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# 1 About the ProtoNode

The ProtoNode is a high performance, cost effective Building and Industrial Automation multi-protocol gateway providing protocol translation between serial/Ethernet devices and networks

**NOTE: For troubleshooting assistance refer to section [9 Troubleshooting](#), or any of the troubleshooting appendices in the related driver supplements.**

The ProtoNode is cloud ready and connects with MSA Safety 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

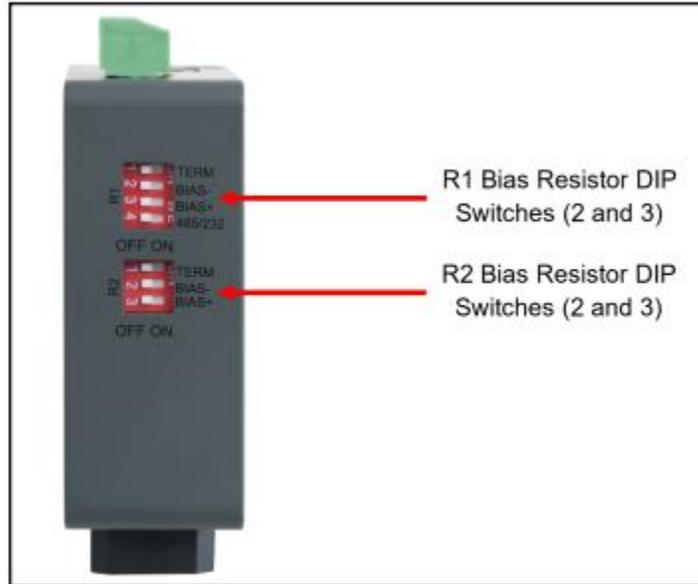




## 3 Installation

### 3.1 Dip Switch Settings

#### 3.1.1 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.

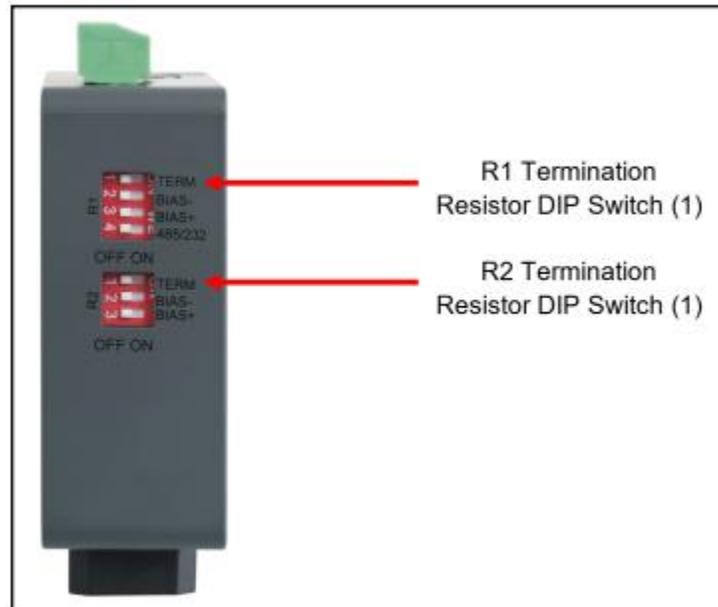
The bias resistor is 510 ohms which is in line with the BACnet spec. It should only be enabled at one point on the bus (for example, on the field port were there are very weak bias resistors of 100k). Since there are no jumpers, many ProtoNodes can be put on the network without running into the bias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

### 3.1.2 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 above.**

**Consult with AirCare before changing any of these dip switches. 99% of cases these don't need to be changed.**

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.**

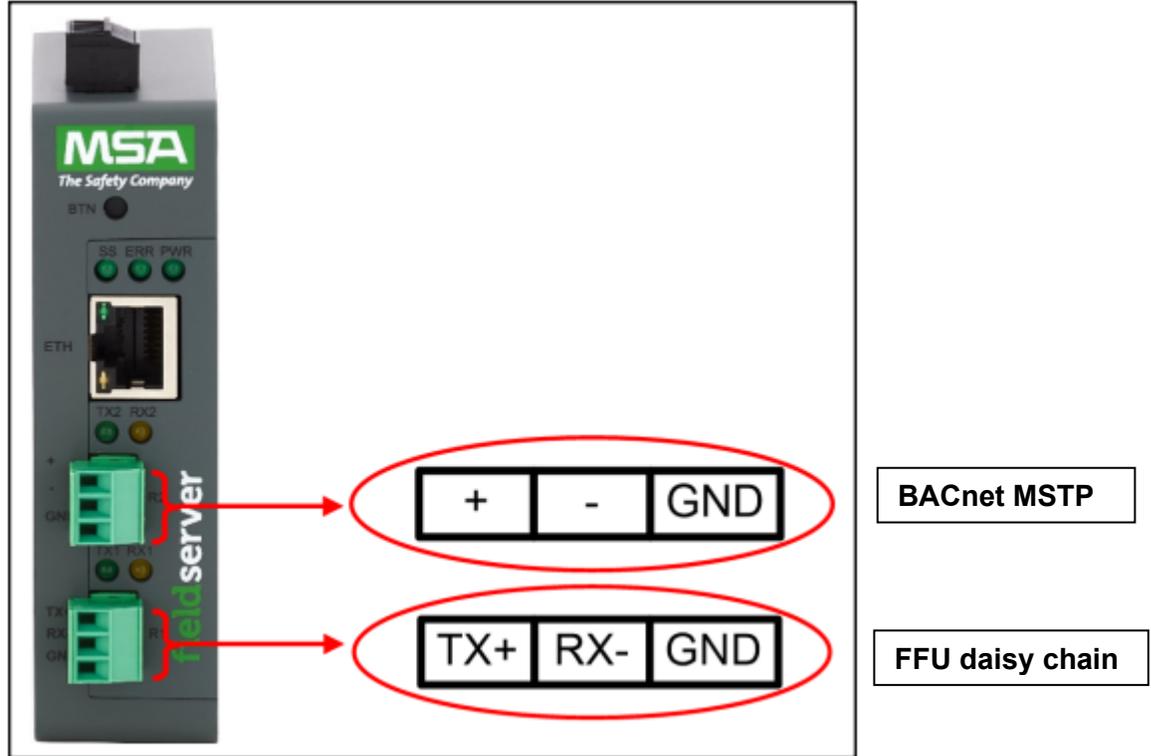
**NOTE: If gateway is already powered on, DIP switch settings won't take effect unless the unit is power cycled.**

### 3.2 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 [3.1 DIP Switch Settings](#)).

The R2 Port is **BACnet MSTP** communication

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.

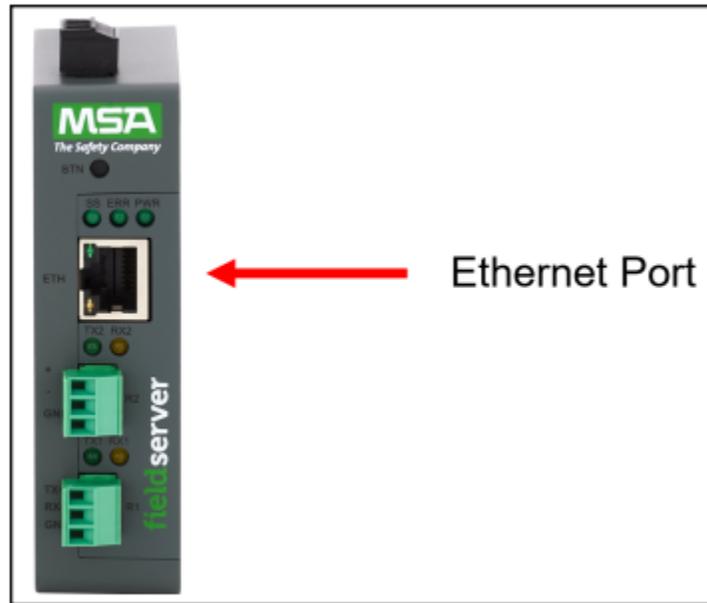
#### 3.2.1 Wiring

RS-485		RS-232	
BMS RS-485 Wiring	Gateway Pin Assignment	BMS 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 be 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).

