ProtoAir FPA-W44
Start-up Guide

For Interfacing Pure Humidifier Products:

Intac, Click_PLC_INTAC

To Building Automation Systems:

BACnet MS/TP, BACnet/IP, Modbus TCP/IP, Metasys N2 and SMC Cloud

APPLICABILITY & EFFECTIVITY

Explains ProtoAir hardware and how to install it.

The instructions are effective for the above as of November 2019.

Document Revision: 5.A
Auto Discovery/Web Configurator
Template Revision: 4

Technical Support

Thank you for purchasing the ProtoAir for Pure Humidifier.

Please call Pure Humidifier for technical support of the ProtoAir product.

Sierra Monitor Corporation does not provide direct support. If Pure Humidifier needs to escalate the concern, they will contact Sierra Monitor Corporation for assistance.

Support Contact Information:

Pure Humidifier Co
141 Jonathan Blvd N
Chaska, MN 55318

Customer Service:
952-368-9335

Email: info@purehumidifier.com

Website: www.purehumidifier.com

Quick Start Guide

1. Methods of Configuration: (**Section** 2.2)
   - Auto-Discovery: See **Figure 1** for the table of devices that support automatic configuration.
   - Web Configurator: For devices that cannot be automatically configured, use a web browser to access the Web Configurator page.
2. Record the information about the unit. (**Section** 3.1)
3. Check that the ProtoAir and customer device COM settings match. (**Section** 3.3)
4. Connect the ProtoAir 3 pin RS-485/RS-232 R1 port to the RS-485 or RS-232 network connected to each of the devices. (**Section** 4.1)
5. **If using a serial field protocol:**
   Connect the ProtoAir 3 pin RS-485 R2 port to the field protocol cabling. (**Section** 4.2)
6. Connect power to ProtoAir 3 pin power port. (**Section** 4.5)
7. Connect a PC to the ProtoAir via Ethernet cable. (**Section** 5)
8. Auto-Discovery Devices: On the Web Configurator page, click the Discovery Mode button at the bottom of the screen. It may take about 3 minutes for all the devices to be discovered and the configuration file to be built. (**Section** 6.3.1)
9. Web Configuration Devices: Use a web browser to access the ProtoAir Web Configurator page to select the profile of the device attached to the ProtoAir and enter any necessary device information. Once the device is selected, the ProtoAir automatically builds and loads the appropriate configuration. (**Section** 6.3.2)

TABLE OF CONTENTS

LIST OF FIGURES

1 CERTIFICATION

1.1 BTL Mark – BACnet®[1] Testing Laboratory

The BTL Mark on ProtoAir 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.

[1] BACnet is a registered trademark of ASHRAE

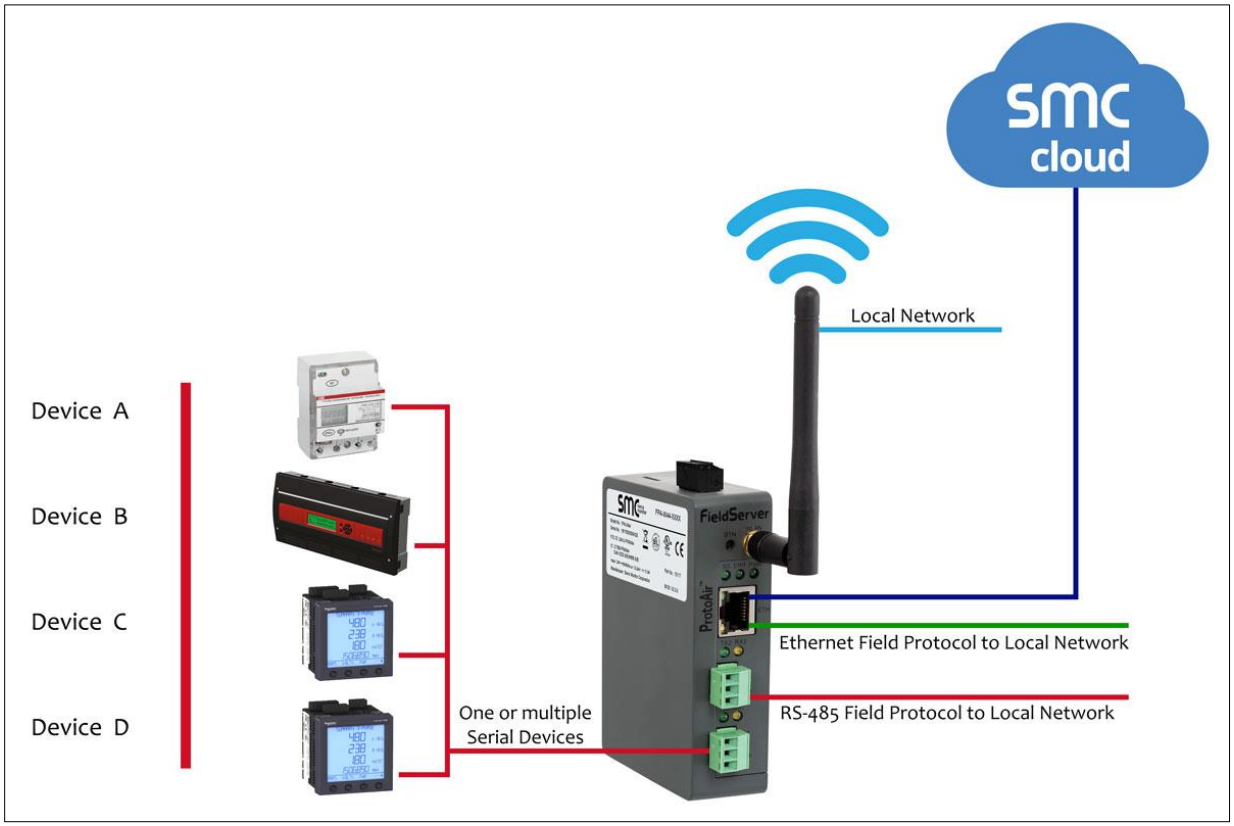
2 INTRODUCTION

2.1 ProtoAir Gateway

The ProtoAir wireless gateway is an external, high performance **building automation multi-protocol gateway** that is preconfigured to automatically communicate between Pure Humidifier's devices (hereafter simply called "device") connected to the ProtoAir and automatically configures them for BACnet/IP, BACnet MS/TP, Modbus TCP/IP and Metasys®[2] N2.

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

FPA-W44 Connectivity Diagram:



The ProtoAir can connect with Sierra Monitor's SMC Cloud. The SMC Cloud allows technicians, the OEM's support team and Sierra Monitor's support team to remotely connect to the ProtoAir. The SMC Cloud provides the following capabilities for any registered devices in the field:

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

For more information about the SMC Cloud, refer to the SMC Cloud Start-up Guide.

[2] Metasys is a registered trademark of Johnson Controls Inc.

2.2 Methods of Configuration

The ProtoAir offers two methods of configuration:

- **Auto-Discovery:** Supported RS-485 devices can be automatically detected and identified for addition to the ProtoAir's configuration via the ProtoAir's Web Configurator. (**Section** 6.3.1)
- **Web Configurator:** Devices that cannot be identified by Auto-Discovery must be configured to the gateway by selecting profiles on the ProtoAir's Web Configurator. The Web Configurator shows all the stored profiles/devices on the ProtoAir. It will also show all the devices that were previously discovered or selected. To configure, select a device and enter the Station Address. Once all required device profiles are saved, the ProtoAir automatically builds and downloads the configuration for the desired protocol. (**Section** 6.3.2)

Devices	Communication	Connection Type	Type of Configuration
Intac	Modbus RTU	RS-485	Auto-Discovery
Click_PLC_INTAC	Modbus RTU	RS-232	Web-Configurator

Figure 1: Method of Configuration for the Devices

3 PROTOAIR SETUP

3.1 Record Identification Data

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

Model	Part Number
ProtoAir	FPA-W44-1732

Figure 2: ProtoAir Part Numbers

- FPA-W44 units have the following 4 ports: Ethernet + Wi-Fi + RS-485 + RS-485/RS-232

3.2 Point Count Capacity and Registers per Device

The total number of registers presented the device(s) attached to the ProtoAir cannot exceed:

Part number	Total Registers
FPA-W44-1732	1,500

Figure 3: Supported Point Count Capacity

Devices	Registers Per Device
Intac	90
Click_PLC_INTAC	29

Figure 4: Registers per Device

3.3 Configuring Device Communications

3.3.1 Confirm the Device and ProtoAir COM Settings Match

- **Any connected serial device MUST have the same baud rate, data bits, stop bits, and parity settings as the ProtoAir.**
- Figure 5 specifies the device serial port settings required to communicate with the ProtoAir.

Port Setting	Device
Protocol	Modbus RTU
Baud Rate	38400
Parity	None
Data Bits	8
Stop Bits	1

Figure 5: COM Settings

3.3.2 Set the Station Address for Any Device Attached to the ProtoAir

- Set the Station Address for the device attached to ProtoAir. The Station Address needs to be uniquely assigned between 1 and 255.
- Document the Station Address that is assigned. The Station Address assigned is used for deriving the Device Instance for BACnet/IP and BACnet MS/TP. (**Section 6.5**)

NOTE: The Metasys N2 and Modbus TCP/IP field protocol Station Addresses are automatically set to be the same value as the Station Address of the device.

3.4 Attaching the Antenna

Wi-Fi Antenna:

Screw in the Wi-Fi antenna to the front of the unit as shown in Figure 54.

NOTE: Using an external antenna is also an option. An external antenna can be plugged into the SMA connector. The best antenna for the job depends on the range, topography and obstacles between the two radios.

4 INTERFACING PROTOAIR TO DEVICES

4.1 Device Connections to ProtoAir

The ProtoAir has a 3-pin Phoenix connector for connecting RS-485 or RS-232 devices on the R1 port.

NOTE: Use standard grounding principles for RS-485 or RS-232 GND.

Device RS-485 Wiring	Device RS-232 Wiring	ProtoAir Pin Label
RS-485 +	RS-232 -	TX+
RS-485 -	RS-232 +	RX-
GND	GND	GND

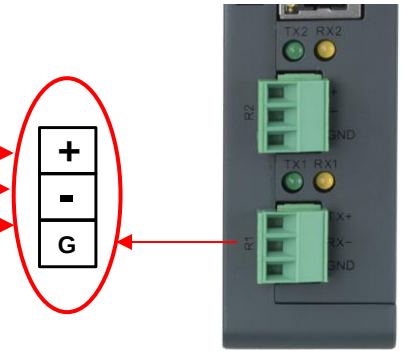
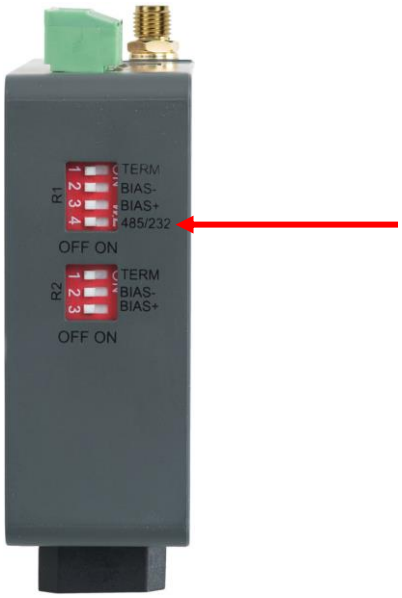


Figure 6: RS-485 and RS-232 Connections from Devices to the ProtoAir

To switch the R1 port between RS-485 and RS-232, move the number 4 DIP Switch left for RS-485 and right for RS-232.



R1 RS-485/RS-232
DIP Switch (4)

Figure 7: R1 Port RS-485/RS-232 DIP Switch

4.1.1 Intac Controller Connection

The ProtoAir has a 3-pin Phoenix connector for connecting RS-485 devices on the R1 port.

NOTE: Use standard grounding principles for RS-485 GND.

Intac Controller	ProtoAir Pin #	Pin Assignment
J3 Pin 1	Pin 1	RS-485 +
J3 pin 2	Pin 2	RS-485 -
J3 pin 3	Pin 3	RS-485 GND

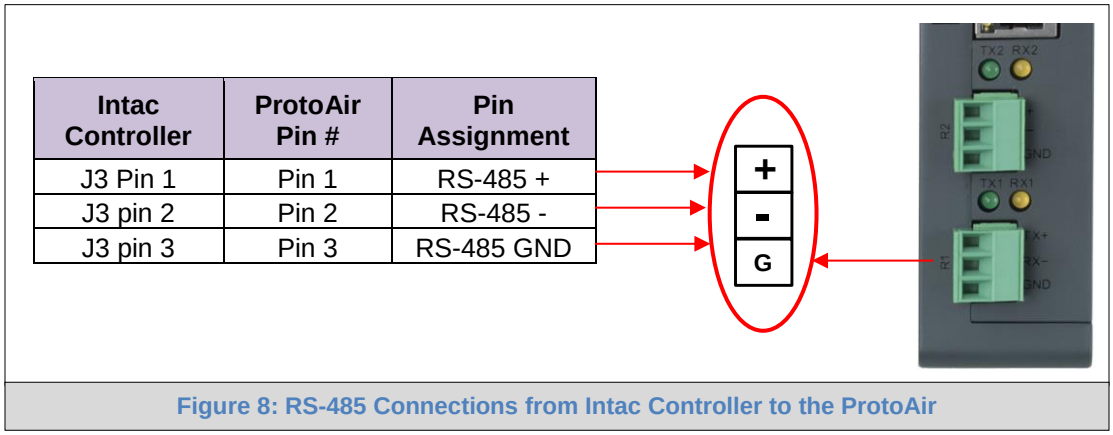


Figure 8: RS-485 Connections from Intac Controller to the ProtoAir

Connecting the Intac Controller's RS-485 DB9 Port or Terminal Block to the ProtoAir's Phoenix 3-pin Connector:

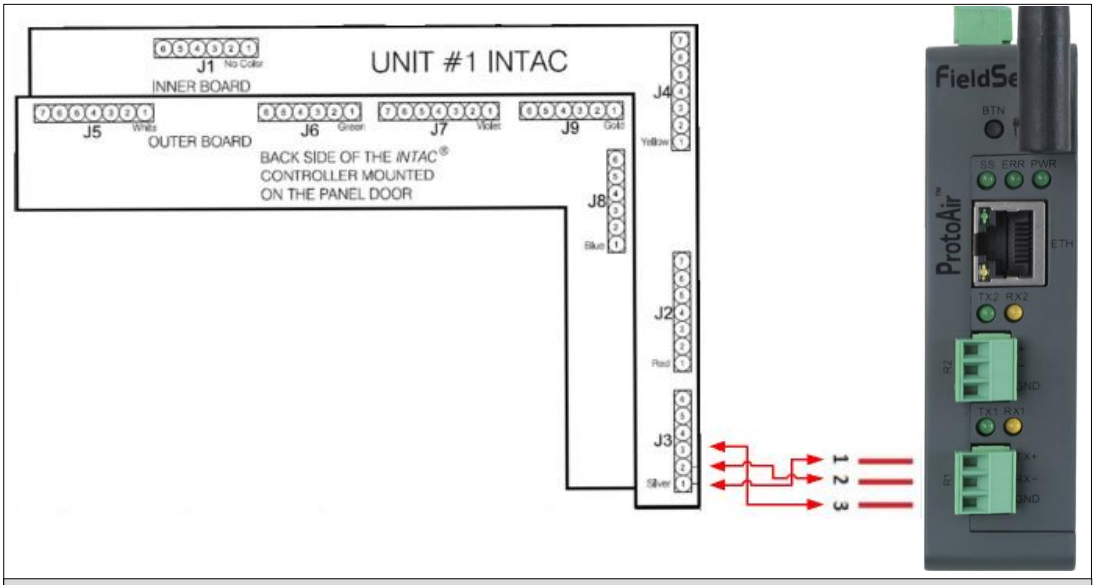


Figure 9: Intac Controller's Modbus RTU Wiring to the ProtoAir

4.2 Wiring Field Port to RS-485 Serial Network

- Connect the RS-485 network wires to the 3-pin RS-485 connector on the R2 port. (**Figure 10**)
  - Use standard grounding principles for RS-485 GND
- See **Section 5** for information on connecting to an Ethernet network.

