MSA The Safety Company | fieldserver

Start-up Guide

ProtoCessor FPC-ED2

For Interfacing VorTek Products

Document Revision: 2.A

Web Configurator

Technical Support

Thank you for purchasing the ProtoCessor for VorTek.

Please call VorTek for technical support of the ProtoCessor product.

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

Support Contact Information:

VorTek Instruments
8475 W I-25 Frontage Rd, Suite 300
Longmont, CO 80504

Customer Service:

(303) 682-9999

Website: www.vortekinst.com

For online assistance, go to the website and click the Contact Us tab in the top right corner of the screen and fill in the form.

Quick Start Guide

1. Record the information about the unit. (**Section 2.1**)
2. **Connect the ProtoCessor FPC-ED2** 3 pin RS-485 port to the field protocol cabling. (**Section 3.1**)
3. Connect a PC to the ProtoCessor via Ethernet cable. (**Section 4**)
4. Setup Web Server Security and login via web browser. (**Section 5**)
5. Configure the ProtoCessor to connect to the local network. (**Section 6**)
6. Integrate the ProtoCessor with the Grid or opt out. (**Section 7.1**)
7. Use a web browser to access the ProtoCessor Web Configurator page to enter any necessary device information for the device attached to the ProtoCessor. (**Section 8**)

Table of Contents

List of Figures

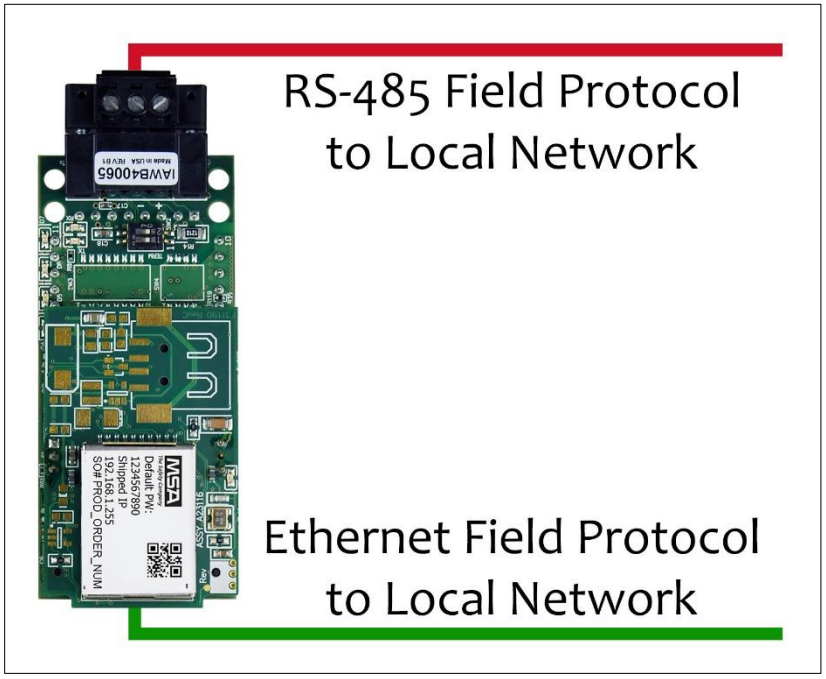
1 Introduction

1.1 ProtoCessor Gateway

The ProtoCessor is an embedded module that is designed into VorTek's product (hereafter simply called "device") and is preconfigured to support Modbus RTU, Modbus TCP/IP, BACnet MS/TP and BACnet/IP.

It is not necessary to download any configuration files to support the required applications. The ProtoCessor is pre-loaded with tested profiles/configurations for the supported device.

FPC-ED2 Connectivity Diagram:



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

- Remotely monitor and control devices.
- Collect device data and view it on the Grid Dashboard and the MSA Smart Phone App.
- Create user defined device notifications (alarm, trouble and warning) via SMS and/or Email.
- Generate diagnostic captures (as needed for troubleshooting) without going to the site.

For more information about the Grid, refer to the MSA Grid Start-up Guide.

2 Setup for ProtoCessor

2.1 Record Identification Data

Each ProtoCessor has a unique part number located on the side or the back of the unit. This number should be recorded, as it may be required for technical support. The numbers are as follows:

Model	Part Number
ProtoCessor	FPC-ED2-2093

Figure 1: ProtoCessor Part Numbers

- FPC-ED2 units have the following 2 ports: RS-485 + Ethernet

2.2 Configuring Device Communications

2.2.1 Confirm the Device and ProtoCessor COM Settings Match

- **Any connected serial device MUST have the same baud rate, data bits, stop bits, and parity settings as the ProtoCessor.**
- **Figure 2** specifies the device serial port settings required to communicate with the ProtoCessor.

Port Setting	Device
Protocol	Modbus RTU
Baud Rate	9600
Parity	None
Data Bits	8
Stop Bits	1

Figure 2: COM Settings

2.2.2 Set Node-ID for the Device

Set Node-ID to 1.

3 Interfacing ProtoCessor to Devices

3.1 ProtoCessor FPC-ED2 Showing Connection Ports

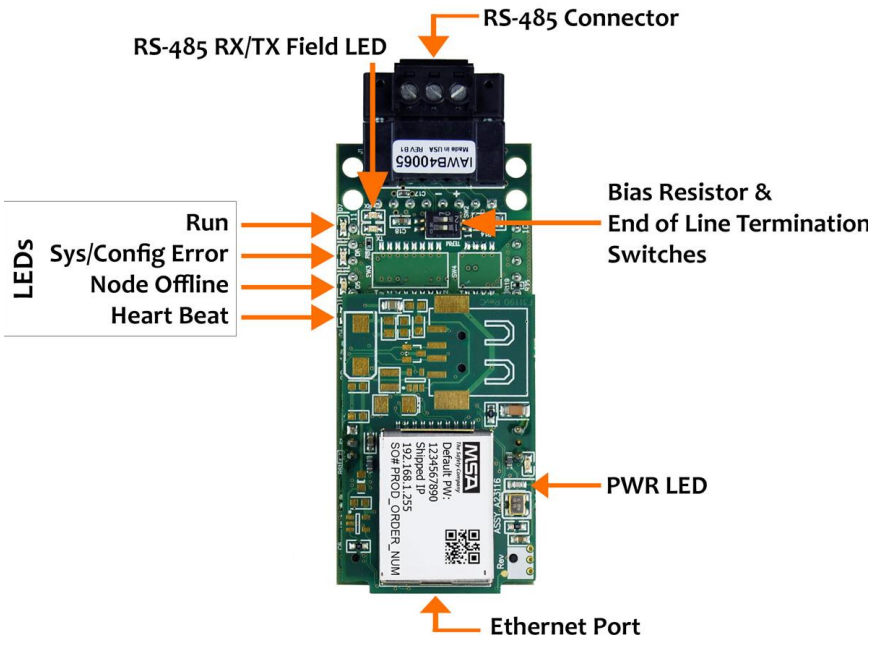


Figure 3: ProtoCessor FPC-ED2

3.2 Serial Network: Wiring Field Port to RS-485 Network

- Connect the RS-485 network wires to the 3-pin RS-485 connector on the ProtoCessor as shown below in **Figure 4**.
  - Use standard grounding principles for RS-485 GND
- See **Section 6.2** for information on connecting to an Ethernet network.

BMS Wiring	ProtoCessor Pin #	Pin Assignment
RS-485 +	Pin 1	RS-485 +
RS-485 -	Pin 2	RS-485 -
-	Pin 3	RS-485 GND

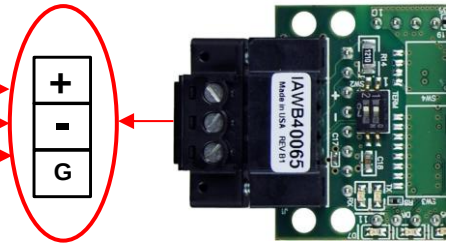


Figure 4: Connection from ProtoCessor to RS-485 Field Network

- If the ProtoCessor is the last device on the trunk, then the end of line (EOL) termination switch needs to be enabled. **See (Figure 5) for the orientation of switch positions referenced below.**
  - The default setting from the factory is OFF (switch position = right side)
  - To enable the EOL termination, turn the EOL switch ON (switch position = left side)

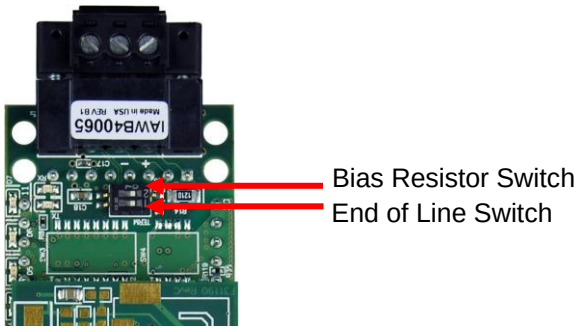


Figure 5: RS-485 EOL & Bias Resistor Switches

- If more than one RS-485 device is connected to the network, then the field bias resistor switch needs to be enabled to ensure proper communication. **See Figure 5 for the orientation of switch positions referenced below.**
  - The default factory setting is OFF (switch position = right side)
  - To enable biasing, turn the bias switch ON (switch position = left side)

NOTE: Biasing only needs to be enabled on one device. The ProtoCessor has 510 ohm resistors that are used to set the biasing.

4 Connect the PC to the ProtoCessor

4.1 Connecting to the Gateway via Ethernet

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

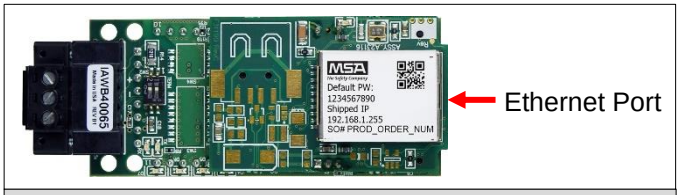
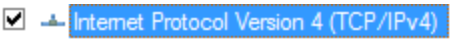


Figure 6: Ethernet Port Location

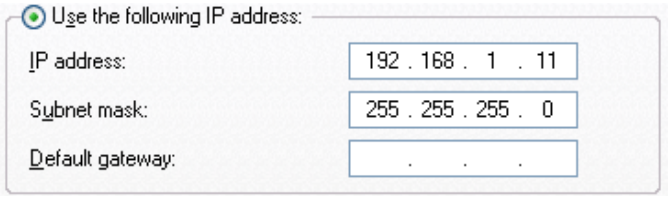
4.1.1 Changing the Subnet of the Connected PC

The default IP Address for the ProtoCessor is **192.168.1.24**, Subnet Mask is **255.255.255.0**. If the PC and ProtoCessor are on different IP networks, assign a static IP Address to the PC on the 192.168.2.xxx network.

For Windows 10:

- Find the search field in the local computer's taskbar (usually to the right of the windows icon) and type in "Control Panel".
- Click "Control Panel", click "Network and Internet" and then click "Network and Sharing Center".
- Click "Change adapter settings" on the left side of the window.
- Right-click on "Local Area Connection" and select "Properties" from the dropdown menu.
- Highlight 

and then click the Properties button.
- Select and enter a static IP Address on the same subnet. For example:



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

5 Setup Web Server Security

Navigate to the IP Address of the ProtoCessor on the local PC by opening a web browser and entering the IP Address of the ProtoCessor; the default address is 192.168.1.24.

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

5.1 Login to the FieldServer

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

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

Figure 7: Web Server Security Window

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

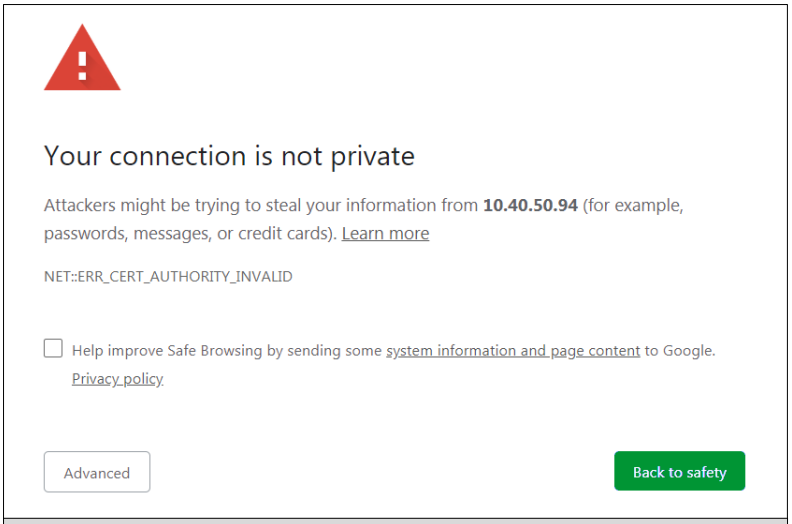


Figure 8: Connection Not Private Warning

- Additional text will expand below the warning, click the underlined text to go to the IP Address. In the **Figure 9** example this text is "Proceed to 10.40.50.94 (unsafe)".

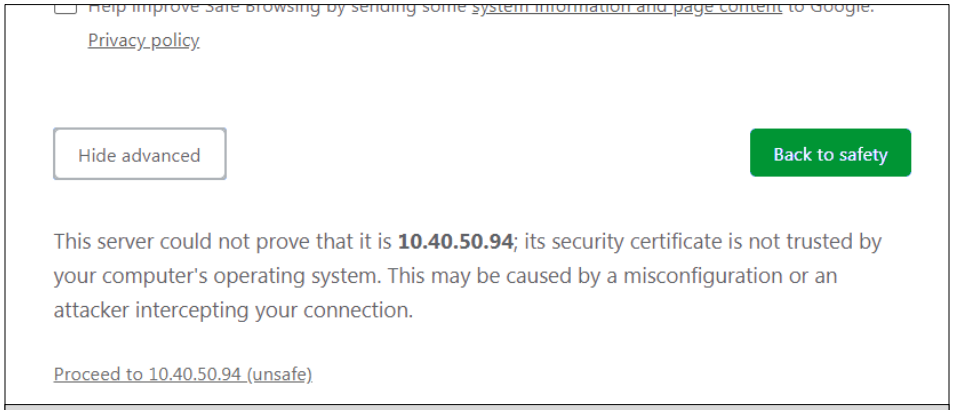


Figure 9: Warning Expanded Text

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

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

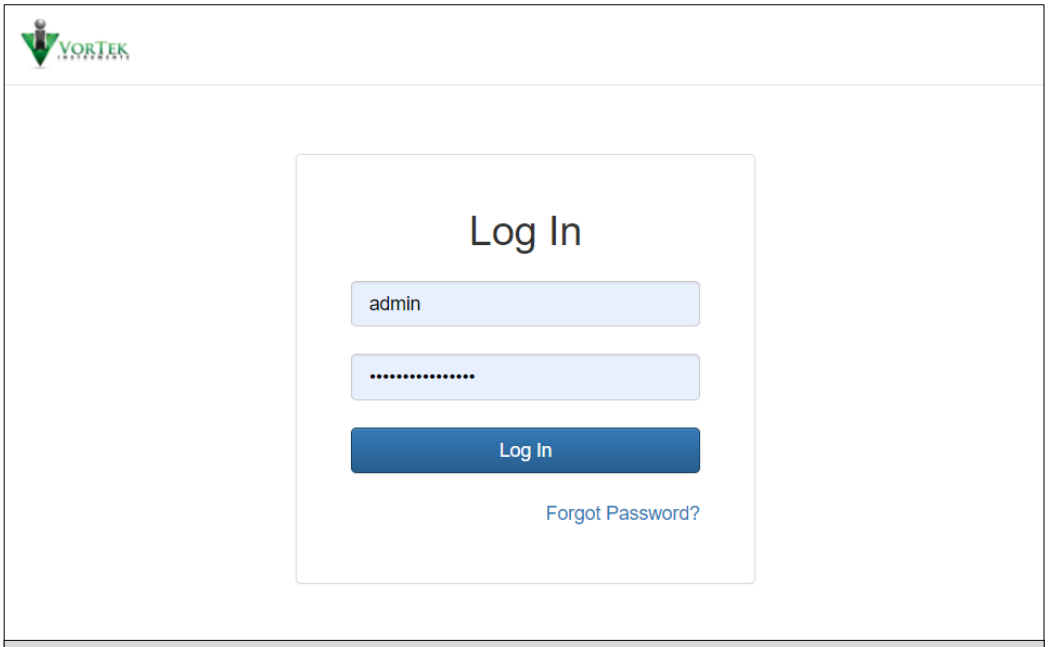


Figure 10: FieldServer Login

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

NOTE: To create individual user logins, go to Section 10.6.

5.2 Select the Security Mode

On the first login to the FieldServer, the following screen will appear that allows the user to select which mode the FieldServer should use.

