

# ProtoNode FPC-N54 Gateway

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## Startup Guide



# Notice

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Thoroughly examine all components and units as soon as they are received. If any cartons are damaged or missing, write a complete and detailed description of the damage or shortage on the face of the freight bill. The carrier's agent must verify the inspection and sign the description. Refuse only the damaged product, not the entire shipment.

Veeder-Root must be notified of any damages and/or shortages within 30 days of receipt of the shipment, as stated in our Terms and Conditions.

## **VEEDER-ROOT'S PREFERRED CARRIER**

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2. Fax signed Bill of Lading (BOL) to Veeder-Root Customer Service at 800-234-5350.
3. Veeder-Root will file the claim with the carrier and replace the damaged/missing product at no charge to the customer. Customer Service will work with production facility to have the replacement product shipped as soon as possible.

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2. Customer may submit a replacement purchase order. Customer is responsible for all charges and freight associated with replacement order. Customer Service will work with production facility to have the replacement product shipped as soon as possible.
3. If "lost" equipment is delivered at a later date and is not needed, Veeder-Root will allow a Return to Stock without a restocking fee.
4. Veeder-Root will NOT be responsible for any compensation when a customer chooses their own carrier.

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For the parts return procedure, please follow the appropriate instructions in the "General Returned Goods Policy" pages in the "Policies and Literature" section of the Veeder-Root **North American Environmental Products** price list. Veeder-Root will not accept any return product without a Return Goods Authorization (RGA) number clearly printed on the outside of the package.

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# Introduction

## ProtoNode Gateway

The ProtoNode is an external, high performance building automation multi-protocol gateway that is preconfigured to automatically communicate between Veeder-Root's devices (hereafter simply called "device") connected to the ProtoNode and automatically configures them for BACnet/IP, BACnet MS/TP, SNMP, Modbus RTU or Modbus TCP/IP.

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

The ProtoNode FPC-N54 is compatible with:

- TLS-3XX Console RS-232/RS-485 Dual Interface Module
- TLS-450PLUS Console RS-232/RS-485 Dual Interface Module

## Contractor Certification Requirements

Veeder-Root requires the following minimum training certifications for contractors who will install and program the equipment discussed in this manual:

**Service Technician Certification (Previously known as Level 2/3):** Contractors holding valid Technician Certifications are approved to perform installation checkout, startup, programming and operations training, system tests, troubleshooting and servicing for all Veeder-Root Series Tank Monitoring Systems, including Line Leak Detection. This certification includes TLS-3xx and TLS4xx certification training.

**In-Station Diagnostics (ISD-PMC) Technician Certification:** ISD PMC Contractors holding a valid ISD/PMC Certification are approved to perform (ISD/PMC) installation checkout, startup, programming, and operations training. This training also includes troubleshooting and service techniques for the Veeder-Root In-Station Diagnostics system. A current Veeder-Root Technician Certification is a prerequisite for the ISD/PMC course.





All service personal on site must comply with all recommended safety practices identified by OSHA and your employer.

Review and comply with all the safety warnings in the manuals listed in this document above and any other Federal, State or Local requirements.

**Warranty Registrations** may only be submitted by selected Distributors.

## Safety Precautions

The following safety symbols may be used throughout this manual to alert you to important safety hazards and precautions

 <b>EXPLOSIVE</b> Fuels and their vapors are extremely explosive if ignited.	 <b>FLAMMABLE</b> Fuels and their vapors are extremely flammable.
 <b>ELECTRICITY</b> High voltage exists in, and is supplied to, the device. A potential shock hazard exists.	 <b>TURN POWER OFF</b> Live power to a device creates a potential shock hazard. Turn Off power to the device and associated accessories when servicing the unit.

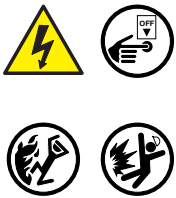
**⚠ WARNING**

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

**READ ALL RELATED MANUALS**

Knowledge of all related procedures before you begin work is important. Read and understand all manuals thoroughly. If you do not understand a procedure, ask someone who does.

## Safety Warnings

<b>⚠ WARNING</b>	
	<p>This console contains high voltages which can be lethal. It is also connected to low power devices that must be kept intrinsically safe.</p> <p><b>FAILURE TO COMPLY WITH THE FOLLOWING WARNINGS AND SAFETY PRECAUTIONS COULD CAUSE DAMAGE TO PROPERTY, ENVIRONMENT, RESULTING IN SERIOUS INJURY OR DEATH.</b></p> <ol style="list-style-type: none"><li>1. Turn off and tag power at the circuit breaker. Do not connect the console AC power supply wires at the breaker until all devices are connected.</li><li>2. Attach conduit from the power panel to the console's Power Area knockouts only.</li><li>3. Comply with all applicable codes including: the National Electrical Code; federal, state, and local codes; and other applicable safety codes.</li></ol> <p>Connecting power wires to a live circuit can cause electrical shock that may result in serious injury or death.</p> <p>Routing conduit for power wires into the intrinsically safe compartment can result in fire or explosion resulting in serious injury or death.</p>

## Related Documents

- |            |   |
|------------|---|
| 576013-879 | TLS-3XX Console Site Prep And Installation Manual     |
| 577014-073 | TLS-450PLUS Console Site Prep And Installation Manual |
| 577014-110 | TLS-450PLUS/TLS4 Operator's Manual                    |

## Precautions Against Static Electricity

If necessary to install electronic components in the ATG to implement this feature, read the following static electricity precautions:

1. Before handling any components, discharge your body's static electric charge by touching a grounded surface.
2. Do not remove parts from their anti-static bags until you are ready to install them.
3. Do not lay parts on the anti-static bags! Only the insides are anti-static.
4. When handling parts, hold them by their edges and their metal mounting brackets.
5. Avoid touching comm board components or edge connectors that plug into slots when handling.
6. Never slide parts over any surface.
7. Avoid plastic, vinyl, and Styrofoam in your work area.

## ProtoNode Gateway

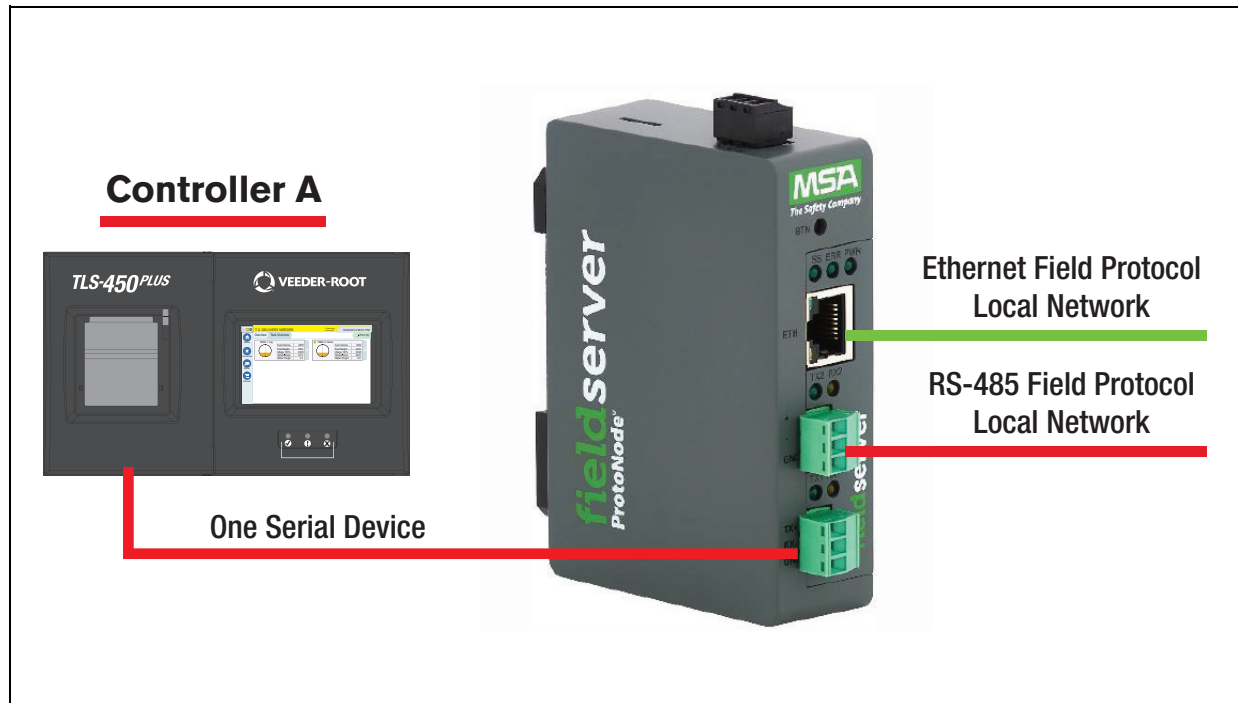


Figure 1. FPC-N54 Connectivity Diagram (TLS450PLUS Shown)



## Quick Start

1. Record the information about the unit. ("Record Identification Data" on page 5 )
2. Check that the ProtoNode and customer device COM settings match. ("Configuring Device Configurations" on page 5)
3. Connect the ProtoNode 3 pin RS-232 R1 port to the RS-232 network connected to each of the devices. ("RS-232 Network" on page 6)
4. If using a serial field protocol: Connect the ProtoNode 3 pin RS-485 R2 port to the field protocol cabling. ("RS-485 Network" on page 7)
5. Connect power to ProtoNode 3 pin power port. ("Power-Up ProtoNode" on page 8)
6. Connect a PC to the ProtoNode via Ethernet cable. ("Connect the PC to the ProtoNode" on page 9)
7. Setup Web Server Security and login via web browser. ("Setup Web Server Security" on page 10)
8. Use a web browser to access the ProtoNode Web Configurator page to select the profile of the device attached to the ProtoNode and enter any necessary device information. Once the device is selected, the ProtoNode automatically builds and loads the appropriate configuration. ("Setting ProtoNode Active Profiles" on page 16)
9. Ethernet Network: If using an Ethernet field protocol, use a web browser to access the ProtoNode Web Configurator page to change the IP Address. ("Ethernet Network: Setting IP Address for the Field Network" on page 17)

## Setup For ProtoNode

### Record Identification Data

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Each ProtoNode 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:

**Table 1. ProtoNode Part Number**

Model	Part Number
ProtoNode	FPC-N54-1759

FPC-N54 units have the following 3 ports: RS-485 + Ethernet + RS-485/RS-232.

### Point Count Capacity

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The total number of registers presented the device attached to the ProtoNode cannot exceed:

**Table 2. ProtoNode Total Registers**

Part Number	Total Registers
330020-840	5000

### Configuring Device Configurations

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- The connected serial device **MUST** have the same baud rate, data bits, stop bits, and parity settings as the ProtoNode
- To set the ProtoNode's COM settings, see "Select Field Protocol and Set Configuration Parameters" on page 15.
- Table 3 specifies the device serial port settings required to communicate with the ProtoNode.

**Table 3. COM Settings**

Port Setting	TLS-3XX/TLS4XX
Protocol	V-R Interface
Baud Rate	9600
Parity	Odd
Data Bits	7
Stop Bits	1

# Interfacing ProtoNode to Devices

## Device Connections to ProtoNode

### RS-232 NETWORK

The ProtoNode has a 3-pin Phoenix connector for connecting RS-232 devices on the R1 port see Figure 2).

**NOTICE** Use standard grounding principles for RS-232 ground.

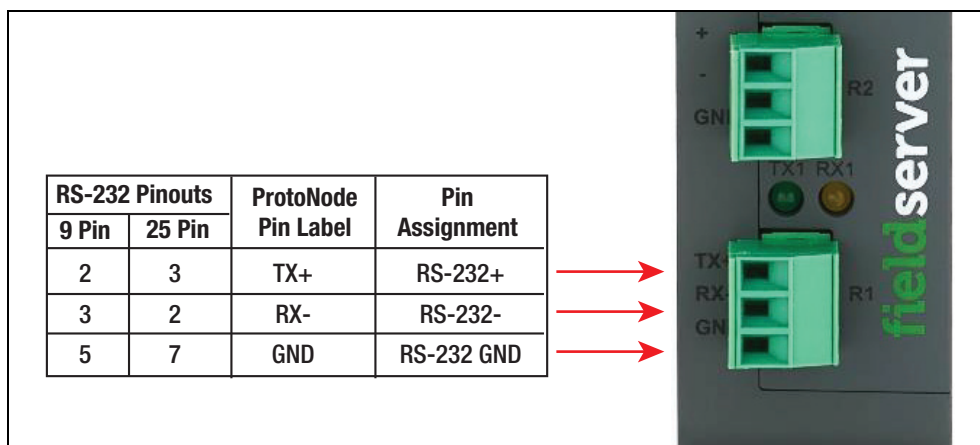


Figure 2. RS-232 Connections from Devices to the ProtoNode R1 Port

To switch the R1 port between RS-485 and RS-232, move the number 4 DIP switch to the left for RS-485 and to the right for RS-232 (see Figure 3).