BMS Wiring	ProtoAir Pin Label	Pin Assignment
RS-485 +	+	RS-485 +
RS-485 -	-	RS-485 -
-	GND	RS-485 GND

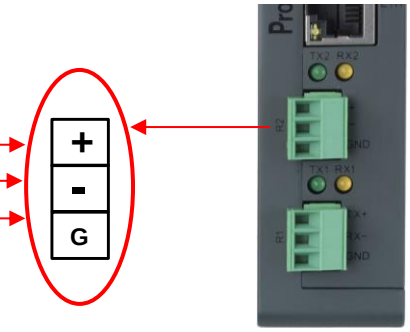


Figure 10: Connection from ProtoAir to RS-485 Field Network

4.3 Bias Resistors

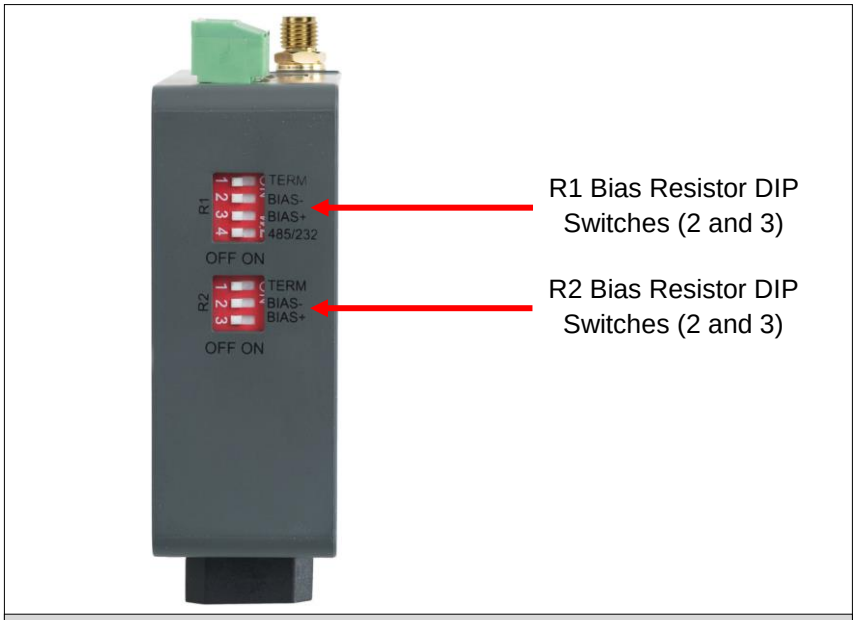


Figure 11: Bias Resistor DIP Switches

To enable Bias Resistors, move both the BIAS- and BIAS+ dip switches to the right as shown in Figure 11.

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

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

NOTE: See www.ni.com/support/serial/resinfo.htm for additional pictures and notes.

NOTE: The R1 and R2 DIP Switches apply settings to the respective serial port.

NOTE: If the gateway is already powered on, DIP switch settings will not take effect unless the unit is power cycled.

4.4 Termination Resistor

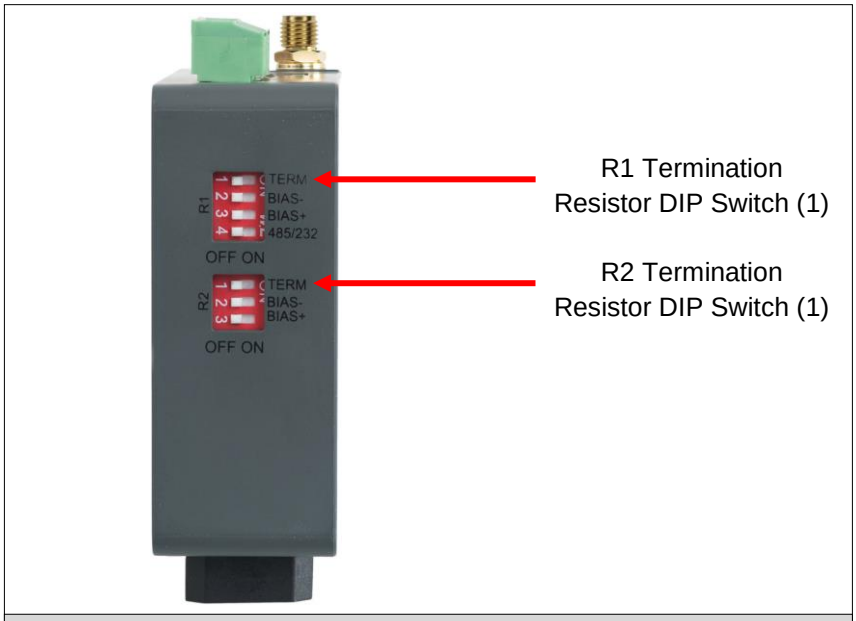


Figure 12: Termination Resistor DIP Switch

If the ProtoAir 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 12.**

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.

NOTE: The R1 and R2 DIP Switches apply settings to the respective serial port.

NOTE: If the gateway is already powered on, DIP switch settings will not take effect unless the unit is power cycled.

4.5 Power-Up ProtoAir

Check power requirements in the table below:

Power Requirement for ProtoAir External Gateway		
	Current Draw Type	
ProtoAir Family	12VDC	24VDC/AC
FPA – W44 (Typical)	250mA	125mA
NOTE: These values are 'nominal' and a safety margin should be added to the power supply of the host system. A safety margin of 25% is recommended.		

Figure 13: Required Current Draw for the ProtoAir

Apply power to the ProtoAir as shown below in **Figure 14.** Ensure that the power supply used complies with the specifications provided in **Appendix D.1**.

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

Power to ProtoAir	ProtoAir Pin Label	Pin Assignment
Power In (+)	L +	V +
Power In (-)	N -	V -
Frame Ground	FG	FRAME GND

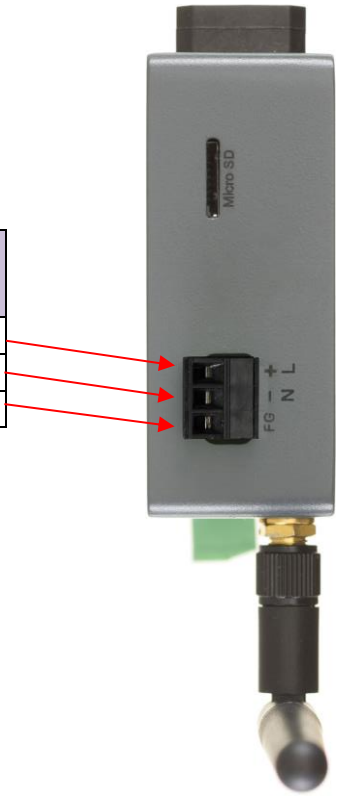


Figure 14: Power Connections

5 CONNECT THE PC TO THE PROTOAIR

5.1 Connecting to the ProtoAir via Ethernet

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

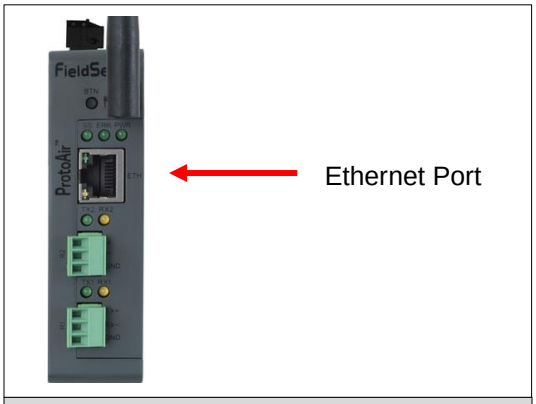


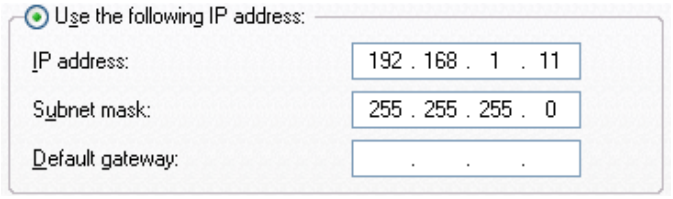
Figure 15: Ethernet Port Location

5.1.1 Changing the Subnet of the Connected PC

The default IP Address for the ProtoAir is **192.168.1.24**, Subnet Mask is **255.255.255.0**. If the PC and ProtoAir 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 taskbar (usually to the right of the windows icon) and type in "Control Panel".
- Click "Control Panel", click "Network and Internet" and then click "Network and Sharing Center".
- Click "Change adapter settings" on the left side of the window.
- Right-click on "Local Area Connection" and select "Properties" from the dropdown menu.
- Highlight 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:



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

6 CONFIGURE THE PROTOAIR

6.1 Accessing the ProtoAir Web Configurator

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

NOTE: If the IP Address of the ProtoAir has been changed, the IP Address can be discovered using the FS Toolbox utility. See Appendix A.1 for instructions.

- Once at the Web App splash page, click the Login button.

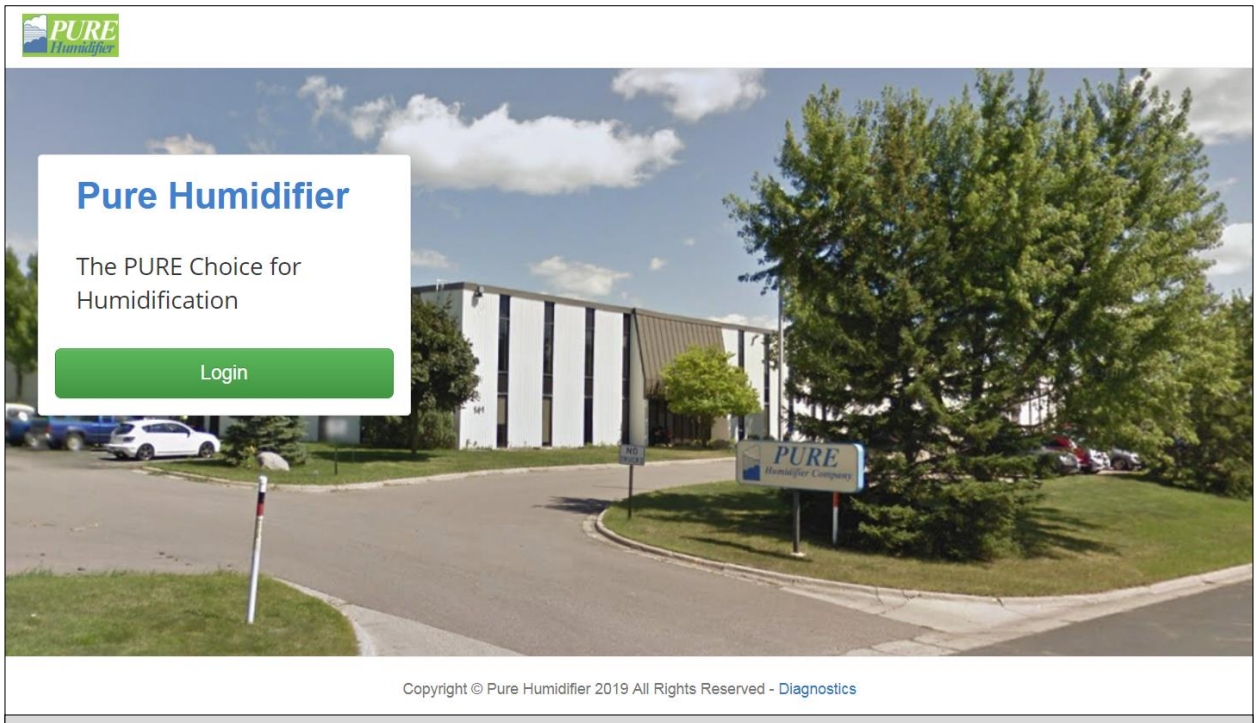


Figure 16: Web App Splash Page

- Enter the previously set up or default username and password.

NOTE: The default username is "admin". The default password is "admin".

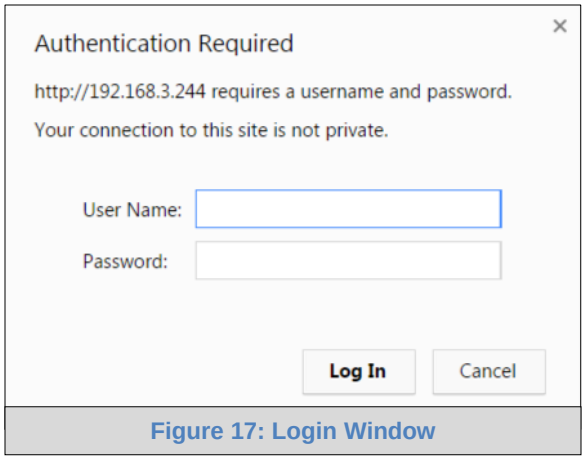


Figure 17: Login Window

- From the Web App landing page (Figure 18), click the Settings tab and then click Configuration.

Figure 18: Web App Landing Page

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

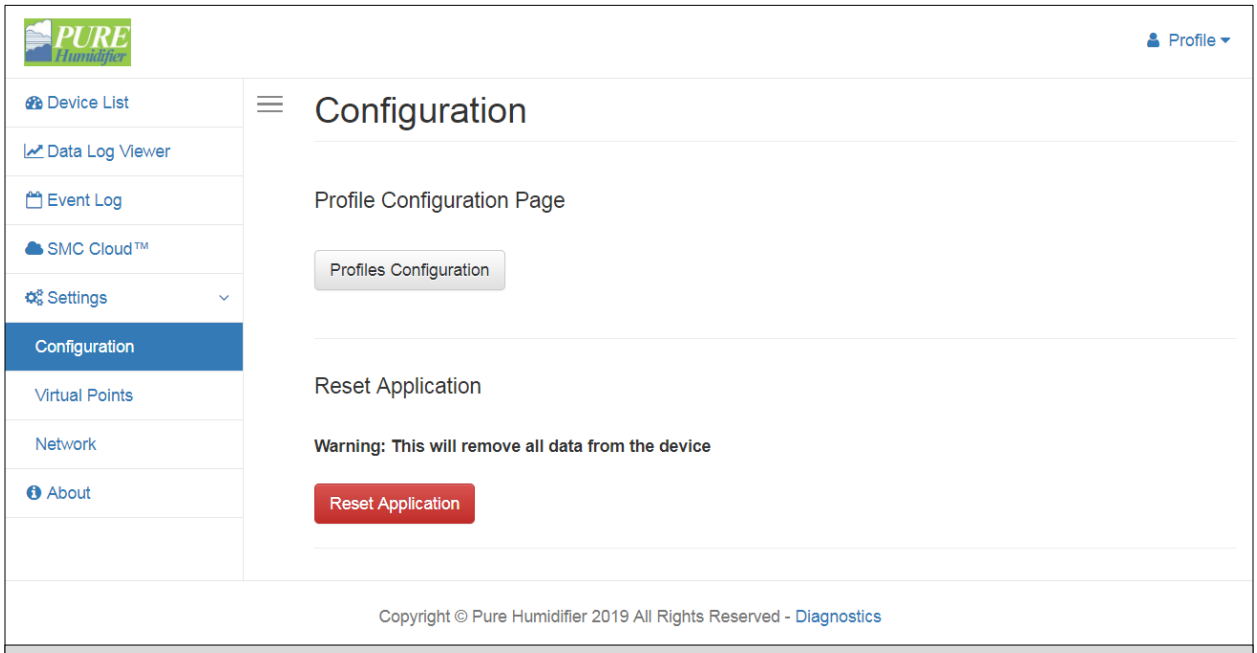


Figure 19: Configure Tab

NOTE: The SMC Cloud™ tab  **(see Figure 19) allows users to connect to the SMC Cloud, Sierra Monitor'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.**

NOTE: For Web App instructions to the System View, Historian, Event Logger and Virtual Points functions, see the SMC Cloud Start-up Guide.

6.2 Select Field Protocol and Set Configuration Parameters

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

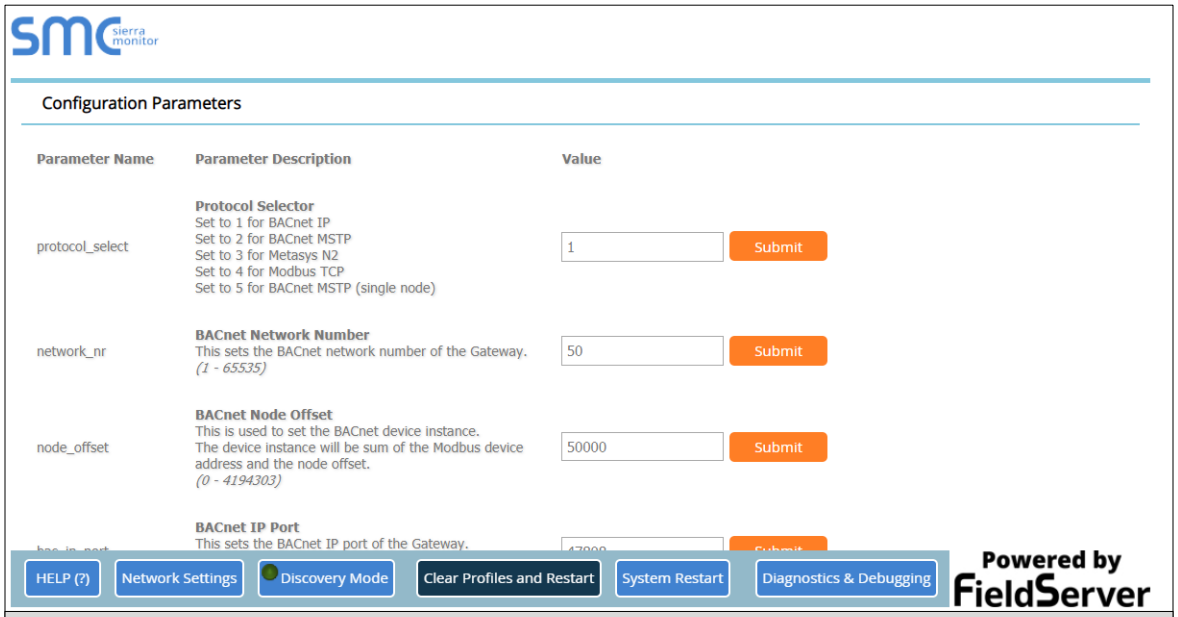


Figure 20: Web Configurator Showing Protocol Selector Parameter

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

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

- 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.

NOTE: If multiple devices are connected to the ProtoAir, set the BACnet Virtual Server Nodes field to "Yes"; otherwise leave the field on the default "No" setting.

6.3 Configure Devices Connected to the Gateway

6.3.1 Use Discovery Mode

This configuration method works only with devices set as Auto-Discovery in Section 2.2.

