FieldServer FS-B35XX Series

Start-up Guide

APPLICABILITY & EFFECTIVITY

Provides instructions for the FS-B35XX-05* Model FieldServer.

The instructions are effective for the above as of March 2020.

**Contact FieldServer Technical Support for information on the earlier FS-B35XX-01 Model.*

Document Revision: 2.C
T18602

Technical Support

Please call us for any technical support needs related to the FieldServer product.

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1 FIELDSERVER FS-B35 SERIES DESCRIPTION

The FieldServer FS-B35 Series is a high performance, cost effective Building and Industrial Automation multi-protocol gateway providing protocol translation between serial, Ethernet, and LonWorks[1] devices and networks.

NOTE: For troubleshooting assistance refer to Appendix A, or any of the troubleshooting appendices in the related driver supplements. Check the Sierra Monitor website for technical support resources and the latest versions of documentation that may be of assistance.

2 CERTIFICATIONS

2.1 BTL Mark – BACnet[2] 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.

2.2 LonMark Certification

LonMark International is the recognized authority for certification, education, and promotion of interoperability standards for the benefit of manufacturers, integrators and end users. LonMark International has developed extensive product certification standards and tests to provide the integrator and user with confidence that products from multiple manufacturers utilizing LonMark devices work together. MSA Safety has more LonMark Certified gateways than any other gateway manufacturer, including the ProtoCessor, ProtoCarrier and ProtoNode for OEM applications and the full featured, configurable gateways.

[1] LonWorks is a registered trademark of Echelon Corporation.
[2] BACnet is a registered trademark of ASHRAE.

3 EQUIPMENT SETUP

3.1 Supplied Equipment

FS-B35XX Series FieldServer

- Preloaded with Modbus RTU driver, SMT Ethernet driver and any other drivers ordered. A sample configuration file is also pre-loaded onto the FieldServer.
- All instruction manuals, driver manuals, configuration manuals and support utilities are available on the USB drive provided in the optional accessory kit, or on the Sierra Monitor website.

USB Flash Drive loaded with:

- FS-B35XX Series Start-up Guide
- FieldServer Configuration Manual
- All FieldServer Driver Manuals
- Support Utilities
- Any additional folders related to special files configured for a specific FieldServer
- Additional components as required - see Driver Manual Supplement for details

Accessories:

- DB9F/RJ45 Connection Adapter (Part # FS-8917-02)
- Adapter for hyperterminal connection to the Sys Port (Part # FS8917-26)
- Power Supply (Part # 69196)
- Detachable Power Cord (Part # 53029)
- 7 pin mini connector (RS-485) (Part # 59232)
- 5 pin mini connector (Power) (Part # 59231)
- 2 pin mini connector – High Temp (LonWorks® connection) (Part # 59230)
- Self-Adhesive feet (Part # 69178)
- Small accessory kit containing four unpinned DB9 connectors (Part # 8915-11)

3.2 Mounting

The following mounting options are available:

- Wall or panel.
- Free standing or table.
- DIN rail (Part # FS-8915-30) - not included.

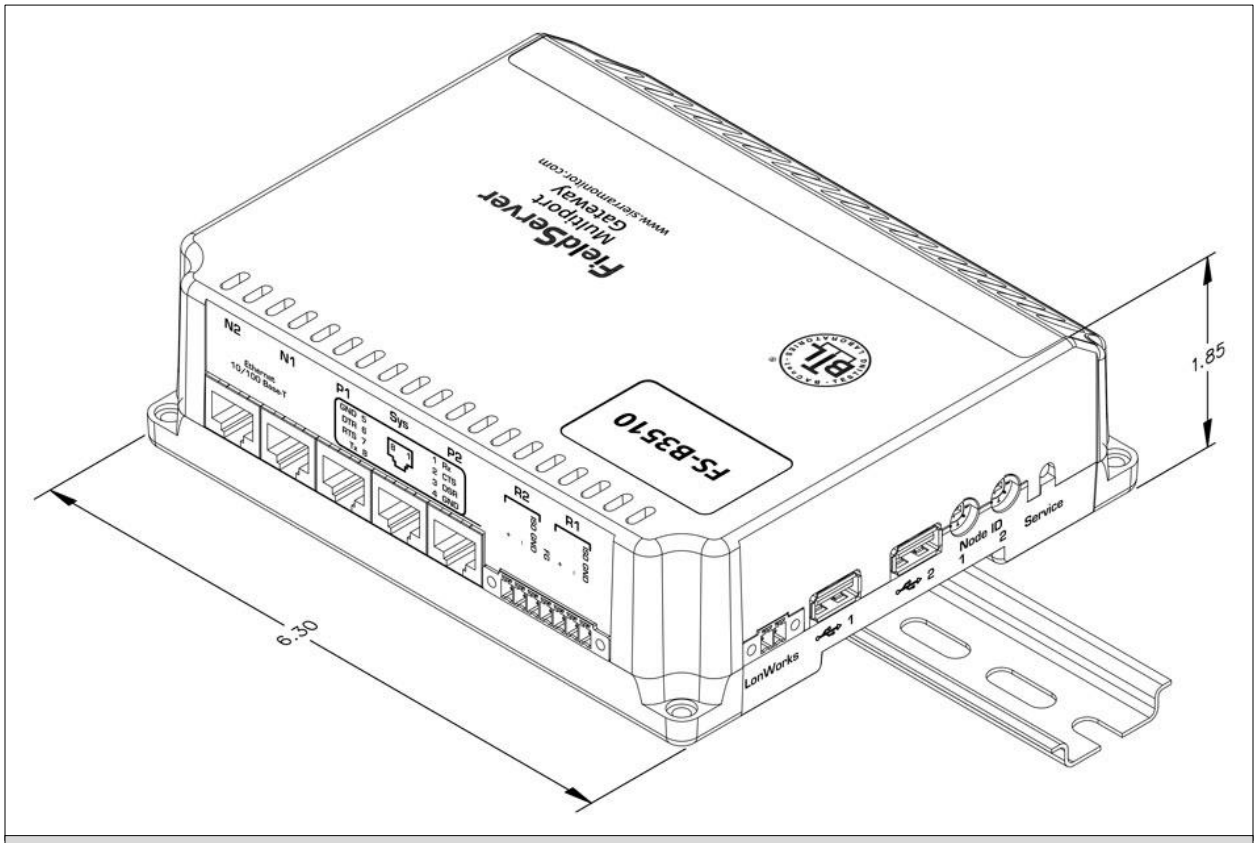


Figure 1: FieldServer FS-B35XX Series Showing Din Mounting Option

NOTE: Install only as instructed, failure to follow the installation guidelines or using screws without the DIN rail mounting bracket could result in permanent damage to the product.

NOTE: If the FieldServer is removed from the din rail, use the original screws to reattach. Longer screws will damage the FieldServer.