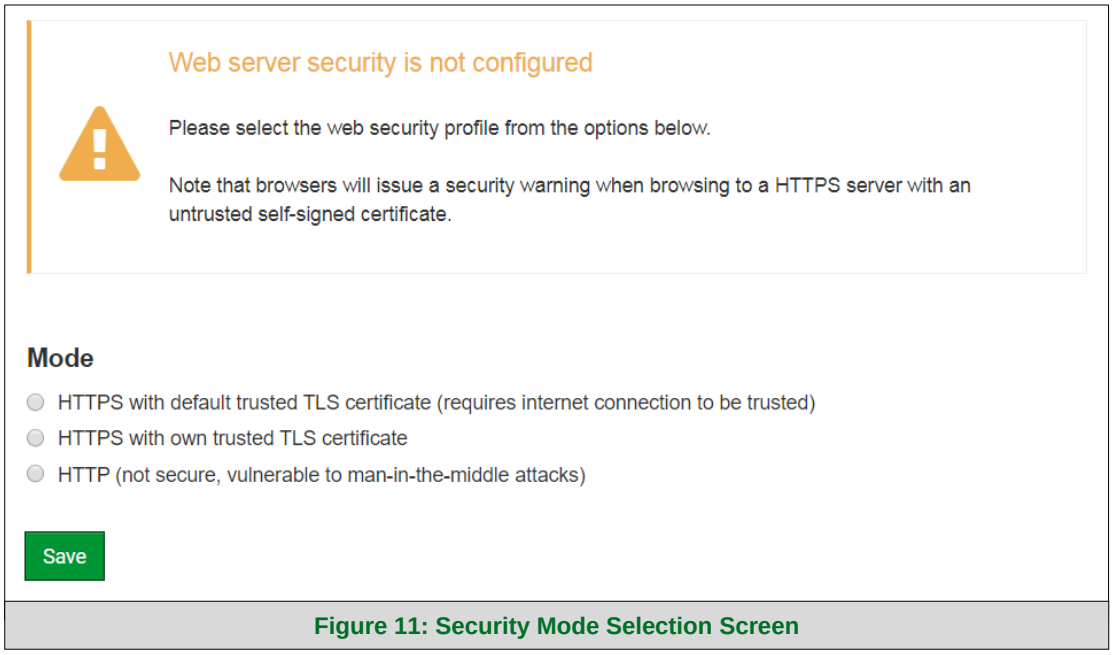


Figure 11: Security Mode Selection Screen

NOTE: Cookies are used for authentication.

NOTE: To change the web server security mode after initial setup, go to Section 10.5.

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

5.2.1 HTTPS with Own Trusted TLS Certificate

This is the recommended selection and the most secure. **Please contact your IT department to find out if you can obtain a TLS certificate from your company before proceeding with the Own Trusted TLS Certificate option.**

- Once this option is selected, the Certificate, Private Key and Private Key Passphrase fields will appear under the mode selection.

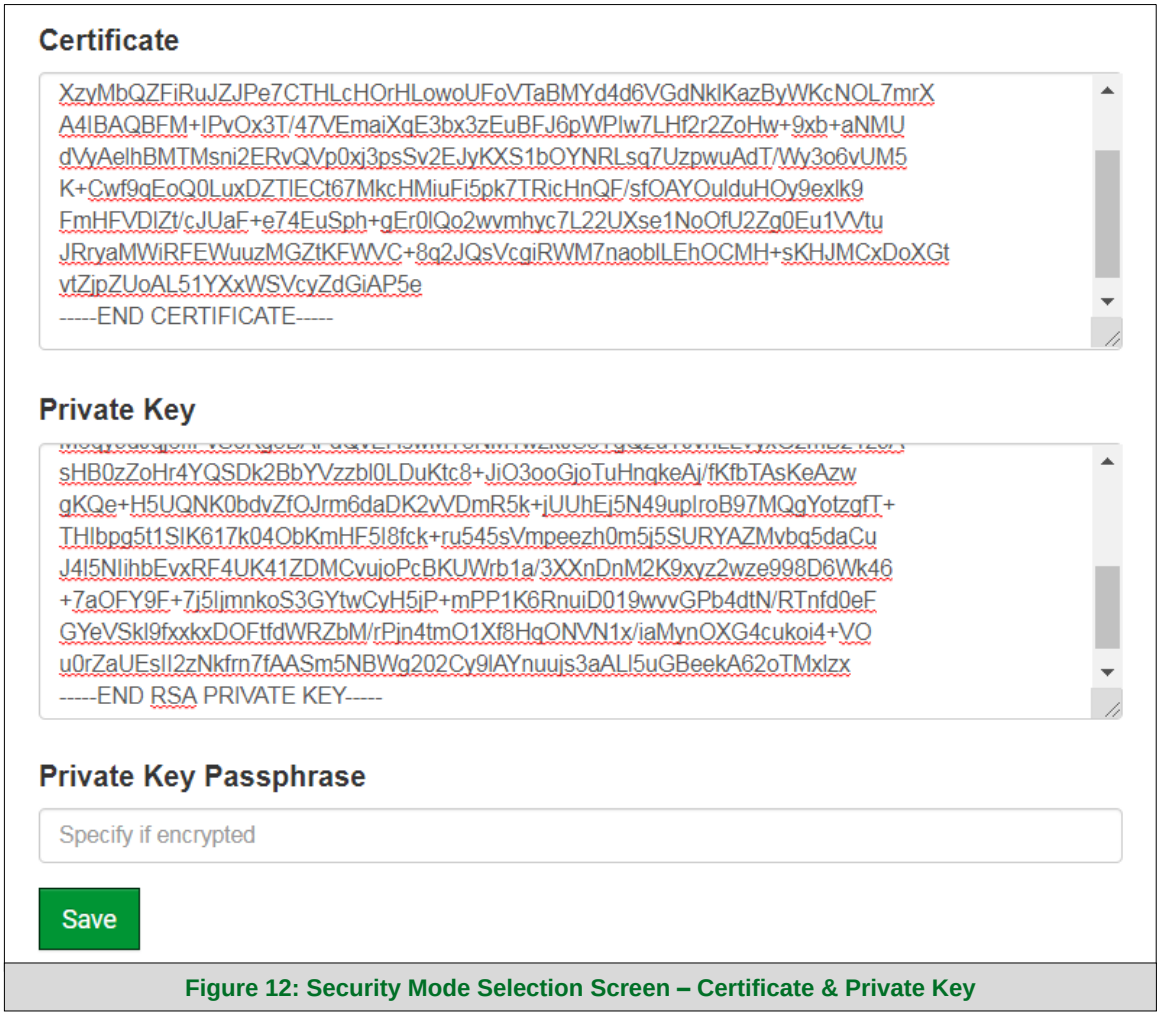


Figure 12: Security Mode Selection Screen – Certificate & Private Key

- Copy and paste the Certificate and Private Key text into their respective fields. If the Private Key is encrypted type in the associated Passphrase.
- Click Save.
- A “Redirecting” message will appear. After a short time, the FieldServer GUI will open.

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

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

6 Configure Network Settings

6.1 Navigate to the Network Settings

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

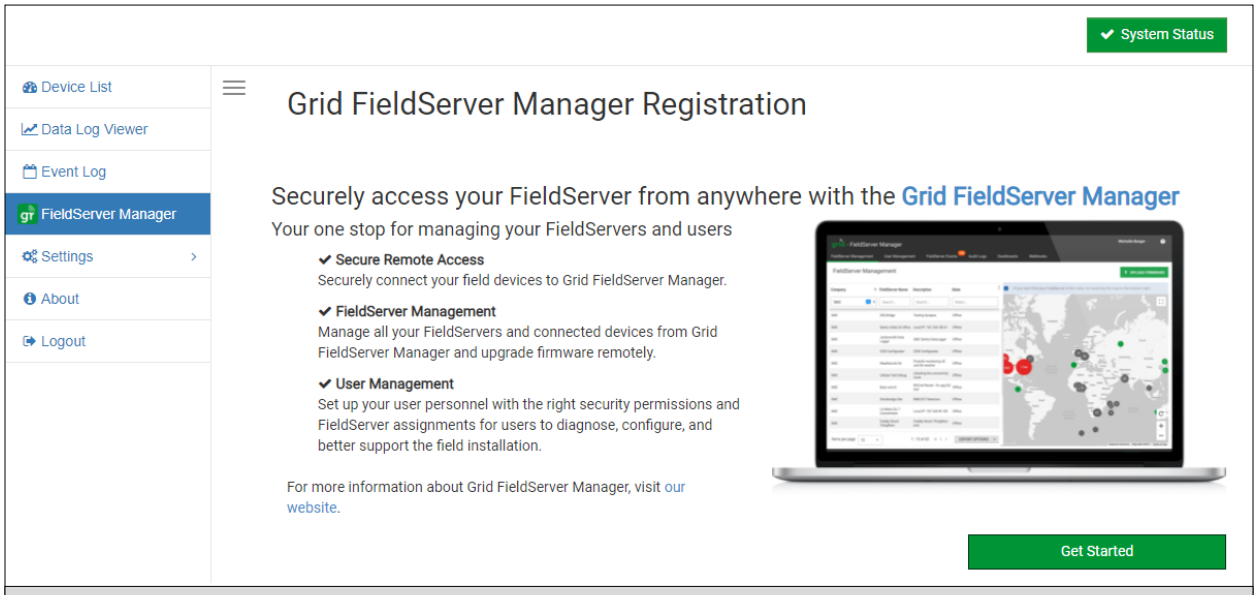


Figure 13: Generic Web App Landing Page

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

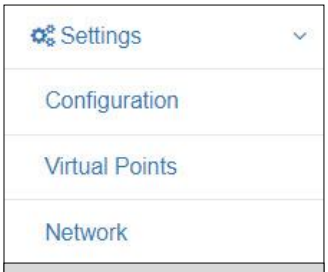


Figure 14: Settings Tabs

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

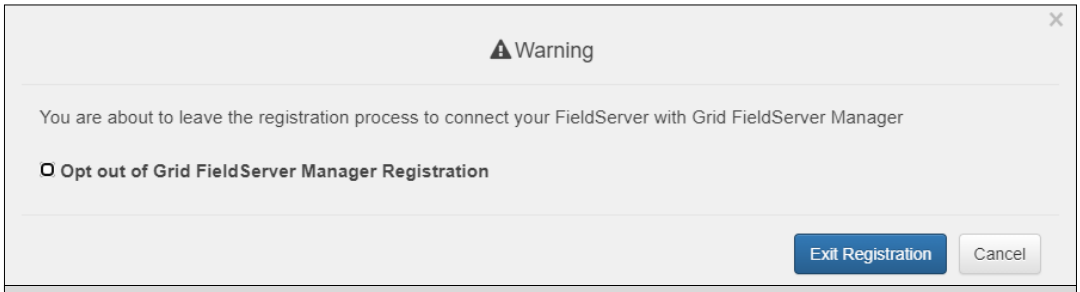


Figure 15: FS-GUI Landing Page

6.2 Change the ProtoCessor IP Address

- Enable DHCP to automatically assign IP Settings or modify the IP Settings manually as needed, via these fields: IP Address, Netmask, 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 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 of the ProtoCessor before the webpage will be accessible again.

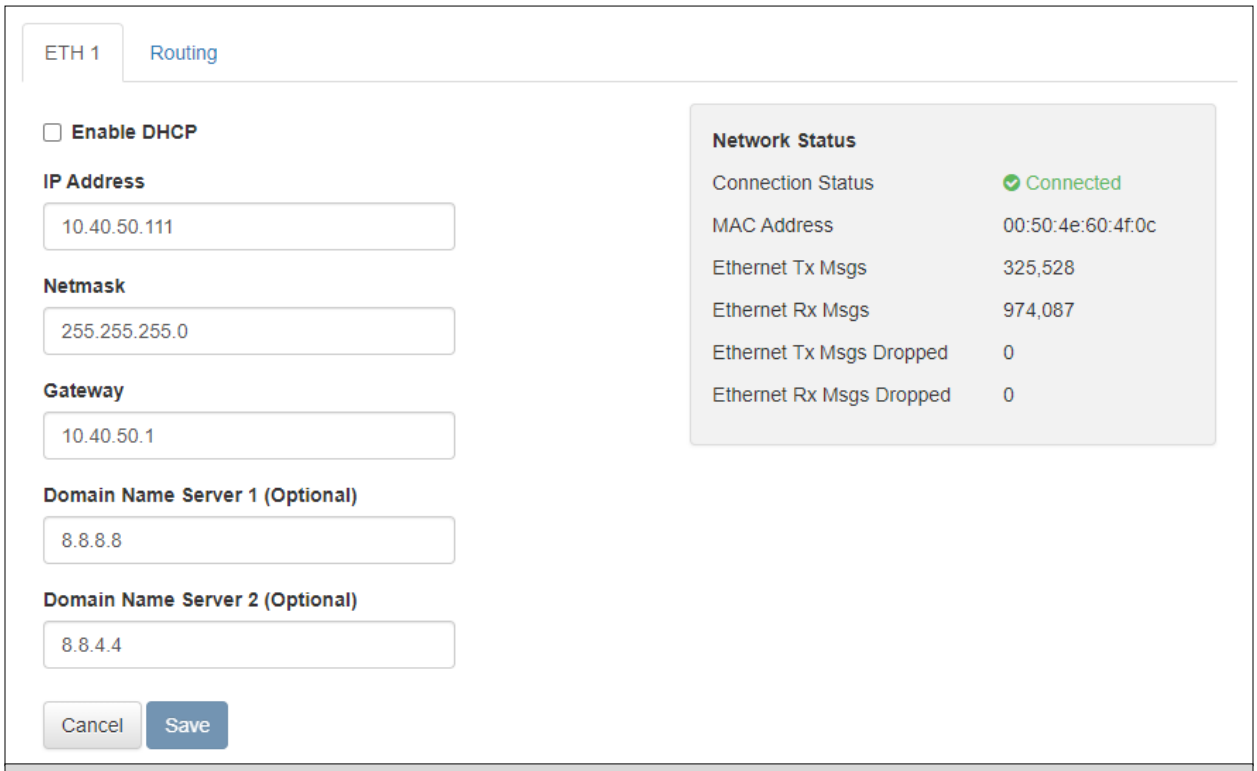


Figure 16: Ethernet Port Network Settings

NOTE: For Router settings go to Section 10.9.

7 Grid User Setup, Registration and Login

The Grid is MSA Safety's device cloud solution for IIoT. Integration with the Grid enables a secure remote connection to field devices through a FieldServer and hosts local applications for device configuration, management, as well as maintenance. For more information about the Grid, refer to the MSA Grid Start-up Guide.

7.1 Choose Whether to Integrate the Grid

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

NOTE: If a warning message appears instead, go to Section 10.7 to resolve the connection issue.

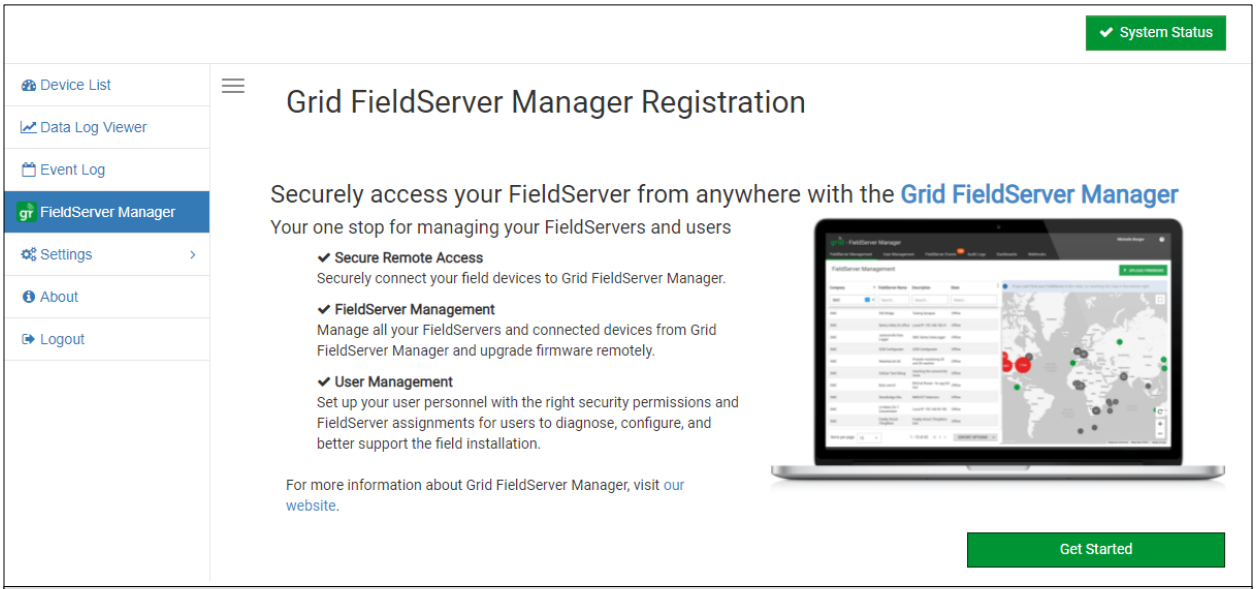


Figure 17: Generic Web App Page – First Login

- Either go through the Grid setup to integrate cloud functionality to the FieldServer or optout of Grid setup.
  - For Grid setup, continue with instructions in the following sections
  - To opt out of Grid setup, click on a tab other than the FieldServer Manager tab, click the checkbox next to “Opt out” in the Warning window that appears and click the Exit Registration button (skip to **Section 8** to continue FieldServer configuration)
  - To ignore Grid setup until the next time the FieldServer Web App is opened, click a tab other than the FieldServer Manager tab and then click the Exit Registration button with the “Opt out” checkbox unchecked (skip to **Section 8** to continue FieldServer configuration)

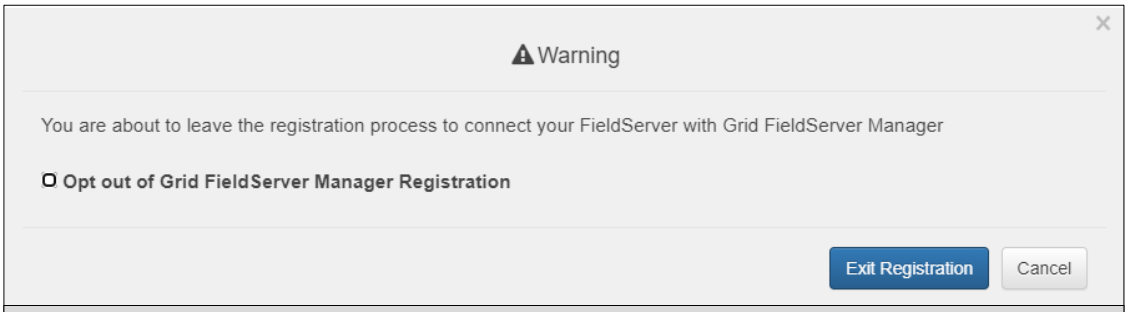


Figure 18: Grid FieldServer Manager Opt Out Warning Window

NOTE: If Grid integration with the ProtoCessor is not desired, skip to Section 8 to continue gateway setup. If user setup is already complete go to Section 7.3.

