption used for multicast / broadcast traffic
Key Mgmt	Encryption type
Link	Connection speed
Signal Level	Signal level in dBm (see Section 10.9 Wi-Fi and Cellular Signal Strength)

7.1.3 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. See the rest of the default settings listed in the screenshot below.

- 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.

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

7.1.4 Routing Settings

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

- 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.

ETH 1WiFi ClientWiFi Access PointCellular LTERouting

Set up the IP routing rules of your FieldServer for internet access and access to other networks.
If you want to reach another device that is not connected to the local network, you can add a rule to determine on which gateway the device must be routed to.

Interface	Destination Network	Netmask	Gateway IP Address	Priority ?
Cellular LTE	Default	-	10.40.50.1	255
ETH ▾	10.40.0.0	255.255.0.0	10.40.50.1	254
ETH ▾	10.136.0.0	255.255.0.0	10.40.50.1	100

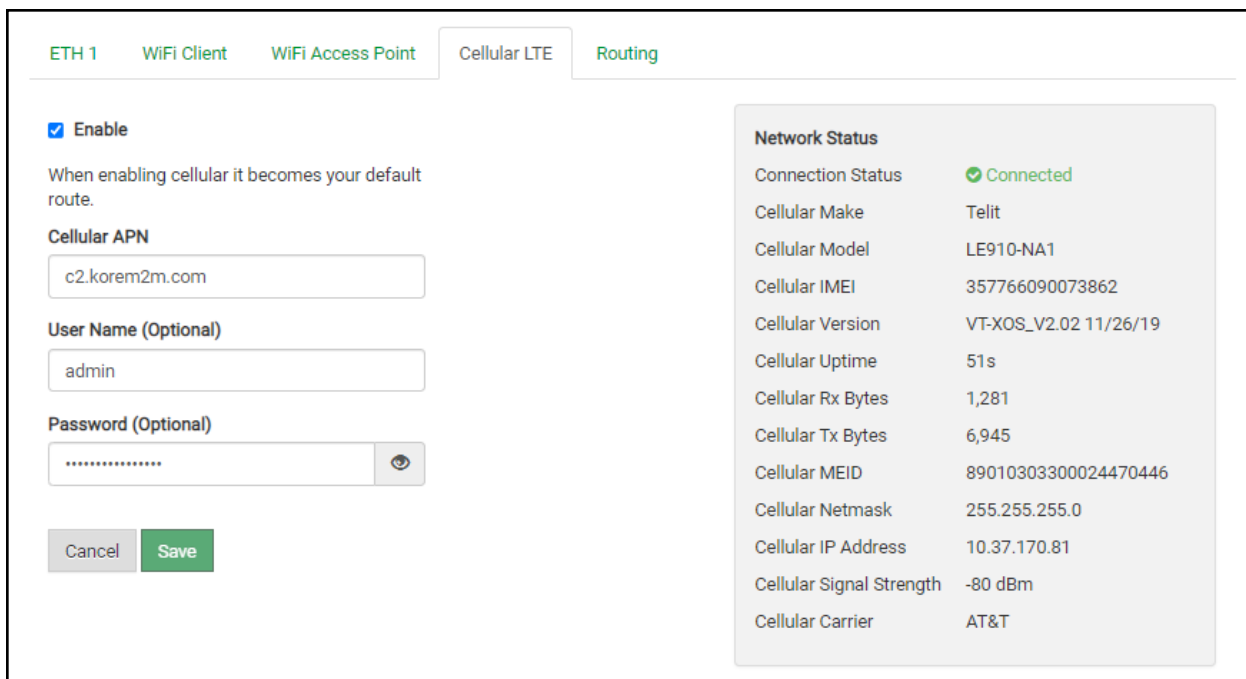
+ Add Rule

CancelSave

7.1.5 FPA-C4X: Cellular Settings

To change the Cellular settings, follow these instructions:

- Check the Enable tick box to allow connecting to the ProtoAir through the Grid.
- Modify the Settings manually as needed, via these fields: Cellular APN (see [Section 11.4 APN Table](#)), User Name, and Password.
- Click the Save button to activate the new settings.
- Power cycle the ProtoAir to update settings.



Cellular Fields	Definition
Connection Status	Status of connection
Make/Model/Version	Vendor, model and software version of the internal cellular chip
Uptime	Length of time connected
Tx/Rx Bytes	Receive and transmit bytes
MEID	Mobile Equipment ID; unique id for a device
IP Address/Netmask	Identifies the type of encryption used for multicast / broadcast traffic
Signal Strength	Strength of signal in dBm (see Section 10.9 Wi-Fi and Cellular Signal Strength)
Carrier	Cellular carrier provider

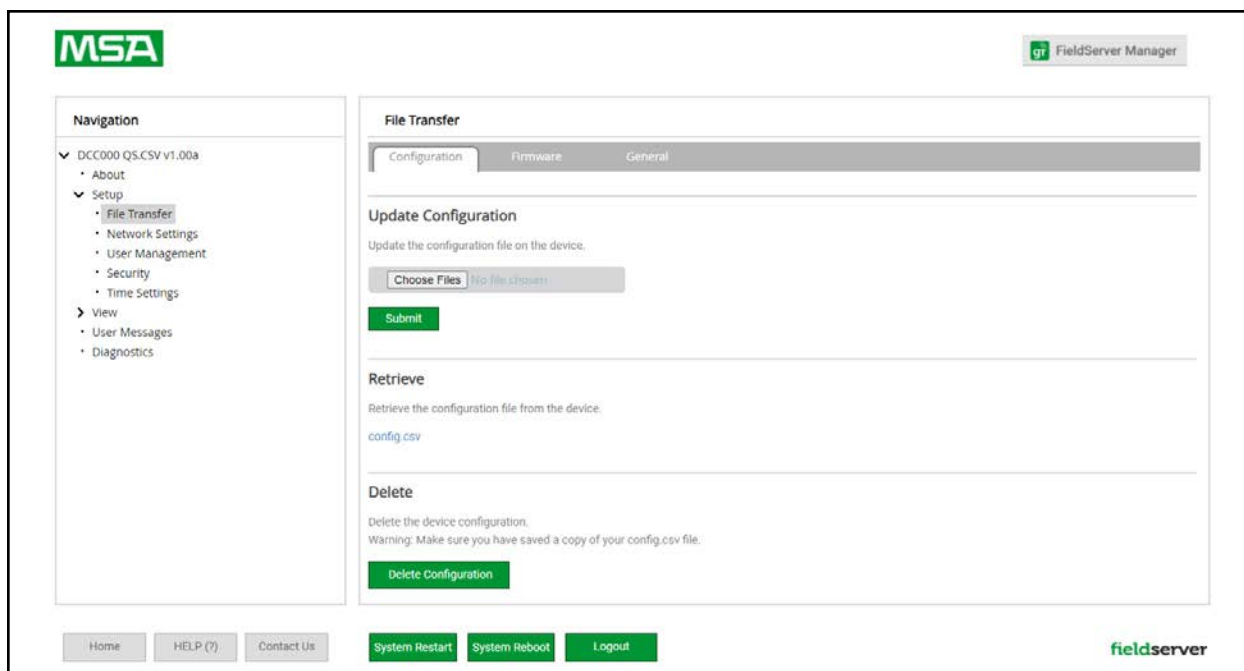
8 Configuring the ProtoAir

8.1 Retrieve the Sample Configuration File

The configuration of the ProtoAir is provided to the ProtoAir's operating system via a comma-delimited file called "CONFIG.CSV".

If a custom configuration was ordered, the ProtoAir will be programmed with the relevant device registers in the Config.csv file for the initial start-up. If not, the product is shipped with a sample config.csv that shows an example of the drivers ordered.

- In the main menu of the FS-GUI screen, go to "Setup", then "File Transfer", and finally "Retrieve".
- Click on "config.csv", and open or save the file.



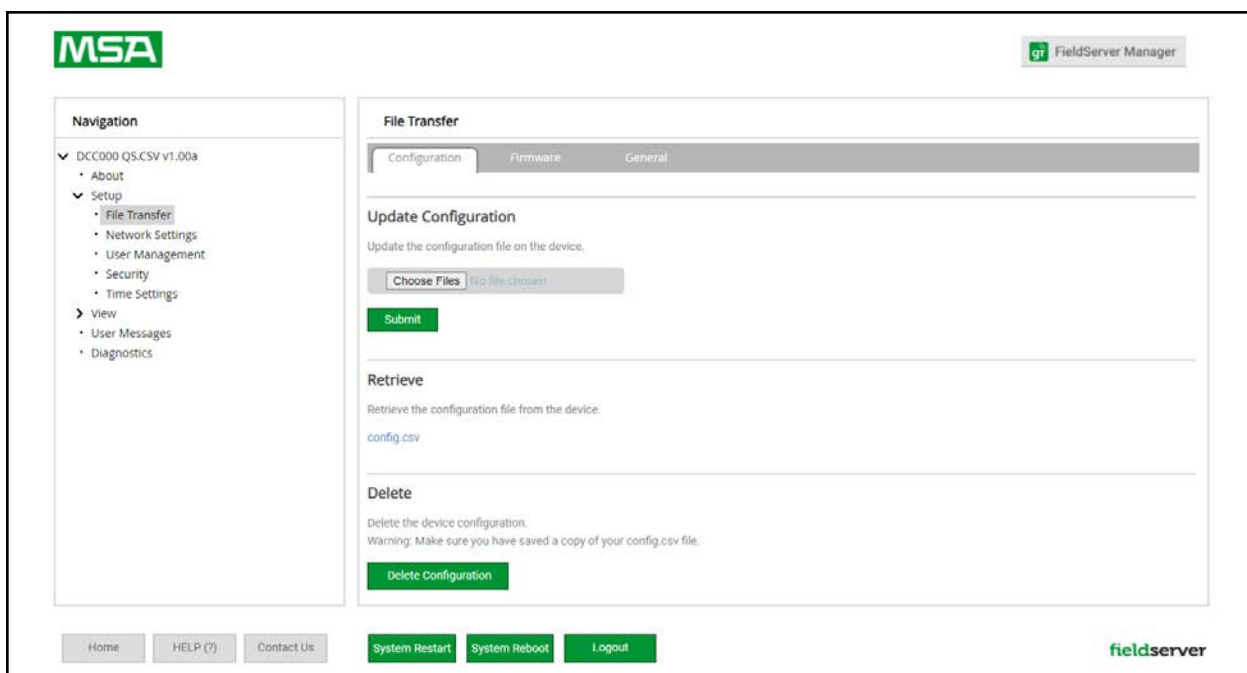
8.2 Change the Configuration File to Meet the Application

Refer to the FieldServer Configuration Manual in conjunction with the Driver supplements for information on configuring the ProtoAir.