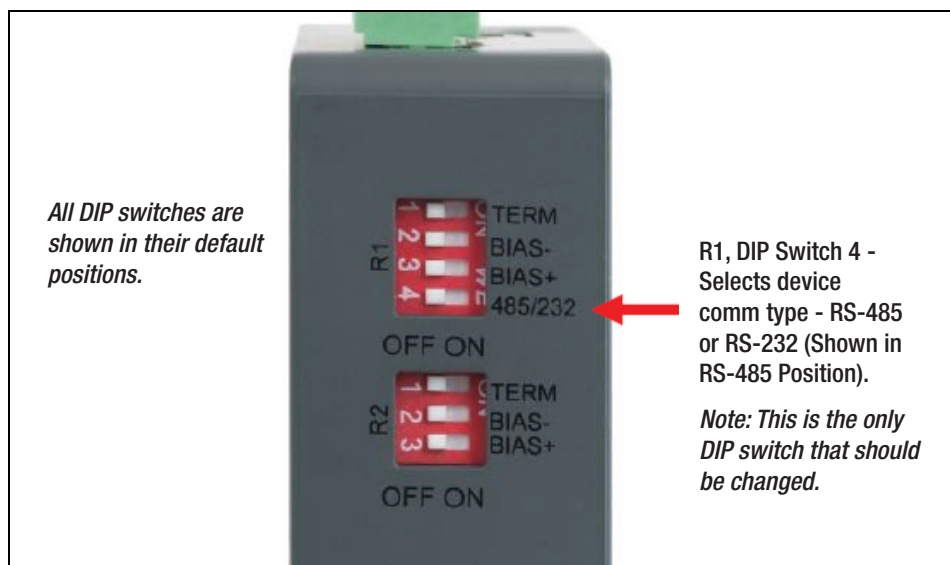


Figure 3. R1 Port RS-485/RS-232 Selection DIP Switch

## RS-485 NETWORK

The ProtoNode has a 3-pin Phoenix connector for connecting RS-485 devices on the R2 port (see Figure 4).

**NOTICE** Use standard grounding principles for RS-485 ground.

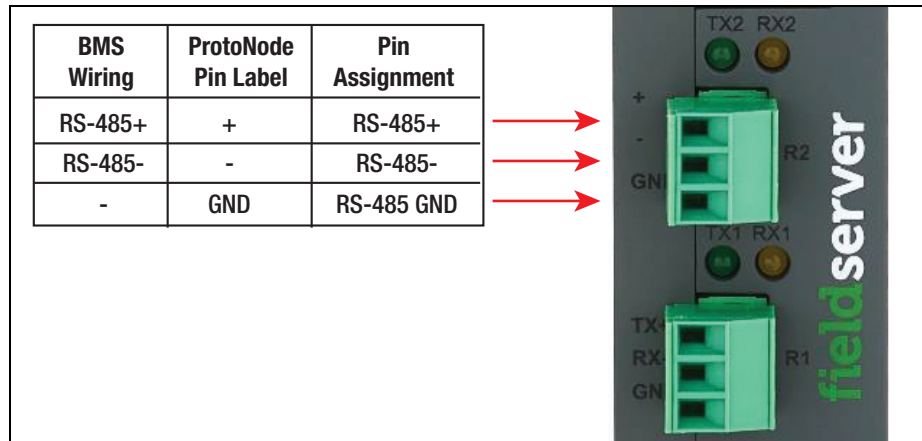


Figure 4. RS-485 Connections from Devices to the ProtoNode R2 Port

## BIAS RESISTORS

The ProtoNode bias resistors are used to keep the RS-485 bus to a known state, when there is no transmission on the line (bus is idling), to help prevent false bits of data from being detected. The bias resistors typically pull one line high and the other low - far away from the decision point of the logic.

The bias resistor is 510 ohms which is in line with the BACnet spec. It should only be enabled at one point on the bus (for example, on the field port where there are very weak bias resistors of 100k). Since there are no jumpers, many gateways can be put on the network without running into the bias resistor limit which is < 500 ohms.

To enable Bias Resistors, move both the BIAS- and BIAS+ dip switches to the right as shown in Figure 5.

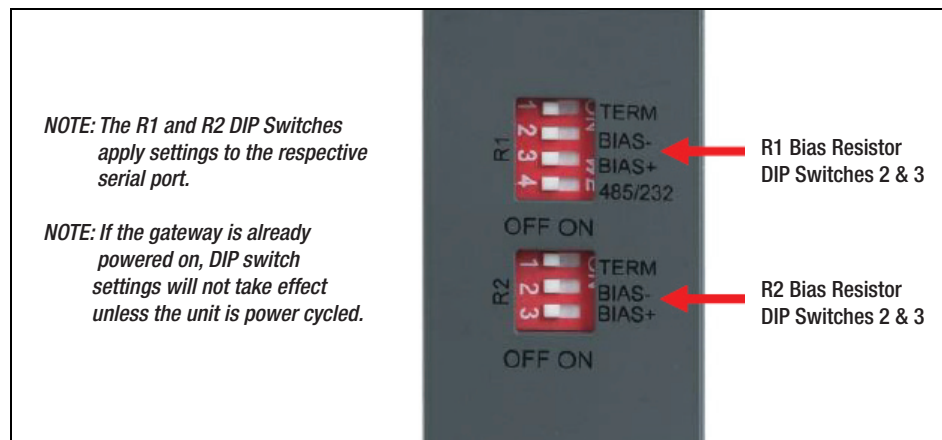


Figure 5. Bias Resistor DIP Switches

## TERMINATION RESISTOR

If the ProtoNode is the last device on the serial trunk, then the End-Of-Line Termination Switch needs to be enabled. To enable the Termination Resistor, move the TERM dip switch to the right as shown in Figure 6.

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.

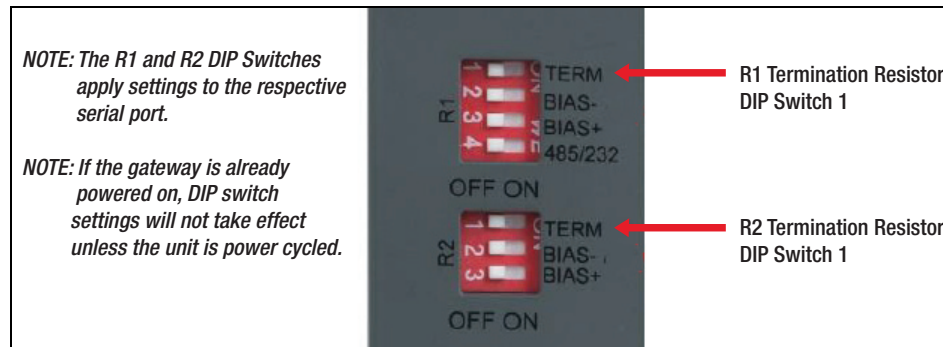


Figure 6. Termination Resistor DIP Switches

## POWER-UP PROTONODE

Check power requirements in Table 4 below.

Table 4. Required Current Draw for the ProtoNode

ProtoNode Family	Current Draw Type	
	12Vdc	24Vdc/ac
FPC-N54 (Typical)	250mA	125mA
<i>Note: These values are 'nominal' and a recommended safety margin of 25% should be added to the power supply of the host system.</i>		

Apply power to the ProtoNode as shown below in Figure 7. Ensure that the power supply used complies with the specifications provided in Table 6 on page 35.

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

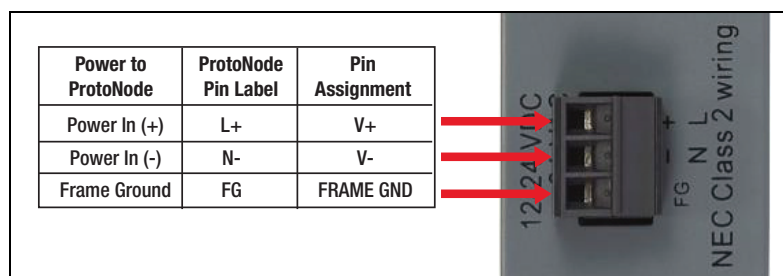


Figure 7. Power Connections

## Connect the PC to the ProtoNode

### Connecting to the Gateway via Ethernet

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

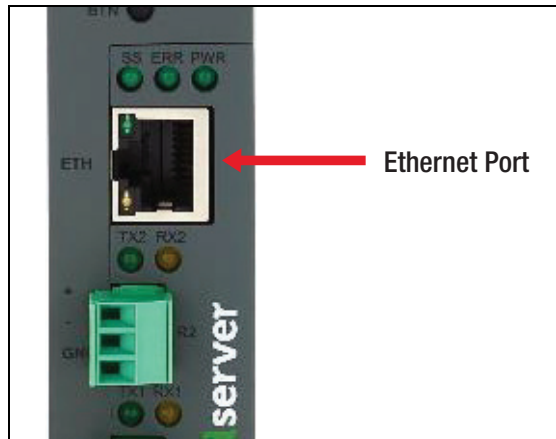



Figure 8. Ethernet Port Location

### 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:

- Find the search field in the local computer's task bar (usually to the right of the windows icon ) and type in "Control Panel".
- Click "Control Panel", click "Network and Internet" and then click "Network and Sharing Center".
- Click "Change adapter settings" on the left side of the window.
- Right-click on "Local Area Connection" and select "Properties" from the dropdown menu.
- Highlight ☒ [Internet Protocol Version 4 \(TCP/IPv4\)](#) and then click the Properties button.
- Select and enter a static IP Address on the same subnet. For example:

☒ Use the following IP address:

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

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

## Setup Web Server Security

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

**NOTICE** If the IP Address of the ProtoNode has been changed, the assigned IP Address can be discovered using the FS Toolbox utility. See “Lost or Incorrect IP Address” on page 20 for instructions.

## 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 (see Figure 9). Read the text and choose whether to move forward with HTTPS or HTTP.

