Monitoring

Wi-MGR

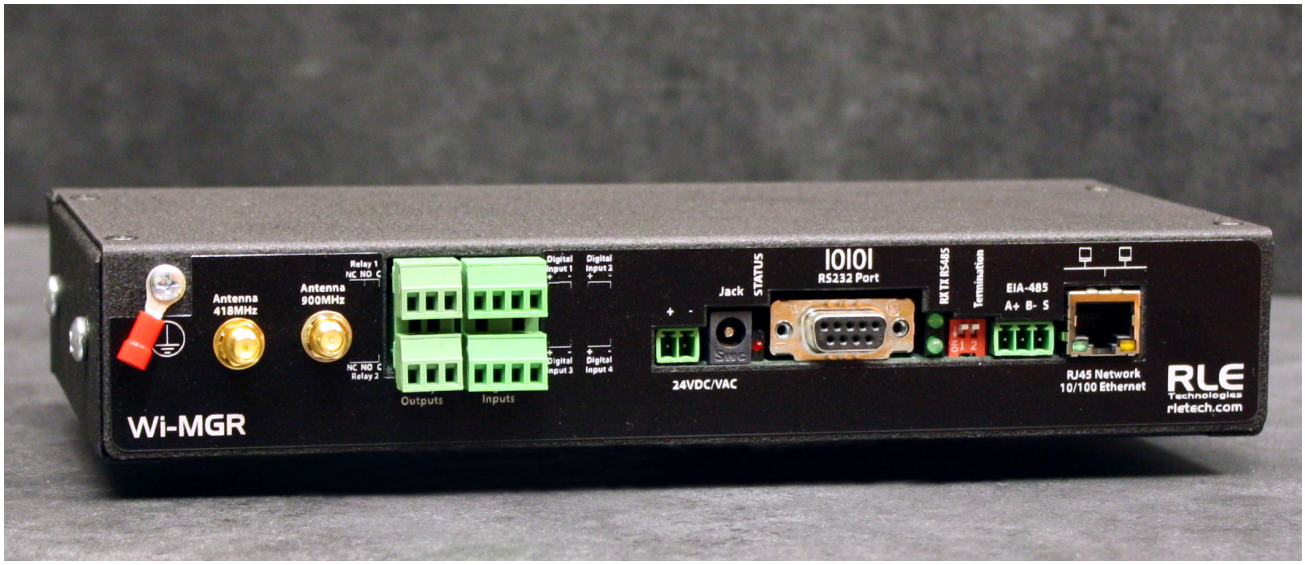
Wireless Sensor Network Manager

User Guide

Version 1.8
Firmware Version 6.3.17

Falcon

RLE Technologies



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Revision History

Rev. No.	Date
1.0	May 2013
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1.6	August 2014
1.7	March 2016
1.8	December 2016

Manufacturer's Notes

This product is manufactured by RLE Technologies, 104 Racquette Drive, Fort Collins, CO, 80524.

If this product is used in any manner other than that specified by the manufacturer, the protection provided by the equipment may be impaired.

Product Registration

Product registration helps RLE Technologies inform owners of:

- Product upgrades
- Firmware enhancements
- New products and technologies
- Special offers available only to registered users

Any information provided to RLE Technologies through the registration form will be regarded as confidential. RLE will not sell or distribute any of the information to third parties.

Technical Support

Personal assistance is available Monday through Friday, from 8:00 a.m. to 5:00 p.m. MST.

A request for assistance may be sent to support@rletech.com.

Otherwise, please call us directly at: **800-518-1519**.

The following information is located on the bottom of each Wi-MGR unit. Please have this information available whenever a technical support call is placed:

Product Model Number	_____
Product Serial Number	_____
Product Manufacture Date	_____

The Wi-MGR is not a field-serviceable item and must be sent back to RLE Technologies for mechanical repair. Only RLE certified service personnel is allowed to access the interior of this equipment, and power must be disconnected (unplugged) from the Wi-MGR any time the unit is mechanically serviced. Physically unplug power from the unit any time you are making wiring connections to or from the Wi-MGR.

RLE cannot accept an item for repair without a Return Materials Authorization number, which must be provided by RLE.

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Seller warrants to the Ultimate Purchaser (the purchaser who buys for use and not for resale) that all products furnished under this order and which are manufactured by Seller will conform to final specifications, drawings, samples and other written descriptions approved in writing by Seller, and will be free from defects in materials and workmanship. These warranties shall remain in effect for RLE Manufactured parts for a period of twenty four (24) months after shipment. These warranties shall remain in effect for RLE distributor supplied parts for a period defined by the original manufacturer's warranty after shipment. All parts replaced or repaired in the warranty period shall carry the unexpired portion of the original warranty. A unit placed with the purchaser on consignment and then later purchased will be warranted for twenty four (24) months [original manufacturer's warranty for RLE distributor supplied parts] from the time the Seller receives notification of the Purchaser's intent to purchase said consigned item.

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This warranty shall be exclusive of any and all other warranties express or implied and may be modified only by writing signed by any officer of the Seller. This warranty shall extend to the Ultimate Purchaser but to no one else. Accessories supplied by Seller but manufactured by others carry any warranty the manufacturers have made to Seller and which can be passed on to the Ultimate Purchaser.

Seller makes no warranty with respect to whether the products sold hereunder infringe any patent, U.S. or foreign, and Purchaser represents that any specially ordered products do not infringe any patent. Purchaser agrees to indemnify and hold Seller harmless from any liability by virtue of any patent claims where Purchaser has ordered a product conforming to Purchaser's specifications, or conforming to Purchaser's specific design.

Purchaser has not relied and shall not rely on any oral representation regarding the Product sold hereunder and any oral representation shall not bind Seller and shall not be part of any warranty.

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CHAPTER

1

SYSTEM OVERVIEW

1.1. Product Description

The Wi-MGR is a wireless sensor network manager that receives signals from up to 400 wireless devices and relays them to facilities monitoring systems as SNMP, Modbus TCP/IP, Modbus RTU, BACnet/IP, and BACnet MS/TP signals.

The Wi-MGR's wireless sensors can receive signals from products transmitting dry contact, analog (0-20mA, 0-5VDC, or 0-10VDC) signals. Commonly used sensors include, but are not limited to, temperature/humidity, temperature, door counters, thermistors, motion sensors, power monitors, and more.

1.2. Indicators

The Wi-MGR has two status indicators to show when data is being transmitted and when data is being received through the EIA-485 port. When data is either being transmitted or received the status lights will blink. If no information is being communicated, the lights are off.

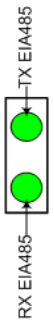
Status	Indicator	Figure
EIA-485 TX	Data is being transmitted.	
EIA-485 RX	Data is being received.	

Table 1.1 EIA-485 TX and EIA-485-RX

1.3. Physical Connections

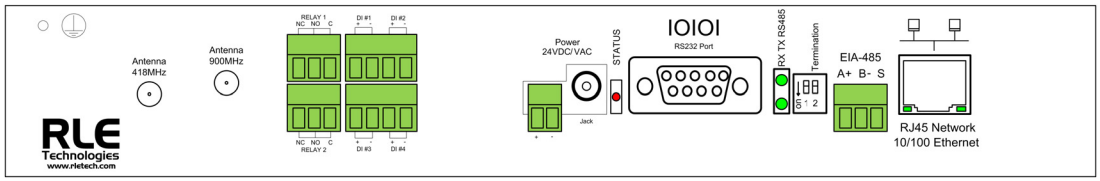


Figure 1.1 Wi-MGR Physical Connections

Item	Description
⏚	Earth ground connection
Antenna 418MHz	RP-SMA connector
Antenna 900MHz	RP-SMA connector
Relay 1	Relay output 1 terminal block (NC/NO/C)
Relay 2	Relay output 2 terminal block (NC/NO/C)
DI #1	Digital input 1 (+ -)
DI #2	Digital input 2 (+ -)
DI #3	Digital input 3 (+ -)
DI#4	Digital input 4 (+ -)
Power 24 VDC/VAC	Power terminal block
Jack	Wall adapter connector
Status	Status LED
RS232 Port	DB9 female connector
RX TX RS485 LED	Receive/Transmit status LED
RS485 Termination switch	1 (unused); 2 100 ohm termination
RS485 Port	EIA-485 circuit connector
RJ45 Ethernet port	10/100 BASE-T connector

Table 1.2 Wi-MGR Physical Connection Descriptions

1.4. SW1 Switch Settings

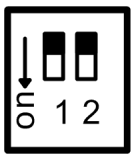
Status	Indicator	Figure
SW1-1	Not used	
SW1-2	EIA-485 Termination (On=100 ohm termination)	

Table 1.3 SW1 Switch Settings

CHAPTER

2

GETTING STARTED

2.1. Installation

The Wi-MGR can be rack or wall mounted, or left free standing. RLE manufactures two different types of mounting brackets for the Wi-MGR:

- The Wi-MGR comes with two L-shaped rack mount tabs. These tabs allow the Wi-MGR to be mounted in either the front or back of a 19-inch rack.

  Remove the screws from the side of the Wi-MGR, put the brackets in place, and reapply the screws. Mount the Wi-MGR in the rack. Use the preferred anchoring method as suggested by the rack manufacturer to mount the unit securely.

- Wall mount tabs are available for the Wi-MGR and are sold separately. They are larger than the rack mount tabs, and the angle configuration and screw holes are aligned to accommodate a wall mount scenario.

  Remove the screws from the side of the Wi-MGR, put the brackets in place, and reapply the screws. Mount the Wi-MGR in the desired wall location.

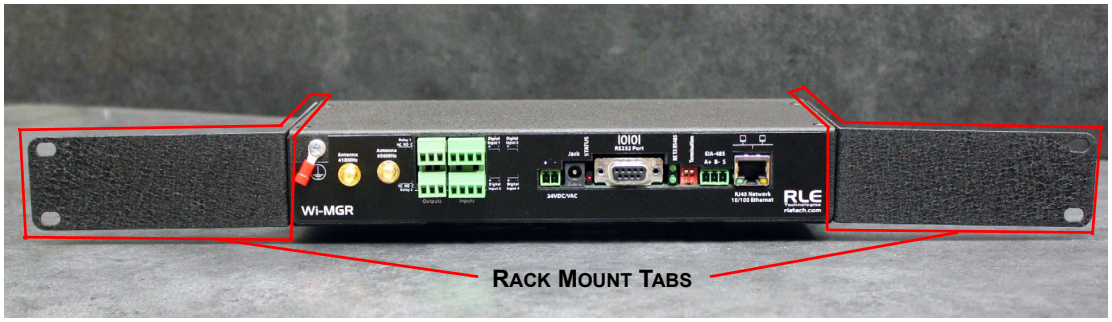


Figure 2.1 Wi-MGR with Rack Mount Tabs Installed

2.2. Wiring

2.2.1 Power Supply and Ground Connections

RLE Technologies recommends powering the Wi-MGR from a UPS supply so the device can send alarm notifications during a power outage. The device can be powered through either the jack or the power supply terminal block, but you must use only one of these power options at a time - you cannot connect the power jack and terminal block power simultaneously or damage will occur. When necessary, be sure to unplug the unit for complete disconnection.

1. If you would like to connect protected Earth ground to the unit, a threaded insert is provided on the enclosure. Connect an 18AWG ground wire from the threaded insert ground terminal to a suitable Earth ground.
2. Plug the provided wall adapter into the jack at P1 and a UPS outlet. The wall adapter has a five foot (1.524m) power cord.
3. If you're providing your own power supply, connect 24VDC to the unit through the power terminal block.