8.3 Load the Updated Configuration File

8.3.1 Using the FS-GUI to Load a Configuration File

- In the main menu of the FS-GUI screen, click “Setup”, then “File Transfer” and finally “Update”.
- Browse and select the .csv file, open, then click “Submit”.



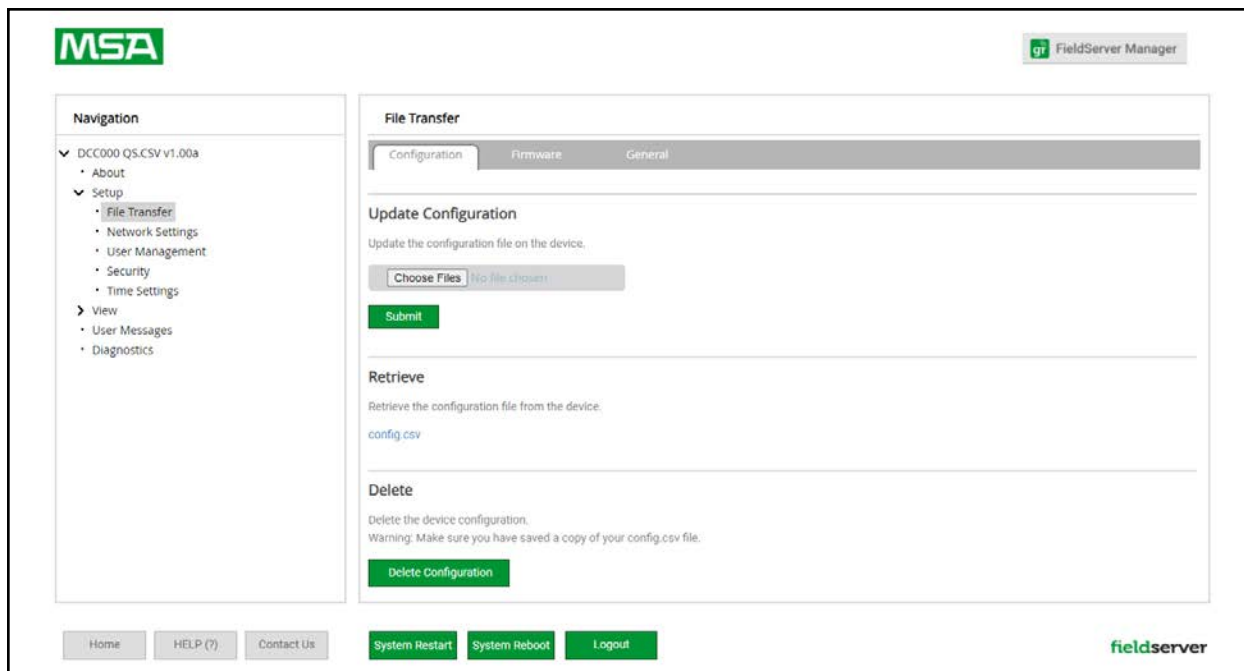
- Once download is complete, a message bar will appear confirming that the configuration was updated successfully.
- Click the System Restart Button to put the new file into operation.

NOTE: It is possible to do multiple downloads to the ProtoAir before resetting it.

8.3.2 Retrieve the Configuration File for Modification or Backup

To get a copy of the configuration file for modifying or backing up a configuration on a local computer, do the following:

- In the main menu of the FS-GUI screen, click “Setup”, then “File Transfer”.

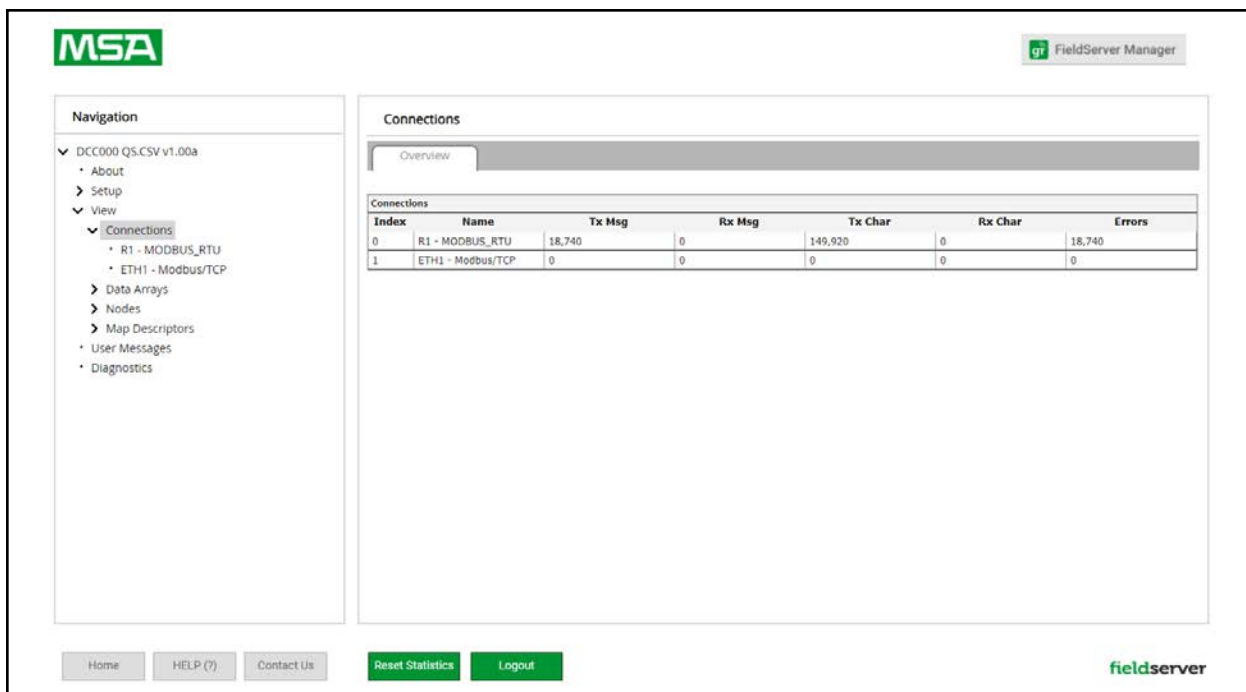


- Click the “config.csv” link under the “Retrieve” heading in the middle section of the screen.
 - The file will automatically download to the web browser’s default download location.
- Edit or store the file as desired.

NOTE: Before using any backup configuration file to reset the configuration settings, check that the backup file is not an old version.

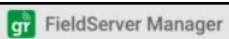
8.4 Test and Commission the ProtoAir

- Connect the ProtoAir to the third party device(s), and test the application.
- From the landing page of the FS-GUI click on “View” in the navigation tree, then “Connections” to see the number of messages on each protocol.



NOTE: For troubleshooting assistance refer to [Section 10 Troubleshooting](#), or any of the troubleshooting appendices in the related driver supplements and configuration manual. MSA Safety also offers a technical support on the MSA Safety website, which contains a significant number of resources and documentation that may be of assistance.