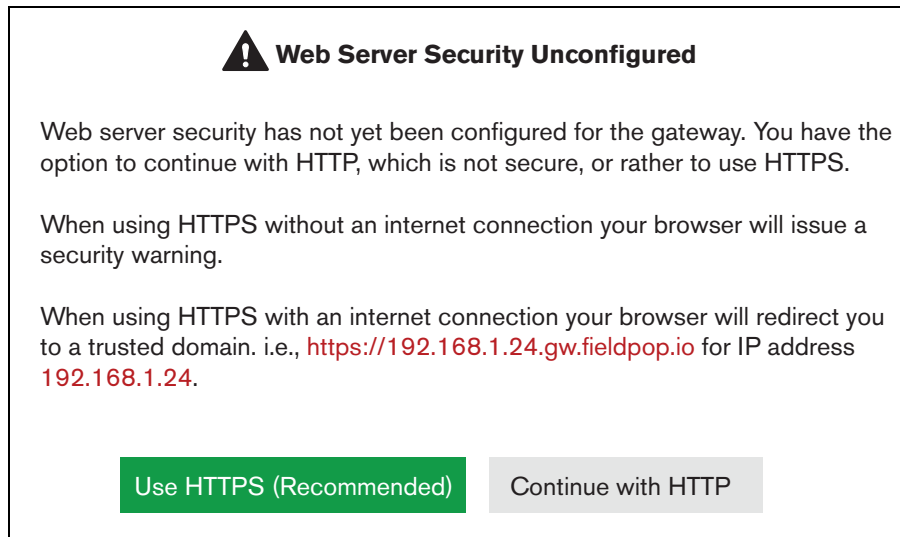


Figure 9. Web Server Security Window

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

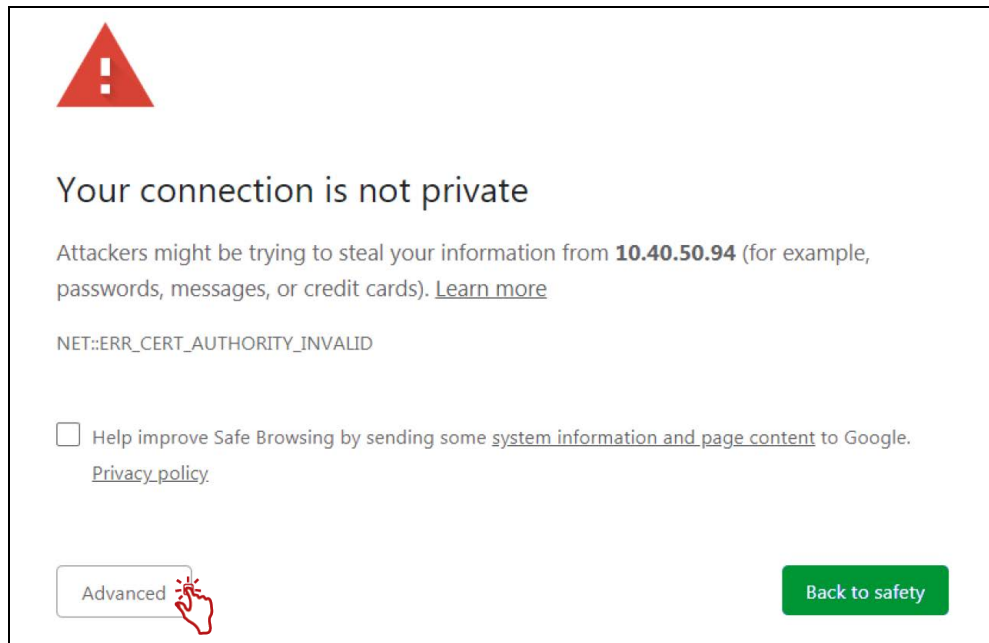


Figure 10. Connection Not Private Warning

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

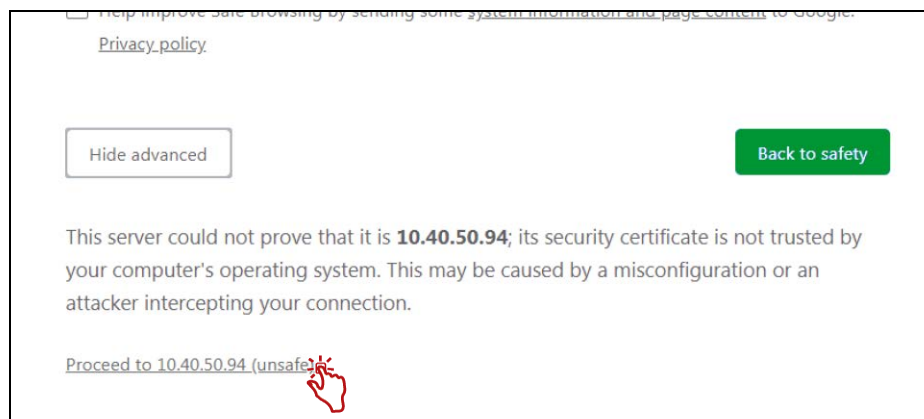


Figure 11. Connection Not Private Warning



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

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

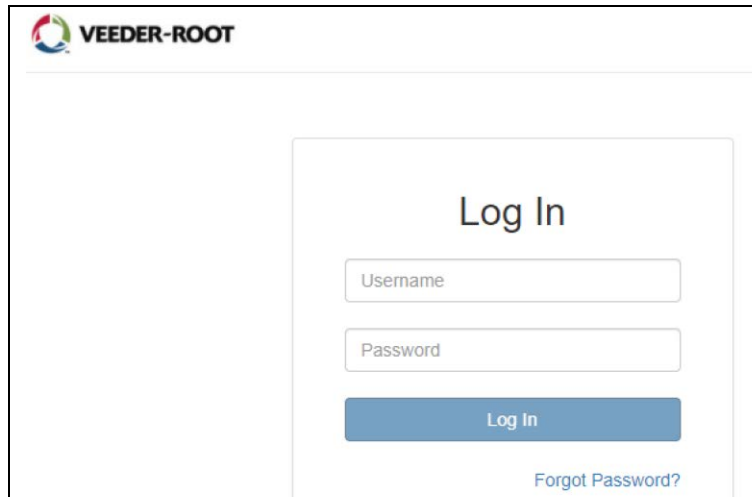


Figure 12. FieldServer Login

**NOTICE** 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.

**NOTICE** To create individual user logins, see “Change User Management Settings” on page 29.

## 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.

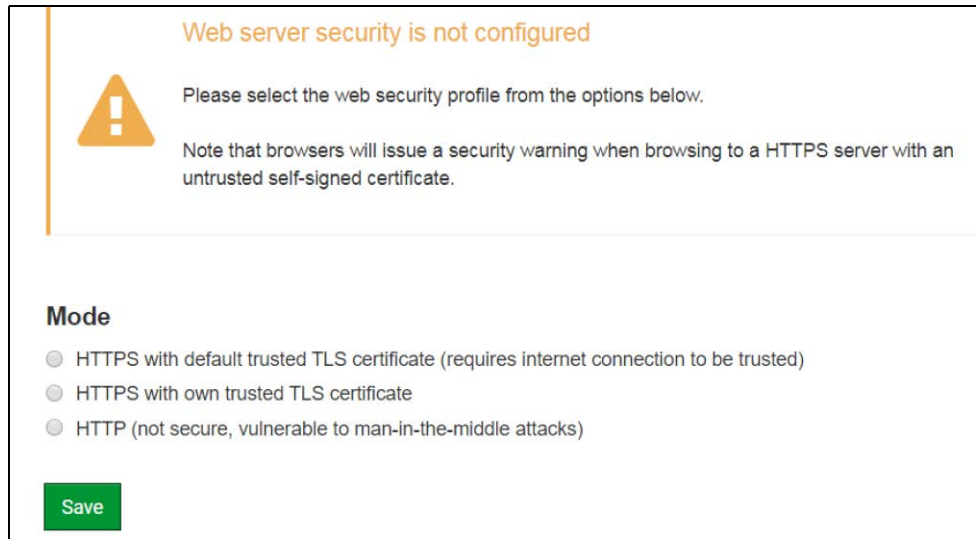


Figure 13. Security Mode Selection Screen

**NOTICE** Cookies are used for authentication.

**NOTICE** To change the web server security mode after initial setup, go to “Update Firmware” on page 25.

## 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 (see Figure 14).
- 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.

### Certificate

```

XzyMbQZFIRuJZJPe7CTHLcHOrHLowoUFoVTaBMYd4d6VGdNklKazByWKcNOL7mrX
A4lBAQBFM+IPvOx3T/47VEmaiXqE3bx3zEuBFJ6pWPlw7LHf2r2ZoHw+9xb+aNMU
dVyAelhBMTMsni2ERvQVp0xj3psSv2EJyKXS1bOYNRLsq7UzpwuAdT/Wy3o6vUM5
K+Cwf9qEoQ0LuxDZTIECt67MkcHMiuFi5pk7TRicHnQF/sfOAYOulduHOy9exlk9
FmHFVDIZt/cJUaF+e74EuSph+gEr0IQo2wvmhyc7L22UXse1NoOfU2Zg0Eu1VVtu
JRryaMWIRFEWuuzMGZtKFWVC+8q2JQsVcqiRWM7naoblLEhOCMH+sKHJMCxDoXGt
vtZjpZUoAL51YXxWSVcyZdGiAP5e
-----END CERTIFICATE-----

```

### Private Key

```

sHB0zZoHr4YQSDk2BbYVzzbl0LDuKtc8+JiO3ooGjoTuHnqkeAj/fKfbTAsKeAzw
gKQe+H5UQNK0bdvZfOJrm6daDK2vVdmR5k+jUUhEj5N49uplroB97MQgYotzgfT+
THlbpq5t1SIK617k04ObKmHF5l8fck+ru545sVmpeeZh0m5j5SURYAZMvbq5daCu
J4l5NlhbEvxRF4UK41ZDMCvujopCbkUWrb1a/3XXnDnM2K9xyz2wze998D6Wk46
+7aOFY9F+7j5ljmnkoS3GYtwCyH5jP+mPP1K6RnuiD019wwwGPb4dtN/RTnfd0eF
GYeVSkI9fxxkxDOFtdWRZbM/rPin4tmO1Xf8HqONVN1x/jaMynOXG4cukoi4+VO
u0rZaUEsIl2zNkfm7fAASm5NBWg202Cy9IAYnuujs3aALi5uGBeekA62oTMxlzx
-----END RSA PRIVATE KEY-----

```

### Private Key Passphrase

Specify if encrypted

Save

Figure 14. Security Mode Selection Screen - Certificate &amp; Private Key

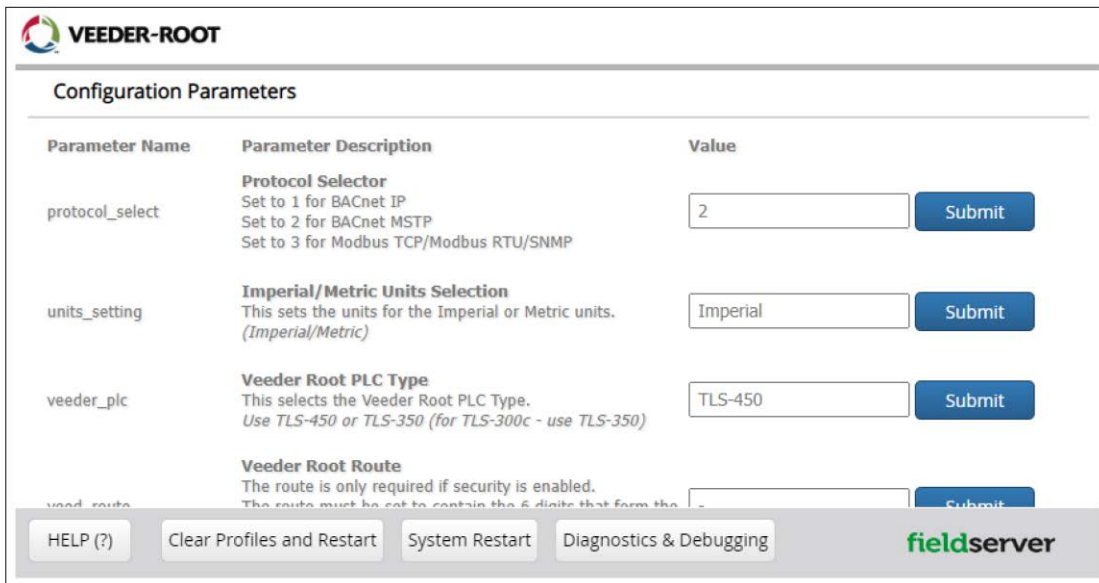
## HTTPS WITH DEFAULT UNTRUSTED SELF-SIGNED TLS CERTIFICATE OR HTTP WITH BUILT-IN PAYLOAD ENCRYPTION

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

## Configure the ProtoNode

### Select Field Protocol and Set Configuration Parameters

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



The screenshot shows the Veeder-Root Web Configurator interface. At the top is the Veeder-Root logo. Below it is a section titled "Configuration Parameters". This section contains a table with three columns: "Parameter Name", "Parameter Description", and "Value".

Parameter Name	Parameter Description	Value
protocol_select	<b>Protocol Selector</b> Set to 1 for BACnet IP Set to 2 for BACnet MSTP Set to 3 for Modbus TCP/Modbus RTU/SNMP	2 <input type="button" value="Submit"/>
units_setting	<b>Imperial/Metric Units Selection</b> This sets the units for the Imperial or Metric units. (Imperial/Metric)	Imperial <input type="button" value="Submit"/>
veeder_plc	<b>Veeder Root PLC Type</b> This selects the Veeder Root PLC Type. Use TLS-450 or TLS-350 (for TLS-300c - use TLS-350)	TLS-450 <input type="button" value="Submit"/>
veeder_route	<b>Veeder Root Route</b> The route is only required if security is enabled. The route must be set to contain the 6 digits that form the	<input type="text"/> <input type="button" value="Submit"/>

At the bottom of the interface, there is a row of buttons: "HELP (?)", "Clear Profiles and Restart", "System Restart", "Diagnostics & Debugging", and the "fieldserver" logo.

Figure 15. Web Configurator Showing Configuration Parameters

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


**NOTICE** Protocol specific parameters are only visible when the associated protocol is selected.

**NOTICE** If Modbus TCP/IP was selected and is used for the field protocol, skip "Setting ProtoNode Active Profiles" section below. 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.

## Setting ProtoNode 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.


**VEEDER-ROOT**

---

### Configuration Parameters

Parameter Name	Parameter Description	Value
protocol_select	<b>Protocol Selector</b> Set to 1 for BACnet IP Set to 2 for BACnet MSTP Set to 3 for Modbus TCP/Modbus RTU/SNMP	2 <input type="button" value="Submit"/>
units_setting	<b>Imperial/Metric Units Selection</b> This sets the units for the Imperial or Metric units. (Imperial/Metric)	Imperial <input type="button" value="Submit"/>
veeder_plc	<b>Veeder Root PLC Type</b> This selects the Veeder Root PLC Type. Use TLS-450 or TLS-350 (for TLS-300c - use TLS-350)	TLS-450 <input type="button" value="Submit"/>
veed_route	<b>Veeder Root Route</b> The route is only required if security is enabled. The route must be set to contain the 6 digits that form the security code. Example: 0.1.2.3.4.5	- <input type="button" value="Submit"/>
veed_baud_rate	<b>Veeder Root Baud Rate</b> This sets the Veeder Root baud rate. (9600/19200/38400/57600/115200)	9600 <input type="button" value="Submit"/>
veed_parity	<b>Veeder Root Parity</b> This sets the Veeder Root parity. (None/Even/Odd)	Odd <input type="button" value="Submit"/>
veed_data_bits	<b>Veeder Root Data Bits</b> This sets the Veeder Root data bits. (7 or 8)	7 <input type="button" value="Submit"/>
veed_stop_bits	<b>Veeder Root Stop Bits</b> This sets the Veeder Root stop bits. (1 or 2)	1 <input type="button" value="Submit"/>
bac_device_id	<b>BACnet Device Instance</b> This sets the BACnet device instance. (1 - 4194303)	50000 <input type="button" value="Submit"/>
bac_mac_addr	<b>BACnet MSTP Mac Address</b> This sets the BACnet MSTP MAC address. (1 - 127)	127 <input type="button" value="Submit"/>
bac_baud_rate	<b>BACnet MSTP Baud Rate</b> This sets the BACnet MSTP baud rate. (9600/19200/38400/76800)	38400 <input type="button" value="Submit"/>
bac_max_master	<b>BACnet MSTP Max Master</b> This sets the BACnet MSTP max master. (1 - 127)	127 <input type="button" value="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 <input type="button" value="Submit"/>

### Active profiles

Nr	Node ID	Current profile	Parameters
<input type="button" value="Add"/>			

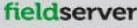


Figure 16. Web Configurator Showing no Active Profiles

- To add an active profile to support a device, click the Add button under the Active Profiles heading (see Figure 16). 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.