3.3 Physical Dimensions

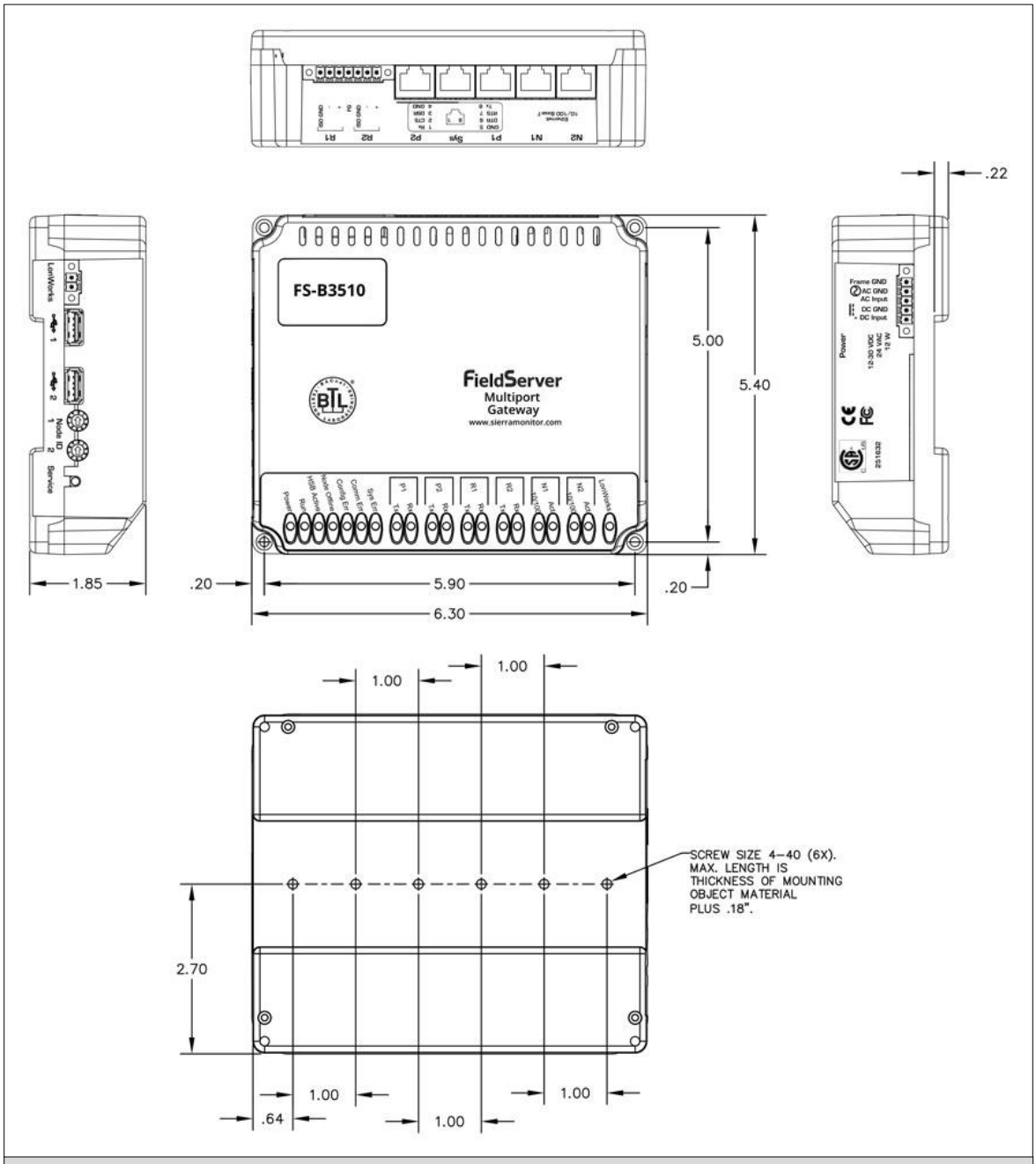


Figure 2: FieldServer FS-B35XX Series Showing Dimensions

3.4 Wiring

The power socket is a “screw terminal” type. It is recommended to use of the power supply sent with the unit. If an alternative power supply is desired, select an external power supply that has been certified for safety for the correct destination country and an output rating that is considered acceptable. Refer to **Appendix D** for detailed specifications.

NOTE: USE COPPER CONDUCTORS ONLY.

4 CONNECTION TO DEVICE

4.1 RS-232 Connection

Connect a RJ-45 cable (A) directly between Port P1/Port P2 and the remote RS-232 device. If using a custom built cable, make sure that the pinout on the FieldServer side of the cable is limited to the use of pins 2(TX), 3(RX) and 5(GND).

NOTE: The Sys Port is for diagnostic use only and should not be used to connect to a Node.

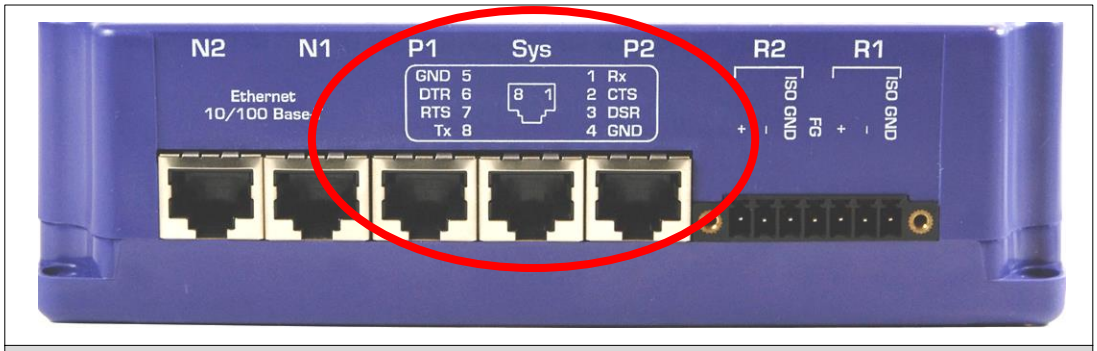


Figure 3: RS-232 Connection Ports

4.2 RS-485 Connection

If using RS-485 from the remote device to the FieldServer, the "+", "–" and "GND" wire connections can be used on the RS-485 port on the FieldServer.

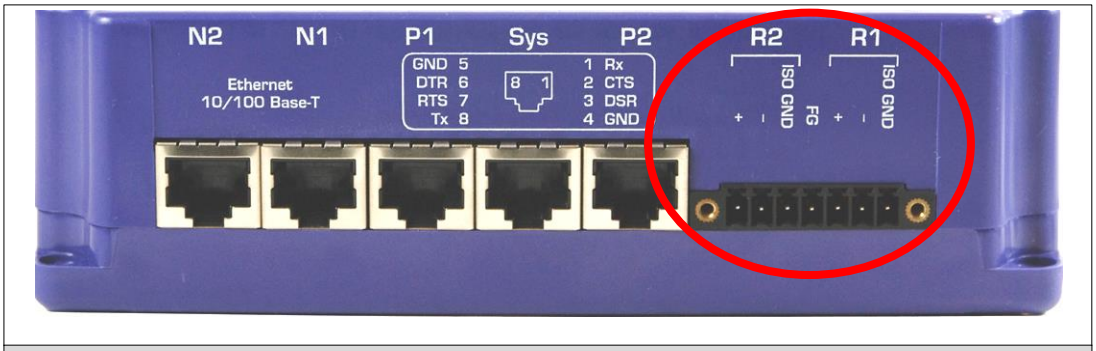


Figure 4: RS-435 Connection Ports

4.3 Ethernet Connection

The Ethernet ports support Auto-MDIX. The provided Cat-5 UTP Ethernet cable can be used to connect the FieldServer to a hub/switch or directly to the device through these ports.

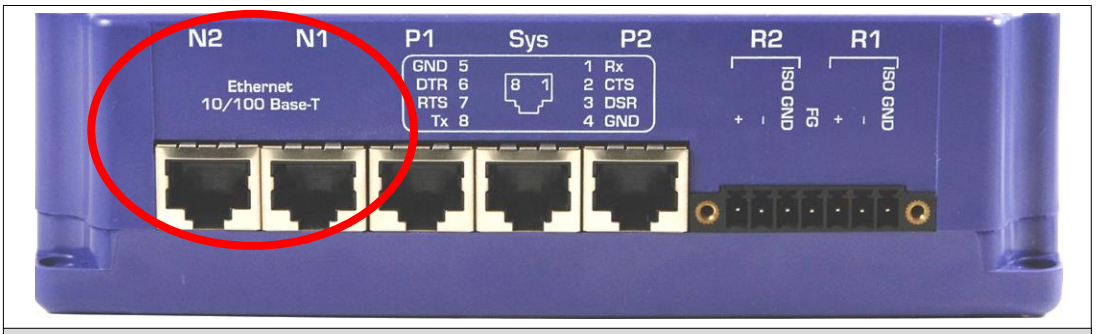


Figure 5: Ethernet Connection Ports

4.3.1 Ethernet Port Behavior (N1 & N2)

The N1 and N2 Ethernet ports share an Ethernet stack. Therefore, the IP addresses of N1 and N2 must be on separate subnets and must be connected to separate networks.