- Click the Discovery Mode button at the bottom of the screen.

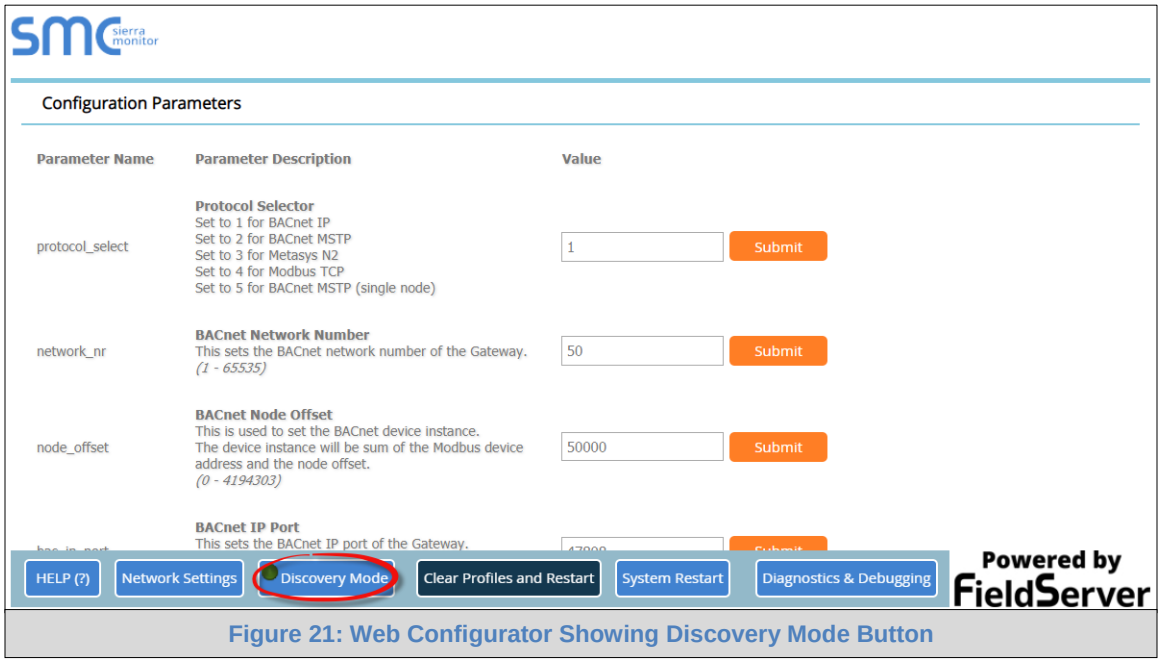


Figure 21: Web Configurator Showing Discovery Mode Button

- Click the OK button in the window that appears to discover devices and restart the device.
- Wait for the ProtoAir to restart and the Discovery in Progress window to disappear.

NOTE: It may take about 3 minutes for all the devices to be discovered and the configuration file to be built.

- If the discovery is successful, the desired device profile should appear under the Active profiles title near the bottom of the screen.

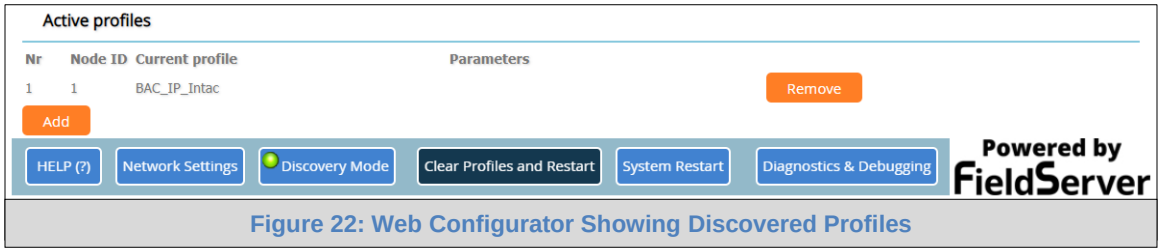


Figure 22: Web Configurator Showing Discovered Profiles

NOTE: Scroll down the page if the Active profiles header is not visible.

6.3.2 Set ProtoAir Active Profiles

This section applies to Web Configurator devices referenced in Section 2.2.

- 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 and any devices identified by Auto-Discovery configuration methods. This list is empty for new installations, or after clearing all configurations. (Figure 23)

Figure 23: Web Configurator Showing no Active Profiles

- To add an active profile to support a device, click the Add button under the Active Profiles heading. This will present a 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 which was assigned in **Section** 3.3.2.
- Then press the "Submit" button to add the Profile to the list of devices to be configured.
- Repeat this process until all the devices have been added.
- Completed additions are listed under "Active profiles" as shown in Figure 24.

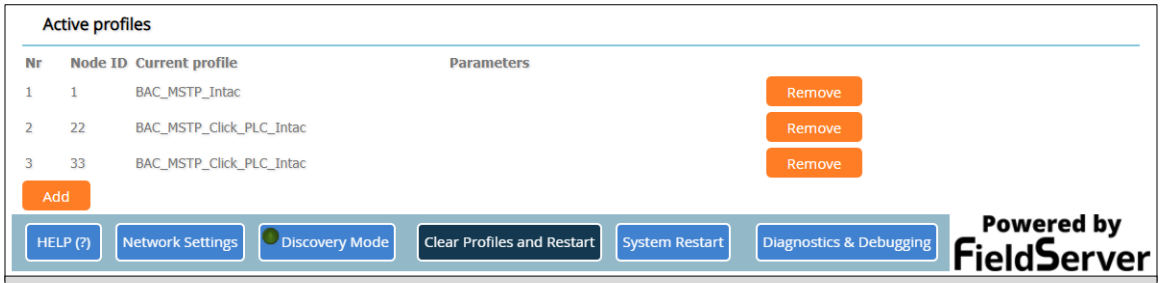


Figure 24: Web Configurator Showing Active Profile Additions

6.4 Verify Device Communications

- **Check that the port R1 TX1 and RX1 LEDs are rapidly flashing**. See Appendix A.4 for additional information and images.
- Confirm the software shows communication without errors. Go to Appendix A.2 for instructions.

6.5 BACnet: Setting Node_Offset to Assign Specific Device Instances

- Follow the steps outlined in **Section 6.1** to access the ProtoAir Web Configurator.
- The Node_Offset field shows the current value (default = 50,000).
  - The values allowed for a BACnet Device Instance can range from 1 to 4,194,303
- To assign a specific Device Instance (or range); change the Node_Offset value as needed using the calculation below:

  Device Instance (desired) = Node_Offset + Node_ID

  For example, if the desired Device Instance for the device 1 is 50,001 and the following is true:
  - Device 1 has a Node-ID of 1
  - Device 2 has a Node-ID of 22
  - Device 3 has a Node-ID of 33

  Then plug the device 1's information into the formula to find the desired Node_Offset:

  50,001 = Node_Offset + 1

  ➢ **50,000 = Node_Offset**

  Once the Node_Offset value is input, it will be applied as shown below:
  - Device 1 Instance = 50,000 + Node_ID = 50,000 + 1 = 50,001
  - Device 2 Instance = 50,000 + Node_ID = 50,000 + 22 = 50,022
  - Device 3 Instance = 50,000 + Node_ID = 50,000 + 33 = 50,033
- Click "Submit" once the desired value is entered.

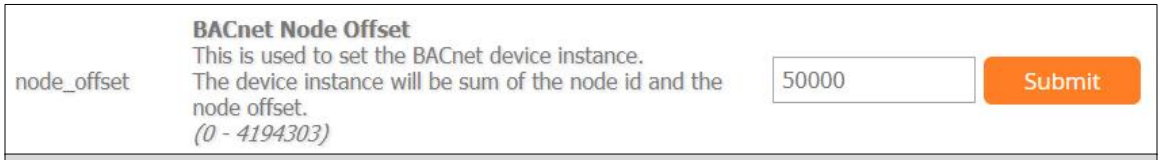


Figure 25: Web Configurator Node Offset Field

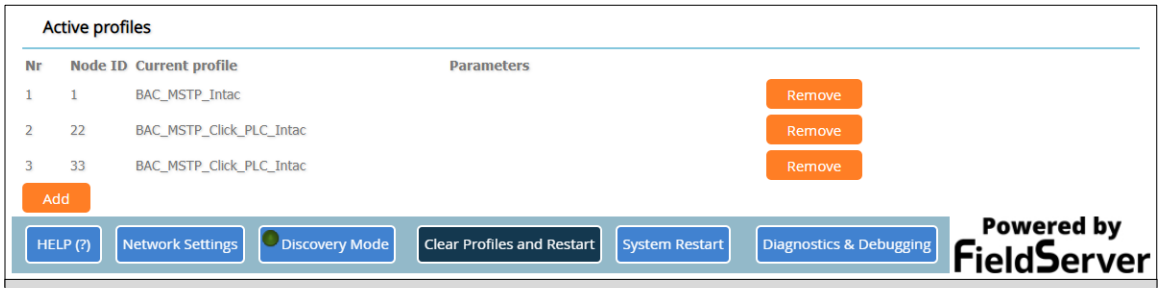


Figure 26: Active Profiles

6.6 How to Start the Installation Over: Clearing Profiles

- Follow the steps outlined in **Section 6.1** to access the ProtoAir 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.

7 NETWORK SETTINGS

7.1 Navigate to the FS-GUI Network Settings

- Open the FS-GUI page.
  - From the Web App landing page, click the word “Diagnostics” found in blue at the bottom of the screen

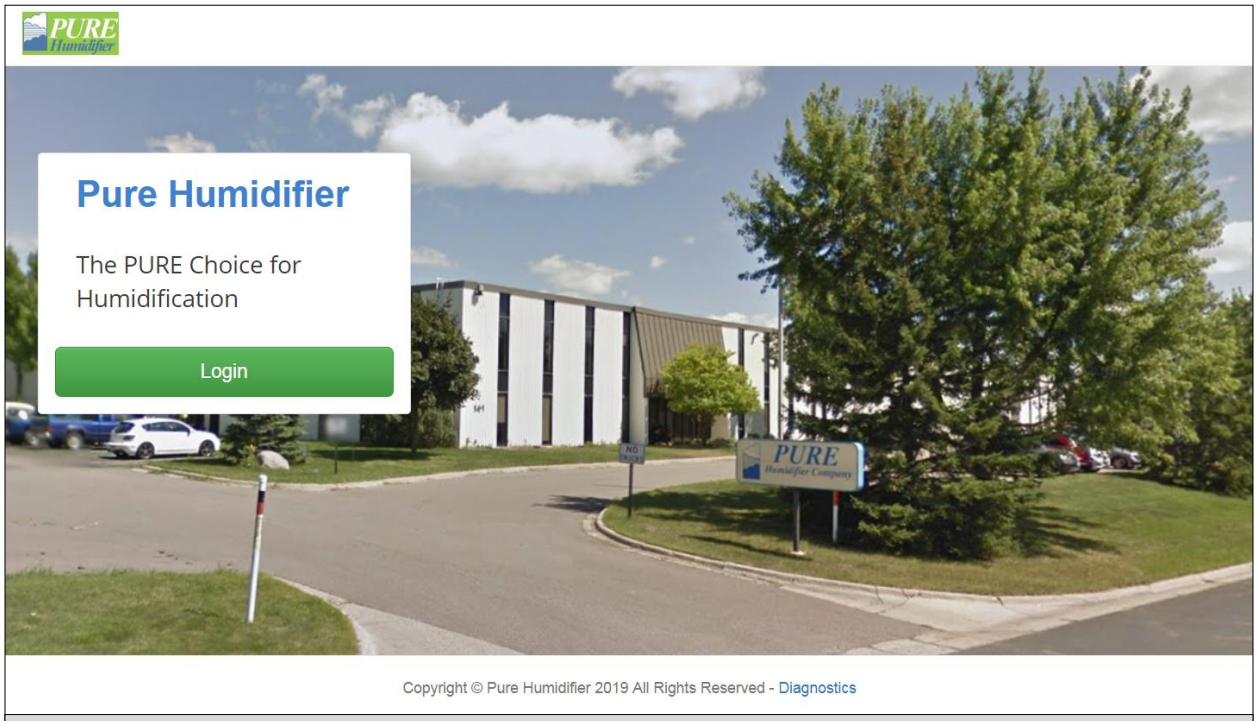


Figure 27: Web App Landing Page

  - From the Web Configurator page, click on the blue “Diagnostics & Debugging” button in the bottom right corner of the screen

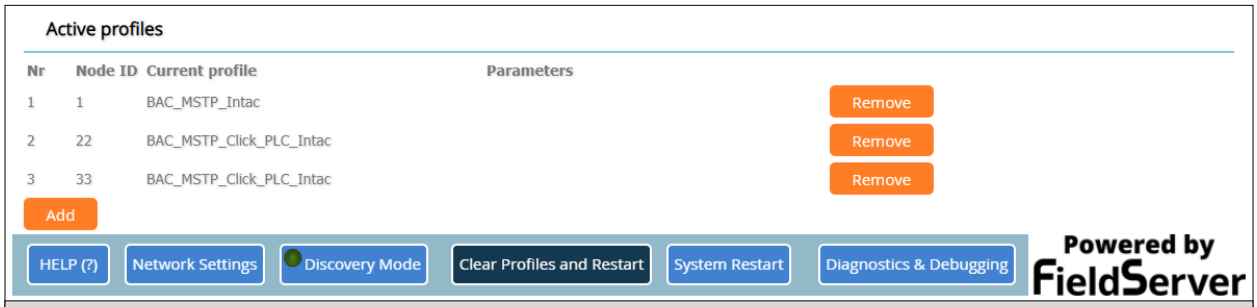


Figure 28: Web Configurator Page – Diagnostics Button

- Find the Navigation tree on the left side of the screen.

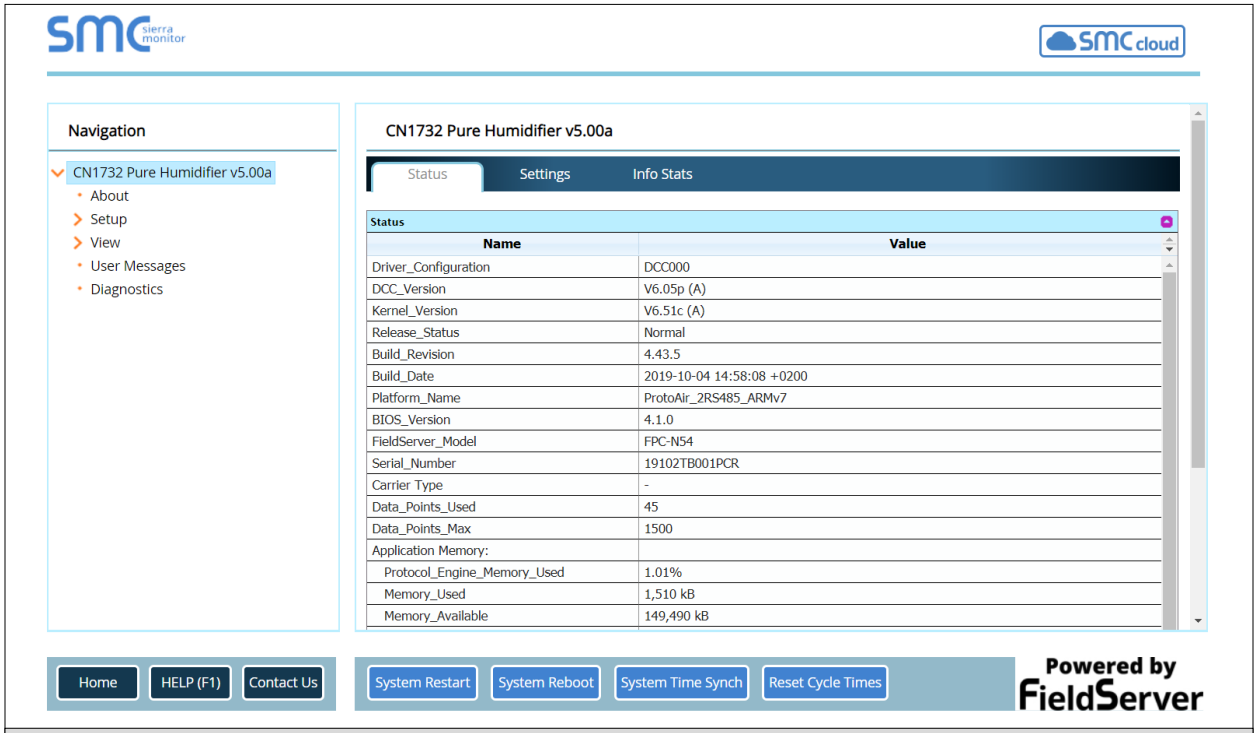


Figure 29: FS-GUI Landing Page

- Click the orange arrow next to the ProtoAir CN number and title to expand the tree.
- Click on the orange arrow next to Setup to expand the tree.
- Click on Network Settings.

