



Start-up Guide

BACnet Router Wi-Fi

FS-ROUTER-BACW

APPLICABILITY & EFFECTIVITY

Effective for all systems manufactured after February 2022.



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fieldserver

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1 BACnet Router Description

The BACnet Router provides stand-alone routing between BACnet networks such as BACnet/IP, BACnet Ethernet, and BACnet MS/TP – thereby allowing the system integrator to mix BACnet network technologies within a single BACnet internetwork. There are three physical communication ports on the BAS Router. One is a 10/100 Mbps Ethernet port and the other two are RS-485 MS/TP ports. Configuration is accomplished via a web page.

The BACnet Router with Wi-Fi (FS-ROUTER-BACW) model has one RS-485 port, one Ethernet 10/100 port and supports Wi-Fi network connection. Additionally, the Router acts as a Wi-Fi access point for modern web based configuration and remote access from any mobile device without user restrictions.

The BACnet Router is cloud ready and connects with MSA Safety's Grid.

NOTE: A cellular version of the BACnet Router is not available.

NOTE: For Grid information, refer to the [MSA Grid Start-up Guide](#) online through the MSA website.

NOTE: The latest versions of instruction manuals, driver manuals, configuration manuals and support utilities are available online through the [MSA Safety website](#).

2 Equipment Setup

2.1 Mounting

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



NOTE: For dimension details see Section 11.4.

2.2 Attaching the Wi-Fi Antenna

Screw in the Wi-Fi antenna to the front of the unit as shown in Section 11.4.

3 Installing the BACnet Router

3.1 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 (**Figure 2**).

The R2 Port is RS-485.

Connect to the 3-pin connector as shown below.

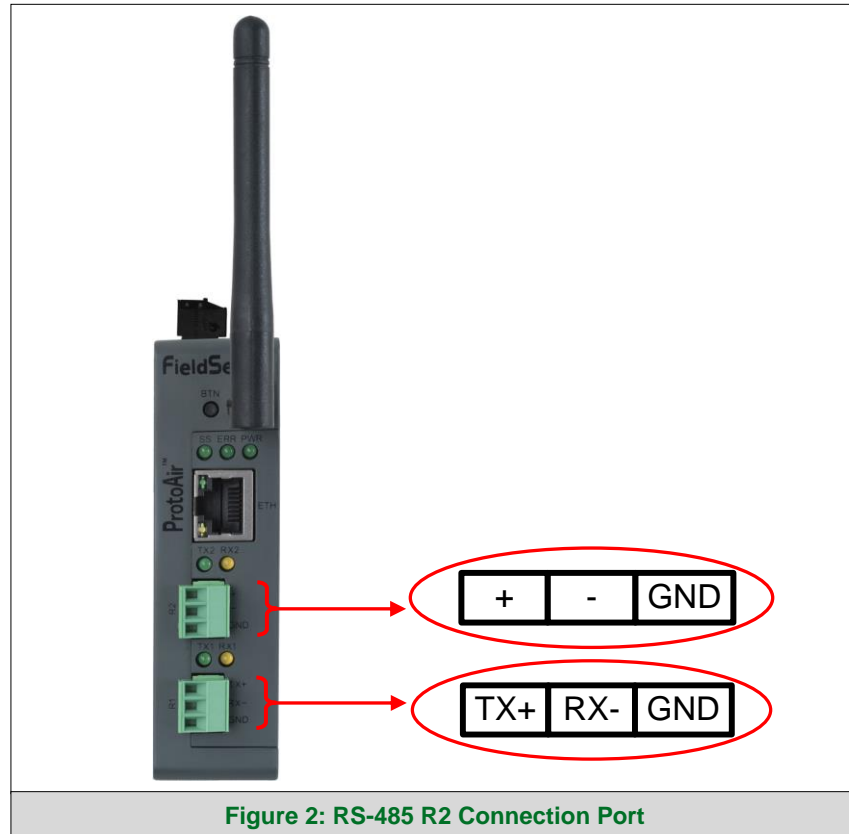


Figure 2: RS-485 R2 Connection Port

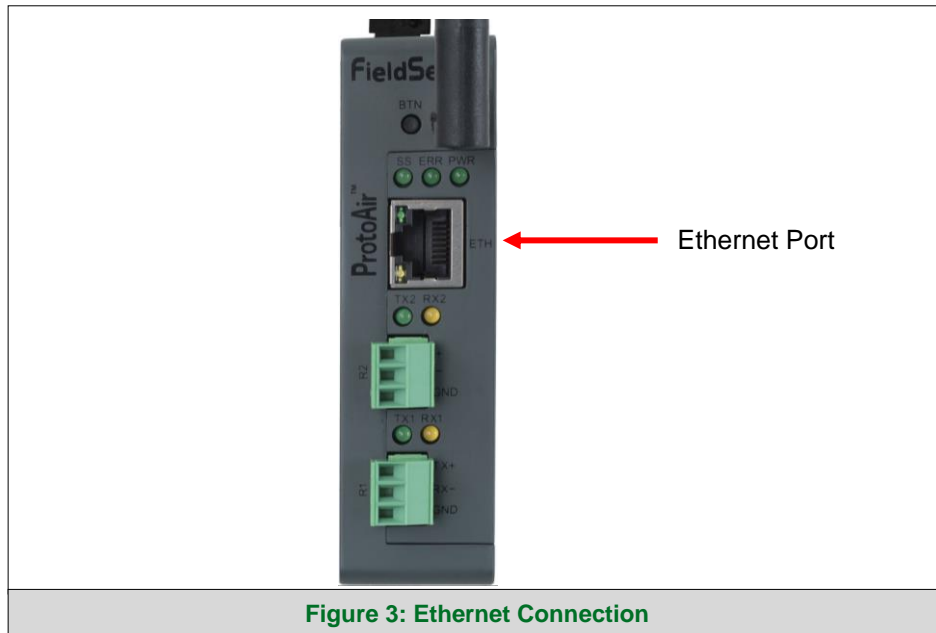
The following baud rates are supported:
9600, 19200, 38400, 76800

3.1.1 Wiring

RS-485	
BMS RS-485 Wiring	Gateway Pin Assignment
RS-485 +	TX +
RS-485 -	RX -
GND	GND

NOTE: Use standard grounding principles for GND.

3.2 10/100 Ethernet Connection Port



The Ethernet Port is used both for BACnet/IP communications and for configuring the BACnet Router via the Web App. To connect the BACnet Router, 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 BACnet Router is 192.168.2.101, Subnet Mask is 255.255.255.0.

4 Power up the BACnet Router

Check power requirements in the table below:

Power Requirement for BACnet Router External Gateway		
BACnet Router Family	Current Draw Type	
	12VDC	24VDC/AC
FS-ROUTER-BACW (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 4: Required Current Draw for the Gateway		

Apply power to the BACnet Router as shown below in **Figure 5**. Ensure that the power supply used complies with the specifications provided in **11.3**.

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

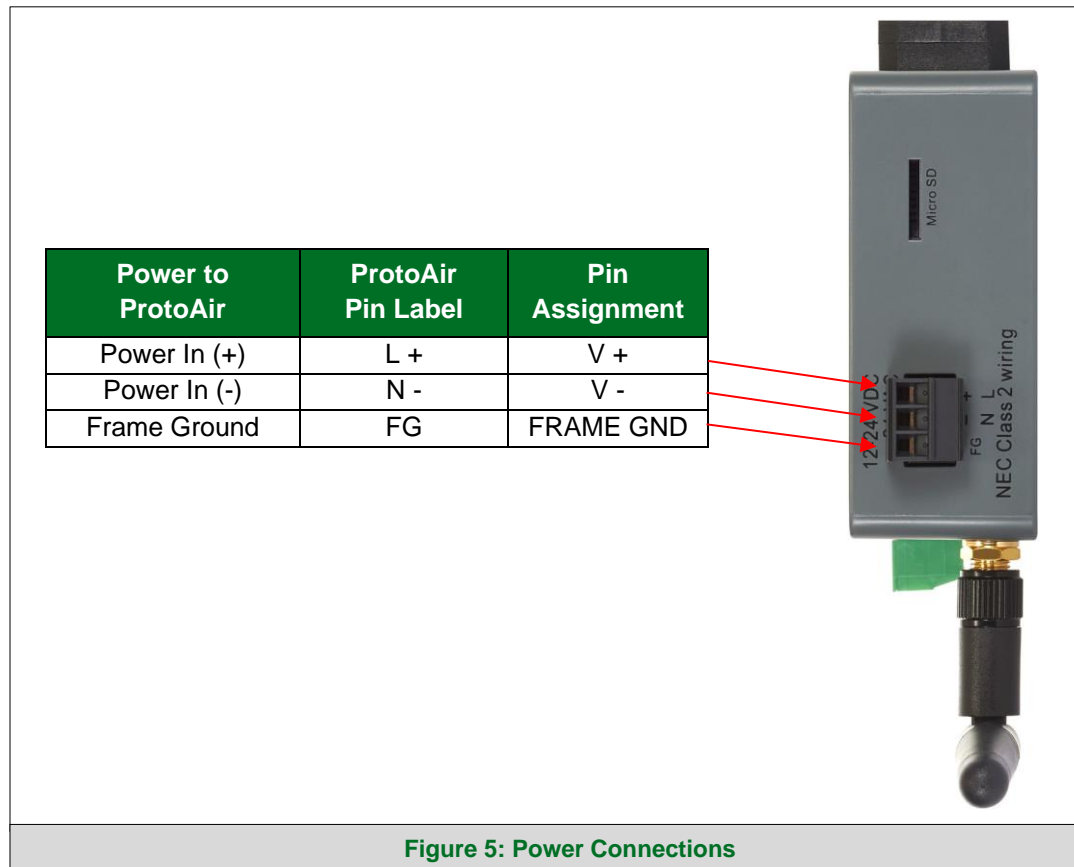



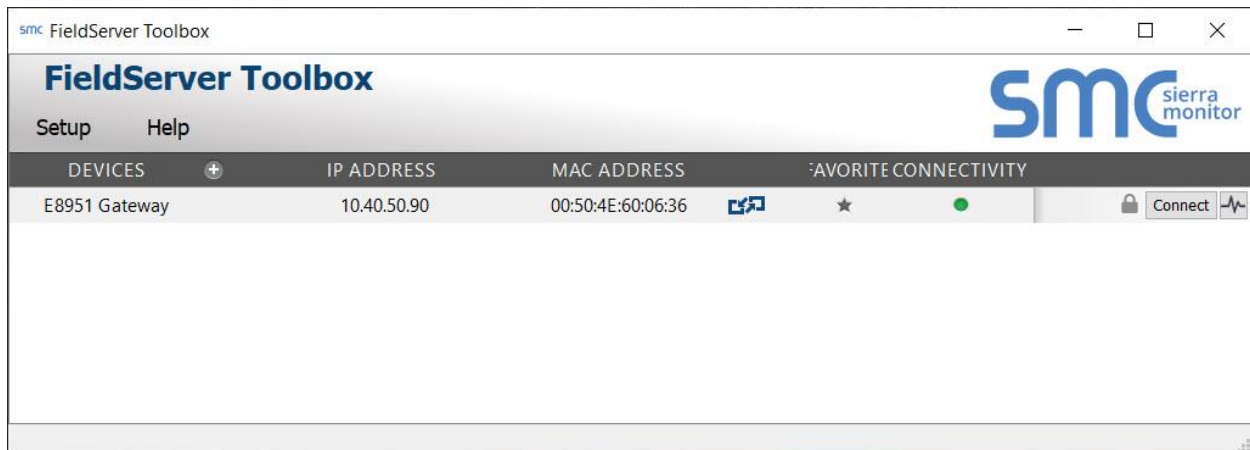
Figure 5: Power Connections

5 Connecting to the BACnet Router

The FieldServer Toolbox Application can be used to discover and connect to the BACnet Router on a local area network. To manually connect to the BACnet Router using the Toolbox, click on the plus icon () and enter the IP Address, or enter the Internet IP Address into a web browser.

5.1 Using the FieldServer Toolbox

- Install the Toolbox application from the USB drive or get it from the MSA website.
- Use the Toolbox application to find the BACnet Router IP Address and launch the Web App (by clicking the Connect button).



5.2 Using a Web Browser

Open a Web Browser and input the BACnet Router's IP Address. The Default IP Address of the BACnet Router is **192.168.2.101**, Subnet Mask is **255.255.255.0**. If the PC and the BACnet Router are on different IP Networks, assign a Static IP Address to the PC on the 192.168.2.X network.

NOTE: Check Section 10.4 for supported browsers.

6 Setup Web Server Security

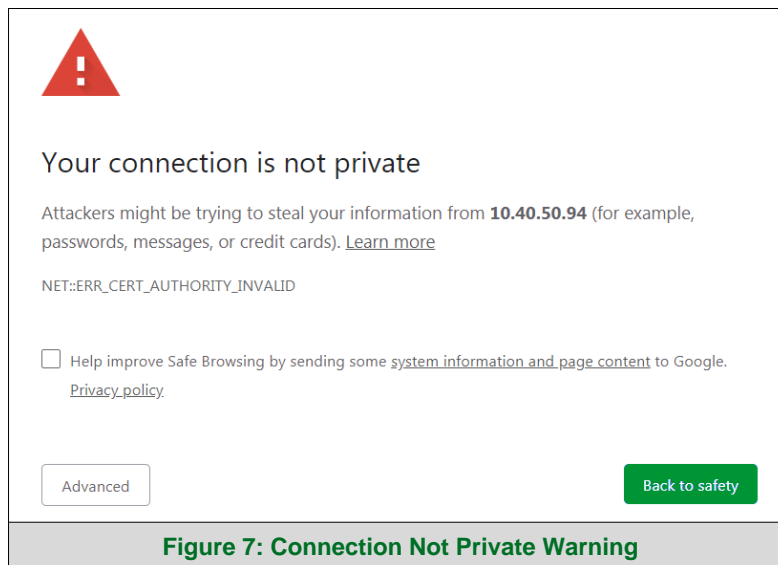
6.1 Login to the FieldServer

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.