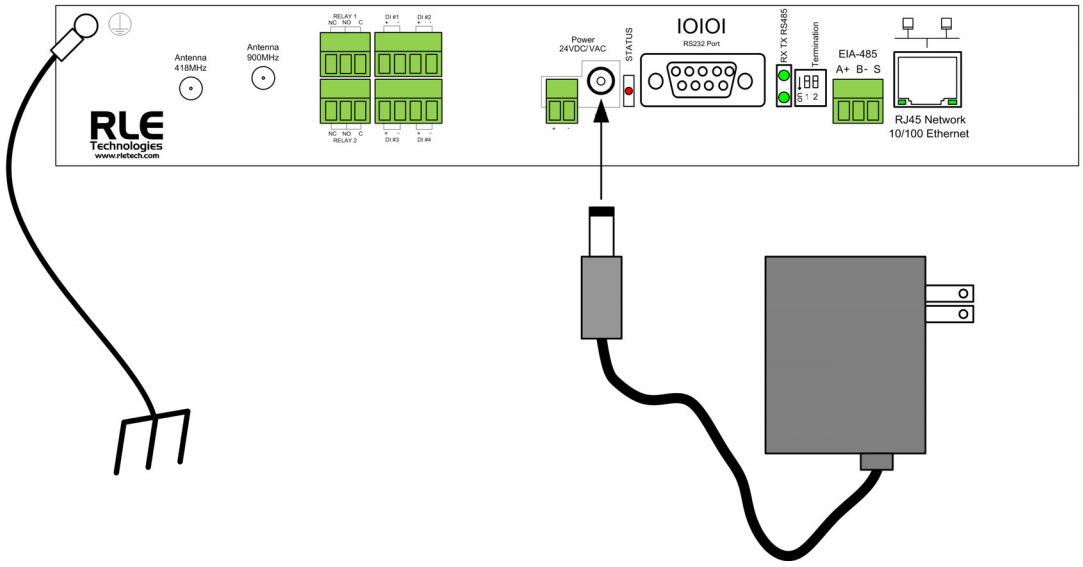


Figure 2.2 24VDC Power Supply Connection

If the EIA-485 port will be used for Modbus RTU communication, RLE Technologies recommends an 18AWG shielded twisted pair stranded copper wire for the connection, using no more than 2000 feet (609.6m) of wire at this specification. If longer runs are needed, please contact RLE Technologies.

2.2.2 Wired Digital Inputs

The Wi-MGR is equipped with four digital relay inputs which allow the device to receive information from hardwired connections. If you have digital inputs you'd like to connect to the Wi-MGR, wire them up now. Your connections may look like those shown here:

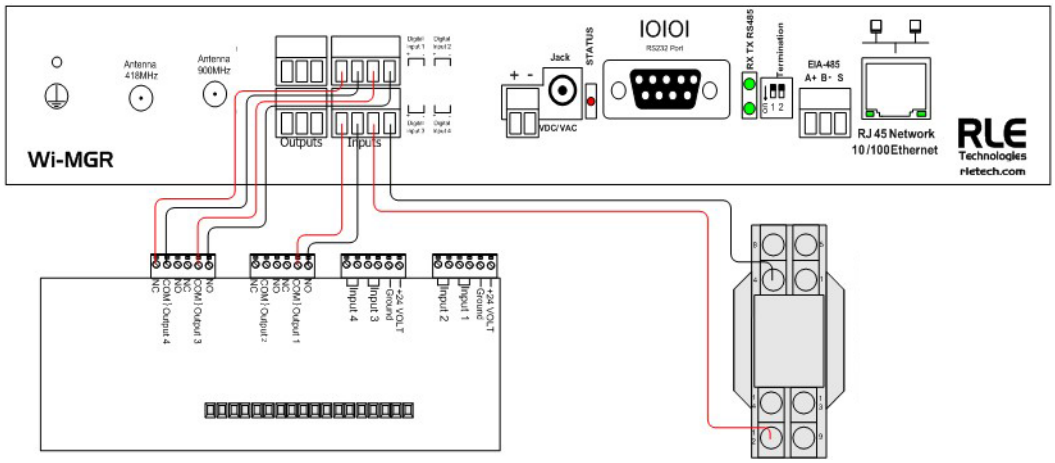


Figure 2.3 Input Connections

2.2.3 Wired Relay Outputs

The Wi-MGR also accommodates two wired relay outputs. Any relay output connections must be made with double insulated wire (jacketed multi-conductor cable). If you wish to use this functionality, wire the connections now. Your wiring may look similar to the connections shown here:

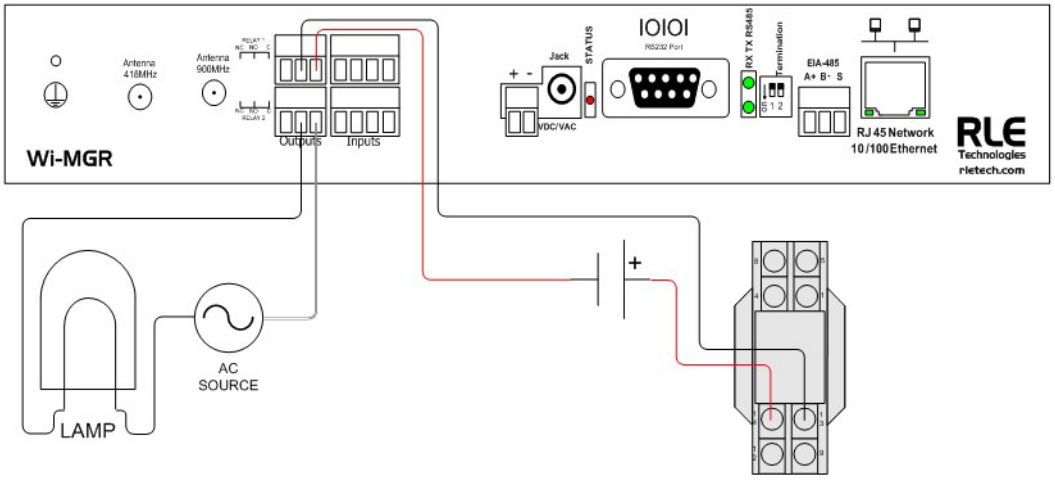


Figure 2.4 Wired Relay Output Connection

2.3. Connectivity

2.3.1 RJ45 Ethernet Connection

The Wi-MGR has an internal 10/100BASE-T Ethernet port that is used for configuration. The Ethernet port supports Web browser access, email (SMTP), BACnet slave, Modbus slave, and SNMP. The device can connect directly to a PC with a crossover cable (provided), or it can connect to a PC through a hub or switch, with CAT5 cables.

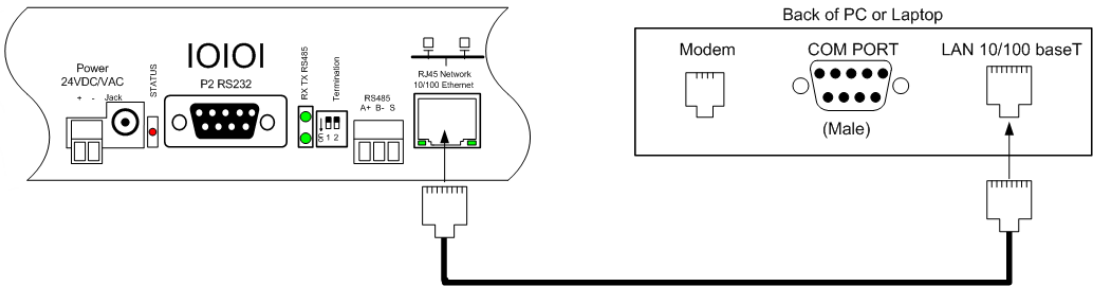


Figure 2.5 Ethernet Connection to a PC Using a Crossover Cable

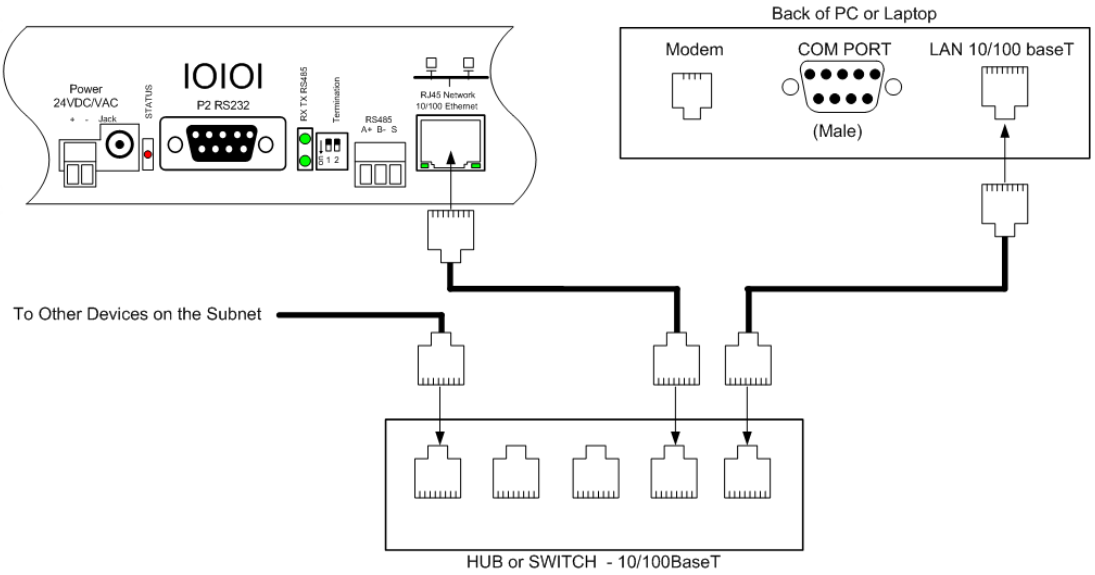


Figure 2.6 Ethernet Connection to a PC on a Subnet, Using a Hub/Switch and CAT5 Cables

2.3.2 EIA-232 COM Connection

The Wi-MGR can be connected directly to a PC through its EIA-232 port. This is useful for IP configuration, firmware downloads, and troubleshooting. The EIA-232 connection is only used as a temporary connection. Connect the straight through, 9-pin serial cable as shown in Figure 2.7.

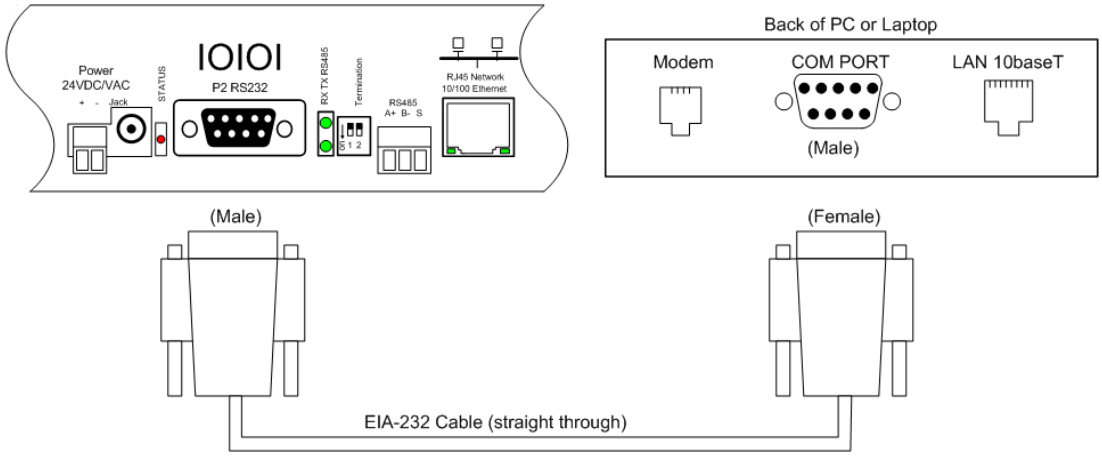


Figure 2.7 EIA-232 COM Connection

2.3.3 Modbus EIA-485 Connections

The Wi-MGR can function as a Modbus Slave over an EIA-485, 2-wire hardware connection, as shown in Figure 2.8.

