



FieldServer – EZ Gateway

Modbus to BACnet Start-up Guide

FS-EZX-MOD-BAC



APPLICABILITY & EFFECTIVITY

Effective for all systems manufactured after July 2017.

Technical Support

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

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1 ABOUT THE EZ GATEWAY

EZ Gateway is a high performance, cost effective building and industrial automation multi-protocol gateway providing protocol translation between serial and Ethernet, 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 [Resource Center](#) for technical support resources and documentation that may be of assistance.

The EZ Gateway is cloud ready and connects with Sierra Monitor's FieldPoP™ device cloud. See [Section 5.3.3](#) for further information.

2 CERTIFICATION

2.1 BTL Mark – BACnet Testing Laboratory¹



The BTL Mark on EZ Gateway 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.

3 SUPPLIED EQUIPMENT

EZ Gateway

- Preloaded with the Modbus and BACnet drivers.
- All instruction manuals, driver manuals, support utilities are available on the USB drive provided in the optional accessory kit, or on the Sierra Monitor website [Resource Center](#).

Accessory kit (optional) (Part # FS-8915-36-QS) includes:

- 7-ft CAT5 cable with RJ45 connectors at both ends
- Power Supply -110/220V (p/n 69196)
- DIN Rail mounting bracket
- Screwdriver for connecting to terminals
- USB Flash drive loaded with:
 - Modbus to BACnet Start-up Guide
 - FieldServer Configuration Manual
 - All FieldServer Driver Manuals
 - Support Utilities
 - Any additional folders related to special files configured for a specific EZ Gateway
 - Additional components as required - see driver manual supplement for details



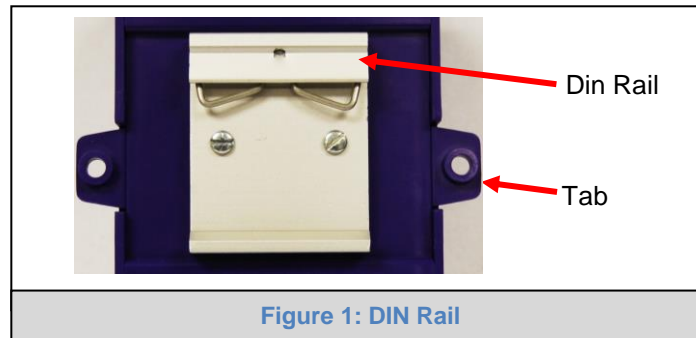
¹ BACnet is a registered trademark of ASHRAE.

4 INSTALLING THE EZ GATEWAY

4.1 Mounting

The following mounting options are available:

- Product comes with tabs for wall or surface mount. These can be snapped off if not required.
- DIN Rail Mounting Bracket - included in the accessory kit or ordered separately (part# FS-8915-35-QS).



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.

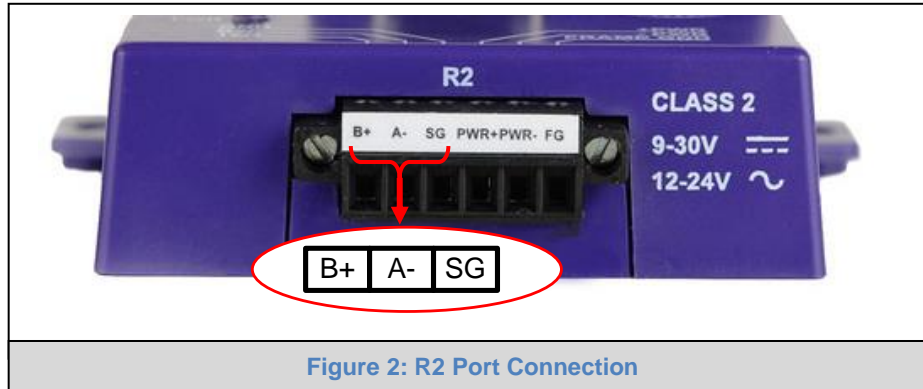
NOTE: If the FieldServer is removed from the din rail, use the original screws to reattach. Longer screws will damage the FieldServer.

NOTE: For dimension details see [Appendix B.3](#).

4.2 RS-485 Connections

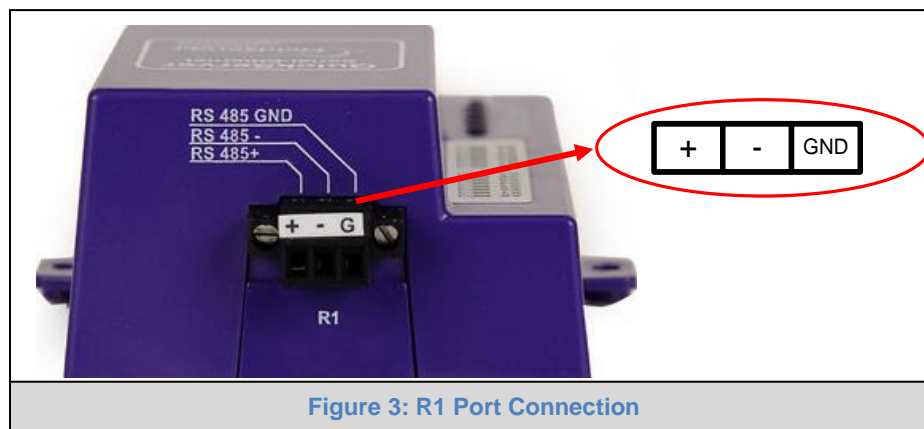
4.2.1 RS-485 Connection R2 Port

Connect to the 3 pins on the left side of the 6 pin connector as shown.



4.2.2 RS-485 Connection R1 Port

Connect to the 3-pin connector as shown.



4.2.3 Supported RS-485 Baud Rates by Protocol

The supported baud rates for either port are based on the protocol of the connected devices.

The following baud rates are supported for Modbus RTU:

2400, 4800, 9600, 19200, 38400, 57600, 76800, 115200

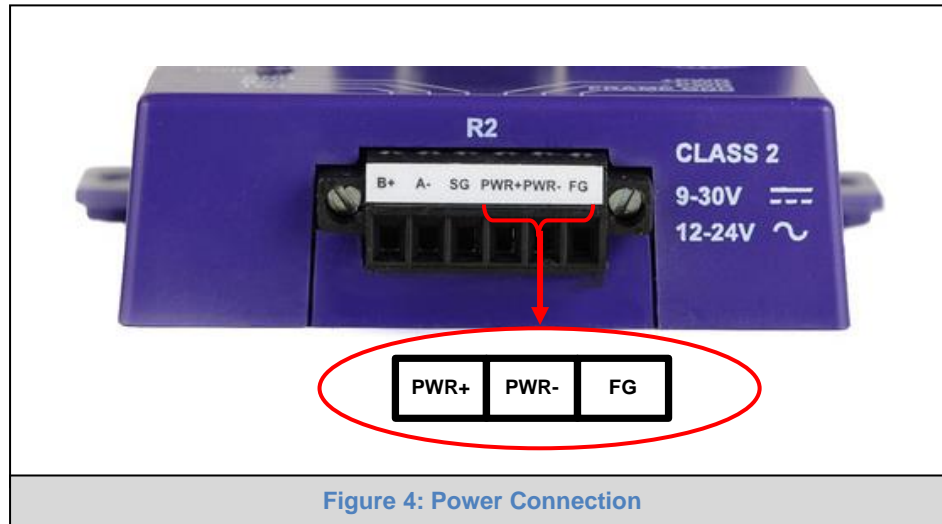
The following baud rates are supported for BACnet MS/TP:

9600, 19200, 38400, 76800

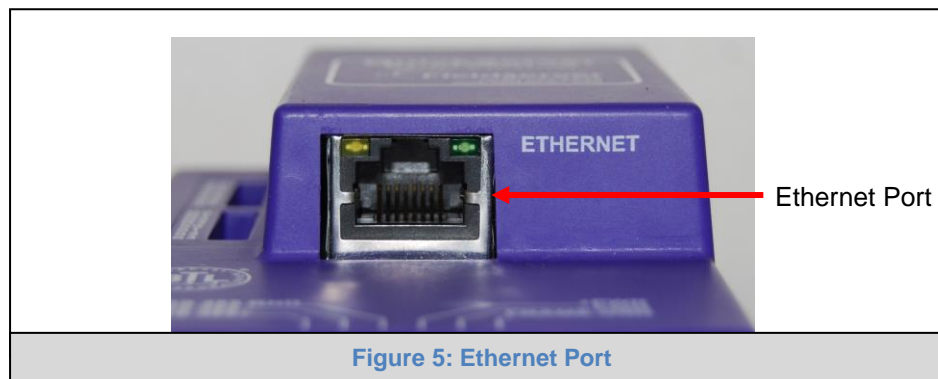
5 OPERATION

5.1 Power up the Device

Apply power to the device. Ensure that the power supply used complies with the specifications provided in [Appendix B.1](#). Ensure that the cable is grounded using the “Frame GND” terminal. The EZ Gateway requires a power supply that provides 9-30V DC or 12-24V AC.



5.2 Connect the PC to the EZ Gateway over the Ethernet Port



- Connect an Ethernet cable between the PC and EZ Gateway or connect the EZ Gateway and the PC to the switch using a straight CAT5 cable.
- The Default IP Address of the EZ Gateway is **192.168.2.101**, Subnet Mask is **255.255.255.0**.

5.3 Connecting to the EZ Gateway

5.3.1 Using the FieldServer Toolbox to Discover and Connect to the EZ Gateway

- Install the Toolbox application from the USB drive or download it from the [Sierra Monitor website](#).
- Use the Toolbox application to find the EZ Gateway and launch the Web Configurator GUI.

NOTE: If the connect button is greyed out, the EZ Gateway's IP Address must be set to be on the same network as the PC. (Section 5.3.2)



5.3.2 Using Web Configurator GUI

- Open a web browser and connect to the EZ Gateway's default IP Address. The default IP Address of the BACnet Router is **192.168.2.101**, Subnet Mask is **255.255.255.0**.
- If the PC and the EZ Gateway are on different IP networks, assign a static IP Address to the PC on the 192.168.2.X network.

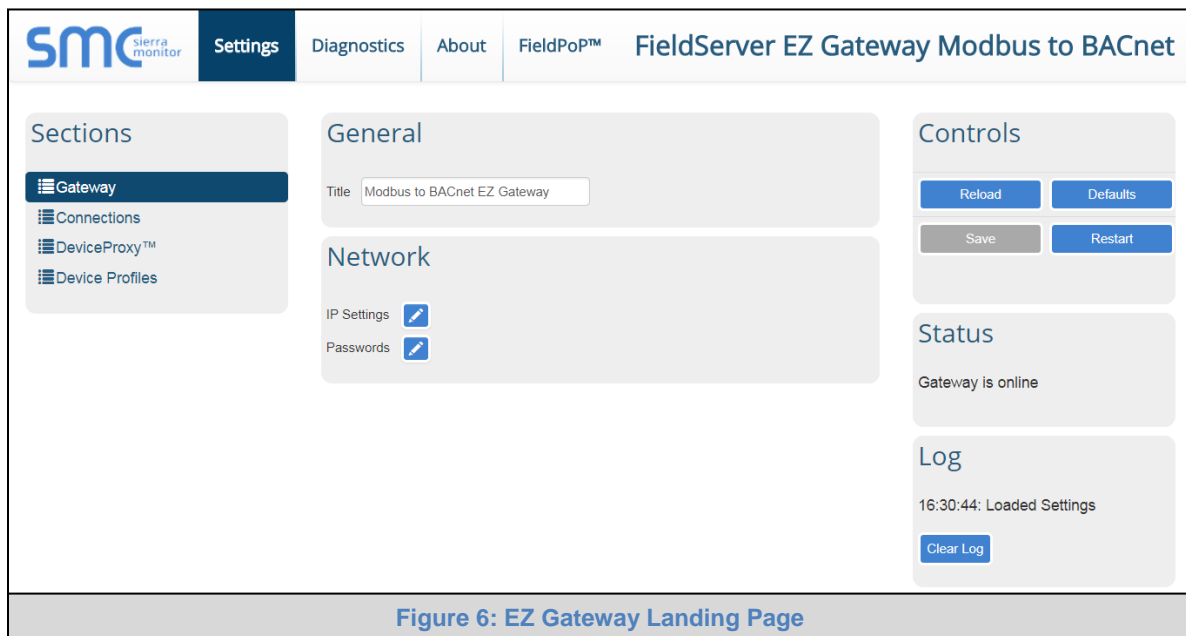



Figure 6: EZ Gateway Landing Page

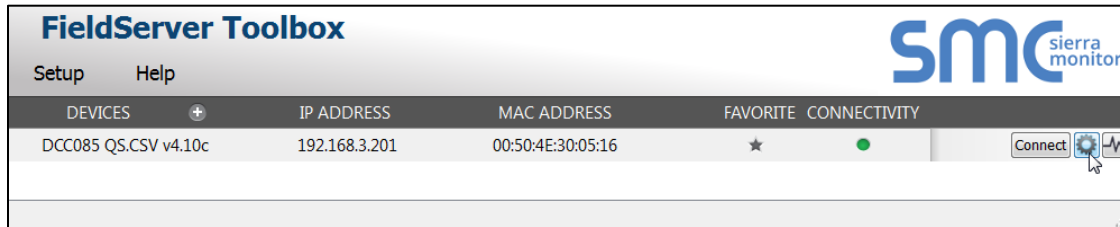
5.3.3 Accessing FieldPoP

The FieldPoP™ tab  (see Figure 6) allows users to connect to FieldPoP, Sierra Monitor's device cloud solution for the IIoT. FieldPoP enables secure remote connection to field devices through a FieldServer and its local applications for configuration, management, maintenance. For more information about FieldPoP, refer to the [FieldPoP™ Device Cloud Start-up Guide](#).