There is only 1 Gateway IP Address in the FS-B35XX. This means that when using both N1 and N2 Ethernet ports simultaneously, only 1 Ethernet port can connect to a larger network through the Gateway IP Address while the other is limited to a local network.

In the configuration file of the FS-B35XX, the choice of N1 or N2 is irrelevant. As a server, the FS-B35XX will accept messages from either N1 or N2 port. As a client, the FS-B35XX will choose the correct port to transmit a message based on the IP address of the remote device.

5 OPERATION

5.1 Power-up the Device

- Apply power to the device. Ensure that the power supply used complies with the specifications provided in **Appendix D**.
- The power light should burn a steady green when the FieldServer is powered up. Refer to **Appendix B** for more information on the various LED functions.

5.2 Connect the PC to the FieldServer via Ethernet Port

- The Ethernet ports support Auto-MDIX. The provided Cat-5 UTP Ethernet cable can be used to connect the FieldServer to a hub/switch or directly to the device through either of the N1 or N2 ports.
- It is important that the PC/Laptop is on the same subnet as the FieldServer.
- If connecting 2 FieldServers together using the N1 and N2 ports, the ports need to be on different subnets. The default IP Address on the FieldServer N1 port is 192.168.2.101 and the N2 port is 192.168.3.101. Refer to **Section 4.3.1** and the FieldServer Toolbox Manual.

5.3 Using FieldServer Toolbox to Find the IP Address

- Check that a Cat-5 Ethernet cable (straight through or cross-over) is connected between the local PC and FieldServer or the local PC is connected to the same subnet as the FieldServer.
- Ensure that FieldServer Toolbox is loaded onto the local PC. Otherwise, download the FieldServer-Toolbox.zip via the Sierra Monitor website's Software Downloads.
- Extract the executable file and complete the installation.
- Double click on the FS Toolbox Utility.
- Check the FieldServer IP Addresses from the device listings.

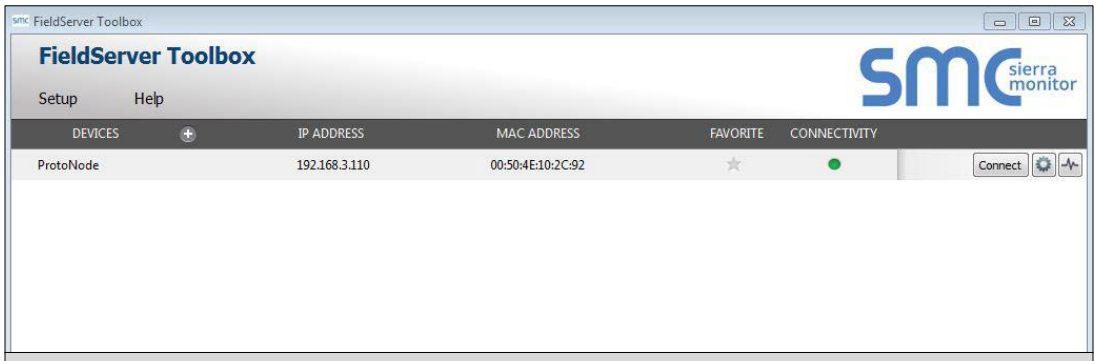


Figure 6: FieldServer Toolbox

- Type the appropriate IP Address into the browser address bar to move onto registering the FieldServer (**Section 5.4**).

5.4 Assign Network Settings for the FieldServer

- 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 7)

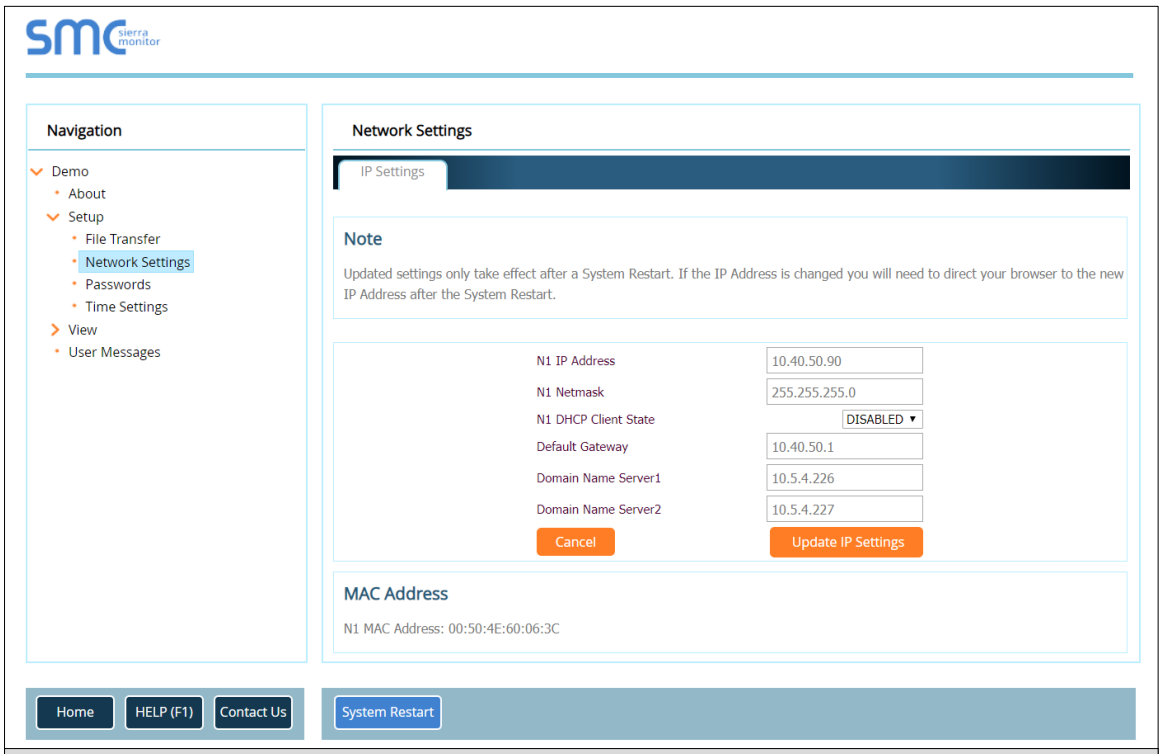


Figure 7: Changing IP Address via FS-GUI

- Modify the IP Address (N1 IP Address field) of the FieldServer Ethernet port.
- If necessary, change the Netmask (N1 Netmask field).
- If necessary, change the IP Gateway (Default Gateway field).

NOTE: Do not change the DHCP Server State (N1 DHCP Server State field).

NOTE: If the FieldServer is connected to a managed switch/router, the IP Gateway of the FieldServer should be set to the IP Address of that managed switch/router.

- Click the “System Restart” button at the bottom of the page to apply changes and restart the FieldServer.
- Unplug Ethernet cable from PC and connect it to the network switch or router.
- Record the IP Address assigned to the FieldServer for future reference.

NOTE: The SMC Cloud button (see Figure 7) allows users to connect to the SMC Cloud, MSA Safety’s device cloud solution for IIoT. The SMC Cloud enables secure remote connection to field devices through a FieldServer and its local applications for configuration, management, maintenance. For more information about the SMC Cloud, refer to the SMC Cloud Start-up Guide.