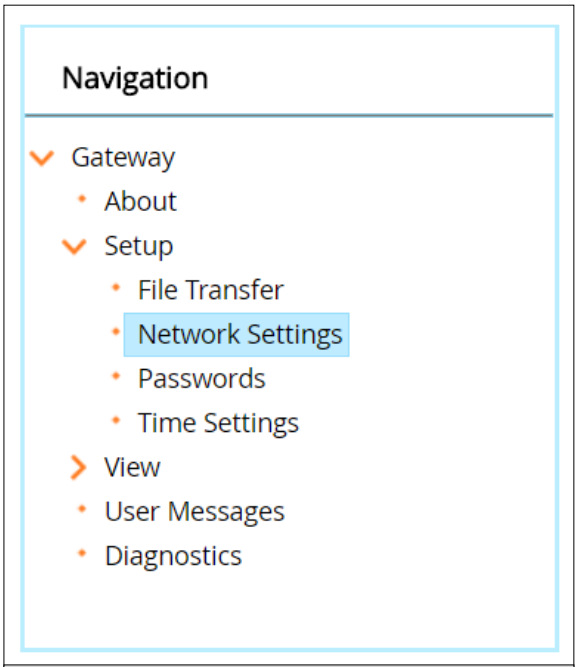


Figure 30: Generic FS-GUI Navigation Panel – Network Settings

7.2 Change the ProtoAir IP Address

Configure the IP settings of the ProtoAir using the following methods:

- When using the Ethernet port to connect to the local network (**Section** 7.2.1).
- When connecting the ProtoAir to a local wireless network, configure the Wi-Fi Client Settings in the ProtoAir (**Section** 7.2.2).

NOTE: For Wi-Fi Access Point network information see Appendix B.4.

7.2.1 Update Wired Network Settings

IP Settings tab is the landing page when selecting Network Settings on the navigation tree. To change the IP settings, follow these instructions:

- Enable DHCP Client State to automatically assign IP Settings or modify the settings manually as needed, via these fields: IP Address, Netmask, Default Gateway and Domain Name Server1/2.

NOTE: If connected to a router, set the Default Gateway to the same IP Address as the router.

- Click Update IP Settings, then click on System Restart to restart the Gateway and activate the new IP Address.
- Connect the ProtoAir to the local network or router.

NOTE: If the FS-GUI was open in a browser, the browser will need to be pointed to the new IP Address of the ProtoAir before the FS-GUI will be accessible again.

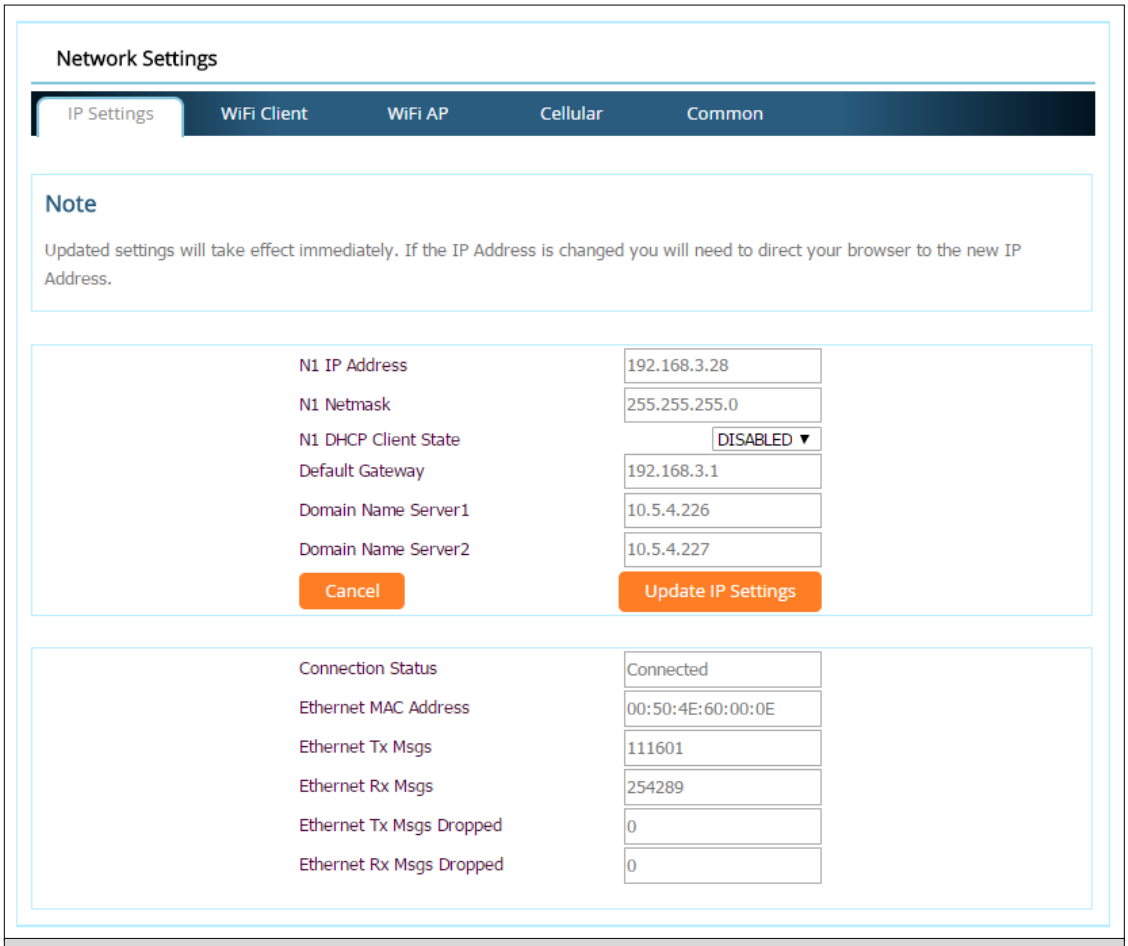


Figure 31: FS-GUI Ethernet Port Network Settings

IP Setting Fields	Definition
Connection Status	Status of connection
MAC Address	Ethernet MAC Address
Tx/Rx Msgs	Number of transmitted and received messages
Tx/Rx Msgs Dropped	Number of unanswered Tx or Rx messages

7.2.2 Update Wi-Fi Client Settings

From the FS-GUI Network Settings landing page, click on the Wi-Fi Client tab. To change the Wi-Fi client settings, follow these instructions:

- Set the Wi-Fi Status to ENABLED for the ProtoAir to communicate with other devices via Wi-Fi.
- Enter the Wi-Fi SSID and Wi-Fi Password for the local wireless network.
- Enable DHCP to automatically assign all Wi-Fi Client network settings or manually modify the setting using the fields immediately below (IP Address, Network, etc.).

NOTE: If connected to a router, set the IP gateway to the same IP Address as the router.

- Click Update Wi-Fi Settings, then click on System Restart to restart the gateway and activate Wi-Fi Client settings.
- **Go to Common settings (Section 7.2.3) to set the Primary Connection to Wi-Fi Client.**

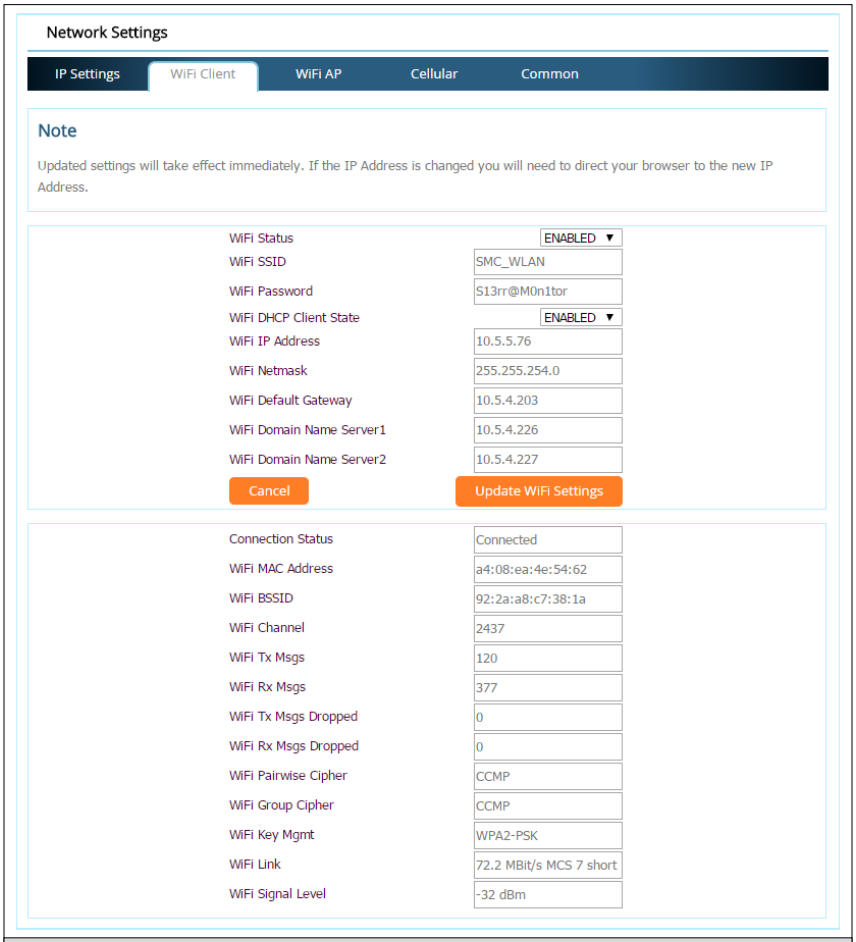


Figure 32: FS-GUI Wi-Fi Client Network Settings

Wi-Fi Client Fields	Definition
Connection Status	Status of connection
MAC Address, BSSID, Channel	Wi-Fi Client MAC Address, BSSID, and Channel
Tx/Rx Msgs	Number of transmitted and received messages
Tx/Rx Msgs Dropped	Number of unanswered Tx or Rx messages
Pairwise Cipher	Type of encryption used for unicast traffic
Group Cipher	Identifies the type of encryption used for multicast / broadcast traffic
Key Mgmt	Encryption type
Link	Connection speed
Signal Level	Signal level in dBm (see Appendix A.6)

7.2.3 Common Settings

The Common Settings make it possible to choose the primary connection when both Ethernet and Wi-Fi Client connections are available.

- From the FS-GUI Network Settings landing page, click on the Common tab.

NOTE: The default Primary Connection is Ethernet.

- Select the desired option from the drop-down menu on the right.
- Click Update Common Settings, then click on System Restart to restart the gateway and activate the new settings.

NOTE: If using Wi-Fi Client and not Ethernet, change Primary Connection to Wi-Fi.

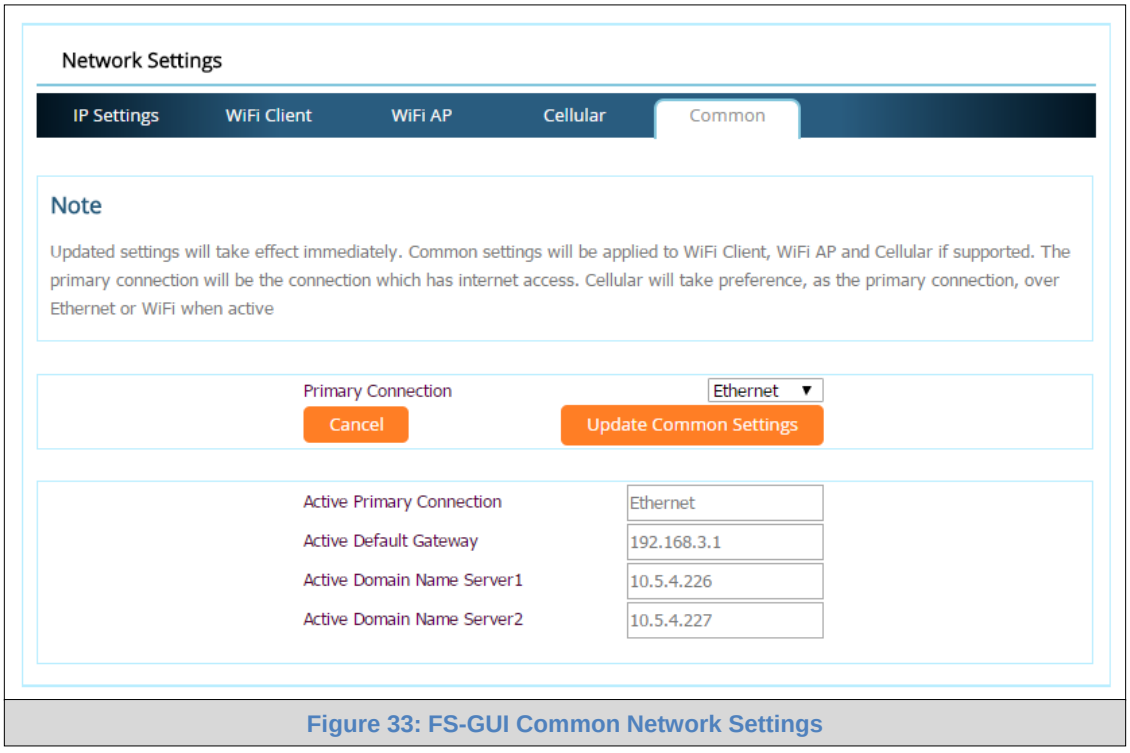


Figure 33: FS-GUI Common Network Settings

NOTE: The fields below the update button show the settings as they were set in the IP Settings or Wi-Fi Client pages. They are not editable on the Common page.

8 SMC CLOUD USER SETUP, REGISTRATION AND LOGIN

8.1 User Setup

Request an invitation to SMC Cloud from the manufacturer's support team and follow the instructions below to set up login details:

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

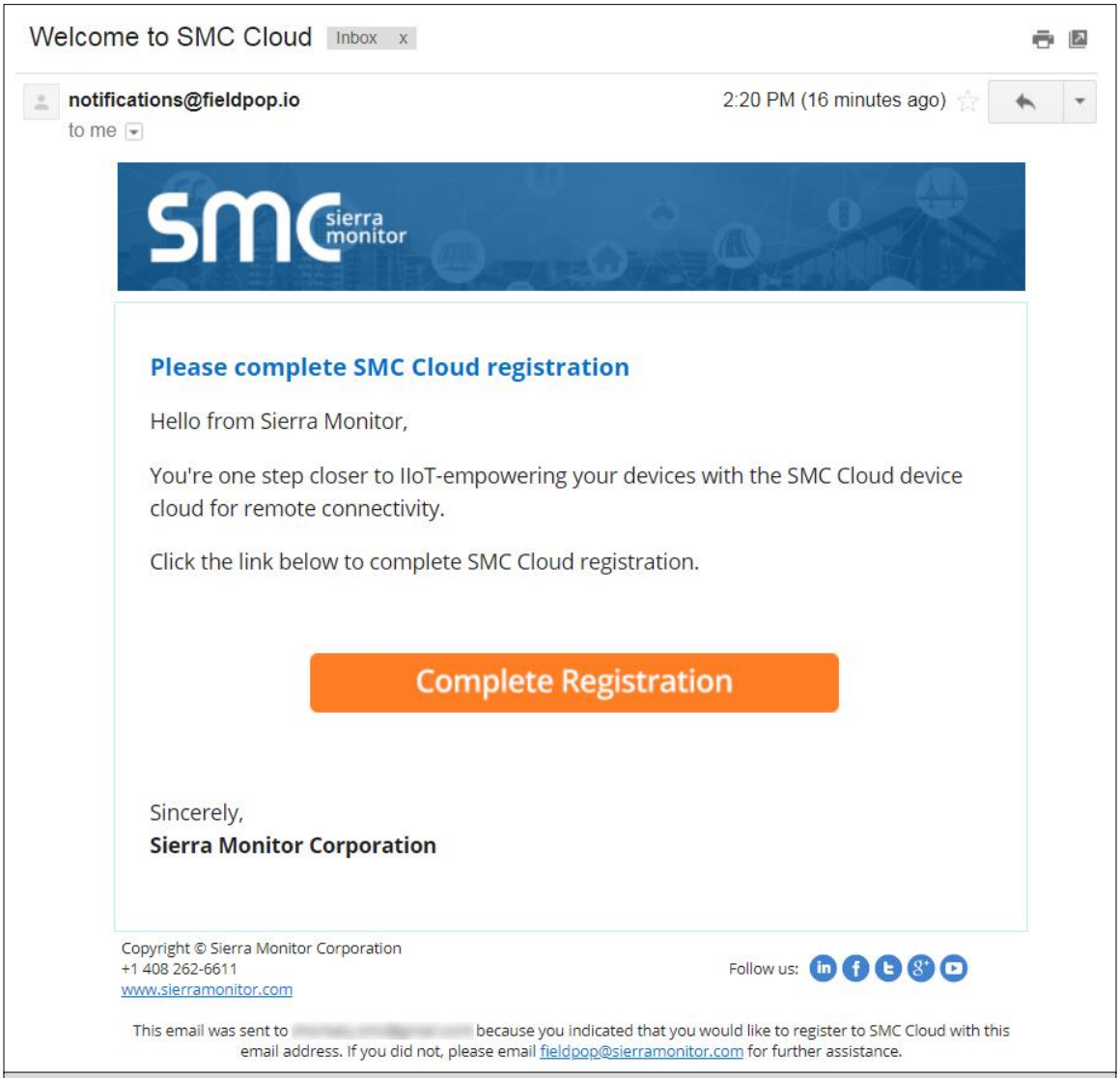


Figure 34: Welcome to SMC Cloud Email

NOTE: If no SMC Cloud email was received, check the spam/junk folder for an email from notification@fieldpop.io. Contact the manufacturer's support team if the email cannot be found.