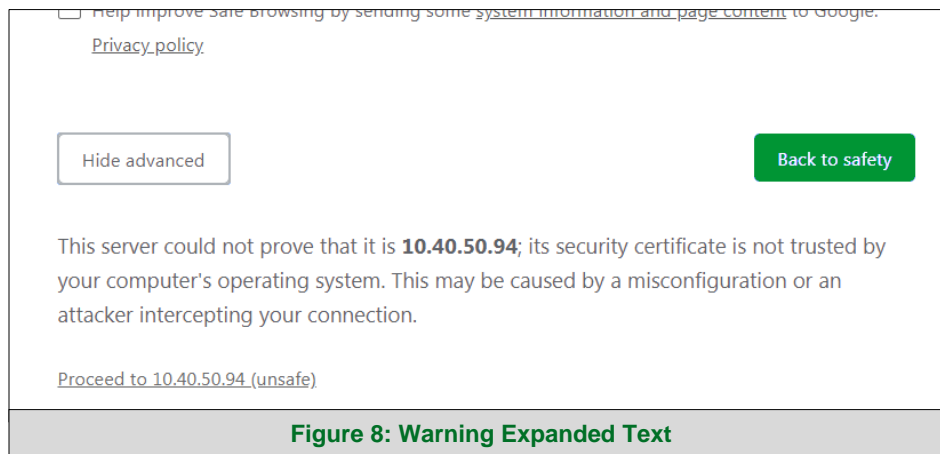


- When the warning that "Your connection is not private" appears, click the advanced button on the bottom left corner of the screen.



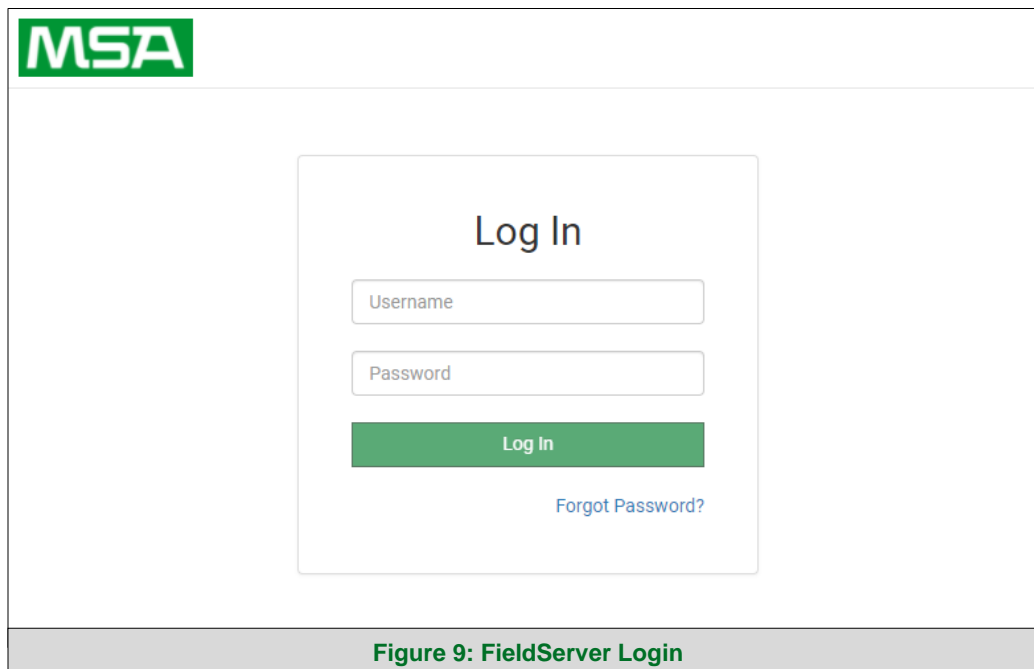
Setup Web Server Security

- Additional text will expand below the warning, click the underlined text to go to the IP Address. In the **Figure 8** example this text is “[Proceed to 10.40.50.94 \(unsafe\)](#)”.



- 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.

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

Figure 10: Security Mode Selection Screen

NOTE: Cookies are used for authentication.

NOTE: To change the web server security mode after initial setup, go to Section 11.1.

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
A4lBAQBfM+IPyOx3T/47VEmaiXqE3bx3zEuBFJ6pWPlw7LHf2r2ZoHw+9xb+aNMU
dVyAelhBMTMsnI2ERvQVp0xj3psSv2EJyKXS1bOYNRLsq7UzpwuAdT/Wy3o6vUM5
K+Cwf9qEoQ0LxuDZTIECt67MkcHMiuFi5pk7TRicHnQF/sfOAYOulduHOy9exlk9
FmHFVDIZt/cJUaF+e74EuSph+gEr0lQo2wmmhyc7L22UXse1NoOfU2Zg0Eu1VWtu
JRyaMWIRFEWuuZMGZtKFWVC+8q2JQsVcgrRWM7naoblEhOCMH+sKHJMCxDoXGt
vtZjpZUoAL51YXxWSVcyZdGiAP5e
-----END CERTIFICATE-----

Private Key

sHB0zZoHr4YQSDK2BbYVzzbl0LDuKtc8+JiO3ooGjoTuHngkeAj/fKfbTAsKeAzw
gKQe+H5UQNK0bdvZfOJrm6daDK2vDmR5k+JiUUhEj5N49uplroB97MQgYotzgfT+
THlpg5t1SIK617k04ObKmHF5l8fck+ru545sVmpeeZh0m5j5SURYAZMvbq5daCu
J4l5NlihbEvxRF4UK41ZDMCvujopCpBKUWrb1a/3XXnDnM2K9xyz2wze998D6Wk46
+7aOFY9F+7j5lJmkoS3GYtwCyH5jP+mPP1K6RnuiD019wvGPb4dtN/RTnfd0eF
GYeVSkI9fxkxDOFtdWRZbM/rPjn4tmO1Xf8HqONVN1x/iaMynOXG4cukoI4+VO
u0rZaUEsII2zNkfrn7fAASm5NBWg202Cy9IAYnuujs3aALi5uGBEEK62oTMxlzx
-----END RSA PRIVATE KEY-----

Private Key Passphrase

Specify if encrypted

Save

Figure 11: 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.

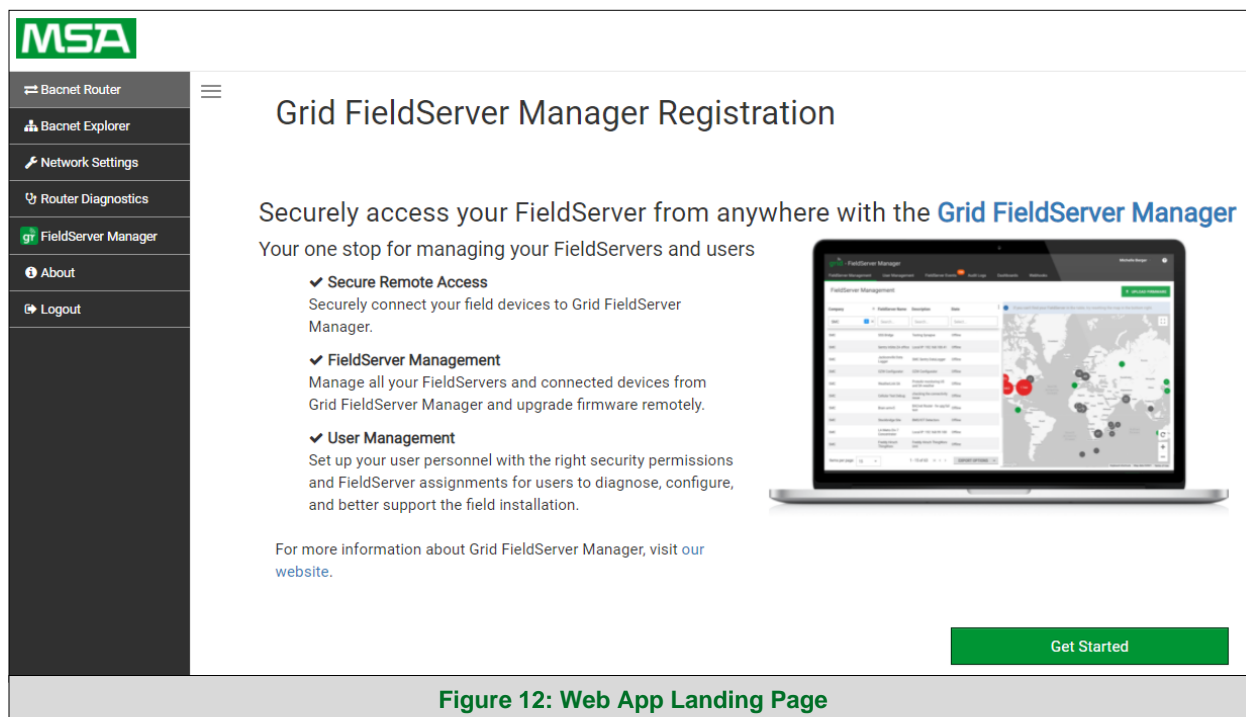
6.2.2 HTTPS with Default Untrusted Self-Signed TLS Certificate or HTTP with Built-in Payload Encryption

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

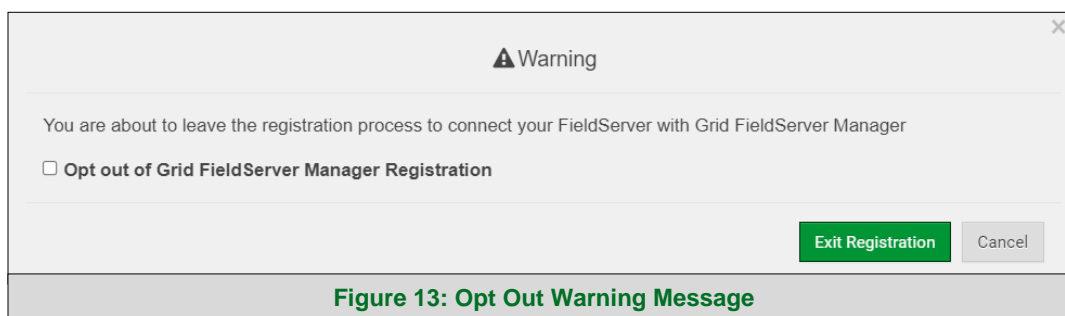
7 Configuring the BACnet Router

7.1 Navigate to the BACnet Router Settings

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



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



7.2 BACnet Router Settings

The screenshot shows the BACnet Router Settings page. The left sidebar contains navigation links: BACnet Router, BACnet Explorer, Network Settings, Router Diagnostics, FieldServer Manager, About, and Logout. The main content area is divided into several sections:

- BACnet Device:** Fields for Device Name (BACnet Router), Device Instance (1000), Device Location (-), and Device Connection (BACnet IP Wired 1).
- BACnet Ethernet:** Fields for Enable (checkbox), Network Number (3), Max Info Frames (50), and Max Master (127).
- BACnet MSTP Settings:** Fields for Enable (checkbox), Network Number (4), MAC Address (0), Baud Rate (38400), and Token Usage Timeout (50).
- BACnet MSTP R1:** Fields for Enable (checkbox), Network Number (4), MAC Address (0), Baud Rate (38400), and Token Usage Timeout (50).
- BACnet MSTP R2:** Fields for Enable (checkbox).
- BACnet IP Wired 1:** Fields for Enable (checked), Network Number (1), and IP Port (47808).
- BACnet IP Wired 2:** Fields for Enable (unchecked), Network Number (2), and IP Port (47809).
- BACnet IP BBMD:** (Section header only).

On the right side, there are buttons for Save, Restart, Reload, and Defaults. Below these buttons is a Status section showing 'Router is online' and a Log section.

Figure 14: BACnet Router Settings Page

7.2.1 Button Functions

The diagram shows four buttons arranged in a 2x2 grid:

- Save:** Green button.
- Restart:** Green button.
- Reload:** Grey button.
- Defaults:** Grey button.

- **Save** – write the currently displayed settings to the device. A restart will be required to apply the updated settings.
- **Reload** – discard the currently displayed settings and reload the settings stored on the device. This will undo any unsaved edits.
- **Defaults** – discard the currently displayed settings and load default settings. This must still be saved and the device must be restarted for the default settings to be applied.
- **Restart** – restarts the device.

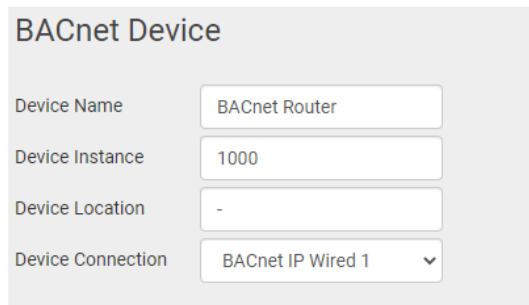
7.2.2 Multiple Connections

- **Network Number** – set up the BACnet network number for the connection. Legal values are 1-65534. Each network number must be unique across the entire BACnet internetwork. All devices that are interconnected by the same IP network and that can reach one another through local IP broadcasts (including local IP broadcasts forwarded by BBMD) should be treated as a single BACnet network segment, and hence all routing ports connected to this segment should have the same globally unique network number.

NOTE: Each BACnet network segment, regardless of technology, must have a unique network number. For example, a single RS-485 MS/TP segment or BACnet/IP subnet, can each be regarded as a BACnet network segment. All routing ports that connect directly to the same segment should also assign the same globally unique network number to that segment.

- **Enable** – enable or disable the connection; note that BACnet/IP Primary is always enabled.

7.2.3 BACnet Device



The screenshot shows a configuration form titled "BACnet Device". It contains four fields: "Device Name" with the value "BACnet Router", "Device Instance" with the value "1000", "Device Location" with the value "-", and "Device Connection" with a dropdown menu showing "BACnet IP Wired 1".

- **Device Instance** and **Device Name** – a BACnet Router must provide a Device Object. Configure its name and Instance Number here. Take care to select a Device Instance Number that is unique across the entire BACnet internetwork.
- **Device Location** – enter a location for the Device. The location may not contain any commas.
- **Device Connection** – select which connection to bond the BACnet device settings.

7.2.4 BACnet/IP

BACnet IP Wired 1

Enable ☒

Network Number

IP Port

BACnet IP Wired 2

Enable ☐

Network Number

IP Port

BACnet IP WiFi

Enable ☐

Network Number

IP Port

BACnet IP BBMD

Enable ☐

BBMD Connection

Public IP Address

Public IP Port

[Edit BDT](#)

- **IP Port** – the BACnet/IP default is 47808 (0xBAC0), but a different port number may be specified here.
- **IP Port** – this MUST be different to the IP Port used on the BACnet/IP Primary connection. Default is 47809 (0xBAC1).
- **BBMD Connection** – select which connection to bond the BACnet/IP BBMD settings.
- **Public IP Address and Port** – if the BBMD is being accessed across a NAT Router, then these values must be configured with the public IP Address and Port by which the BBMD can be reached from across the NAT Router. The Public IP Address and Port would also be used in the BDT of remote BBMD's that need to reach this BBMD across the NAT Router. If no NAT Router is being used, these fields can be left blank. For example, type into a Google browser “my IP Address” to see the local PC’s Public IP Address.