6 CONFIGURING THE FIELDSERVER

6.1 Retrieve the Sample Configuration File

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

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

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

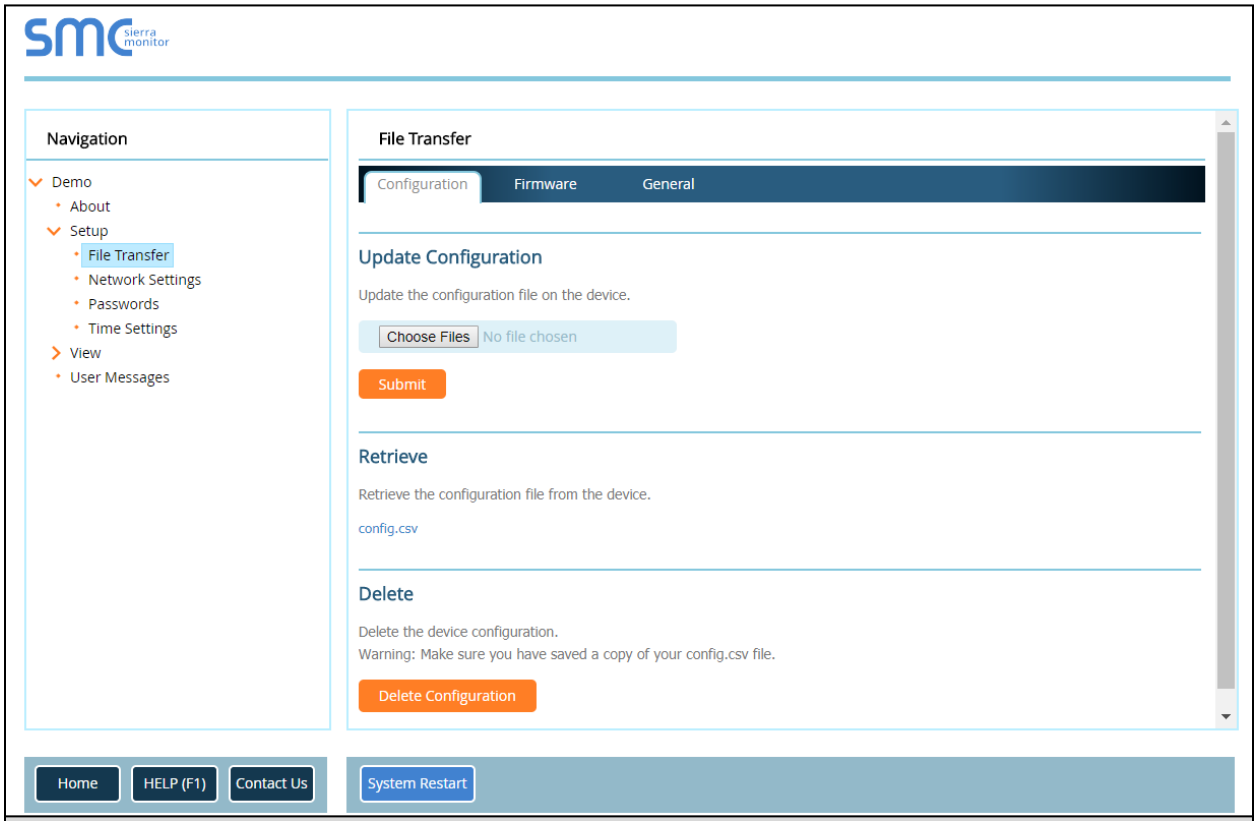


Figure 8: FS-GUI File Transfer

6.2 Change the Configuration File to Meet the Application

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

6.3 Load the Updated Configuration File

6.3.1 Using the FS-GUI to Load a Configuration File

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

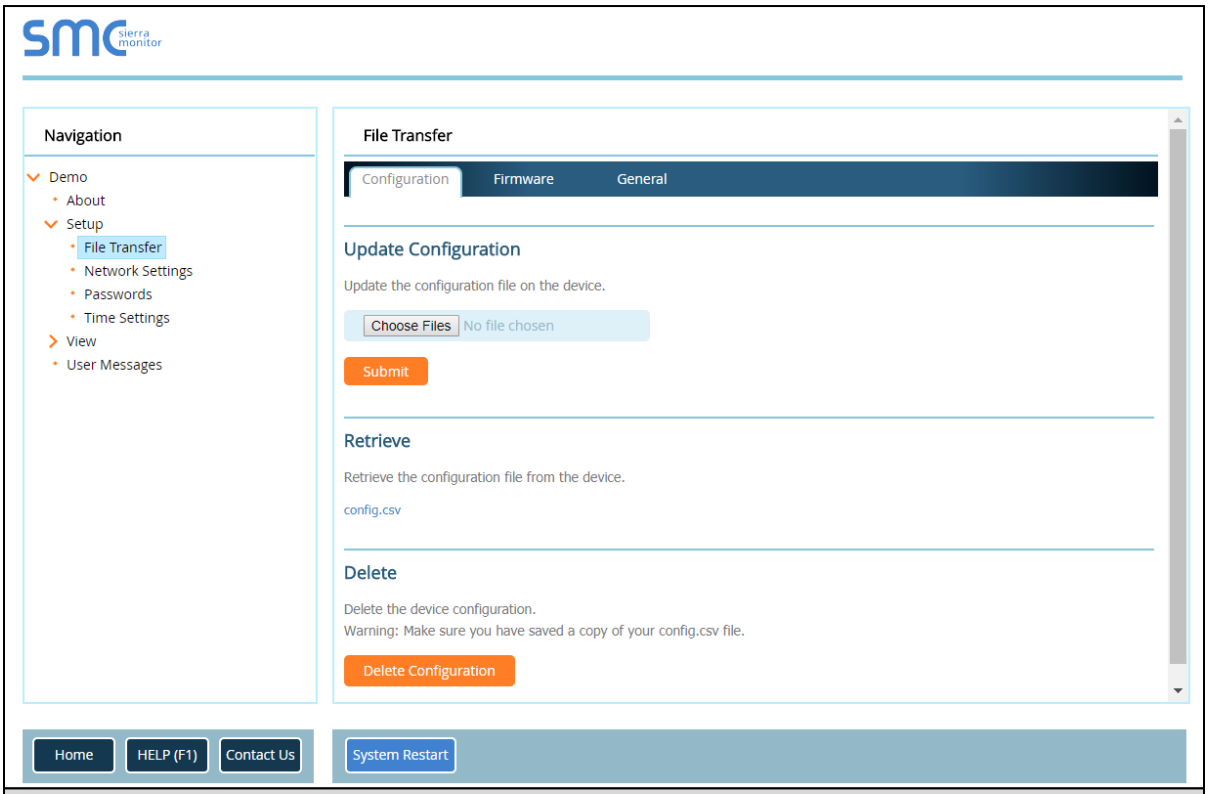


Figure 9: FS-GUI Loading Files

- Once download is complete, a message bar will appear confirming that the configuration was updated successfully.
- Click the System Restart Button to put the new file into operation. Note that it is possible to do multiple downloads to the FieldServer before resetting it.