**NOTICE** The first entered Node-ID must be set to “1” and be followed by sequential values.

- Then enter the Address Parameter. The Address is used to specify the tank, sensor or input number. This information can be found in the Veeder-Root Panel Report.
- 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 17.

Nr	Node ID	Current profile	Parameters
1	1	BAC_IP_Tank	address : 1
2	2	BAC_IP_Tank	address : 2
3	3	BAC_IP_Tank	address : 4

Buttons: Add, Remove (x3), HELP (?), Clear Profiles and Restart, System Restart, Diagnostics & Debugging, fieldserver

Figure 17. Web Configurator Showing no Active Profiles

**NOTICE** The System and Unknown Type points are automatically configured therefore no profile is required. Refer to Tables A-1 and A-2 in Appendix A for a list of available points.

## Verify Device Communications

- If using a serial connection, check that the port R1 TX1 and RX1 LEDs are rapidly flashing. See “LED Diagnostics for Communications Between ProtoNode and Devices” on page 22 for additional LED information and images.
- Confirm the software shows good communications without errors (see “Viewing Diagnostic Information” on page 20).

## Ethernet Network: Setting IP Address for the Field Network

- Follow the steps outlined in “Login to the FieldServer” on page 10 to access the ProtoNode Web Configurator.
- To access the FS-GUI, click the “Diagnostics & Debugging” button at the bottom of the Web Configurator page.

Buttons: Add, Remove (x3), HELP (?), Clear Profiles and Restart, System Restart, Diagnostics & Debugging (highlighted), fieldserver

Figure 18. Diagnostics & Debugging Button

- From the FS-GUI landing page, click on “Setup” to expand the navigation tree and then select “Network Settings” to access the IP Settings menu. (Figure 23)

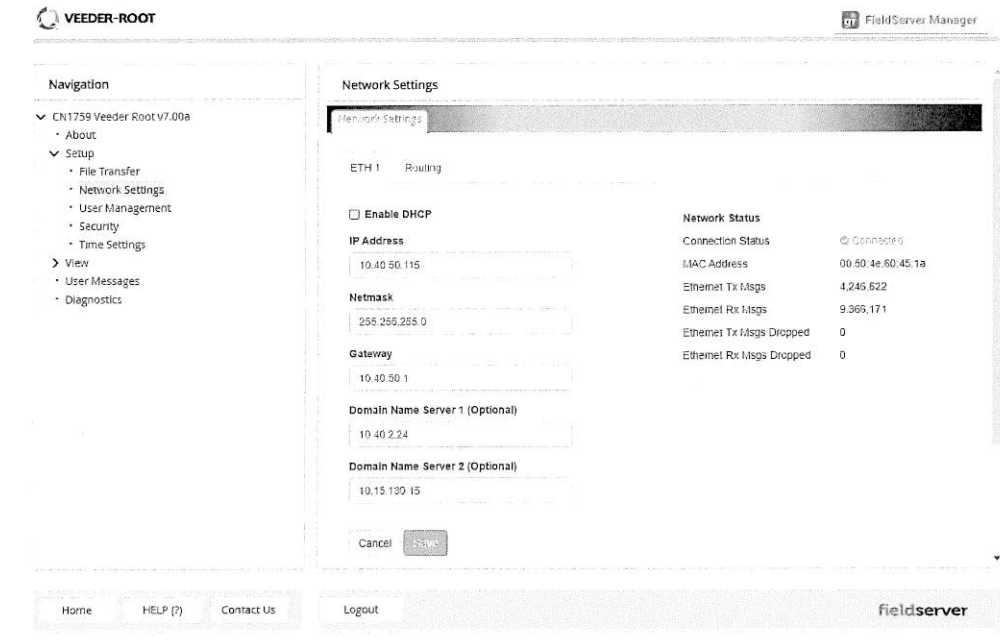


Figure 19. Changing IP Address via FS GUI

- 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.


**NOTICE** If connected to a router, set the Gateway to the same IP Address as the router.

- Click Save to record and activate the new IP Address.
- Connect the FieldServer to the local network or router.

**NOTICE** If the web page was open in a browser, the browser will need to be pointed to the new IP Address of the FieldServer before the web page will be accessible again.

- Unplug Ethernet cable from PC and connect it to the network switch or router.
- Record the IP Address assigned to the ProtoNode for future reference

**NOTICE** For Router settings go to “Routing Settings” on page 34

**NOTICE** The FieldServer Manager tab  FieldServer Manager (see upper right corner of browser in Figure 19) allows users to connect to the Grid, MSA Safety’s device cloud solution for IIoT. FieldServer Manager enables secure remote connection to field devices through a FieldServer and its local applications for configuration, management, maintenance. For more information about the FieldServer Manager, refer to the MSA Grid - FieldServer Manager Start-up Guide.

## **How to Start the Installation Over: Clearing Profiles**

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- Follow the steps outlined in “Login to the FieldServer” on page 10 to access the ProtoNode Web Configurator.
- At the bottom-left of the page, click the “Clear Profiles and Restart” button.
- Once restart is complete, all past profiles discovered and/or added via Web Configurator are deleted. The unit can now be reinstalled.



## Troubleshooting

### 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 (see Figure 8).
- 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.

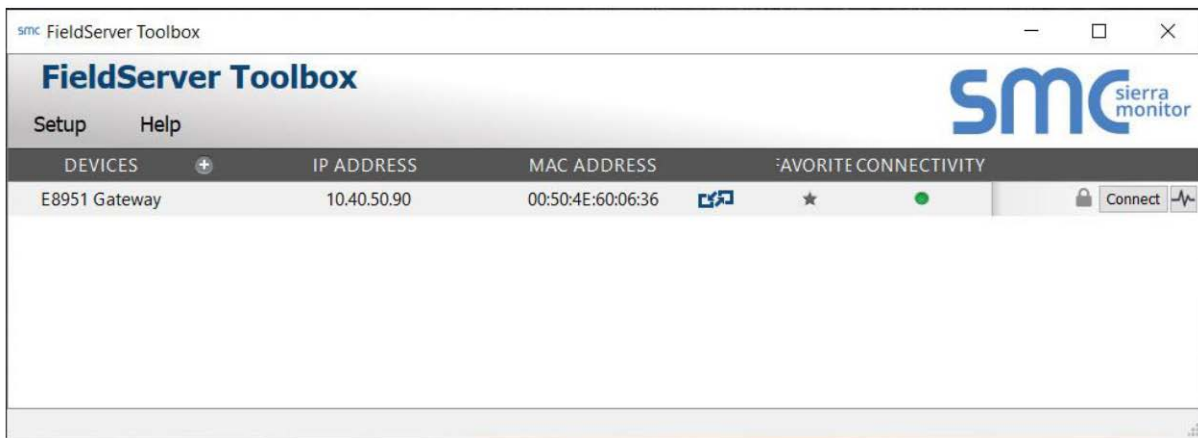


Figure 20. Checking for IP Address of the Desired Gateway

### Viewing Diagnostic Information

- Type the IP Address of the ProtoNode into the web browser or use the FieldServer Toolbox to connect to the ProtoNode.
- Click on Diagnostics and Debugging Button, then click on view, and then on connections.
- If there are any errors showing on the Connection page (see Figure 21), refer to “Checking Wiring and Settings” on page 21 for the relevant wiring and settings.

The screenshot shows the Veeder-Root FieldServer Manager interface. The navigation menu on the left includes options like 'About', 'Setup', 'View', 'Connections', 'Data Arrays', 'Nodes', 'Map Descriptors', 'User Messages', and 'Diagnostics'. The 'Connections' section is active, displaying a table with the following data:

Index	Name	Tx Msg	Rx Msg	Tx Char	Rx Char	Errors
0	R1 - Veeder	172	0	1,204	0	171
1	R2 - BACnet_MSTP	4	0	56	0	0

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

Figure 21. Error Messages Screen

## Checking Wiring and Settings

- No COMS on Veeder-Root Interface 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 the ProtoNode (see “LED Diagnostics for Communications Between ProtoNode and Devices” on page 22)
  - Check baud rate, parity, data bits, stop bits
  - Check device address
  - Verify wiring
  - Verify the device was listed in the Web Configurator (see “Setting ProtoNode Active Profiles” on page 16).
- Field COM problems:
  - Visual observations of LEDs on the ProtoNode (see “LED Diagnostics for Communications Between ProtoNode and Devices” on page 22)
  - Verify IP Address setting
  - Verify wiring

**NOTICE** If the problem persists, a Diagnostic Capture needs to be taken and sent to support. (See “Taking a FieldServer Diagnostic Capture” on page 23).

## LED Diagnostics for Communications Between ProtoNode and Devices

See Figure 22 below for ProtoNode LED Locations and Table 5 for LED descriptions.

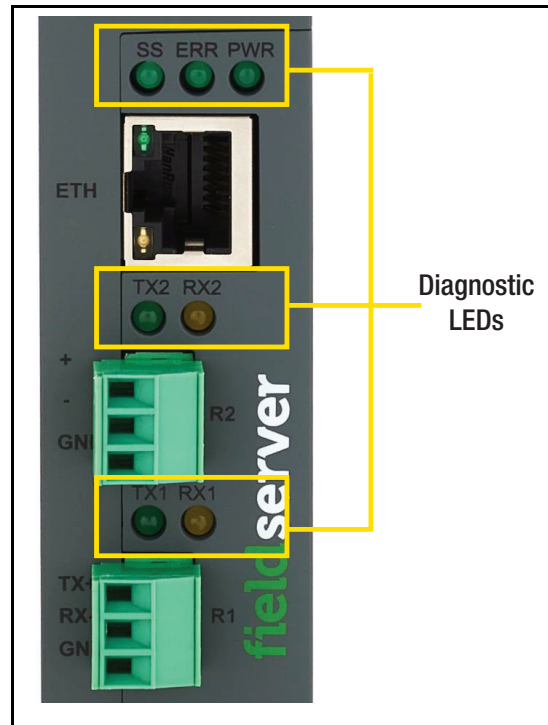


Figure 22. Diagnostic LEDs

Table 5. Diagnostic LED Descriptions


LED	Description
SS	The green SS LED will flash once a second to indicate that the bridge is in operation.
ERR	The green SYS ERR LED will go on solid indicating there is a system error. If this occurs, immediately report the related "system error" shown in the error screen of the FS-GUI interface to support for evaluation.
PWR	The power light should always show steady green when connected to a functioning power source.
RX	The yellow 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. RX1 applies to the R1 connection while RX2 applies to the R2 connection.
TX	The green TX LED will flash when a message is sent on the serial port on the 3-pin connector. If the serial port is not used, this LED is non-operational. TX1 applies to the R1 connection while TX2 applies to the R2 connection.

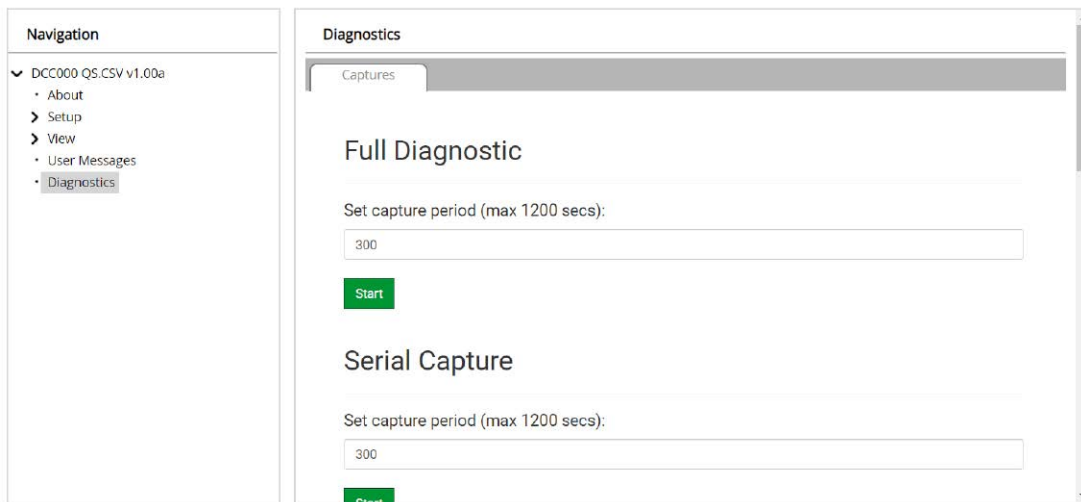
## Taking a FieldServer Diagnostic Capture

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.

**NOTICE** The MIB file will be saved when a capture is performed.

- 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 (Figure 23).