7.2.5 BACnet MS/TP, BACnet Ethernet and BACnet Explorer

BACnet Ethernet

Enable ☐

Network Number

3

BACnet MSTP Settings

Max Info Frames

50

Max Master

127

BACnet MSTP R1

Enable ☐

Network Number

4

MAC Address

0

Baud Rate

38400



Token Usage Timeout (ms)

50



BACnet MSTP R2

Enable ☐

Network Number

5

MAC Address

0

Baud Rate

38400



Token Usage Timeout (ms)

50



BACnet Explorer

Network Number

7

- **Max Info Frames** – the number of transactions the Router may initiate while it has the MS/TP token. Default is 50.
- **Max Master** – the highest MAC address to scan for other MS/TP master devices. The default of 127 is guaranteed to discover all other MS/TP master devices on the network.
- **MAC Address** – legal values are 0 to 127, must be unique on the physical network.
- **Baud Rate** – the serial baud rate used on the network.
- **Token Usage Timeout (ms)** – the number of milliseconds the router will wait before deciding that another master has dropped the MS/TP token. This value must be between 20ms and 100ms. Choose a larger value to improve reliability when working with slow MS/TP devices that may not be able to meet strict timing specifications.

7.3 Network Settings

Navigate to the Network Settings tab shown below and configure the settings as needed.

MSA

Navigation: BACnet Router, BACnet Explorer, Network Settings, Router Diagnostics, FieldServer Manager, About, Logout

BACnet Device

Device Name: BACnet Router
 Device Instance: 1000
 Device Location: -
 Device Connection: BACnet IP Wired 1

BACnet IP Wired 1

Enable: ☒
 Network Number: 1
 IP Port: 47808

BACnet IP Wired 2

Enable: ☐
 Network Number: 2
 IP Port: 47809

BACnet IP BBMD

BACnet Ethernet

Enable: ☐
 Network Number: 3

BACnet MSTP Settings

Max Info Frames: 50
 Max Master: 127

BACnet MSTP R1

Enable: ☐
 Network Number: 4
 MAC Address: 0
 Baud Rate: 38400
 Token Usage Timeout (ms): 50

BACnet MSTP R2

Enable: ☐

Buttons: Save, Restart, Reload, Defaults

Status: Router is online

Log

Copyright © MSA Safety - Diagnostics **fieldserver**

Figure 15: Network Settings Tab

7.3.1 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.

ETH 1 WiFi Client WiFi Access Point Routing

☐ Enable DHCP

IP Address
10.40.50.92

Netmask
255.255.255.0

Gateway
10.40.50.1

Domain Name Server 1 (Optional)
10.40.2.24

Domain Name Server 2 (Optional)
10.15.130.15

Cancel Save

Network Status

Connection Status	✔ Connected
MAC Address	00:50:4e:60:01:fd
Ethernet Tx Msgs	498,827
Ethernet Rx Msgs	1,384,116
Ethernet Tx Msgs Dropped	0
Ethernet Rx Msgs Dropped	0

Figure 16: ETH 1 Port Network Settings

7.3.2 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 7.3.4**) to set the default connection to Wi-Fi Client.

ETH 1 WiFi Client WiFi Access Point Routing

☒ Enable

SSID

FieldSVR

Password (Optional)

.....

☒ Enable DHCP

IP Address

10.40.50.37

Netmask

255.255.255.0

Gateway

10.40.50.1

Domain Name Server 1 (Optional)

10.5.4.77

Domain Name Server 2 (Optional)

10.40.2.24

Cancel Save

Network Status

Connection Status	✔ Connected
MAC Address	A0:CC:2B:FF:AB:59
WiFi BSSID	78:BC:1A:52:C8:42
WiFi Channel	2,462
WiFi Tx Msgs	1,484
WiFi Rx Msgs	1,799
WiFi Tx Msgs Dropped	0
WiFi Rx Msgs Dropped	16
WiFi Pairwise Cipher	CCMP
WiFi Group Cipher	CCMP
WiFi Key Mgmt	WPA2-PSK
WiFi Link	19.5 MBit/s MCS 2
WiFi Signal Level	-86 dBm

Figure 17: Wi-Fi Client Network Settings

7.3.3 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.

ETH 1 WiFi Client **WiFi Access Point** Routing

☐ Enable

SSID

ProtoAir-6001FD

Password (Optional)

.....

Channel

11

☒ Allow others to find this network

☐ Enable hotspot

IP Address

192.168.50.1

Netmask

255.255.255.0

IP Pool Address Start

192.168.50.120

IP Pool Address End

192.168.50.130

Cancel Save

Network Status

Connection Status	Disabled
Access Point MAC Address	a0:cc:2b:ff:ab:59
Access Point Tx Msgs	0
Access Point Rx Msgs	0
Access Point Tx Msgs Dropped	0
Access Point Rx Msgs Dropped	0

Figure 18: Wi-Fi AP Network Settings

7.3.4 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.

ETH 1 WiFi Client WiFi Access Point Routing

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 ?
WiFi Client	Default	-	10.40.50.1	255
ETH 1	10.40.50.10	255.255.255.255	10.40.50.1	100


+ Add Rule

Cancel Save

Figure 19: Routing Network Settings

7.4 Router Diagnostics

By clicking on the Router Diagnostics tab all the connection communication details can be viewed to ensure the BACnet Router is working correctly.



- Bacnet Router
- Bacnet Explorer
- Network Settings
- Router Diagnostics
- FieldServer Manager
- About
- Logout

ETH1 - BACnet IP Wired 1

Network Number	1	
Info Statistics	Messages Sent	270
	Messages Received	280
Error Statistics	Total Errors	0

Routing Table

DNET	MAC Address	Status
5	10.40.51.113:47808	Available
6	10.40.50.80:47808	Available
50	10.40.50.103:47808	Available
181	10.40.50.181:47808	Available
1100	10.40.50.73:47808	Available
1200	10.40.50.73:47808	Available
50001	10.40.50.88:47808	Available
50003	10.40.50.88:47808	Available
60003	10.40.50.116:47808	Available

ETH1 - BACnet Explorer 47800

Network Number	7	
Info Statistics	Messages Sent	258
	Messages Received	246
Error Statistics	Total Errors	0

Routing Table is empty

Copyright © MSA Safety - Diagnostics




Figure 20: BACnet Router Diagnostics Page

8 BACnet Explorer

The Bacnet Explorer tab allows installers to validate that their equipment is working on Bacnet without having to ask the BMS integrator to test the unit.

- To access the embedded BACnet Explorer click the BACnet Explorer tab.

The screenshot displays the MSA FieldServer Manager interface for the BACnet Explorer tab. The left sidebar contains navigation options: BACnet Router, BACnet Explorer (highlighted), Network Settings, Router Diagnostics, FieldServer Manager, About, and Logout. The main content area is divided into several sections for configuration:

- BACnet Device:** Fields for Device Name (BACnet Router), Device Instance (1000), Device Location (-), and Device Connection (BACnet IP Wired 1).
- BACnet Ethernet:** Fields for Enable (checkbox), Network Number (3), and buttons for Save, Restart, Reload, and Defaults.
- BACnet MSTP Settings:** Fields for Max Info Frames (50) and Max Master (127).
- BACnet MSTP R1:** Fields for Enable (checkbox), Network Number (4), MAC Address (0), Baud Rate (38400), and Token Usage Timeout (50).
- BACnet MSTP R2:** Fields for Enable (checkbox).
- BACnet IP Wired 1:** Fields for Enable (checked), Network Number (1), and IP Port (47808).
- BACnet IP Wired 2:** Fields for Enable (unchecked), Network Number (2), and IP Port (47809).
- BACnet IP BBMD:** Section header.

On the right side, there is a **Status** section indicating 'Router is online' and a **Log** section. The footer shows 'Copyright © MSA Safety - Diagnostics' and the 'fieldserver' logo.

Figure 21: FS-GUI BACnet Explorer Tab

NOTE: For BACnet/IP, click on the Settings button on the left side of the landing page to ensure the BACnet Router is on the BACnet/IP network subnet or to configure BBMD.

8.1 Discover Device List

- From the BACnet Explorer landing page, click on the BACnet Explorer tab on the left side of the screen to go to the BACnet Explorer page.

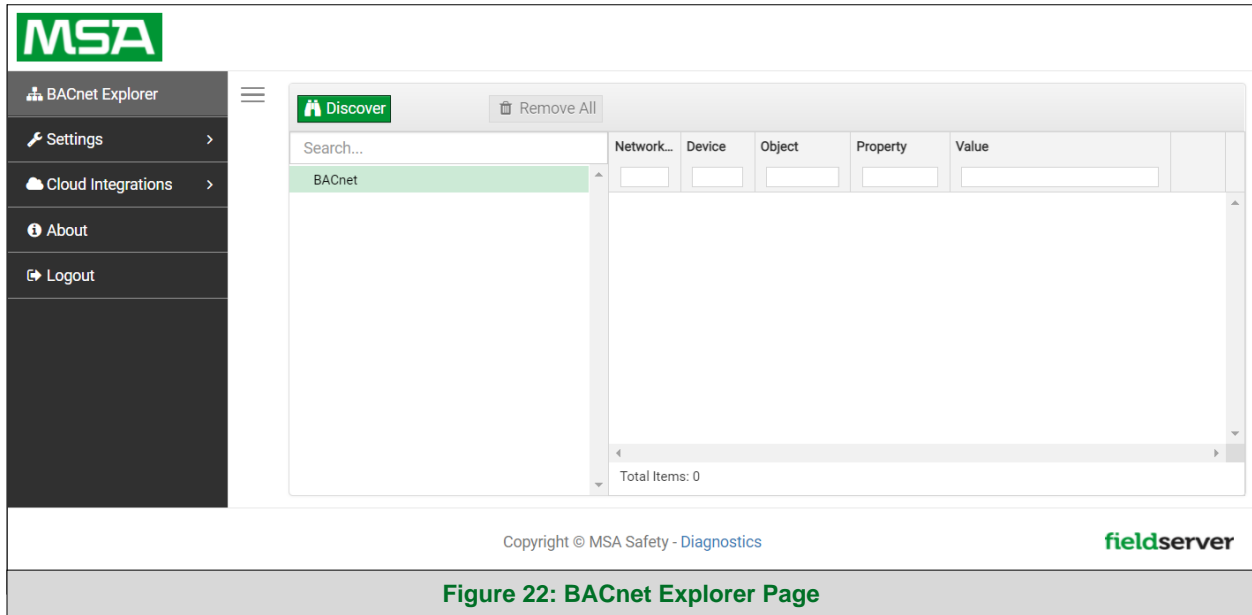



Figure 22: BACnet Explorer Page

- To discover the devices connected to the same subnet as the BACnet IoT Gateway, click the Discover button  (binocular icon).
- This will open the Discovery window, click the checkboxes next to the desired discovery settings and click Discover to start the search.

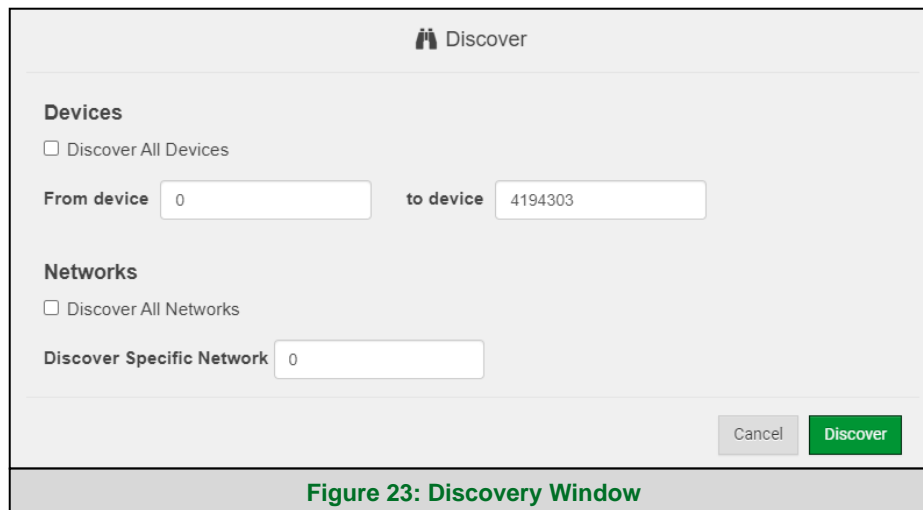


Figure 23: Discovery Window

NOTE: The “Discover All Devices” or “Discover All Networks” checkboxes must be unchecked to search for a specific device range or network.

Allow the devices to populate before interacting with the device list for optimal performance. Any discovery or explore process will cause a green message to appear in the upper right corner of the browser to confirm that the action is complete.