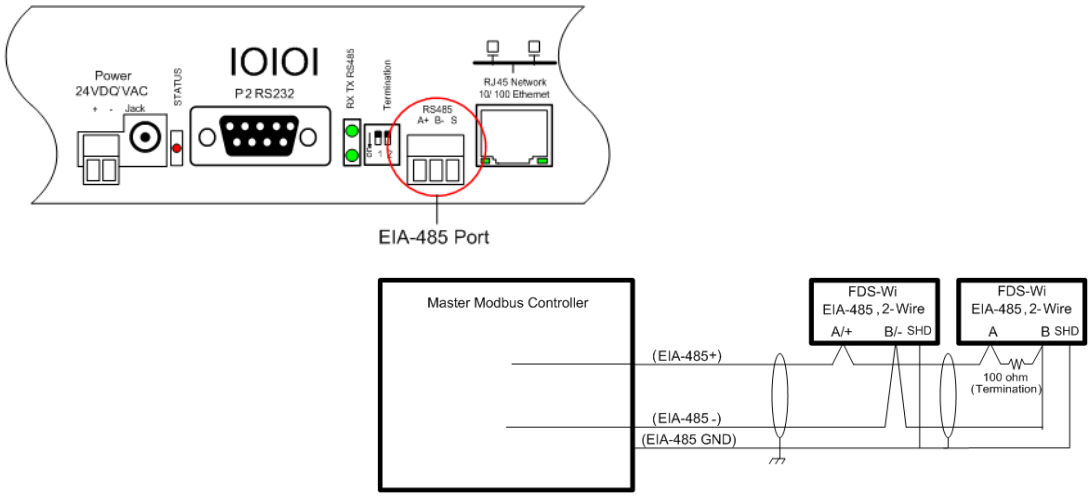


Figure 2.8 EIA-485 Connection

2.3.4 Antenna Connections

The Wi-MGR is shipped with a 418 MHz, 6-foot cable antenna and a 900 MHz, 6-foot cable antenna. The 418 MHz antenna has longer shafts; the 900 MHz antenna has shorter shafts. Plug each antenna into its appropriate jack on the front of the Wi-MGR.

Figure 2.9 Wi-MGR Antennas

2.4. Communication: Set the IP Address

The Wi-MGR will not communicate over a user's network the first time it is connected. This is because the manufacturer programs the device with a default IP address: `10.0.0.188`, Subnet Mask: `255.255.255.0`. This default address must be changed to an IP address that corresponds with the user's network before the Wi-MGR can communicate over the network. There are two ways to set the Wi-MGR's IP address:

- Via the Web browser
- Via the EIA-232 interface

2.4.1 Set the IP Address Using a Web Browser

Attention: If you have not set an IP address before, consult your IT Department for support.

NOTE **The default IP address for the Wi-MGR is `10.0.0.188`**

The default Subnet Mask is `255.255.255.0`

The default user name is `fds` (all lowercase)

There is no default password - leave the password field empty.

1. Contact your IT Department to obtain an available IP address, Subnet Mask, and default Gateway.
2. Plug a crossover network cable (provided) into the laptop or workstation that will be used to configure the Wi-MGR.
3. You'll need to change the IP address and Subnet Mask of your computer so it can communicate with the Wi-MGR in its factory-configured state. Before you change anything, write down the original IP address and Subnet Mask of your computer - you'll need to revert back to these original settings once the Wi-MGR is configured.
4. Change the IP address and Subnet Mask of the computer from its existing address to one that will allow it to communicate with the Wi-MGR, such as `10.0.0.189`. It may be beneficial to set the IP address to one that is one number different from the Wi-MGR's IP address (`10.0.0.188`).
5. Connect the other end of the crossover cable to the Ethernet port on the back of the Wi-MGR.
6. Access the Wi-MGR through a Web browser — type the Wi-MGR's IP address (`10.0.0.188`) into the location bar. When prompted, enter the Wi-MGR user name, which is `fds`. There is no default password, leave it blank.
7. Select the **Configuration Menu** link, then change the IP address, Subnet Mask, and default Gateway to the one provided by your IT Department. Press the **Submit Changes** button. The Wi-MGR will save the new IP address, Subnet Mask and default Gateway and reboot.
8. Change the IP address of the computer back to its original IP address. If the computer was configured as DHCP (the network domain controller assigns an IP address) return it to this state. This may require assistance from your IT Department, or you may need to consult the computer's manual.
9. The computer and the Wi-MGR are now both configured to communicate on the network. Both should be accessible via the network. Connect the PC and the Wi-MGR to the

network. From the PC web browser, type in the new IP address of the Wi-MGR. Enter the user name and password as stated above to verify network access to the device.

2.4.2 Set the Wi-MGR's IP Address via EIA-232 Connection

To use the EIA-232 interface:

1. Contact your IT Department to obtain an available IP address, Subnet Mask, and default Gateway.
2. Use a 9-pin male-female straight through serial cable to connect the EIA-232 port on the Wi-MGR to a terminal or PC running terminal emulation software (HyperTerminal).
3. Set the appropriate communication port to **9600 baud**, **NO parity**, **8 data bits**, **1 stop bit**, **(9600/N/8/1)**, and **no software or hardware flow command**.
4. Once the terminal emulation software starts, press **Enter** on the keyboard and the Wi-MGR boot prompt should appear, (FDS_WI>). If the boot prompt does not appear, check the communication settings and make sure the unit is powered on.
5. From the boot prompt type `IP` then type one space and type the IP address your IT Department provided for the unit. Press the enter key. For example, `IP 192.168.103.211` The Wi-MGR will reboot after the IP address is changed.
6. From the boot prompt type `NM` then type one space and type the Subnet Mask address your IT Department provided for the unit. Press the enter key. For example, `NM 255.255.255.0` The Wi-MGR will reboot after the Subnet Mask is changed.
7. From the boot prompt type `DG` then type one space and type the Default Gateway address your IT Department provided for the unit. Press the enter key. For example, `DG 192.168.103.1` The Wi-MGR will reboot after the Default Gateway is changed.
8. The IP address is now set and the Wi-MGR can be accessed through a Web browser using the new IP address. The default user name is `fds` and there is no password. Leave the password field blank.

2.5. Sensor Discovery

The Wi-MGR is equipped with a sensor discovery feature. The device will discover available wireless sensor inputs and enter them into the Sensor Summary page. By default, this feature is disabled. Turn on this feature when you are installing or locating new sensors. Turn it off once your sensors have all been discovered. If you do not turn off the Sensor Discovery feature, the Wi-MGR will continue to attempt to find new sensors. This could cause a device malfunction, or contaminate your list of active sensors with additional sensors that do not actually exist.

To configure sensors to communicate with the Wi-MGR, follow these steps:

1 In the Wi-MGR's user interface, go to the Configuration>Wireless/Sensors page. If it is not already enabled, click the Enabled radio button for Sensor Discovery. Click the **Submit Changes** button to save the modification and enable the sensor discovery.

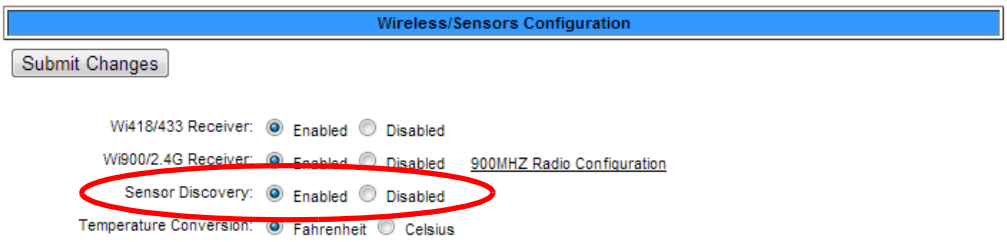


Figure 2.10 Enabling Sensor Discovery

2 Take off the sensor's lid by pinching the outer corners of the lid.

Figure 2.11 Remove the Sensor's Lid

3 With the lid off, remove the polyester tab from the battery. Make sure the terminal clips fit snugly around the battery (if necessary, gently squeeze them to tighten the contacts) and make sure the terminal clips and ends of the battery are free of any glue residue that may

have come from the sticker at the end of the battery. If necessary, wipe the battery and clips with rubbing alcohol to remove any sticky residue. Replace the lid.

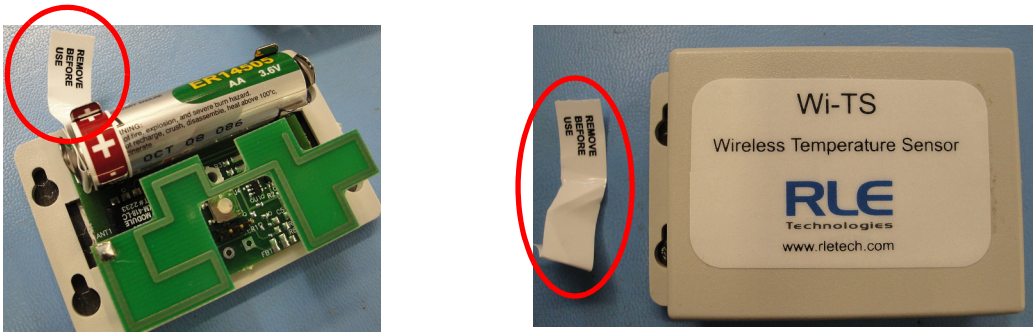


Figure 2.12 Remove the Battery's Protective Tab

4 Turn the sensor over to show the product label on the bottom. This label contains the serial number of the sensor. The serial number is unique to each sensor, and appears in the table on the Sensors page of the web interface once the sensor has been discovered by the Wi-MGR.

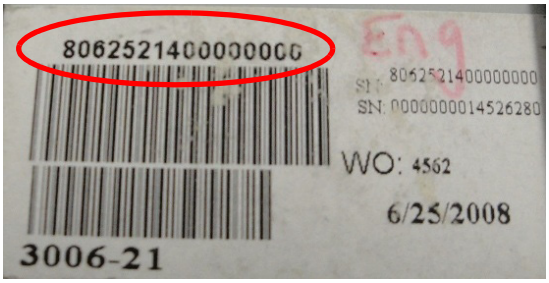
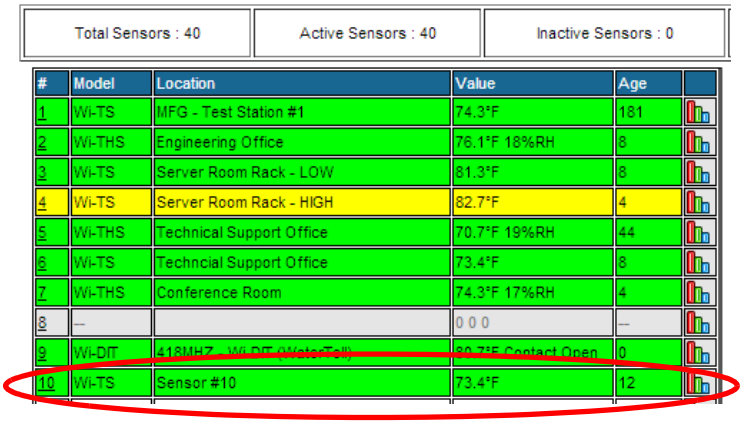


Figure 2.13 Sensor's Serial Number on Product Label

5 Go to the Sensors page of the Wi-MGR's web interface and confirm the placement in the sensor discovery list. Newly added sensors will appear at the BOTTOM of the list. Click on the sensor's index number (in the # column) and verify the serial number reported at that index number matches the serial number of the sensor you just added to the system.