**Figure 23. Diagnostic Capture Screen**

- Go to Full Diagnostic and select the capture period, e.g., 300 seconds (see Figure 24).
- 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.

### Full Diagnostic

Set capture period (max 1200 secs):

100% Complete

Start
Download

**Figure 24. Full Diagnostic Capture Entry**

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

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

## Factory Reset Instructions

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

## Internet Browsers Supported

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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

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

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

## Additional Information

### Update Firmware

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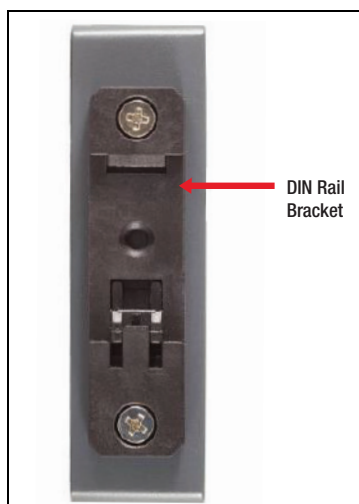
To load a new version of the firmware, follow these instructions:

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.
  - a. Default IP Address is 192.168.1.24
  - b. Use the FS Toolbox utility if the IP Address is unknown (see “Lost or Incorrect IP Address” on page 20)
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 1.
6. Click on the orange “Submit” button.
7. When the download is complete, click on the “System Restart” button

### Mounting

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The ProtoNode can be mounted using the DIN rail mounting bracket on the back of the unit (see Figure 25).

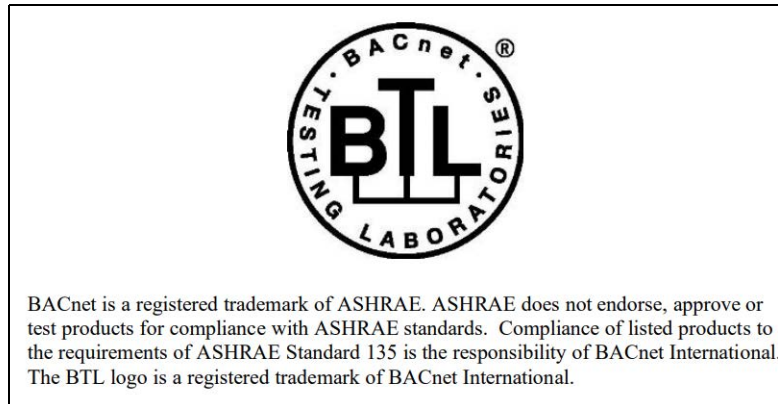


**Figure 25. ProtoNode DIN Rail Mount**

## Certification

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The BTL Mark on ProtoNode 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.



**Figure 26. BTL Mark – BACnet® Testing Laboratory**

**NOTICE** BACnet is a registered trademark of ASHRAE

Go to <https://BACnetInternational.net> for more information about the BACnet Testing Laboratory. Click [here](#) for the BACnet PIC Statement.

## PHYSICAL DIMENSION DRAWING

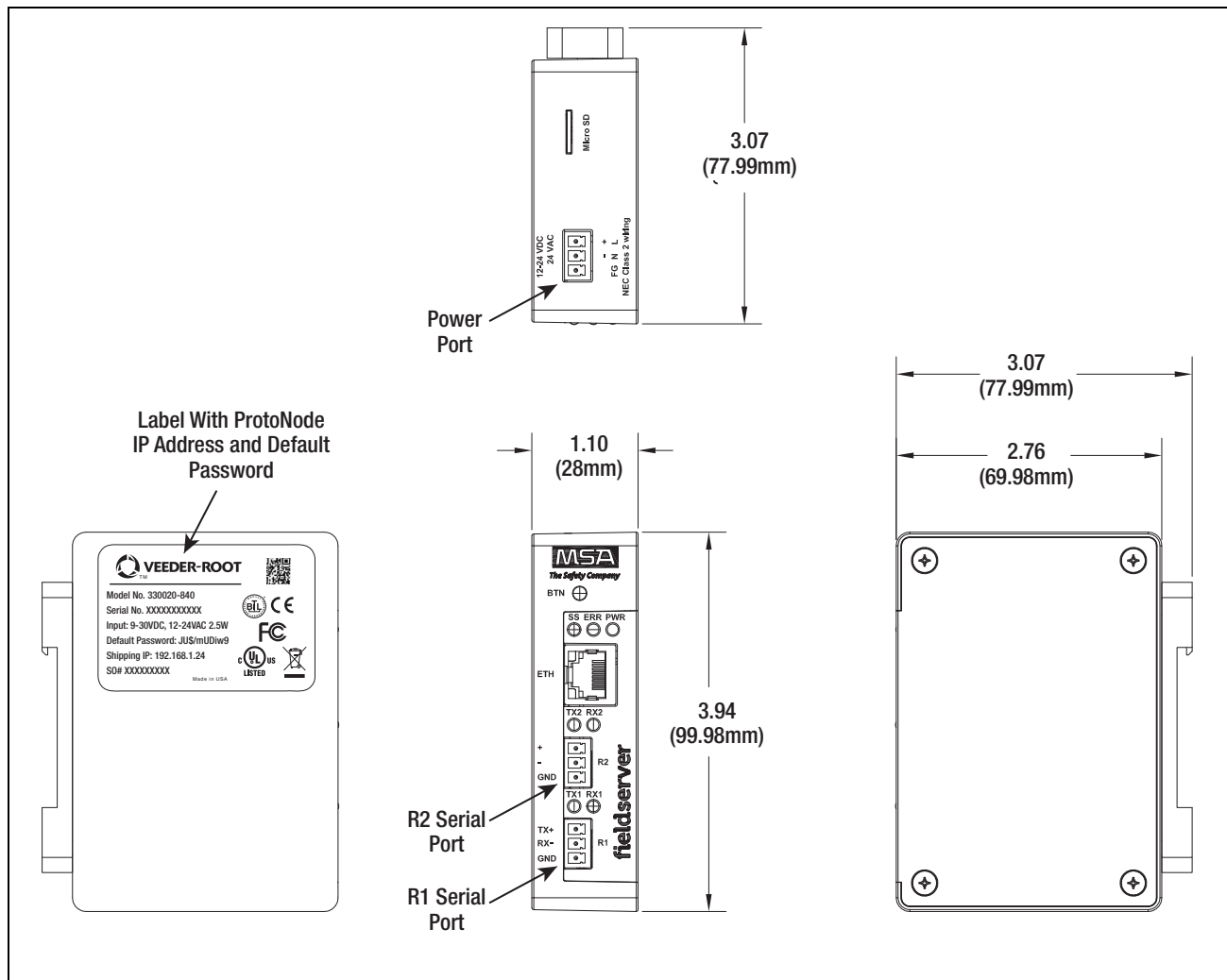


Figure 27. ProtoNode FPC N54 Dimensions



## Change Web Server Security Settings After Initial Setup

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

- From the FS-GUI page, click **Setup** in the Navigation panel (see Figure 28).

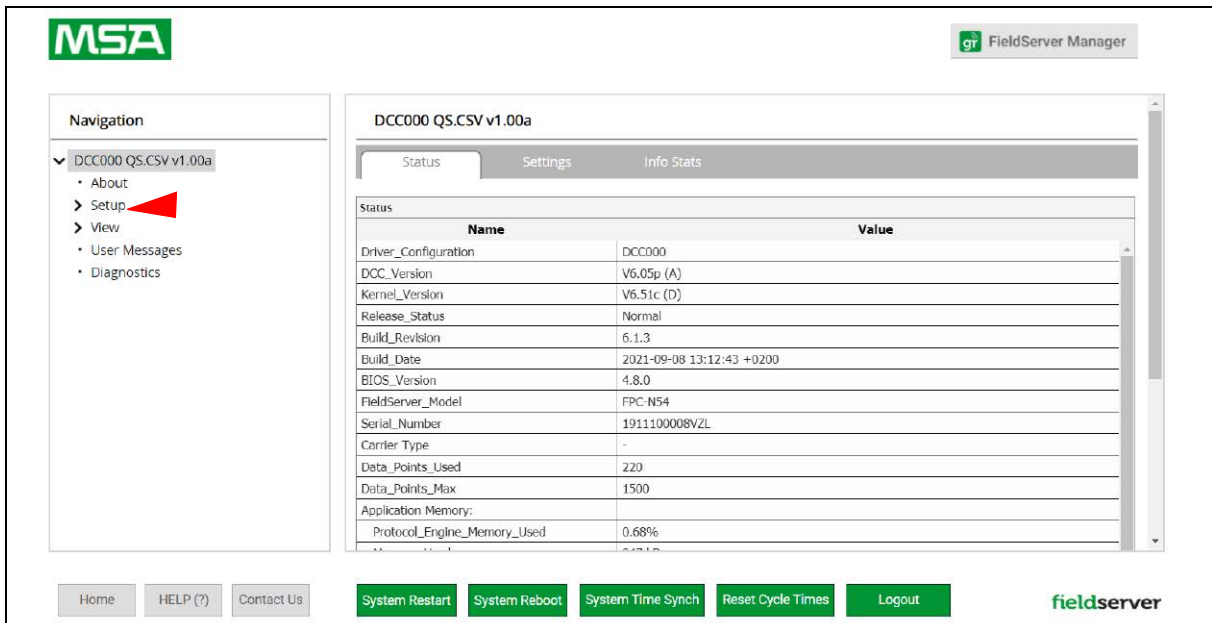


Figure 28. FS-GUI Page

## CHANGE SECURITY MODE

- Click **Security** under Setup in the Navigation panel.

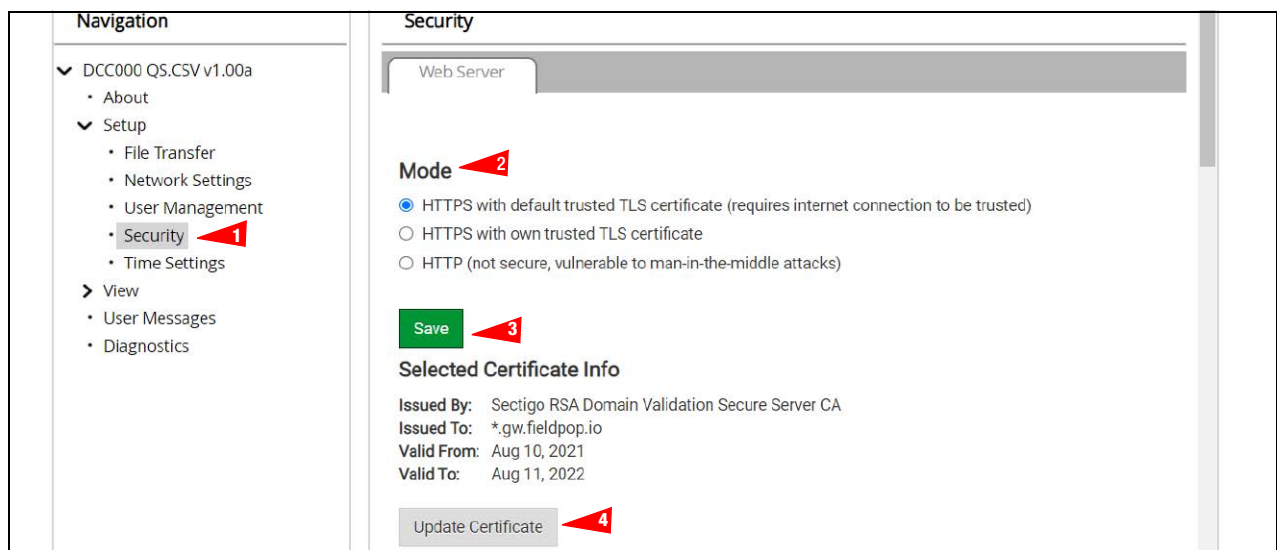


Figure 29. FS-GUI Security Setup

- Click the Mode desired. If HTTPS with own trusted TLS certificate is selected, follow instructions in “HTTPS with Own Trusted TLS Certificate” on page 13. Click the **Save** button.

## EDIT THE CERTIFICATE LOADED ONTO THE FIELDSEVER

**NOTICE** 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 (Item 1 in Figure 29).
- Click the **Update Certificate** button (Item 4 in Figure 29) to open the certificate and key fields.
- Edit the loaded certificate or key text as needed.
- Click **Save** (Item 3 in Figure 29).

## Change User Management Settings

- From the FS-GUI page, click **Setup** (see Figure 28) in the Navigation panel.
- Click **User Management** in the Navigation panel.

**NOTICE** If the passwords are lost, the unit can be reset to factory settings to reinstate the default unique password on the label. For ProtoNode, ProtoCessor or ProtoCarrier recovery instructions, see the [FieldServer Recovery Instructions document](#). For ProtoNode FPC-N54, ProtoNode FPC-N64 or ProtoAir recovery instructions, see the [FieldServer Next Gen Recovery document](#). If the default unique password is lost, then the unit must be mailed back to the factory. Default password is locked on the device.

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

- Check that the **Users** tab is selected.