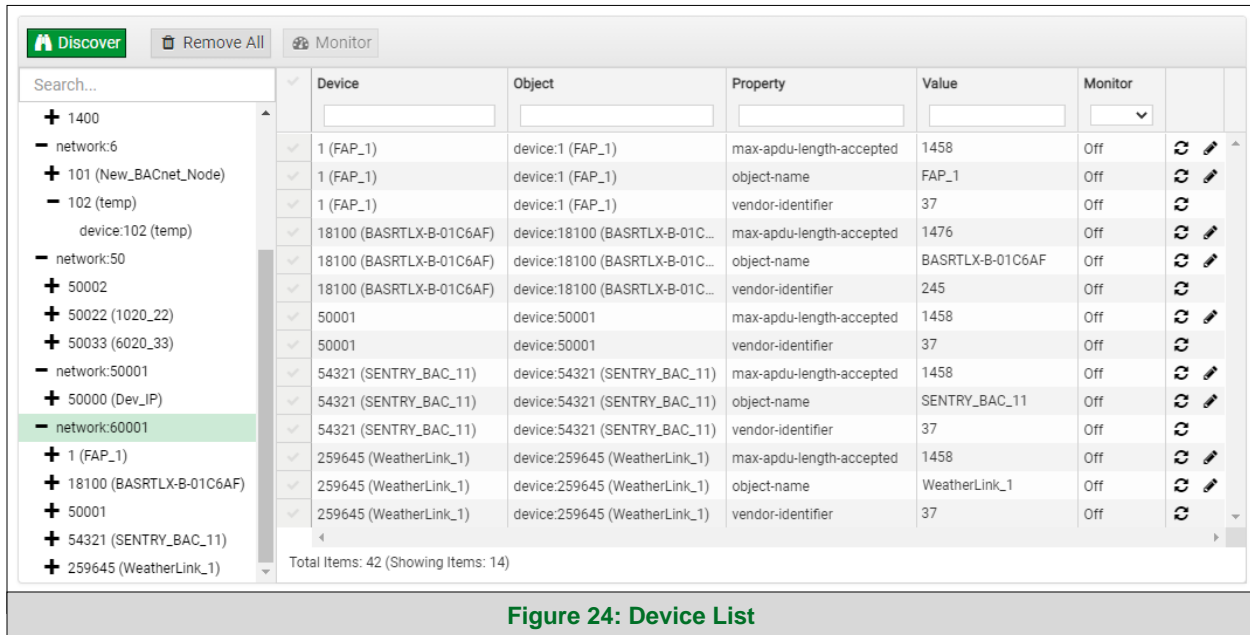


Figure 24: Device List

8.2 View Device Details and Explore Points/Parameters

- To view the device details, click the blue plus sign (+) next to the desired device in the list.
 - This will show only some of the device properties for the selected aspect of a device

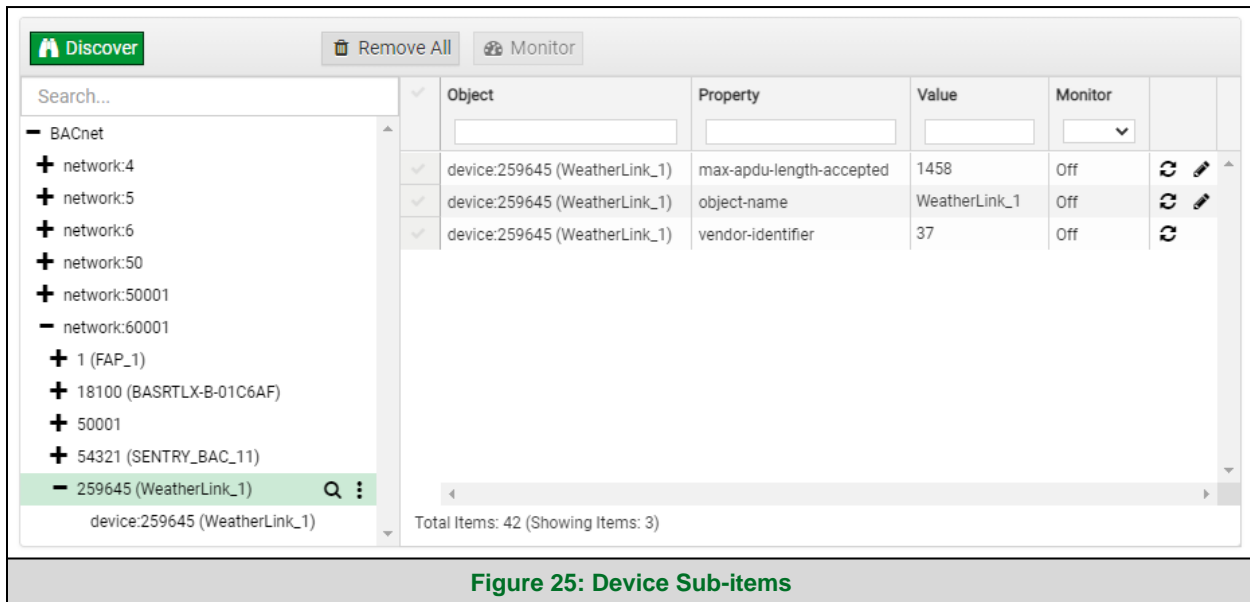


Figure 25: Device Sub-items

- To view the full details of a device, highlight the device directly (in the image below – “1991 WeatherLink_1”) and click the Explore button (🔍) that appears to the right of the highlighted device as a magnifying glass icon or double-click the highlighted device.

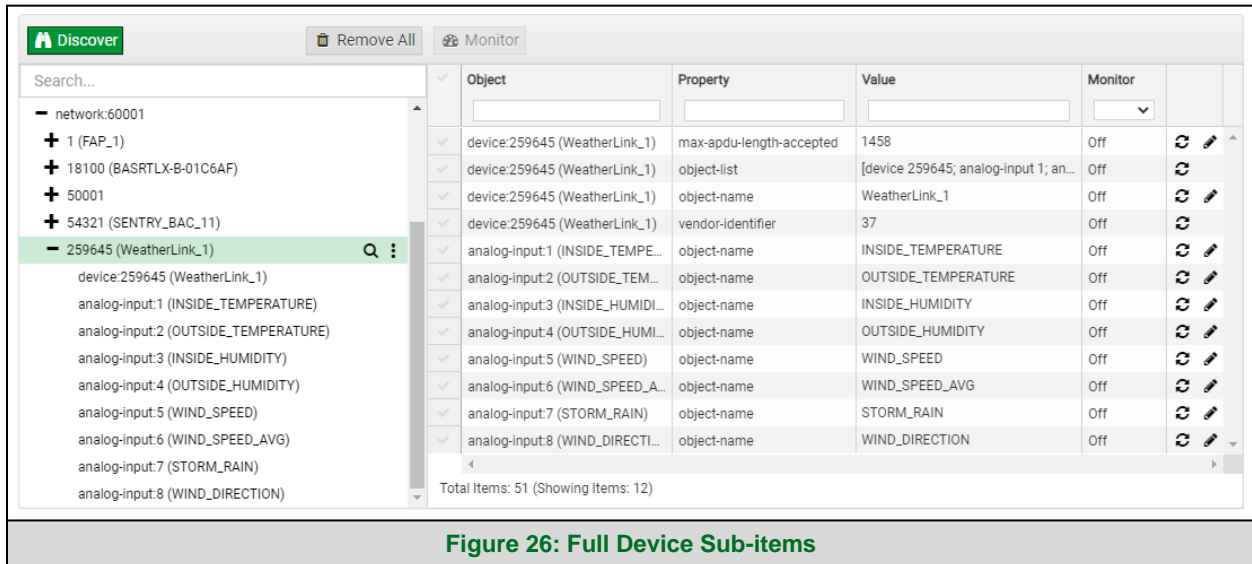


Figure 26: Full Device Sub-items

- Now additional device details are viewable; however, the device can be explored even further
- Click on one of the device details.

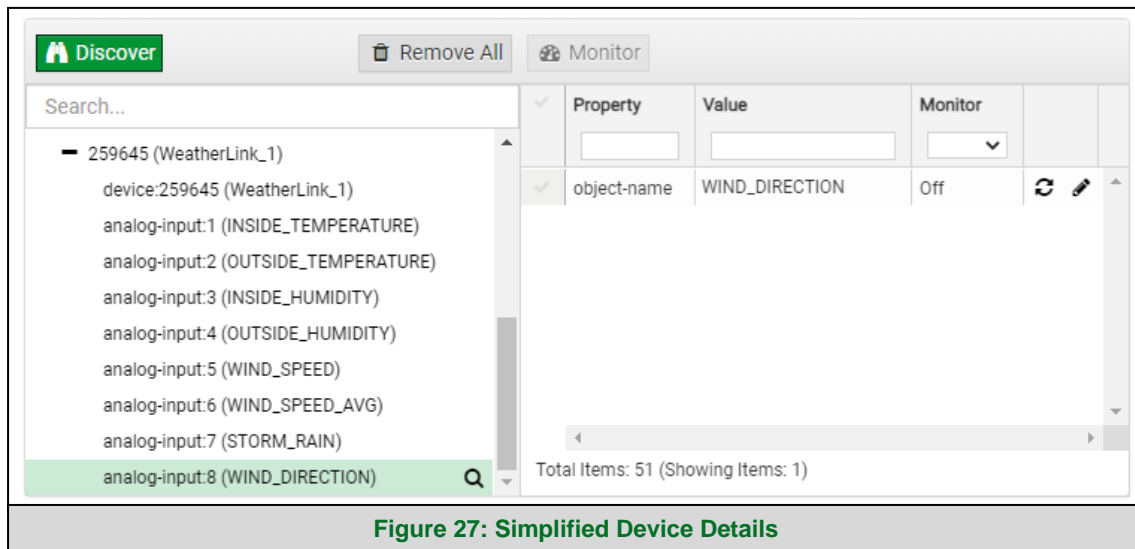


Figure 27: Simplified Device Details

- Then click on the Explore button that appears or double-click the device object.

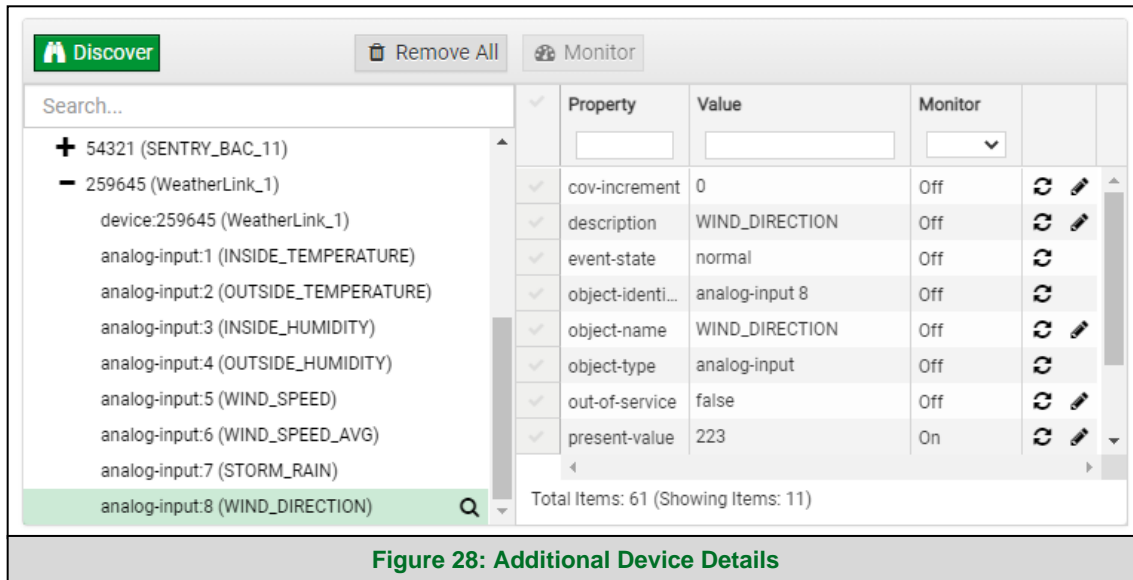


Figure 28: Additional Device Details

A full list of the device details will appear on the right side window. If changes are expected since the last explore, simply press the Refresh button (↻) that appears to right of individual properties to refresh.

NOTE: The Explorer Search Bar will find devices based on their Device ID.

NOTE: The Explorer Discovery Tree has 3 levels that correspond to the following.

- **Network number**
 - **Device**
 - **Device object**

8.2.1 Edit the Present Value Field

The only recommended field to edit via BACnet Explorer is the device's present value field.

NOTE: Other BACnet properties are editable (such as object name, object description, etc.); however, this is not recommended because the BACnet Explorer is a discovery tool not a Building Management System (BMS).

- To edit the present value, select it in the property listings.

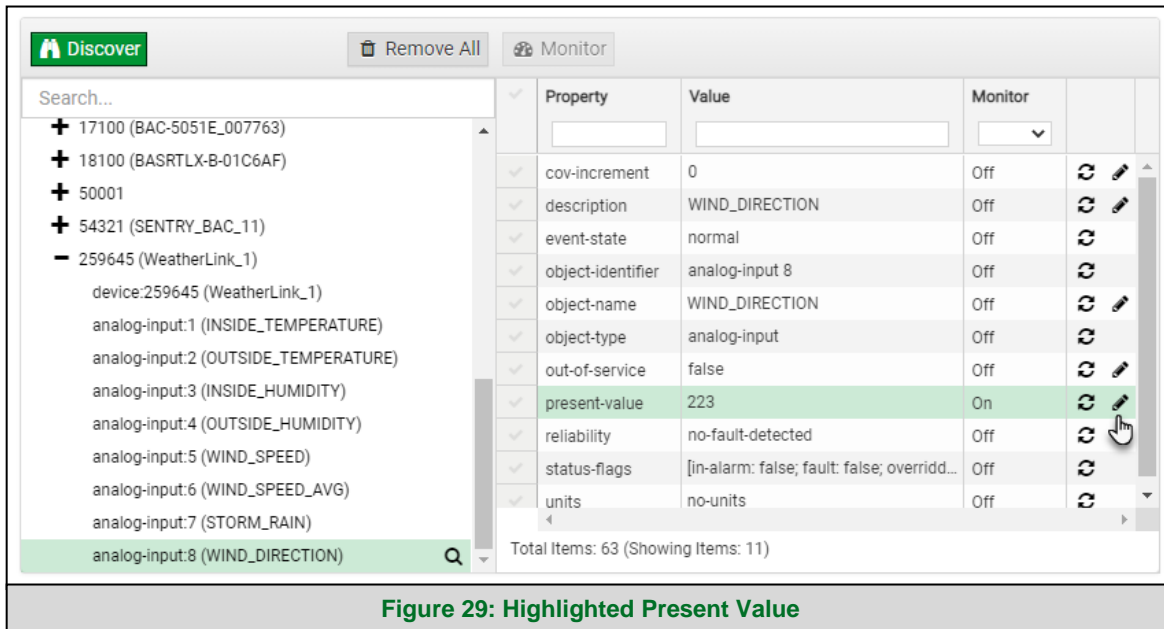


Figure 29: Highlighted Present Value

- Then click the Write button (✎) on the right of the property to bring up the Write Property window.

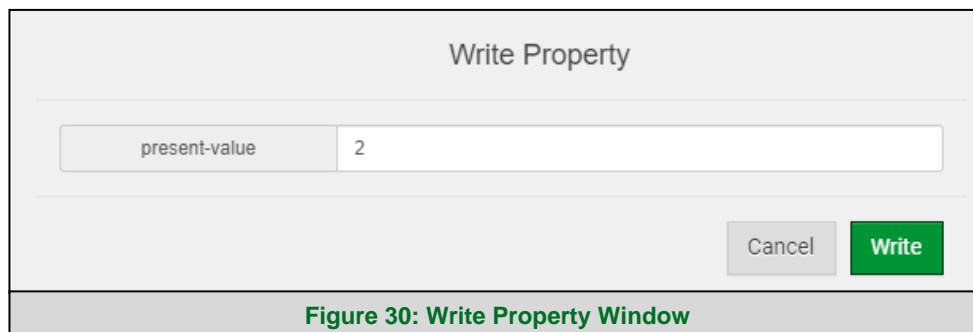


Figure 30: Write Property Window

- Enter the appropriate change and click write.

The window will close. When the BACnet Explorer page appears, the present value will be changed as specified.