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

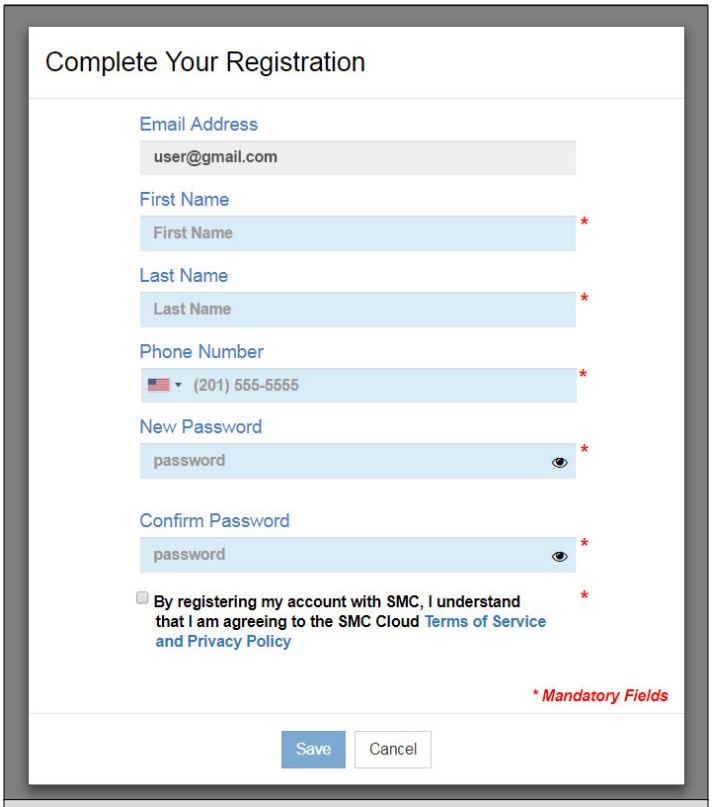


Figure 35: Setting User Details

- Fill in the name, phone number, password fields and click the checkbox to agree to the privacy policy and terms of service.
- Click “Save” to save the user details.
- Click “OK” when the Success message appears.
- Record the email account used and password for future use.

8.2 Registration Process

Once SMC Cloud user credentials have been generated, the ProtoAir can be registered onto the SMC Cloud server.

- Click on the SMC Cloud™ tab on the left-hand side of the screen.

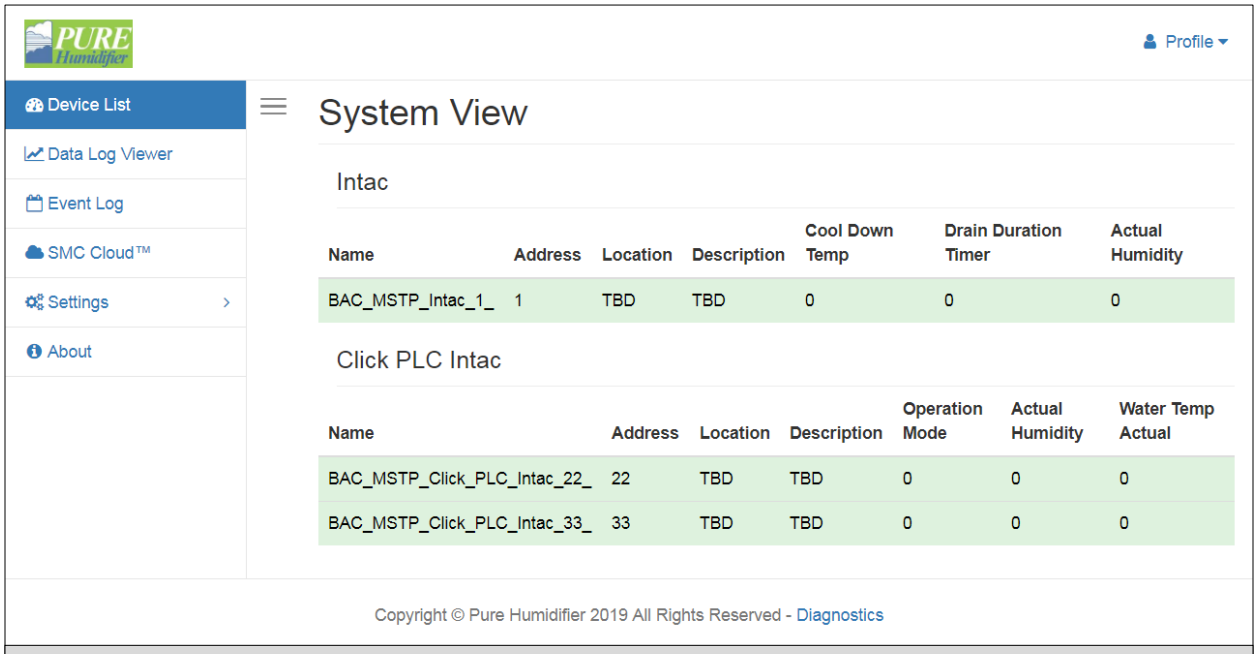


Figure 36: Web App Landing Page – SMC Cloud Tab

- The following informational splash page will appear, click Close to view the registration page.

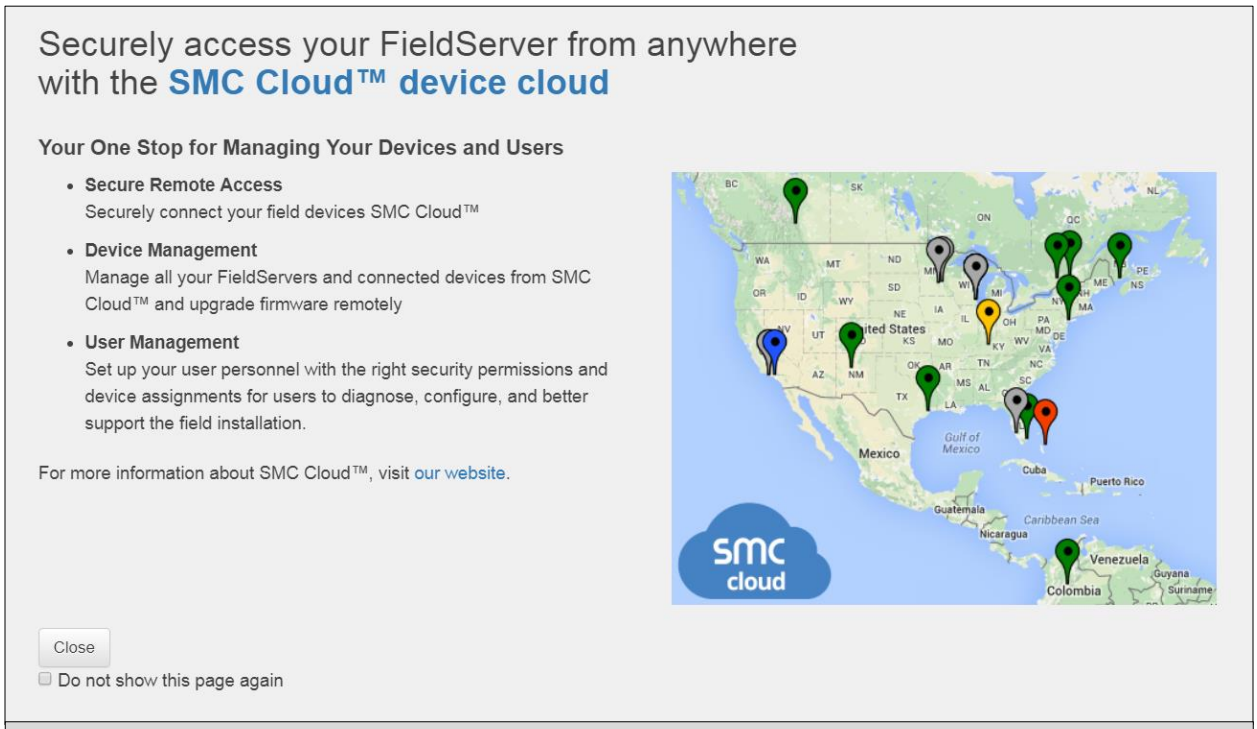


Figure 37: Registration Information Page

- If a warning message appears instead of the splash page, follow the suggestion that appears on screen.
- If the ProtoAir cannot reach the SMC Cloud server, the following message will appear.

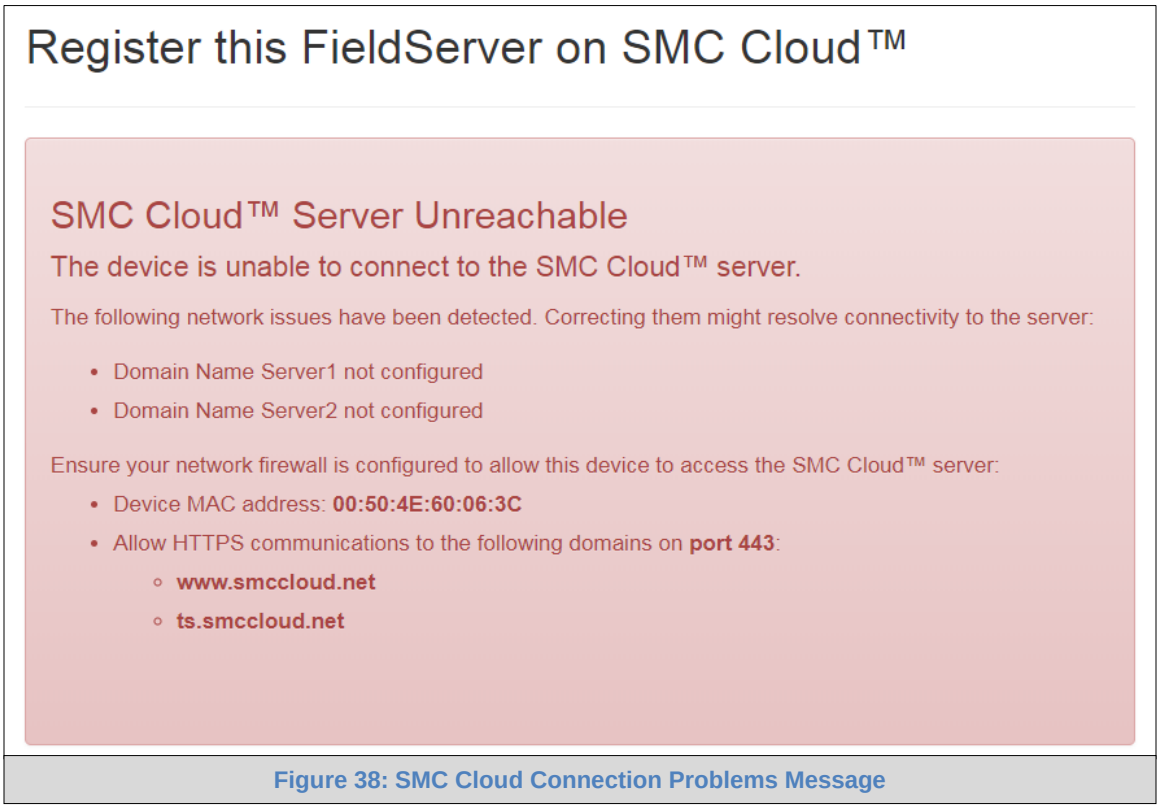


Figure 38: SMC Cloud Connection Problems Message

  - Follow the directions presented in the warning message and check that the DNS settings are set up with the following Domain Name Server (DNS) settings:

    DNS1=8.8.8.8

    DNS2=8.8.4.4

  - Ensure that the ProtoAir is properly connected to the Internet

NOTE: If changes to the network settings are done, remember to click "Update IP Settings" and then power cycle the ProtoAir.

- On the registration page, fill in user credentials and all other device information fields for registration of each individual ProtoAir in the field.

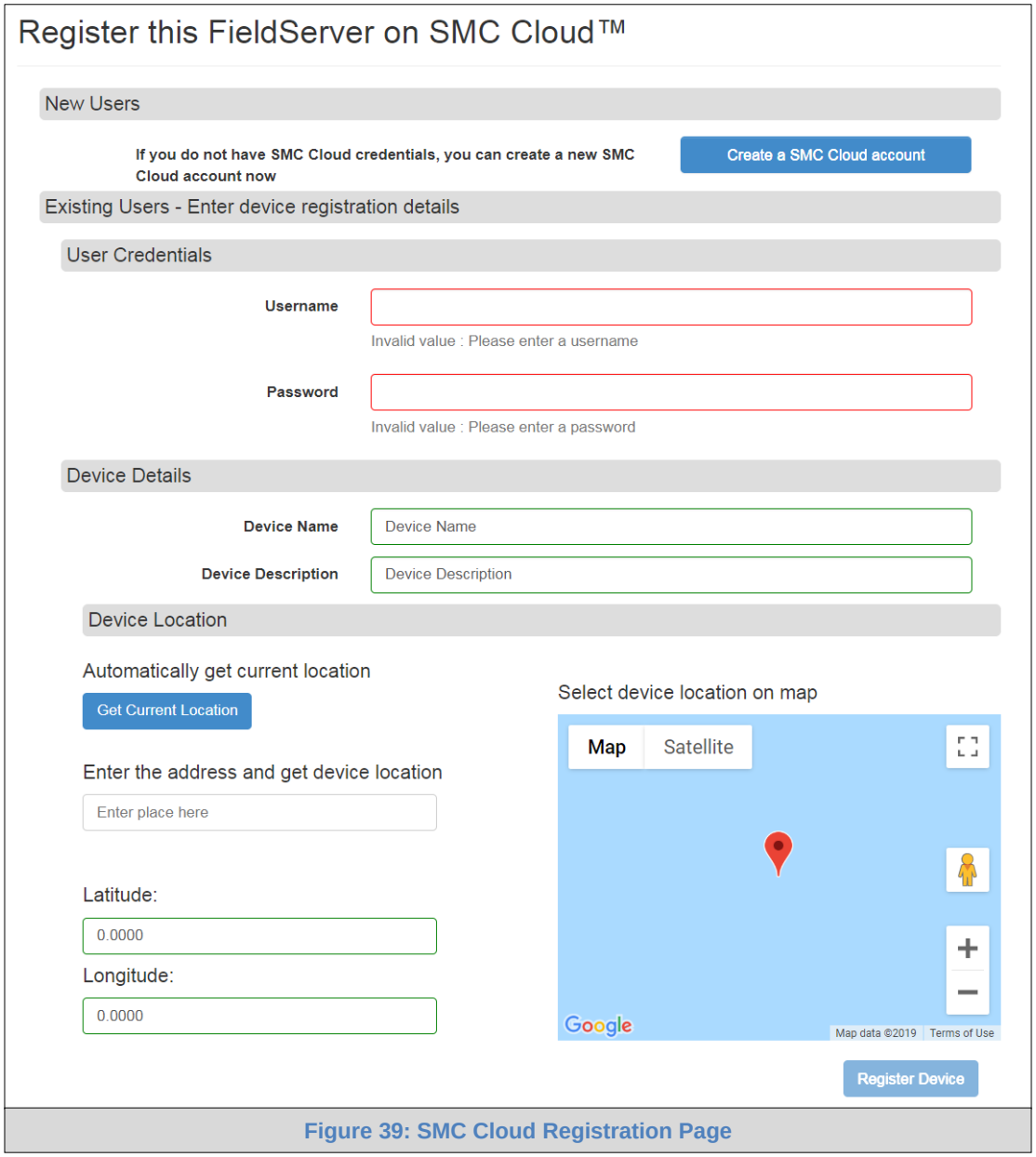


Figure 39: SMC Cloud Registration Page

- To input the device location, do one of the following:
  - Enter the address in the address field
  - Click the “Get Current Location” button to auto-populate

NOTE: This button will only work if location services have been enabled on the local browser. If using the Chrome browser and connected via LAN, this method will not work.

  - Drop a location directly on the Google map
  - Enter the latitude and longitude manually

- Click Register Device.

- Once the device has successfully been registered, the following screen will appear listing the device details and additional information auto-populated by the ProtoAir.