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

6.3.2 Retrieve the Configuration File for Modification or Backup

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

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

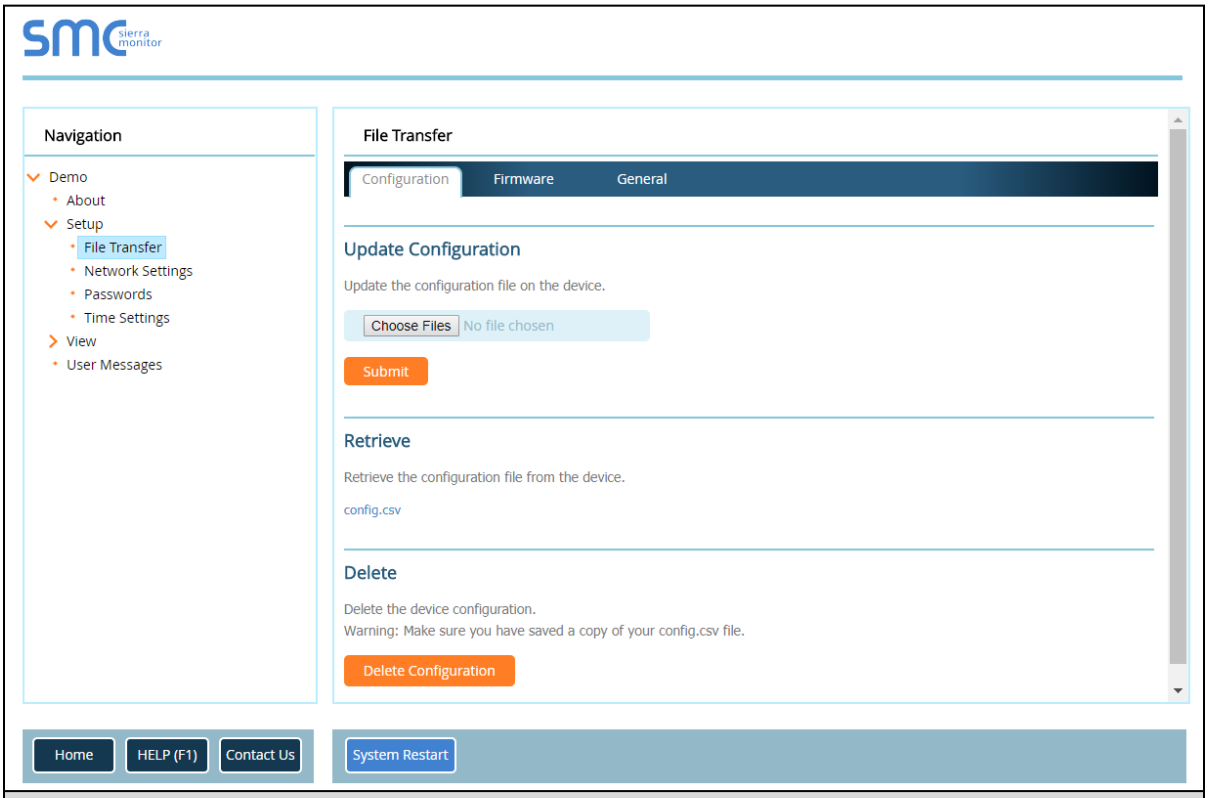


Figure 10: Retrieve Configuration File

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

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

6.4 Test and Commission the FieldServer

- Connect the FieldServer to the third party device(s), and test the application.
- From the main menu of the FS-GUI click on “View”, then “Connections” to see the number of messages on each protocol.

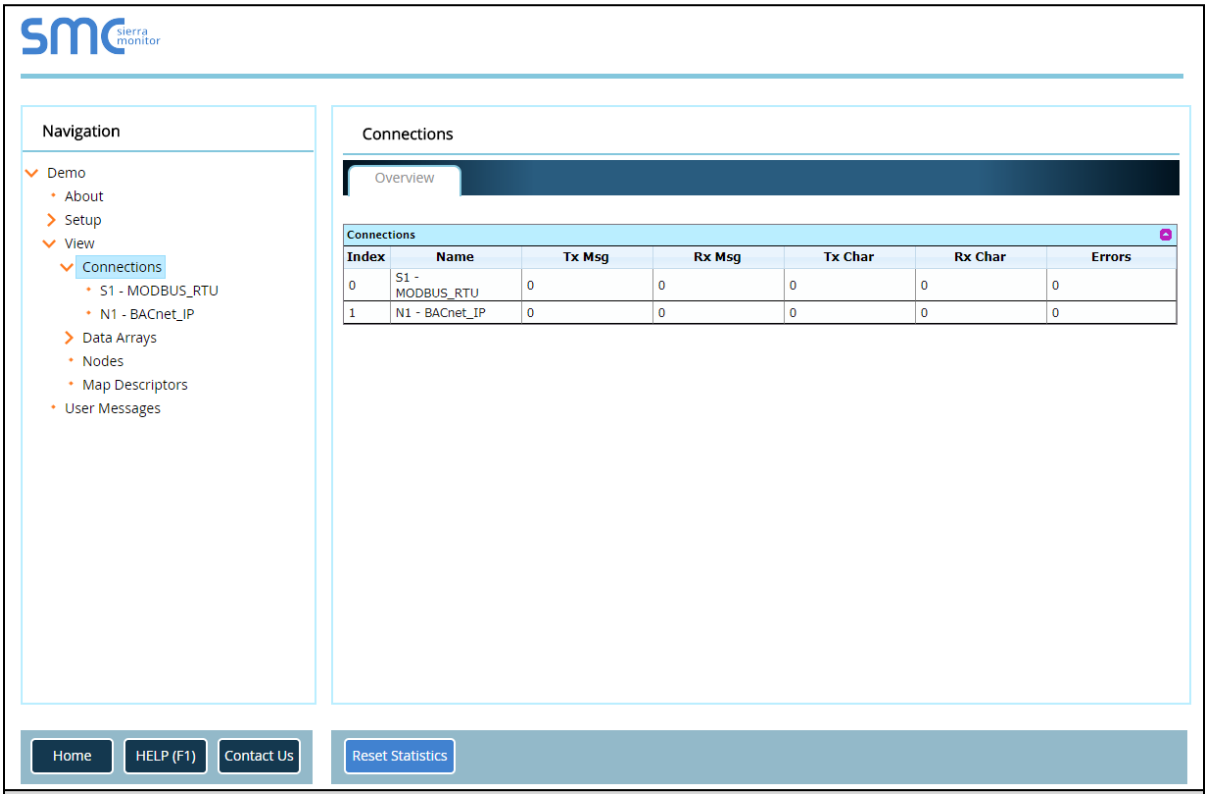


Figure 11: FS-GUI Connections

NOTE: For troubleshooting assistance refer to Appendix A, or any of the troubleshooting appendices in the related driver supplements and configuration manual. MSA Safety also offers a technical support page on the Sierra Monitor website, which contains a significant number of resources and the latest versions of documentation that may be of assistance.

APPENDIX A TROUBLESHOOTING

Appendix A.1 Communicating with the FieldServer Over the Network

- Confirm that the network cabling is correct.
- Confirm that the computer network card is operational and correctly configured.
- Confirm that there is an Ethernet adapter installed in the software configuration, and that it is configured to run the TCP/IP protocol.
- Open Command Prompt.
- Type in “ipconfig”.
- The account settings should be displayed.
- Ensure that the IP address is on the same Subnet of the FieldServer.
  - Default N1 IP Address is 192.168.2.101
  - Default N2 IP Address is 192.168.3.101
- The IP address of the FieldServer can be changed using the FS-GUI. Refer to the FieldServer FS-GUI manual for more information.

Appendix A.2 Before Contacting Technical Support take a Diagnostic Capture

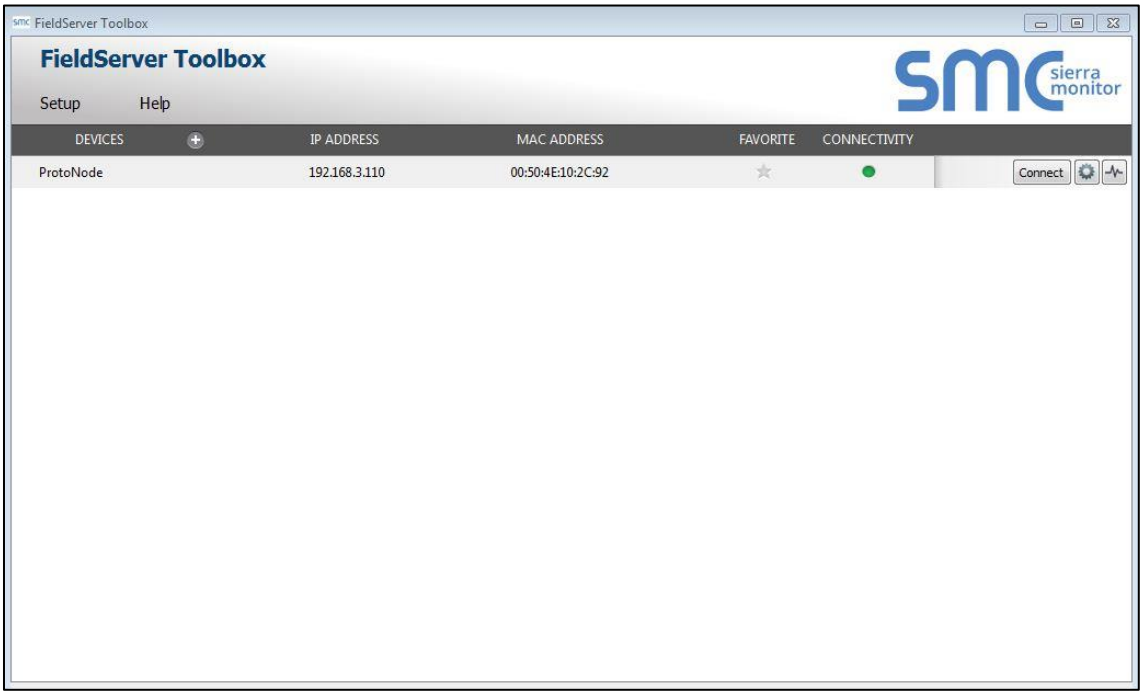
When a problem occurs that cannot be resolved with regular troubleshooting, take a log via the FieldServer Toolbox. Send this log together with a detailed description of the problem to smc-support@msasafety.com for evaluation. The Diagnostic Capture will allow us to rapidly diagnose the problem.