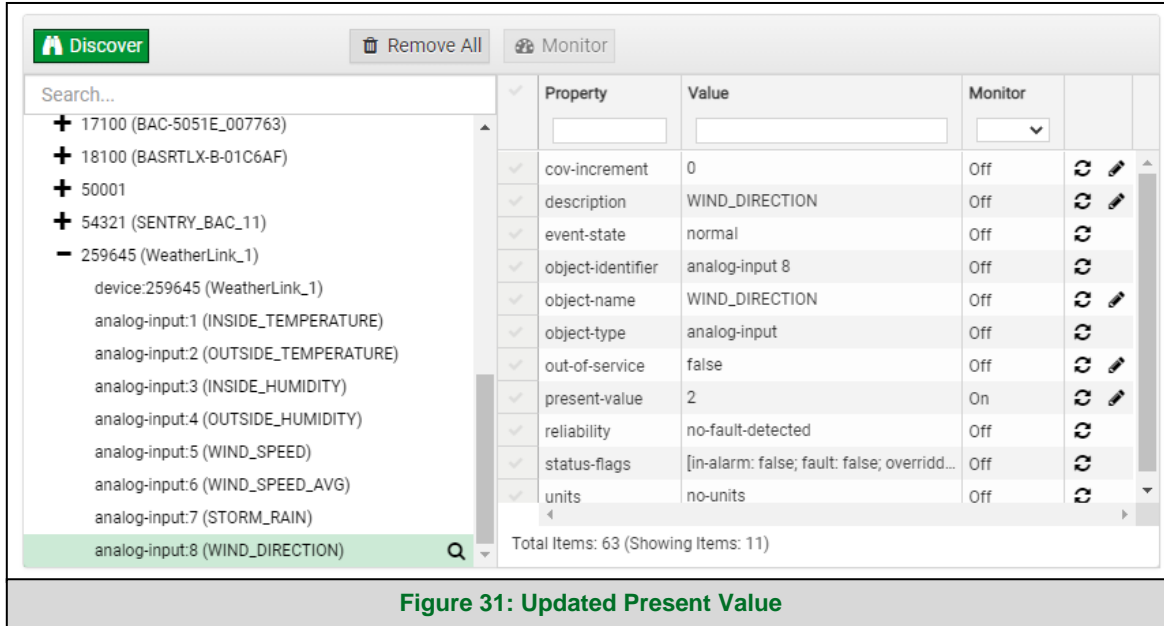


Figure 31: Updated Present Value

9 Grid Setup

The Grid is MSA Safety's device cloud solution for IIoT. Integration with the MSA Grid – FieldServer Manager 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 FieldServer Manager, refer to the [MSA Grid Start-up Guide](#).

9.1 Create a New FieldServer Manager Account

The first step to connecting to the FieldServer Manager is to create an account.

- Click on the FieldServer Manager tab.

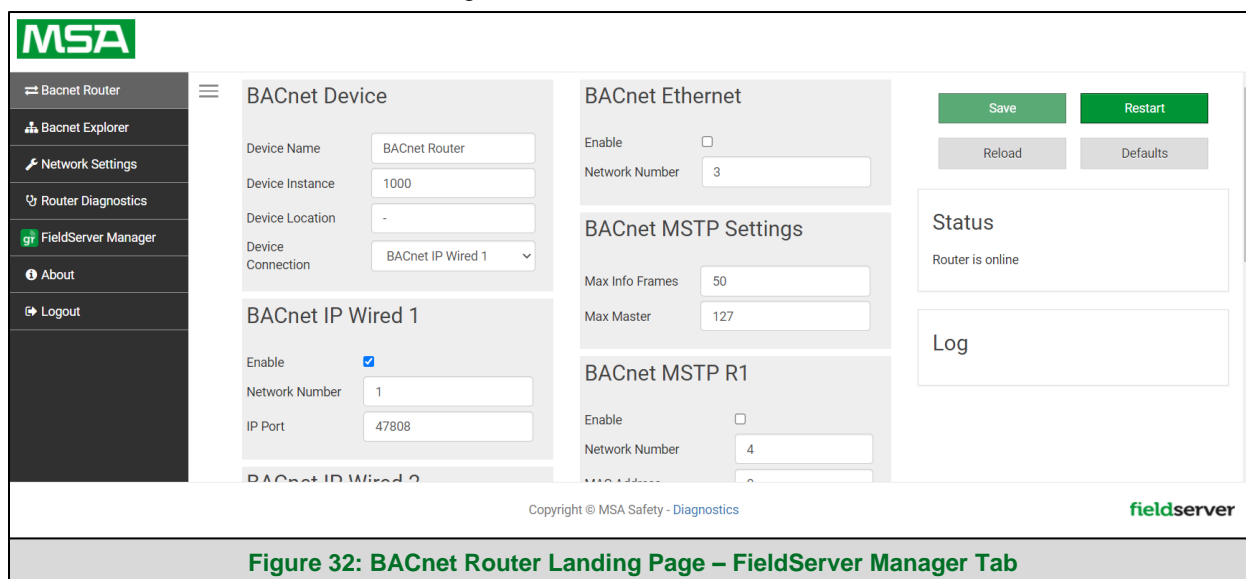


Figure 32: BACnet Router Landing Page – FieldServer Manager Tab

- An informational splash page will appear, click the Close button to view the registration page.

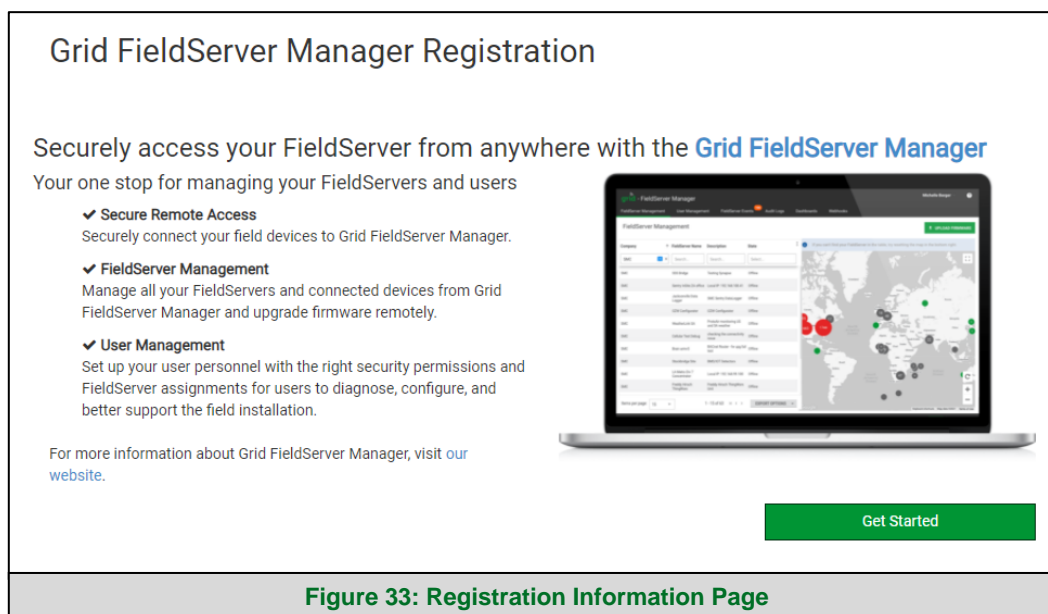
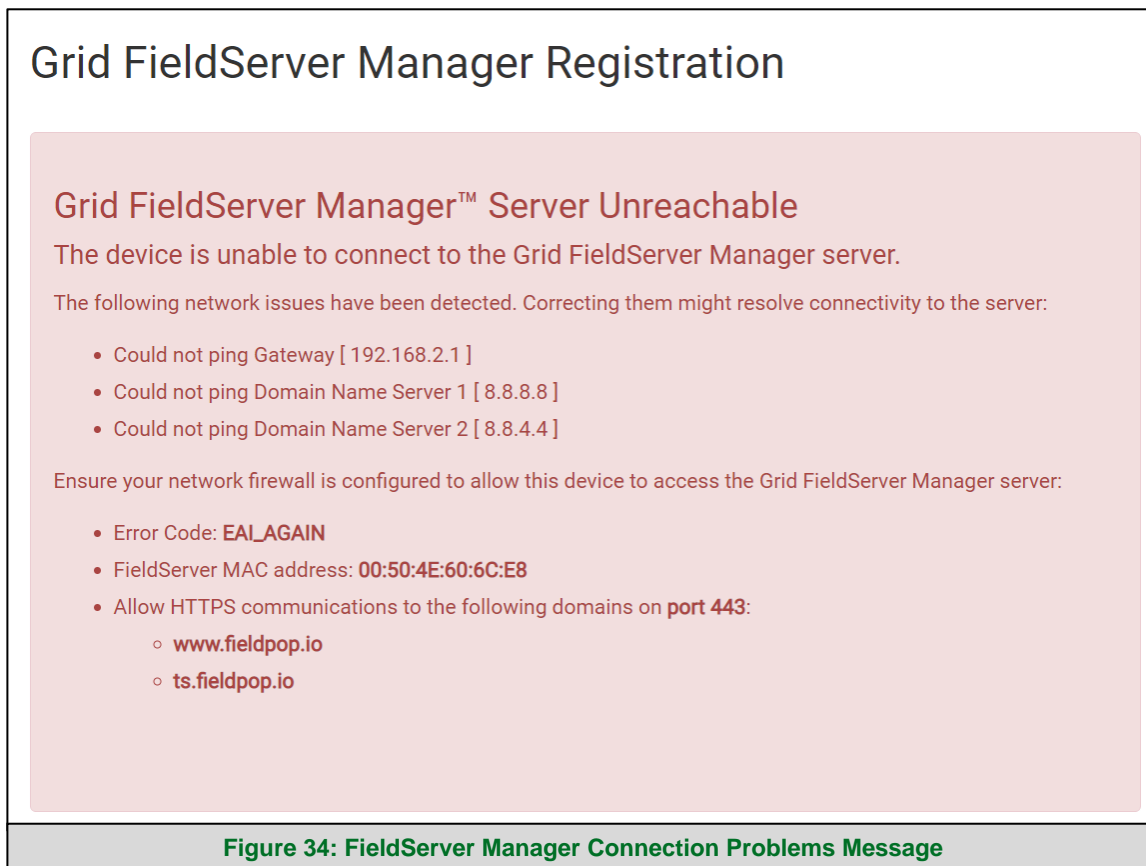


Figure 33: Registration Information Page

- If a warning message appears instead of the splash page, follow the suggestion that appears on screen.
- If the BACnet Router cannot reach the Grid server, the following message will appear.



- Follow the directions presented in the warning message and check that the DNS settings are set up with the following Domain Name Server (DNS) settings:

DNS1=8.8.8.8

DNS2=8.8.4.4

- Ensure that the BACnet Router is properly connected to the Internet

NOTE: If changes to the network settings are done, remember to save and then power cycle the BACnet Router to update the settings.

- Fill in the user details, site details, gateway details and create a new account.
 - Enter user details and click Next

The screenshot shows the 'Installer Details' step of the registration process. At the top, there are four numbered tabs: 1 (Installer Details), 2 (Installation Site), 3 (FieldServer Details), and 4 (Account Details). The 'Installer Details' tab is active. Below the tabs, the form contains the following fields:

- Installer Name:** A text input field.
- Company:** A text input field.
- Telephone:** A text input field.
- Email:** A text input field.
- Installation Date:** A date picker showing '20-September-2021'.

At the bottom right of the form, there are two buttons: 'Cancel' (grey) and 'Next' (green).

Figure 35: FieldServer Manager Registration – Installer Details

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

The screenshot shows the 'Installation Site Details' step of the registration process. At the top, there are four numbered tabs: 1 (Installer Details), 2 (Installation Site), 3 (FieldServer Details), and 4 (Account Details). The 'Installation Site' tab is active. Below the tabs, the form contains the following fields:

- Search:** A search bar with the placeholder text 'Search Google Maps' and a magnifying glass icon.
- Site Name:** A red text input field with the placeholder text 'Enter a name for this location'.
- Building:** A text input field.
- Street Address:** A text input field with the placeholder text 'Enter street address'.
- Suburb:** A text input field.
- City:** A text input field.
- State:** A text input field.
- Country:** A text input field.
- Postal Code:** A text input field.
- Latitude:** A red text input field with the placeholder text 'Enter latitude'.
- Longitude:** A red text input field with the placeholder text 'Enter longitude'.

To the right of the form is a Google Map showing the area around Lafayette, Mississippi. The map includes labels for various locations like Chalmers, Yeoman, Rockledge, Brookston, Delphi, Americus, Battle Ground, Montmorenci, Bar Barry Heights, Shadeland, Dayton, Mulberry, Stockwell, Clarks Hill, Coffax, New Richmond, Linden, Wingate, Odell, Attica, Independence, West Point, Green Hill, and Round Grove. The map also shows major roads like US-52, US-231, and US-19.

At the bottom right of the form, there are three buttons: 'Cancel' (grey), 'Previous' (grey), and 'Next' (green).

Figure 36: FieldServer Manager Registration – Site Details

- Enter Name and Description (required) then click Next

Grid FieldServer Manager Registration

Progress: 1 Installer Details, 2 Installation Site, **3 FieldServer Details**, 4 Account Details

FieldServer Details

Name

Description

FieldServer Info

Timezone (GMT -08:00) America/Los_Angeles ▼

Cancel Previous **Next**

Figure 37: FieldServer Manager Registration – Gateway Details

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

Grid FieldServer Manager Registration

Progress: 1 Installer Details, 2 Installation Site, 3 FieldServer Details, **4 Account Details**

New Users

If you do not have Grid FieldServer Manager credentials, you can create a new Grid FieldServer Manager account now **Create an Grid FieldServer Manager account**

Existing Users - Enter FieldServer registration details

User Credentials

Username

Password

Cancel Previous **Register FieldServer**

Figure 38: Grid Registration – FieldServer Manager 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 BACnet Router.