### 3.3 10/100 Ethernet Connection Port

**NOTE: Do not use shielded Ethernet cables.**



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**

## 4 Power up the Gateway

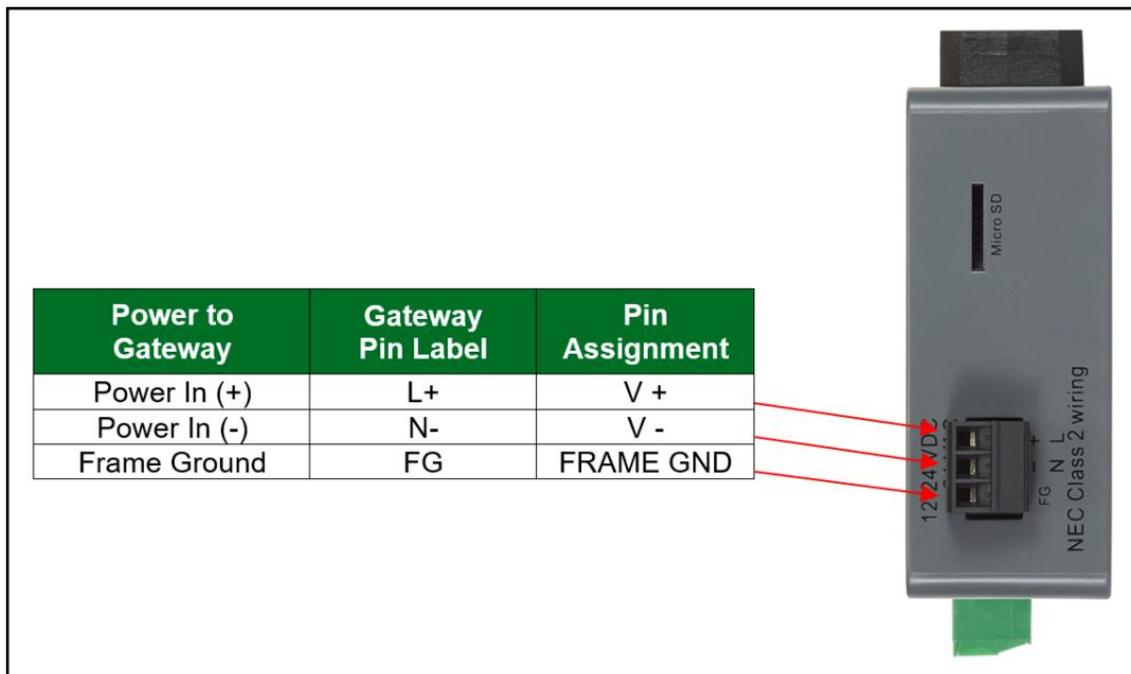
Check power requirements in the table below:

Power Requirement for ProtoNode External Gateway		
Current Draw Type		
ProtoNode Family	12VDC	24 VDC/AC
FPC - N54 (Typical)	250mA	125mA
<b>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.</b>		

Apply power to the ProtoNode as shown below. Ensure that the power supply used complies with the specifications provided in Section [10.4 Specifications](#).

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

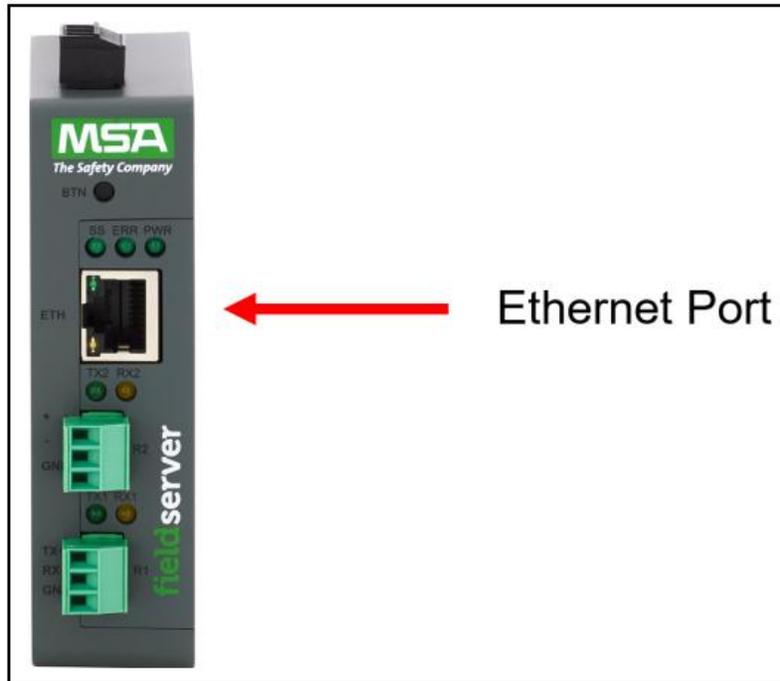
**NOTE: Only Class 2 PSU's must be used to power FieldServers.**



## 5 Connect the PC to the Gateway

### 5.1 Connecting the Gateway via Ethernet

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



#### 5.1.1 Changing the Subnet of the Connected PC

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

For Windows 10 and 11:

- 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:

<input checked="" type="radio"/> Use the following IP address:	
IP address:	<input type="text" value="192 . 168 . 1 . 99"/>
Subnet mask:	<input type="text" value="255 . 255 . 255 . 0"/>
Default gateway:	<input type="text" value=" . . ."/>

- 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 by pasting the default IP Address in the search bar. The default IP Address of the FieldServer is 192.168.1.24, Subnet Mask is 255.255.255.0

**NOTE:** If the IP Address of the ProtoNode has been changed, the IP Address can be discovered using the FS Toolbox utility. See Section [9.1 Lost or Incorrect IP Address](#) for instructions.

## 6 Setup Web Server Security

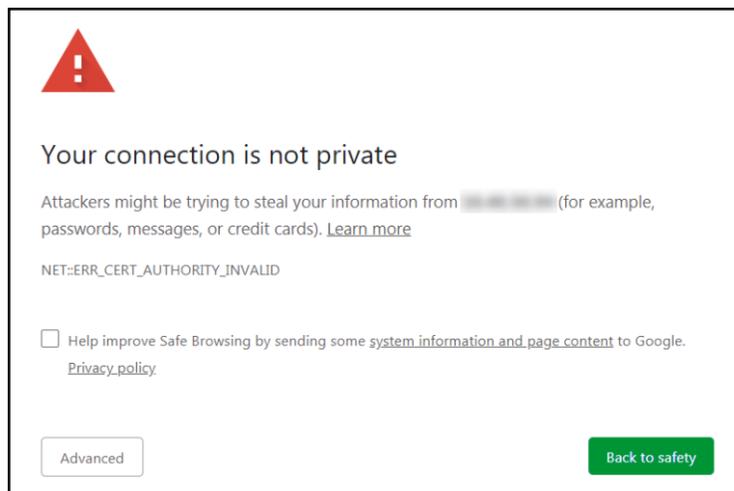
### 6.1 Login to the FieldServer

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.

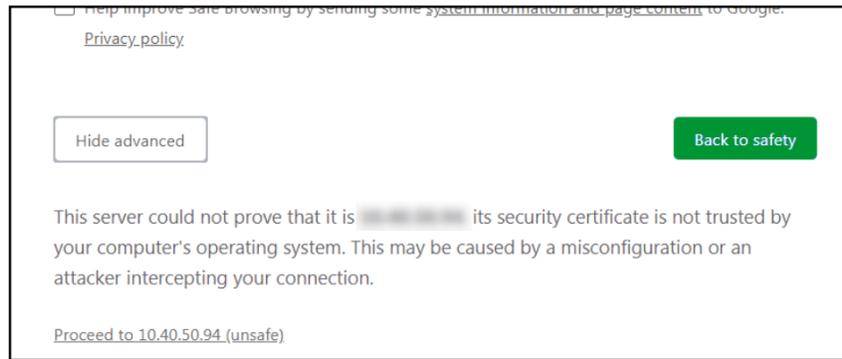
- When the Web Server Security Unconfigured window appears, read the text and choose whether to move forward with HTTPS or HTTP.



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

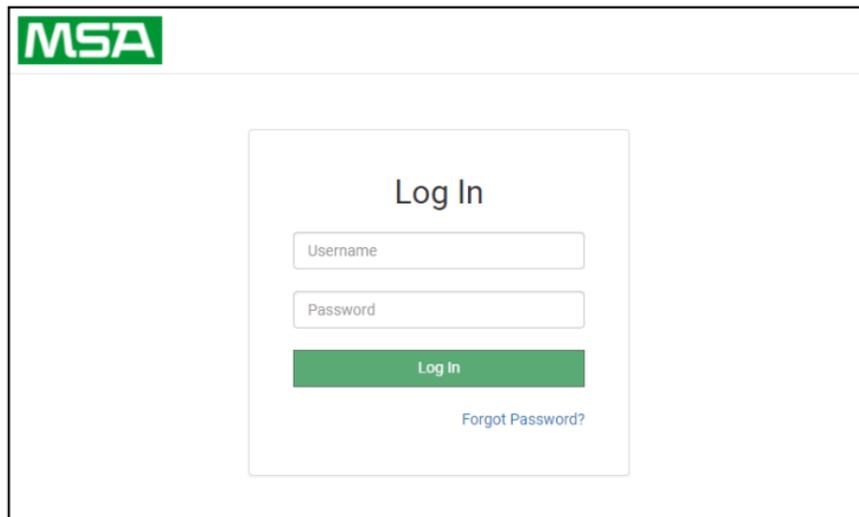


- Additional text will expand below the warning, click the underlined text to go to the IP Address. In the example below this text is “Proceed to (unsafe).”