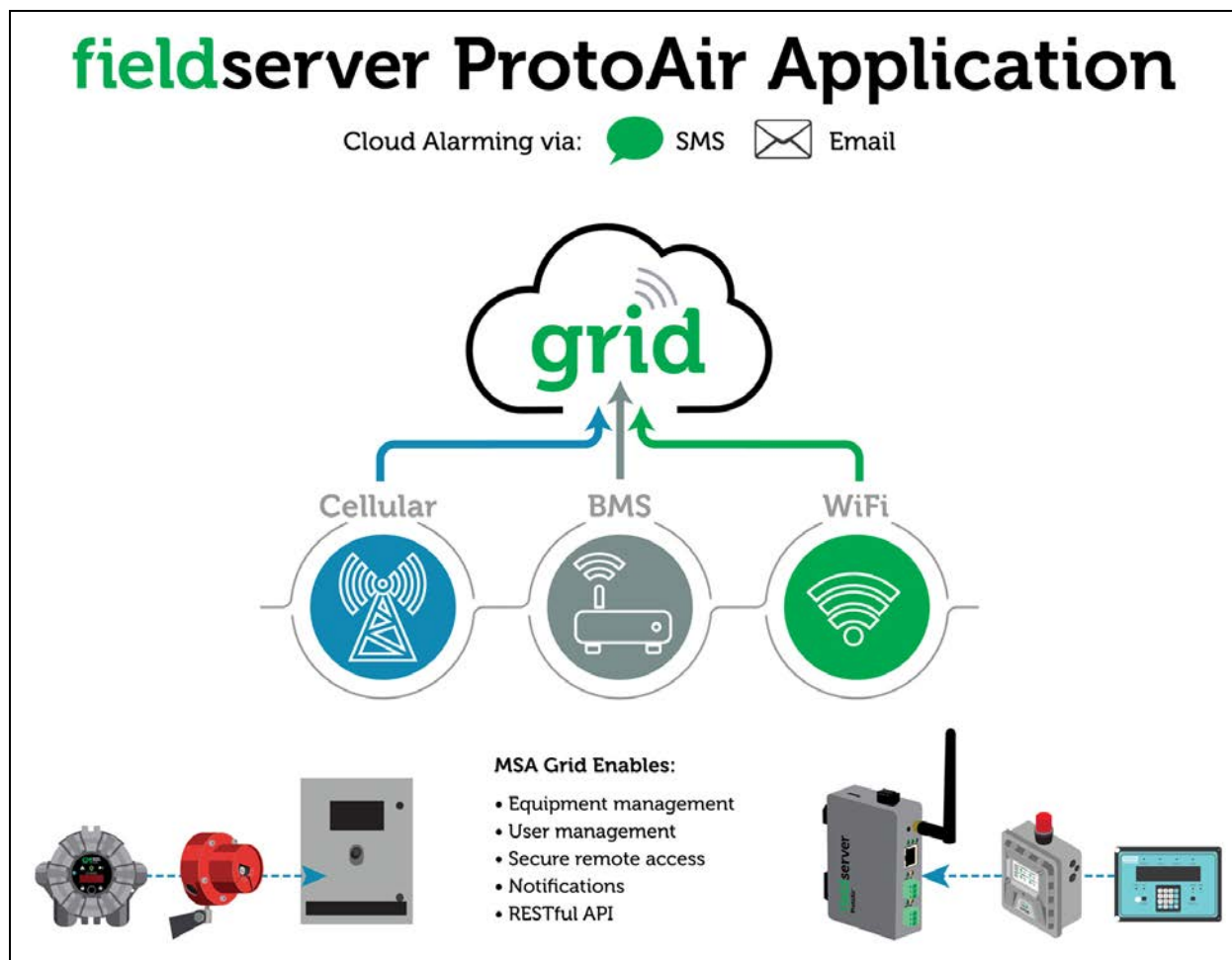
8.4.1 Accessing the FieldServer Manager

NOTE: The FieldServer Manager tab  (see image above) allows users to connect to the Grid, MSA Safety's device cloud solution for IIoT. The FieldServer Manager enables secure remote connection to field devices through a FieldServer and its local applications for configuration, management, maintenance. For more information about the FieldServer Manager, refer to the [MSA Grid - FieldServer Manager Start-up Guide](#).

9 Applications

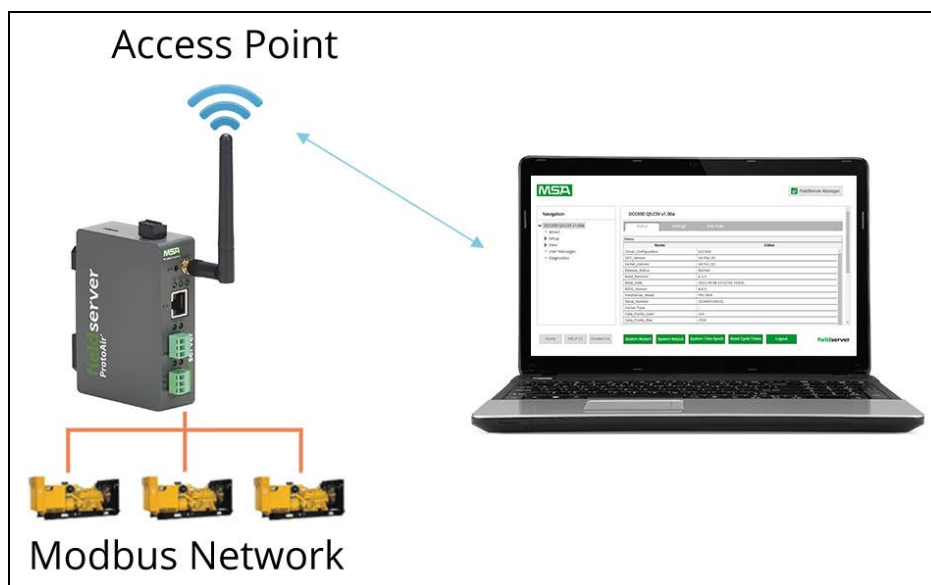
9.1 Connecting to the Network Through Wi-Fi

The ProtoAir can connect customer devices to the local Ethernet Network via Wi-Fi signal and connect customer devices to the cloud via cellular for remote accessibility.



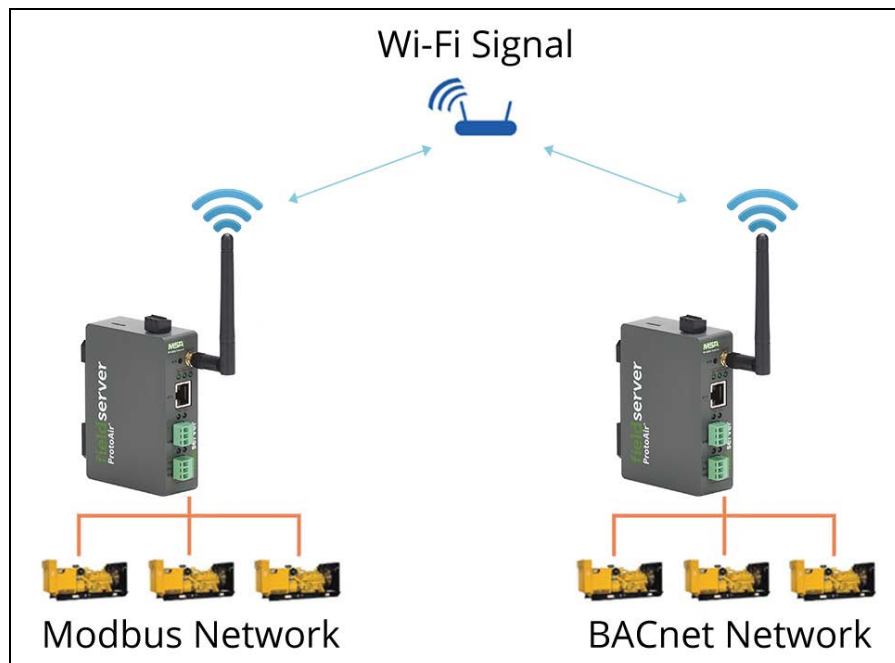
9.2 Connecting to Devices via Access Point

Customer devices setup on the ProtoAir can be connected to via the ProtoAir's dedicated Access Point.



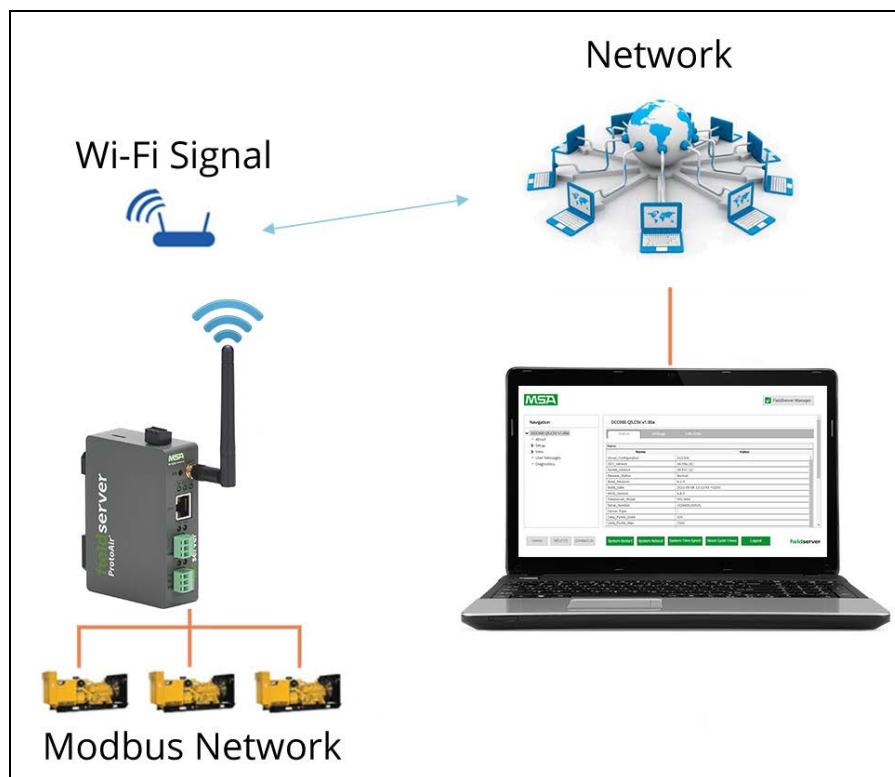
9.3 Device Communications via Wi-Fi

The ProtoAir can connect multiple customer devices via Wi-Fi.



9.4 Connecting Devices to the Network

The ProtoAir can connect devices to the local Network via Wi-Fi.