7.2 User Setup

Before the gateway can be connected to the Grid a user account must be created. Request an invitation to the Grid from the manufacturer's support team and follow the instructions below to set up login details:

- The "Welcome to SMC Cloud" email will appear as shown below.

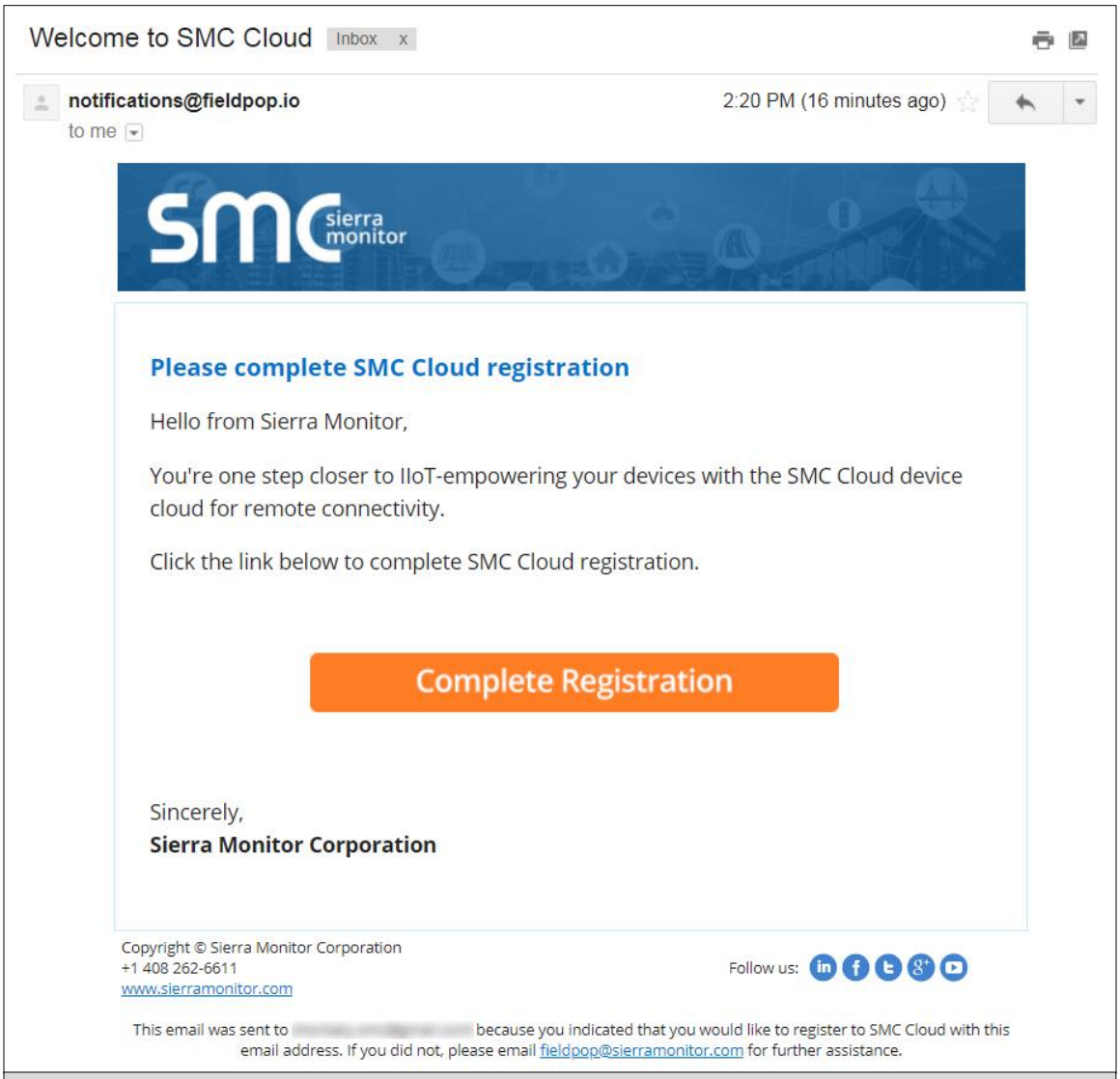


Figure 19: Welcome to SMC Cloud Email

NOTE: If no Grid email was received, check the spam/junk folder for an email from notification@fieldpop.io. Contact the manufacturer's support team if no email is found.

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

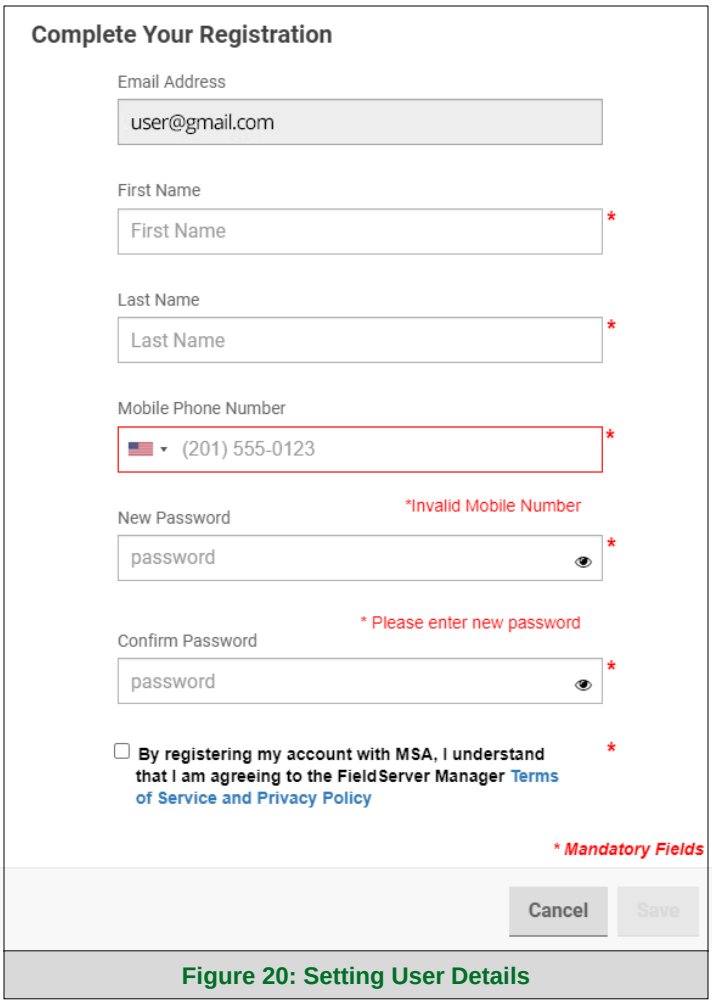


Figure 20: Setting User Details

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

NOTE: If access to data logs using RESTful API is needed, do not include “#” in the password.

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

7.3 Registration Process

Once Grid user credentials have been generated, the ProtoCessor can be registered onto the Grid server.

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

NOTE: If a warning message appears instead, go to Section 10.7 to resolve the connection issue.

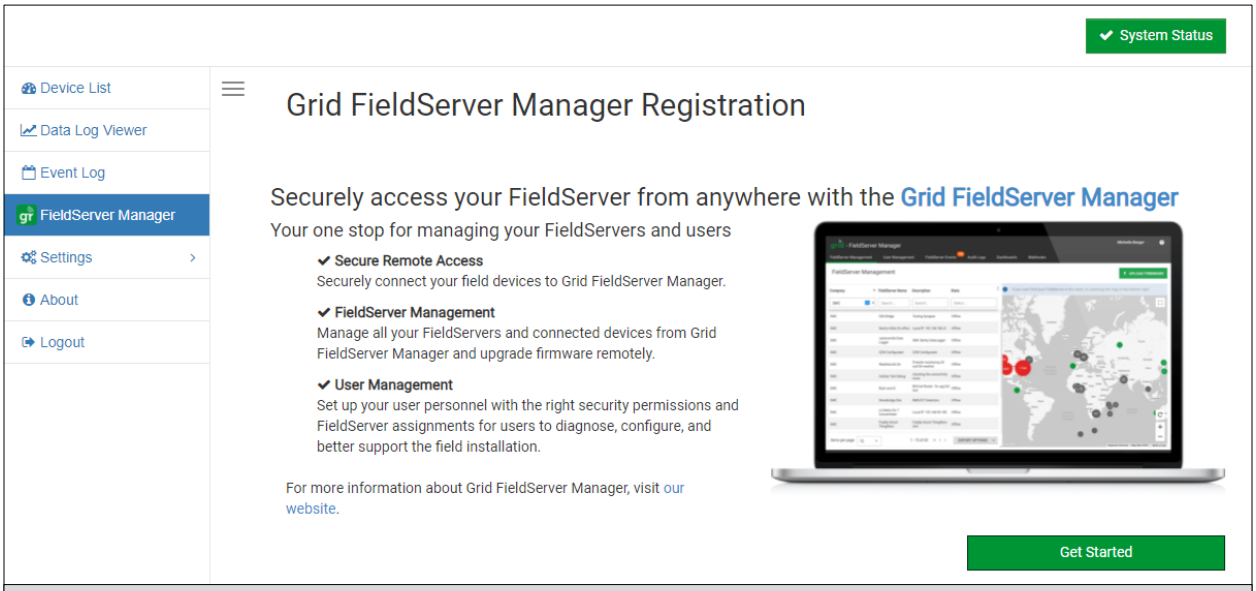


Figure 21: Grid Registration Message

- Click Get Started to view the Grid registration page.

NOTE: For information on the System Status button, go to Section 10.8.