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

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



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

**NOTE: To create individual user logins, go to Section [10.3 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)

**NOTE: Cookies are used for authentication.**

**NOTE: To change the web server security mode after initial setup, go to Section [10.2 Change Web Server Security Settings After Initial Setup](#).**

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

## 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:

- The home screen will be displayed as the landing page below
- The Web Configurator is displayed as the landing page below.

Parameter Name	Parameter Description	Value	
protocol_select	<b>Protocol Selector</b> Set to 1 for BACnet IP/Modbus TCP Set to 2 for BACnet MSTP Set to 3 for Metasys N2 Set to 4 for BACnet MSTP (single node)	4	Submit
mod_timeout	<b>Modbus RTU Timeout</b> This sets the Modbus RTU timeout period in seconds. (0 - 10)	0.250s	Submit
mod_retries	<b>Modbus RTU Retries</b> This sets the Modbus RTU retries. (0 - 10)	2	Submit
bac_device_id	<b>BACnet Device Instance</b> This sets the BACnet device instance. (1 - 4194303)	50000	Submit
bac_mac_addr	<b>BACnet MSTP Mac Address</b> This sets the BACnet MSTP MAC address. (1 - 127)	127	Submit
bac_baud_rate	<b>BACnet MSTP Baud Rate</b> This sets the BACnet MSTP baud rate. (9600/19200/38400/76800)	38400	Submit
bac_max_master	<b>BACnet MSTP Max Master</b> This sets the BACnet MSTP max master. (1 - 127)	127	Submit
bac_max_info_fr	<b>BACnet MSTP Max Info Frames</b> This sets the max number of information frames the connection may send before it must pass the token. (1 - 65535)	50	Submit
bac_cov_option	<b>BACnet COV</b> This enables or disables COVs for the BACnet connection. Use COV_Enable to enable. Use COV_Disable to disable. (COV_Enable/COV_Disable)	COV_Disable	Submit

HELP (?)   **Discovery Mode**   Clear Profiles and Restart   System Restart   Diagnostics & Debugging

**NOTE:** In the “*protocol\_select*” section, the user must configure it based on the following:

- Set to 1 for BACnet IP/Modbus TCP
- Set to 2 for BACnet MSTP
- Set to 4 for BACnet MSTP (single node)

Then press the “Submit” button then press the “System Restart” button at the bottom of the page to save the changes.

**Note:** The proper section/ choices for IP or MSTP will not be accurate until you select the desired Protocol and follow the steps mentioned above!

node_offset	<b>BACnet Node Offset</b> This is used to set the BACnet device instance. The device instance will be sum of the Modbus device address and the node offset. (0 - 4194303)	50000	Submit
bac_ip_port	<b>BACnet IP Port</b> This sets the BACnet IP port of the Gateway. The default is 47808.	47808	Submit

In the “*node\_offset*” section, the user can configure the BACnet device instance.

In the “*bac\_ip\_port*” section, the user can configure the BACnet IP port of the Gateway.

Email: [info@aircareautomation.com](mailto:info@aircareautomation.com)

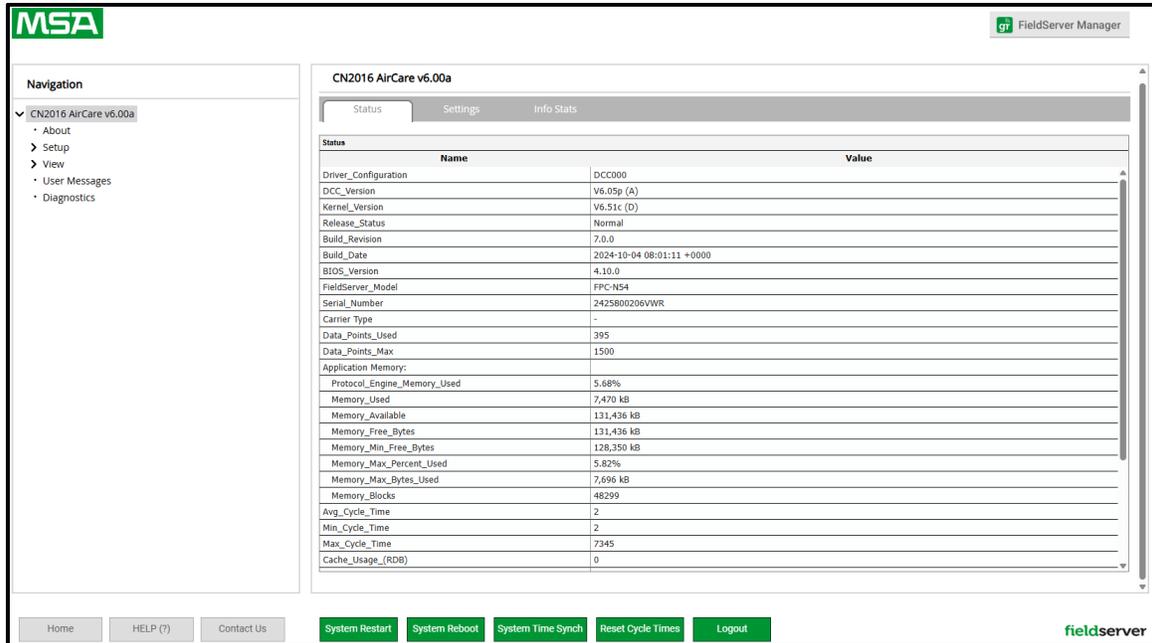
Website: [www.aircareautomation.com](http://www.aircareautomation.com)

8546 Broadway San Antonio, TX 78216.

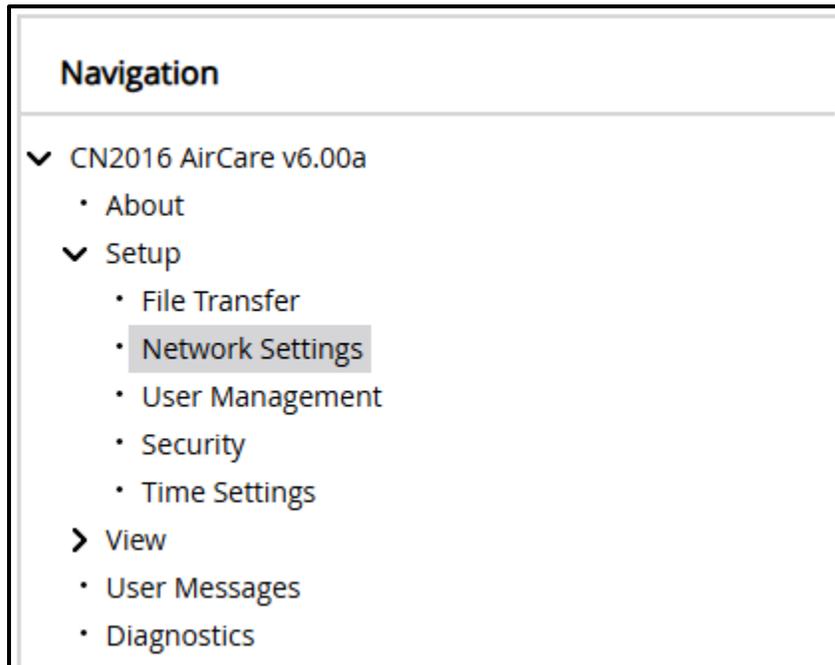
Tel: (210) 442-8821

Fax: (512)275-6155

- Access the FS-GUI by clicking on the “Diagnostics & Debugging” button in the bottom right side of the page.
- 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.

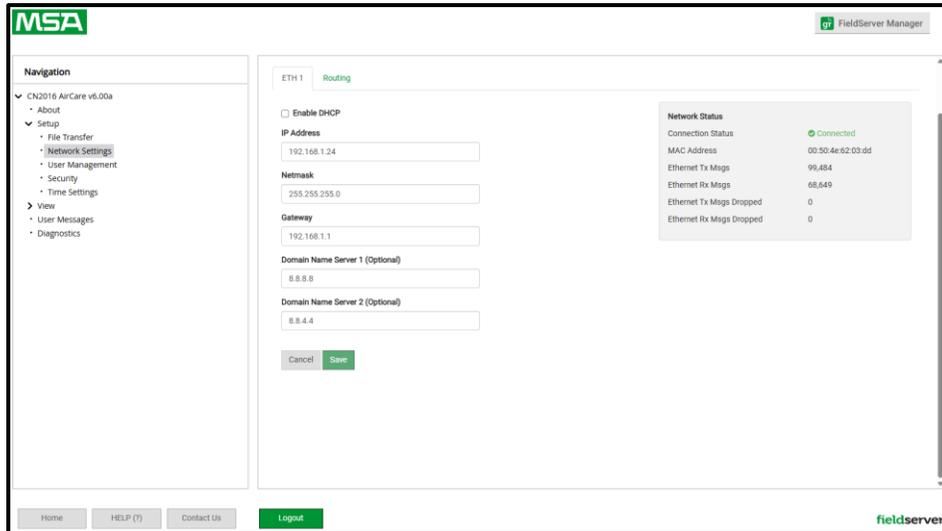


- Click on the arrow next to Setup to expand the tree.
- Click on Network Settings.