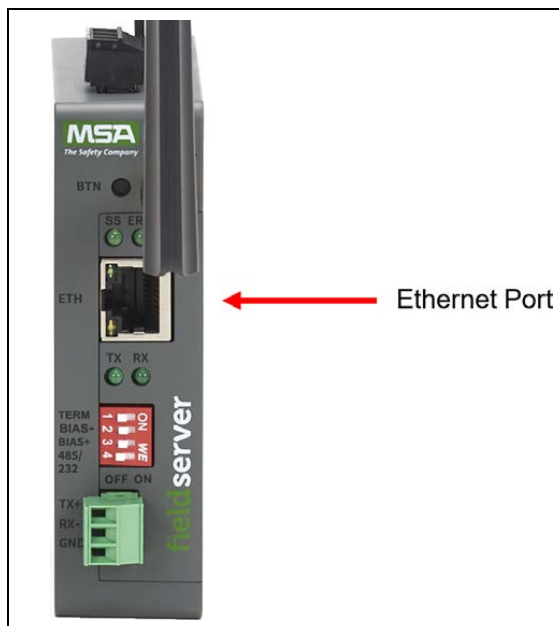
10 Troubleshooting

10.1 Communicating with the ProtoAir Over the Network

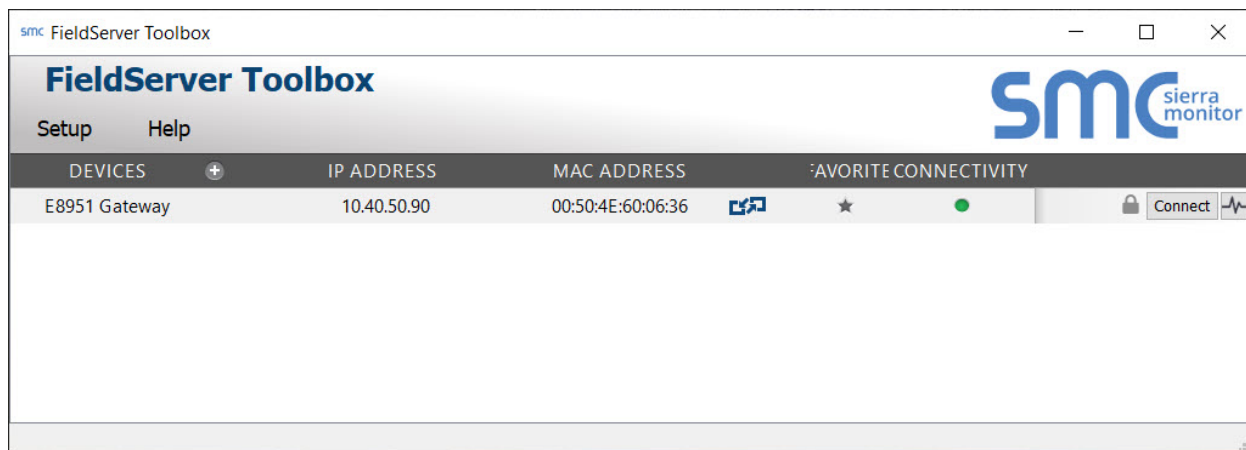
- Confirm that the network cabling is correct.
- Confirm that the computer network card is operational and correctly configured.
- Confirm that there is an Ethernet adapter installed in the PC's Device Manager List, and that it is configured to run the TCP/IP protocol.
- Check that the IP netmask of the PC matches the ProtoAir. The Default IP Address of the ProtoAir is 192.168.1.X, Subnet Mask is 255.255.255.0.
 - Go to Start|Run
 - Type in "ipconfig"
 - The account settings should be displayed
 - Ensure that the IP Address is 102.168.1.X and the netmask 255.255.255.0
- Ensure that the PC and ProtoAir are on the same IP Network, or assign a Static IP Address to the PC on the 192.168.1.X network.

10.2 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.

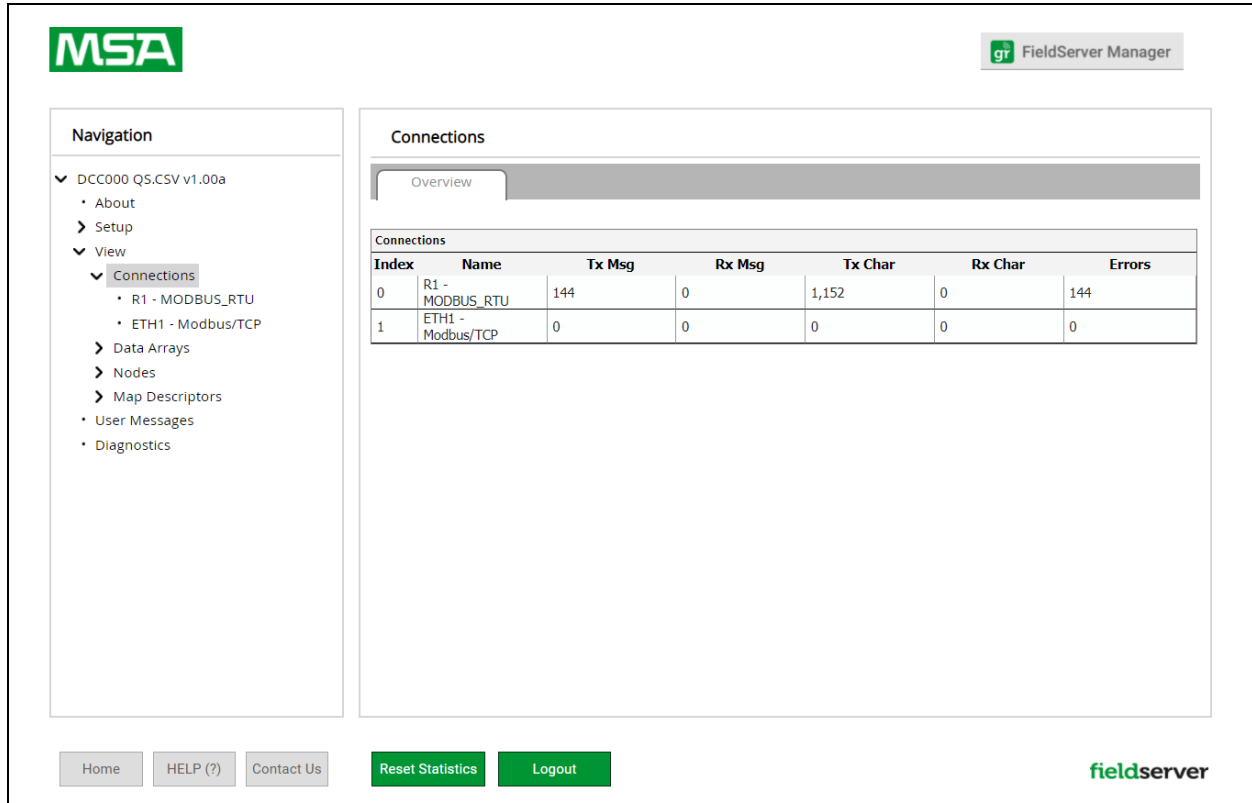


- Connect a standard Cat-5 Ethernet cable between the user's PC and ProtoAir.
- Double click on the FS Toolbox Utility and click Discover Now on the splash page.
- Check for the IP Address of the desired gateway.



10.3 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 10.4 Checking Wiring and Settings** for the relevant wiring and settings.



The screenshot shows the MSA FieldServer Manager web interface. On the left is a navigation menu with options like About, Setup, View, Connections, Data Arrays, Nodes, Map Descriptors, User Messages, and Diagnostics. The 'Connections' section is active, displaying a table with connection details.

Index	Name	Tx Msg	Rx Msg	Tx Char	Rx Char	Errors
0	R1 - MODBUS_RTU	144	0	1,152	0	144
1	ETH1 - Modbus/TCP	0	0	0	0	0

At the bottom of the interface, there are buttons for Home, HELP (?), Contact Us, Reset Statistics, and Logout, along with the fieldserver logo.

10.4 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 10.6 LED Functions**)
- Check baud rate, parity, data bits, stop bits.
- Check device address.
- Verify wiring.
- Verify the device is connected to the same subnet as the ProtoAir.

Field COM problems:

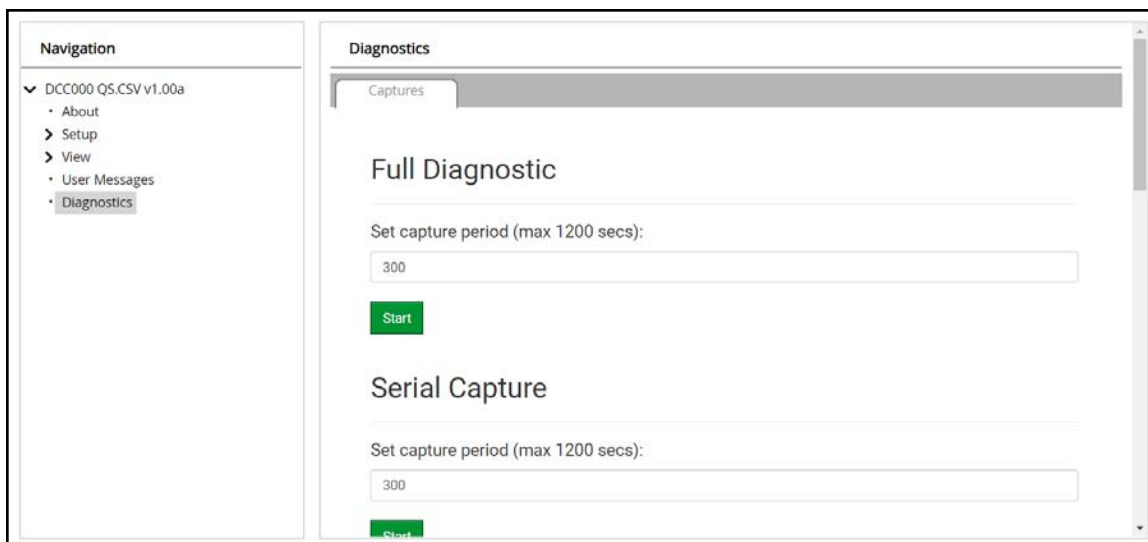
- Visual observations of LEDs on the ProtoAir. (**Section 10.6 LED Functions**)
- Verify wiring.
- Verify IP Address setting.