Total Sensors : 40 | Active Sensors : 40 | Inactive Sensors : 0

#	Model	Location	Value	Age	
1	Wi-TS	MFG - Test Station #1	74.3°F	181	
2	Wi-THS	Engineering Office	76.1°F 18%RH	8	
3	Wi-TS	Server Room Rack - LOW	81.3°F	8	
4	Wi-TS	Server Room Rack - HIGH	82.7°F	4	
5	Wi-THS	Technical Support Office	70.7°F 19%RH	44	
6	Wi-TS	Techncial Support Office	73.4°F	8	
7	Wi-THS	Conference Room	74.3°F 17%RH	4	
8	--		0 0 0	--	
9	Wi-DIT	418MHZ - Wi-DIT (WaterTalk)	80.7°F Contact Open	0	
10	Wi-TS	Sensor #10	73.4°F	12	

Figure 2.14 Verifying a Sensor's Discovery

6 Place a label or other marking on the sensor to show its index number.

Figure 2.15 Label the Sensor

7 Once the sensors have been discovered, **turn off** the Sensor Discovery option on the Configuration>Wireless/Sensors page of the Wi-MGR's web interface and click the Submit Changes button to switch off the feature. If you do not turn off the Sensor Discovery feature, the Wi-MGR will continue to attempt to find new sensors. This could cause a device malfunction, or contaminate your list of active sensors with additional sensors that do not actually exist.

8 Note each sensor's index number and location. Reference Chapter 3, "Web Interface" on page 25 to learn how to enter the location and any other necessary identifying information in each sensor's configuration information.

9 Once you have configured the Wi-MGR, download and save a copy of the system configuration.

2.6. Sensor Mounting Tips

The electronics in a wireless sensor are water-resistant, but not waterproof. Wireless sensors need to be mounted in a safe location, where the chance of them becoming submerged in a liquid are minimal. Sensors can be mounted with double-faced tape or adhesive velcro. To mount a sensor on a metallic surface, purchase adhesive-backed magnetic tape and adhere it to the back of the sensor. Use magnetic tape that is 0.5 inch (1.27cm) wide. The magnetic tape will not disturb the electronics, and when placed correctly, the tape allows the sensor's label to remain visible. The serial number on this label is unique to each sensor, and you will need to refer to this number throughout the life span of the sensor.

Figure 2.16 Magnetic Strips Used to Mount a Sensor

To mount sensors using magnetic tape:

1 For each sensor, cut two 1.5-inch (3.81cm) strips of tape.

Figure 2.17 Recommended Length of 0.5 Inch for Magnetic Strip

2 Make sure the back of the sensor is clean. If necessary, use isopropyl alcohol to clean the sensor.

3 Remove the protective film from the adhesive side of the magnetic tape and place the tape on the sensor.

4 Place the sensor in the desired location.

CHAPTER

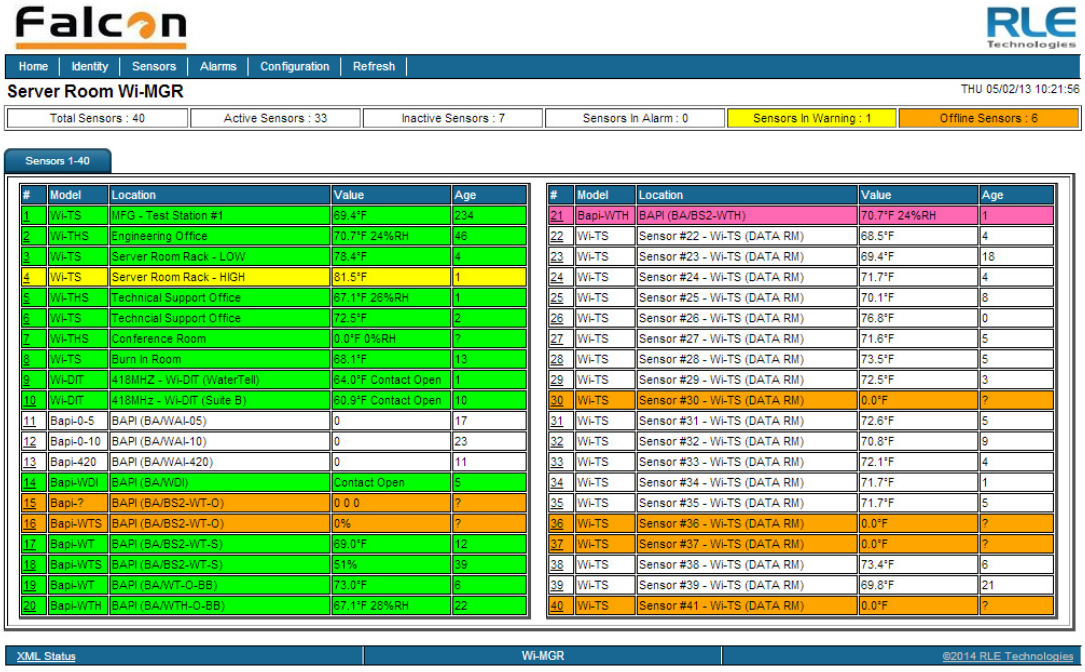
3

WEB INTERFACE

The Wi-MGR allows users to view data points and configure the unit/points via the Web. To access the Web interface, users must first configure the Wi-MGR to communicate via the Internet. To set the IP address, see section 2.4., “Communication: Set the IP Address” on page 19. The Wi-MGR web interface is most compatible with Internet Explorer and Firefox. If you choose to access the web interface via Google Chrome, some functionality may not be available.

3.1. Home Page

The Home page allows users to view sensors, inputs, and outputs managed by the Wi-MGR.



#	Model	Location	Value	Age
1	Wi-TS	MFG - Test Station #1	69.4°F	234
2	Wi-THS	Engineering Office	70.7°F 24%RH	46
3	Wi-TS	Server Room Rack - LOW	78.4°F	4
4	Wi-TS	Server Room Rack - HIGH	81.5°F	1
5	Wi-THS	Technical Support Office	67.1°F 26%RH	1
6	Wi-TS	Technical Support Office	72.5°F	2
7	Wi-THS	Conference Room	0.0°F 0%RH	?
8	Wi-TS	Burn In Room	68.1°F	13
9	Wi-DIT	418MHZ - Wi-DIT (WaterTell)	64.0°F Contact Open	1
10	Wi-DIT	418MHz - Wi-DIT (Suite B)	60.9°F Contact Open	10
11	Bapi-0-5	BAPI (BA/WAI-05)	0	17
12	Bapi-0-10	BAPI (BA/WAI-10)	0	23
13	Bapi-420	BAPI (BA/WAI-420)	0	11
14	Bapi-WDI	BAPI (BA/WDI)	Contact Open	6
15	Bapi-?	BAPI (BA/BS2-WT-O)	0 0 0	?
16	Bapi-WTS	BAPI (BA/BS2-WT-O)	0%	?
17	Bapi-WT	BAPI (BA/BS2-WT-S)	69.0°F	12
18	Bapi-WTS	BAPI (BA/BS2-WT-S)	51%	89
19	Bapi-WT	BAPI (BA/WT-O-BB)	73.0°F	6
20	Bapi-WTH	BAPI (BA/WTH-O-BB)	67.1°F 28%RH	22

#	Model	Location	Value	Age
21	Bapi-WTH	BAPI (BA/BS2-WTH)	70.7°F 24%RH	1
22	Wi-TS	Sensor #22 - Wi-TS (DATA RM)	68.5°F	4
23	Wi-TS	Sensor #23 - Wi-TS (DATA RM)	69.4°F	18
24	Wi-TS	Sensor #24 - Wi-TS (DATA RM)	71.7°F	4
25	Wi-TS	Sensor #25 - Wi-TS (DATA RM)	70.1°F	8
26	Wi-TS	Sensor #26 - Wi-TS (DATA RM)	76.8°F	0
27	Wi-TS	Sensor #27 - Wi-TS (DATA RM)	71.6°F	5
28	Wi-TS	Sensor #28 - Wi-TS (DATA RM)	73.5°F	5
29	Wi-TS	Sensor #29 - Wi-TS (DATA RM)	72.5°F	3
30	Wi-TS	Sensor #30 - Wi-TS (DATA RM)	0.0°F	?
31	Wi-TS	Sensor #31 - Wi-TS (DATA RM)	72.6°F	5
32	Wi-TS	Sensor #32 - Wi-TS (DATA RM)	70.8°F	9
33	Wi-TS	Sensor #33 - Wi-TS (DATA RM)	72.1°F	4
34	Wi-TS	Sensor #34 - Wi-TS (DATA RM)	71.7°F	1
35	Wi-TS	Sensor #35 - Wi-TS (DATA RM)	71.7°F	5
36	Wi-TS	Sensor #36 - Wi-TS (DATA RM)	0.0°F	?
37	Wi-TS	Sensor #37 - Wi-TS (DATA RM)	0.0°F	?
38	Wi-TS	Sensor #38 - Wi-TS (DATA RM)	73.4°F	6
39	Wi-TS	Sensor #39 - Wi-TS (DATA RM)	69.8°F	21
40	Wi-TS	Sensor #41 - Wi-TS (DATA RM)	0.0°F	?

Figure 3.1 Wi-MGR Home Page

Sensors on the Home page are color coded to help notify users of alarm conditions.

Color	Indication
Green	Sensor is registering properly - sensor is communicating properly.
Red	Sensor is registering properly - sensor has an alarm.
Yellow	Sensor is registering properly - sensor has a warning and may be approaching an alarm condition.
Orange	Sensor is offline - there is a problem with communications.
White	The sensor is operating, but it is not configured with a threshold.
Pink	Battery maintenance is recommended - the cumulative run time on the sensor indicates the battery should be changed.

Table 3.1 Wi-MGR Home Page Alarm Color Codes

Note the XML Status link on the left side of the page footer. This link allows a user to download data collected by the Wi-MGR as an XML file and then import it into a spreadsheet for viewing, logging, and analyzing. If you'd like to save this file from the web interface, right click on the link and select "Save Target As". If you left click on the link, you will just be able to view the information.

3.2. Identity

The Identity link displays basic Wi-MGR information, including model number, firmware version, contact information, and IP address. Most of these values can be adjusted through the Configuration screens. This page is intended for reference only, not system adjustments.

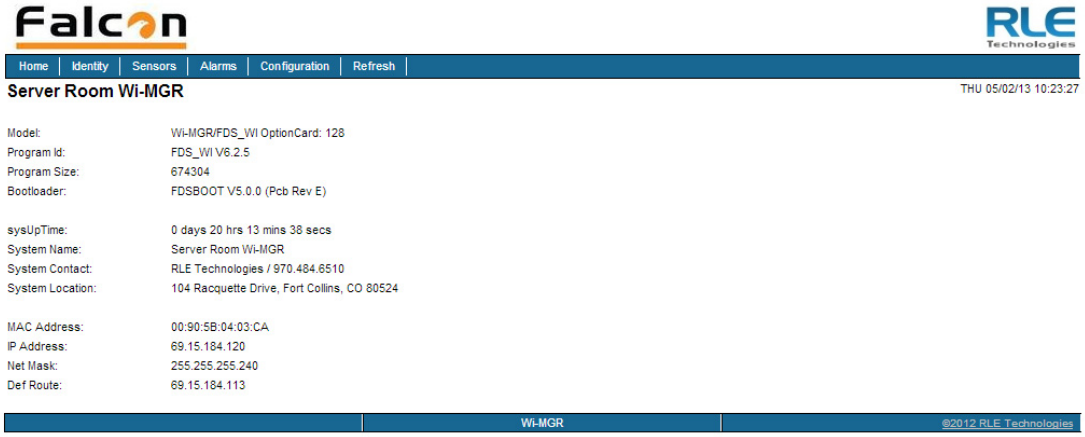


Figure 3.2 Identity Page

3.3. Sensors

The Sensors page allows users to view all the sensors accessible through the Wi-MGR. Up to 400 total sensors can be monitored by the Wi-MGR.