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

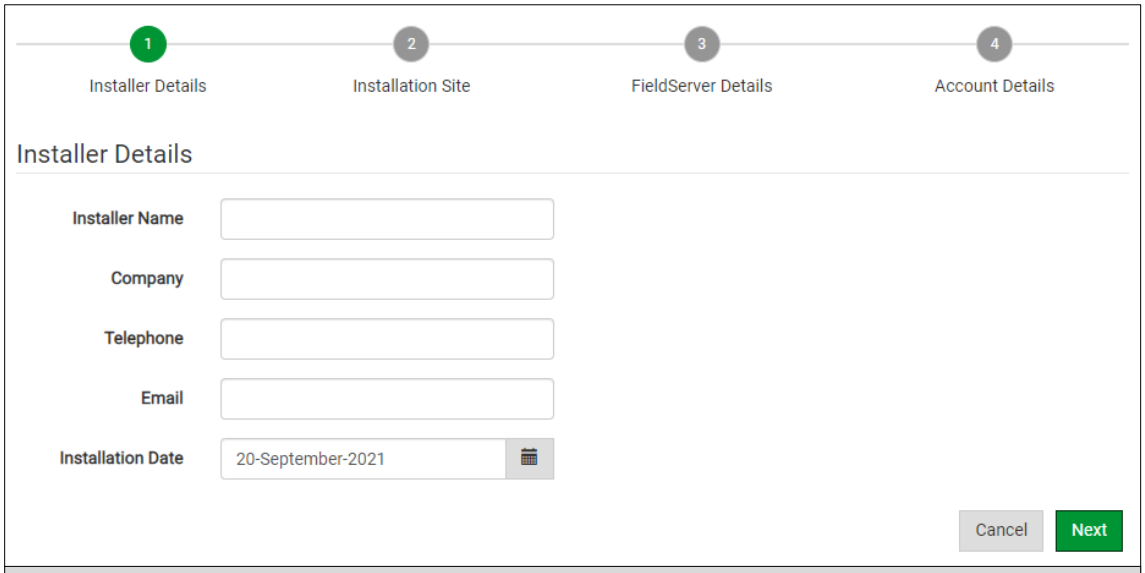


Figure 22: Grid Registration – Installer Details

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

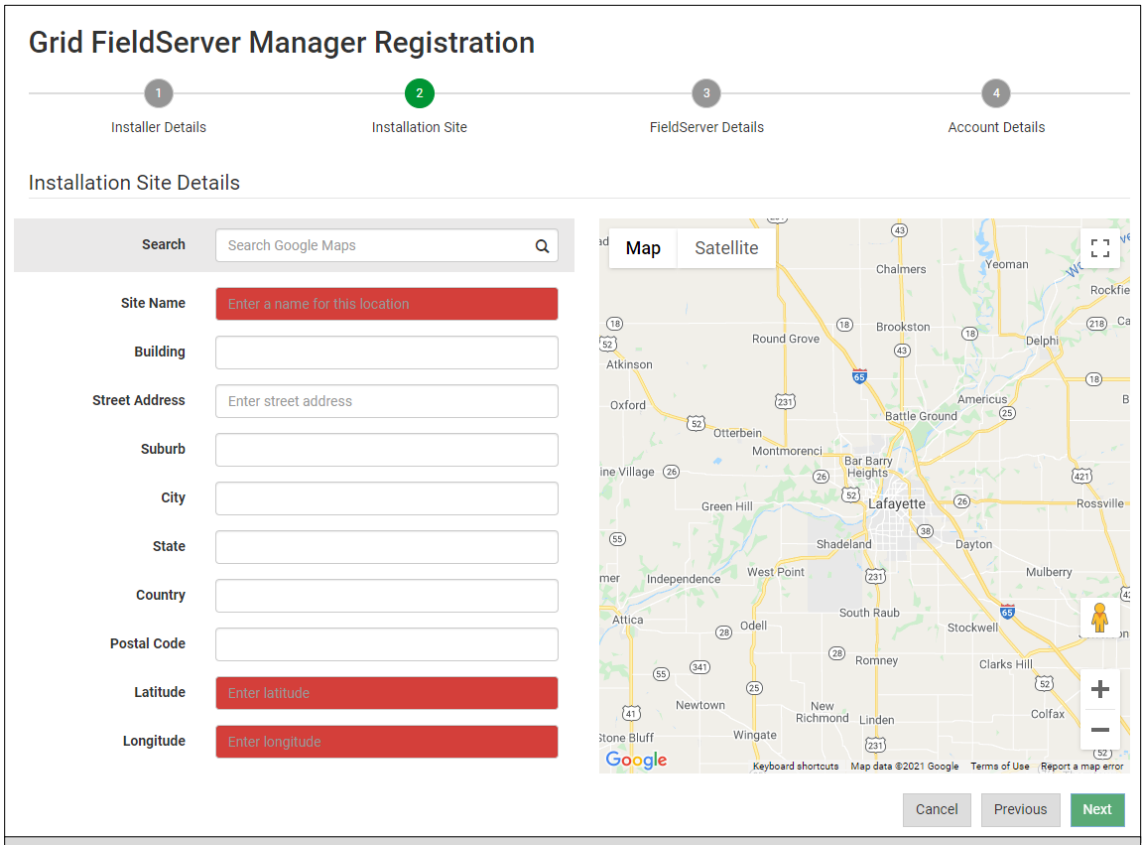


Figure 23: Grid Registration – Site Details

- Enter Name and Description (required) then click Next

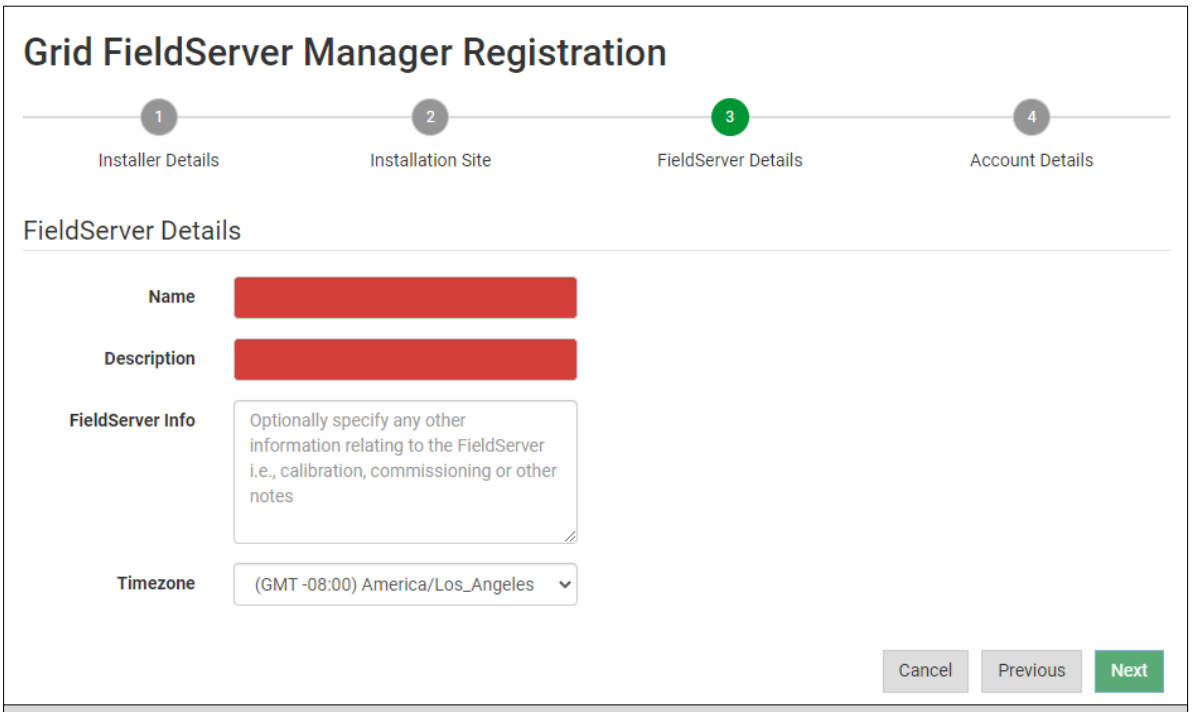


Figure 24: Grid Registration – Gateway Details

- Enter user credentials and click Register Device

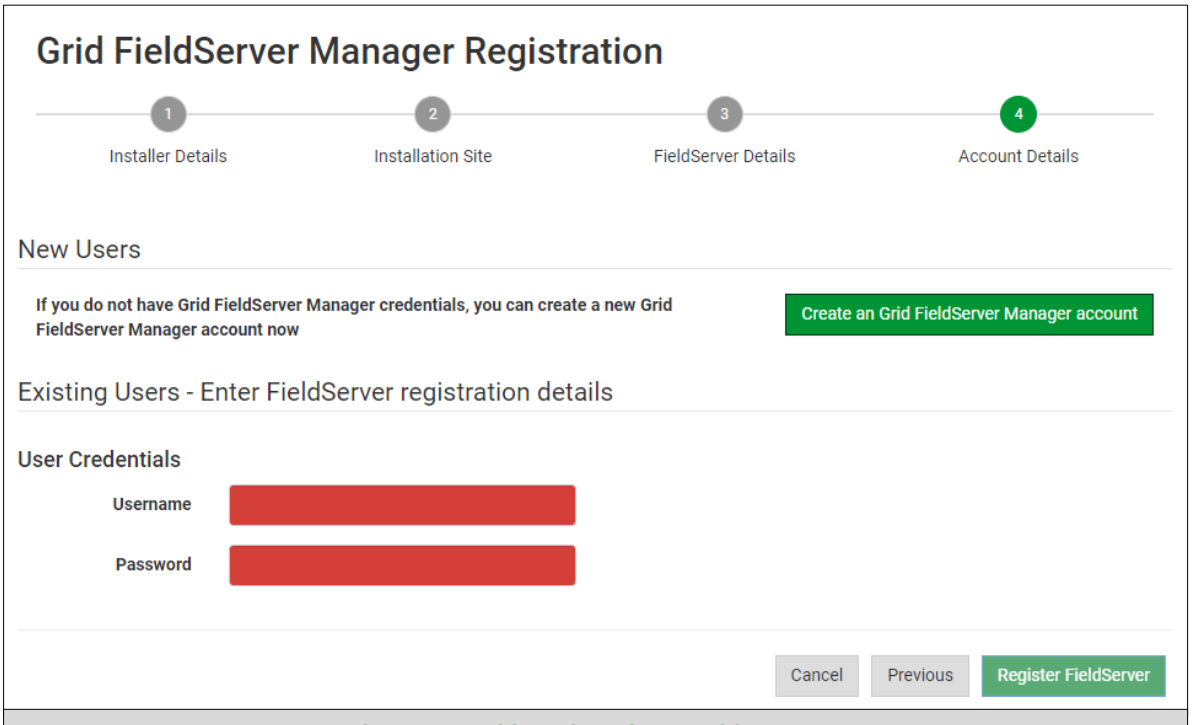


Figure 25: Grid Registration – Grid Account

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

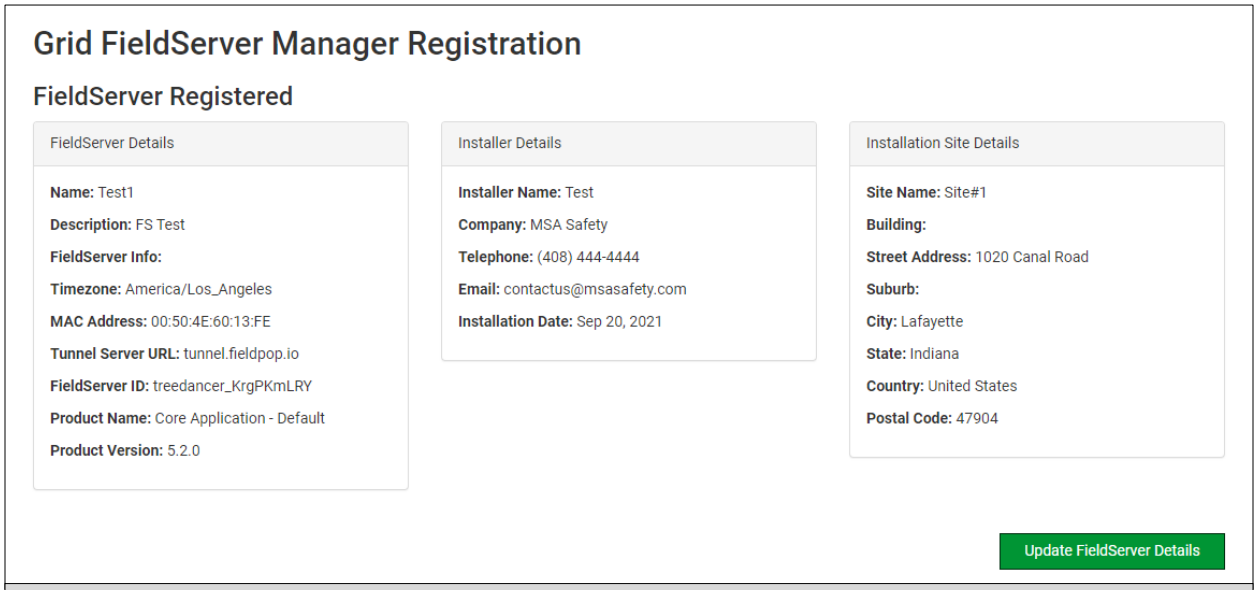


Figure 26: Device Registered for the Grid

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

7.4 Login to the Grid

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

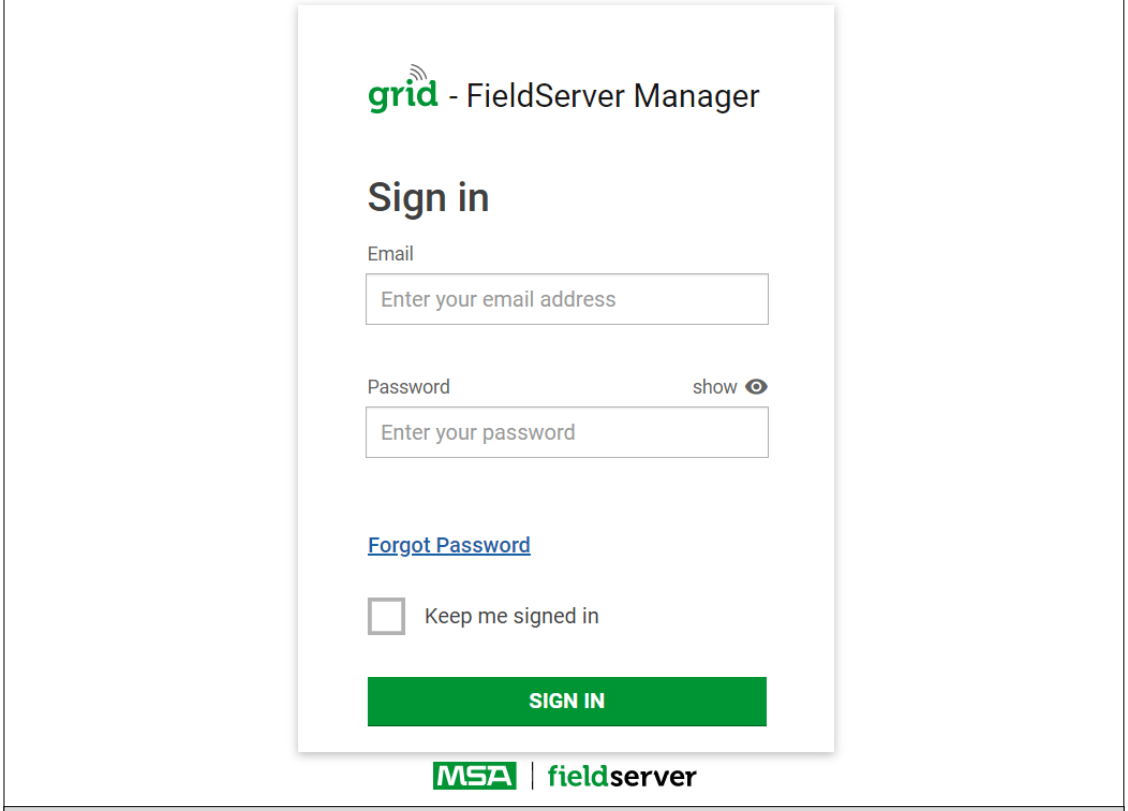


Figure 27: Grid Login Page

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

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

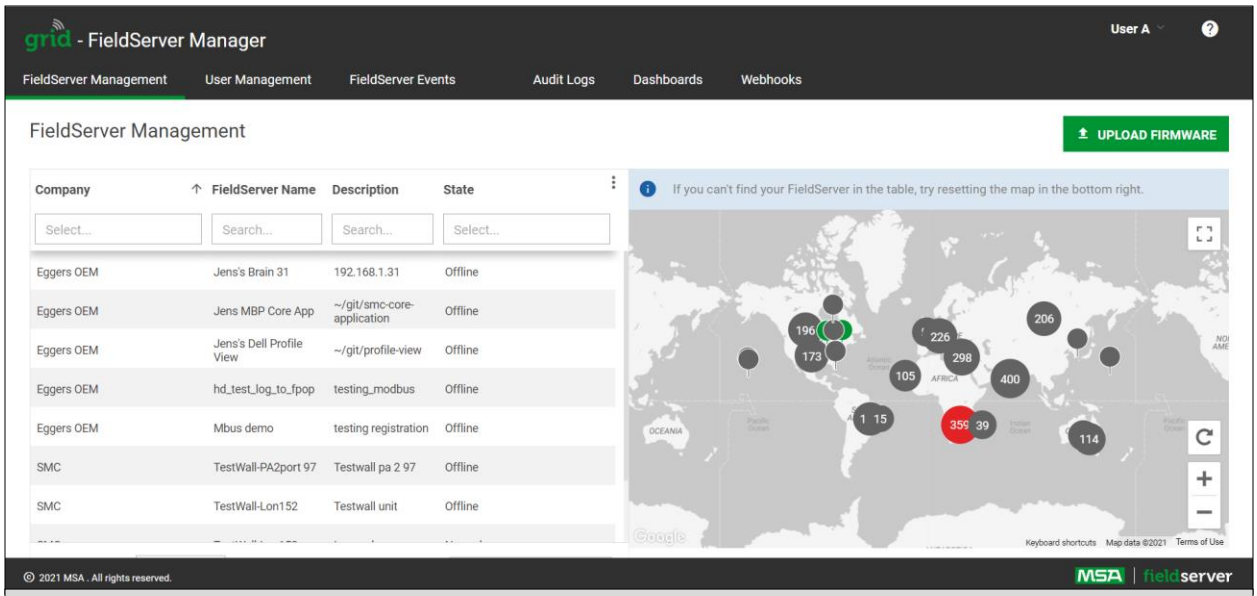


Figure 28: Grid Landing Page

8 Configure the ProtoCessor

8.1 Navigate to the ProtoCessor Web Configurator

- From the Web App landing page (**Figure 29**), click the Settings tab and then click Configuration.

Figure 29: Web App Landing Page

NOTE: For information on the System Status button, go to Section 10.8.

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

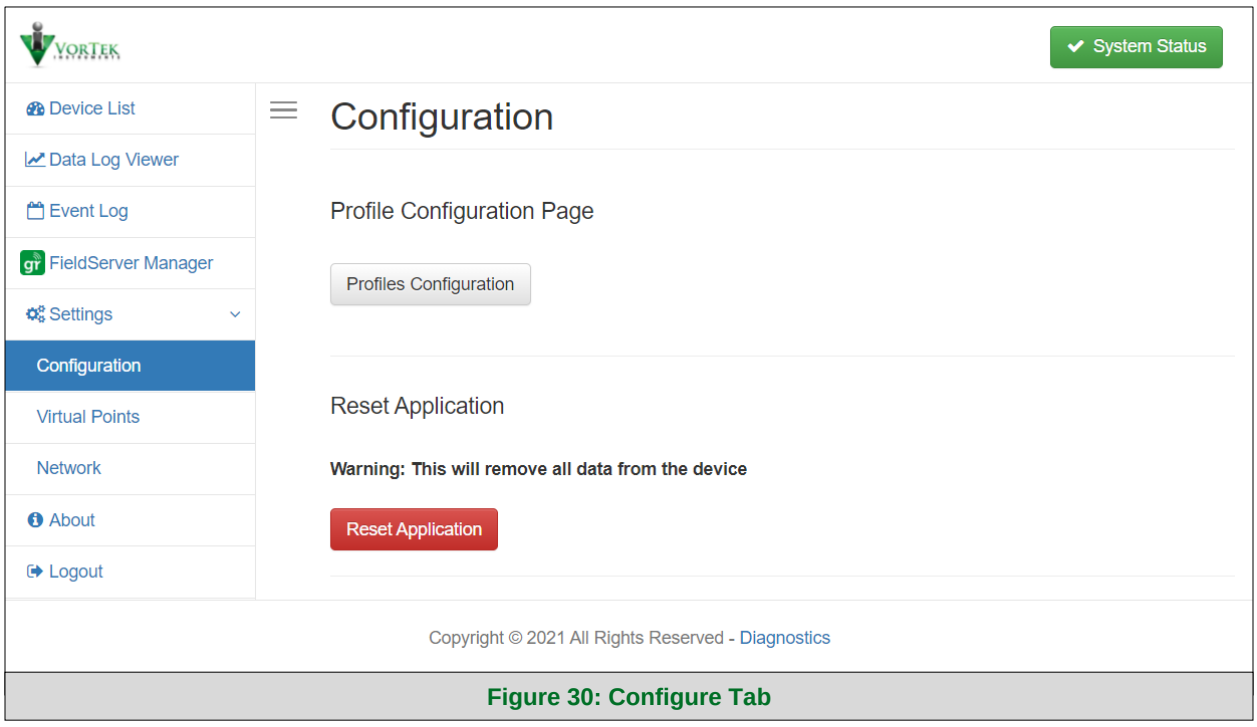


Figure 30: Configure Tab

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

8.2 Select Field Protocol and Set Configuration Parameters

- On the Web Configurator page, the first configuration parameter is the Protocol Selector.