NOTE: While all necessary documentation is shipped with the FieldServer on the USB flash drive, these documents are constantly being updated. Newer versions may be available on the Sierra Monitor website.

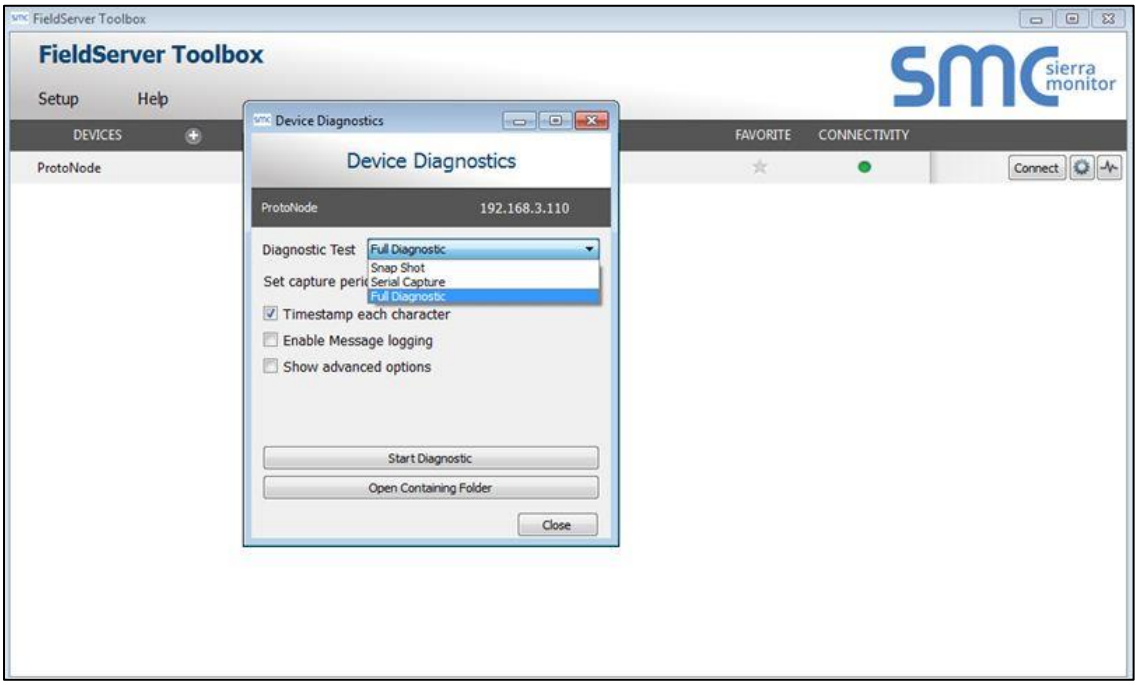
- Ensure that FieldServer Toolbox is loaded onto the local PC. Otherwise, download the FieldServer-Toolbox.zip via the Sierra Monitor website’s Software Downloads.
- Extract the executable file and complete the installation.
- Connect a standard Cat-5 Ethernet cable between the PC and FieldServer.
- Double click on the FS Toolbox Utility.

Step 1: Take a Log

- Click on the diagnose icon of the desired device

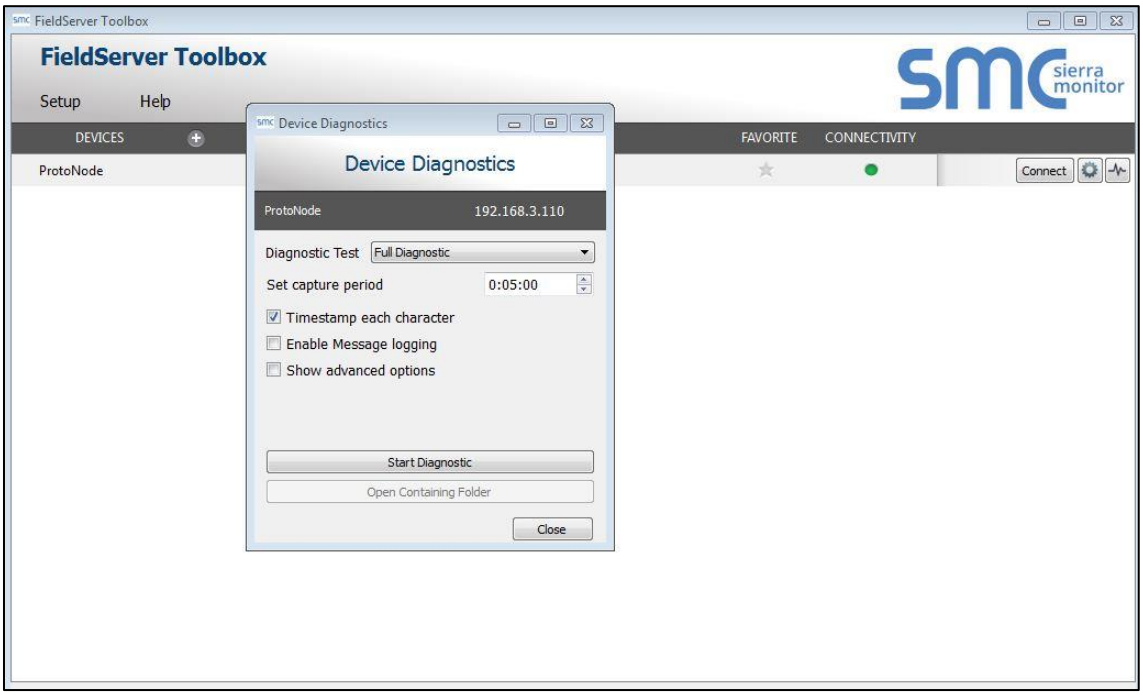


- Ensure “Full Diagnostic" is selected (this is the default)