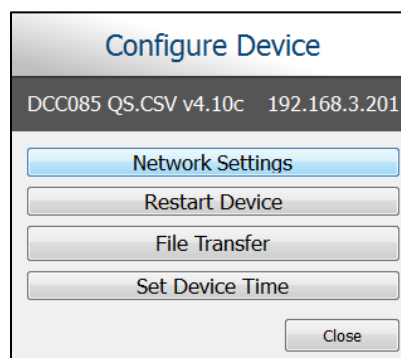
5.4 Set the IP Address of the EZ Gateway

5.4.1 Using the Toolbox Application to Set the Network Settings

- From the Toolbox main page, click on the setup button (gear icon).



- Select Network Settings in the Configure Device Window.



- Modify the IP Address (N1 IP Address field) of the EZ Gateway Ethernet port.
 - The following fields may also be changed as needed: Netmask (N1 Netmask field), DHCP Client State (N1 DHCP Client State field), IP Gateway (Default Gateway field) and DNS 1 & 2 (Domain Name Server fields)

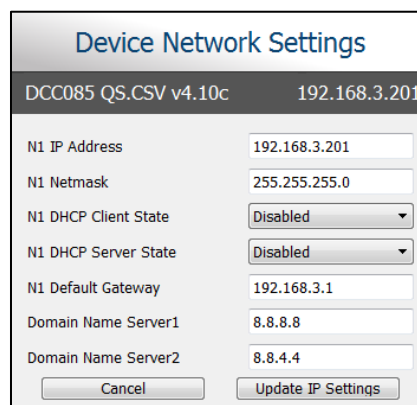
NOTE: If the EZ Gateway is connected to a router, the IP Gateway of the EZ Gateway should be set to the IP Address of the connected router.

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

NOTE: If DNS settings are unknown, set DNS1 to “8.8.8.8” and DNS2 to “8.8.4.4”.

- Click “Update IP Settings”, then click on the “Change and Restart” to restart the Gateway and activate the new IP Address.

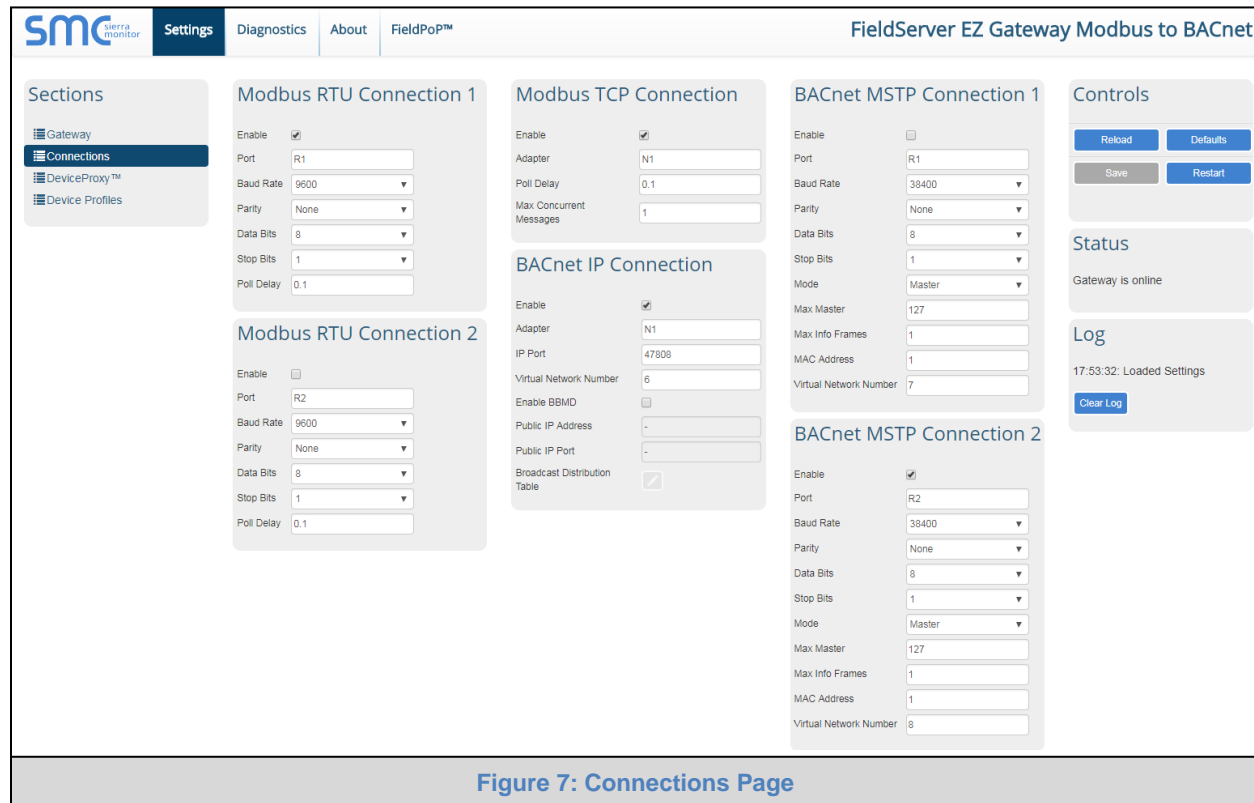
NOTE: If the Web Configurator GUI was open in a browser, the browser will need to be pointed to the new IP Address of the EZ Gateway before the GUI will be accessible again.



6 CONFIGURING THE EZ GATEWAY

6.1 Setting up the Connections

- The Connections page is used to setup the connection ports and parameters.



The screenshot displays the 'FieldServer EZ Gateway Modbus to BACnet' configuration page. The left sidebar shows 'Sections' with 'Gateway', 'Connections' (selected), 'DeviceProxy™', and 'Device Profiles'. The main content area is divided into several configuration panels:

- Modbus RTU Connection 1:** Enable (checked), Port (R1), Baud Rate (9600), Parity (None), Data Bits (8), Stop Bits (1), Poll Delay (0.1).
- Modbus RTU Connection 2:** Enable (unchecked), Port (R2), Baud Rate (9600), Parity (None), Data Bits (8), Stop Bits (1), Poll Delay (0.1).
- Modbus TCP Connection:** Enable (checked), Adapter (N1), Poll Delay (0.1), Max Concurrent Messages (1).
- BACnet IP Connection:** Enable (checked), Adapter (N1), IP Port (47808), Virtual Network Number (6), Enable BBMD (unchecked), Public IP Address (-), Public IP Port (-), Broadcast Distribution Table (checked).
- BACnet MSTP Connection 1:** Enable (unchecked), Port (R1), Baud Rate (38400), Parity (None), Data Bits (8), Stop Bits (1), Mode (Master), Max Master (127), Max Info Frames (1), MAC Address (1), Virtual Network Number (7).
- BACnet MSTP Connection 2:** Enable (checked), Port (R2), Baud Rate (38400), Parity (None), Data Bits (8), Stop Bits (1), Mode (Master), Max Master (127), Max Info Frames (1), MAC Address (1), Virtual Network Number (8).