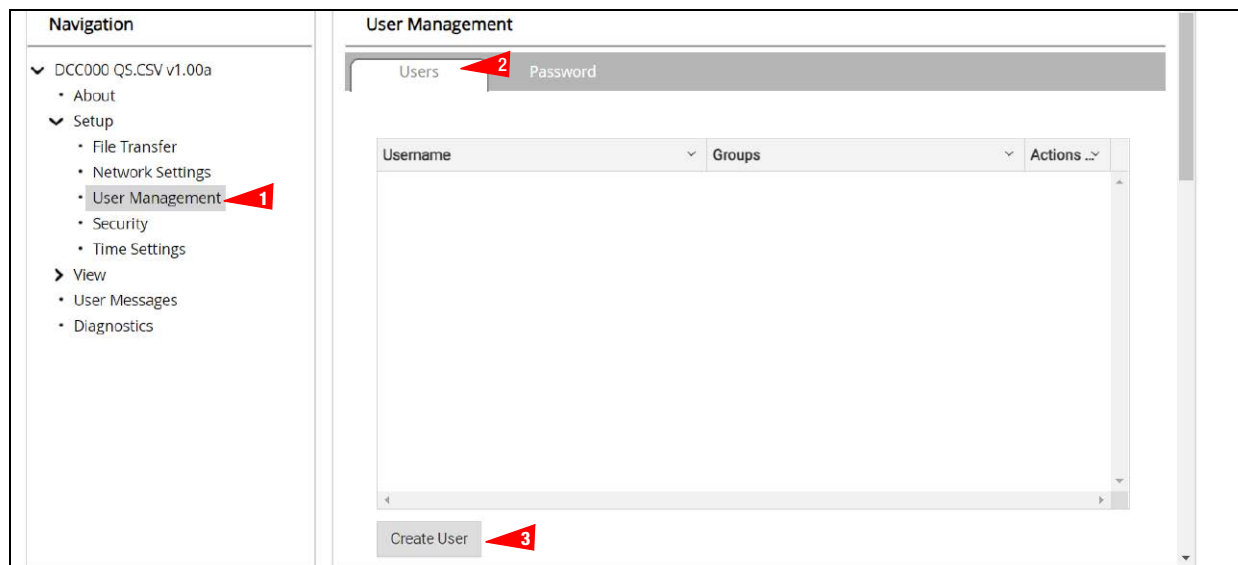


Figure 30. FS-GUI User Management

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.

## CREATE USERS

- Click the **Create User** button (Item 3 in Figure 30).

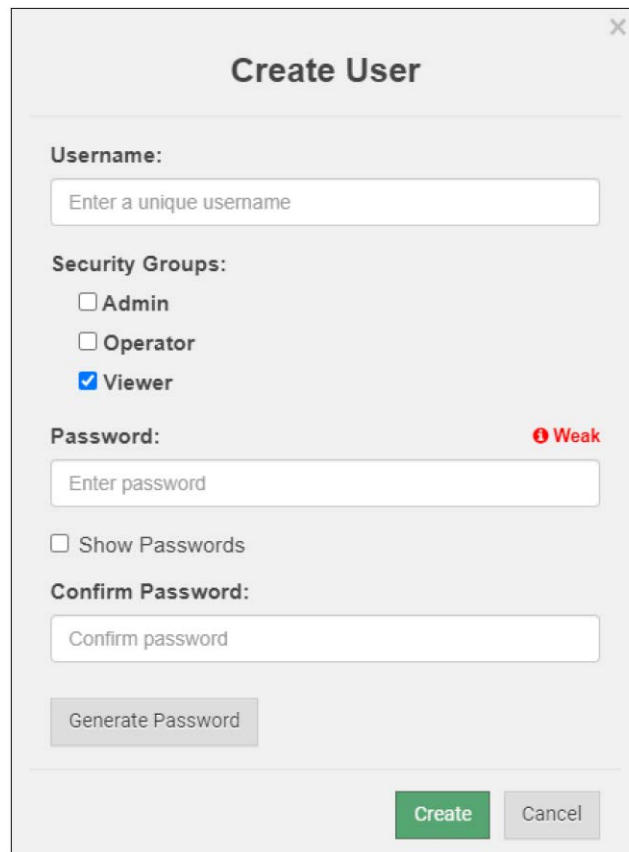
A screenshot of a 'Create User' dialog box. The dialog has a title bar with a close button (X). Inside, the title 'Create User' is centered at the top. Below the title, there are four sections: 'Username:' with a text input field containing the placeholder 'Enter a unique username'; 'Security Groups:' with three radio button options: 'Admin', 'Operator', and 'Viewer' (which is selected with a blue checkmark); 'Password:' with a text input field containing the placeholder 'Enter password' and a red indicator 'Weak' to its right; and 'Confirm Password:' with a text input field containing the placeholder 'Confirm password'. Below these fields is a 'Generate Password' button. At the bottom right of the dialog are two buttons: 'Create' (green) and 'Cancel' (gray).

Figure 31. Create User Window

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

**NOTICE** 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**.

## EDIT USERS

Click the pencil icon next to the desired user to open the User Edit window (Item 1 in Figure 32).

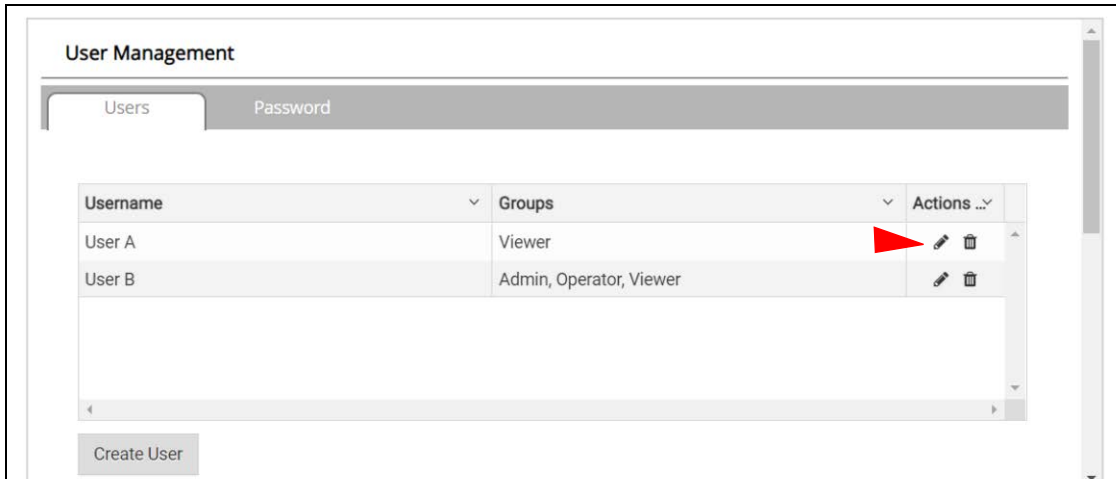


Figure 32. Setup Users

- Once the User Edit window opens (Figure 33), change the User Security Group and/or Password as needed.

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

- Username:** A text field containing 'User A'.
- Security Groups:** A list of checkboxes: 'Admin' (unchecked), 'Operator' (unchecked), and 'Viewer' (checked).
- Password:** A text field containing 'Optional'.
- Show passwords:** An unchecked checkbox.
- Confirm Password:** A text field containing 'Optional'.
- Generate Password:** A button.
- Confirm:** A green button.
- Cancel:** A grey button.

Figure 33. Edit User Window

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

## DELETE USERS

Click the **Trash Can** icon next to the desired user to delete the entry (see Figure 34).

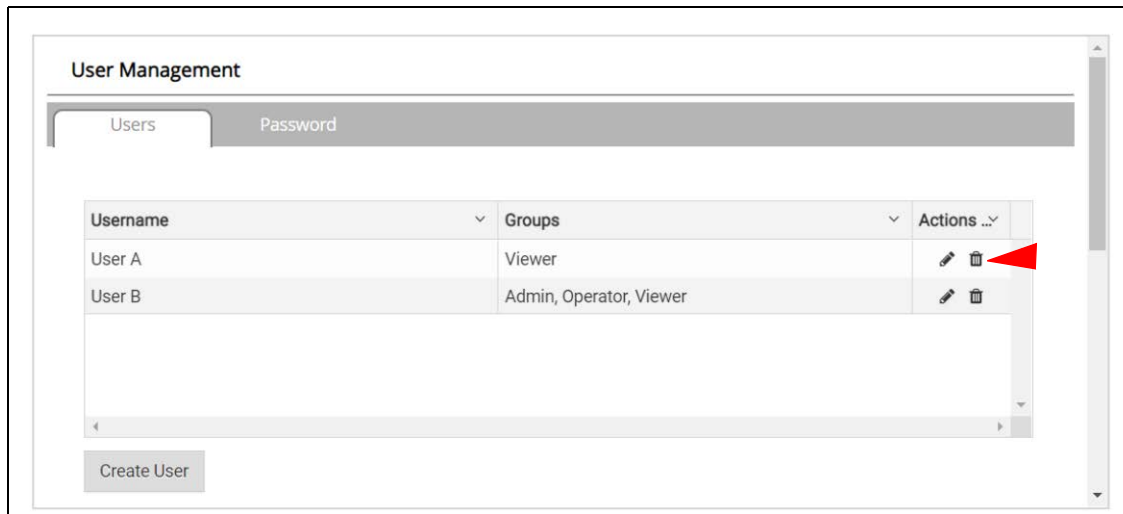


Figure 34. Setup Users

- When the warning message appears, click **Confirm** (see Figure 35).

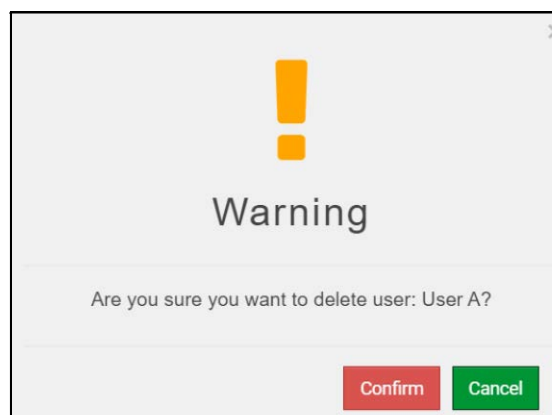


Figure 35. Delete User Warning

## CHANGE FIELDSEVER PASSWORD

- Click the Password tab on the FS-GUI User Management screen (see Figure 36).

The screenshot displays the FS-GUI User Management interface. On the left is a 'Navigation' sidebar with a tree structure: 'DCC000 QS.CSV v1.00a' (expanded) containing 'About', 'Setup' (expanded), 'User Management' (highlighted), 'Security', and 'Time Settings'; 'View' (expanded) containing 'User Messages' and 'Diagnostics'. The main area is titled 'User Management' and has two tabs: 'Users' and 'Password' (selected). The 'Password' tab contains a 'Password:' label with a red 'Weak' indicator, a text input field with placeholder 'Enter password', a 'Show passwords' checkbox, a 'Confirm Password:' label, another text input field with placeholder 'Confirm password', a 'Generate Password' button, and a green 'Confirm' button at the bottom right.

Figure 36. FieldServer Password Update via FS GUI

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

**NOTICE** 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 **Confirm**.
- Once the Success message appears, click **OK**.

## Routing Settings

- In the Navigation panel of the FS-GUI User Management screen (see Figure 36), click on **Network Settings** (see Figure 37).

**Network Settings**

Network Settings

ETH Routing

Set up the IP routing rules of your FieldServer for internet access and access to other networks.

If you want to reach another device that is not connected to the local network, you can add a rule to determine on which gateway the device must be routed to.

Interface	Destination Network	Netmask	Gateway IP Address	Priority ?
ETH	Default	-	10.40.50.1	255
ETH	10.40.50.10	255.255.255.255	10.40.50.1	254

+ Add Rule

Cancel Save

There are unsaved settings

**Figure 37. Routing Settings**

- 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.

## Specifications



Table 6. Specifications

<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 (Tx+ / Rx- / gnd) One 3-pin Phoenix connector with: Power port (+ / - / Frame-gnd) One Ethernet 10/100 BaseT port
<b>Power Requirements</b>	Input Voltage: 9-30VDC or 24VAC Current draw: 24VAC 0.125A Max Power: 3 Watts 9-30VDC .25A @12VDC
<b>Approvals</b>	CE and FCC part 15 B, UL 60950-1, CAN/CSA C22.2, BTL marked, WEEE compliant, RoHS3 compliant, Modbus and DNP 3.0 conformance tested, REACH compliant, UKCA compliant
<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

## Compliance with UL Regulations

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

- 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 ProtoNode
- 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.



## 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.

## Appendix A: Vendor Information – Veeder-Root

The ProtoNode provides capability to support any Veeder-Root serial command by defining customized map descriptors for any command or data type. Refer to Appendix A-1 of the 577014-XXX Veeder Root Driver Manual.

Refer to Appendix A-10 of the 577014-XXX Veeder Root Driver Manual for instructions on using a Security Code for the TLS communications port.

### Interface To BACnet & Modbus Tables

**NOTICE** An X in the BACnet Object ID or Modbus Register represents a one- or two-digit number that equals the Node ID. In the Liquid Sensor X Fuel Alarm examples below, with a Node ID of 3, the X will be 3; for a Node ID of 11, the X will be 11.