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

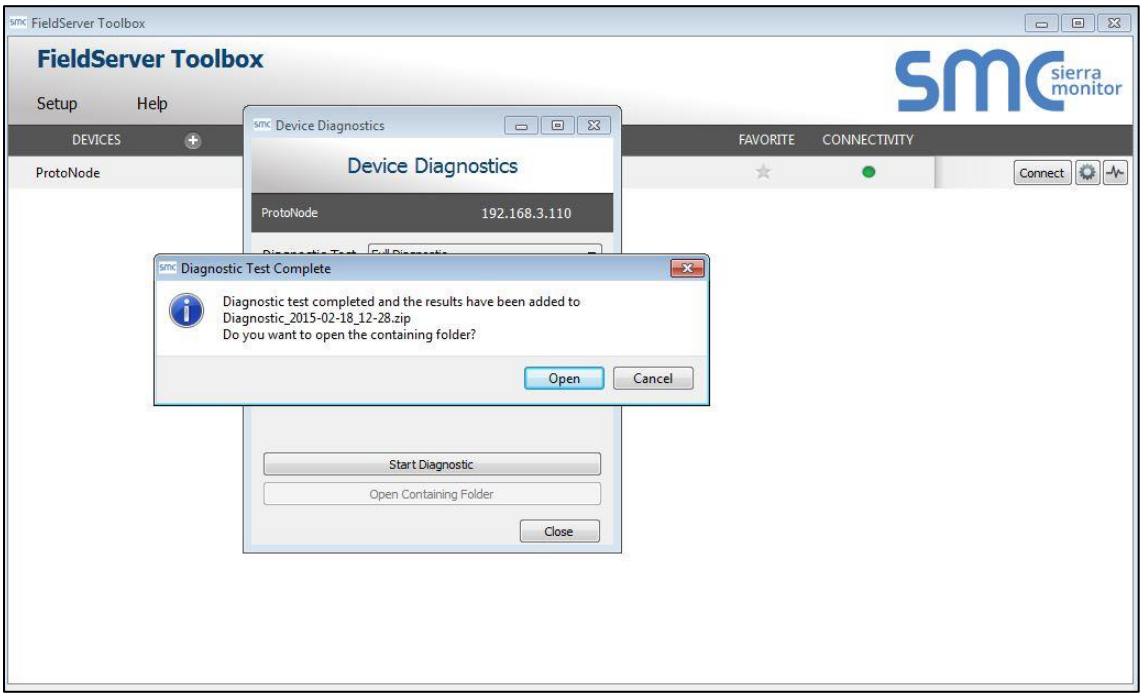
- Click on “Start Diagnostic”



- When the capture period is finished, the “Diagnostic Test Complete” window will appear

Step 2: Send Log

- Once the diagnostic test is complete, a .zip file will be saved on the PC



- Click “Open” to launch explorer and have it point directly at the correct folder
- Email the diagnostic zip file to smc-support@msasafety.com

Appendix A.3 Securing FieldServer with Password

Access to the FieldServer can be restricted by enabling a password on the FS-GUI Passwords page – click Setup and then Passwords in the navigation panel. There are 2 access levels defined by 2 account names: Admin and User.

- The Admin account has unrestricted access to the FieldServer.
- The User account can view any FieldServer information but cannot make any changes or restart the FieldServer.

The password needs to be a minimum of eight characters and is **case sensitive**.

If the password is lost, click cancel on the password authentication popup window, and e-mail the password recovery token to smc-support@msasafety.com to receive a temporary password from the FieldServer support team. This will allow access to the FieldServer in order to set a new password.

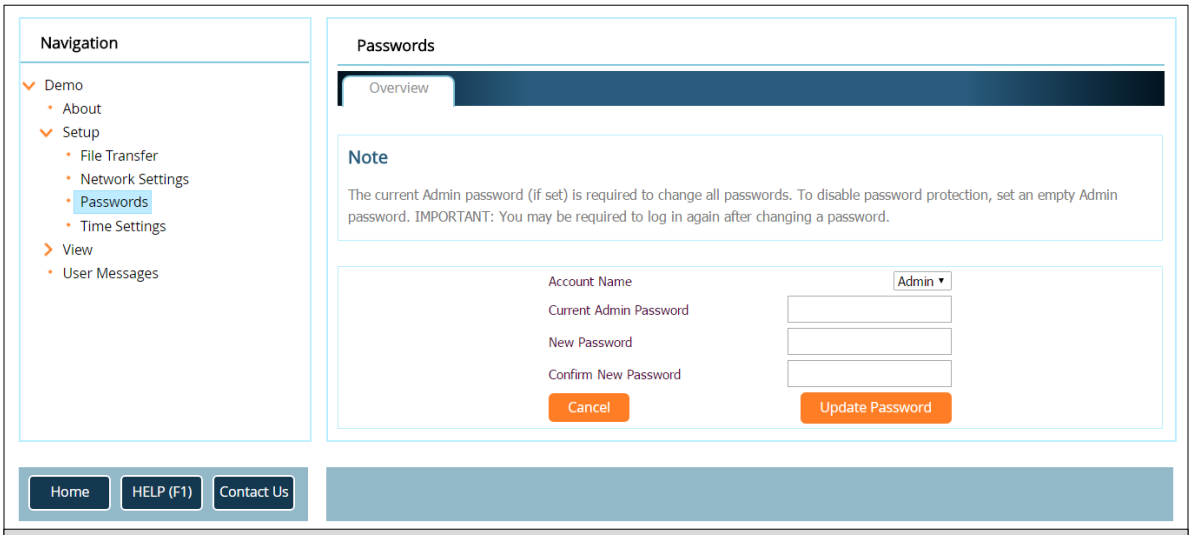


Figure 12: FS-GUI Passwords Page

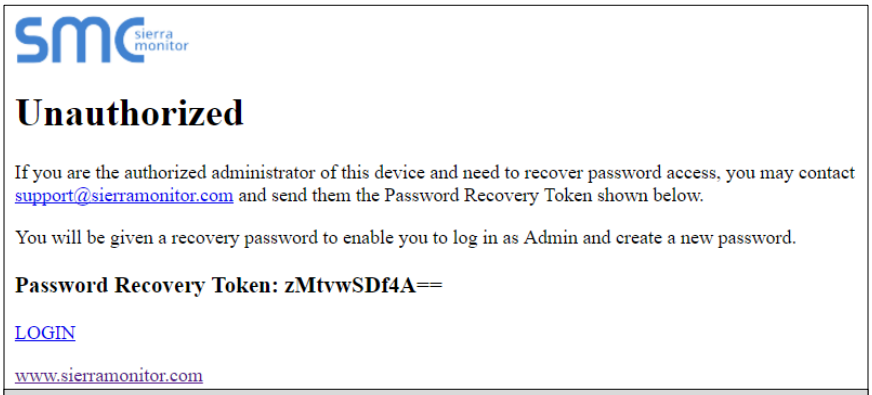


Figure 13: Password Recovery Page

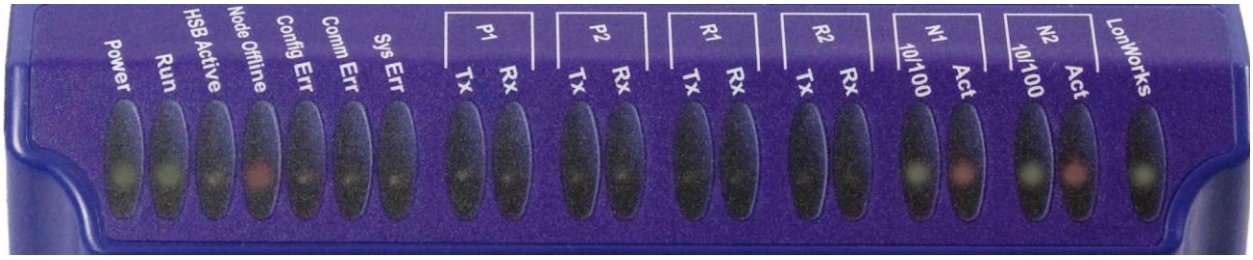
Appendix A.4 Internet Browsers Not Supported

- Internet Explorer 11

NOTE: Internet Explorer is no longer supported as recommended by Microsoft. Please use the latest version of Chrome, Firefox or Edge.