On the right side, the **Controls** section includes 'Reload', 'Defaults', 'Save', and 'Restart' buttons. The **Status** section indicates 'Gateway is online'. The **Log** section shows a timestamp '17:53:32: Loaded Settings' and a 'Clear Log' button.

Figure 7: Connections Page

- Click the Save button in the Controls section once completed.

6.2 Creating Device EZ Profiles

- Click on the fields under Profile Name to enter the name of the EZ Profiles.

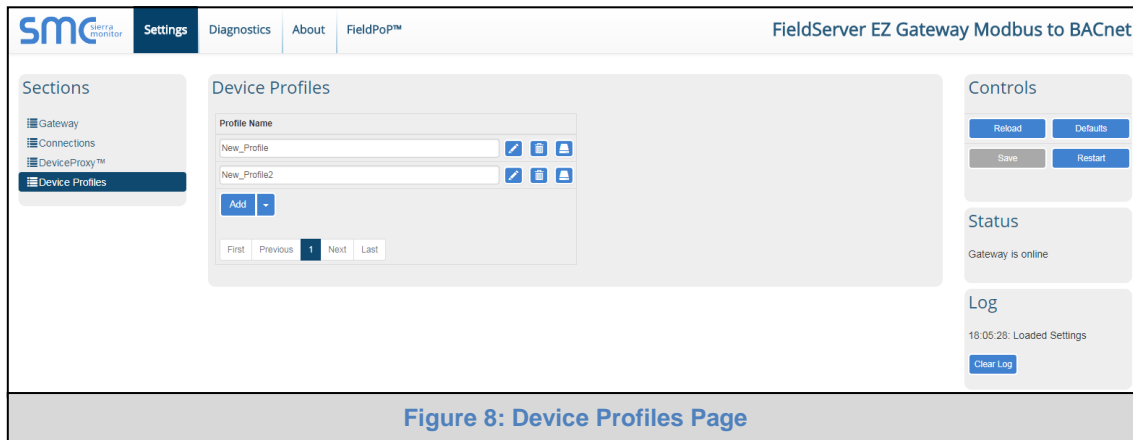


Figure 8: Device Profiles Page

- Click on the Edit button (pencil icon) next to the name.
- Choose the Modbus addressing parameters.

NOTE: See for [Appendix B.4](#) additional information on Address Type.



Figure 9: Edit Profile Window

- Click on the Data Map tab and add the first Modbus address range.

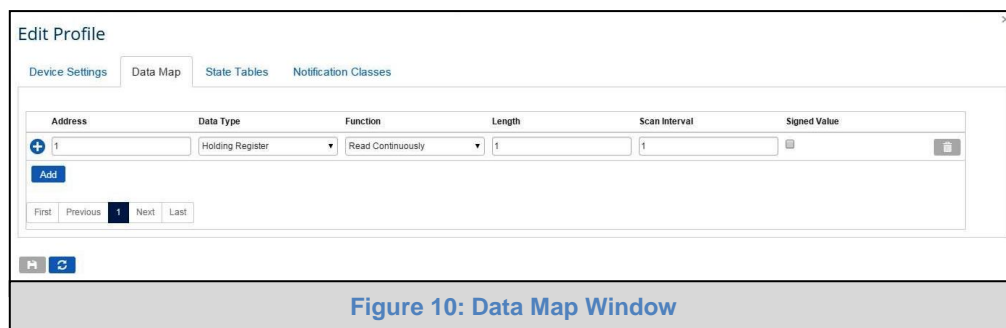


Figure 10: Data Map Window

- Click on the blue plus sign icon on the left side of the Address to map the BACnet Addresses to the Modbus Registers.

Figure 11: Mapping BACnet Addresses to Modbus Registers

NOTE: The Advanced button (eye icon) allows additional settings, including: Intrinsic Reporting, Bit Extraction, scaling and more.

- Repeat for all of the Modbus registers.
- If using a BACnet State Table, click on the “State Table” tab to define the table and its variables.

Figure 12: State Table Window

- To define a Notification Class, click the “Notification Class” tab and define the parameters as needed.

Figure 13: Notification Class Window

- Once all mappings and settings are defined, click the “Save” button in the bottom left corner of the window to record the Profile.

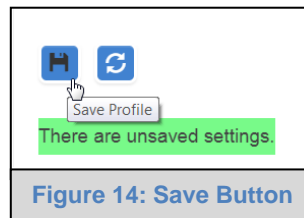


Figure 14: Save Button

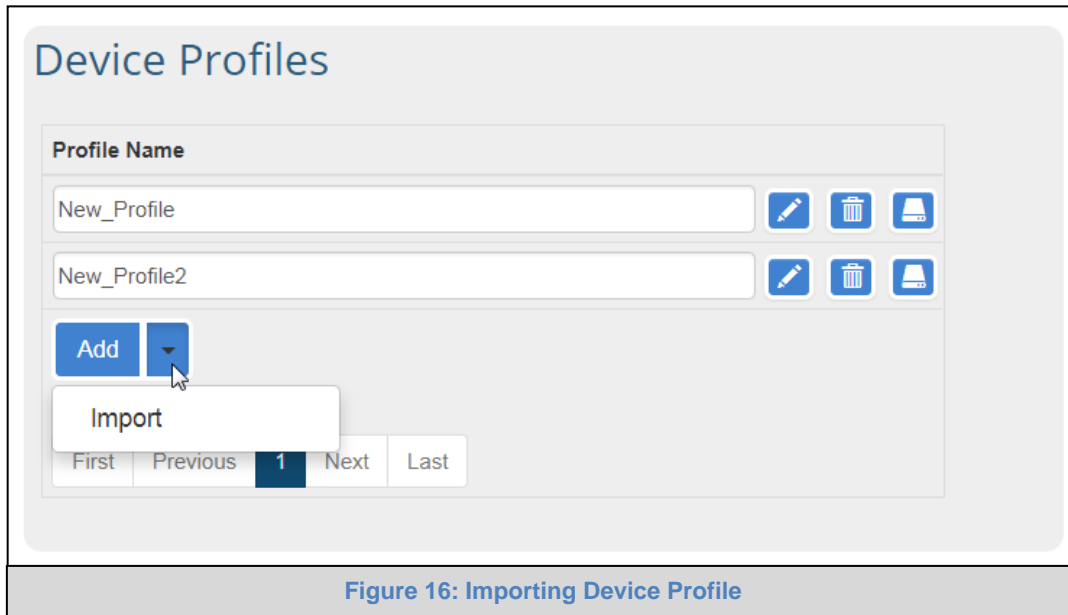
- Back on the Device Profiles page, the profile can be exported for backup or future use by hitting the Export Profile button (harddrive icon).

Figure 15: Export Profile

- The profile downloads to the local computer in the format: <Profile Name>.profile

6.3 Importing a Device Profile

- Profiles on the local computer can be imported to the EZ Gateway by going to the Device Profiles section and hitting the arrow to the right of the Add button.