Point Name	Node ID	BACnet Object ID (X002)	Modbus Register (10X02)	SNMP OID (1.3.6.1.4.1.6347.0.XX1.2.0)
Sensor X Fuel Alarm	3	3002	10302	1.3.6.1.4.1.6347.0.31.2.0
Sensor X Fuel Alarm	11	11002	101102	1.3.6.1.4.1.6347.0.111.2.0

Table A-1. System Veeder-Root Interface Mappings to BACnet, Modbus and SNMP

Point Name	BACnet Object Type	BACnet Object ID	Modbus Register	SNMP OID
Unknown Device Address	AI	1	30001	1.3.6.1.4.1.6347.0.1.1.0
Unknown Alarm Category	AI	2	30002	1.3.6.1.4.1.6347.0.1.2.0
Unknown Alarm Type	AI	3	30003	1.3.6.1.4.1.6347.0.1.3.0
Printer out of Paper	BI	1	10001	1.3.6.1.4.1.6347.0.1.4.0
Printer Error	BI	2	10002	1.3.6.1.4.1.6347.0.1.5.0
EEPROM Configuration Error	BI	3	10003	1.3.6.1.4.1.6347.0.1.6.0
Battery Off	BI	4	10004	1.3.6.1.4.1.6347.0.1.7.0
Too Many Tanks	BI	5	10005	1.3.6.1.4.1.6347.0.1.8.0
System Security Warning	BI	6	10006	1.3.6.1.4.1.6347.0.1.9.0
ROM Revision Warning	BI	7	10007	1.3.6.1.4.1.6347.0.1.10.0
Remote Display Communications Error	BI	8	10008	1.3.6.1.4.1.6347.0.1.11.0
Autodial Error	BI	9	10009	1.3.6.1.4.1.6347.0.1.12.0
Software Module Warning	BI	10	10010	1.3.6.1.4.1.6347.0.1.13.0
Tank Test Shutdown Warning	BI	11	10011	1.3.6.1.4.1.6347.0.1.14.0
Protective Cover Alarm	BI	12	10012	1.3.6.1.4.1.6347.0.1.15.0
BIR Shift Close Pending	BI	13	10013	1.3.6.1.4.1.6347.0.1.16.0
BIR Daily Close Pending	BI	14	10014	1.3.6.1.4.1.6347.0.1.17.0
PC(H8) Revision Warning	BI	15	10015	1.3.6.1.4.1.6347.0.1.18.0
System Self Test Error	BI	16	10016	1.3.6.1.4.1.6347.0.1.19.0
System Clock Incorrect Warning	BI	17	10017	1.3.6.1.4.1.6347.0.1.20.0
System Device Poll Timeout	BI	18	10018	1.3.6.1.4.1.6347.0.1.21.0
Maintenance Tracker NVMem	BI	19	10019	1.3.6.1.4.1.6347.0.1.22.0
Maintenance Tracker Communication Module	BI	20	10020	1.3.6.1.4.1.6347.0.1.23.0
Database Error	BI	21	10021	1.3.6.1.4.1.6347.0.1.24.0
File System Error	BI	22	10022	1.3.6.1.4.1.6347.0.1.25.0
BIR Status Warning	BI	23	10023	1.3.6.1.4.1.6347.0.1.26.0
VR Bus Power Outage Warning	BI	24	10024	1.3.6.1.4.1.6347.0.1.27.0
Software Upgrade Failure Alarm	BI	25	10025	1.3.6.1.4.1.6347.0.1.28.0
iButton Fault Warning	BI	26	10026	1.3.6.1.4.1.6347.0.1.29.0
iButton Fault Alarm	BI	27	10027	1.3.6.1.4.1.6347.0.1.30.0
Version Upgrade Available	BI	28	10028	1.3.6.1.4.1.6347.0.1.31.0
Expansion Box Unsupported	BI	29	10029	1.3.6.1.4.1.6347.0.1.32.0

Table A-2. Unknown\_Type Veeder-Root Interface Mappings to BACnet, Modbus and SNMP

Point Name	BACnet Object Type	BACnet Object ID	Modbus Register	SNMP OID
Unknown Device Address	AI	1	30001	1.3.6.1.4.1.6347.0.XX1.1.0
Unknown Alarm Category	AI	2	30002	1.3.6.1.4.1.6347.0.XX1.2.0
Unknown Alarm Type	AI	3	30003	1.3.6.1.4.1.6347.0.XX1.3.0

Table A-3. Tank Veeder-Root Interface Mappings to BACnet, Modbus and SNMP

Point Name	BACnet Object Type	BACnet Object ID	Modbus Register	SNMP OID
Tank X Inventory Volume	AI	X001	30X01/30X02 (FLOAT)	1.3.6.1.4.1.6347.0.XX1.1.0
Tank X Inventory TC Volume	AI	X002	30X03/30X04 (FLOAT)	1.3.6.1.4.1.6347.0.XX1.2.0
Tank X Inventory Ullage	AI	X003	30X05/30X06 (FLOAT)	1.3.6.1.4.1.6347.0.XX1.3.0
Tank X Inventory Height	AI	X004	30X07/30X08 (FLOAT)	1.3.6.1.4.1.6347.0.XX1.4.0
Tank X Inventory Water	AI	X005	30X09/30X10 (FLOAT)	1.3.6.1.4.1.6347.0.XX1.5.0
Tank X Inventory Temperature	AI	X006	30X11/30X12 (FLOAT)	1.3.6.1.4.1.6347.0.XX1.6.0
Tank X Inventory Water Volume	AI	X007	30X13/30X14 (FLOAT)	1.3.6.1.4.1.6347.0.XX1.7.0
Tank X Delivery Product Code	AI	X008	30X15/30X16 (FLOAT)	1.3.6.1.4.1.6347.0.XX1.8.0
Tank X Delivery Number of Deliveries	AI	X009	30X17/30X18 (FLOAT)	1.3.6.1.4.1.6347.0.XX1.9.0
Tank X Delivery Start Time from 01/01/1970	AI	X010	30X19/30X20 (FLOAT)	1.3.6.1.4.1.6347.0.XX1.10.0
Tank X Delivery Stop Time from 01/01/1970	AI	X011	30X21/30X22 (FLOAT)	1.3.6.1.4.1.6347.0.XX1.11.0
Tank X Delivery Starting Volume	AI	X012	30X23/30X24 (FLOAT)	1.3.6.1.4.1.6347.0.XX1.12.0
Tank X Delivery Starting TC Volume	AI	X013	30X25/30X26 (FLOAT)	1.3.6.1.4.1.6347.0.XX1.13.0
Tank X Delivery Starting Water	AI	X014	30X27/30X28 (FLOAT)	1.3.6.1.4.1.6347.0.XX1.14.0
Tank X Delivery Starting Temp	AI	X015	30X29/30X30 (FLOAT)	1.3.6.1.4.1.6347.0.XX1.15.0
Tank X Delivery Ending Volume	AI	X016	30X31/30X32 (FLOAT)	1.3.6.1.4.1.6347.0.XX1.16.0
Tank X Delivery Ending TC Volume	AI	X017	30X33/30X34 (FLOAT)	1.3.6.1.4.1.6347.0.XX1.17.0
Tank X Delivery Ending Water	AI	X018	30X35/30X36 (FLOAT)	1.3.6.1.4.1.6347.0.XX1.18.0
Tank X Delivery Ending Temp	AI	X019	30X37/30X38 (FLOAT)	1.3.6.1.4.1.6347.0.XX1.19.0
Tank X Delivery Starting Height	AI	X020	30X39/30X40 (FLOAT)	1.3.6.1.4.1.6347.0.XX1.20.0
Tank X Delivery Ending Height	AI	X021	30X41/30X42 (FLOAT)	1.3.6.1.4.1.6347.0.XX1.21.0
Tank X Inventory User Ullage	AI	X022	30X43/30X44 (FLOAT)	1.3.6.1.4.1.6347.0.XX1.22.0
Tank X Tank Setup Warning	BI	X001	10X01	1.3.6.1.4.1.6347.0.XX1.23.0
Tank X Tank Leak Alarm	BI	X002	10X02	1.3.6.1.4.1.6347.0.XX1.24.0
Tank X High Water Alarm	BI	X003	10X03	1.3.6.1.4.1.6347.0.XX1.25.0
Tank X Overfill Alarm	BI	X004	10X04	1.3.6.1.4.1.6347.0.XX1.26.0
Tank X Low Limit Alarm	BI	X005	10X05	1.3.6.1.4.1.6347.0.XX1.27.0
Tank X Sudden Loss Alarm	BI	X006	10X06	1.3.6.1.4.1.6347.0.XX1.28.0
Tank X High Limit Alarm	BI	X007	10X07	1.3.6.1.4.1.6347.0.XX1.29.0
Tank X Invalid Height Alarm	BI	X008	10X08	1.3.6.1.4.1.6347.0.XX1.30.0
Tank X Probe Out Alarm	BI	X009	10X09	1.3.6.1.4.1.6347.0.XX1.31.0
Tank X High Water Alarm	BI	X010	10X10	1.3.6.1.4.1.6347.0.XX1.32.0
Tank X Delivery Needed	BI	X011	10X11	1.3.6.1.4.1.6347.0.XX1.33.0
Tank X Maximum Level Alarm	BI	X012	10X12	1.3.6.1.4.1.6347.0.XX1.34.0
Tank X Gross Leak Test Alarm	BI	X013	10X13	1.3.6.1.4.1.6347.0.XX1.35.0
Tank X Periodic Leak Test Alarm	BI	X014	10X14	1.3.6.1.4.1.6347.0.XX1.36.0
Tank X Annual Leak Test Alarm	BI	X015	10X15	1.3.6.1.4.1.6347.0.XX1.37.0
Tank X Periodic Test Warning	BI	X016	10X16	1.3.6.1.4.1.6347.0.XX1.38.0
Tank X Annual Test Warning	BI	X017	10X17	1.3.6.1.4.1.6347.0.XX1.39.0
Tank X Periodic Test Alarm	BI	X018	10X18	1.3.6.1.4.1.6347.0.XX1.40.0
Tank X Annual Test Alarm	BI	X019	10X19	1.3.6.1.4.1.6347.0.XX1.41.0
Tank X Leak Test Active	BI	X020	10X20	1.3.6.1.4.1.6347.0.XX1.42.0
Tank X No CSLD Idle Time Warning	BI	X021	10X21	1.3.6.1.4.1.6347.0.XX1.43.0
Tank X Siphon Break Active Warning	BI	X022	10X22	1.3.6.1.4.1.6347.0.XX1.44.0
Tank X CSLD Rate Increase Warning	BI	X023	10X23	1.3.6.1.4.1.6347.0.XX1.45.0
Tank X AccuChart Calibration Warning	BI	X024	10X24	1.3.6.1.4.1.6347.0.XX1.46.0
Tank X HRM Reconciliation Warning	BI	X025	10X25	1.3.6.1.4.1.6347.0.XX1.47.0
Tank X HRM Reconciliation Alarm	BI	X026	10X26	1.3.6.1.4.1.6347.0.XX1.48.0
Tank X Cold Temperature Warning	BI	X027	10X27	1.3.6.1.4.1.6347.0.XX1.49.0
Tank X Missing Delivery Ticket Warning	BI	X028	10X28	1.3.6.1.4.1.6347.0.XX1.50.0
Tank X Gross Leak Alarm	BI	X029	10X29	1.3.6.1.4.1.6347.0.XX1.51.0
Tank X Delivery Density Warning	BI	X030	10X30	1.3.6.1.4.1.6347.0.XX1.52.0
Tank X Density warning	BI	X031	10X31	1.3.6.1.4.1.6347.0.XX1.53.0
Tank X Fuel Quality Alarm	BI	X032	10X32	1.3.6.1.4.1.6347.0.XX1.54.0
Tank X Tank High Temperature Warning	BI	x033	10X33	1.3.6.1.4.1.6347.0.XX1.55.0
Tank X Tank Low Temperature Warning	BI	x034	10X34	1.3.6.1.4.1.6347.0.XX1.56.0
Tank X Density Offset Warning	BI	x035	10X35	1.3.6.1.4.1.6347.0.XX1.57.0

**Table A-4. Liquid\_Sensor Veeder-Root Interface Mappings to BACnet, Modbus and SNMP**

Point Name	BACnet Object Type	BACnet Object ID	Modbus Register	SNMP OID
Sensor X Setup Data Warning	BI	X001	10X01	1.3.6.1.4.1.6347.0.XX1.1.0
Sensor X Fuel Alarm	BI	X002	10X02	1.3.6.1.4.1.6347.0.XX1.2.0
Sensor X Out Alarm	BI	X003	10X03	1.3.6.1.4.1.6347.0.XX1.3.0
Sensor X Short Alarm	BI	X004	10X04	1.3.6.1.4.1.6347.0.XX1.4.0
Sensor X Water Alarm	BI	X005	10X05	1.3.6.1.4.1.6347.0.XX1.5.0
Sensor X Water Out Alarm	BI	X006	10X06	1.3.6.1.4.1.6347.0.XX1.6.0
Sensor X High Liquid Alarm	BI	X007	10X07	1.3.6.1.4.1.6347.0.XX1.7.0
Sensor X Low Liquid Alarm	BI	X008	10X08	1.3.6.1.4.1.6347.0.XX1.8.0
Sensor X Liquid Warning	BI	X009	10X09	1.3.6.1.4.1.6347.0.XX1.9.0