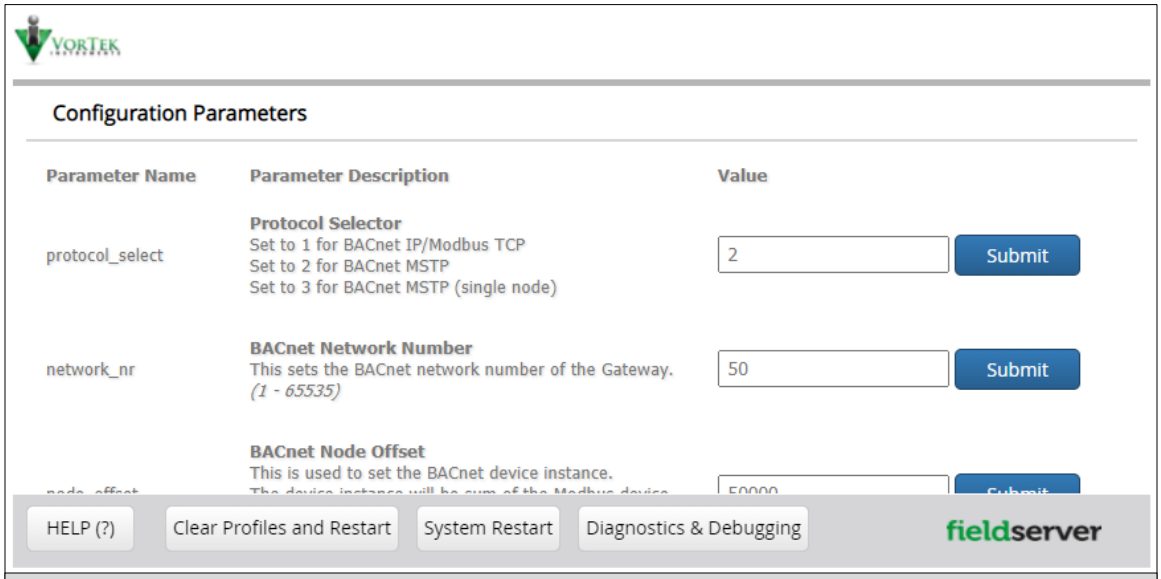


Figure 31: Web Configurator Protocol Selector Parameter

- Select the field protocol by entering the appropriate number into the Protocol Selector Value. Click the Submit button. Click the System Restart button to save the updated configuration.

NOTE: Protocol specific parameters are only visible when the associated protocol is selected.

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

- Ensure that all parameters are entered for successful operation of the gateway. Find the legal value options for each parameter under the Parameter Description in parentheses.

8.3 Setting ProtoCessor Active Profiles

- In the Web Configurator, the Active Profiles are shown below the configuration parameters. The Active Profiles section lists the currently active device profiles, including previous Web Configurator additions. This list is empty for new installations, or after clearing all configurations. (**Figure 32**)

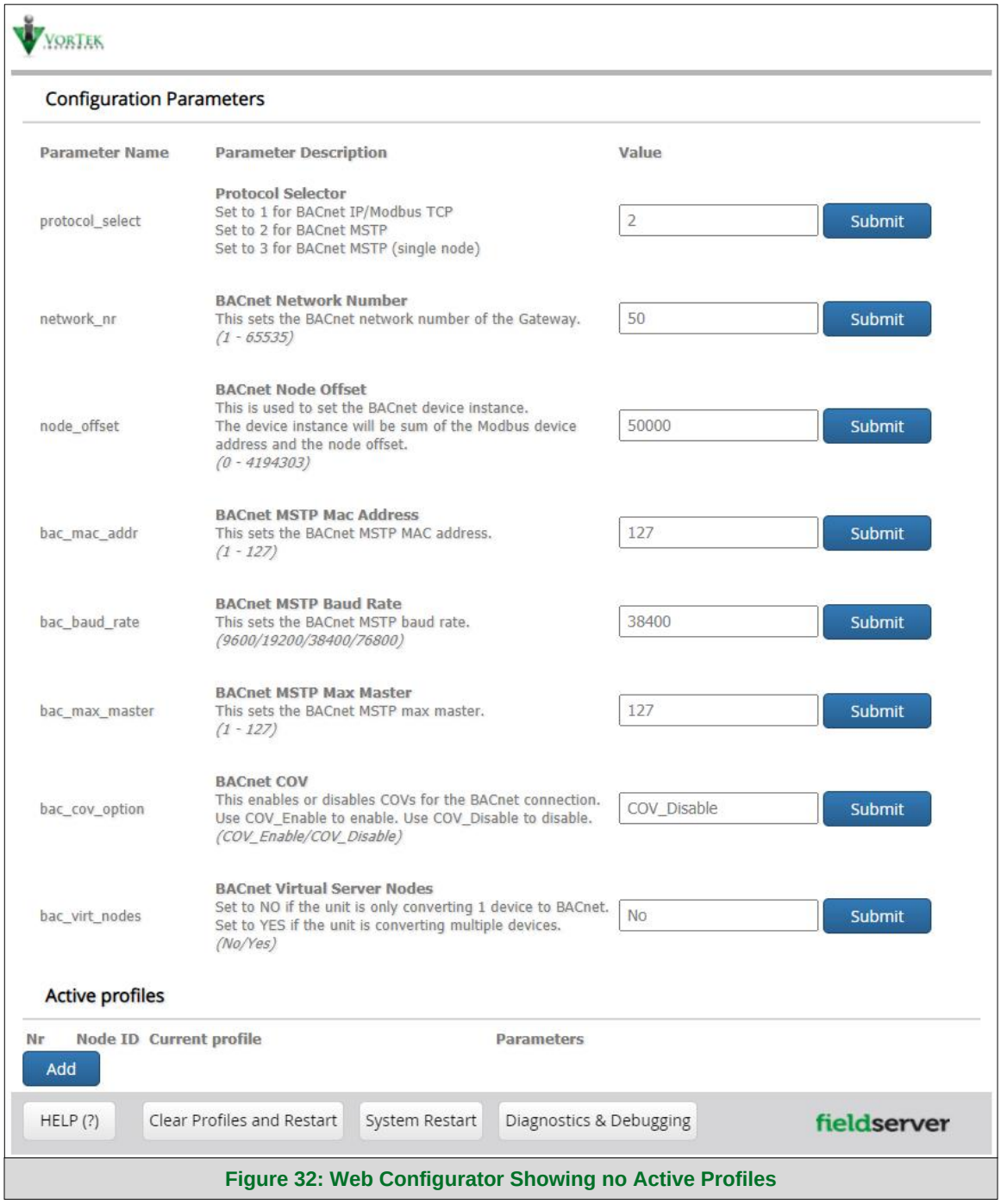


Figure 32: Web Configurator Showing no Active Profiles

- To add an active profile to support a device, click the Add button under the Active Profiles heading. This will present a profile drop-down menu underneath the Current profile column.
- Once the Profile for the device has been selected from the drop-down list, enter the value of the device's Node-ID as 1.
- Then press the "Submit" button to add the Profile to the list of devices to be configured.
- Completed additions are listed under "Active profiles" as shown in **Figure 33**.

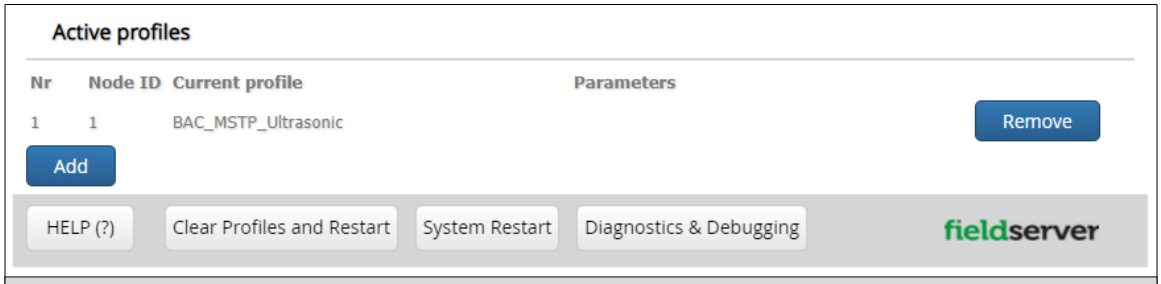


Figure 33: Web Configurator Showing Active Profile Additions

8.4 Verify Device Communications

- **Check that TX and RX LEDs** are rapidly flashing. See **Section 9.4** for more information.
- Confirm the software shows communication without errors. (**Section 9.2**)

8.5 BACnet: Setting Node_Offset to Assign Specific Device Instances

- Follow the steps outlined in **Section 5.1** to access the ProtoCessor Web Configurator.
- Node_Offset field shows the current value (default = 50,000).
  - The values allowed for a BACnet Device Instance can range from 1 to 4,194,303
- To assign a specific Device Instance (or range); change the Node_Offset value as needed using the calculation below:

  Device Instance (desired) = Node_Offset + Node_ID

  For example, if the desired Device Instance for the device is 50,001 and the following is true:
  - Device has a Node-ID of 1

  Then plug the device's information into the formula to find the desired Node_Offset:

  50,001 = Node_Offset + 1
  - **50,000 = Node_Offset**

  Once the Node_Offset value is input, it will be applied as shown below:
  - Device Instance = 50,000 + Node_ID = 50,000 + 1 = 50,001
- Click "Submit" once the desired value is entered.

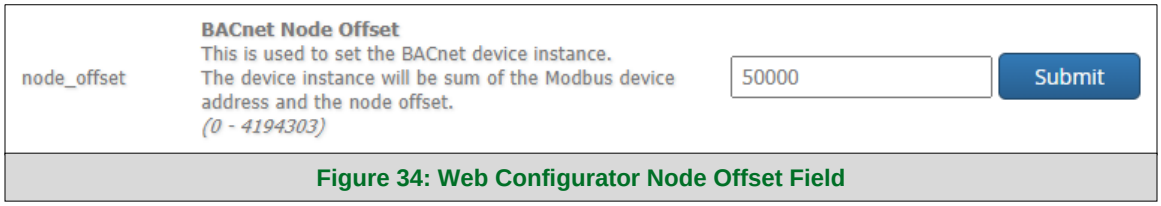


Figure 34: Web Configurator Node Offset Field

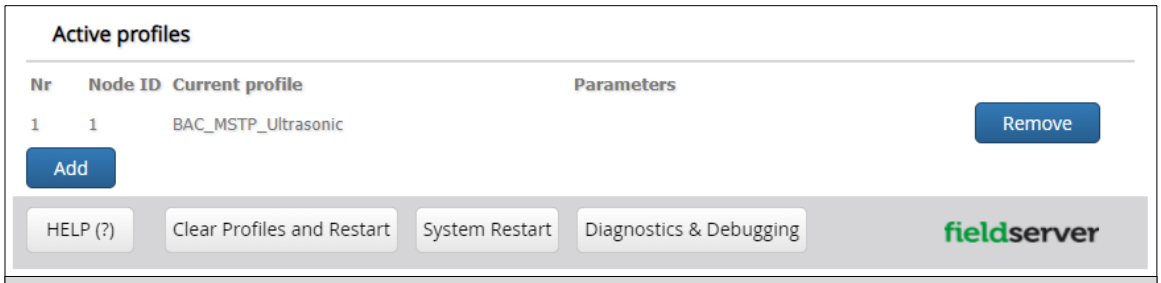


Figure 35: Active Profiles

9 Troubleshooting

9.1 Lost or Incorrect IP Address

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

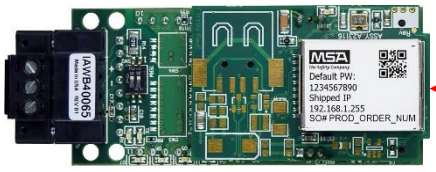
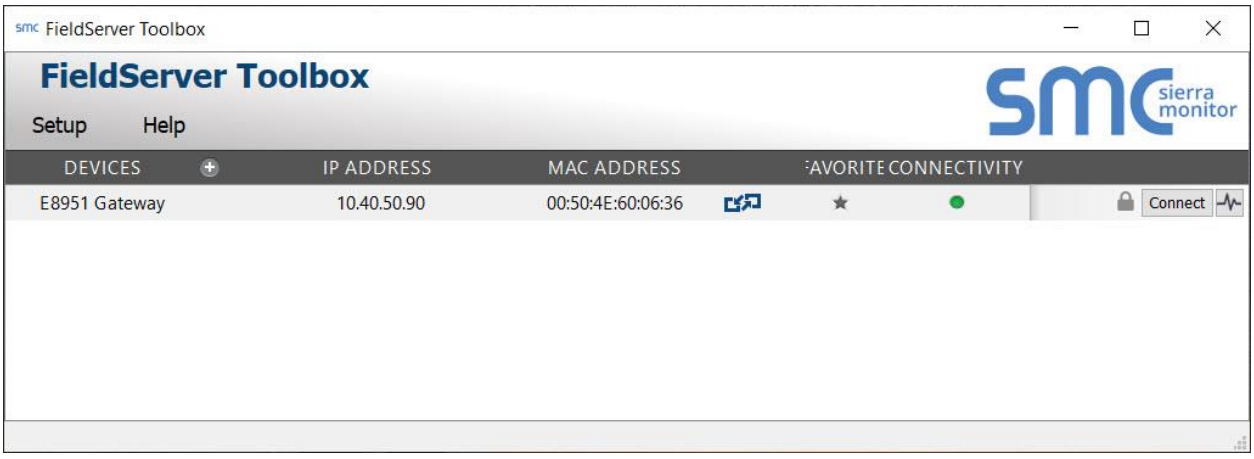


Figure 36: Ethernet Port Location

- Connect a standard Cat-5 Ethernet cable between the user's PC and ProtoCessor.
- 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 ProtoCessor into the web browser or use the FieldServer Toolbox to connect to the ProtoCessor.
- Click on Diagnostics and Debugging Button, then click on view, and then on connections.
- If there are any errors showing on the Connection page, refer to **Section 9.3** for the relevant wiring and settings.

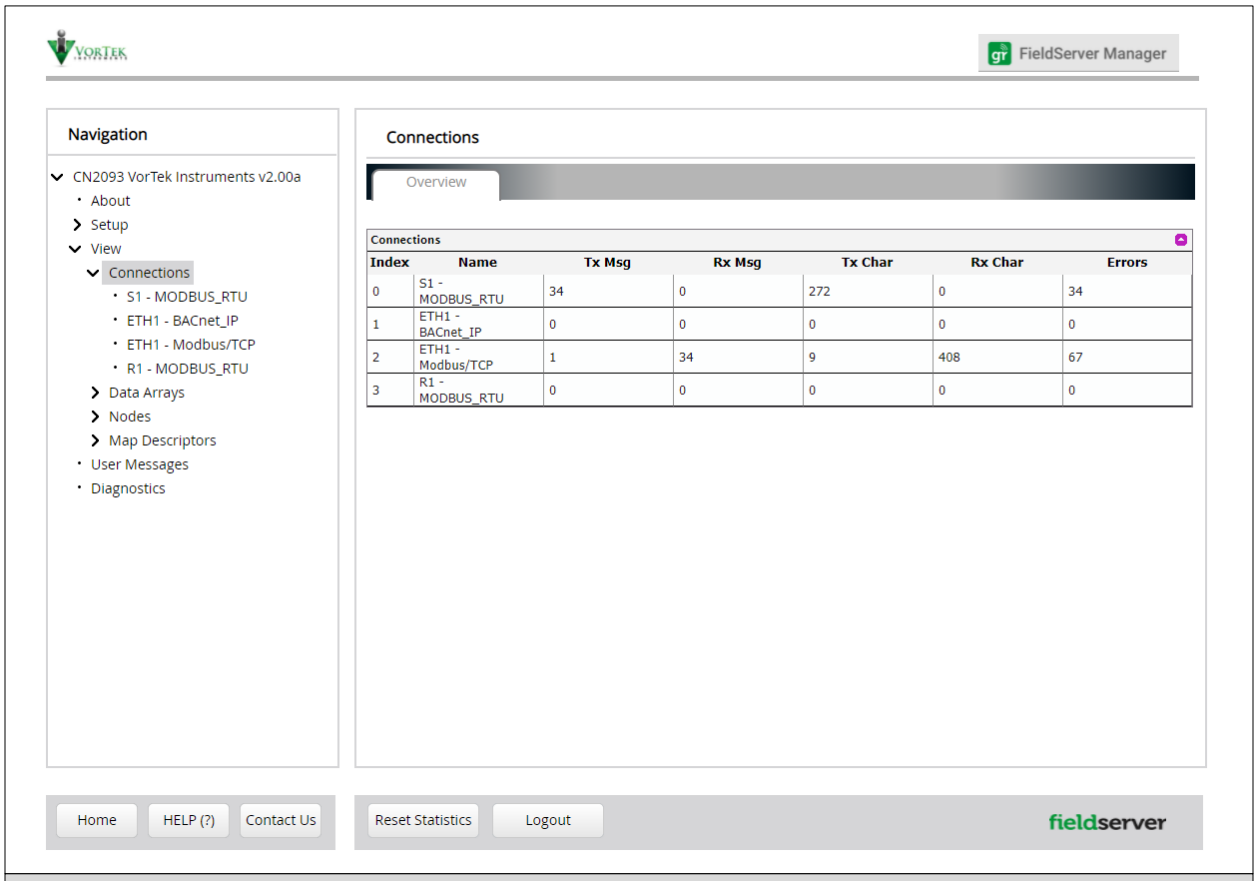


Figure 37: Error Messages Screen

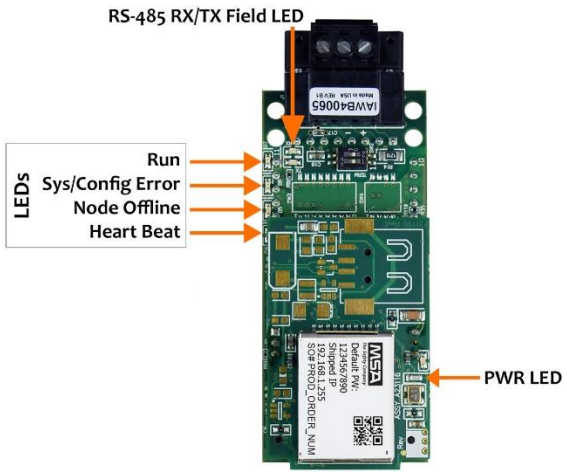
9.3 Checking Wiring and Settings

- No COMS on Modbus RTU side. If the Tx/Rx LEDs are not flashing rapidly then there is a COM issue. To fix this, check the following:
  - Visual observations of LEDs on ProtoCessor (**Section 9.4**)
  - Check baud rate, parity, data bits, stop bits
  - Check device address
  - Verify wiring
  - Verify the device was listed under the Web Configurator Active Profiles (**Section 8.3**)
- Field COM problems:
  - Visual observations of LEDs on the ProtoCessor (**Section 9.4**)
  - Verify IP Address setting
  - Verify wiring

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

9.4 LED Diagnostics for Communications Between ProtoCessor and Devices

See the diagram below for ProtoCessor FPC-ED2 LED Locations.