NOTE: All profiles will need to be created or imported to the EZ Gateway before proceeding.

6.4 Mapping BACnet Output with Device EZ Profiles

- Click on the DeviceProxy™ button.
- Choose the Device Profile to load from the drop down menu.

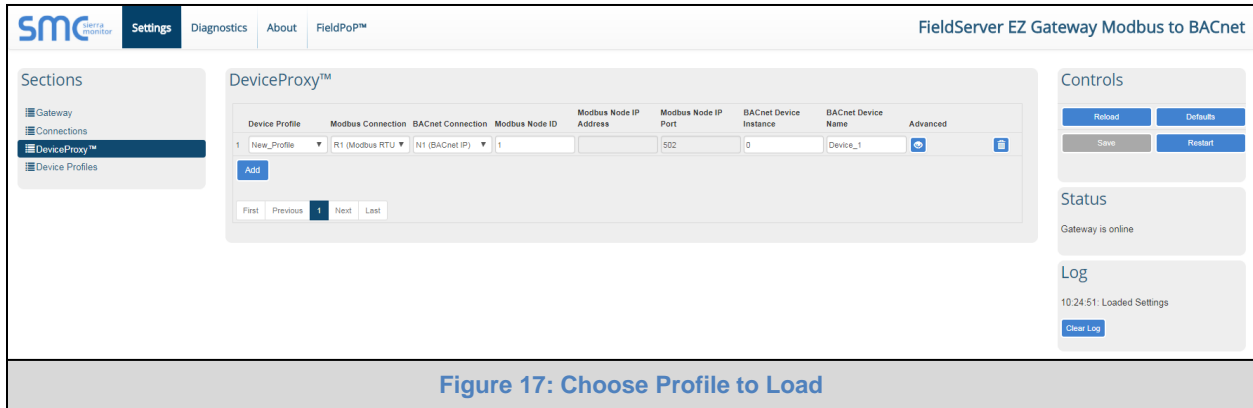
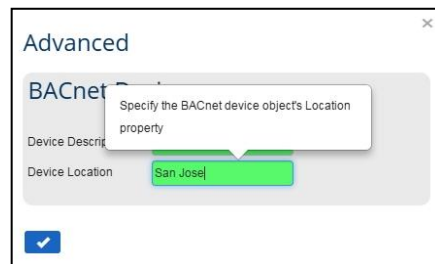


Figure 17: Choose Profile to Load

NOTE: If required, click the Advanced Settings button (eye icon) to enter the Device Description and Device Location.



- Choose the appropriate connection and Node ID/BACnet Device Instance for both the incoming Modbus device and the mapped BACnet output.
- Click Add to include additional device profiles in the Configuration.
- Repeat for all Modbus devices intended to connect to the EZ Gateway.
- Click the Save button in the Controls section once all device EZ Profiles are added and then click the Restart button to reset the system.

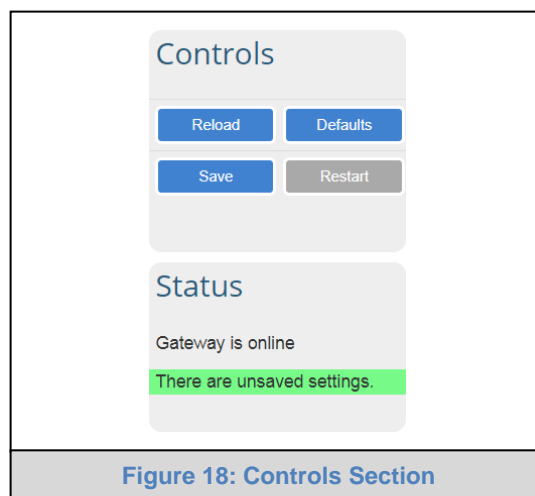


Figure 18: Controls Section

6.5 Test and Commission the EZ Gateway

- Connect the EZ Gateway to the third party device(s), and test the application.
- Click on the Diagnostic button to view to get to the FS-GUI.
- From the landing page of the FS-GUI click on View in the navigation tree, then Connections to see the number of messages on each protocol.

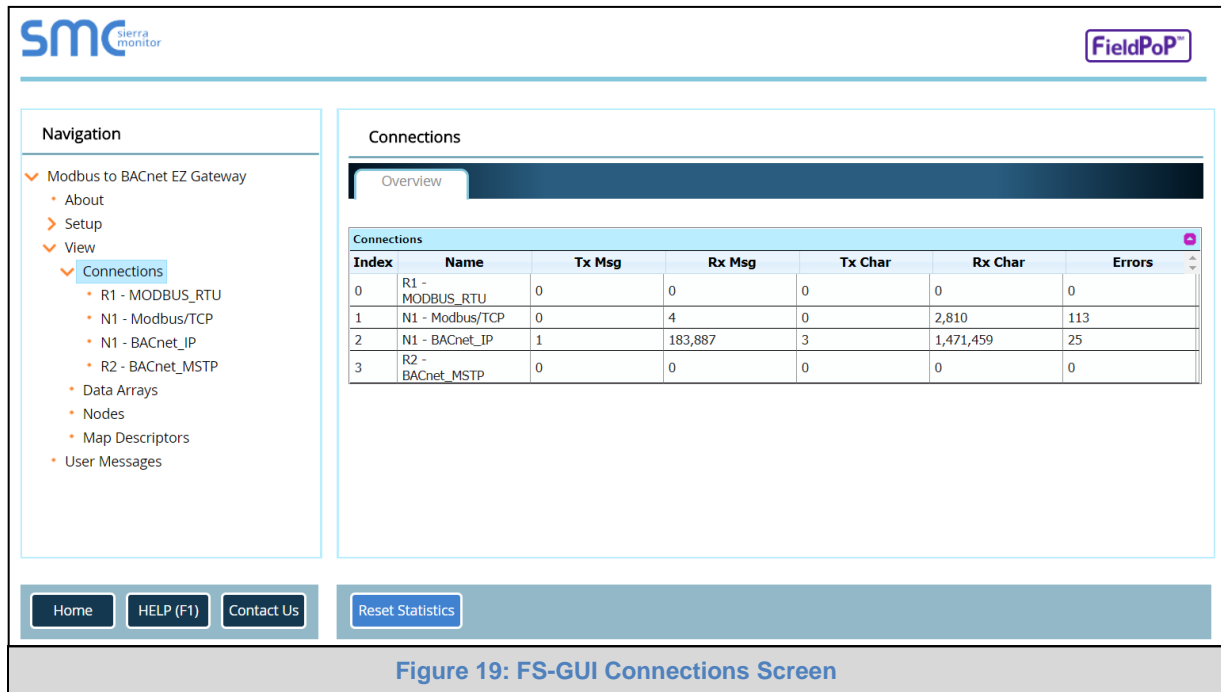


Figure 19: FS-GUI Connections Screen

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

NOTE: The FieldPoP™ button  (see [Figure 19](#)) allows users to connect to FieldPoP, Sierra Monitor's device cloud solution for IIOT. FieldPoP enables secure remote connection to field devices through a FieldServer and its local applications for configuration, management, maintenance. For more information about FieldPoP, refer to the [FieldPoP™ Device Cloud Start-up Guide](#).