**Table A-5. Input Veeder-Root Interface to BACnet, Modbus and SNMP**

Point Name	BACnet Object Type	BACnet Object ID	Modbus Register	SNMP OID
Input X Input Setup Data Warning	BI	X001	10X01	1.3.6.1.4.1.6347.0.XX1.1.0
Input X Input Normal	BI	X002	10X02	1.3.6.1.4.1.6347.0.XX1.2.0
Input X Input Alarm	BI	X003	10X03	1.3.6.1.4.1.6347.0.XX1.3.0
Input X Generator Off	BI	X004	10X04	1.3.6.1.4.1.6347.0.XX1.4.0
Input X Generator On	BI	X005	10X05	1.3.6.1.4.1.6347.0.XX1.5.0
Input X Input Out Alarm	BI	X006	10X06	1.3.6.1.4.1.6347.0.XX1.6.0

**Table A-6. Type\_A\_Sensor Veeder-Root Interface to BACnet, Modbus and SNMP**

Point Name	BACnet Object Type	BACnet Object ID	Modbus Register	SNMP OID
Type-A Sensor X Setup Data Warning	BI	X001	10X01	1.3.6.1.4.1.6347.0.XX1.1.0
Type-A Sensor X Fuel Alarm	BI	X002	10X02	1.3.6.1.4.1.6347.0.XX1.2.0
Type-A Sensor X Out Alarm	BI	X003	10X03	1.3.6.1.4.1.6347.0.XX1.3.0
Type-A Sensor X Short Alarm	BI	X004	10X04	1.3.6.1.4.1.6347.0.XX1.4.0
Type-A Sensor X Water Alarm	BI	X005	10X05	1.3.6.1.4.1.6347.0.XX1.5.0

**Table A-7. Type\_B\_Sensor Veeder-Root Interface to BACnet, Modbus and SNMP**

Point Name	BACnet Object Type	BACnet Object ID	Modbus Register	SNMP OID
Type-B Sensor X Setup Data Warning	BI	X001	10X01	1.3.6.1.4.1.6347.0.XX1.1.0
Type-B Sensor X Fuel Alarm	BI	X002	10X02	1.3.6.1.4.1.6347.0.XX1.2.0
Type-B Sensor X Out Alarm	BI	X003	10X03	1.3.6.1.4.1.6347.0.XX1.3.0
Type-B Sensor X Short Alarm	BI	X004	10X04	1.3.6.1.4.1.6347.0.XX1.4.0
Type-B Sensor X High Liquid Alarm	BI	X005	10X05	1.3.6.1.4.1.6347.0.XX1.5.0
Type-B Sensor X Liquid Warning	BI	X006	10X06	1.3.6.1.4.1.6347.0.XX1.6.0

**Table A-8. Printer Veeder-Root Interface to BACnet, Modbus and SNMP**

Point Name	BACnet Object Type	BACnet Object ID	Modbus Register	SNMP OID
Printer X Out of Paper	BI	X001	10X01	1.3.6.1.4.1.6347.0.XX1.1.0
Printer X Error	BI	X002	10X02	1.3.6.1.4.1.6347.0.XX1.2.0

**Table A-9. VVapor\_Sensor Veeder-Root Interface to BACnet, Modbus and SNMP**

Point Name	BACnet Object Type	BACnet Object ID	Modbus Register	SNMP OID
Vapor Sensor X Setup Data Warning	BI	X001	10X01	1.3.6.1.4.1.6347.0.XX1.1.0
Vapor Sensor X Fuel Alarm	BI	X002	10X02	1.3.6.1.4.1.6347.0.XX1.2.0
Vapor Sensor X Out Alarm	BI	X003	10X03	1.3.6.1.4.1.6347.0.XX1.3.0
Vapor Sensor X Short Alarm	BI	X004	10X04	1.3.6.1.4.1.6347.0.XX1.4.0
Vapor Sensor X Water Alarm	BI	X005	10X05	1.3.6.1.4.1.6347.0.XX1.5.0
Vapor Sensor X Water Out Alarm	BI	X006	10X06	1.3.6.1.4.1.6347.0.XX1.6.0
Vapor Sensor X High Liquid Alarm	BI	X007	10X07	1.3.6.1.4.1.6347.0.XX1.7.0
Vapor Sensor X Low Liquid Alarm	BI	X008	10X08	1.3.6.1.4.1.6347.0.XX1.8.0
Vapor Sensor X Liquid Warning	BI	X009	10X09	1.3.6.1.4.1.6347.0.XX1.9.0

**Table A-10. Groundwater\_Sensor Veeder-Root Interface to BACnet, Modbus and SNMP**

Point Name	BACnet Object Type	BACnet Object ID	Modbus Register	SNMP OID
Groundwater Sensor X Setup Data Warning	BI	X001	10X01	1.3.6.1.4.1.6347.0.XX1.1.0
Groundwater Sensor X Fuel Alarm	BI	X002	10X02	1.3.6.1.4.1.6347.0.XX1.2.0
Groundwater Sensor X Out Alarm	BI	X003	10X03	1.3.6.1.4.1.6347.0.XX1.3.0
Groundwater Sensor X Short Alarm	BI	X004	10X04	1.3.6.1.4.1.6347.0.XX1.4.0
Groundwater Sensor X Water Alarm	BI	X005	10X05	1.3.6.1.4.1.6347.0.XX1.5.0
Groundwater Sensor X Water Out Alarm	BI	X006	10X06	1.3.6.1.4.1.6347.0.XX1.6.0
Groundwater Sensor X High Liquid Alarm	BI	X007	10X07	1.3.6.1.4.1.6347.0.XX1.7.0
Groundwater Sensor X Low Liquid Alarm	BI	X008	10X08	1.3.6.1.4.1.6347.0.XX1.8.0
Groundwater Sensor X Liquid Warning	BI	X009	10X09	1.3.6.1.4.1.6347.0.XX1.9.0

**Table A-11. MAG\_Sensor Veeder-Root Interface to BACnet, Modbus and SNMP**

Point Name	BACnet Object Type	BACnet Object ID	Modbus Register	SNMP OID
MAG Sensor X Setup Data Warning	BI	X001	10X01	1.3.6.1.4.1.6347.0.XX1.1.0
MAG Sensor X Communication Alarm	BI	X002	10X02	1.3.6.1.4.1.6347.0.XX1.2.0
MAG Sensor X Fault Alarm	BI	X003	10X03	1.3.6.1.4.1.6347.0.XX1.3.0
MAG Sensor X Fuel Warning	BI	X004	10X04	1.3.6.1.4.1.6347.0.XX1.4.0
MAG Sensor X Fuel Alarm	BI	X005	10X05	1.3.6.1.4.1.6347.0.XX1.5.0
MAG Sensor X Water Warning	BI	X006	10X06	1.3.6.1.4.1.6347.0.XX1.6.0
MAG Sensor X Water Alarm	BI	X007	10X07	1.3.6.1.4.1.6347.0.XX1.7.0
MAG Sensor X High Liquid Warning	BI	X008	10X08	1.3.6.1.4.1.6347.0.XX1.8.0
MAG Sensor X High Liquid Alarm	BI	X009	10X09	1.3.6.1.4.1.6347.0.XX1.9.0
MAG Sensor X Low Liquid Warning	BI	X010	10X10	1.3.6.1.4.1.6347.0.XX1.10.0
MAG Sensor X Low Liquid Alarm	BI	X011	10X11	1.3.6.1.4.1.6347.0.XX1.11.0
MAG Sensor X Temperature Warning	BI	X012	10X12	1.3.6.1.4.1.6347.0.XX1.12.0
MAG Sensor X Relay Active	BI	X013	10X13	1.3.6.1.4.1.6347.0.XX1.13.0
MAG Sensor X Install Alarm	BI	X014	10X14	1.3.6.1.4.1.6347.0.XX1.14.0

**Table A-12. Smart\_Sensor Veeder-Root Interface to BACnet, Modbus and SNMP**

Point Name	BACnet Object Type	BACnet Object ID	Modbus Register	SNMP OID
Smart Sensor X Setup Data Warning	BI	X001	10X01	1.3.6.1.4.1.6347.0.XX1.1.0
Smart Sensor X Communication Alarm	BI	X002	10X02	1.3.6.1.4.1.6347.0.XX1.2.0
Smart Sensor X Fault Alarm	BI	X003	10X03	1.3.6.1.4.1.6347.0.XX1.3.0
Smart Sensor X Fuel Warning	BI	X004	10X04	1.3.6.1.4.1.6347.0.XX1.4.0
Smart Sensor X Fuel Alarm	BI	X005	10X05	1.3.6.1.4.1.6347.0.XX1.5.0
Smart Sensor X Water Warning	BI	X006	10X06	1.3.6.1.4.1.6347.0.XX1.6.0
Smart Sensor X Water Alarm	BI	X007	10X07	1.3.6.1.4.1.6347.0.XX1.7.0
Smart Sensor X High Liquid Warning	BI	X008	10X08	1.3.6.1.4.1.6347.0.XX1.8.0
Smart Sensor X High Liquid Alarm	BI	X009	10X09	1.3.6.1.4.1.6347.0.XX1.9.0
Smart Sensor X Low Liquid Warning	BI	X010	10X10	1.3.6.1.4.1.6347.0.XX1.10.0
Smart Sensor X Low Liquid Alarm	BI	X011	10X11	1.3.6.1.4.1.6347.0.XX1.11.0
Smart Sensor X Temperature Warning	BI	X012	10X12	1.3.6.1.4.1.6347.0.XX1.12.0
Smart Sensor X Relay Active	BI	X013	10X13	1.3.6.1.4.1.6347.0.XX1.13.0
Smart Sensor X Install Alarm	BI	X014	10X14	1.3.6.1.4.1.6347.0.XX1.14.0
Smart Sensor X Fault Warning	BI	X015	10X15	1.3.6.1.4.1.6347.0.XX1.15.0
Smart Sensor X Vacuum Warning	BI	X016	10X16	1.3.6.1.4.1.6347.0.XX1.16.0
Smart Sensor X No Vacuum Warning	BI	X017	10X17	1.3.6.1.4.1.6347.0.XX1.17.0

**Table A-13. PLLD Veeder-Root Interface to BACnet, Modbus and SNMP**

Point Name	BACnet Object Type	BACnet Object ID	Modbus Register	SNMP OID
PLLD X Setup Data Warning	BI	X001	10X01	1.3.6.1.4.1.6347.0.XX1.1.0
PLLD X Gross Test Fail Alarm	BI	X002	10X02	1.3.6.1.4.1.6347.0.XX1.2.0
PLLD X Annual Test Fail Alarm	BI	X003	10X03	1.3.6.1.4.1.6347.0.XX1.3.0
PLLD X Periodic Test Needed Warning	BI	X004	10X04	1.3.6.1.4.1.6347.0.XX1.4.0
PLLD X Periodic Test Needed Alarm	BI	X005	10X05	1.3.6.1.4.1.6347.0.XX1.5.0
PLLD X Sensor Open Alarm	BI	X006	10X06	1.3.6.1.4.1.6347.0.XX1.6.0
PLLD X High Pressure Alarm	BI	X007	10X07	1.3.6.1.4.1.6347.0.XX1.7.0
PLLD X Shutdown Alarm	BI	X008	10X08	1.3.6.1.4.1.6347.0.XX1.8.0
PLLD X High Pressure Warning	BI	X009	10X09	1.3.6.1.4.1.6347.0.XX1.9.0
PLLD X Continuous Handle On Warning	BI	X010	10X10	1.3.6.1.4.1.6347.0.XX1.10.0
PLLD X Periodic Test Fail Alarm	BI	X011	10X11	1.3.6.1.4.1.6347.0.XX1.11.0
PLLD X Annual Test Needed Warning	BI	X012	10X12	1.3.6.1.4.1.6347.0.XX1.12.0
PLLD X Annual Test Needed Alarm	BI	X013	10X13	1.3.6.1.4.1.6347.0.XX1.13.0
PLLD X Low Pressure Alarm	BI	X014	10X14	1.3.6.1.4.1.6347.0.XX1.14.0
PLLD X Sensor Short Alarm	BI	X015	10X15	1.3.6.1.4.1.6347.0.XX1.15.0
PLLD X Continuous Handle On Alarm	BI	X016	10X16	1.3.6.1.4.1.6347.0.XX1.16.0
PLLD X Fuel Out Alarm	BI	X017	10X17	1.3.6.1.4.1.6347.0.XX1.17.0
PLLD X Line Equipment Alarm	BI	X018	10X18	1.3.6.1.4.1.6347.0.XX1.18.0
PLLD X Gross Test Needed Alarm	BI	X019	10X19	1.3.6.1.4.1.6347.0.XX1.19.0



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