If/as necessary, change IP network configuration values:

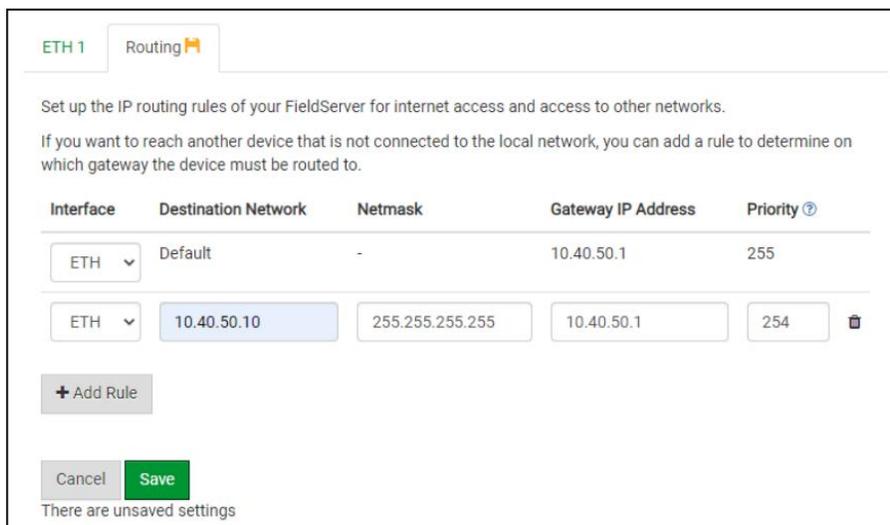
- IP Address (N1 IP Address field) of the ACGW008 Ethernet port.
- Netmask (N1 Netmask field).
- IP Gateway (Default Gateway field).



## 7.2 Routing Settings

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

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



## 7.3 Ethernet 1 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.**

ETH 1 Routing

Enable DHCP

IP Address  
10.40.50.109

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:60:13:be
Ethernet Tx Msgs	1,209,919
Ethernet Rx Msgs	2,745,183
Ethernet Tx Msgs Dropped	0
Ethernet Rx Msgs Dropped	0

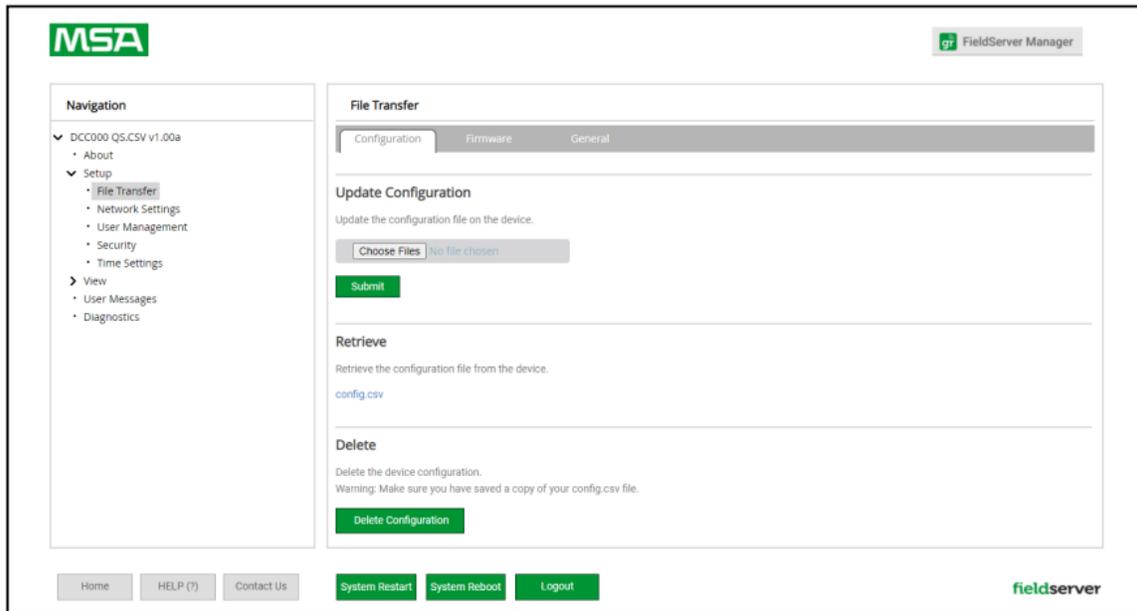
## 8 Configuring the ProtoNode

### 8.1 Retrieve the Sample Configuration File

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

If a custom configuration was ordered, the ProtoNode 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.

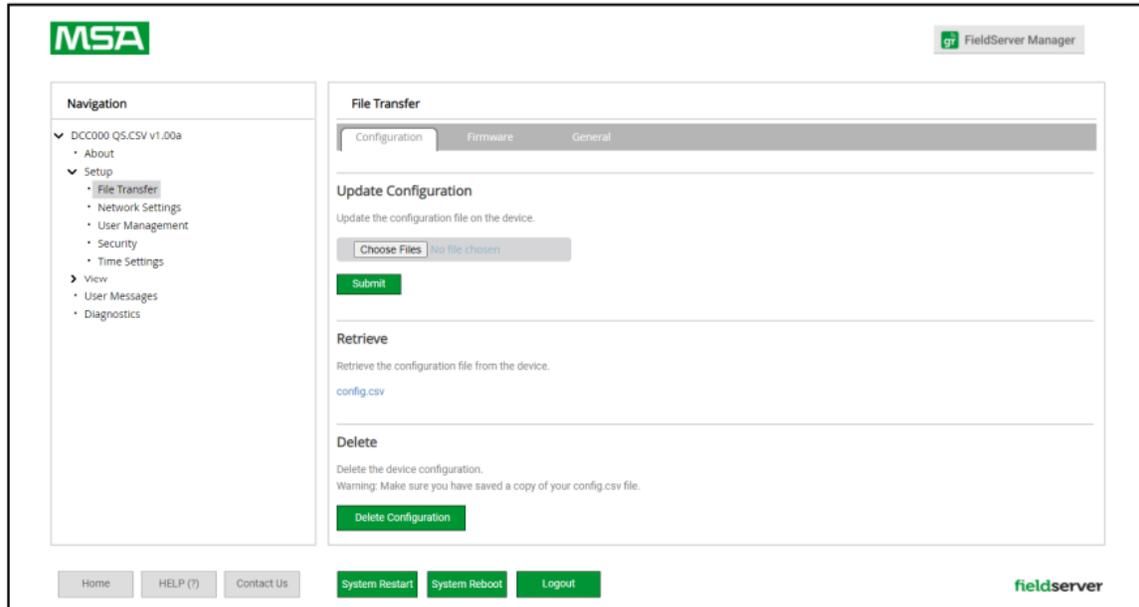


The screenshot displays the MSA FieldServer Manager web interface. The top left features the MSA logo, and the top right shows the FieldServer Manager logo. A navigation menu on the left lists options such as "DCC000 QS.CSV v1.00a", "About", "Setup", "File Transfer", "Network Settings", "User Management", "Security", "Time Settings", "View", "User Messages", and "Diagnostics". The main content area is titled "File Transfer" and includes tabs for "Configuration", "Firmware", and "General". Under the "Configuration" tab, there are three sections: "Update Configuration" with a "Choose Files" button and a "Submit" button; "Retrieve" with a link to "config.csv"; and "Delete" with a "Delete Configuration" button. At the bottom of the interface, there are buttons for "Home", "HELP (?)", "Contact Us", "System Restart", "System Reboot", and "Logout", along with the fieldserver logo.