APPENDIX B LED FUNCTIONS

Appendix B.1 LED Identification and Function



Light	Description
Power	The power light should show steady green at all times when the FieldServer is powered.
Run	The run light indicates that the FieldServer firmware is running. It should flash green once per second once the FieldServer has booted up. Note that it may take a while from power up to boot up the FieldServer if the loaded configuration is particularly large.
HSB Active	Two FieldServers can be connected in a hot standby configuration to ensure reliability in the case of a vital system failure on the Active FieldServer. Refer to the FieldServer Configuration Manual for more information. A steady amber light indicates which FieldServer in a hot standby pair is currently active.
Node Offline	An amber light will burn when a configured node in the FieldServer is detected as being offline. See Node overview screen in the remote user interface for further details
Config Err	An amber light will burn if a configuration error exists in the active configuration. See Error screen in the remote user interface for description of configuration error.
Comm Err	The communications light will turn amber if there is a communications error detected. To establish the cause of the error, go to the error screen of the FS-GUI interface.
Sys Err	The system light will burn red if there is a system error on the FieldServer. If this occurs, immediately report the related “system error” shown in the error screen of the FS-GUI interface to technical support for evaluation.
RS-232 Lights (P1, P2)	These lights are related to the RS-232 serial ports provided on the FieldServer. The **Rx** (Receive) light will flash red if the FieldServer is receiving data. The **Tx** (Transmit) light will flash red if the FieldServer is sending data. The frequency of the flashing is directly related to the frequency of data transfer.
RS-485 Lights (R1, R2)	These lights are related to the RS-485 serial ports provided on the FieldServer. The **Rx** (Receive) light will flash red if the FieldServer is receiving data. The **Tx** (Transmit) light will flash red if the FieldServer is sending data. (Note that due to the nature of 2-wire RS-485 the Rx light will flash every time the Tx light flashes). The frequency of the flashing is directly related to the frequency of data transfer.
Ethernet Lights (N1,N2)	These lights are related to the two Ethernet network ports provided on the FieldServer. The **10/100** light indicates connection speed. LED Off = 10; LED On = 100. The **Act** (Activity) light indicates link and activity on the network. The LED will be Off if there is no link, On if there is a link and blinking represents activity on the link.
LonWorks®	This light indicates activity on the LonWorks® port. Refer to **Appendix B.2.1** for behavior interpretation.

Appendix B.2 LED Interpretation

Sys Err	HSB Active	Com Err	Config Err	Active	Node Offline	Run	PWR	Description
						FLASH	ON	Indicating Power.
					ON	FLASH	ON	One of the configured nodes is offline.
	ON					FLASH	ON	FieldServer is active in a Hot Standby configuration.
ON						FLASH	ON	System Error. Contact support.
			OFF			FLASH	ON	RELEASE DCC running.
			ON			FLASH	ON	Configuration error.
			FLASH			FLASH	ON	Demo Mode.
Flash Once	Flash Once	Flash Once	Flash Once	Flash Once	Flash Once	Flash Once	ON	Sequence of LEDs – shows a boot cycle attempt.

Appendix B.2.1 LonWorks LED Interpretation

Explicit	Implicit – Not Commissioned	Implicit – Commissioned
Off	Flashing	Off

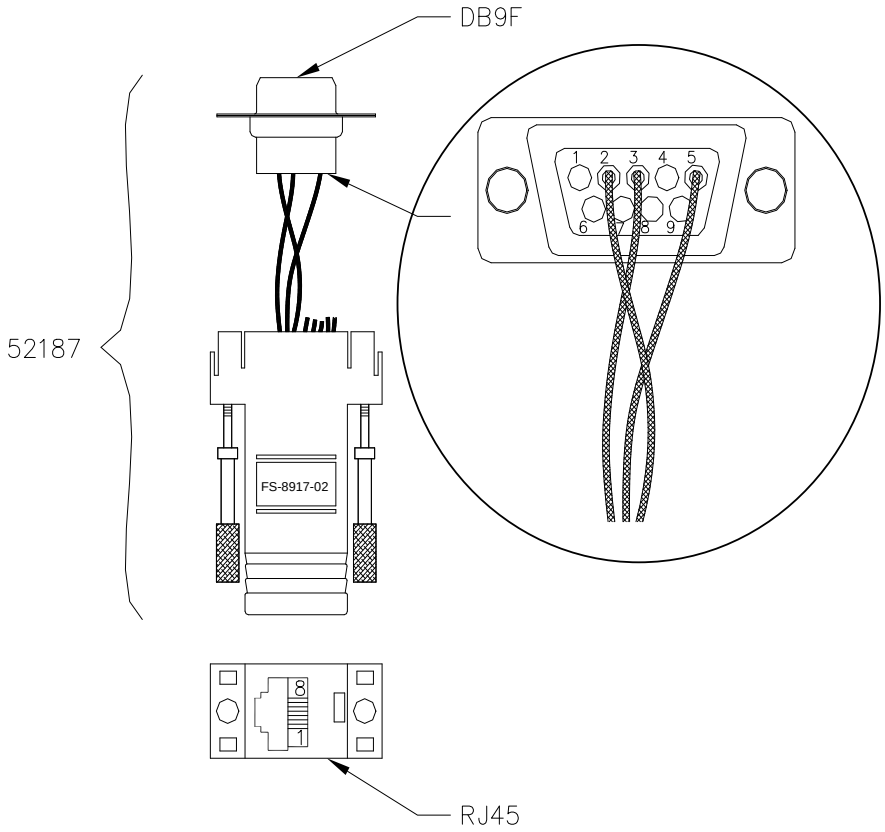
Appendix B.3 LED Power-up Sequence

1. Start-up: All LED's on.
2. Load Bios: Run LED will switch off after completion.
3. Load U-boot: HSB Active LED will switch off after completion.
4. Load Linux Kernel: Node Offline LED will switch off after completion.
5. Load Ethernet driver: Config LED will switch off after completion.
6. Load Flash File: Sys LED will switch off after completion.
7. Load Application Firmware: Sys Error LED will switch off after completion.

APPENDIX C SUPPLIED CONNECTOR KIT (FS-8915-11)

The following connector is supplied to facilitate RS-232 communications on the RJ-45 RS-232 port. The table in the diagram shows the functions applied to each of the RJ-45 pins by the FieldServer to assist in determination of the required pinout configuration for connection to the third party device.

NOTE: FS-B35XX Series RS-232 numbering convention is reverse to the 10BaseT numbering.



WIRE LIST

FS– B3510-05 FUCTION	FROM	TO	COLOR
RX	RJ45–01	DB9F–03	WHITE
GND	RJ45–04	DB9F–05	GREEN
TX	RJ45–08	DB9F–02	BLUE

Figure 14: FieldServer Connector

APPENDIX D SPECIFICATIONS

	FS-B35XX Series [3]
Available Ports	2 x 10/100 BaseT Ethernet connectors (auto sensing) with ESD Protection: **N1, N2**. Ethernet ports are not networked together. 2 x RJ45 RS-232 connectors: **P1, P2** – both galvanically isolated with ESD protection. 1 x RJ45 RS-232 System port: **Sys** – For FieldServer diagnostic use only. 2 x RS-485 Serial connectors: **R1, R2** – both galvanically isolated with ESD protection. 1 x LonWorks® connector. **Auxiliary Components:** 2x USB Host (Type A) connectors which can be used to update the Firmware and Configuration File, Linux Kernel and Flash File system. The Node ID selectors and LonWorks® Service button are available for those drivers requiring these features. See appropriate driver manual. For more information refer to "ENOTE – Loading Files using USB". **Fieldbus:** Fieldbus connectors available on selected gateways.
Power Requirements	24 VAC (+/- 10%) and 12-30 VDC, 12W **NOTE: USE COPPER CONDUCTORS ONLY**
Approvals	CE Marked, CSA Certified: UL916 Standard and CSA @ 22.2, DNP 3.0 Tested, FCC: Part 15, LonMark Certified, Modbus Tested, RoHS3 Compliant, GOST-R Certified
Power Requirements[4]	Multi-mode power adapter: 9-30VDC or 12-24VAC
Physical Dimensions (WxDxH) [5]	6.3 W x 5.4 D x 1.95 H inches (16 x 13.7 x 5 cm)
Weight [4]	2.5 lbs. (1.5 Kg)
Operating Temp.	0 – 60°C (32 – 140°F)
Surge Suppression	EN61000-4-2 ESD EN61000-4-3 EMC EN61000-4-4 EFT
Humidity	10 - 90% RH (non-condensing)

Figure 15: Specifications

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

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

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

[3] Specifications subject to change without notice.
[4] Excluding external power supply.
[5] Excluding mounting tabs.

APPENDIX E 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.