NOTE: If the problem still exists, a Diagnostic Capture needs to be taken and sent to support. (**Section 10.5 Taking a FieldServer Diagnostic Capture**)

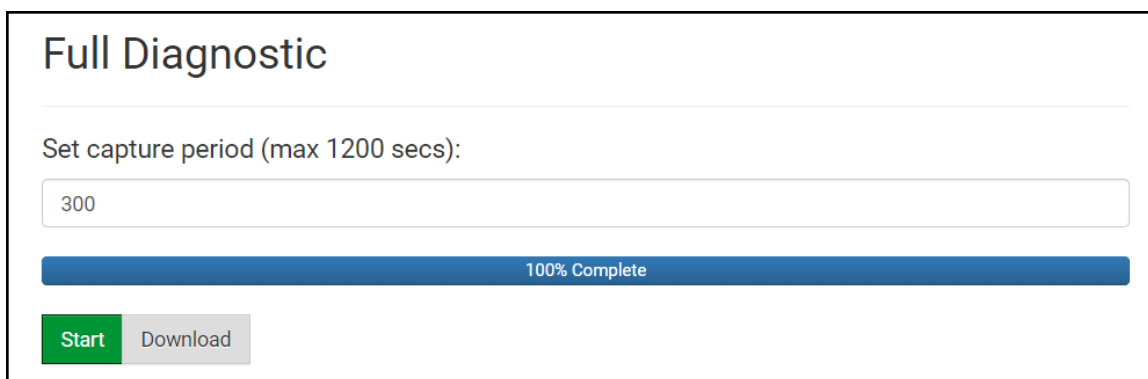
10.5 Taking a FieldServer Diagnostic Capture

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



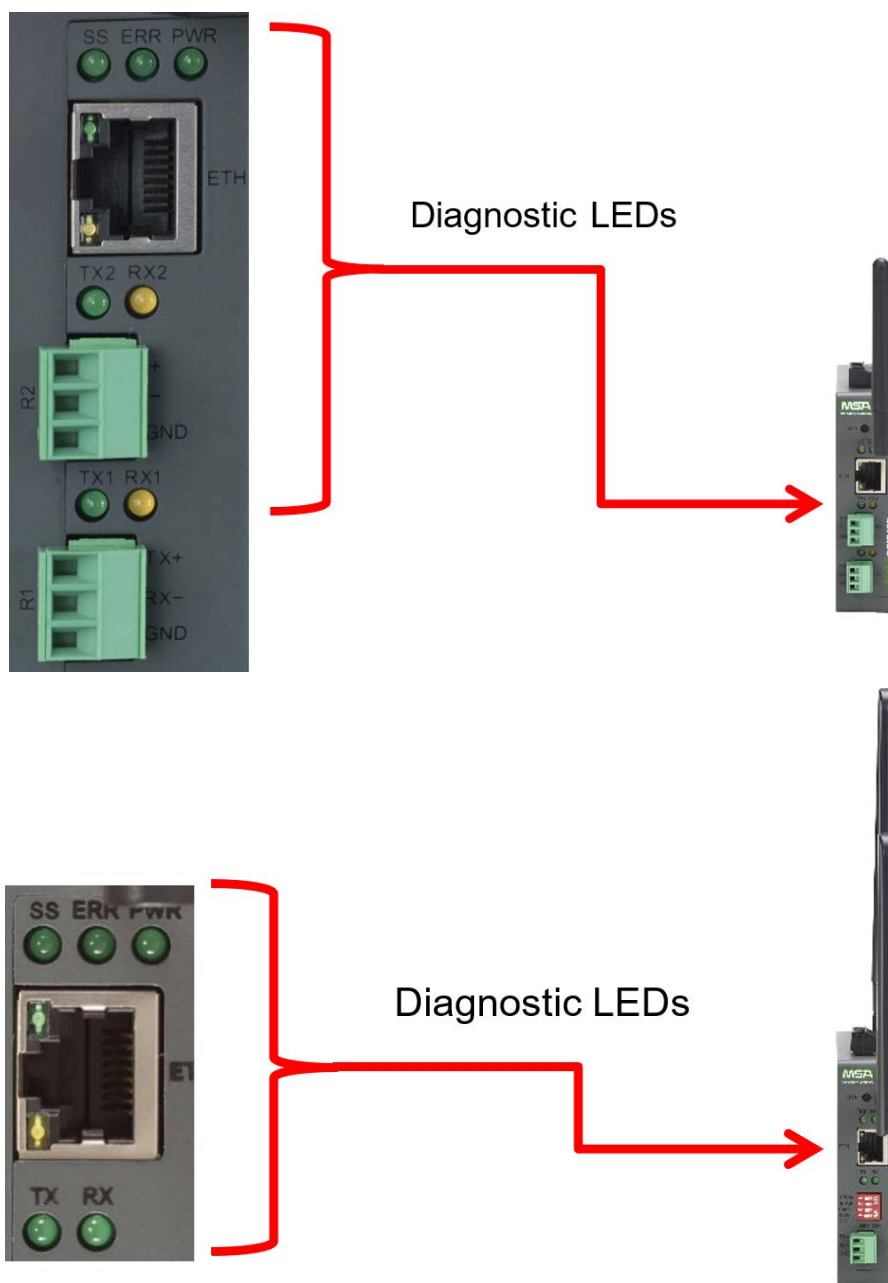
- Go to Full Diagnostic and select the capture period.
- Click the Start button under the Full Diagnostic heading to start the capture.
 - When the capture period is finished, a Download button will appear next to the Start button



- 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.

10.6 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. For the FPA-W44 , 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. For the FPA-W44 , TX1 applies to the R1 connection while TX2 applies to the R2 connection.

10.7 Factory Reset Instructions

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

10.8 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.

10.9 Wi-Fi and Cellular Signal Strength

Wi-Fi	Cellular
<60dBm – Excellent	< 60dBm – Excellent
<70dBm – Very good	<70dBm – Very good
<80dBm – Good	<80dBm – Good
>80dBm – Weak	<90dBm – Weak
	>90dBm – Spotty; not good for data

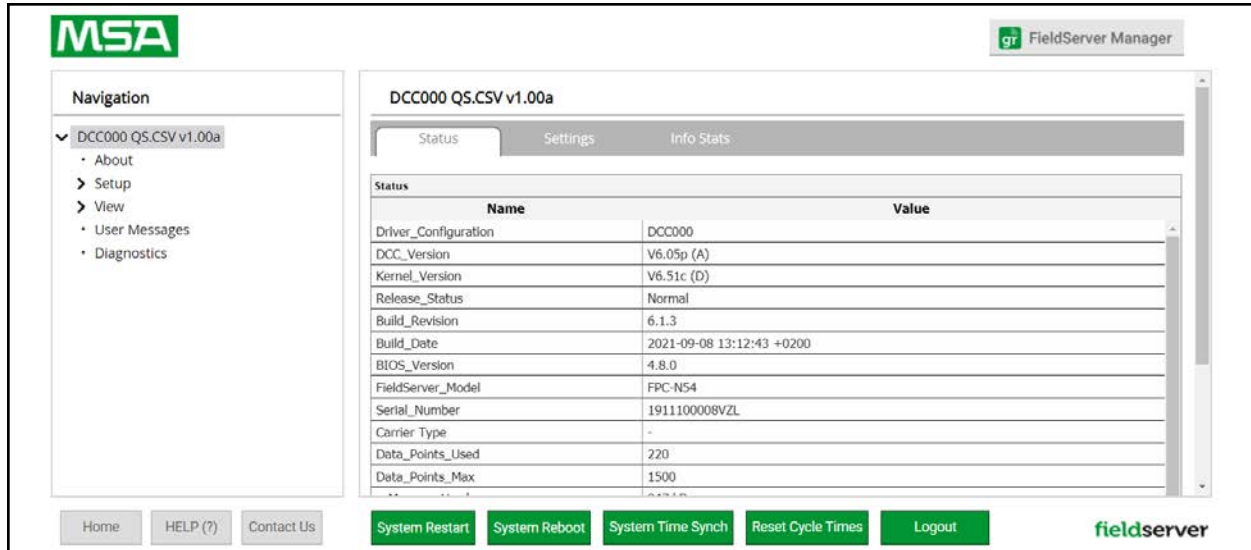
NOTE: If the signal is weak or spotty, try to improve the signal strength by checking the antenna and the FieldServer position.