The top of the page displays the total number of sensors connected to the Wi-MGR, the active sensors that are currently communicating with the Wi-MGR, and the total inactive sensors that are not currently communicating with the Wi-MGR. To navigate to individual sensor pages, select the appropriate page number in the upper-right corner.

The page displays a # link, sensor model description, location information, present value reading, the amount of time that's passed since the last reading was transmitted (age), and trending information. It also provides links to download bulk sensor data in a .csv file.

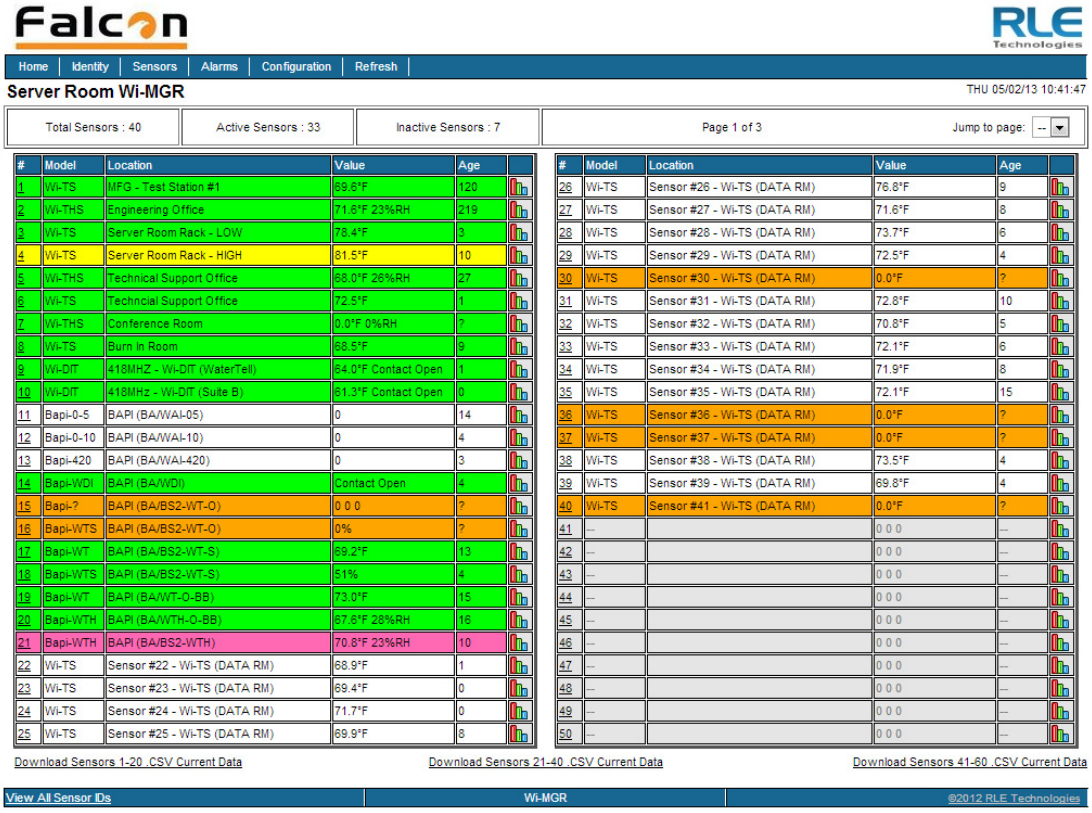


Figure 3.3 Sensors Page

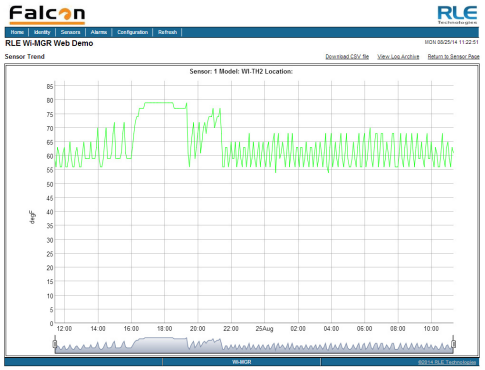
Attribute	Description
# Link	Click on the sensor number to go to the sensor's configuration page.
Model	Displays the sensor's model and type.
Location	A label used to note the sensor's physical location, or any other necessary descriptive information.
Value	Displays the current sensor reading.
Age	Amount of time that has passed, in seconds, since the Wi-MGR has received a broadcast signal from this sensor.

Table 3.2 Sensor Summary Menu Options

Attribute	Description
Graph Link	Click the links to view either a graph or a log showing the sensor's data record from the last 24 hours, or to download the data as a .csv file.
Download Sensors .CSV Current Data	Use these links to download bulk sensor data. The data will be bundled in groups of 20 sensors, and will be provided as a .csv file. Bulk data may take up to 20 seconds to download.
View All Sensor IDs	Click this link to view a complete list of all the sensors connected to the Wi-MGR. This list displays the sensor number (including a clickable link to the individual sensor page), sensor ID, serial #, and age.

Table 3.2 Sensor Summary Menu Options

Click the Graph link to access trending information, download a .csv file of the trending data, or view the log archive for that sensor.




```
System Name:,Server Room Wi-MGR
Sensor:,22
Model:,Wi-TS
Description:,Sensor #22 - Wi-TS (DATA RM)
Date,Time,Temperature
03/05/13,16:30,70
03/05/13,16:40,70
03/05/13,16:50,70
03/05/13,17:00,70
03/05/13,17:10,70
03/05/13,17:20,70
03/05/13,17:30,70
03/05/13,17:40,70
03/05/13,17:50,70
03/05/13,18:00,69
03/05/13,18:10,69
03/05/13,18:20,69
03/05/13,18:30,69
03/05/13,18:40,69
03/05/13,18:50,69
03/05/13,19:00,68
03/05/13,19:10,68
03/05/13,19:20,68
03/05/13,19:30,68
03/05/13,19:40,67
03/05/13,19:50,67
03/05/13,20:00,67
03/05/13,20:10,66
03/05/13,20:20,66
03/05/13,20:30,66
03/05/13,20:40,65
03/05/13,20:50,65
03/05/13,21:00,65
03/05/13,21:10,65
03/05/13,21:20,64
03/05/13,21:30,64
03/05/13,21:40,64
03/05/13,21:50,64
03/05/13,22:00,64
03/05/13,22:10,63
03/05/13,22:20,63
03/05/13,22:30,63
```

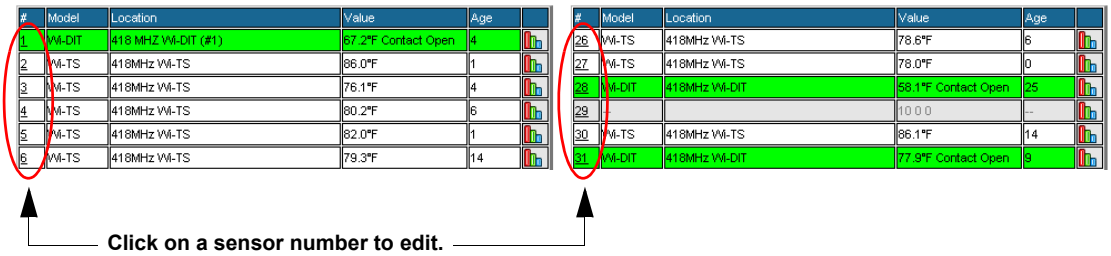
Figure 3.4 Log Graphs and Trending Information

3.3.1 Individual Sensor Configuration

Whether you're viewing the sensors through the Sensor page or the Home page, note that each sensor's system number (identifier) is a clickable number link. Click this link to access the sensor's configuration page.

Each sensor has its own configuration page which allows users to edit a wide variety of sensor information. The Wi-MGR's Sensor Discovery feature automatically checks and updates the serial numbers of sensors once they are connected to the system. Therefore, if the sensor discovery feature is enabled (3.5.1, "Wireless/Sensors" on page 36), sensors communicating with the system should automatically be connected to the Wi-MGR.

If a sensor needs to be edited, or if it hasn't been discovered automatically and needs to manually be entered, click the sensor's # link, which can be found on the left side of each sensor row. If you're entering information for a new sensor, click a depopulated number.



#	Model	Location	Value	Age
1	Wi-DIT	418 MHZ Wi-DIT (#1)	67.2°F Contact Open	4
2	Wi-TS	418MHz Wi-TS	86.0°F	1
3	Wi-TS	418MHz Wi-TS	76.1°F	4
4	Wi-TS	418MHz Wi-TS	80.2°F	6
5	Wi-TS	418MHz Wi-TS	82.0°F	1
6	Wi-TS	418MHz Wi-TS	79.3°F	14

#	Model	Location	Value	Age
26	Wi-TS	418MHz Wi-TS	78.6°F	6
27	Wi-TS	418MHz Wi-TS	78.0°F	0
28	Wi-DIT	418MHz Wi-DIT	58.1°F Contact Open	25
29	--		1000	--
30	Wi-TS	418MHz Wi-TS	86.1°F	14
31	Wi-DIT	418MHz Wi-DIT	77.9°F Contact Open	9

Figure 3.5 Edit Sensor Properties

Click the number on the left side of the sensor row to edit individual sensor properties.

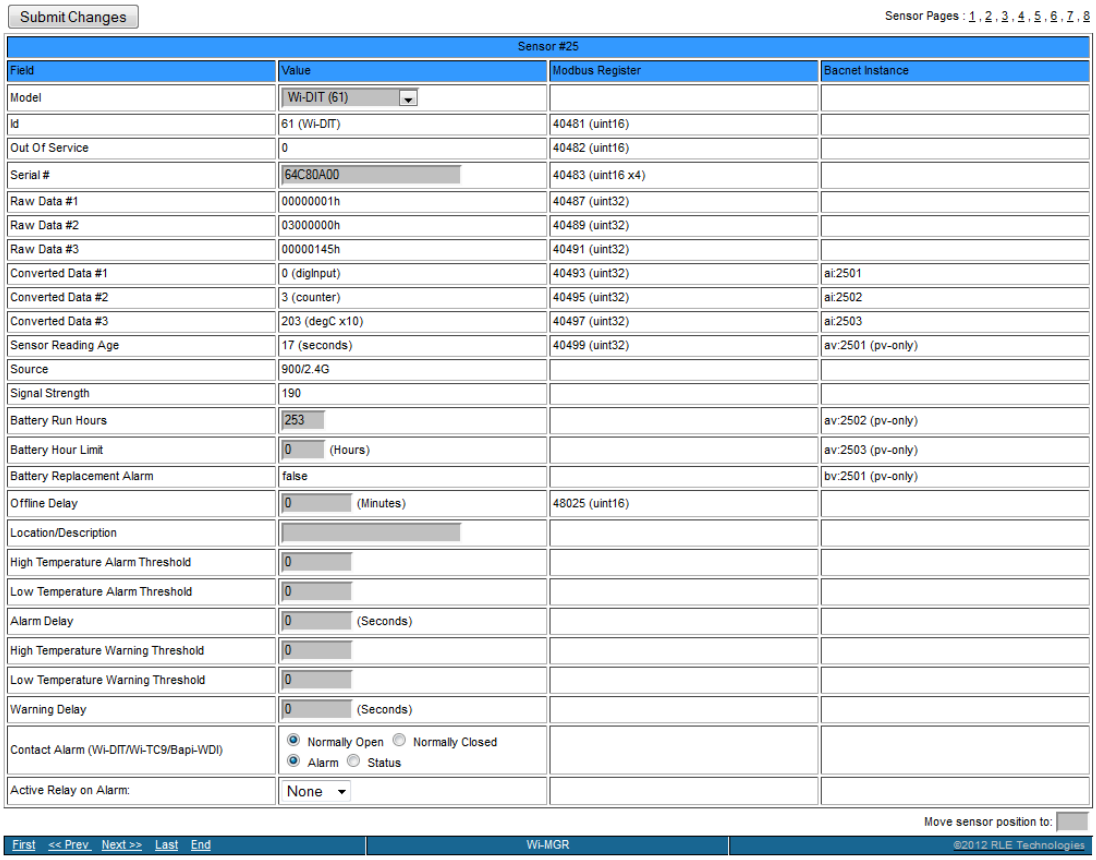


Figure 3.6 Wireless Sensor Configuration

For each sensor, all fields in gray are editable. All other fields are for reference only. To the right of the Value field is the corresponding Modbus Register column for slave data output from that sensor. To the right of that is the BACnet Instance column for slave interface to a Building Management System.