Grid FieldServer Manager Registration

FieldServer Registered

FieldServer Details

Name: Test1

Description: FS Test

FieldServer Info:

Timezone: America/Los_Angeles

MAC Address: 00:50:4E:60:13:FE

Tunnel Server URL: tunnel.fieldpop.io

FieldServer ID: treedancer_KrgPKmLRY

Product Name: Core Application - Default

Product Version: 5.2.0

Installer Details

Installer Name: Test

Company: MSA Safety

Telephone: (408) 444-4444

Email: contactus@msasafety.com

Installation Date: Sep 20, 2021

Installation Site Details

Site Name: Site#1

Building:

Street Address: 1020 Canal Road

Suburb:

City: Lafayette

State: Indiana

Country: United States

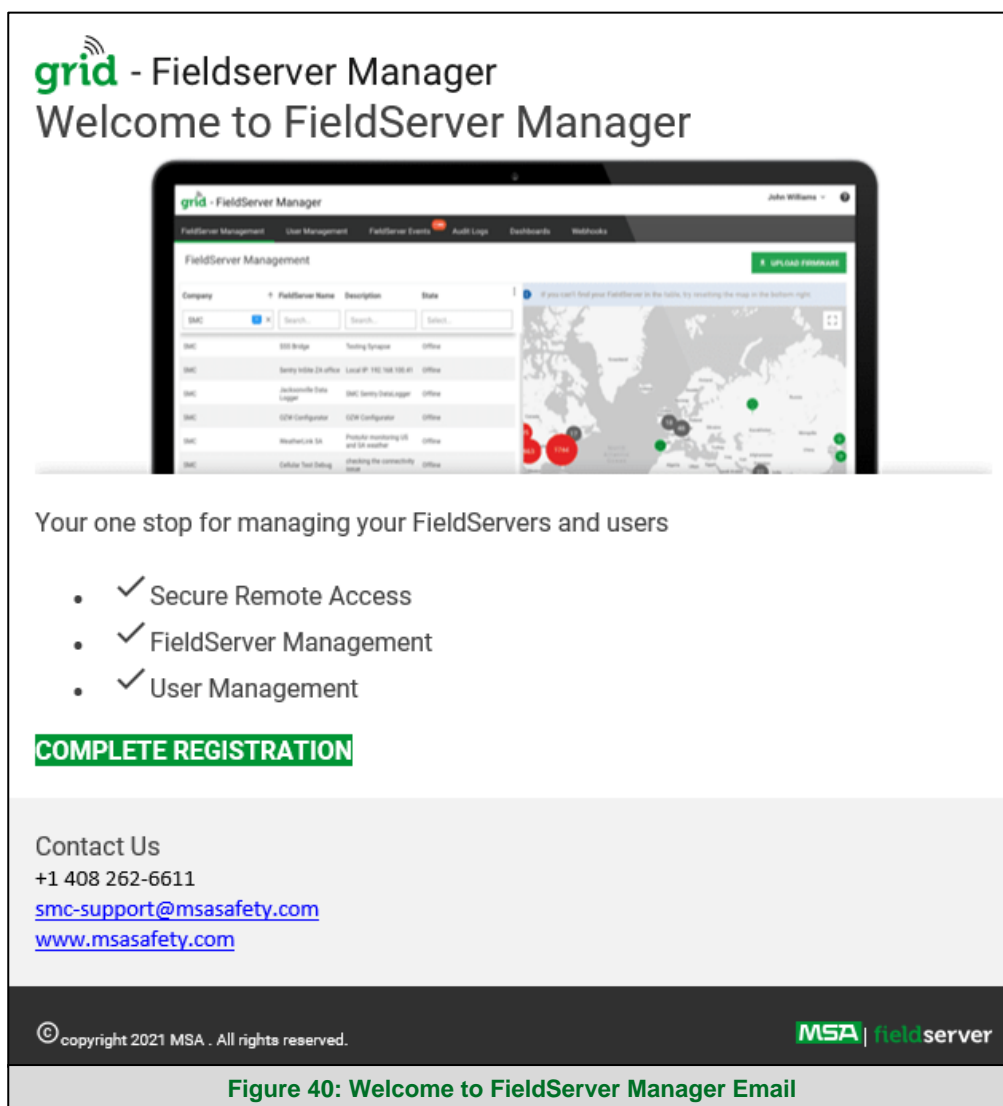
Postal Code: 47904

Update FieldServer Details

Figure 39: Device Registered for the FieldServer Manager

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

- Open the registered email account.
- The “Welcome to FieldServer Manager” email will appear as shown below.



NOTE: If no Grid email was received, check the spam/junk folder for an email from notification@fieldpop.io. Contact the FieldServer support team if the email cannot be found.

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

Complete Your Registration

Email Address

First Name

Last Name

Mobile Phone Number

New Password

Confirm Password

☐ By registering my account with MSA, I understand that I am agreeing to the FieldServer Manager [Terms of Service and Privacy Policy](#)

Figure 41: Setting User Details

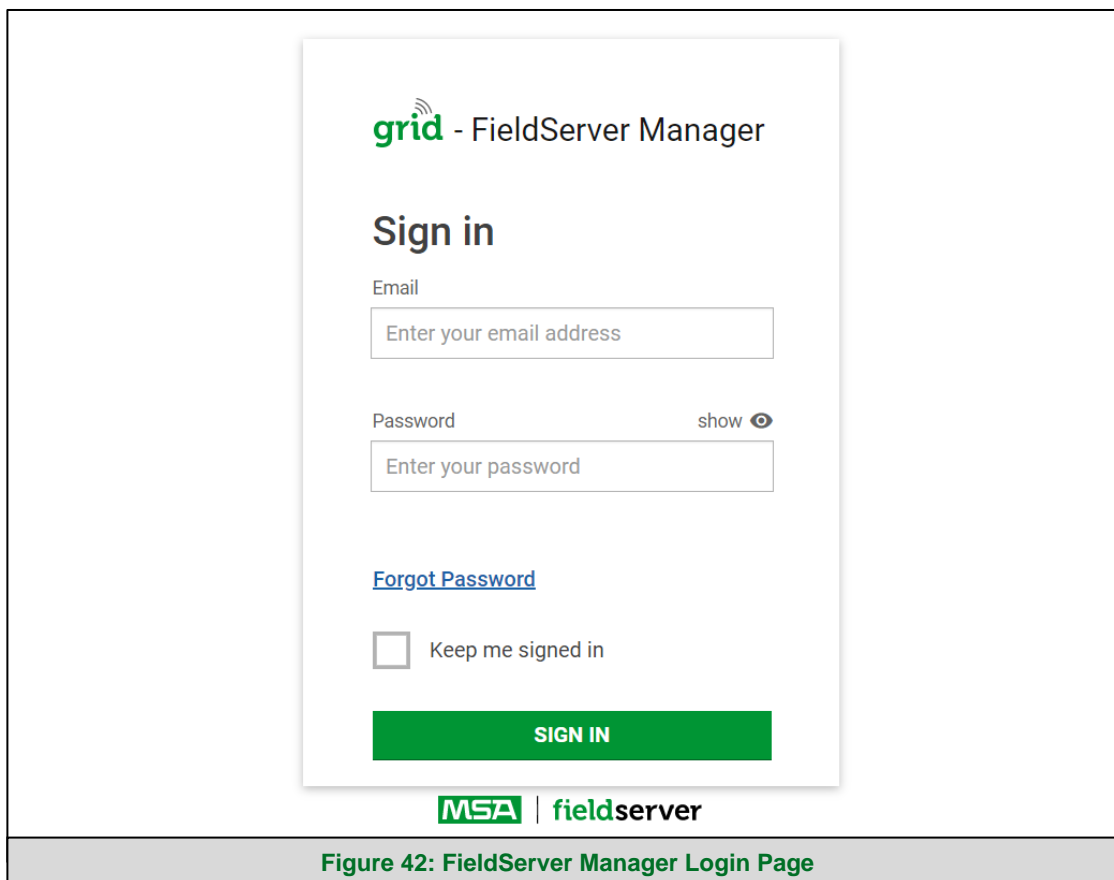
- Fill in the name, phone number, password fields and click the checkbox to agree to the privacy policy and terms of service.

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.

9.2 Login to the FieldServer Manager

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




grid - FieldServer Manager

Sign in

Email

Enter your email address

Password show 

Enter your password

[Forgot Password](#)

☐ Keep me signed in

SIGN IN

MSA | fieldserver

Figure 42: FieldServer Manager Login Page

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

NOTE: For additional Grid instructions see the [MSA Grid - FieldServer Manager Start-up Guide](#).

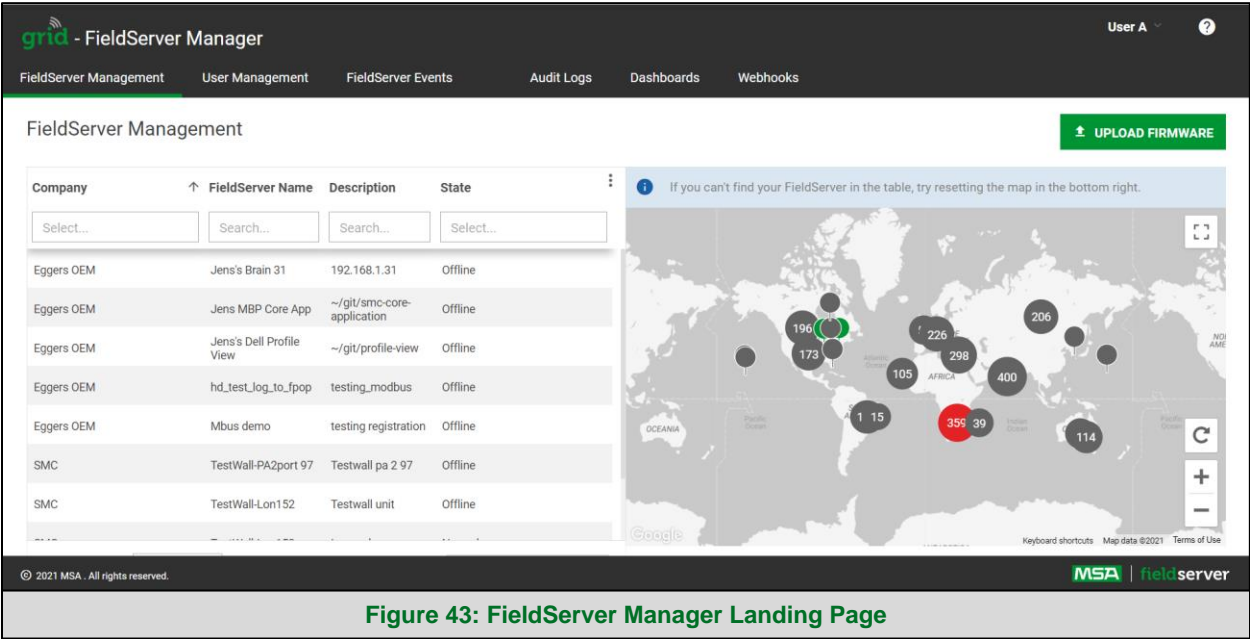


Figure 43: FieldServer Manager Landing Page

10 Troubleshooting

10.1 Tooltips

Tooltips appear when the mouse pointer hovers over the corresponding settings field. A balloon will appear giving a description of that input field. This applies to all input fields.

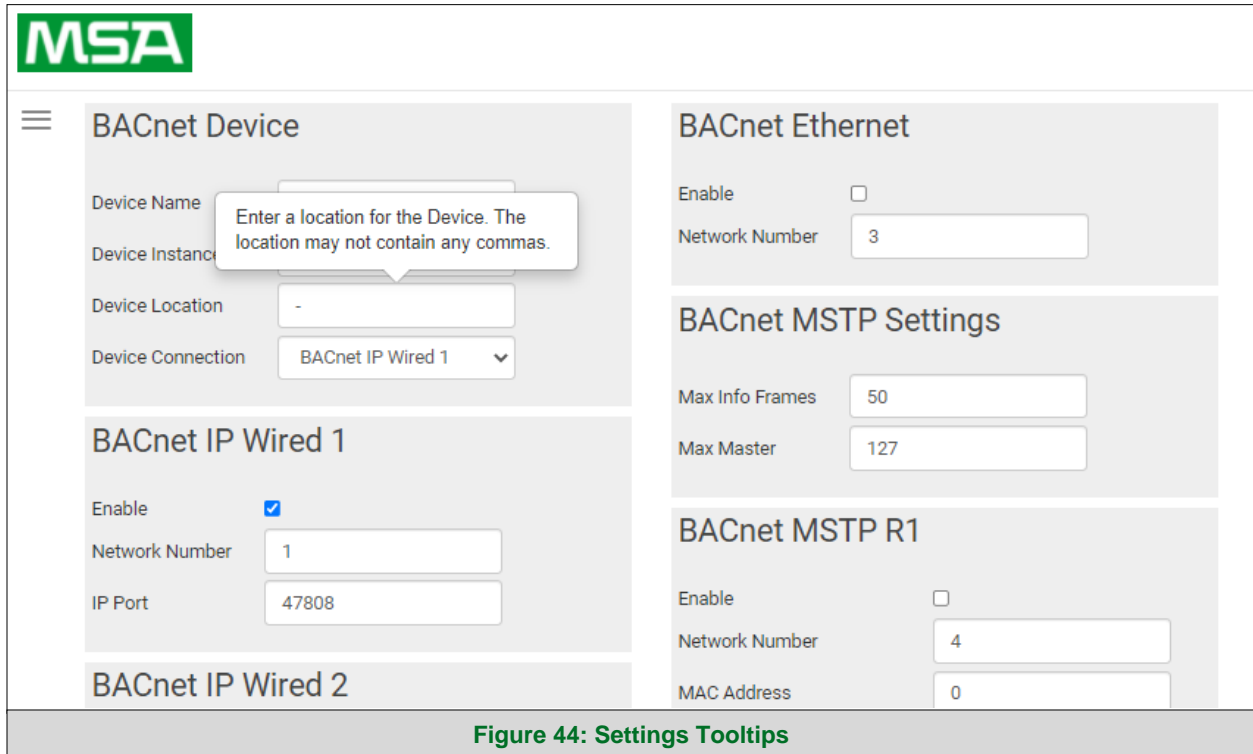

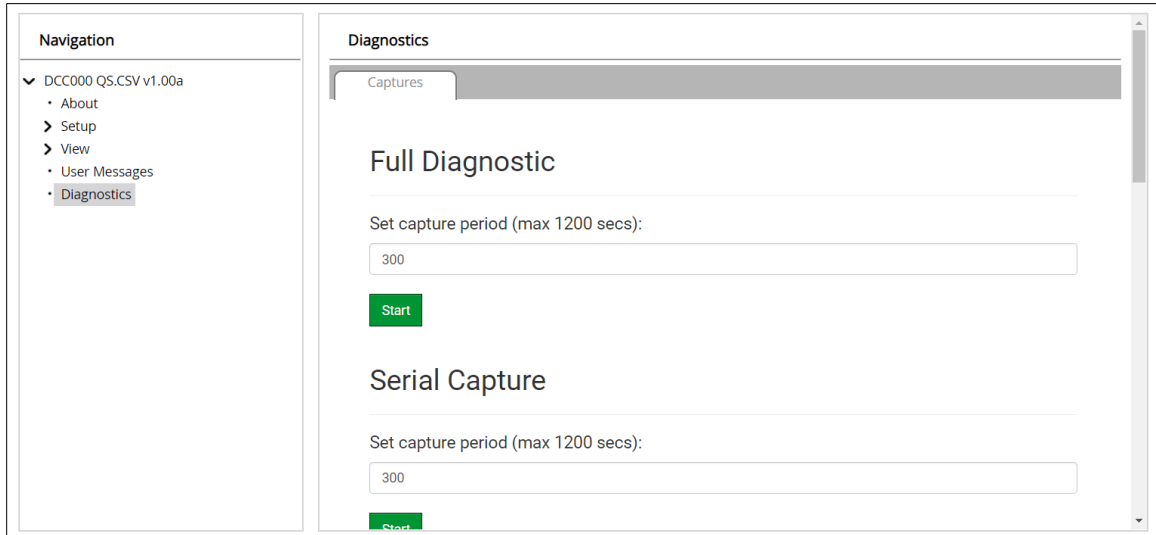


Figure 44: Settings Tooltips

10.2 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.