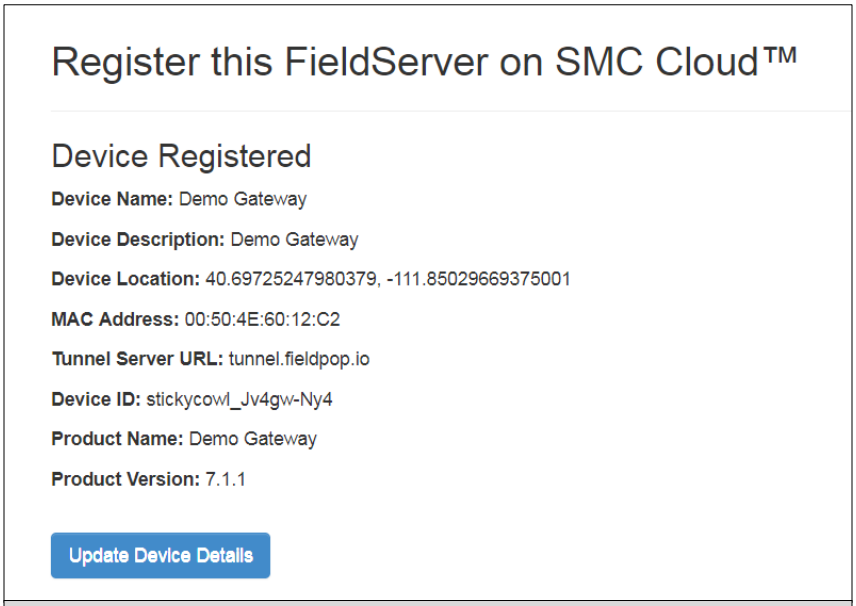


Figure 40: Device Registered for SMC Cloud

8.3 Login to SMC Cloud

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

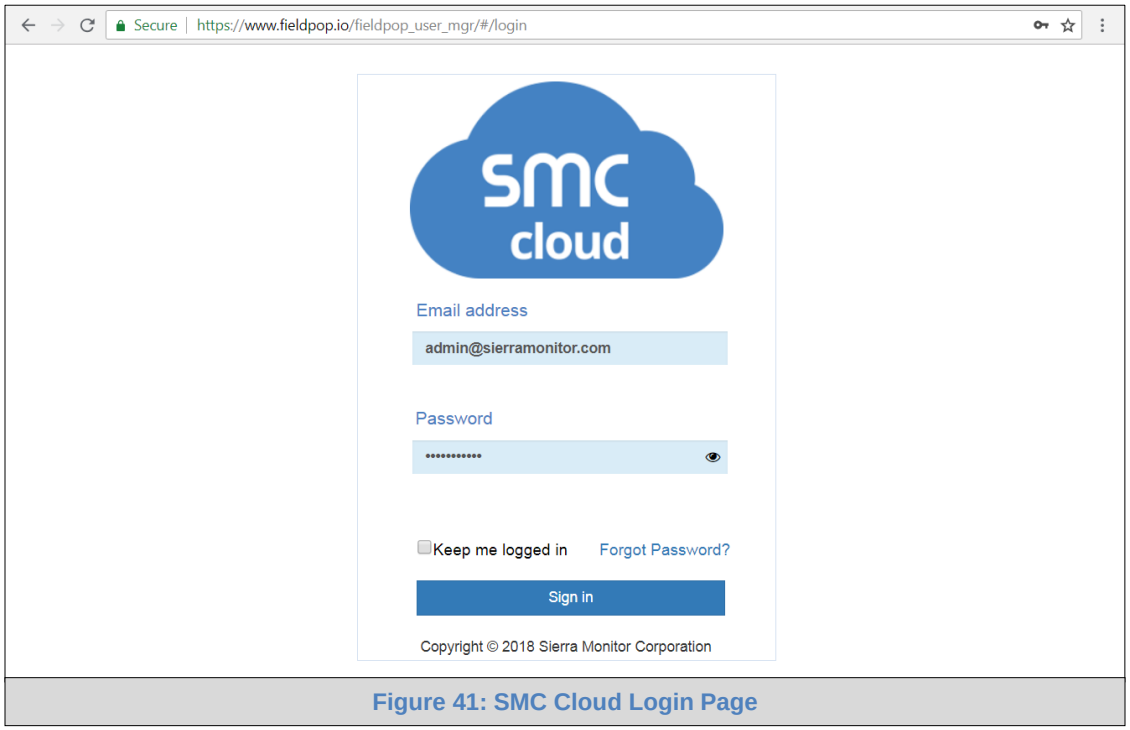


Figure 41: SMC Cloud Login Page

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

On first login, the Privacy Policy window will appear. Read the Terms of Service, click the checkbox to accept the terms and then click the Continue button to access SMC Cloud.

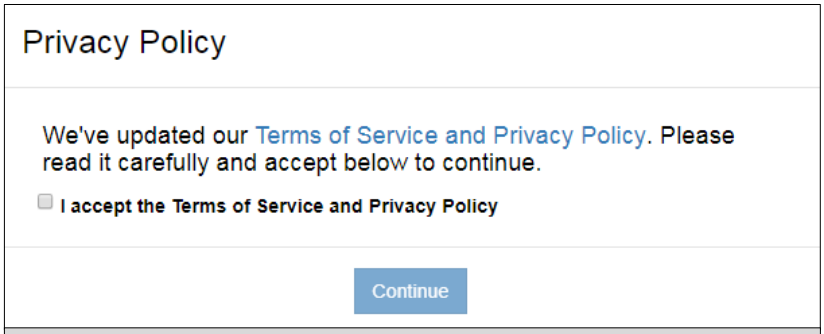


Figure 42: SMC Cloud Privacy Policy

NOTE: For additional SMC Cloud instructions see the SMC Cloud Start-up Guide.

Figure 43: SMC Cloud Landing Page

Appendix A Troubleshooting

Appendix A.1 Lost or Incorrect IP Address

- 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.

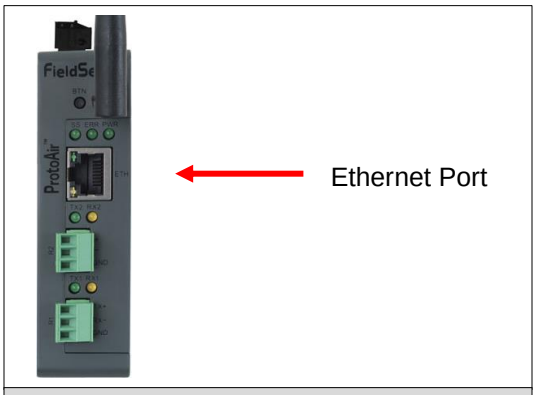
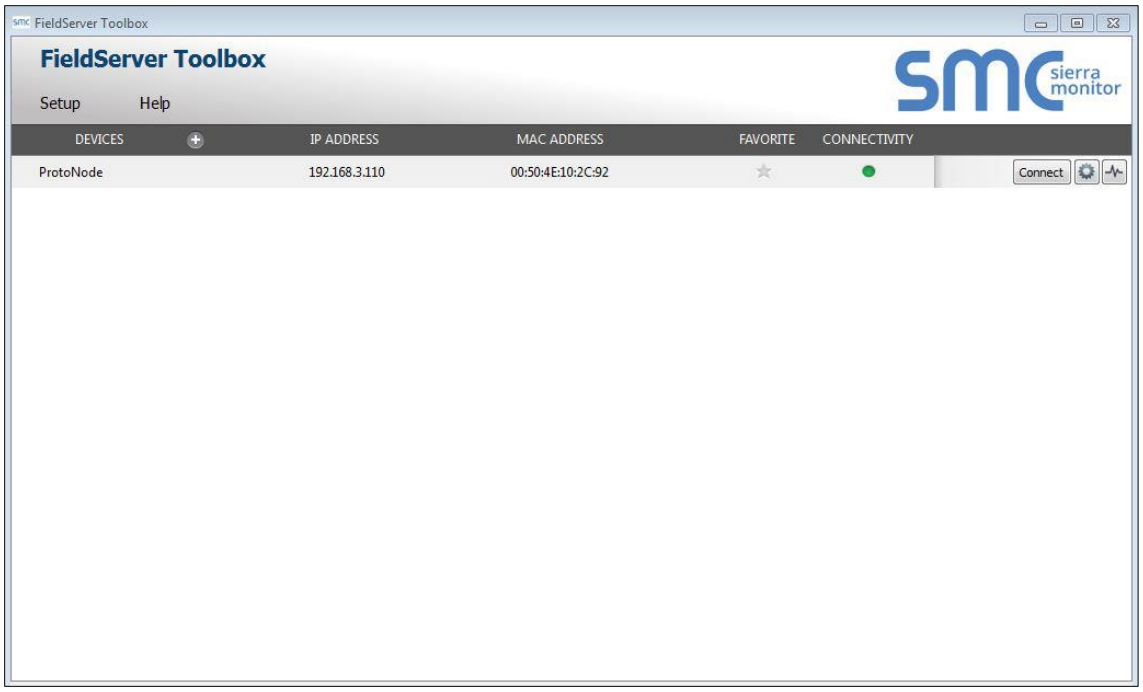


Figure 44: Ethernet Port Location

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



- If correcting the IP Address of the gateway: click the settings icon  on the same row as the gateway, then click Network Settings, change the IP Address and click Update IP Settings to save.

Appendix A.2 Viewing Diagnostic Information

- Type the IP Address of the ProtoAir into the web browser or use the FieldServer Toolbox to connect to the ProtoAir.
- Click on Diagnostics Button, then click on view, and then on connections.
- If there are any errors showing on the Connections page, refer to **Appendix A.3** to check the wiring and settings.

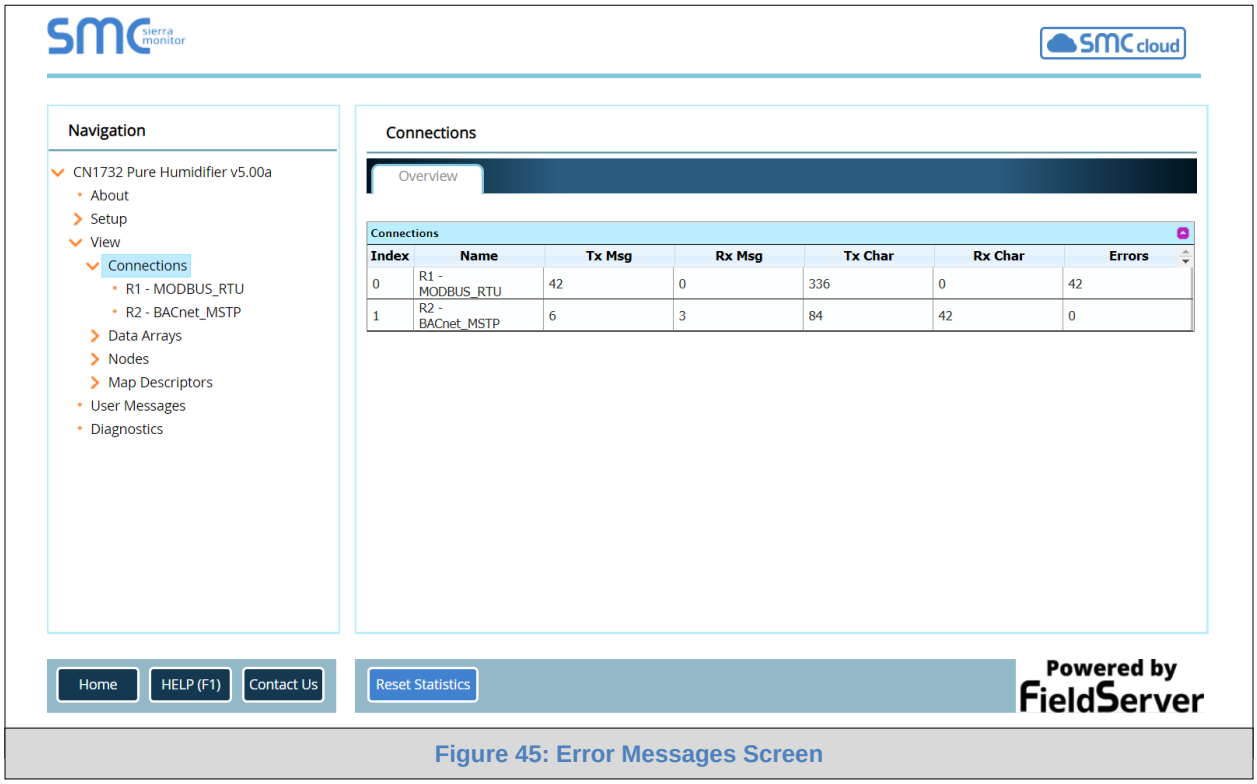


Figure 45: Error Messages Screen

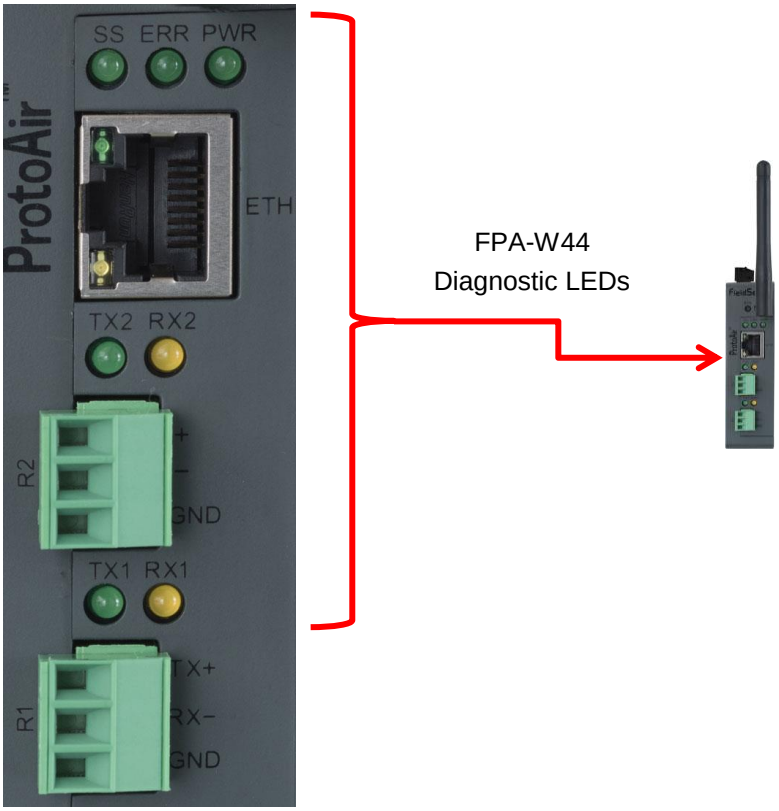
Appendix A.3 Checking Wiring and Settings

- No COMS on Modbus RTU side. If the Tx/Rx LEDs are not flashing rapidly then there is a COM issue. To fix this, check the following:
  - Visual observations of LEDs on ProtoAir (**Appendix A.4**)
  - Check baud rate, parity, data bits, stop bits
  - Check Detector ID matches the correct device
  - Verify wiring
  - Verify the device was listed under the Web Configurator Active Profiles (**Section 6.3**)
- Field COM problems:
  - Visual observations of LEDs on the ProtoAir (**Appendix A.4**)
  - Verify IP Address setting
  - Verify wiring

NOTE: If the problem still exists, a Diagnostic Capture needs to be taken and sent to technical support. (Appendix A.5)

Appendix A.4 LED Diagnostics for Communications Between ProtoAir and Devices

See the diagram below for ProtoAir FPA-W44 LED Locations.



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

Figure 46: Diagnostic LEDs

Appendix A.5 Taking a FieldServer Diagnostic Capture

When there is a problem on-site that cannot easily be resolved, perform a diagnostic capture before contacting support so that support can quickly solve the problem. There are two methods for taking diagnostic captures:

- **FieldServer Toolbox:**
  This method requires installation of the FS Toolbox program. A FS Toolbox diagnostic capture takes a snapshot of the loaded configuration files and a log of all the communications on the serial ports over a specified period of time. If the problem occurs over an Ethernet connection, then take a Wire Shark capture.
- **Gateway's FS-GUI Page:**
  This method doesn't require downloading software. The diagnostic capture utilities are embedded in the FS-GUI web interface. Starting a diagnostic capture takes a snapshot of the loaded configuration files and a log of all the communications over a specified period of time. This works for both serial and Ethernet connections.

NOTE: The information in the zipped files contains everything support needs to quickly resolve problems that occur on-site.

Appendix A.5.1 Using the FieldServer Toolbox

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

- Ensure that FieldServer Toolbox is loaded onto the local PC. Otherwise, download the FieldServer-Toolbox.zip via the Sierra Monitor website's Software Downloads.
- Extract the executable file and complete the installation.