NOTE **When the desired edits have been made, click the Submit Changes button to save the changes. If the Submit Changes button is not selected, the new configuration will not be updated and saved.**

All fields in the following table will not be available for each sensor. Only the configurable options that apply to each sensor are displayed in that sensor's configuration menu. Editable options are as follows:

Option	Description
Model	To edit the sensor model, select the type of sensor from the drop-down list by clicking on the down arrow. This number is used by the Wi-MGR to identify what kind of sensor is being read in to the system. The possible values are: Wi-TS 54 Wi_THS 48 Wi-DIT 61 Wi-ASx/Wi-MS 41 Wi-TH2 52 Counter 11 BAPI 76 Wi-LD 76 Thermistor 57 SetPointOverride 5B Wi-TC9 74
Id	Uneditable; this reflects the value currently saved as the model number.
Out of Service	A binary number used to determine if a sensor is online or offline. 0 = online, any other non-zero number = offline
Serial #	This is the unique number broadcasted from the sensor to the Wi-MGR for identification. Each sensor has a unique serial number. The Serial # field should automatically fill when the Wi-MGR automatically discovers the sensors. If a serial number is not automatically updated and needs to be entered manually, the serial number should be entered from left to right. Point Six sensors have two serial numbers on the sensors, one that reads from left to right and one that reads from right to left. The serial number should be entered starting with a number (not zero) or an alpha character. Enter the appropriate serial number, listed on the bottom of the sensor, in the provided text field.
Raw Data #1, #2, #3	Uneditable; this is the uncalculated data received from the wireless sensor. This data is then processed by the Wi-MGR to a calculated value.
Converted Data #1, #2, #3	Uneditable; this is the calculated data processed from the raw data. This data is then displayed by the Wi-MGR and used for Modbus, BACnet, and SNMP output.
Sensor Reading Age	Uneditable; the amount of time that has passed, in seconds, since the Wi-MGR has received a broadcast signal from this sensor.

Table 3.3 Wireless Sensor Configuration Options

Option	Description
Source	Uneditable; displays to the user where the signal is coming from. 418 is broadcasted from the common sensor 418MHz Point Six Wireless sensor. A 900 means it is being broadcasted from a Point Repeater (Wi-PR) or a 900MHz Point Six Wireless sensor. A 2402 means it is being received from another Wi-MGR using the Ethernet Packet Repeater feature. The MAC address and IP address will be displayed after the 2402.
Signal Strength	Uneditable; displays the quality of the signal from the sensor. 418MHz sensors display between 0-100.
Battery Run Hours	Number of hours the battery on the sensor has been running. Set this value to 0 each time you replace the sensor's battery. This will reset the run-time clock, so it is in synch with the battery operation time.
Battery Hour Limit	Number of hours the battery on the sensor can run before a "Change Battery" notification is triggered. Set this value to 0 to disable the battery alarm.
Battery Replacement Alarm	Uneditable; the Wi-MGR can be configured to trigger a "Change Battery" notification once a specific period of time has elapsed. This notifies users that they should change the battery in this sensor, to avoid erroneous readings that may be generated by a sensor with a low battery. If the "Change Battery" alarm is triggered, this field will report "True." If the alarm is not triggered, this field will report "False."
Offline Delay	Users can designate how many minutes must pass before the Wi-MGR considers the sensor offline. Typical transmission time is 10-20 seconds for 418MHz sensors and 3-5 minutes for 900MHz sensors. Set this value to 0 to disable the sensor offline alarm.
Location/ Description	Enter a label up to 30 characters to describe the sensor and its location.
High Temperature/ Analog Alarm Threshold	Enter a high alarm threshold - if the value rises above this number, an alarm is generated for this sensor.
Low Temperature/ Analog Alarm Threshold	Enter a low alarm threshold - if the value drops below this number, an alarm is generated for this sensor.
High Temperature Alarm Threshold	Enter a high temperature alarm threshold - if the temperature rises above this value, a high temperature alarm is generated.
Low Temperature Alarm Threshold	Enter a low temperature alarm threshold - if the temperature drops below this value, a low temperature alarm is generated.
High Humidity Alarm Threshold	Enter a high humidity alarm threshold - if the humidity rises above this value, a high humidity alarm is generated.

Table 3.3 Wireless Sensor Configuration Options (continued)

Option	Description
Low Humidity Alarm Threshold	Enter a low humidity alarm threshold - if the humidity drops below this value, a low humidity alarm is generated.
Alarm Delay	The number of seconds that pass between the time the system goes into alarm and the time that alarm is annunciated.
High Temperature Warning Threshold	Enter a high temperature warning threshold - if the temperature rises above this value, a high temperature warning is generated.
Low Temperature Warning Threshold	Enter a low temperature warning threshold - if the temperature drops below this value, a low temperature warning is generated.
High Humidity Warning Threshold	Enter a high humidity warning threshold - if the humidity rises above this value, a high humidity warning is generated.
Low Humidity Warning Threshold	Enter a low humidity warning threshold - if the humidity drops below this value, a low humidity warning is generated.
Warning Delay	The number of seconds that pass between the time the system goes into a warning state and the time that warning is annunciated.
Contact Alarm (Wi-DIT/Wi-TC9/ Bapi-WDI)	Designate if the default state for the alarm is normally open or normally closed. Designate whether you are monitoring the point for status, or for an alarm condition. Default = NC, Alarm
Active Relay on Alarm	If the sensor goes into alarm, will it activate a relay? If so, designate which relay or relays it will activate. Default = None

Table 3.3 Wireless Sensor Configuration Options (continued)

Option	Description
Gain (Wi-ASx/Wi-MS) **and** **Offset (Wi-ASx/Wi-MS)**	Applies only to analog 4-20mA, 0-5V, and 0-10V input types. Inputs like temperature, humidity, pressure, etc. convert information to an analog signal. The Wi-MGR reads this raw analog signal and calculates a value based on the input and the predetermined gain and offset settings. The idea is to determine the correct gain and offset values so that the Wi-MGR calculates and displays accurate readings. Without setting the correct gain and offset, the Wi-MGR will not convert the raw data correctly. As a result, missed alarms or nuisance alarms occur. Gain and offset values for sensors are as follows: **Wi-AS1 (Analog 0-20mA)** Gain = (sensor high range value - sensor low range value) ÷ 3277 Offset = sensor low range - ((sensor high range value - sensor low range value) ÷ 4) *Example*: Temperature sensor with a sensing range of 50-95°F - displayed in Fahrenheit Gain = (95 - 50) ÷ 3277 = 0.013732 Offset = 50 - ((95-50) ÷ 4) = 50 - 11.25 = 38.75 (round up to 39) *Example*: Humidity sensor with a range of 0-100% RH Gain = (100 - 0) ÷ 3277 = 0.0305157 Offset = 0 - ((100 - 0) ÷ 4) = -25 **Wi-AS2 (Analog 0-5mA) and Wi-AS3 (Analog 0-10mA)** Gain = (sensor high range value - sensor low range value) ÷ 4096 Offset = sensor low range - ((sensor high range value - sensor low range value) ÷ 4) *Example*: Temperature sensor with a sensing range of 50-95°F - displayed in Fahrenheit Gain = (95 - 50) ÷ 4096 = 0.0109863 Offset = 50 - ((95-50) ÷ 4) = 50 - 11.25 = 38.75 (round up to 39) *Example*: Humidity sensor with a range of 0-100% RH Gain = (100 - 0) ÷ 4096 = 0.024414 Offset = 0 - ((100 - 0) ÷ 4) = -25 **BAPI 4-20mA, BAPI 0-5mA, and BAPI 0-10mA Transducers** Gain = (sensor high range value - sensor low range value) ÷ 4096 Offset = sensor low range value *Example*: Temperature sensor with a sensing range of 50-95°F - displayed in Fahrenheit Gain = (95 - 50) ÷ 4096 = 0.0109863 Offset = 50

Option	Description
Move sensor position to	Reorder the sensors by typing the appropriate number in this box.
Footer Links - Remember to click the **Submit Changes** button for the sensor you're currently configuring before you move to another sensor's configuration page.	
First	Skip to the configuration screen for Sensor 1.
<<Prev	Configure the previous sensor in the list.
Next>>	Configure the next sensor in the list.
Last	Skip to the configuration screen for the last connected sensor.
End	Skip to the end of the sensor list, regardless of whether a sensor is connected at that point.

Table 3.3 Wireless Sensor Configuration Options (continued)

To navigate to specific sensor pages, select the appropriate page number (1-8) in the upper-right corner of the sensors page.

3.4. Alarms

The Alarms page displays the 40 most recent events from all monitored sensors. If a sensor was in an alarm state that has since returned to normal, "Return" is noted in the Present Condition field. If the sensor is still in an alarm state, the alarm will be noted in the Present Condition field.

If the Wi-MGR's power is cycled, all entries on this page will be cleared.

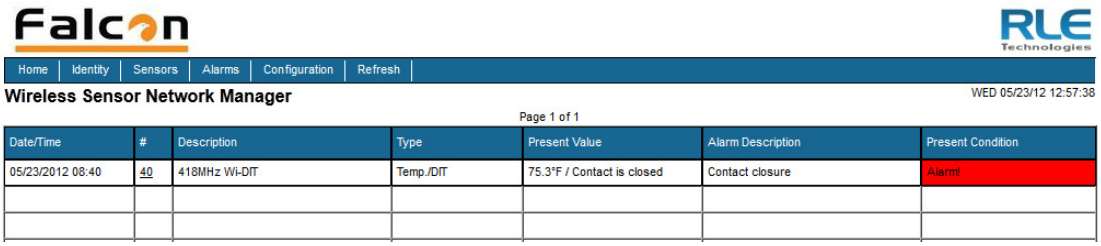


Figure 3.7 Alarm and Warnings Page

3.5. Configuration

The Configuration page allows authorized users to adjust the Wi-MGR settings. Each link on the Configuration page displays more editable information about specific configuration settings.

NOTE **If any of these fields are edited, be sure to click the Submit Changes button to save the changes. If you edit the fields and do not click the Submit Changes button, all edits will be lost.**

3.5.1 Wireless/Sensors

Use this menu to configure wireless sensor options, home page display, and general monitoring options within the Wi-MGR.