10.3 Factory Reset Instructions

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

10.4 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.

10.5 Wi-Fi Signal Strength

Wi-Fi
<60dBm – Excellent
<70dBm – Very good
<80dBm – Good
>80dBm – Weak
Figure 45: 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 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 from the BACnet Router landing page to the FS-GUI by clicking the blue “Diagnostics” text on the bottom of the screen.

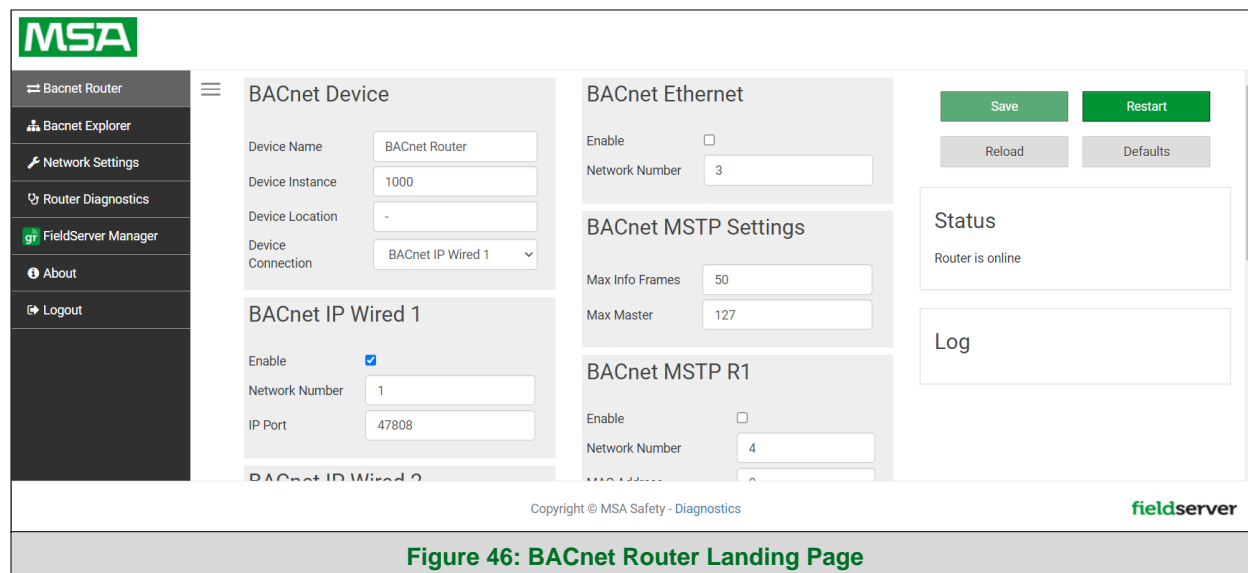


Figure 46: BACnet Router Landing Page

- Click Setup in the Navigation panel.

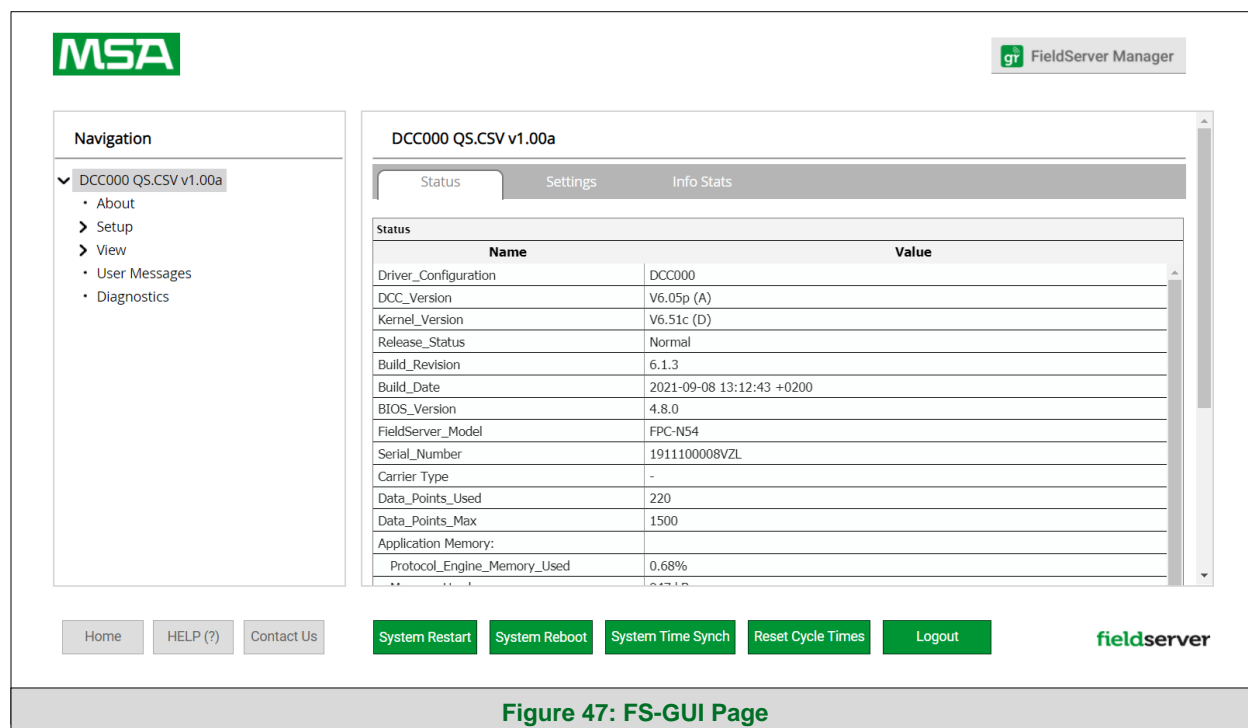


Figure 47: FS-GUI Page

11.1.1 Change Security Mode

- Click Security in the Navigation panel.

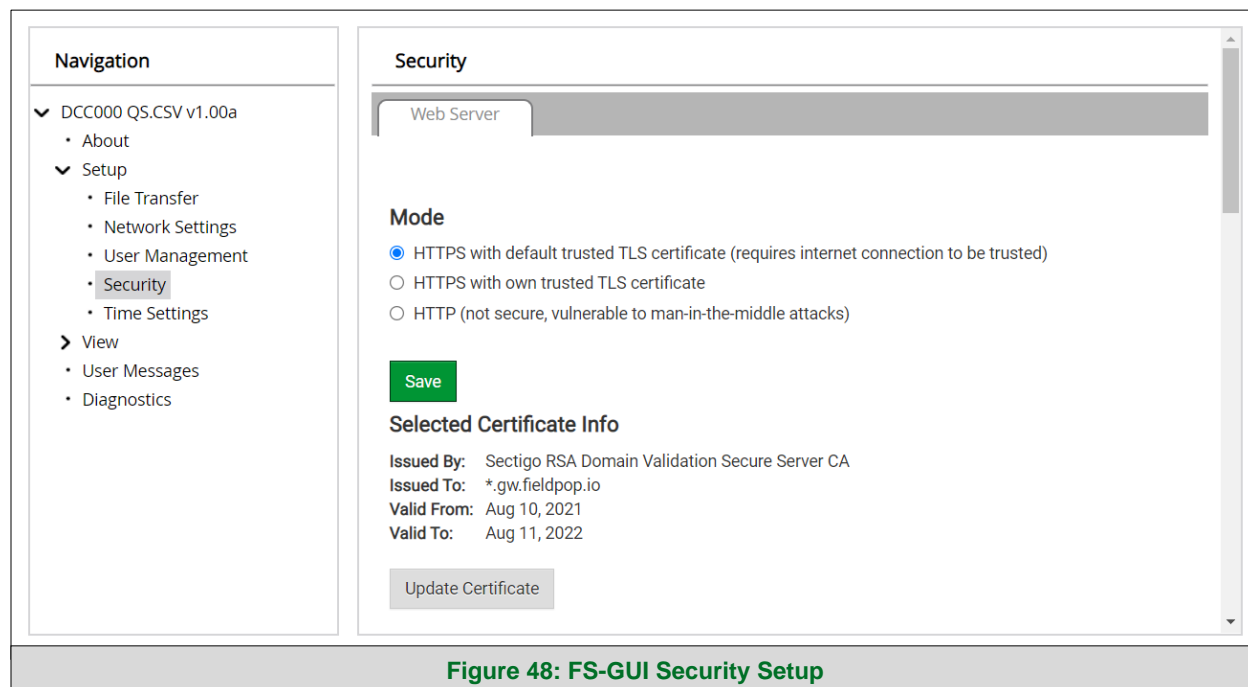


Figure 48: FS-GUI Security Setup

- Click the Mode desired.
 - If HTTPS with own trusted TLS certificate is selected, follow instructions in **Section 6.2.1**
- 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.

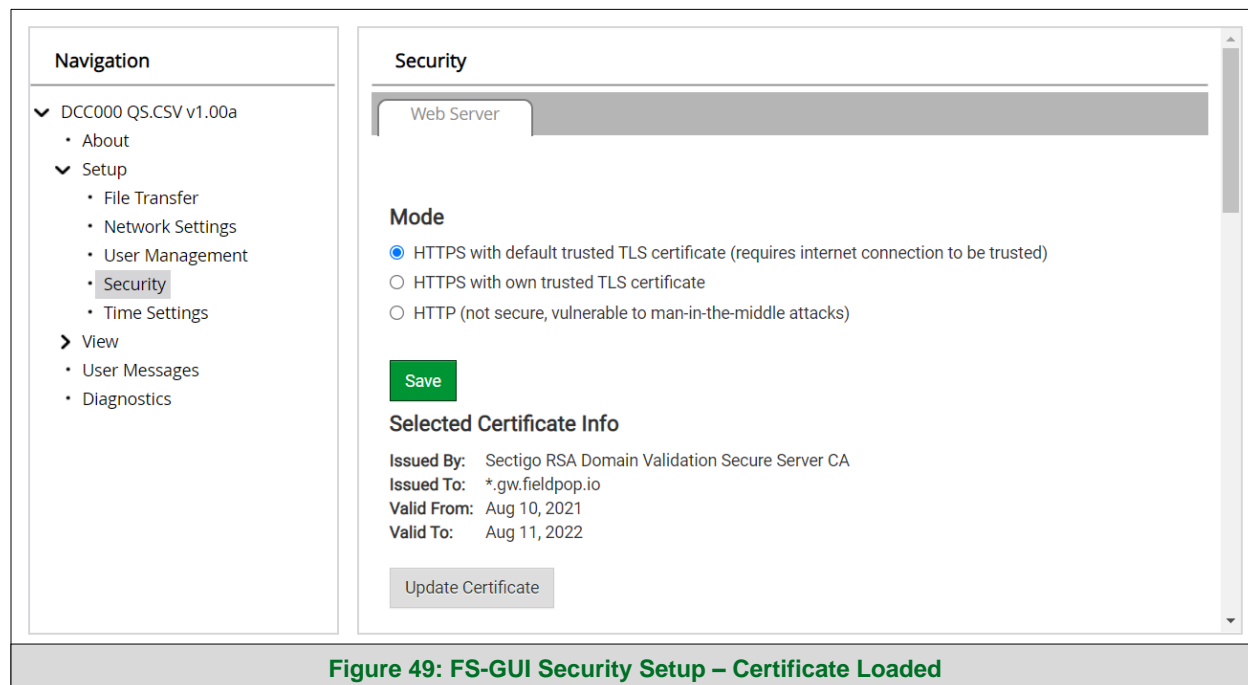


Figure 49: FS-GUI Security Setup – Certificate Loaded

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

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.

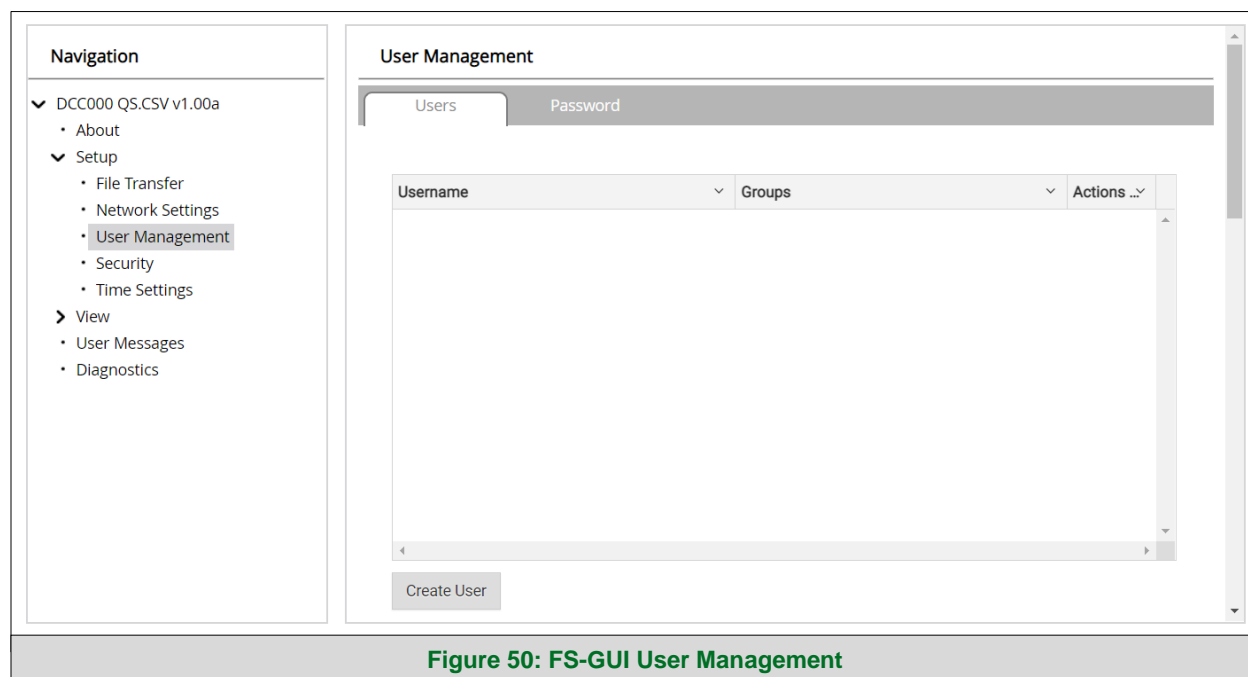


Figure 50: FS-GUI User Management

User Types:

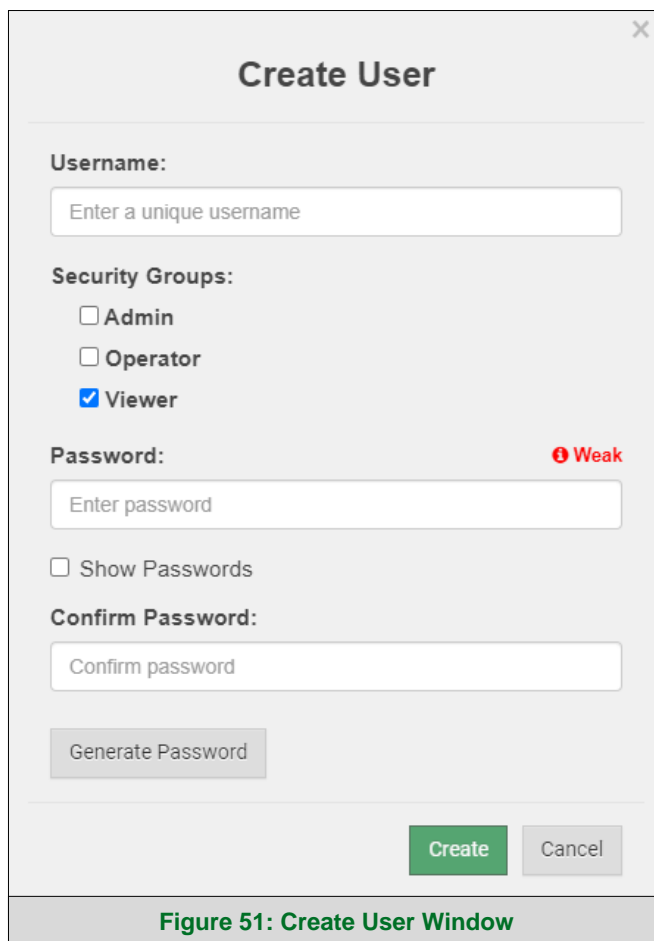
Admin – Can modify and view any settings on the FieldServer.

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

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

11.2.1 Create Users

- Click the Create User button.



The image shows a 'Create User' dialog box with a close button (X) in the top right corner. The dialog contains the following fields and controls:

- Username:** A text input field with the placeholder text 'Enter a unique username'.
- Security Groups:** Three radio button options: 'Admin', 'Operator', and 'Viewer'. The 'Viewer' option is selected.
- Password:** A text input field with the placeholder text 'Enter password'. To the right of the field is a red indicator 'Weak'.
- Show Passwords:** A checkbox that is currently unchecked.
- Confirm Password:** A text input field with the placeholder text 'Confirm password'.
- Generate Password:** A button located below the password fields.
- Create and Cancel:** Two buttons at the bottom right of the dialog.

Figure 51: 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.

11.2.2 Edit Users

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

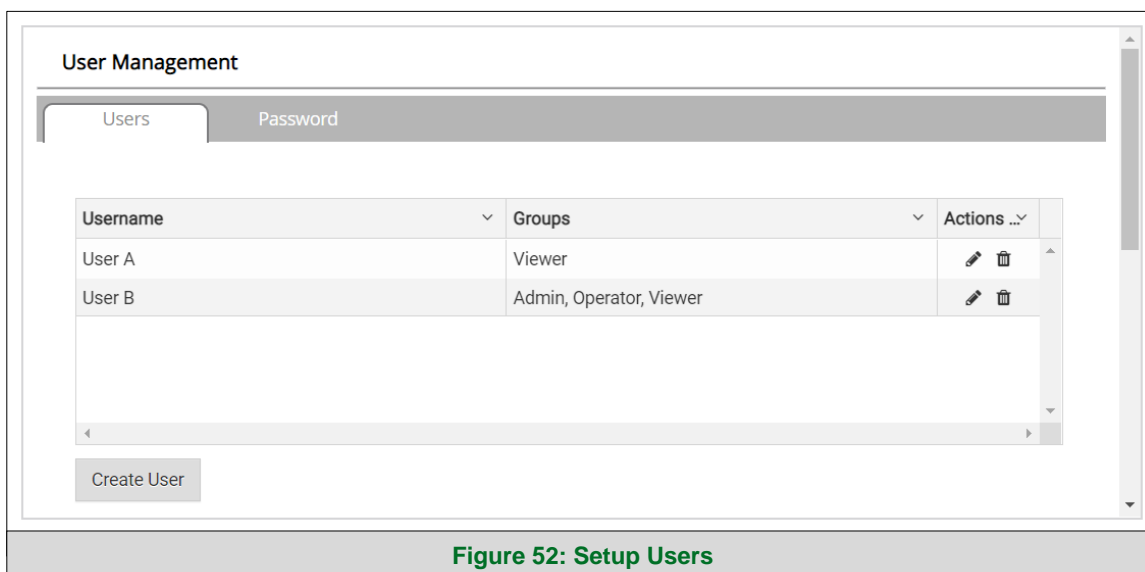


Figure 52: Setup Users

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

Edit User

Username:
User A

Security Groups:
☐ Admin
☐ Operator
☒ Viewer

Password:
Optional

☐ Show passwords

Confirm Password:
Optional

Generate Password

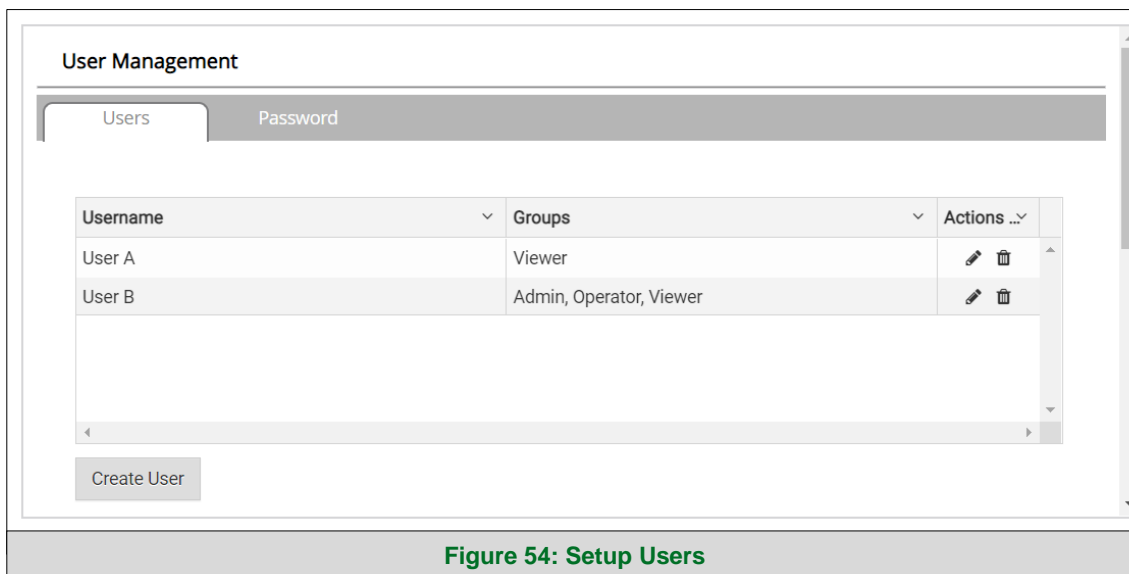
Confirm Cancel

Figure 53: Edit User Window

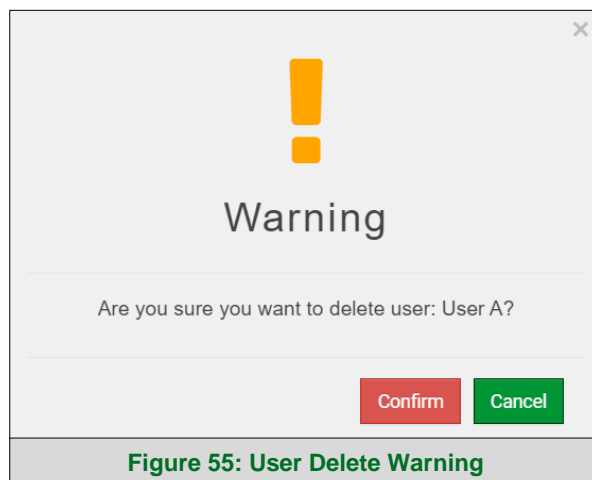
- Click Confirm.
- Once the Success message appears, click OK.

11.2.3 Delete Users

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



- When the warning message appears, click Confirm.



11.2.4 Change FieldServer Password

- Click the Password tab.

The screenshot displays the 'User Management' interface of the FieldServer GUI. On the left is a 'Navigation' sidebar with a tree structure. The main area is titled 'User Management' and contains two tabs: 'Users' and 'Password'. The 'Password' tab is active. It features a 'Password:' label with a red 'Weak' strength indicator, a text input field for the password, a 'Show passwords' checkbox, a 'Confirm Password:' label, another text input field for the confirmation, a 'Generate Password' button, and a 'Confirm' button at the bottom right.

Navigation

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

User Management

Users Password

Password: Weak

Enter password

☐ Show passwords

Confirm Password:

Confirm password

Generate Password

Confirm

Figure 56: 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.

11.3 Specifications



FS-ROUTER-BACW ¹	
Available Ports	One 3-pin Phoenix connector with: RS-485 port (TX+/RX-/gnd) One 3-pin Phoenix connector with: RS-485 port (TX+/RX-/gnd) One 3-pin Phoenix connector with: Power port (+/-/Frame-gnd) One Ethernet 10/100 BaseT port
Power Requirements	<i>Input Voltage:</i> 9-30VDC or 24VAC <i>Current draw:</i> 24VAC 0.125A <i>Max Power:</i> 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, UKCA compliant
Dimensions (WxDxH)	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 to 70°C (-4 to 158°F)
Humidity	10-95% RH non-condensing
Wi-Fi 802.11 b/g/n	<i>Frequency:</i> 2.4 GHz <i>Channels:</i> 1 to 11 (inclusive) <i>Antenna Type:</i> SMA <i>Encryption:</i> TKIP, WPA & AES
Figure 57: Specifications	

“This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

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

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his expense.

Modifications not expressly approved by FieldServer could void the user's authority to operate the equipment under FCC rules.”

¹ Specifications subject to change without notice.

11.4 FS-ROUTER-BACW Dimension Drawing

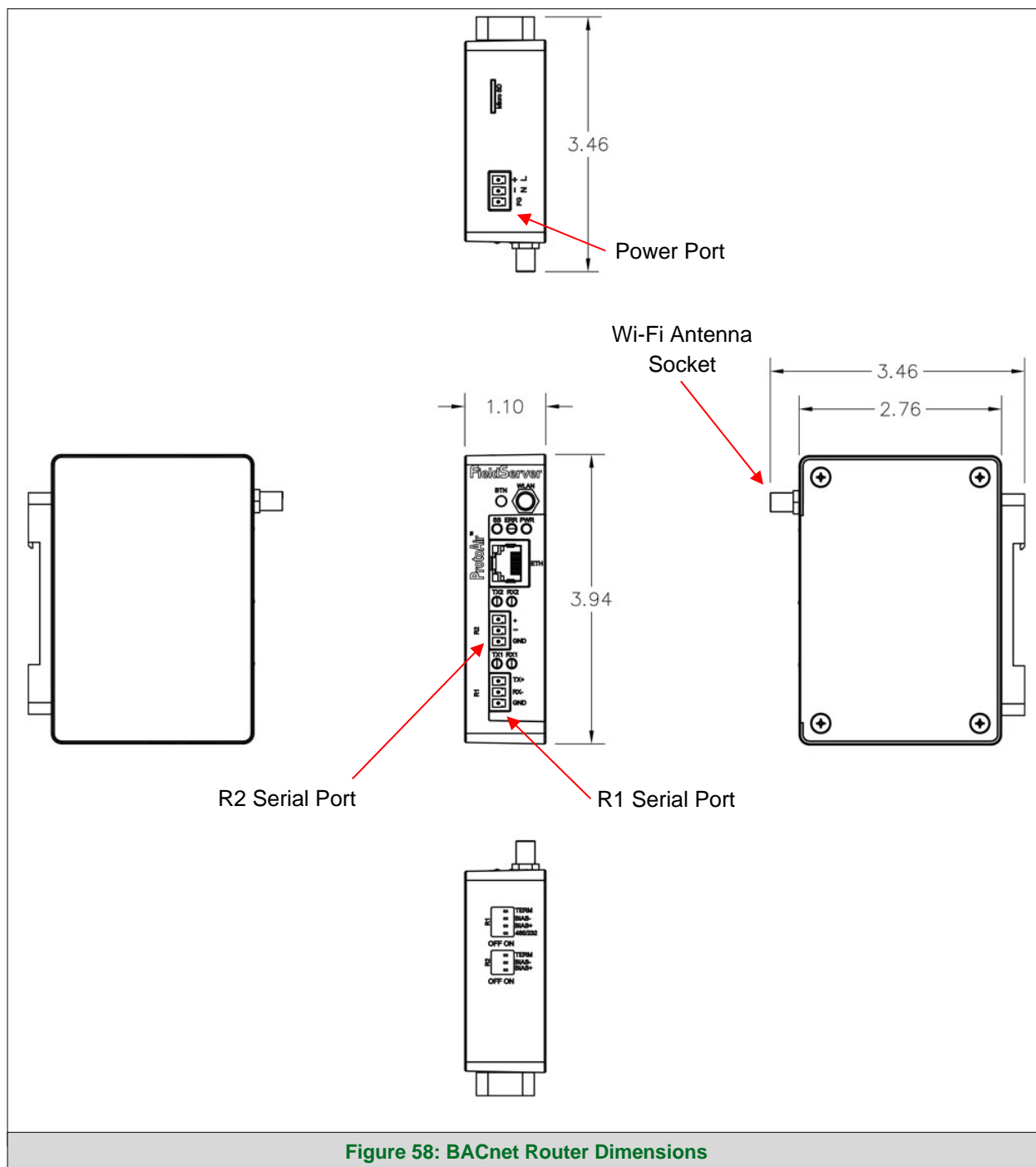


Figure 58: BACnet Router Dimensions

12 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.

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