11 Additional Information

11.1 Change Web Server Security Settings After Initial Setup

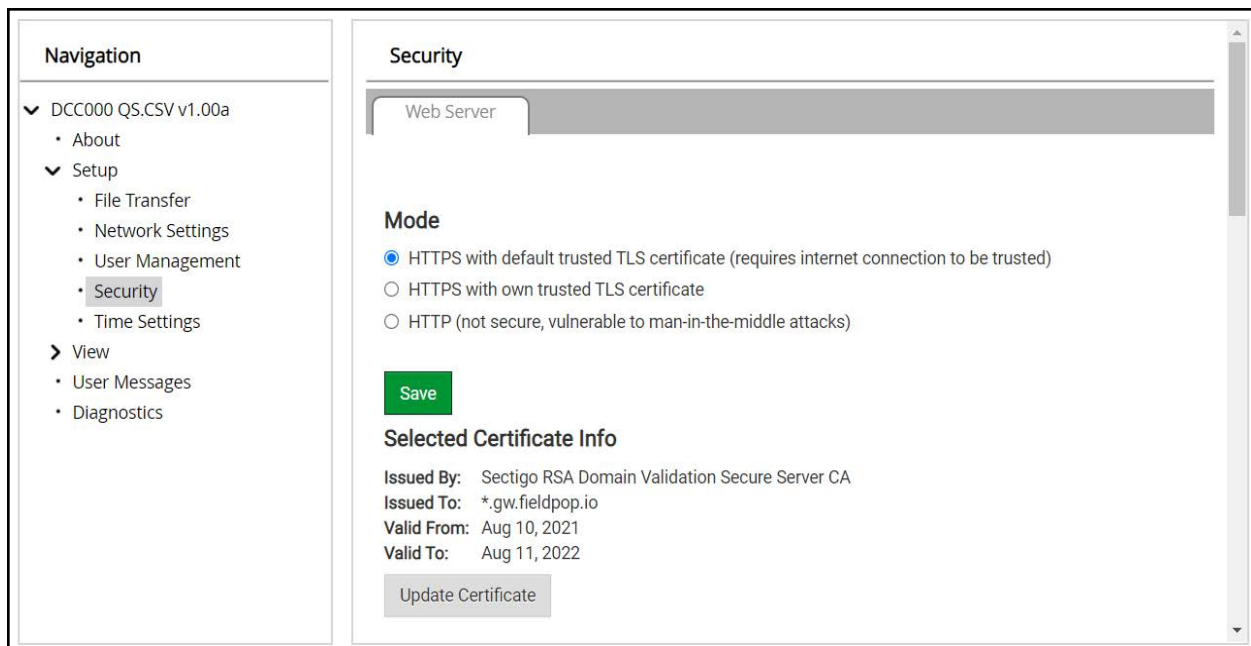
NOTE: Any changes will require a FieldServer reboot to take effect.

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



11.1.1 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 6.2.1 HTTPS with Own Trusted TLS Certificate**
- Click the Save button.

11.1.2 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.

The screenshot shows the 'Security' configuration page. On the left is a 'Navigation' panel with a tree structure. The 'Security' option is highlighted. The main content area is titled 'Security' and has a 'Web Server' tab selected. Under the 'Mode' section, three radio buttons are present: 'HTTPS with default trusted TLS certificate (requires internet connection to be trusted)' (which is selected), 'HTTPS with own trusted TLS certificate', and 'HTTP (not secure, vulnerable to man-in-the-middle attacks)'. Below the mode selection is a green 'Save' button. Under the 'Selected Certificate Info' section, the following details are displayed: 'Issued By: Sectigo RSA Domain Validation Secure Server CA', 'Issued To: *.gw.fieldpop.io', 'Valid From: Aug 10, 2021', and 'Valid To: Aug 11, 2022'. At the bottom of this section is a grey 'Update Certificate' button.

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

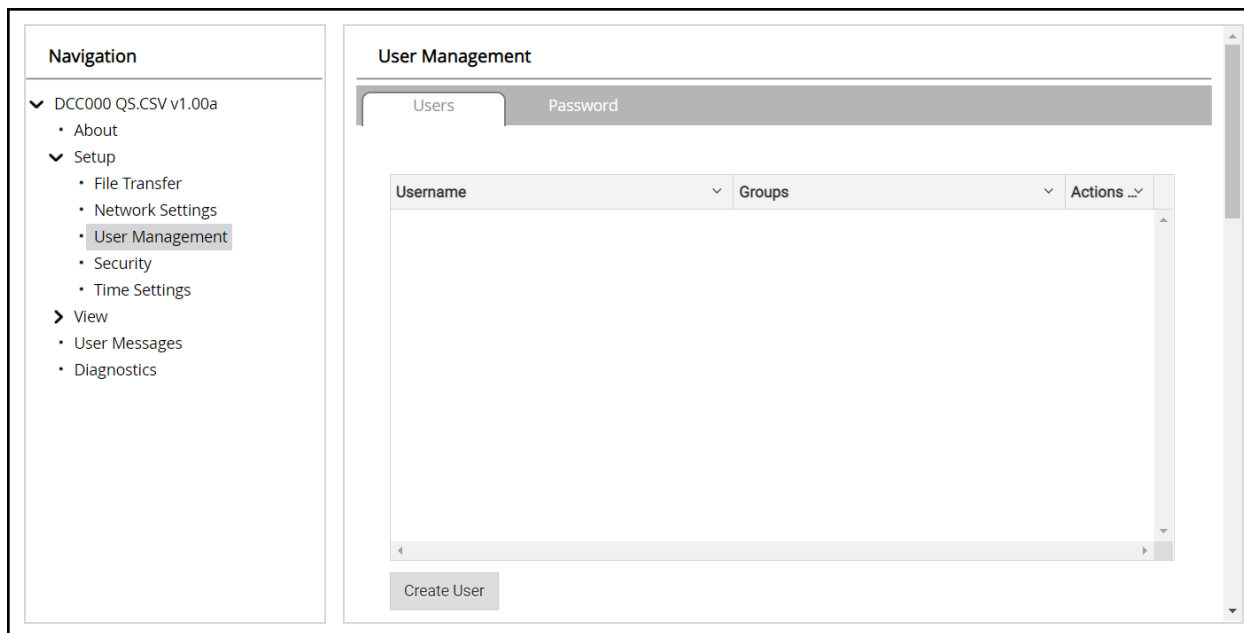
11.2 Change User Management Settings

- 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:

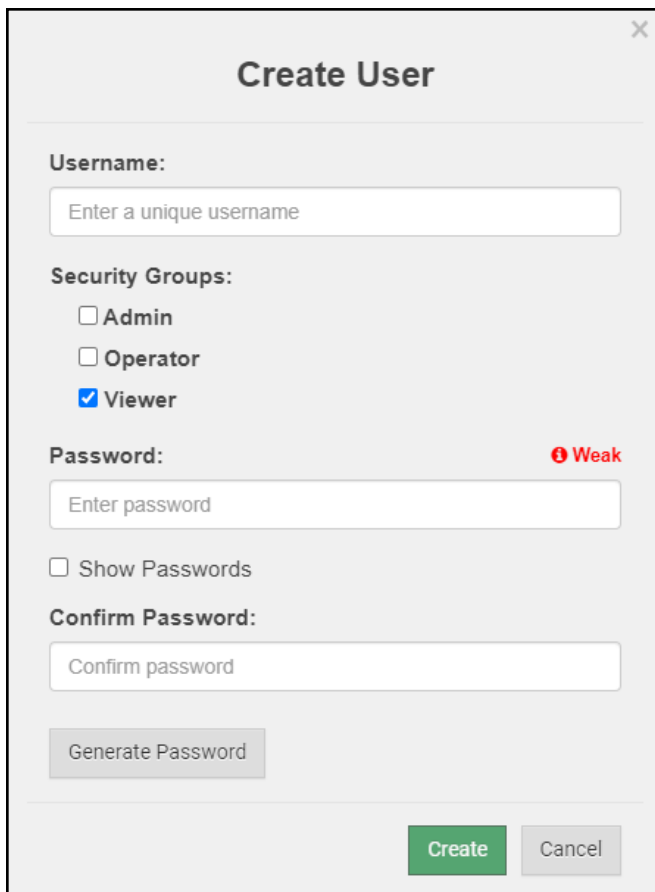
Admin – Can modify and view any settings on the FieldServer.

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

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

11.2.1 Create Users

- Click the Create User button.

A screenshot of a 'Create User' dialog box. The dialog has a title bar with a close button (X). The main content area is light gray. It contains the following fields and controls:

- Username:** A text input field with the placeholder text 'Enter a unique username'.
- Security Groups:** A section with three checkboxes: 'Admin' (unchecked), 'Operator' (unchecked), and 'Viewer' (checked).
- Password:** A text input field with the placeholder text 'Enter password'. To the right of the field is a red icon of an exclamation mark inside a circle, followed by the word 'Weak' in red.
- Show Passwords:** A checkbox that is currently unchecked.
- Confirm Password:** A text input field with the placeholder text 'Confirm password'.
- Generate Password:** A gray button located below the Confirm Password field.
- Create and Cancel buttons:** Two buttons at the bottom right: a green 'Create' button and a gray 'Cancel' button.