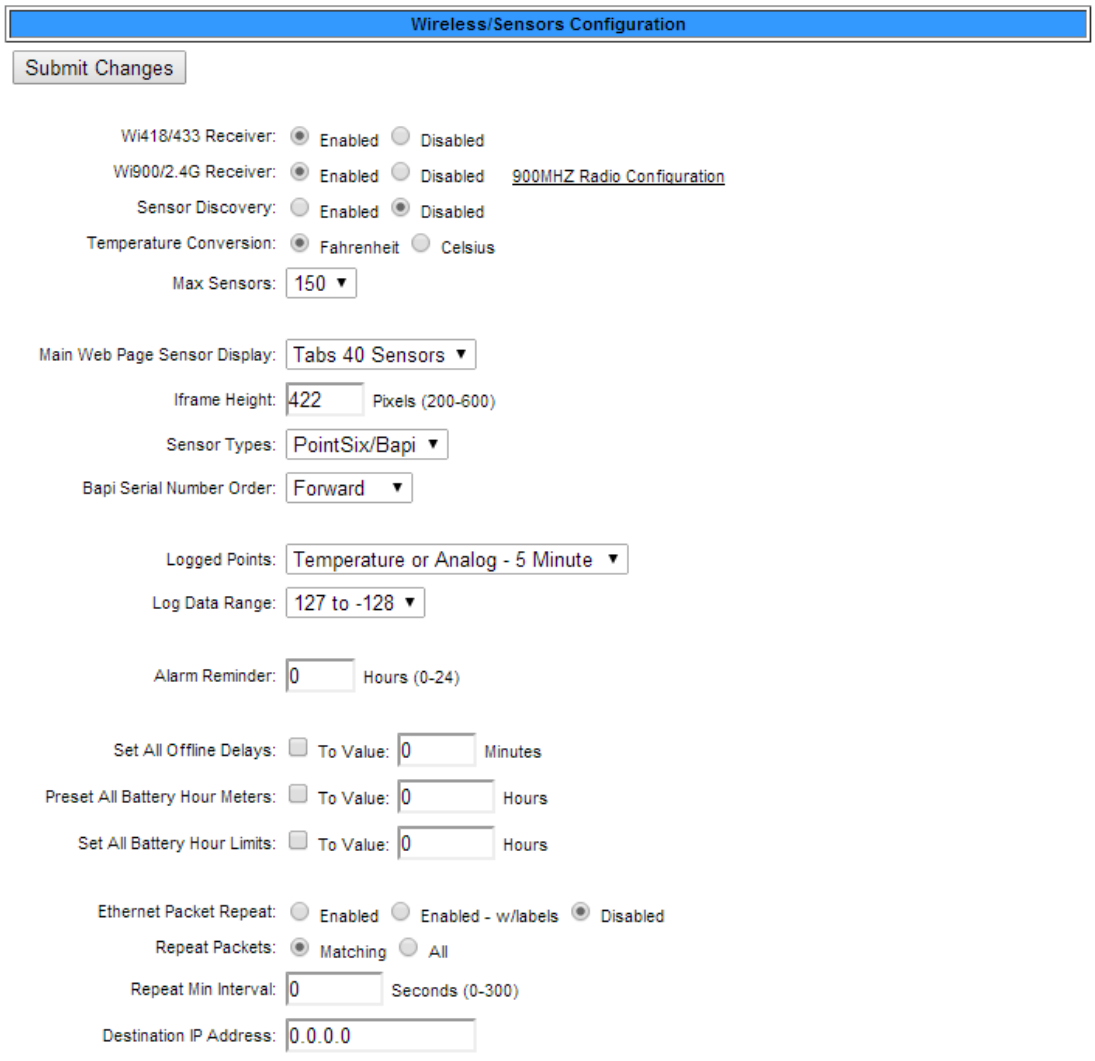


Figure 3.8 Wireless/Sensors Configuration Page

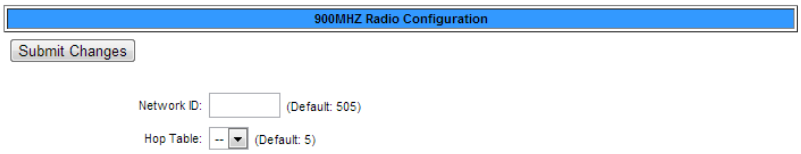
Option	Description
Wi418/433 Receiver	The Wi-MGR is equipped with either a 418 or 433MHz receiver. Enabled: Turns on the Wi-MGR's 418 or 433MHz receiver. This allows it to communicate with devices communicating on the 418/ 433MHz wavelength. Disabled: Turns the receiver off and prohibits the Wi-MGR from communicating with devices on this wavelength. Default: Enabled
Wi900/2.4G Receiver	The Wi-MGR is equipped with either a 900MHz or 2.4GHz receiver. Enabled: Turns on the Wi-MGR's 900MHz or 2.4GHz receiver. This allows it to communicate with devices communicating on the 900MHz or 2.4GHz wavelength. Disabled: Turns the receiver off and prohibits the Wi-MGR from communicating with devices on this wavelength. Default: Enabled
900MHz Radio Configuration	Designate specific point repeaters that the Wi-MGR will communicate with. This option is only on systems utilizing BAPI point repeaters.  Configuration information should be included with the BAPI repeaters. For reference, network ID and Hop Table information is as follows: Repeater Part # / Channel / Network ID / Hop Table BA/RPT49A-EA-EZ 1 399 1 BA/RPT49B-EA-EZ 2 398 2 BA/RPT49C-EA-EZ 3 397 3 BA/RPT49D-EA-EZ 4 395 4 BA/RPT49E-EA-EZ 5 555 5 BA/RPT49F-EA-EZ 6 901 6 BA/RPT49-EA-EZ 7* 505 5 *Standard product offering

Table 3.4 Wireless Sensors Configuration Options

Option	Description
Sensor Discovery	Enabled: When sensor discovery is enabled, the Wi-MGR automatically discovers new sensors transmitting to it. The Wi-MGR loads the newly detected sensor's type and serial number in its next available sensor position. Disabled: This is the Wi-MGR's default setting. **Once you're done with the sensor discovery process, set this option to disabled.** This prevents the Wi-MGR from seeing transmissions from new sensors, and keeps your system from logging sensors that may not actually exist. Set Sensor Discovery to Disabled and click on the submit changes button. Default: Disabled
Temperature Conversion	Select whether the temperature on the main page displays as Fahrenheit or Celsius. Default: Fahrenheit
Max Sensors	Designate the maximum number of sensors this Wi-MGR will monitor. Thresholds are at 150, 200, 250, and 400 sensors. For maximum efficiency, select the number closest to (but not less than) the number of sensors monitored by this Wi-MGR. For example, if the Wi-MGR is monitoring 80 sensors, set this value to 150. If the Wi-MGR is monitoring 220 sensors, set this value to 250 sensors. If you set this value as less than the actual number of sensors monitored by the Wi-MGR (you have 270 sensors, but this value is set to 250) the 20 sensors over the threshold will not show up on the web interface. Default: 150 sensors

Table 3.4 Wireless Sensors Configuration Options

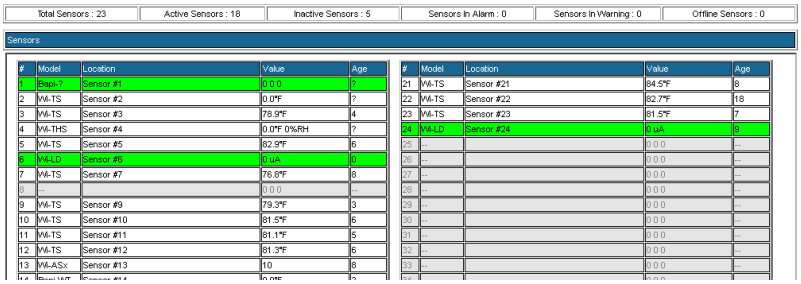
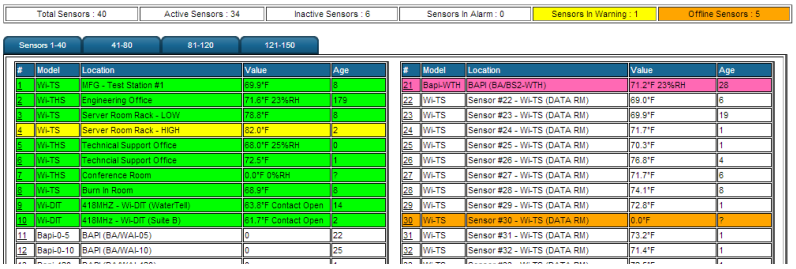
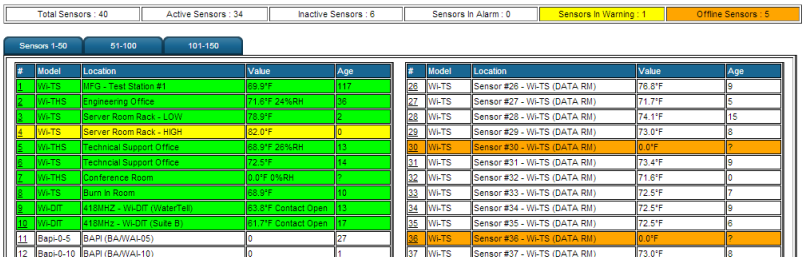
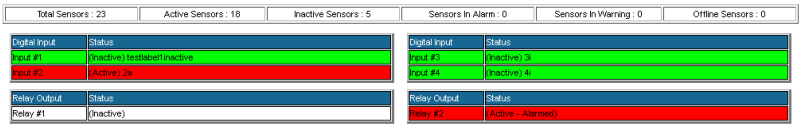
Option	Description
Main Web Page Sensor Display	Sensor data can be displayed in a variety of formats on the Home page. Select the option that best suits your application. Iframe - View all your monitored sensors in one long list.  Tabs 40 Sensors - View your sensors on a series of tabbed pages. 40 sensors will display on each tab.  Tabs 50 Sensors - View your sensors on a series of tabbed pages. 50 sensors will display on each tab.  None - No sensors will display on the Home page. Use the **Sensors** link to view the sensors.  Default: Tabs 40 Sensors
Iframe Height	If you have selected the Iframe display option, designate how tall the Iframe should be, from 200 - 600 pixels. Default: 422

Table 3.4 Wireless Sensors Configuration Options

Option	Description
Sensor Types	Designate whether your system uses only Bapi sensors, only Point Six sensors, or a combination of the two. Default: PointSix/Bapi
Bapi Serial Number Order	If your system uses Bapi sensors, indicate whether the serial numbers should be read forward or backward by the Wi-MGR. In most instances, the serial numbers should be read forward. If the Bapi sensors are an older generation, the serial number may need to be read backward.
Logged Points	Use this option to determine how frequently the sensors are sampled for graphing and logging purposes. Default: Temperature or Analog - 5 Minute
Log Data Range	The Wi-MGR will log temperature readings that fall within a designated range. Readings that fall outside the range will be omitted. Select the range that best suits your application. Default: 127 to -128 degrees
Alarm Reminder	This is the Wi-MGR's re-alarm function. The device will re-send an alarm after a point has been in alarm for a certain number of hours. Select a re-alarm time from 1-24 hours. Set the re-alarm time to 0 to disable the feature. Default: 0 (disabled)
Set All Offline Delays	Users can designate how many minutes must pass before the Wi-MGR considers the sensor offline. Typical transmission time is 10-20 seconds for 418MHz sensors and 3-5 minutes for 900MHz sensors. Check the box to activate the option, and enter a time interval.
Preset All Battery Hour Meters	The Wi-MGR helps monitor sensor run-time, so users know when to change the sensor's batteries. If you're installing sensors that have already been used in another application, estimate the amount of time the sensors have already been used, and enter the value in this field. Check the box to activate the option, and enter the amount of time, in hours, that the sensor has already been in use.
Set All Battery Hour Limits	Configure the Wi-MGR to display an alert when the run-time on a sensor reaches a designated threshold. This notifies the users that it is time to change the batteries in the sensor. Check the box to activate the option, and enter the number of hours (run time) that should accumulate before the alarm sounds.

Table 3.4 Wireless Sensors Configuration Options

Option	Description
Ethernet Packet Repeat	Use this feature to allow the Wi-MGR to transmit sensor information over the network (via port 6767) to another Wi-MGR. If this option is enabled, you also need to designate a destination IP address. Default: Disabled
Repeat Packets	Designate whether the Wi-MGR will repeat only information for sensors that are already configured within the system (Matching) or whether it will repeat any information it receives, regardless of whether the sensor is configured within the Wi-MGR. Default: Matching
Repeat Min Interval	The minimum number of seconds that passes between transmissions.
Destination IP Address	Enter the IP address of the Wi-MGR with which you wish to transmit sensor information. Enter the IP address of the other Wi-MGR.