## 8.2 Load the Updated Configuration File

### 8.2.1 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”.



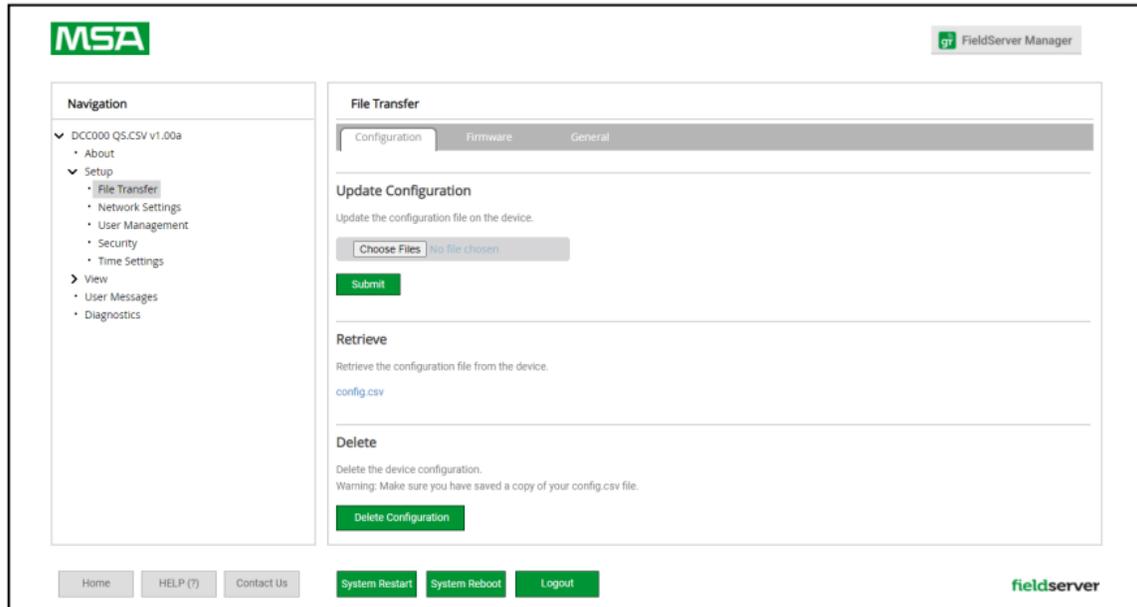
- Once download is complete, a message bar will appear confirming that the configuration was updated successfully.
- Click the System Restart Button to put the new file into operation.

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

## 8.2.2 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.**

### 8.3 Test and Commission the ProtoNode

- Connect the ProtoNode 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.

The screenshot shows the MSA FieldServer Manager interface. On the left is a navigation tree with the following structure:

- Navigation
  - DCC000 QS.CSV v1.00a
    - About
    - Setup
    - View
      - Connections
        - R1 - MODBUS\_RTU
        - ETH1 - Modbus/TCP
      - Data Arrays
      - Nodes
      - Map Descriptors
      - User Messages
      - Diagnostics

The main content area is titled "Connections" and has an "Overview" tab selected. Below the tab is a table with the following data:

Index	Name	Tx Msg	Rx Msg	Tx Char	Rx Char	Errors
0	R1 - MODBUS_RTU	18,740	0	149,920	0	18,740
1	ETH1 - Modbus/TCP	0	0	0	0	0

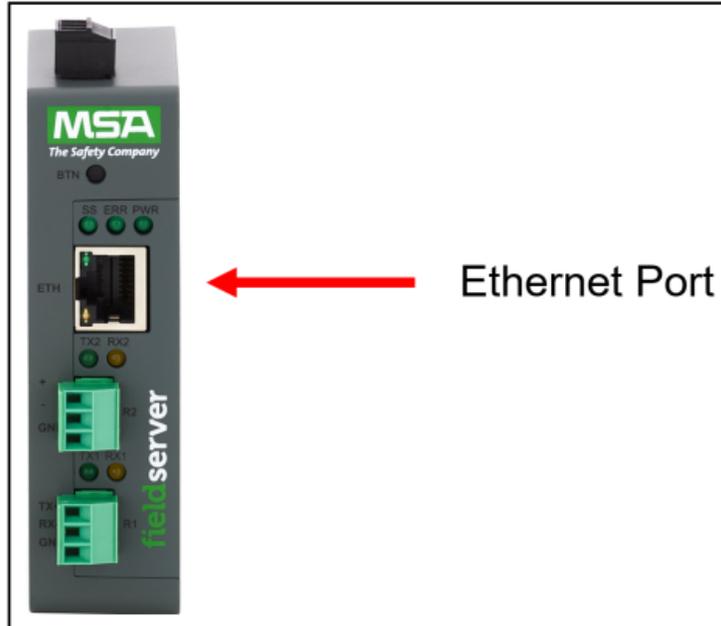
At the bottom of the interface, there are buttons for "Home", "HELP (?)", "Contact Us", "Reset Statistics", and "Logout". The "fieldserver" logo is visible in the bottom right corner.

**NOTE:** For troubleshooting assistance refer to Section 9 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.

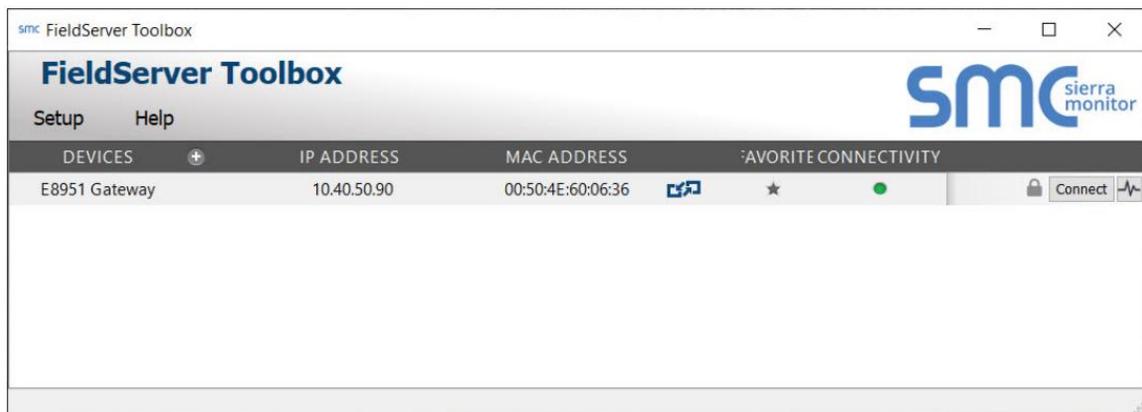
## 9 Troubleshooting

### 9.1 Lost or Incorrect IP Address

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



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



## 9.2 Viewing Diagnostic Information

- Type the IP Address of the FieldServer into the web browser or use the FieldServer Toolbox to connect to the FieldServer.
- Click on Diagnostics and Debugging Button, then click on view, and then on connections.
- If there are any errors showing on the Connection page, refer to Section [9.3 Checking Wiring and Settings](#) for the relevant wiring and settings.

The screenshot shows the MSA FieldServer Manager web interface. The navigation menu on the left includes: Navigation, DCC000 Q5.CSV v1.00a, About, Setup, View, Connections (selected), R1 - MODBUS\_RTU, ETH1 - Modbus/TCP, Data Arrays, Nodes, Map Descriptors, User Messages, and Diagnostics. The main content area displays the Connections page with a table showing connection statistics:

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

The footer contains buttons for Home, HELP (?), Contact Us, Reset Statistics, and Logout, along with the fieldserver logo.

## 9.3 Checking Wiring and Settings

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

- Visual observations of LEDs on the ProtoNode. (Section [9.5 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 ProtoNode.

Field COM problems:

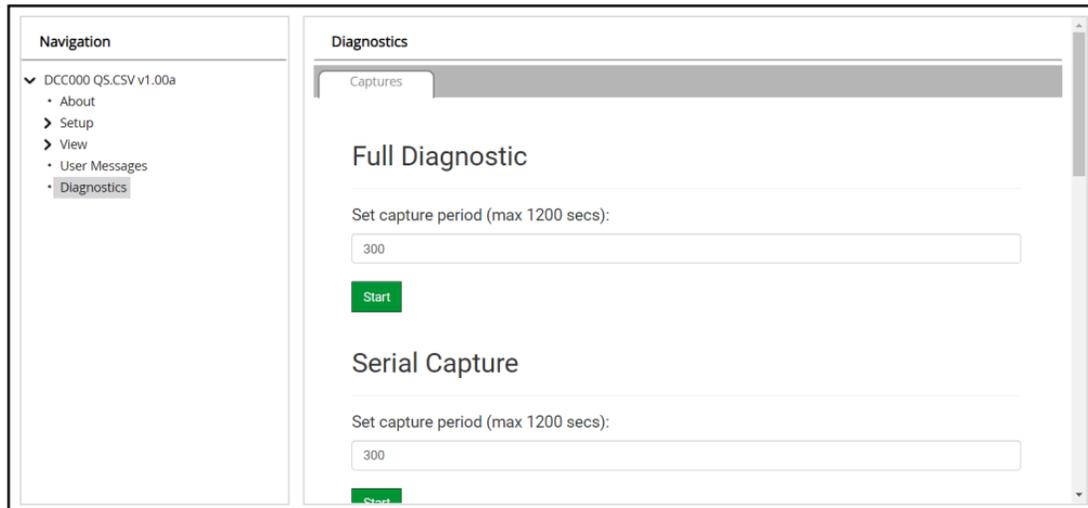
- Visual observations of LEDs on the ProtoNode. (Section [9.5 LED Functions](#))
- Verify wiring.
- Verify IP Address setting.