Appendix A Troubleshooting

Appendix A.1. Communicating with the EZ Gateway over the Network

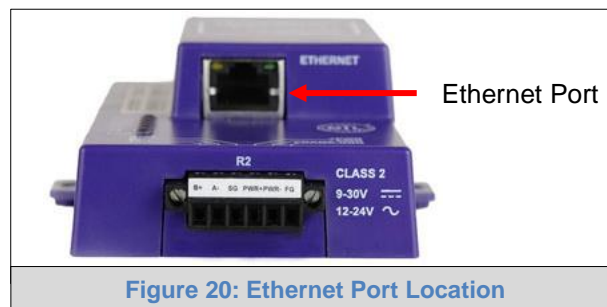
- Confirm that the network cabling is correct.
- Confirm that the computer network card is operational and correctly configured.
- Confirm that there is an Ethernet adapter installed in the PC's Device Manager List, and that it is configured to run the TCP/IP protocol.
- Check that the IP netmask of the PC matches the EZ Gateway. The Default IP Address of the EZ Gateway is 192.168.2.X, Subnet Mask is 255.255.255.0.
 - Go to Start|Run
 - Type in "ipconfig"
 - The account settings should be displayed
 - Ensure that the IP Address is 102.168.2.X and the netmask 255.255.255.0
- Ensure that the PC and EZ Gateway are on the same IP Network, or assign a Static IP Address to the PC on the 192.168.2.X network.

Appendix A.1. 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 support@sierramonitor.com for evaluation. The diagnostic capture assists technical support to quickly solve the problem.

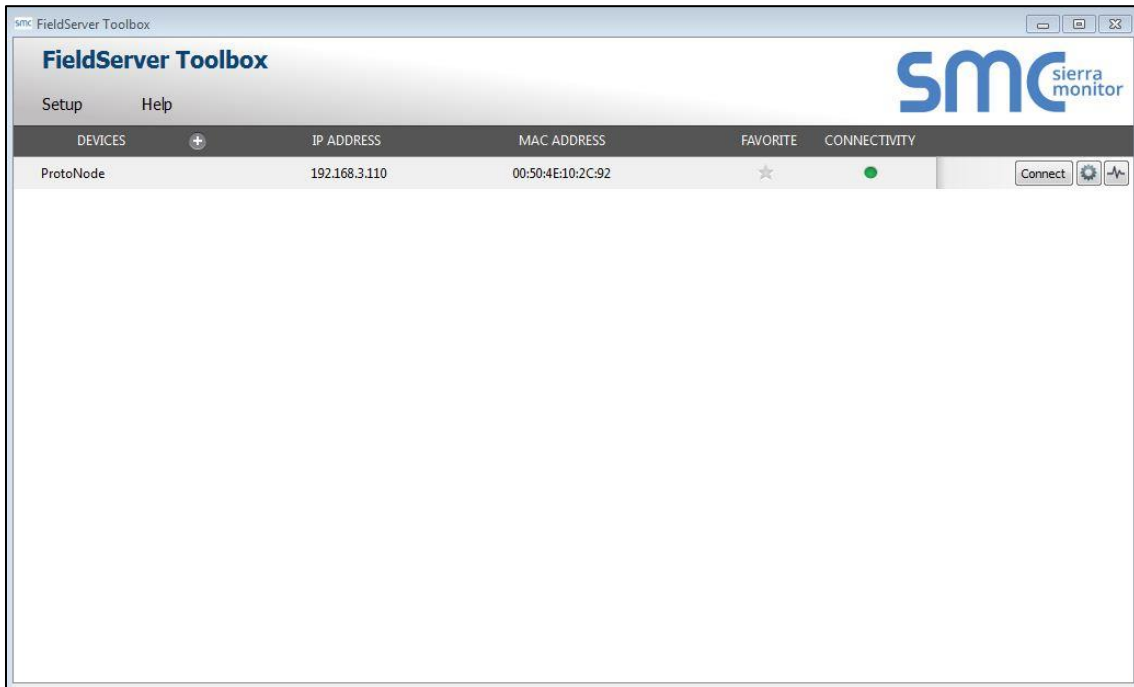
NOTE: While all necessary documentation is shipped with the FieldServer on the USB flash drive, these documents are constantly being updated. Newer versions may be available on the [Sierra Monitor Resource Center website](#).

- Ensure that FieldServer Toolbox is loaded onto the local PC. Otherwise, download the FieldServer-Toolbox.zip via the Sierra Monitor Resource Center [Software Downloads](#).
- Extract the executable file and complete the installation.

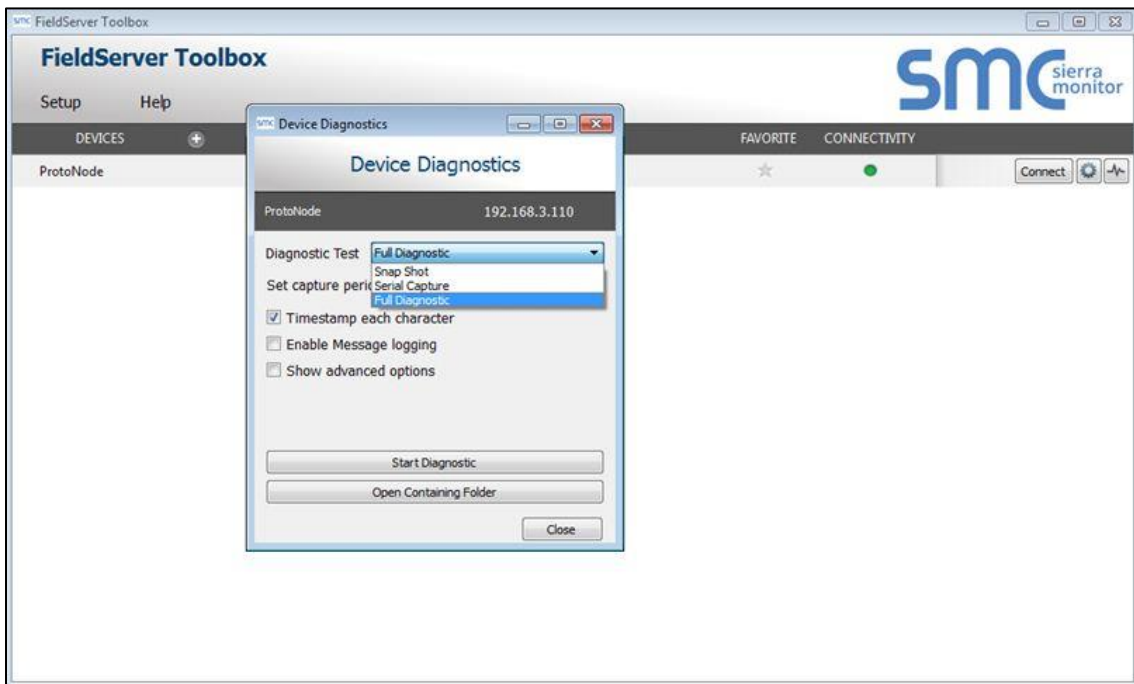


- Connect a standard CAT5 Ethernet cable between the PC and ProtoNode.
- Double click on the FS Toolbox Utility.