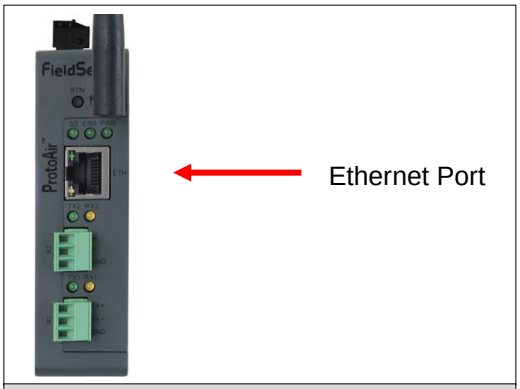
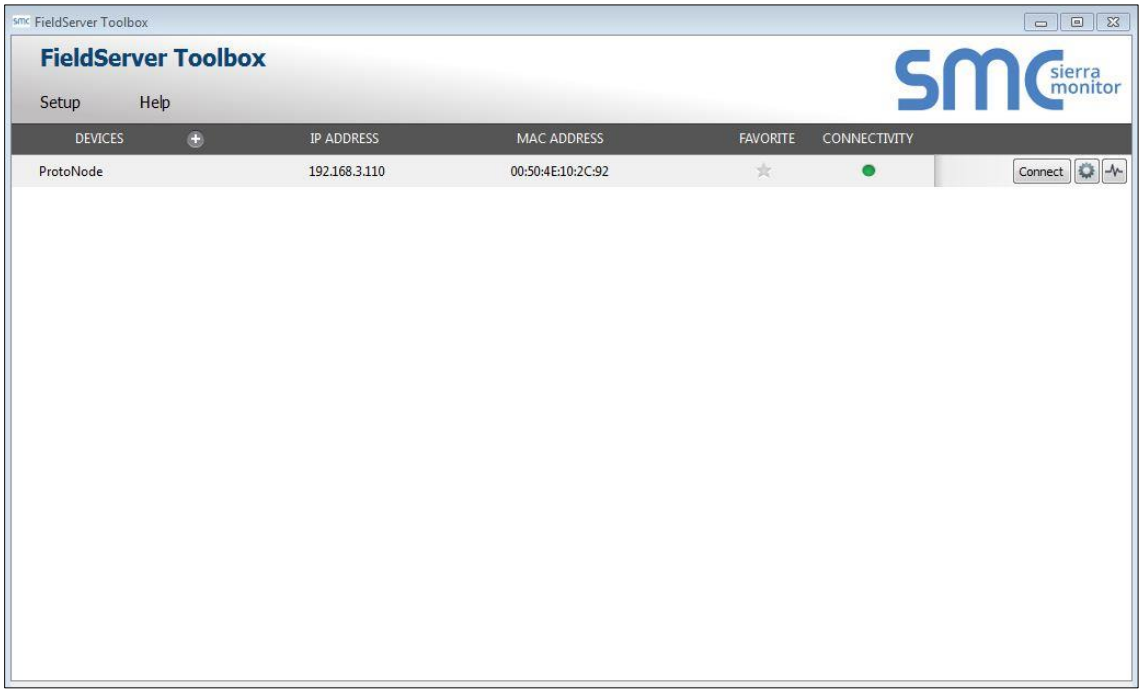


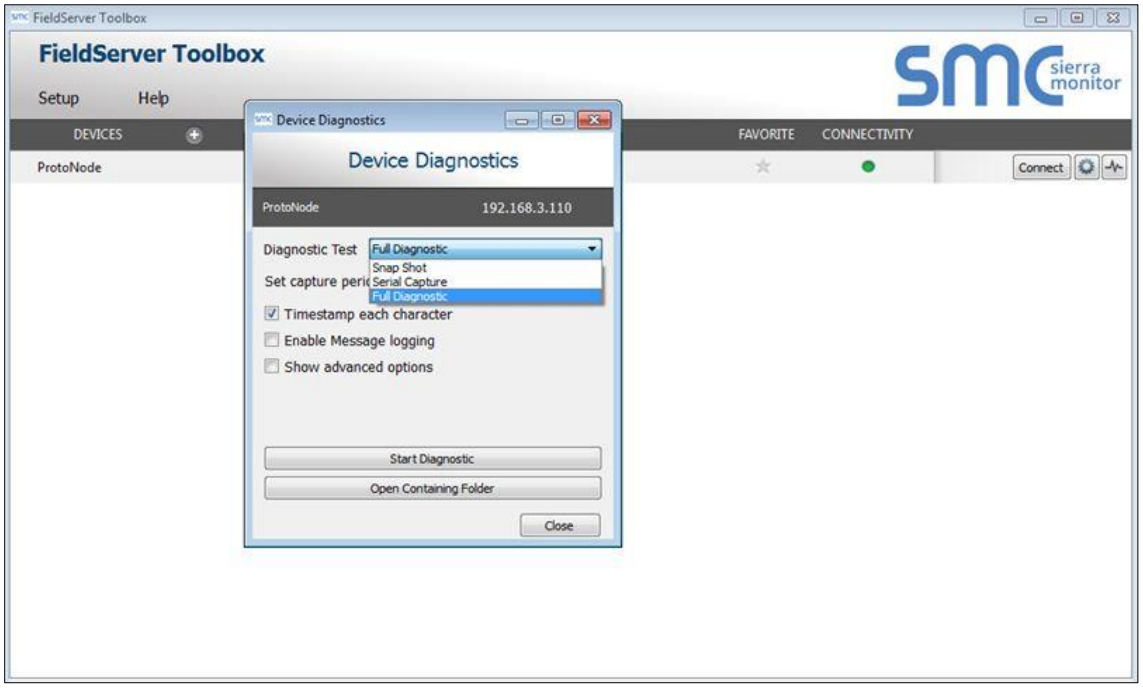
Figure 47: Ethernet Port Location

- Connect a standard Cat-5 Ethernet cable between the PC and ProtoAir.
- Double click on the FS Toolbox Utility.

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

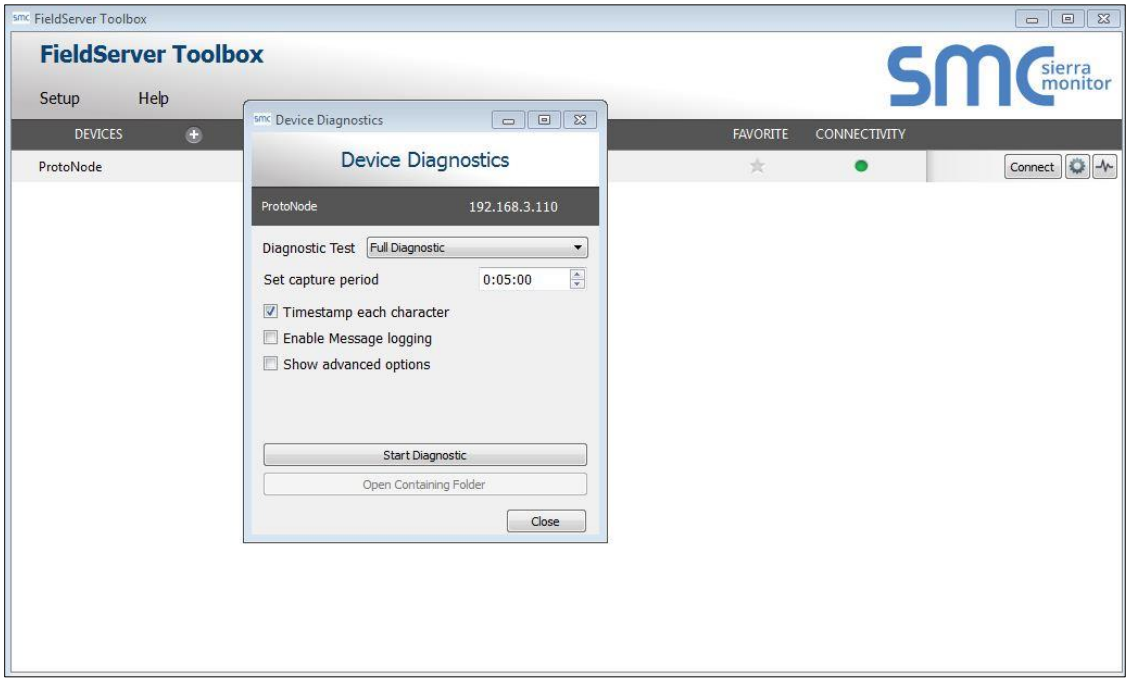


  - Ensure “Full Diagnostic” is selected (this is the default)



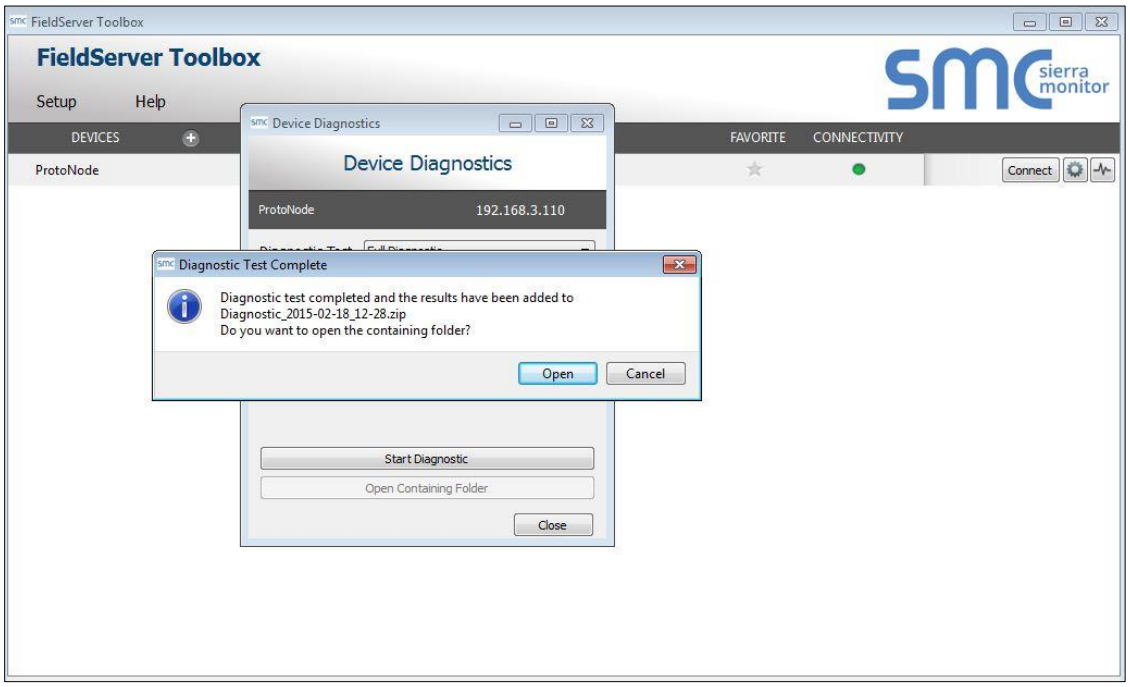
NOTE: If desired, the default capture period can be changed.

- 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 is saved on the PC



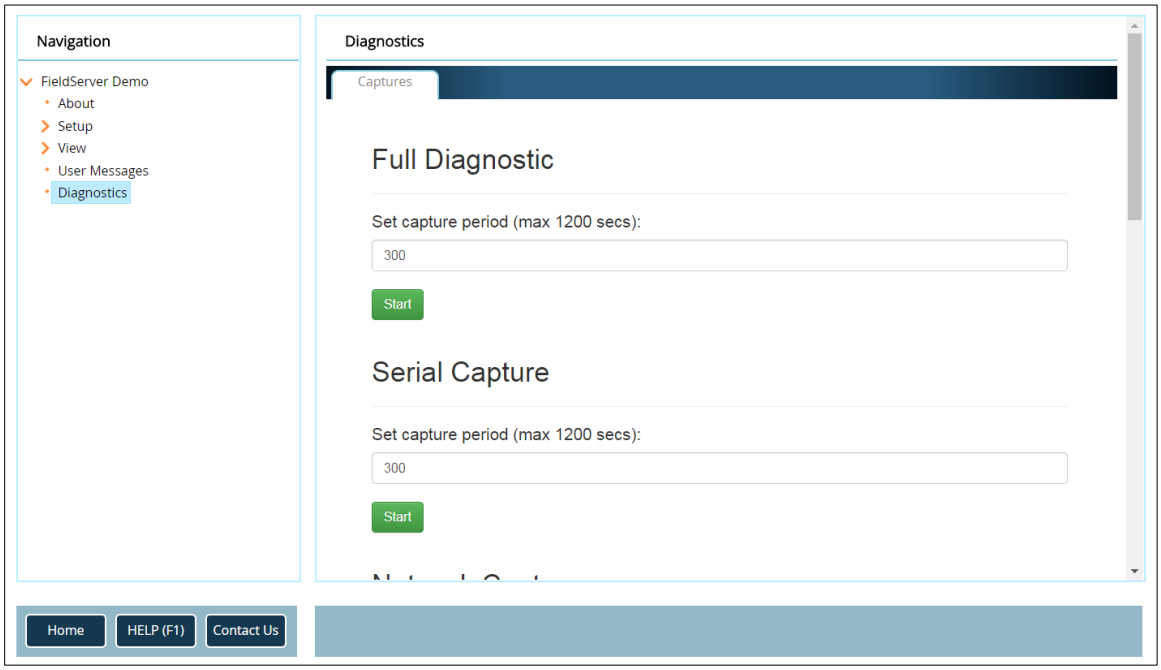
  - Choose “Open” to launch explorer and have it point directly at the correct folder
  - Send the Diagnostic zip file to technical support

Appendix A.5.2 Using FS-GUI

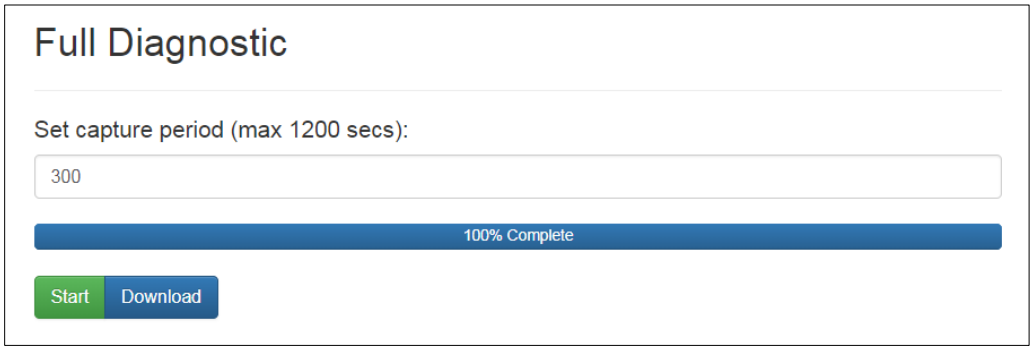
Diagnostic Capture via FS-GUI is only available on FieldServers with a bios updated/released on November 2017 or later. Completing a Diagnostic Capture through the FieldServer allows network connections (such as Ethernet and Wi-Fi) to be captured.

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

- Open the FieldServer FS-GUI page.
- Click on Diagnostics in the Navigation panel.



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



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

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

Appendix A.6 Wi-Fi Signal Strength

Wi-Fi
<60dBm – Excellent
<70dBm – Very good
<80dBm – Good
>80dBm – Weak

Figure 48: Wi-Fi Signal Strength Listing

NOTE: If the signal is weak or spotty, try to improve the signal strength by checking the antenna and the ProtoAir position.

Appendix A.7 Factory Reset Instructions

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

Appendix A.8 Internet Browsers Not Supported

- Internet Explorer 11 and prior versions

Appendix B Additional Information

Appendix B.1 Updating Firmware

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

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

Appendix B.2 BACnet: Setting Network_Number for More Than One ProtoAir on the Subnet

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

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

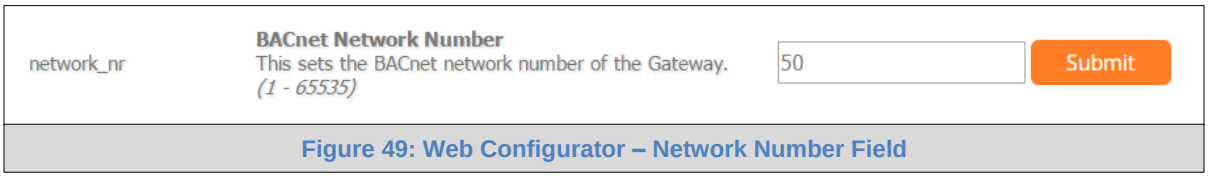


Figure 49: Web Configurator – Network Number Field

Appendix B.3 Securing ProtoAir with Passwords

Access to the ProtoAir 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 ProtoAir.
- The User account can view any ProtoAir information but cannot make any changes or restart the ProtoAir.

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 email the password recovery token to technical support to receive a temporary password from the customer support team. Access the ProtoAir to set a new password.

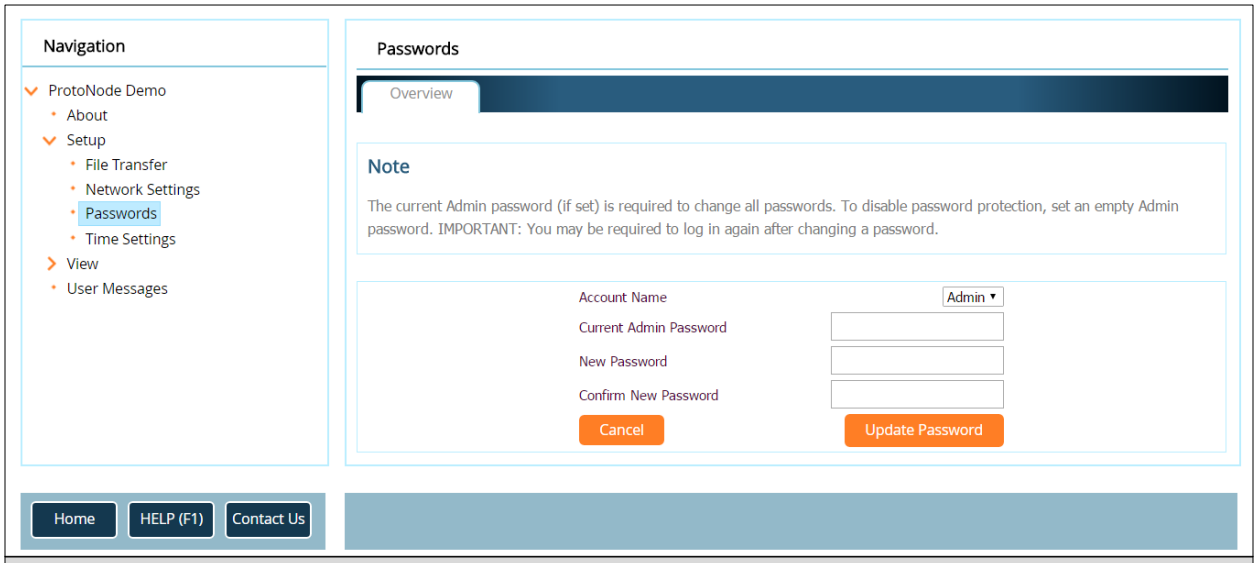


Figure 50: FS-GUI Passwords Page

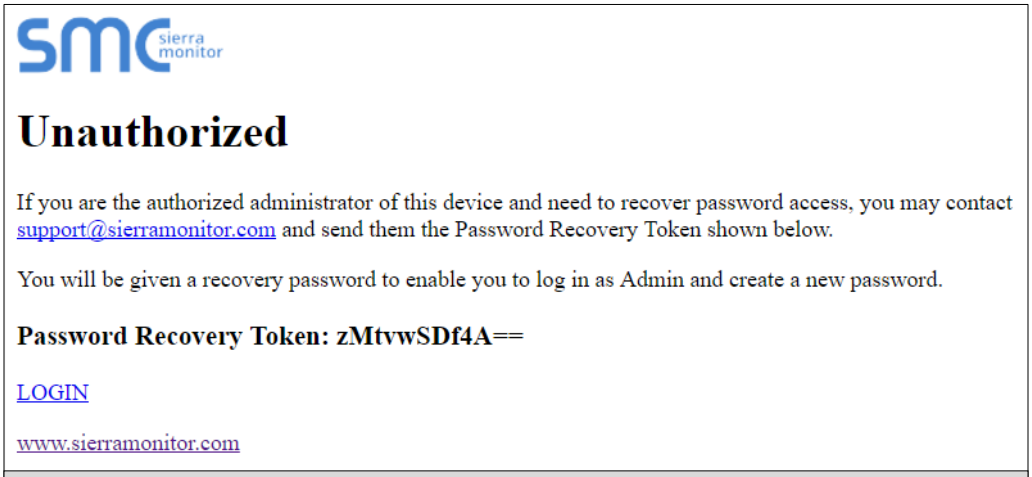


Figure 51: Password Recovery Page

Appendix B.4 Wi-Fi Access Point Network Settings

From the FS-GUI Network Settings landing page, click on the Wi-Fi AP tab. To change the Wi-Fi AP settings, follow these instructions:

- The Access Point Status Field must be ENABLED to allow connecting to the ProtoAir via Wi-Fi.
- Modify the Settings manually as needed, via these fields: Access Point SSID, Access Point Password, SSID Broadcast, and Channel.