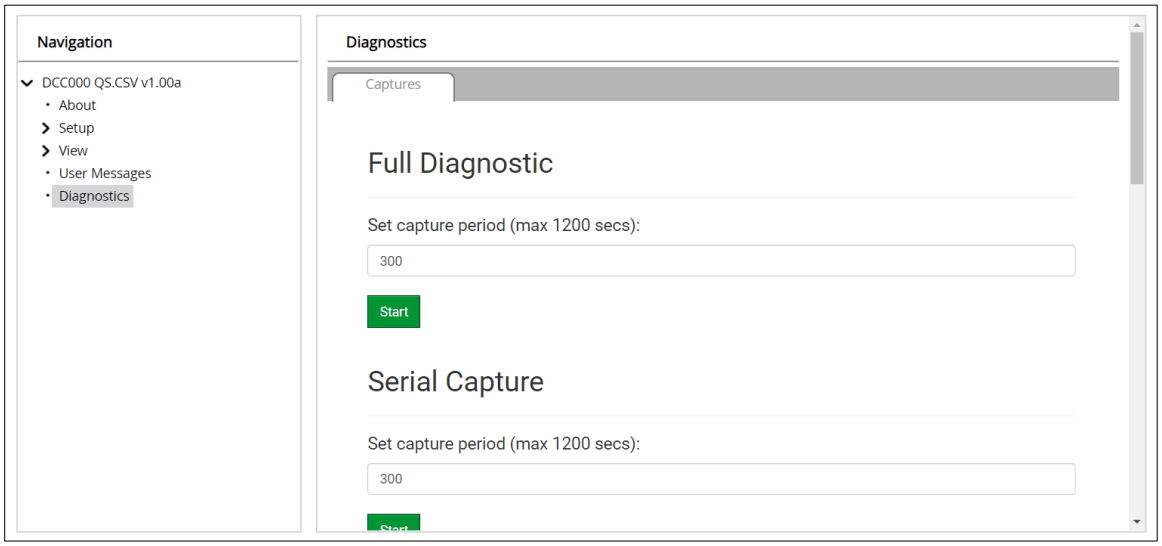
Tag	Description
Run	The Run LED will start flashing 20 seconds after power indicating normal operation. The **Heat Beat** LED has the same functionality but flashes more rapidly.
Sys/ Config Error	The Sys/Config Error LED will go on solid 15 seconds after power up. It will turn off after 5 seconds. A steady red light will indicate there is a system error on ProtoCessor. If this occurs, immediately report the related “system error” shown in the error screen of the FS-GUI interface to support for evaluation.
Node Offline	The Node Offline LED will turn on and stay solid if there is no communication with the device.
RX	The RX LED will flash when a message is received on the field port.
TX	The TX LED will flash when a message is sent on the field port.
PWR	The power light should show steady green when connected to a functioning power source.

Figure 38: Diagnostic LEDs

9.5 Taking a FieldServer Diagnostic Capture

When there is a problem on-site that cannot easily be resolved, perform a Diagnostic Capture before contacting support. Once the Diagnostic Capture is complete, email it to technical support. The Diagnostic Capture will accelerate diagnosis of the problem. If the FieldServer bios is updated/released on November 2017 or later then the Diagnostic Capture is performed via the gateway's on-board system.

- Access the FieldServer Diagnostics page via one of the following methods:
  - Open the FieldServer FS-GUI page and click on Diagnostics in the Navigation panel
  - Open the FieldServer Toolbox software and click the diagnose icon of the desired device



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

- Click Download for the capture to be downloaded to the local PC.
- Email the diagnostic zip file to technical support.

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

9.5.1 Taking a Capture with Older Firmware

If the FieldServer firmware is from before November 2017, the Diagnostic Capture can be done by downloading the FieldServer Toolbox software but network connections (such as Ethernet and Wi-Fi) cannot be captured (if a network diagnostic is needed take a Wire Shark capture).

Once the Diagnostic Capture is complete, email it to technical support. The Diagnostic Capture will accelerate diagnosis of the problem.

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

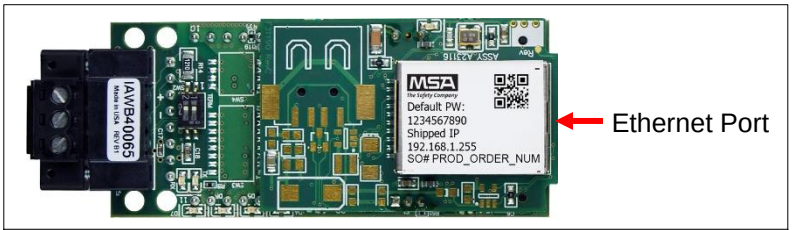
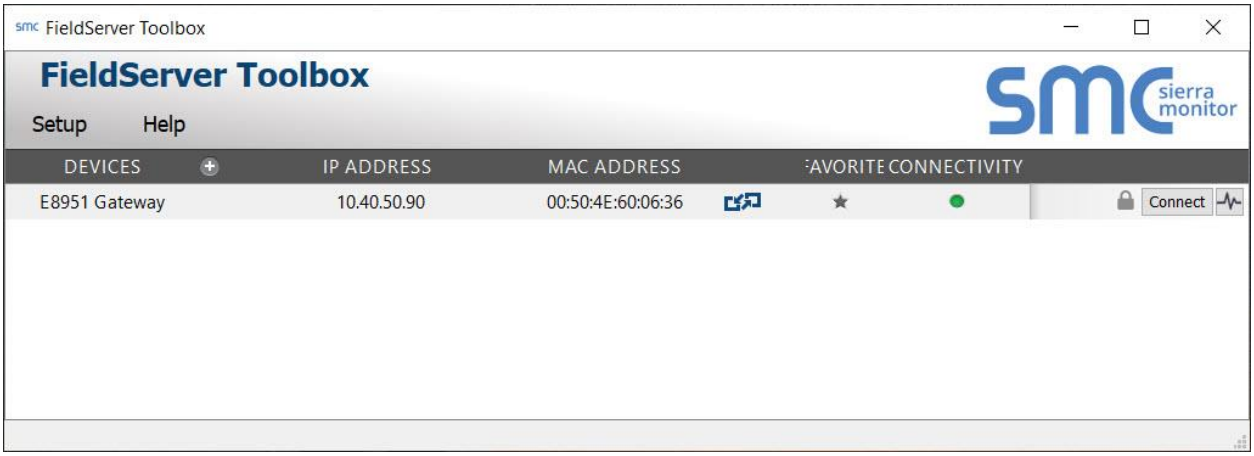


Figure 39: Ethernet Port Location

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



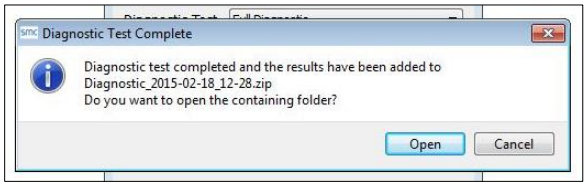
- Select “Full Diagnostic" from the drop down menu

NOTE: If desired, the default capture period can be changed.

- Click on the Start Diagnostic button

- Wait for the capture period to finish and the Diagnostic Test Complete window will appear

- **Step 2**: Send Log
  - Once the diagnostic test is complete, a .zip file is saved on the PC



  - Choose “Open” to launch explorer and have it point directly at the correct folder
  - Send the Diagnostic zip file to technical support

10 Additional Information

10.1 Update Firmware

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

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

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

For both BACnet MS/TP and BACnet/IP, if more than one ProtoCessor is connected to the same subnet, they must be assigned unique Network_Number values.

On the main Web Configuration screen, update the BACnet Network Number field and click submit. The default value is 50.

Figure 40: Web Configurator – Network Number Field

10.3 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.

10.4 Certification

10.4.1 BTL Mark – BACnet® Testing Laboratory

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

Go to www.BACnetInternational.net for more information about the BACnet Testing Laboratory. Click here for the BACnet PIC Statement.

NOTE: BACnet is a registered trademark of ASHRAE.

10.5 Change Web Server Security Settings After Initial Setup

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

- From the FS-GUI page, click Setup in the Navigation panel.

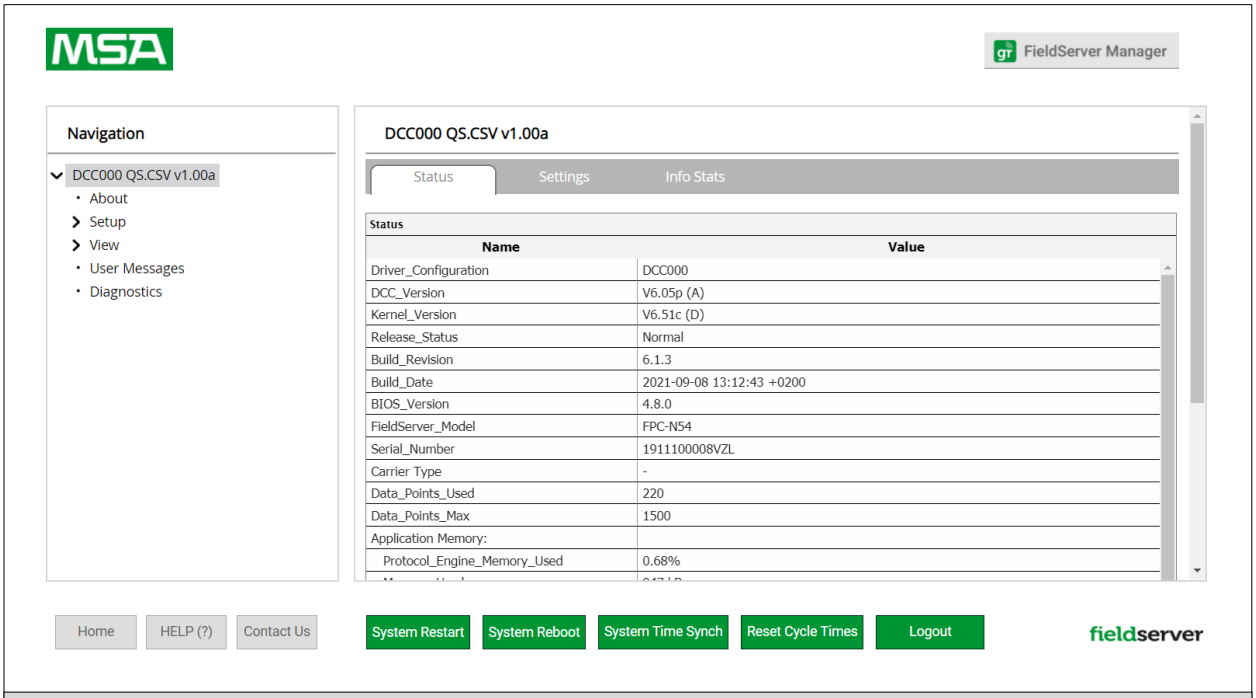


Figure 41: FS-GUI Page

10.5.1 Change Security Mode

- Click Security in the Navigation panel.

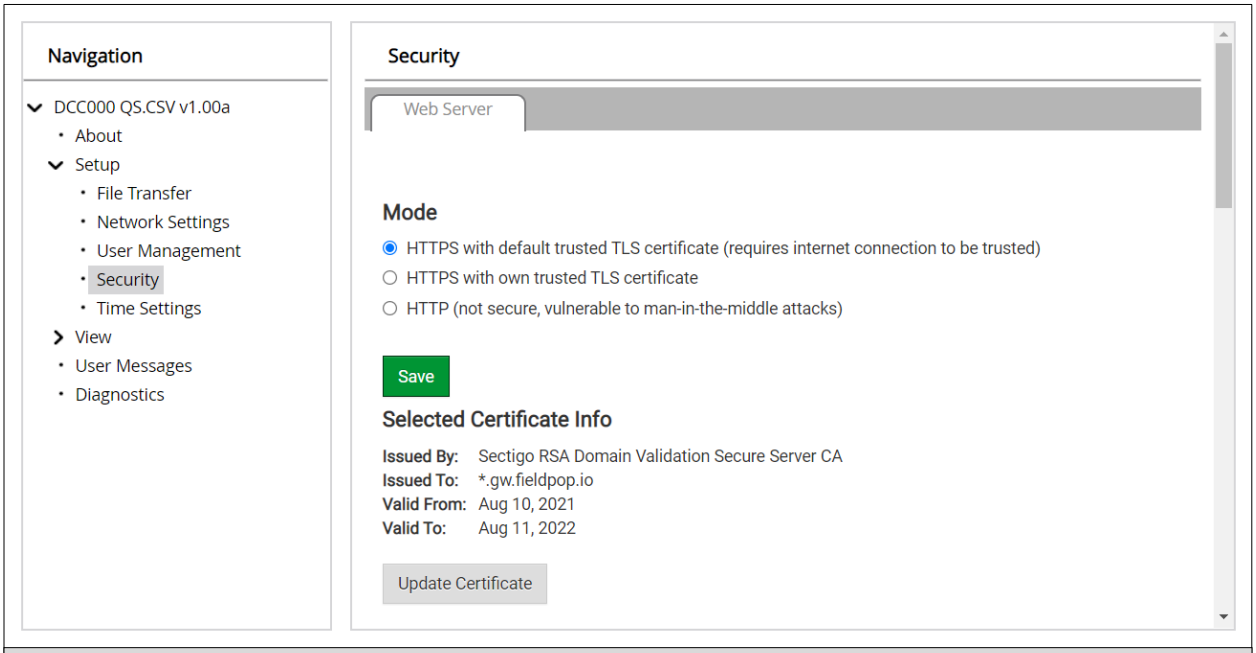


Figure 42: FS-GUI Security Setup

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

10.5.2 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.

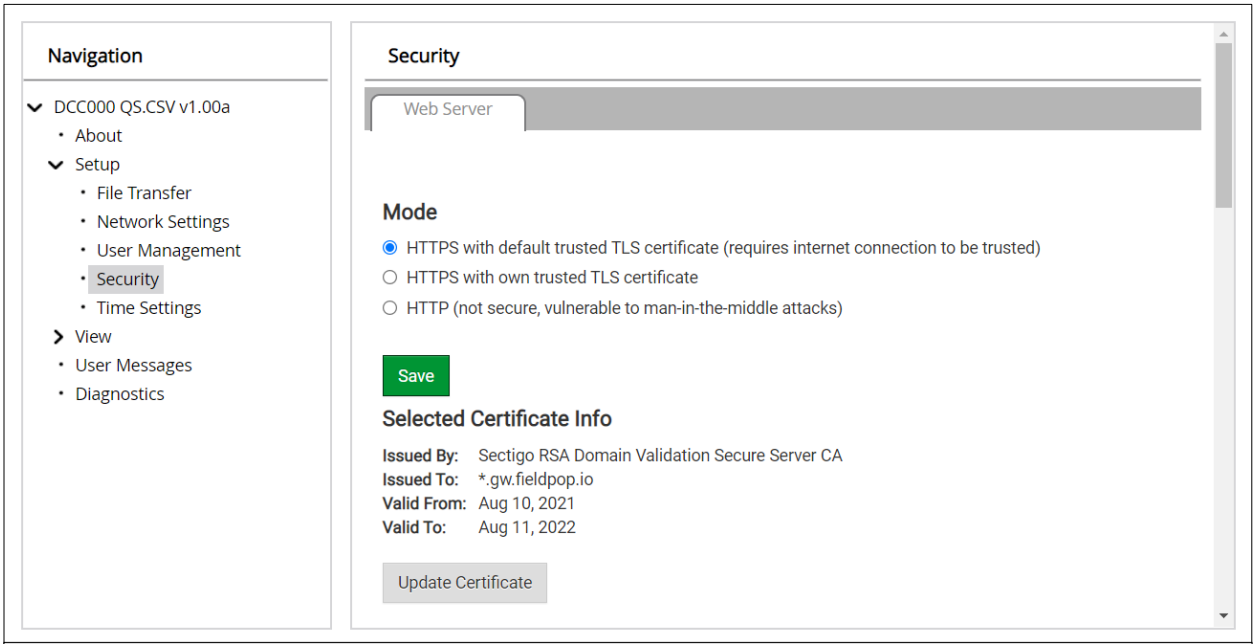


Figure 43: FS-GUI Security Setup – Certificate Loaded

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

10.6 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 Recovery Instructions 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.