**NOTE: If the problem still exists, a Diagnostic Capture needs to be taken and sent to support. (Section [9.4 Taking a FieldServer Diagnostic Capture](#))**

## 9.4 Taking a FieldServer Diagnostic Capture

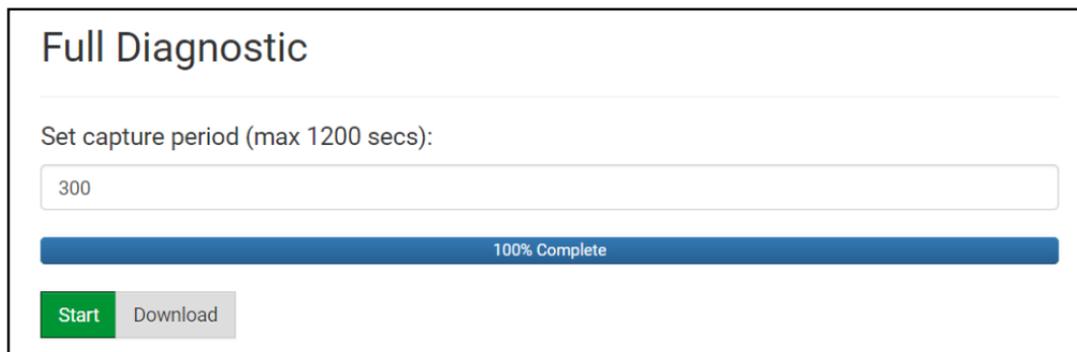
When there is a problem on-site that cannot easily be resolved, perform a Diagnostic Capture before contacting support. Once the Diagnostic Capture is complete, email it to technical support. The Diagnostic Capture will accelerate diagnosis of the problem.

- 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



The screenshot shows the FieldServer Diagnostics interface. On the left is a 'Navigation' panel with a tree view containing 'DCC000 QS.CSV v1.00a', 'About', 'Setup', 'View', 'User Messages', and 'Diagnostics'. The 'Diagnostics' section is selected. The main area is titled 'Diagnostics' and has a 'Captures' tab. It contains two sections: 'Full Diagnostic' and 'Serial Capture'. Each section has a 'Set capture period (max 1200 secs):' label and a text input field containing '300'. Below each input field is a green 'Start' button.

- 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

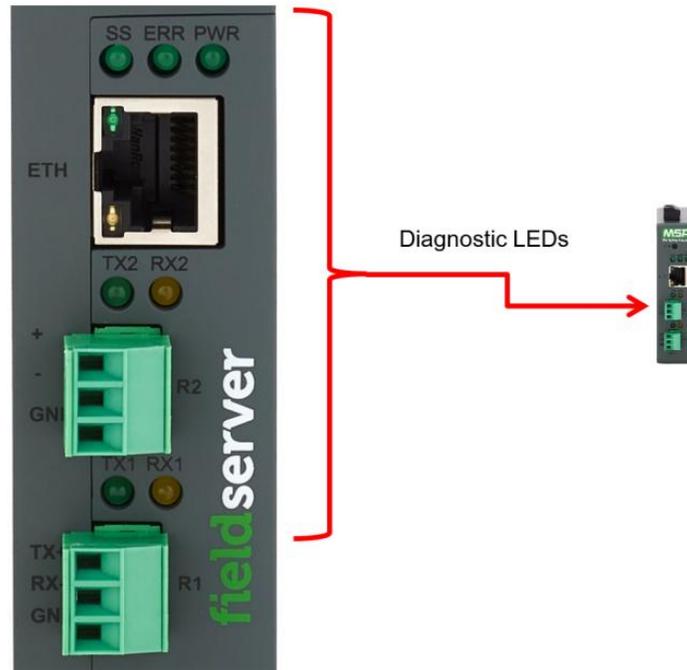


This screenshot shows the 'Full Diagnostic' section after the capture is complete. The 'Set capture period (max 1200 secs):' label is above a text input field containing '300'. Below the input field is a blue progress bar that is 100% full, with the text '100% Complete' centered on it. At the bottom, there is a green 'Start' button and a grey 'Download' 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](mailto:smc-support.emea@msasafety.com)).

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

## 9.5 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.
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.

## 9.6 Internet Browser Software Support

The following web browsers are supported:

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

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

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

## 9.7 Troubleshooting and Verifying FFU Connections

- In the bottom of the home page click on “Discovery Mode”.
- You will be prompted to restart the device to start the discovery process, click “OK”.

- The page will refresh and the discovery process will begin, the circle next to the Discovery Mode button will turn light green to indicate this as well.
- At the bottom of the home page under the “Active Profiles” section you should see all of the FFUs that are active

Active profiles			
Nr	Node ID	Current profile	Parameters
1	1	BAC_IP_EN01B41	Remove
2	2	BAC_IP_EN01B41	Remove
3	3	BAC_IP_EN01B41	Remove
4	4	BAC_IP_EN01B41	Remove
5	5	BAC_IP_EN01B41	Remove
6	6	BAC_IP_EN01B41	Remove
7	7	BAC_IP_EN01B41	Remove
8	8	BAC_IP_EN01B41	Remove
9	9	BAC_IP_EN01B41	Remove
10	10	BAC_IP_EN01B41	Remove
11	11	BAC_IP_EN01B41	Remove
12	12	BAC_IP_EN01B41	Remove
13	13	BAC_IP_EN01B41	Remove
14	14	BAC_IP_EN01B41	Remove
15	15	BAC_IP_EN01B41	Remove
16	16	BAC_IP_EN01B41	Remove
17	17	BAC_IP_EN01B41	Remove
18	18	BAC_IP_EN01B41	Remove
19	19	BAC_IP_EN01B41	Remove

HELP (?) **Discovery Mode** Clear Profiles and Restart System Restart Diagnostics & Debugging

- To turn Discovery Mode off, click on the “Discovery Mode” button.
- You will be prompted to disable discovery and restart the device, click “OK”.
- Next click on the “Clear Profiles and Restart” button at the bottom of the page. Note when using MSTP connection, you must “Clear profiles and Restart”
- You will be prompted to restart the system, click “OK”.

## 10 Additional Information

### 10.1 Update Firmware

To load a new version of the firmware, follow these instructions:

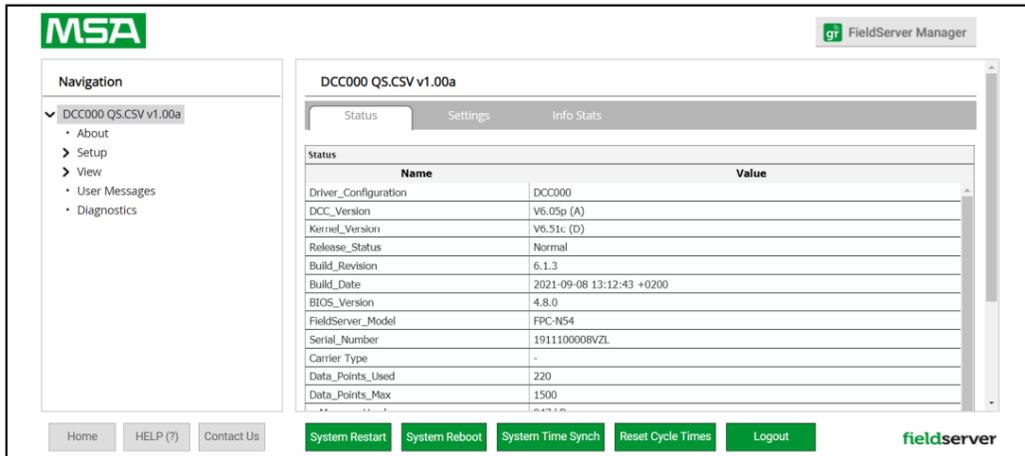
1. Extract and save the new file onto the local PC.
2. Open a web browser and type the IP Address of the FieldServer in the address bar.
  - Default IP Address is 192.168.1.24
  - Use the FS Toolbox utility if the IP Address is unknown (Section [9.1 Lost or Incorrect IP Address](#))
3. Click on the “Diagnostics & Debugging” button.
4. In the Navigation Tree on the left hand side, do the following:
  - a. Click on “Setup”
  - b. Click on “File Transfer”
  - c. Click on the “General” tab
5. In the General tab, click on “Choose Files” and select the web.img file extracted in step 1.
6. Click on the orange “Submit” button.
7. When the download is complete, click on the “System Restart” button.