- **Step 1: Take a Log**
 - Click on the diagnose icon  of the desired device

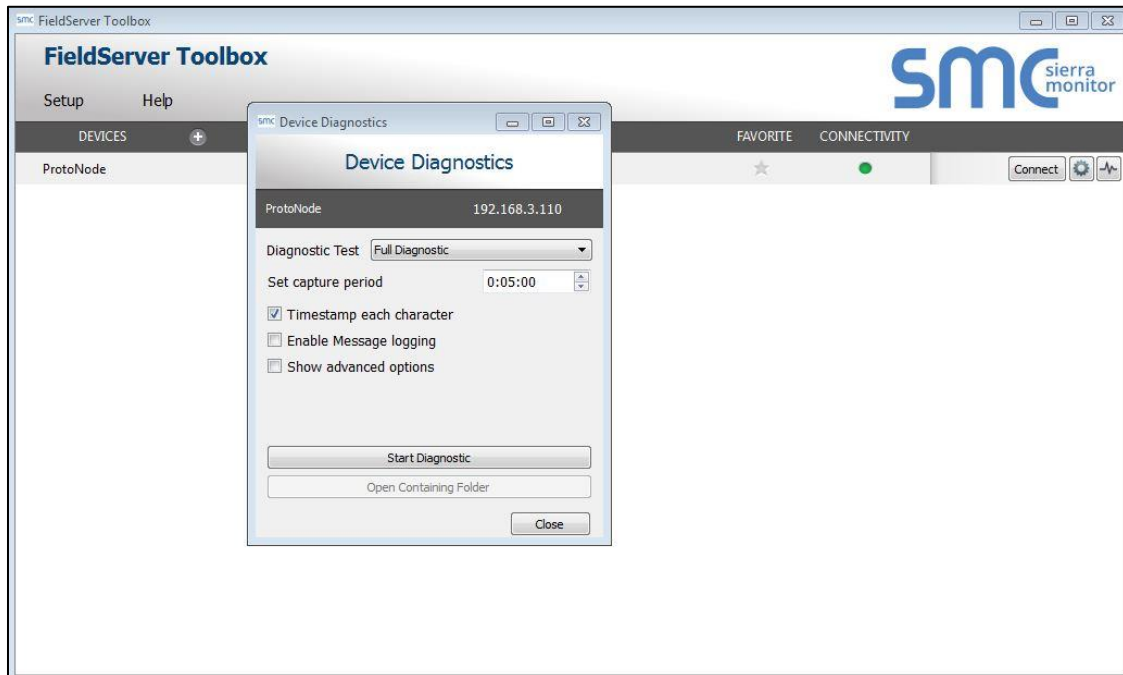


- Ensure "Full Diagnostic" is selected (this is the default)



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

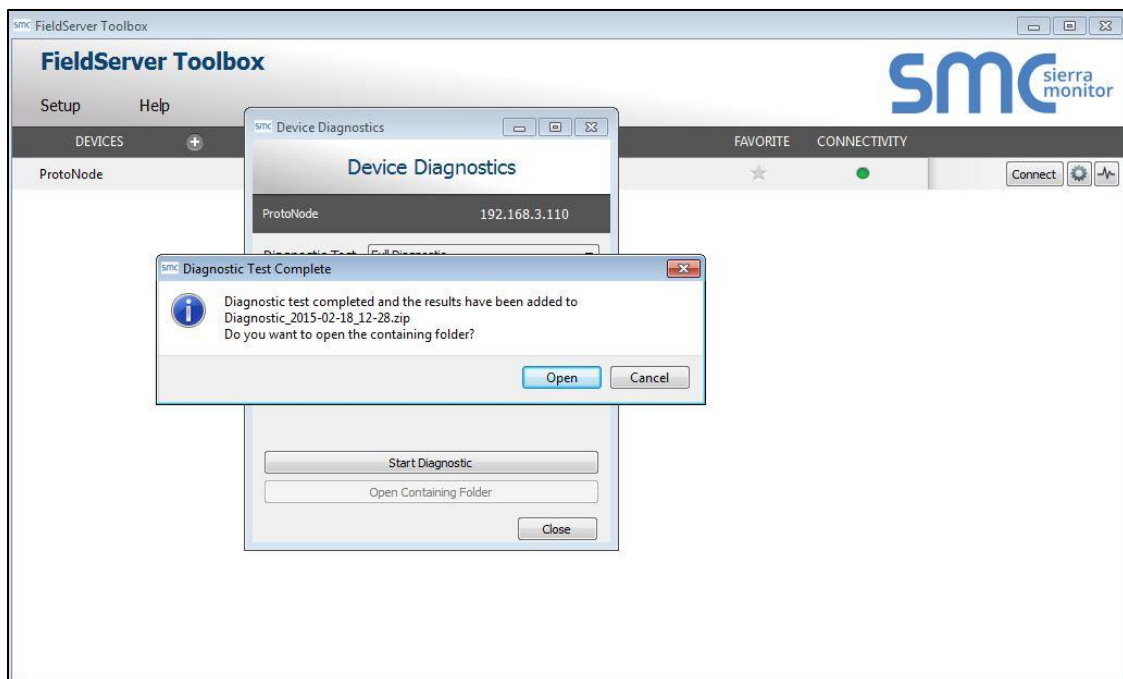
- Click on “Start Diagnostic”



- Wait for Capture period to finish, then 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



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

 Diagnostic_2014-07-17_20-15.zip	2014/07/17 20:16	zip Archive	676 KB
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Appendix A.2. Notes Regarding Subnets and Subnet Masks

RFC standards allocate the IP Address range of 192.0.0.0 through to 223.255.255.255 to be used in Class-C subnetting (Subnets listed as 255.255.255.xxx, where xxx can vary based on filtering required).

Consequently, the IP stack for this product will not allow any IP Addresses in this range to be allocated a subnet that does not fall within the Class C range.

Appendix A.3. LED Functions



Figure 21: LED allocation

Light	Description
SPL	SPL LED will be on when a configured node in the EZ Gateway is detected as being offline. For details, check the FS-GUI Node overview screen in FS-GUI (click “View” then “Nodes”).
RUN	RUN LED will flash 20 seconds after power up, signifying normal operation. The EZ Gateway will be able to access the Web Configurator GUI (Section 5.3) once this LED starts flashing. During the first 20 seconds, the LED should be off.
ERR	The ERR LED will go on solid 15 seconds after power up. It will turn off after 5 seconds. A steady red light will indicate there is a system error on the FieldServer. If this occurs, immediately report the related “system error” shown in the FS-GUI User Messages error screen to technical support for evaluation.
RX	On normal operation, the RX LED will flash when a message is received on the field port of the EZ Gateway.
TX	On normal operation, the TX LED will flash when a message is sent on the field port of the EZ Gateway.
PWR	This is the power light and should show steady green at all times when the EZ Gateway is powered.