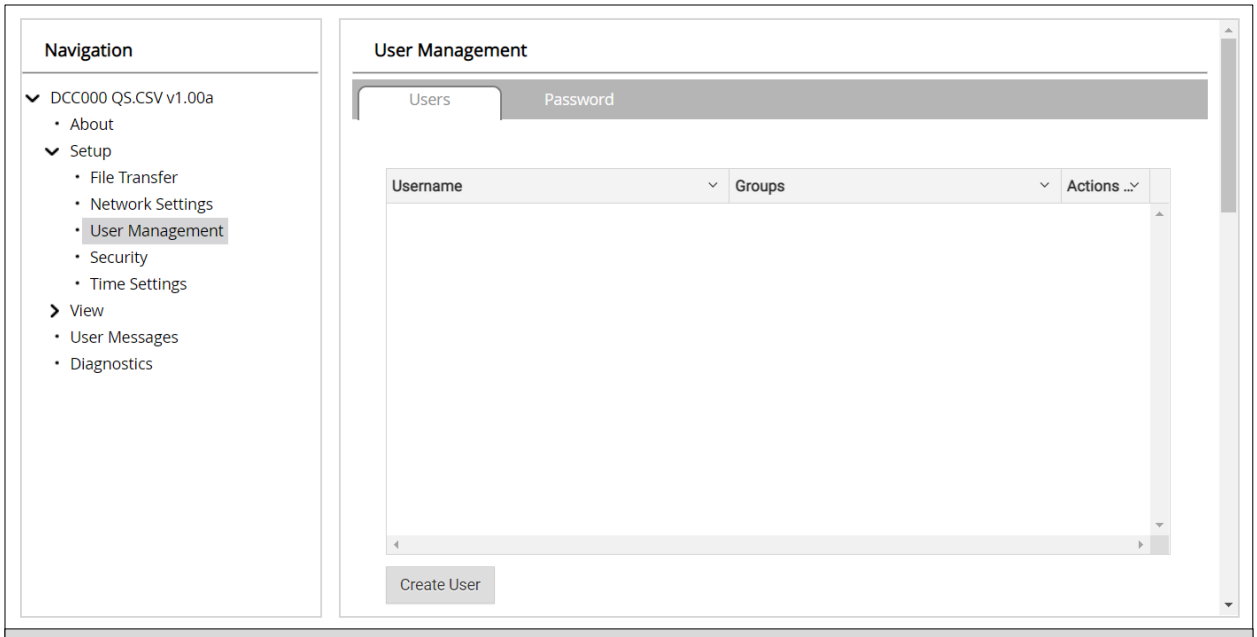


Figure 44: FS-GUI User Management

User Types:

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

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

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

10.6.1 Create Users

- Click the Create User button.

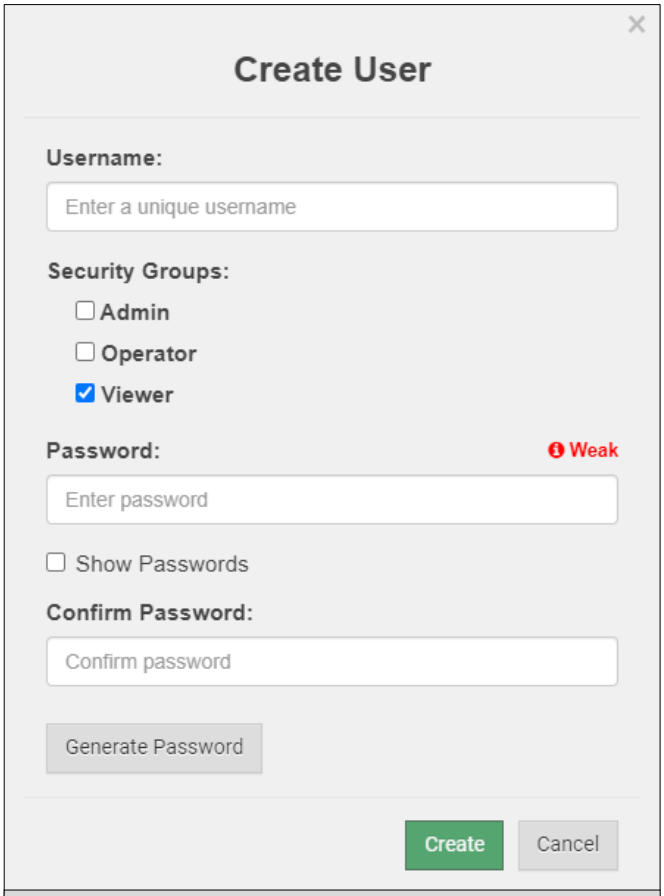


Figure 45: Create User Window

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

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

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

10.6.2 Edit Users

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

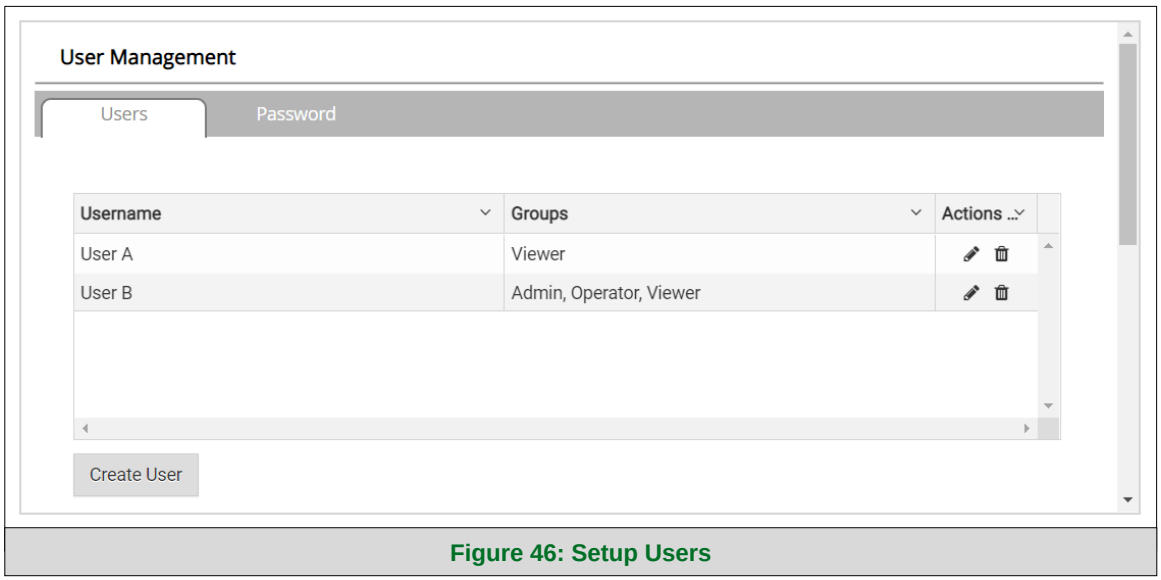


Figure 46: Setup Users

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

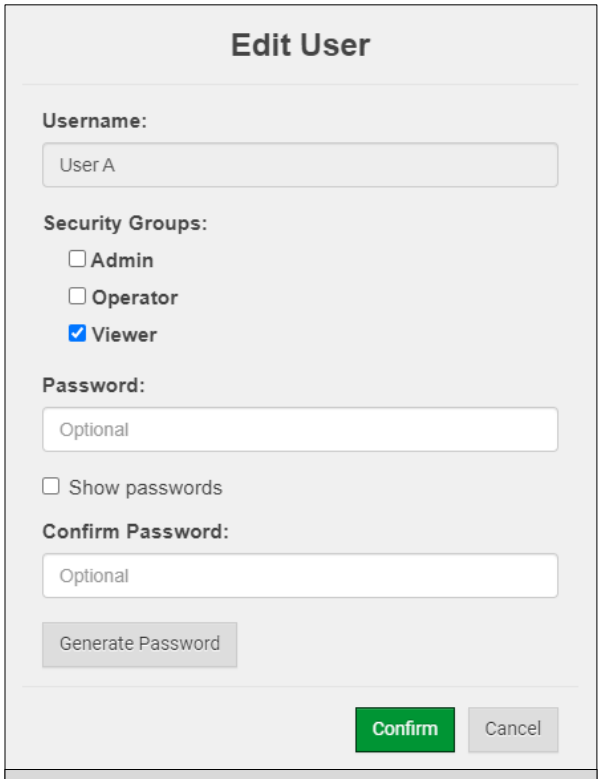


Figure 47: Edit User Window

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

10.6.3 Delete Users

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

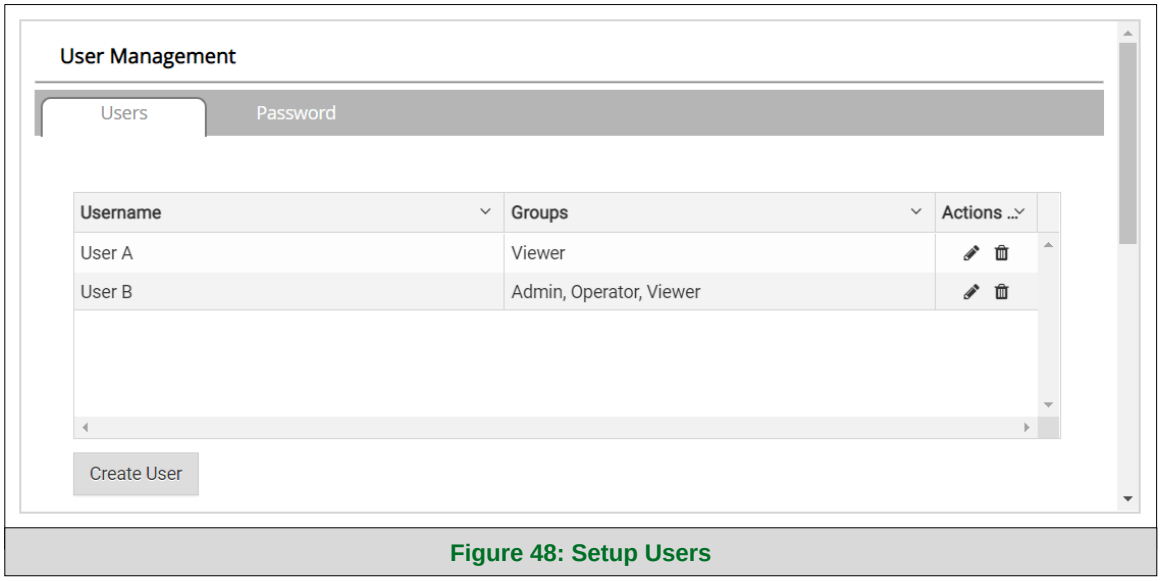


Figure 48: Setup Users

- When the warning message appears, click Confirm.

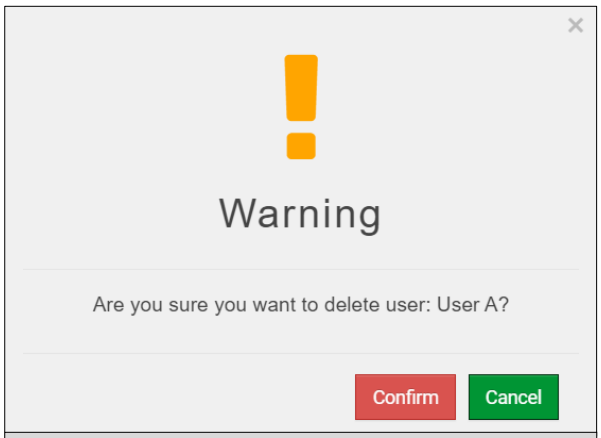


Figure 49: User Delete Warning

10.6.4 Change FieldServer Password

- Click the Password tab.

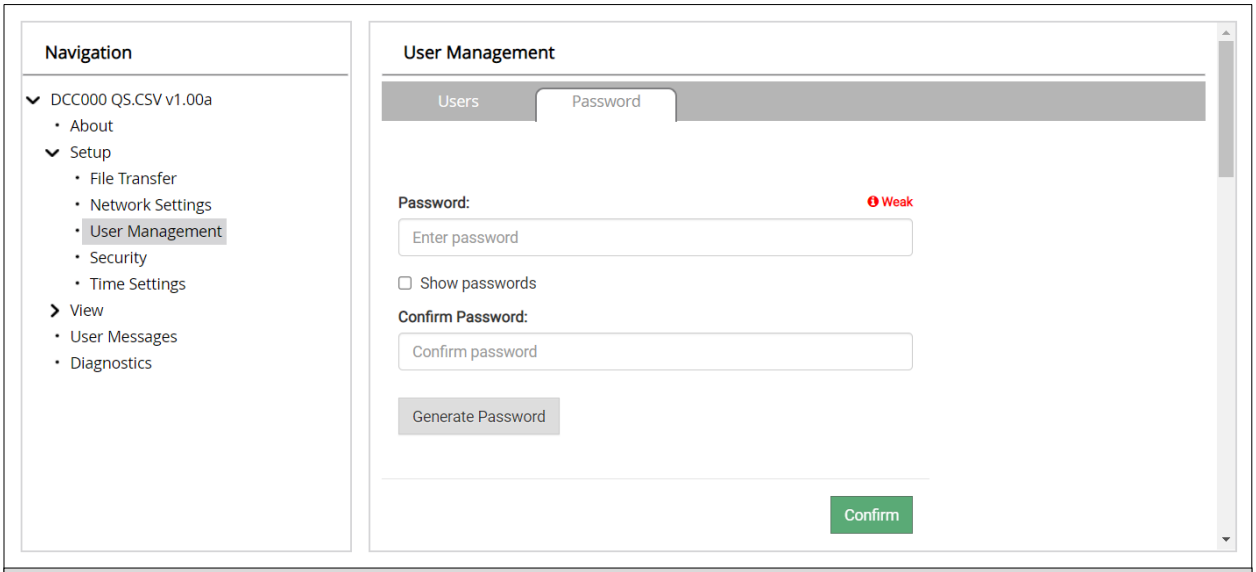


Figure 50: FieldServer Password Update via FS-GUI

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

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

10.7 Grid Connection Warning Message

- If a warning message appears instead of the page as shown in **Figure 21**, follow the suggestion that appears on screen.
    - If the ProtoCessor cannot reach the Grid server, the following message will appear

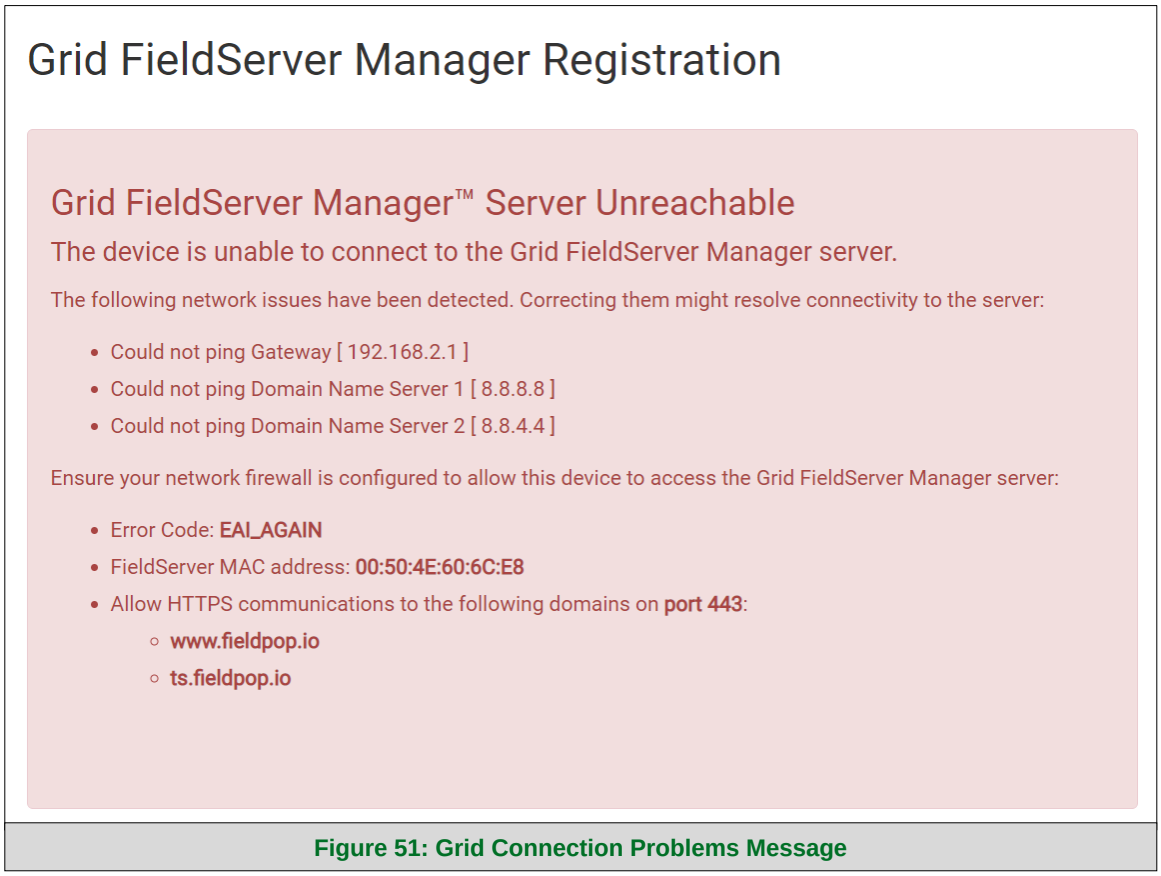


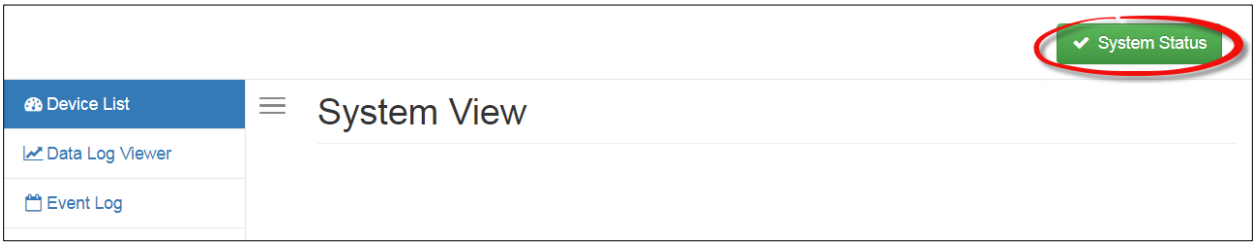
Figure 51: Grid Connection Problems Message

- Follow the directions presented in the warning message.
    - Go to the network settings by clicking the Settings tab and then click the Network tab
    - Check with the site's IT support that the DNS settings are setup correctly
    - Ensure that the ProtoCessor is properly connected to the Internet

NOTE: If changes to the network settings are done, remember to click the Save button. Then power cycle the FieldServer by clicking on the Confirm button in the window and click on the bolded "Restart" text in the yellow pop-up box that appears in the upper right corner of the screen.