**NOTE: Contact to receive any firmware updates.**

## 10.2 Change Web Server Security Settings After Initial Setup

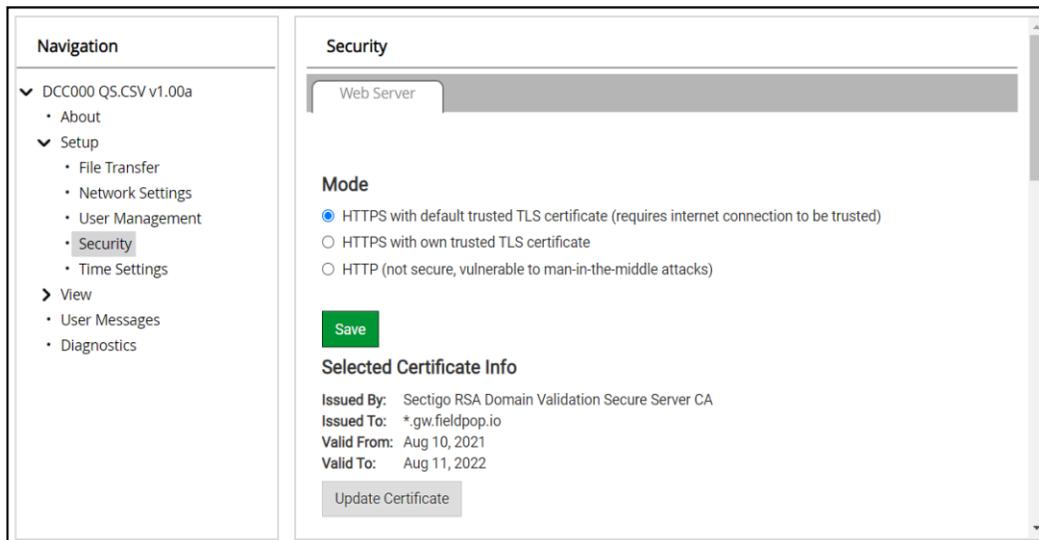
**NOTE:** Any changes will require a FieldServer reboot to take effect.

- Navigate from the ProtoNode landing page to the FS-GUI by clicking the blue “Diagnostics” text on the bottom of the screen.
- The ProtoNode landing page is the FS-GUI.
- Click Setup in the Navigation panel.



### 10.02.1 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.

## 10.2.2 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 for a 'Web Server'. On the left is a 'Navigation' sidebar with a tree view containing: DCC000 QS.CSV v1.00a (expanded), About, Setup (expanded), File Transfer, Network Settings, User Management, Security (highlighted), Time Settings, View, User Messages, and Diagnostics. The main content area is titled 'Security' and has a 'Web Server' tab. Under the 'Mode' section, there are three radio button options: 'HTTPS with default trusted TLS certificate (requires internet connection to be trusted)' (selected), 'HTTPS with own trusted TLS certificate', and 'HTTP (not secure, vulnerable to man-in-the-middle attacks)'. Below the modes is a green 'Save' button. Under the 'Selected Certificate Info' section, the following details are listed: '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.

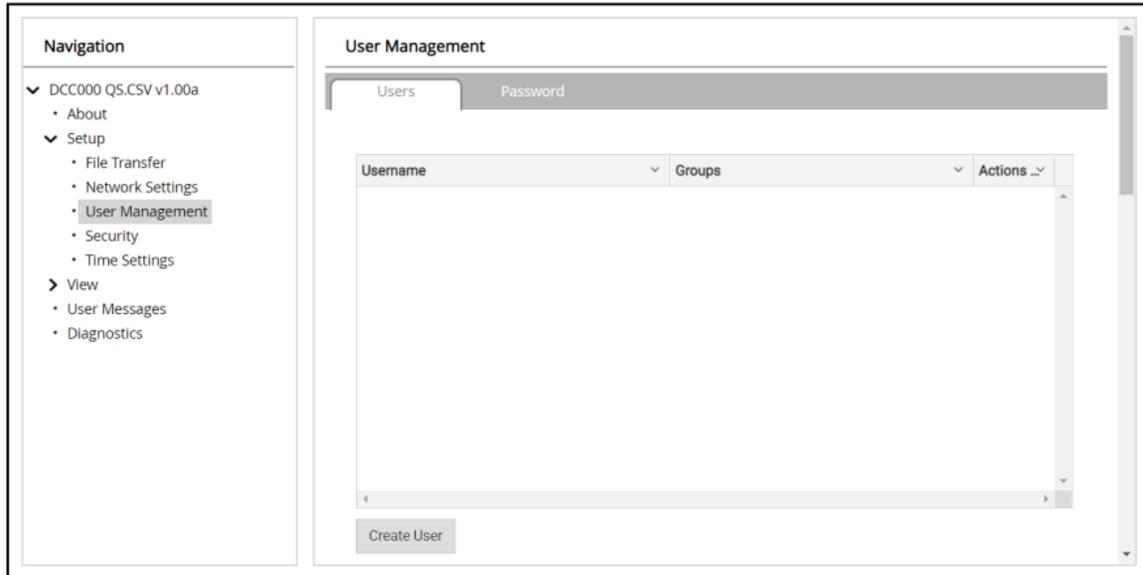
## 10.3 Change User Management Settings

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

**NOTE:** If the passwords are lost, the unit can be reset to factory settings to reinstate the default unique password on the label. For recovery instructions, see the [FieldServer Next Gen Recovery](#) document. If the default unique password is lost, then the unit must be mailed back to the factory.

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

- Check that the Users tab is selected.



User Types:

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

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

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

### 10.3.1 Create Users

- Click the Create User button.

**Create User**

**Username:**  
Enter a unique username

**Security Groups:**

Admin  
 Operator  
 Viewer

**Password:** ⓘ Weak  
Enter password

Show Passwords

**Confirm Password:**  
Confirm password

Generate Password

Create Cancel

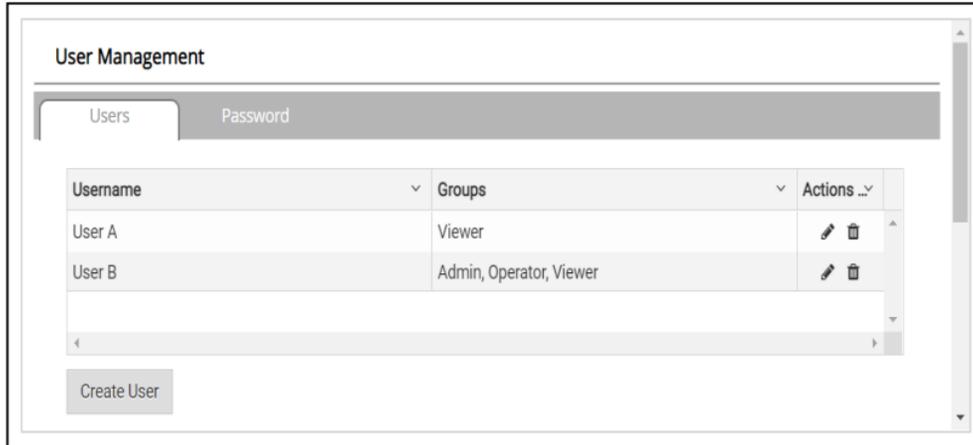
- Enter the new User fields: Name, Security Group and Password.
  - User details are hashed and salted

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

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

### 10.3.2 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.

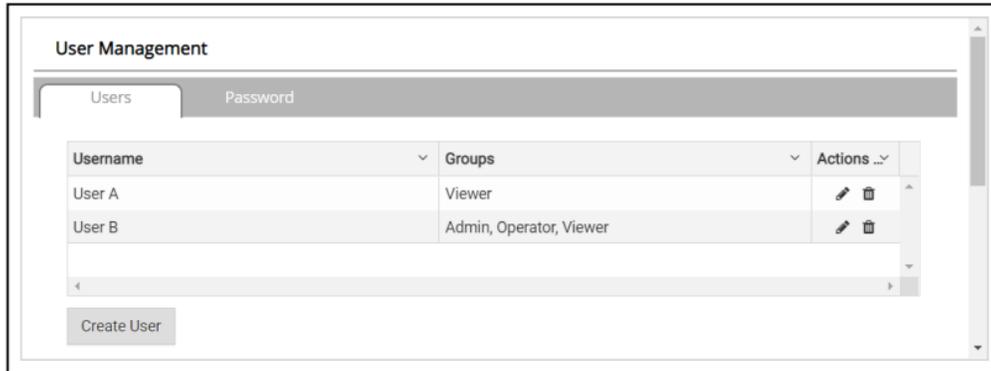
The 'Edit User' form contains the following fields and options:

- Username:** Text input field containing 'User A'.
- Security Groups:** Three radio button options: 'Admin' (unchecked), 'Operator' (unchecked), and 'Viewer' (checked).
- Password:** Text input field containing 'Optional'.
- Show passwords
- Confirm Password:** Text input field containing 'Optional'.
- 
- (green)
- 

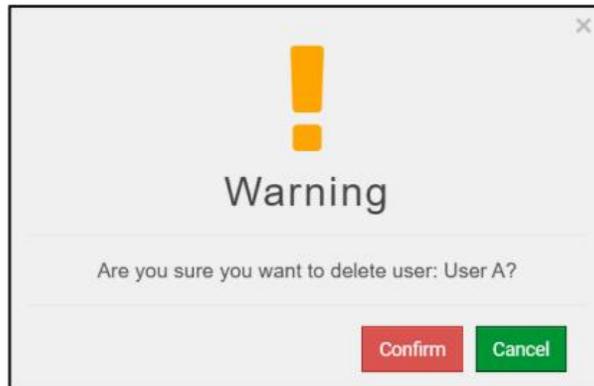
- Click Confirm.
- Once the Success message appears, click OK.

### 10.3.3 Delete Users

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

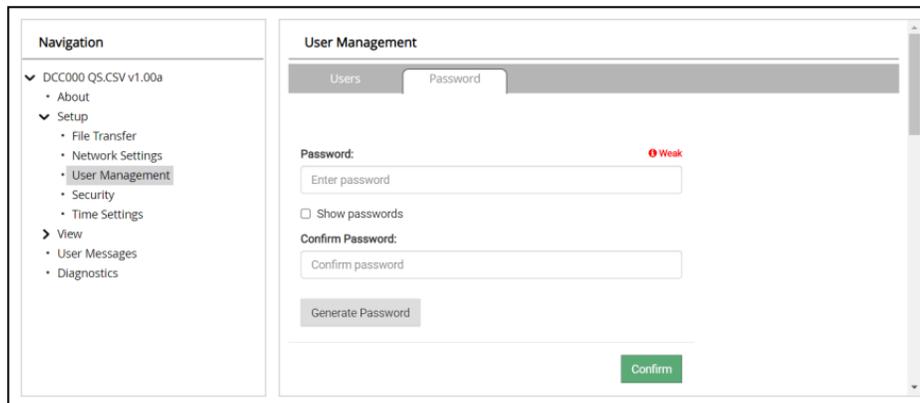


- When the warning message appears, click Confirm.



### 10.3.4 Change FieldServer Password

- Click the Password tab.



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

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

## 10.4 Specifications



FPC-N54	
<b>Electrical Connections</b>	One 3-pin Phoenix connector with: RS-485/RS-232 (Tx+ / Rx- / gnd) One 3-pin Phoenix connector with: RS-485 (+ / - / gnd) One 3-pin Phoenix connector with: Power port (+ / - / Frame-gnd) One Ethernet 10/100 BaseT port
<b>Power Requirements</b>	<i>Input Voltage:</i> 12-24VDC or 24VAC <i>Current draw:</i> 24VAC 0.125A <i>Max Power:</i> 3 Watts      12-24VDC 0.25A @12VDC
<b>Approvals</b>	FCC Part 15 B, UL 60950-1 and CAN/CSA C22.2, EN IEC 62368-1, WEEE compliant, RoHS compliant, DNP 3.0 and Modbus conformance tested, BTL marked, REACH compliant, UKCA and CE compliant, ODVA conformant, CAN ICES-003(B) / NMB-003(B)
<b>Physical Dimensions</b>	4 x 1.1 x 2.7 in (10.16 x 2.8 x 6.8 cm)
<b>Weight</b>	0.4 lbs (0.2 Kg)
<b>Operating Temperature</b>	-20°C to 70°C (-4°F to 158°F)
<b>Humidity</b>	10-95% RH non-condensing

**NOTE: Specifications subject to change without notice.**

## 10.5 Warnings

### FCC Class B

**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.

## 10.6 Compliance with EN IEC 62368-1

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

- 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.

Email: [info@aircareautomation.com](mailto:info@aircareautomation.com)

Website: [www.aircareautomation.com](http://www.aircareautomation.com)

8546 Broadway San Antonio, TX 78216.

Tel: (210) 442-8821

Fax: (512)275-6155

## 10.7 BACnet Points Descriptions

### Variphase Product ID 0xB126

BACnet Object Id	Point Name	Range	Description
BV1	RunStop	0,1	'0' shuts down fan motor. '1' enables fan motor to run at value in Speed register
AV2	Setpoint	0-100	Runtime speed control. '0'(off) to 100% applied speed
AI4	Sensor Input 1	0-1023	0-5V sensor signal scaled to 1023; 0=0VDC; 1023=5VDC
AV5	Default Setpoint	0-100	% Speed applied at power-up of FFU controller
AV6	Default RunStop	0,1	Motor enable/disable at power-up of FFU controller
AI7	Sensor Input 2	0-1023	0-5V sensor signal scaled to 1023; 0=0VDC; 1023=5VDC

### N-Series Product ID 0xB135

BACnet Object Id	Point Name	Range	Description
BV1	RunStop	0,1	'0' shuts down fan motor. '1' enables fan motor to run at value in Speed register
AV2	Setpoint	0-100	Runtime speed control. '0'(off) to 100% applied speed
AI3	Ext. Pressure Switch	0,1023	0': Switch Closure '1023': Switch Open, Contact FFU Manufacturer for Error States
AV5	Default Setpoint	0-100	% Speed applied at power-up of FFU controller
AV6	Default RunStop	0,1	Motor enable/disable at power-up of FFU controller

### ACM1020 Product ID 0xB164 & EN01B41 (UCC2) Product ID 0xB148

BACnet Object Id	Point Name	Range	Description
BV1	RunStop	0,1	'0' shuts down fan motor. '1' enables fan motor to run at value in Speed register
AV2	Setpoint	0-100	Runtime speed control. '0'(off) to 100% applied speed
AI3	RPM	0-9999	TACH input measurement expressed in revolutions per minute (RPM).
AI4	Sensor Input 1	0-1023	0-5/10VDC sensor signal scaled to 1023; 0=0V; 1023=5/10VDC
AV5	Default Setpoint	0-100	% Speed applied at power-up of FFU controller
AV6	Default RunStop	0,1	Motor enable/disable at power-up of FFU controller
AI7	Sensor Input 2	0-1023	0-5/10VDC sensor signal scaled to 1023; 0=0V; 1023=5/10VDC

### DSM2 Product ID 0xB145 (\* Need to Autodiscover for these at Modbus addresses 201-210)

BACnet Object Id	Point Name	Range	Description
AI1 <sup>1</sup>	Pressure Value	Dynamic	Pressure Value, units determined by Pressure Transducer installed
AI2 <sup>1</sup>	Temperature Value	Dynamic	Temp Value, units determined by Temp Sensor installed
AI3 <sup>1</sup>	Relative Humidity Value	Dynamic	Humidity Value, units determined by Humidity Sensor installed
AV4 <sup>2</sup>	Pressure Sensor range Min	Dynamic	Set the low range of the pressure sensor. Ex 0-1"WC sensor is 0
AV5 <sup>2</sup>	Pressure Sensor range Max	Dynamic	Set the low range of the pressure sensor. Ex 0-1"WC sensor is 1.000
AV6 <sup>3</sup>	Temperature Sensor range Min	Dynamic	Set the low range of the temp sensor. Ex -40-140°F sensor is -40.0
AV7 <sup>3</sup>	Temperature Sensor range Max	Dynamic	Set the low range of the temp sensor. Ex -40-140°F sensor is 140.0
AV8 <sup>4</sup>	Pressure Sensor Decimal place	Dynamic	Sets the decimal place of the scaling for example 3 adds 3 decimal places to AI1
AV9 <sup>4</sup>	Temperature Sensor Decimal Place	Dynamic	Sets the decimal place of the scaling for example 1 adds 1 decimal places to AI2

<sup>1,2</sup> Pressure, Temperature and Humidity values come in raw form 0-1023,

Pressure will need to be converted from 0-1023 to AV4-AV5, with decimal place determined by AV8

Temperature Will need to be from 0-1023 to AV 6-7, with decimal place determined by AV9

Humidity will be converted from 0-1023 to 0-100 fixed values no adjustable value required.

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8546 Broadway San Antonio, TX 78216.

Website: [www.aircareautomation.com](http://www.aircareautomation.com)  
Tel: (210) 442-8821 Fax: (512)275-6155

## 11 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.