Appendix B Reference

Appendix B.1. Specifications²



FS-EZX-MOD-BAC	
Available Ports	One 6-pin Phoenix connector with: RS-485 port (+ / - / gnd) Power port (+ / - / Frame-gnd) One 3-pin Phoenix connector with: RS-485 port (+ / - / gnd) One Ethernet 10/100 BaseT port
Power Requirements	Input Voltage: 9-30V DC or 12-24V AC Input Power Frequency: 50/60 Hz. Power Rating: 2.5 Watts Current draw @ 12V, 150 mA
Approvals	TUV approved to UL 916 Standard RoHS Compliant FCC Part 15 Compliant CE Mark BTL Mark
Surge Suppression	
EN61000-4-2 ESD EN61000-4-3 EMC EN61000-4-4 EFT	
Physical Dimensions (excluding the external power supply)	
(WxDxH)	5.05 x 2.91 x 1.6 in. (12.82 x 7.39 x 4.06 cm) excluding mounting tabs
Weight	0.4 lbs (0.2 Kg)
Environment	
Operating Temperature:	-40°C to 75°C (-40°F to 167°F)
Humidity:	5 - 90% RH (non-condensing)

"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 Sierra Monitor could void the user's authority to operate the equipment under FCC rules".

² Specifications subject to change without notice.

Appendix B.2. Compliance with UL Regulations

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

- 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 EZ Gateway
- 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.

Appendix B.3. Dimension Drawing FS-EZX-MOD-BAC

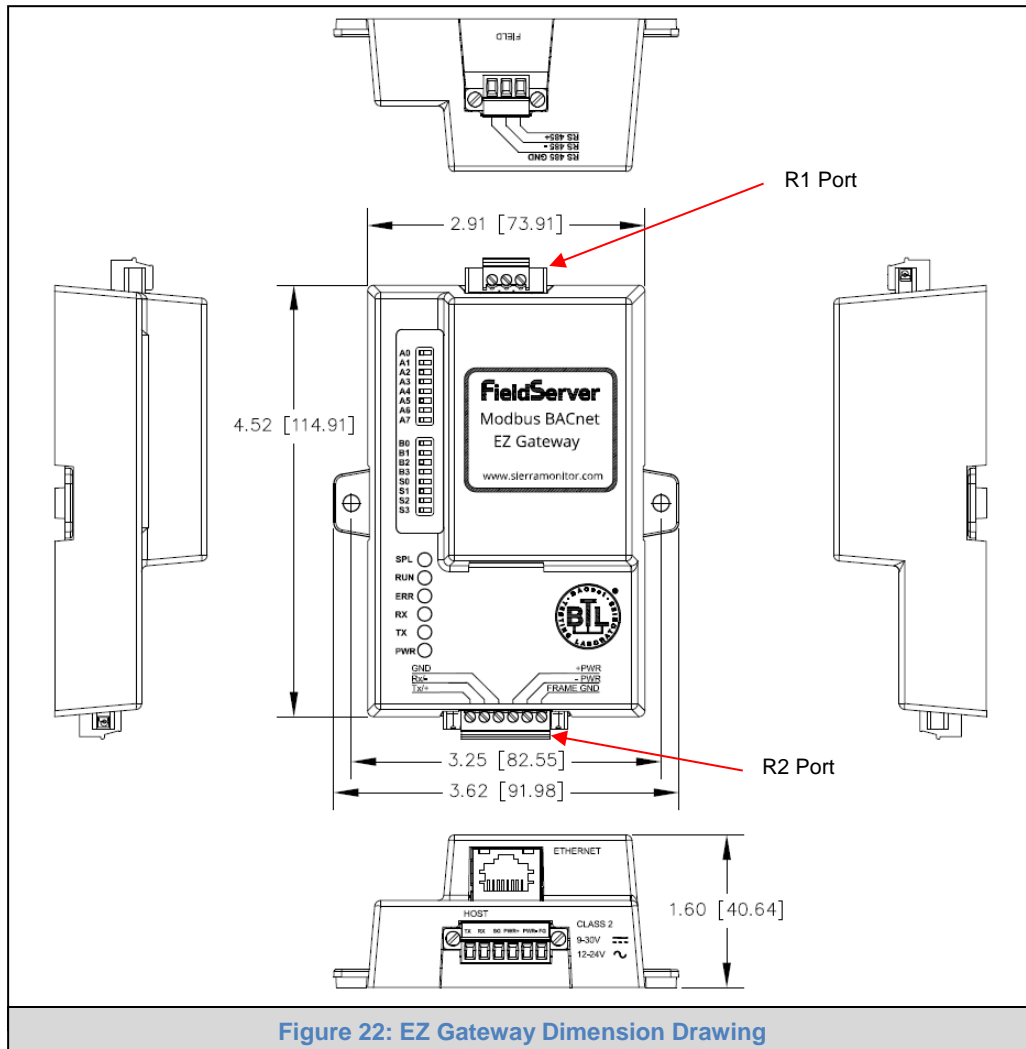


Figure 22: EZ Gateway Dimension Drawing

Appendix B.4. Address Types and Data Types

If the node parameter Address_Type is set as ADU or PDU, then Data_Type must be specified as follows.

For Address_Type ADU:

Address range	Data_Type	Function Code (Write)	Function Code (Read)
1 - 65536	Coil	15	1
1 – 65536	Discrete_Input	n/a.	2
1 – 65536	Input_Register	n/a.	4
1 - 65536	Holding_Register	16	3

For Address_Type PDU:

Address range	Data_Type	Function Code (Write)	Function Code (Read)
0 - 65535	FC01	15	1
0 – 65535	FC02	n/a.	2
0 – 65535	FC04	n/a.	4
0 – 65535	FC03	16	3

For Address_Type Modicon_5digit:

When a Modbus address range is specified, a particular Data Type is implied. The defaults are shown below.

Address range	Data_Type	Function Code (Write)	Function Code (Read)
00001 - 09999	Coil	5,15	1
10001 - 19999	Discrete_Input	n/a.	2
30001 - 39999	Input_Register	n/a.	4
40001 - 49999	Holding_Register	6,16	3

Appendix C Limited 2 Year Warranty

Sierra Monitor Corporation warrants its products to be free from defects in workmanship or material under normal use and service for two years after date of shipment. Sierra Monitor Corporation 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 Sierra Monitor Corporation 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 Sierra Monitor Corporation'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 Sierra Monitor Corporation'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, Sierra Monitor Corporation 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 Sierra Monitor Corporation for damages including, but not limited to, consequential damages arising out of/or in connection with the use or performance of the product.