10.8 System Status Button

The System Status Button can be found on any page of the web apps. This shows the level of alert/functionality for the customer device. This is an aggregate of the Web App page's resource usage upon the local PC or mobile device, Grid connectivity and device alert level.



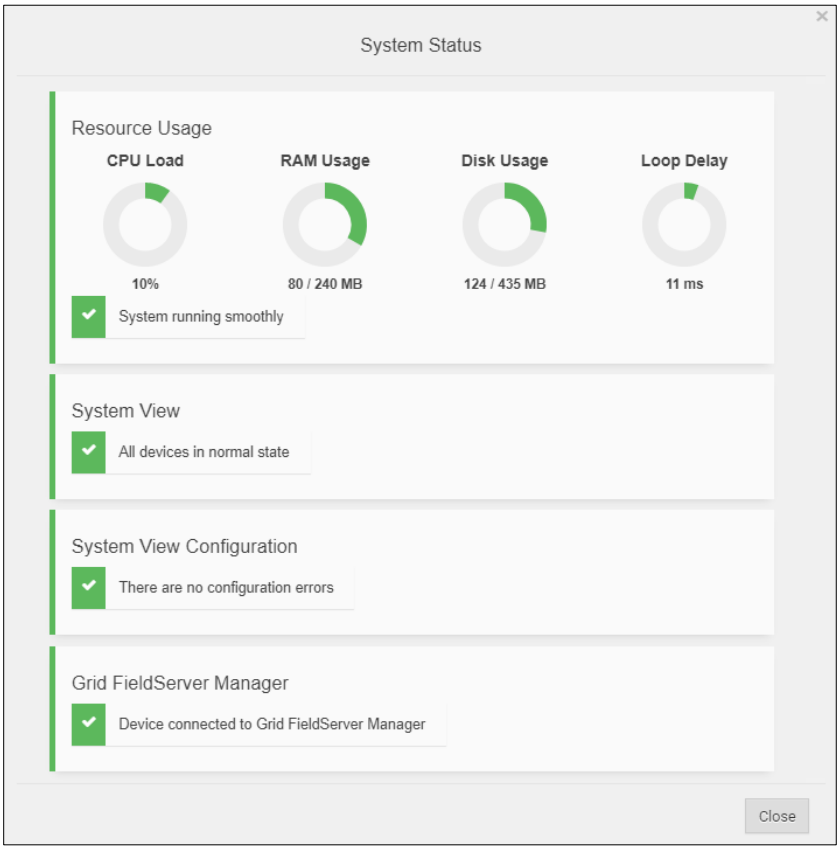
The color of the button represents the status of one to all three systems:

Green – Normal status

Yellow – Warning status

Red – Alarm status

Click on the System Status Button to open the System Status window, showing more details on the status of each system.



NOTE: If it was selected to opt out of the Grid (Figure 18), the Grid status will not show in the System Status window. This means the status will show as green even if the gateway is not connected to the Grid.

10.9 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.

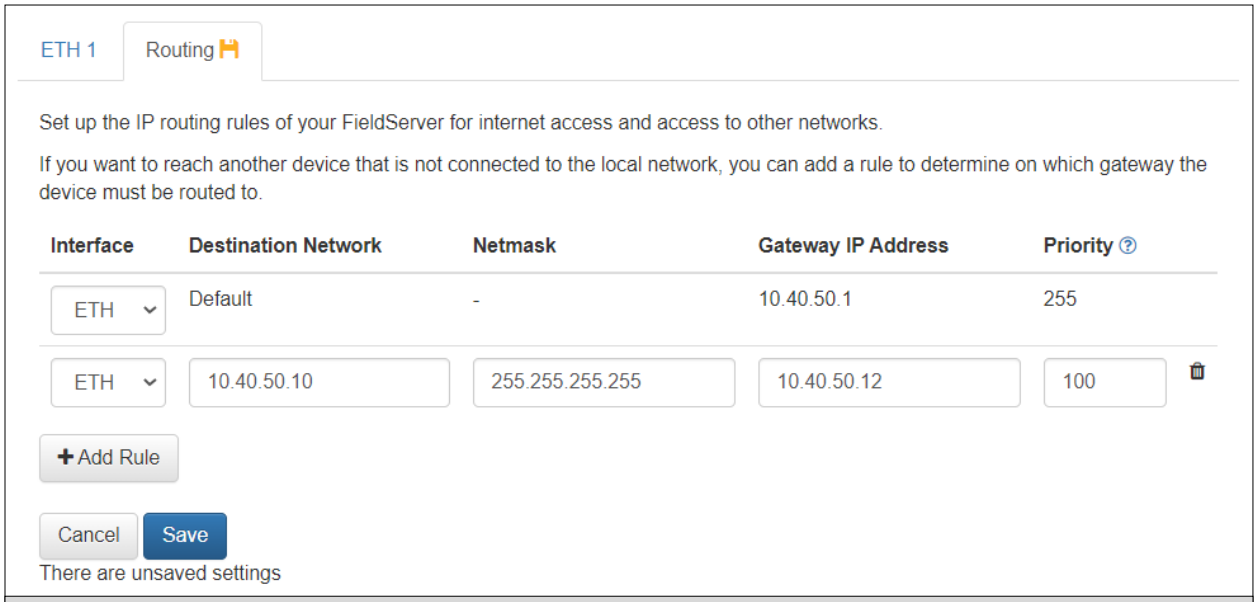


Figure 52: Routing Settings

11 Vendor Information – VorTek

11.1 Ultrasonic Modbus RTU Mappings to Modbus and BACnet

Point Name	BACnet Data Type	BACnet Object ID	Modbus Register
Volume Flow	AI	1	30007-30008
Mass Flow	AI	2	30009-30010
Temperature 1	AI	3	30001-30002
Velocity	AI	4	32555-32556
Velocity (ft/sec)	AI	5	30029-30030
Delta Time Filtered (ns)	AI	6	32553-32554
Volume Units	AI	7	32007-32012
Mass Units	AI	8	32001-32006
Temperature Units	AI	9	32025-32030
Velocity Units	AI	10	32073-32078
Length Units	AI	11	32079-32084
Net Volume Flow Totalizer	AI	12	30545-30546
Forward Volume Flow Totalizer	AI	13	30501-30502
Reverse Volume Flow Totalizer	AI	14	30549-30550
Net Mass Flow Totalizer	AI	15	30547-30548
Forward Mass Flow Totalizer	AI	16	30503-30504
Reverse Mass Flow Totalizer	AI	17	30551-30552
Volume Total Units	AI	18	32055-32060
Mass Total Units	AI	19	32061-32066
Low Flow Cutoff	AV	1	43193-43194
Zero	AV	2	45159-45160
Tag	AV	3	48501-48524
Signal Quality	AI	20	32551-32552
Time of Flight	AI	21	32501-32502
Speed of Sound	AI	22	32537-32538
Speed of Sound Ratio	AI	23	32549-32550
Transducer	AI	24	34564
Transducer Mounting	AI	25	34567
Transducer Spacing	AI	26	32557-32558
Pipe Inside Diameter	AI	27	33159-33160
Density	AI	28	30015-30016
Viscosity	AI	29	30013-30014
Reynolds Number	AI	30	30031-30032
Enthalpy 1	AI	31	30017-30018
Enthalpy 2	AI	32	30019-30020
Reset Totalizers	BV	1	9
Clear Alarm History	BV	2	12
Reboot Device	BV	3	8
Set Zero	BV	4	21
Energy Flow	AI	33	30011-30012
Energy Units	AI	34	32013-32018
Temperature 2	AI	35	30003-30004
Delta Temperature	AI	36	30191-30192
Energy Total Units	AI	37	32067-32072
Net Energy Flow Totalizer	AI	38	30543-30544
Forward Energy Flow Totalizer	AI	39	30505-30506
Reverse Energy Flow Totalizer	AI	40	30507-30508

11.2 Actival_Plus Modbus RTU Mappings to Modbus and BACnet

Point Name	BACnet Data Type	BACnet Object ID	Modbus Register
Control Setting Value	AV	1	04096
Actual Valve Position	AI	2	04097
Point Status Energy	BI	3	04105.7
Point Status Return Water Temp	BI	4	04105.8
Point Status Supply Water Temp	BI	5	04105.9
Point Status Valve Outlet Pressure	BI	6	04105.10
Point Status Valve Inlet Pressure	BI	7	04105.11
Point Status Set Flow	BI	8	04105.12

Point Status Actual Flow	BI	9	04105.13
Point Status Actual Valve Position	BI	10	04105.14
Point Status Control Setting Value	BI	11	04105.15
Energized Time	AI	12	04114-04115
Operating Time	AI	13	04116-04117
Operating Level	AI	14	04118-04119
Number Of Operations	AI	15	04120-04121
Number Of Reverse	AI	16	04122-04123
Total Operating Time Within Range 1	AI	17	04124-04125
Total Operating Time Within Range 2	AI	18	04126-04127
Total Operating Time Within Range 3	AI	19	04128-04129
Total Operating Time Within Range 4	AI	20	04130-04131
Total Operating Time Within Range 5	AI	21	04132-04133
Cooling/Heating Status	BV	22	04134
Dev Status Reverse Flow Error	BI	23	04135.1
Dev Status Pressure Sensor Error	BI	24	04135.2
Dev Status Control Method Setting	BI	25	04135.3
Dev Status Fully Close Error	BI	26	04135.4
Dev Status Potentiometer Error	BI	27	04135.5
Dev Status Operation Failure	BI	28	04135.6
Dev Status Unmatched Pos Detection	BI	29	04135.7
Dev Status RS-485 Comm Error	BI	30	04135.11
Dev Status Minor Error 2	BI	31	04135.12
Dev Status Minor Error 1	BI	32	04135.13
Actual Flow	AI	33	04155
Set Flow	AI	34	04156
Supply Temperature	AI	35	04157
Return Temperature	AI	36	04158
Valve Inlet Pressure	AI	37	04159
Valve Outlet Pressure	AI	38	04160
Energy	AI	39	04161
Totalized Flow (Cooling)	AI	40	04162-04163
Totalized Flow (Heating)	AI	41	04164-04165
Totalized Energy (Cooling)	AI	42	04166-04167
Totalized Energy (Heating)	AI	43	04168-04169

11.3 U42_U43 Modbus RTU Mappings to Modbus and BACnet

Point Name	BACnet Data Type	BACnet Object ID	Modbus Register
Volume Flow Rate	AI	1	40005/40006
Velocity	AI	2	40007/40008
Positive Total	AI	3	40009/40010
Positive Total – exponent	AI	4	40011
Negative Total	AI	5	40012/40013
Negative Total – exponent	AI	6	40014
Net Total	AI	7	40015/40016
Net Total – exponent	AI	8	40017
Energy flow	AI	9	40018/40019
Energy Total (hot)	AI	10	40020/40021
Energy Total (hot) – exponent	AI	11	40022
Energy Total (cold)	AI	12	40023/40024
Energy Total (cold) – exponent	AI	13	40025
Up Signal Int	AI	14	40026/40027
Down Signal Int	AI	15	40028/40029
Quality	AI	16	40030
Error Code	AI	17	40031
Flow Velocity Unit	AI	18	40060/40061
Flow Rate Unit	AI	19	40062/40063
Flow Total Unit	AI	20	40064
Energy rate Unit	AI	21	40065/40066
Energy Total Unit	AI	22	40067
Analog Input AI1 Value	AI	23	40074/40075
Analog Input AI2 Value	AI	24	40076/40077
4 - 20 mA Value	AI	25	40078/40079

11.4 Pro-T_M22_M23 Modbus RTU Mappings to Modbus and BACnet

Point Name	BACnet Data Type	BACnet Object ID	Modbus Register
Serial Number	AI	1	65100\65101
Totalizer	AI	2	00525\00526
Totalizer Units	AI	3	02037\02038
Mass Flow	AI	4	00009\00010
Volume Flow	AI	5	00007\00008
Pressure	AI	6	00005\00006
Temperature	AI	7	00001\00002
Velocity	AI	8	00029\00030
Density	AI	9	00015\00016
Viscosity	AI	10	00013\00014
Reynolds Number	AI	11	00031\00032
Vortex Frequency	AI	12	00025\00026
Gain Char	AI	13	04532
Vortex Amplitude	AI	14	00085\00086
Filter Setting	AI	15	00027\00028
Totalizer #2	AI	16	00527\00528
Totalizer #2 Units	AI	17	02043\02044
Temperature #2	AI	18	00003\00004
Energy Flow	AI	19	00011\00012
Volume Flow Units	AI	20	02007\02008
Mass Flow Units	AI	21	02001\02002
Temperature Units	AI	22	02025\02026
Pressure Units	AI	23	02019\02020
Density Units	AI	24	02031\02032
Energy Flow Units	AI	25	02013\02014
Alarm #1 State	BI	26	00001
Alarm #2 State	BI	27	00002
Alarm #3 State	BI	28	00003

12 Specifications

	ProtoCessor FPC-ED2
Electrical Connections	One 3-pin Phoenix connector with RS-485 port (+ / - / gnd) One Ethernet 10/100 BaseT port
Approvals	CE certified; UL 916 approved; WEEE compliant; EN 60950-1, EN 50491-3 and CSA C22-2 standards; FCC Class A Part 15; DNP 3.0 conformance tested; RoHS compliant; CSA 205 approved
	BTL Marked
Power Requirements	5VDC
Physical Dimensions	6.9 x 3.0 x 2.0 cm (2.7 x 1.2 x 0.8 in.)
Weight	0.03 kg (0.07 lbs)
Operating Temperature	-40°C to 75°C (-40°F to167°F)
Surge Suppression	EN61000-4-2 ESD EN61000-4-3 EMC EN61000-4-4 EFT
Humidity	5 - 90% RH (non-condensing)
(Specifications subject to change without notice)	

Figure 53: Specifications

Warning: This equipment is compliant with Class A of CISPR 32. In a residential environment, this equipment may cause radio interference.

12.1.1 Compliance with UL Regulations

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

- The units shall be powered by listed LPS or Class 2 power supply suited to the expected operating temperature range.
- The interconnecting power connector and power cable shall:
  - Comply with local electrical code
  - Be suited to the expected operating temperature range
  - Meet the current and voltage rating for the ProtoCessor
- 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.

13 Limited 2 Year Warranty

MSA Safety warrants its products to be free from defects in workmanship or material under normal use and service for two years after date of shipment. MSA Safety will repair or replace any equipment found to be defective during the warranty period. Final determination of the nature and responsibility for defective or damaged equipment will be made by MSA Safety personnel.

All warranties hereunder are contingent upon proper use in the application for which the product was intended and do not cover products which have been modified or repaired without MSA Safety's approval or which have been subjected to accident, improper maintenance, installation or application; or on which original identification marks have been removed or altered. This Limited Warranty also will not apply to interconnecting cables or wires, consumables or to any damage resulting from battery leakage.

In all cases MSA Safety's responsibility and liability under this warranty shall be limited to the cost of the equipment. The purchaser must obtain shipping instructions for the prepaid return of any item under this warranty provision and compliance with such instruction shall be a condition of this warranty.

Except for the express warranty stated above, MSA Safety disclaims all warranties with regard to the products sold hereunder including all implied warranties of merchantability and fitness and the express warranties stated herein are in lieu of all obligations or liabilities on the part of MSA Safety for damages including, but not limited to, consequential damages arising out of/or in connection with the use or performance of the product.