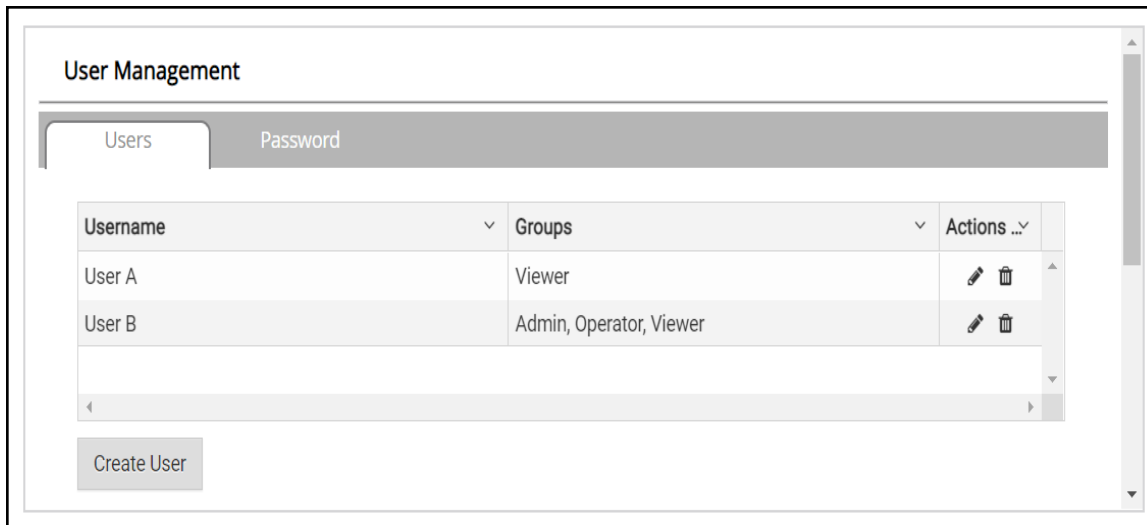
- Enter the new User fields: Name, Security Group and Password.
 - User details are hashed and salted**

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.

11.2.2 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.

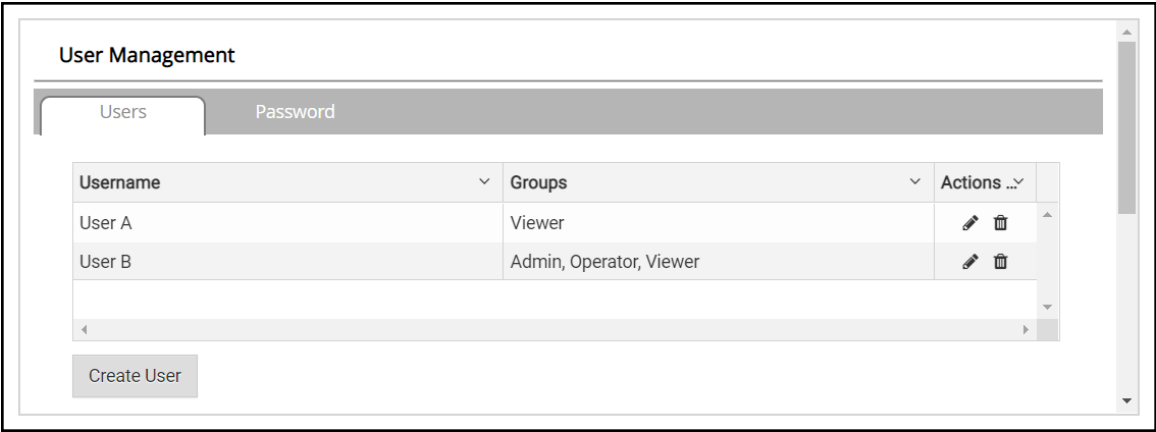
The 'Edit User' window contains the following fields and controls:

- Username:** A text field containing 'User A'.
- Security Groups:** Three checkboxes: ☐ Admin, ☐ Operator, and ☒ Viewer.
- Password:** A text field containing 'Optional'.
- ☐ Show passwords
- Confirm Password:** A text field containing 'Optional'.
-
- (green button)
-

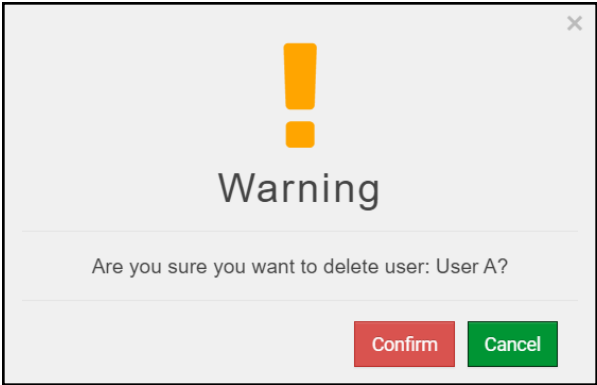
- Click Confirm.
- Once the Success message appears, click OK.

11.2.3Delete Users

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

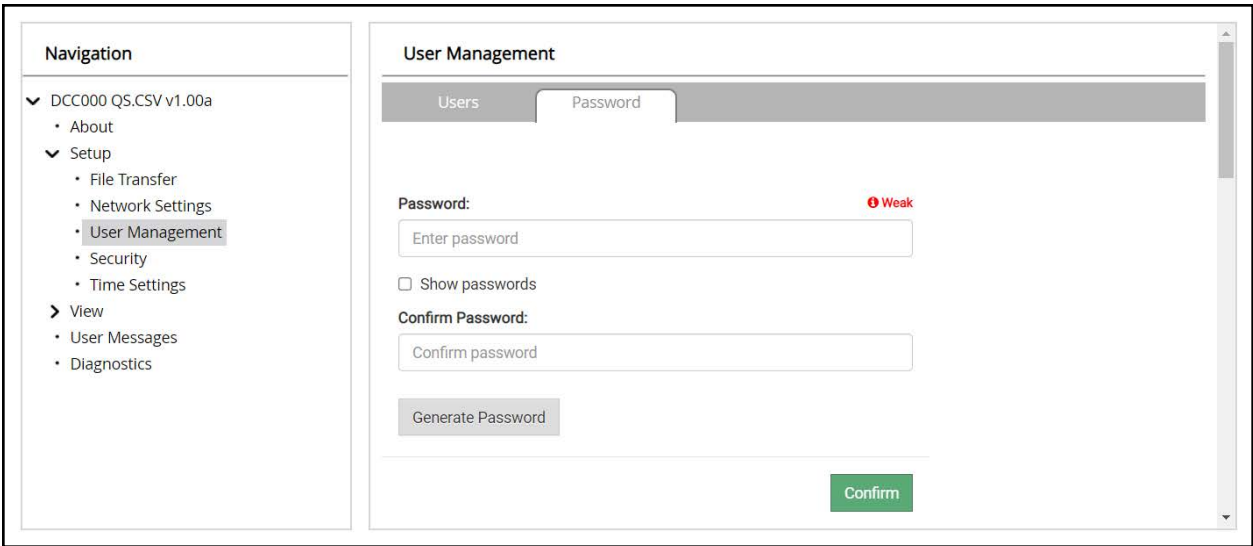


- When the warning message appears, click Confirm.



11.2.4Change 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.

11.3 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 10.2 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 to receive any firmware updates.

11.4 APN Table

Use the table below to enter one of the correct APNs for your sim card:

Cellular Provider	APN
AT&T	broadband NXTGENPHONE
Verizon	Vzwinternet internet
Kore	c2.korem2m.com

11.5 ProtoAir Part Number by Carrier

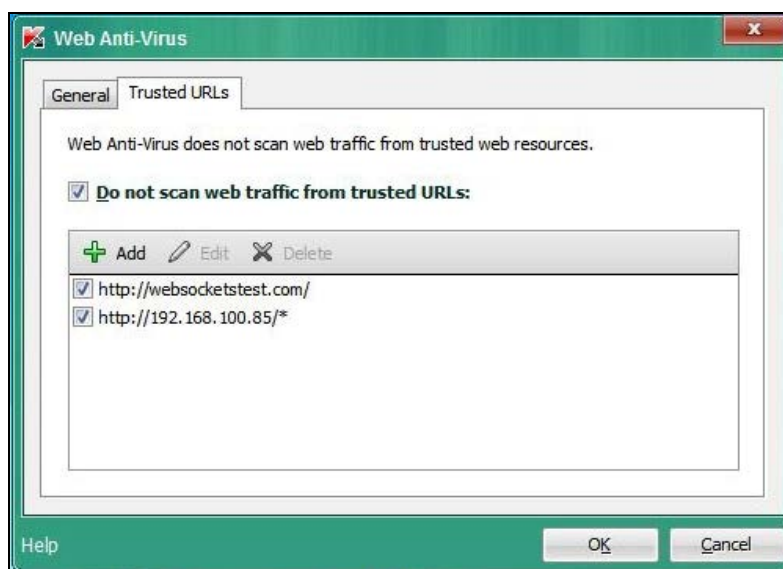
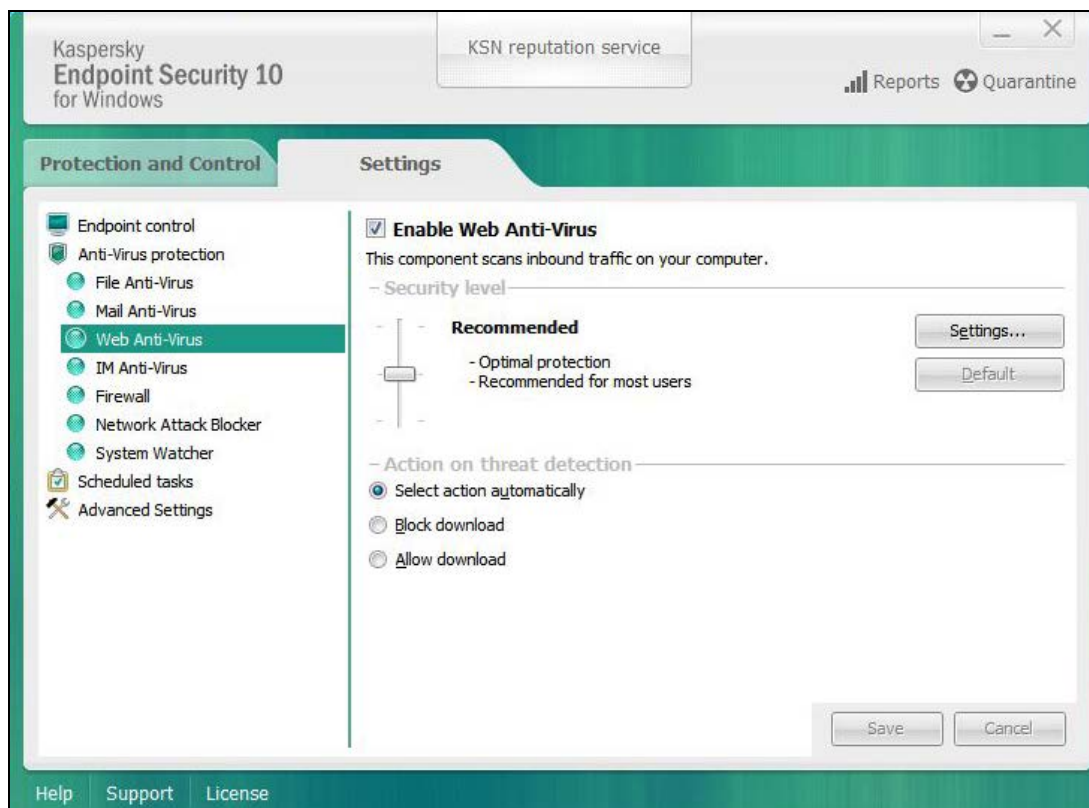
- FPA-C41-XXXX: Serial, Ethernet, AT&T Cellular and Wi-Fi
- FPA-C42-XXXX: Serial, Ethernet, Verizon Cellular and Wi-Fi
- FPA-C43-XXXX: Serial, Ethernet, Vodafone Cellular and Wi-Fi