NOTE: The default channel is 11.

- Click Update Wi-Fi Settings, then click on the System Restart to restart the Gateway and activate the Wi-Fi settings.

NOTE: If the FS-GUI was open in a browser via Wi-Fi, the browser will need to be updated with the new Wi-Fi details before the ProtoAir FS-GUI will be accessible again.

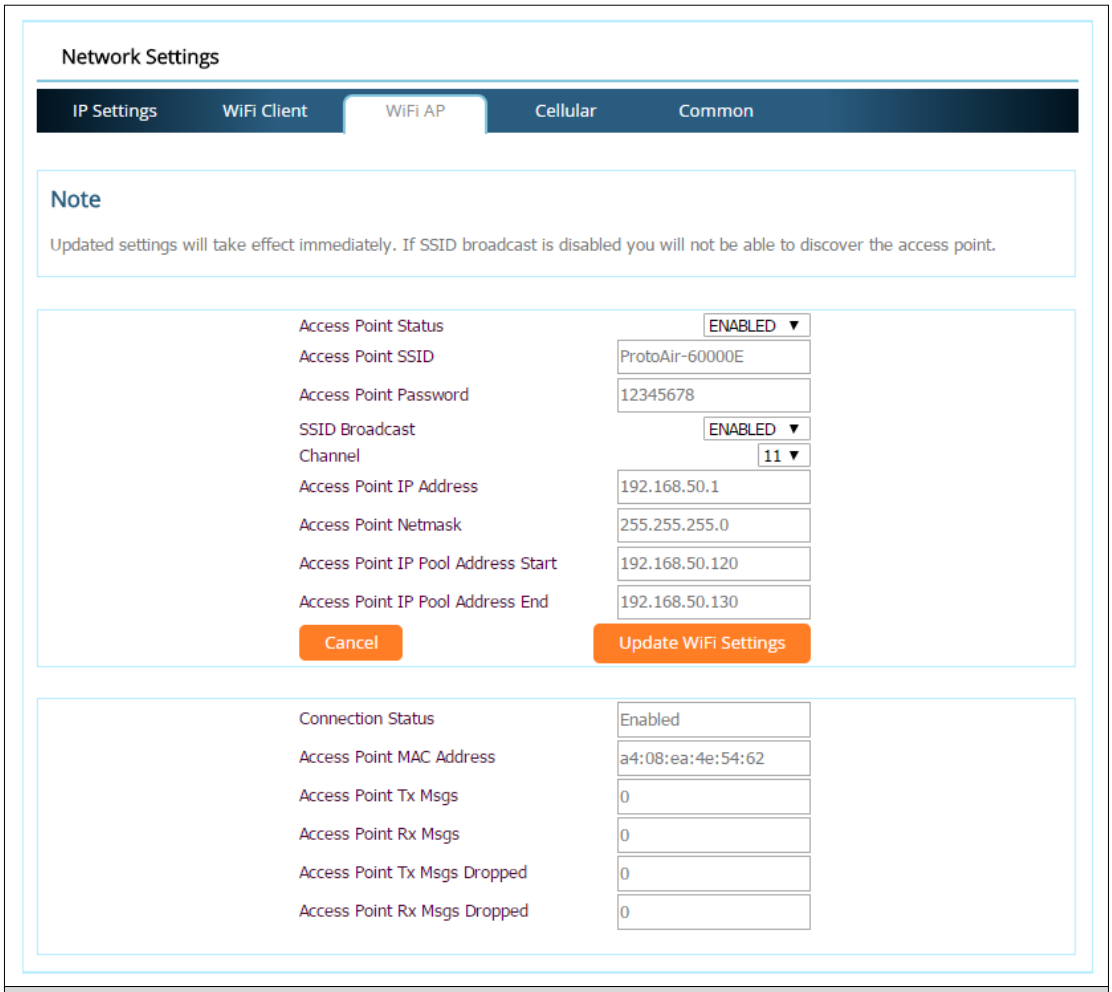


Figure 52: FS-GUI Wi-Fi AP Network Settings

Wi-Fi AP Fields	Definition
Connection Status	Status of connection
MAC Address	Access point's MAC Address
Tx/Rx Msgs	Number of transmitted and received messages
Tx/Rx Msgs Dropped	Number of unanswered Tx or Rx messages

Appendix B.5 Mounting

The ProtoAir can be mounted using the DIN rail mounting bracket on the back of the unit.

Figure 53: DIN Rail

Appendix B.6 Physical Dimension Drawing

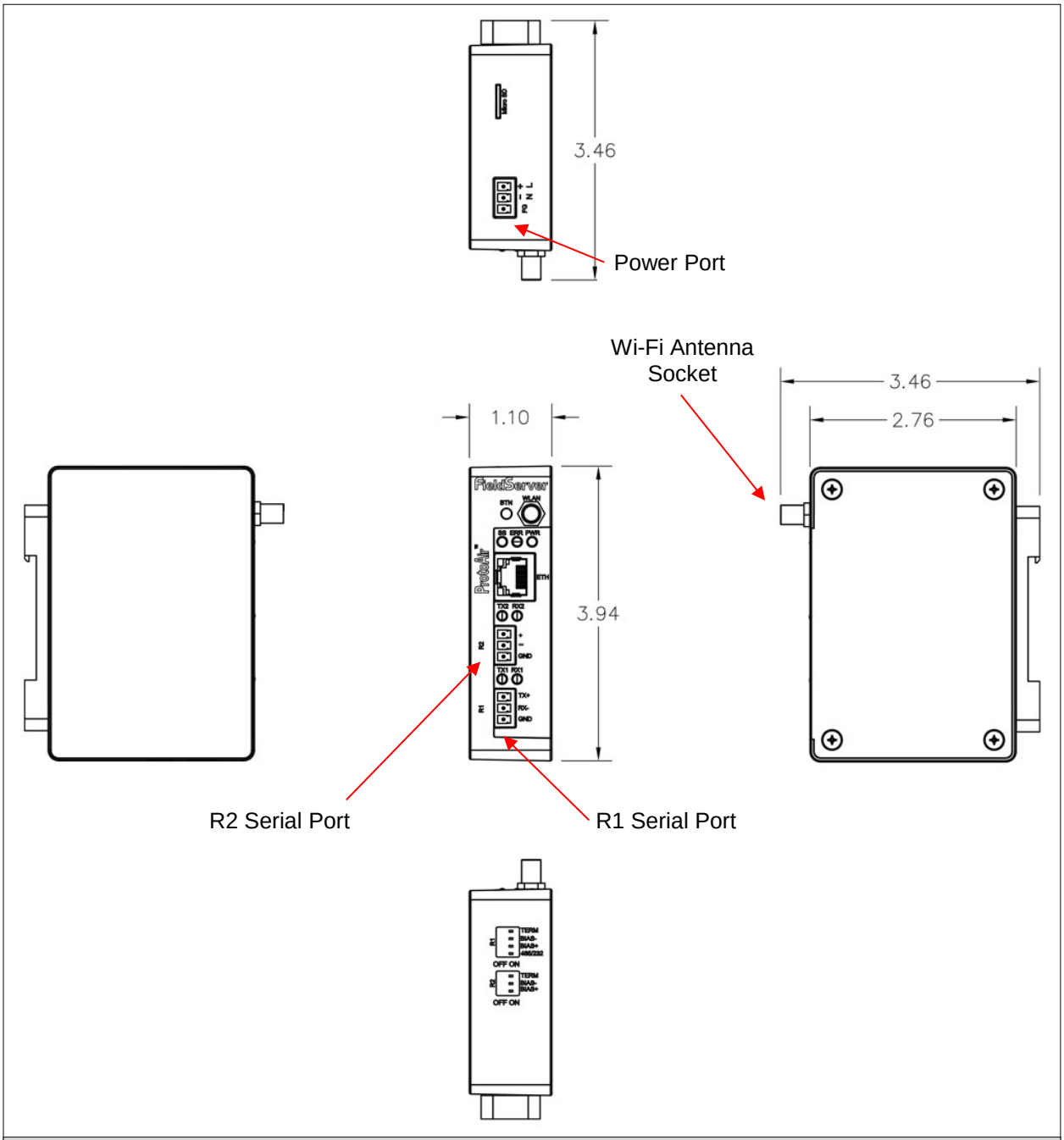


Figure 54: ProtoAir FPA-W44 Dimensions

Appendix C Vendor Information – Pure Humidifier

Appendix C.1 Intac Modbus RTU Mappings to BACnet, Metasys N2 & Modbus TCP/IP

Point Name	BACnet Object Type	BACnet Object ID	N2 Data Type	N2 Address	Modbus Register
RH Set Point	AV	1	AO	1	102
High Limit Set point	AV	2	AO	2	103
RH Low Alarm	AV	3	AO	3	104
RH High Alarm	AV	4	AO	4	105
Operation Mode	AV	5	AO	5	202
Drain Duration Timer	AV	6	AO	6	203
Drain Interval timer	AV	7	AO	7	204
Cool Down Delay	AV	8	AO	8	205
Cool Down Temp	AV	9	AO	9	206
Fill Delay Timer	AV	10	AO	10	207
Water Temp Set Point	AV	11	AO	11	208
Water Temp Hysteresis	AV	12	AO	12	209
End of Use Drain Timer	AV	13	AO	13	210
Time to Clean Timer	AV	14	AO	14	211
Clean Reset	AV	15	AO	15	212
Intac Address	AV	16	AO	16	213
Intac Baud Rate	AV	17	AO	17	214
Room Prop band	AV	18	AO	18	302
Room hysteresis	AV	19	AO	19	303
Room Integral	AV	20	AO	20	304
Room Derivative	AV	21	AO	21	305
Cycle Time	AV	22	AO	22	306
Duct Prop Band	AV	23	AO	23	307
Duct Hysteresis	AV	24	AO	24	308
Duct Integral	AV	25	AO	25	309
Duct Derivative	AV	26	AO	26	310
RH Input filter	AV	27	AO	27	311
Control Source	AV	28	AO	28	503
Water Sensor	AV	29	AO	29	504
RH Sensor	AV	30	AO	30	505
RH Process Low	AV	31	AO	31	506
RH Process High	AV	32	AO	32	507
High Limit Sensor	AV	33	AO	33	509
HighLimit Process Low	AV	34	AO	34	510
HighLimit Process High	AV	35	AO	35	511
Outdoor Air Sensor	AV	36	AO	36	512
OAT Process Low	AV	37	AO	37	513
OAT Process High	AV	38	AO	38	514
OAT Range Low	AV	39	AO	39	515
OAT Range High	AV	40	AO	40	516
OAT Offset	AV	41	AO	41	517
Process Output	AV	42	AO	42	518
Out Process Low	AV	43	AO	43	519
Out Process High	AV	44	AO	44	520
Dedicated Input	AV	45	AO	45	521
Temp units	AV	46	AO	46	522
Capacity Units	AV	47	AO	47	523
Unit Capacity	AV	48	AO	48	524
Menu access	AV	49	AO	49	526
Control Type	AV	50	AO	50	702
Active heaters	AV	51	AO	51	703
Water Enable	AV	52	AO	52	704
Air Enable	AV	53	AO	53	705
Water Level Sensor	AV	54	AO	54	706
Drain Type	AV	55	AO	55	707
High limit enable	AV	56	AO	56	708
Clean Time	AV	57	AO	57	709
Gas Burners	AV	58	AO	58	710

Low Fire Set point	AV	59	AO	59	711
Low Fire Hysteresis	AV	60	AO	60	712
Burner #2 Set point	AV	61	AO	61	713
Burner #2 Hysteresis	AV	62	AO	62	714
Burner #3 Set Point	AV	63	AO	63	715
Burner #3 Hysteresis	AV	64	AO	64	716
Post purge timer	AV	65	AO	65	717
VFD Intensity	AV	66	AO	66	718
Range Checking	AV	67	AO	67	719
Low H2O Timer	AV	68	AO	68	720
Actual Humidity	AV	69	AO	69	049
Control RH Sensor	AV	70	AO	70	050
High Limit RH Actual	AV	71	AO	71	051
High Limit RH Sensor	AV	72	AO	72	052
Water Temp Actual	AV	73	AO	73	053
Water Sensor(temp)	AV	74	AO	74	054
Outdoor Air Temp Actual	AV	75	AO	75	055
Outdoor Air Sensor	AV	76	AO	76	056
Heater #1 %Power	AV	77	AO	77	823
Heater #2 %Power	AV	78	AO	78	824
Heater #3 %Power	AV	79	AO	79	825
Heater #4 %Power	AV	80	AO	80	826
Heater Power	AV	81	AO	81	853
Water Level	AV	82	AO	82	831
Accumulated Run Time	AV	83	AO	83	852
Internal Module #1 I/O Error	AV	84	AO	84	847
Internal Module #2 I/O Error	AV	85	AO	85	848
Internal Module #3 I/O Error	AV	86	AO	86	849
Interlock Input Open	AV	87	AO	87	857
Dedicated Input	AV	88	AO	88	858
Actual Water Level	AV	89	AO	89	832
Fill Valve Status	AV	90	AO	90	840

Appendix C.2 Click_PLC_Intac Modbus RTU Mappings to BACnet, Metasys N2 & Modbus TCP/IP

Point Name	BACnet Object Type	BACnet Object ID	N2 Data Type	N2 Address	Modbus Register
RH Set Point	AV	1	AO	1	45
High Limit Setpoint	AV	2	AO	2	46
Operation Mode	AV	3	AO	3	47
Actual Humidity	AV	4	AO	4	37
Control RH Sensor	AV	5	AO	5	38
High Limit RH Actual	AV	6	AO	6	39
High Limit RH Sensor	AV	7	AO	7	40
Water Temp Actual	AV	8	AO	8	41
Water Sensor (temp)	AV	9	AO	9	42
Outdoor Air Temp Actual	AV	10	AO	10	43
Outdoor Air Sensor	AV	11	AO	11	44
Heater #1 %Power	AV	12	AO	12	1
Heater #2 %Power	AV	13	AO	13	2
Heater #3 %Power	AV	14	AO	14	3
Heater #4 %Power	AV	15	AO	15	4
Heater Power	AV	16	AO	16	31
Water Level	AV	17	AO	17	9
Accumulated Run Time	AV	18	AO	18	30
Internal Module #1 I/O Error	AV	19	AO	19	25
Internal Module #2 I/O Error	AV	20	AO	20	26
Internal Module #3 I/O Error	AV	21	AO	21	27
Interlock Input Open	AV	22	AO	22	35
Dedicated Input	AV	23	AO	23	36
Actual Water Level	AV	24	AO	24	10
Fill Valve Status	AV	25	AO	25	18

Write RH Setpoint	AV	26	AO	26	2045
Write High Limit Setpoint	AV	27	AO	27	2046
Write Operation Mode	AV	28	AO	28	2047
Burner Lockout Alarm	AV	29	AO	29	1000

Appendix D Reference

Appendix D.1 Specifications

	ProtoAir FPA-W44[3]
Electrical Connections	One 3-pin Phoenix connector with: RS-485/RS-232 port (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
Power Requirements	*Input Voltage:* 9-30VDC or 24VAC *Current draw:* 24VAC 0.125A *Max Power:* 3 Watts 9-30VDC 0.25A @12VDC
Approvals	CE and FCC Class B & C Part 15, UL 60950, WEEE compliant, IC Canada, RoHS compliant
Physical Dimensions	4 x 1.1 x 2.7 in (10.16 x 2.8 x 6.8 cm)
Weight	0.4 lbs (0.2 Kg)
Operating Temperature	-20°C to 70°C (-4°F to158°F)
Humidity	10-95% RH non-condensing
Wi-Fi 802.11 b/g/n	*Frequency:* 2.4 GHz *Channels:* 1 to 11 (inclusive) *Antenna Type:* SMA *Encryption:* TKIP, WPA & AES

Figure 55: Specifications

Appendix D.1.1 Compliance with UL Regulations

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

- 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 ProtoAir
- 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.

[3] Specifications subject to change without notice.

Appendix E 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.