11.6 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.



11.7 Specifications



	ProtoAir FPA-W44 & FPA-C4X	
Electrical Connections	One 3-pin Phoenix connector with: RS-485/RS-232 (Tx+ / Rx- / gnd) One 3-pin Phoenix connector with: Power port (+ / - / Frame-gnd) One Ethernet 10/100 BaseT port W44 includes an additional: One 3-pin Phoenix connector with: RS-485 (+ / - / gnd)	
W44 Power Requirements	<i>Input Voltage:</i> 12-24VDC or 24VAC <i>Max Power:</i> 3 Watts	<i>Current draw:</i> 24VAC 0.125A 12-24VDC 0.25A @12VDC
C4X Power Requirements	<i>Input Voltage:</i> 12-24VDC <i>Max Power:</i> 8 Watts	<i>Current draw:</i> @ 12V, 0.67A
Approvals	FCC Part 15 C, UL 60950-1 and CAN/CSA C22.2 No. 60950-1 (W44), EN IEC 62368-1:2020+A11:2020, WEEE compliant, RoHS compliant, DNP 3.0 and Modbus conformance tested, PTCRB compliant, BTL marked, REACH compliant, UKCA and CE compliant, ODVA conformant, CAN ICES-003(B) / NMB-003(B) (W44, C41, C42)	
FCC ID	FPA-W44: P9R-FPAW44	FPA-C4X: 2AIVJ-FPAC41
IC ID	FPA-W44: 324C-FPAW44	
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	<i>Frequency:</i> 2.4 GHz <i>Antenna:</i> Omnidirectional SMA	<i>Channels:</i> 1 to 11 (inclusive) <i>Encryption:</i> TKIP, WPA2 & AES
Cellular (C4X only)	<i>Features:</i> LTE Cat 4 <i>Uplink:</i> Up to 50 Mbps <i>IMEI:</i> 357178070517852	<i>Antenna:</i> Omnidirectional 4G/LTE SMA <i>Downlink:</i> Up to 150 Mbps

NOTE: Specifications subject to change without notice.

11.8 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.

11.9 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. Contact local organizations or recycling/disposal center for more recycling/disposal methods of related products.

WARNING!

- 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.

Failure to follow these warnings can result in serious personal injury or death.

Comply with the following safety tips:

WARNING!

- **Read and understand all Cautions and Warnings. Cautions and Warnings in this manual notify users of potential risks. These should be used in addition to complying with all safety requirements for your operation environment.**
- **Do not use near/keep away from a combustible and explosive environment.**
- 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.**
- With the aim of avoiding accidents, it is not allowed to replace the system or change components unless with permission and certification. Please contact MSA Support for help.

Failure to follow these warnings can result in serious personal injury or death.

Notice

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

MSA Safety 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 (-W44, -C41, -C42)

WARNING!

- 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. Modification could void the user's authority to operate the equipment. Contact the FieldServer technical support department or local branches for help.

Failure to follow this warning can result in serious personal injury or death.

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.

For FPA-C41/C42, this device complies with Part 22H, Part 24E and Part 27 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.

ISED Statement

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

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

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

Industry Canada ICES-003 Compliance Label:

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

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes:

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

FCC RF Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator and any part of your body.

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator and any part of your body.

Pour se conformer aux exigences de conformité CNR 102 RF exposition, une distance de séparation d'au moins 20 cm doit être maintenue entre l'antenne de cet appareil et toutes les personnes.

Must use the same type of antenna with lower or equal gain to the listing antenna as shown in Section 11.

FCC Supplier's Declaration of Conformity

M2M Gateway/ FPA-W44

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

MSA Innovation, LLC

1100 Cranberry Woods Drive, Cranberry Township, PA 16066

Tel: 724-776-8600

Power Output**⚠ WARNING!**

- The device should be professionally installed to ensure compliance with power requirements. A trained/certified electrician is not needed, but someone knowledgeable with electrical components is required to power up the unit, so that it isn't damaged.
- 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.

Failure to follow these warnings can result in serious personal injury or death.

Frequency Range Output Power:

Wi-Fi (*applies to all models*)

2402.0 – 2480 MHz 0.004 W

2412.0 – 2462.0 MHz 0.0258 W

LTE (*FPA-C4X models only*)

Supported Bands:

FPA-C41/FPA-C42 – B2, B4, B5, B12, B13 & B17 (0.25 W)

FPA-C43 – B1, B3, B7, B8, B20 (0.25 W)

The Output Power listed is conducted. This device supports 20MHz and 40MHz bandwidth.

This radio transmitter [IC: 324C-FPAW44] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device. The concrete contents to check are the following three points:

1. Antenna type is a Dipole with no more than 2dBi gain at 2.4G
2. Should be installed so that the end user cannot modify the antenna.
3. Feed line should be designed in 50ohm Fine-tuning of return loss etc.

A matching network can be used.

11 Additional Information

Le présent émetteur radio [IC: 324C-FPAW44] a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué pour tout type figurant sur la liste, sont strictement interdits pour l'exploitation de l'émetteur. Le contenu concret à vérifier sont les trois points suivants.

1. Le type d'antenne est un Dipole avec pas plus de 2 dBi gain à 2.4G
2. Doivent être installés de façon que l'utilisateur final ne peut pas modifier l'antenne.
3. La ligne d'alimentation doit être conçue en 50ohm Le réglage précis de la perte de rendement, etc.

peut être effectué en utilisant un réseau correspondant.

Frequency (MHz)	Antenna Type	Max Antenna Gain
2402-2480	Linear vertical Omnidirectional	2
2412-2462	Linear vertical Omnidirectional	2

12 Limited 2 Year Warranty

MSA warrants the product furnished, except software or software components, to be free from defects in workmanship or materials for a period of two (2) years after date of shipment, provided such product is installed, maintained, and used in accordance with MSA's instructions and/or recommendations. It is expressly agreed that the product user's sole and exclusive remedy for breach of the above warranty, for any tortious conduct of MSA or for any other cause of action, will be the repair or replacement, at MSA's option, of any equipment that after examination by MSA is shown to be defective in either workmanship or materials during the warranty period. Final determination of the nature and responsibility for defective or damaged equipment will be made by MSA personnel. Replacement equipment and/or components will be provided at no cost to Purchaser, F.O.B. MSA's plant. Failure of MSA to successfully replace any nonconforming equipment or components shall not cause the remedy established hereby to fail of its essential purpose. In all cases MSA'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.

This warranty is contingent upon proper use in the application for which the product was intended and does not cover products (including, without limitation, any software components) which have been modified or repaired by persons other than its own or authorized service personnel or without MSA's prior written approval, or on which original identification marks have been removed or altered. MSA shall be released from all obligations hereunder in the event a warranty claim results from normal wear and tear, product physical abuse, accident, alteration, misuse, or neglect. This Limited Warranty also will not apply to interconnecting cables or wires, consumables or to any damage resulting from battery leakage.

No agent, employee or representative of MSA may bind MSA to any affirmation, representation, or modification of the warranty concerning any product sold by MSA. This warranty constitutes the sole and entire warranty, and any change or modification hereto must be in writing and signed by the parties. MSA does not guarantee accuracy or completeness of its technical information, specifications, literature, and other printed materials, and reserves the right to change such information without notice to Purchaser.

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