Table 3.4 Wireless Sensors Configuration Options

3.5.2 Digital IO

The Wi-MGR is equipped with four hard-wired digital inputs and two hard-wired relay outputs. Use this page to individually configure the digital inputs and relay outputs.

NOTE The Wi-MGR firmware is backwards compatible. This means it can be loaded onto older versions of the Wi-MGR, including the FDS-Wi, which are not equipped with wired inputs and outputs. If this firmware is loaded on a unit without wired inputs and outputs, the Digital IO menu option will not be accessible.

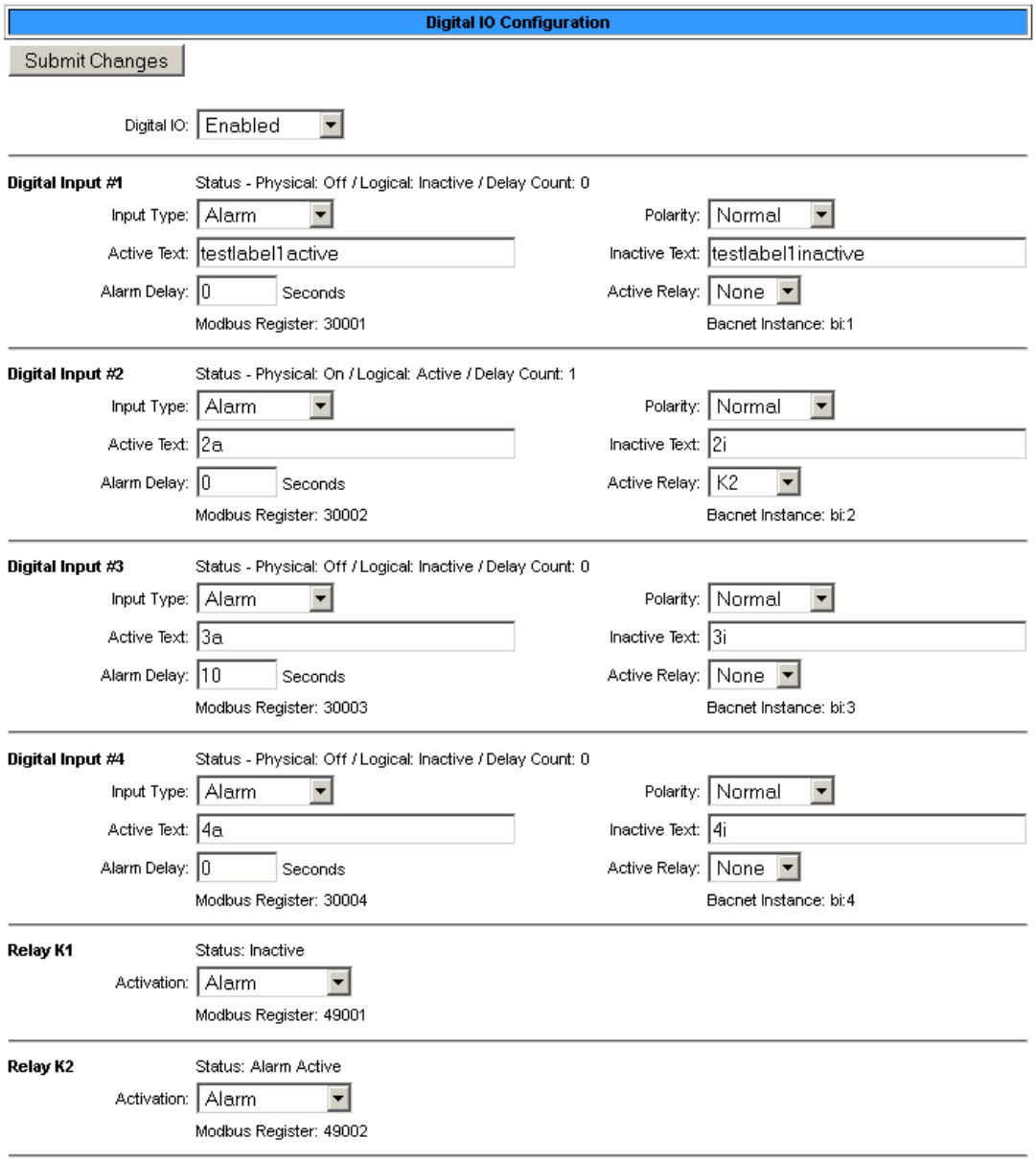


Figure 3.9 Digital IO Configuration Page

Option	Description
Digital IO	Enable or disable the digital inputs and relay outputs. If there are no digital inputs and relay outputs installed on your Wi-MGR, select Not Installed. Default: Enabled

Digital Inputs #1, #2, #3, and #4

Each digital input has its own configurable options, but all fields have several read-only values that are displayed. These fields include the input's modbus register number, the input's bacnet instance, and the input's status information.

Adjust the following editable fields as necessary:

Input Type	Decide if the point should go into alarm or simply report its status. Default: Alarm
Polarity	Note the polarity of the input, normal or reversed. Default: Normal
Active Text	This text will appear on the Wi-MGR's home page when the input goes into an alarm condition. Default: #a, where # represents the digital input number
Inactive Text	This text will appear on the Wi-MGR's home page when the input is in its normal operating condition. Default: #i, where # represents the digital input number
Alarm Delay	The number of seconds that passes between the time the point goes into an alarm state and the time that alarm is annunciated. Default: 0
Active Relay	Designate which relay outputs are activated when the point goes into alarm. Select: None, K1, K2, or K1+K2 Default: None

Table 3.5 Digital IO Configuration Options

Option	Description
Relay K1, K2 The two relay outputs also have static reference fields and configurable options. Adjust the following editable fields as necessary:	
Activation	Each relay can be configured as an alarm relay or a Modbus only relay. When the relay is activated, an alarm can be triggered, or the information can be conveyed via Modbus only. Default: Alarm

Table 3.5 Digital IO Configuration Options

3.5.3 Network and Web

The Network and Web page displays the assigned MAC address and allows users to configure common network information. Editing this information will change the way the web interface operates. Only change this information if you have been in contact with your network administrator, and are sure the changes are correct.

The logos on the top right and left corners of the web pages can be customized. Use the lower half of this page to configure those images.

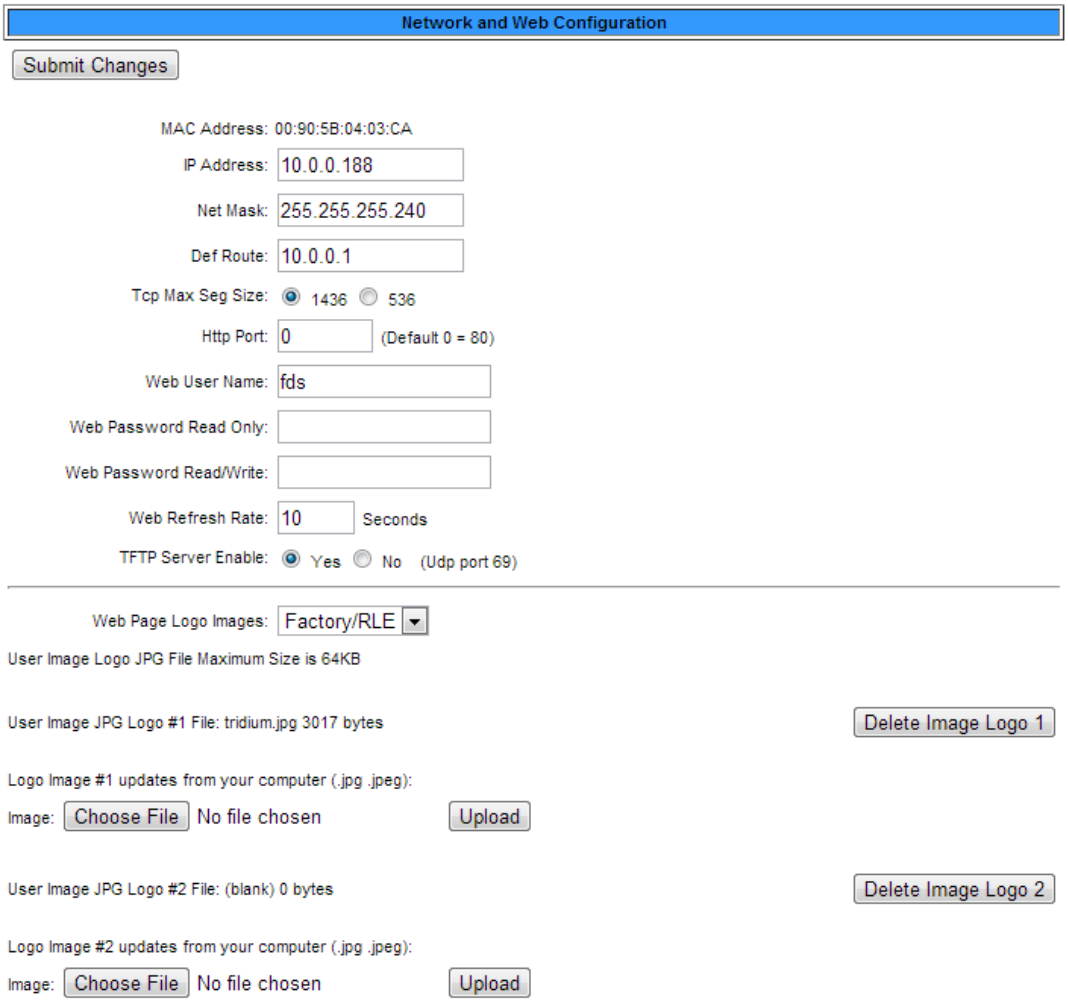


Figure 3.10 Network and Web Configuration Page

Option	Description
MAC Address	The MAC address is a unique identifier set by the manufacturer, and is non-editable.
IP Address	The Wi-MGR is shipped with a default IP address of 10.0.0.188. Contact your IT Department for an appropriate IP address, if you wish to change this field. Default IP address: 10.0.0.188

Table 3.6 Network and Web Configuration Options

Option	Description
Net Mask	The Wi-MGR is shipped with a default Subnet Mask of 255.255.255.0. Contact your IT Department for an appropriate Subnet Mask, if you wish to change this field. Default subnet mask: 255.255.255.0
Def Route	The Wi-MGR is shipped with a default Gateway Route of 10.0.0.1. Contact your IT Department for an appropriate Default Gateway, if you wish to change this field. Default device route: 10.0.0.1
Tcp Max Seg Size	The Wi-MGR defaults to 1436 packet size for web page data. Users may select 536 for limited bandwidth or VPN applications. Default: 1436
Http Port	Some ISPs use alternate http ports as an added security measure. Edit this field in accordance with your ISPs security settings. Default: 0 = Port 80
Web User Name	If this field is left blank, the Wi-MGR's default user name is fds (all lower case). Users can enter a user name up to 18 characters, either alpha, numeric, or a combination of the two. The Wi-MGR user name is case sensitive. Default username: fds
Web Password Read Only	Two separate passwords can be configured on the Wi-MGR. The Read Only password allows users to access the Wi-MGR's web interface and view the conditions of the system, but does not allow users to make changes to the Wi-MGR's configuration.
Web Password Read/Write	The second configurable password on the Wi-MGR provides users with expanded access. The Read/Write password allows users to view the conditions of the system and make changes to the Wi-MGR's configuration.
Web Refresh Rate	The Web Refresh Rate is the amount of time the system waits until it updates the Web interface with current data. To change the rate, click in the field and type in the desired amount of time (in seconds). **The minimum recommended refresh rate is five seconds; otherwise, errors may occur that prevent the system from functioning properly**. The default refresh rate is set to 0 - the Wi-MGR will not refresh at all. Users must set a refresh rate in order for the system to automatically update. Default: 10 seconds

Table 3.6 Network and Web Configuration Options

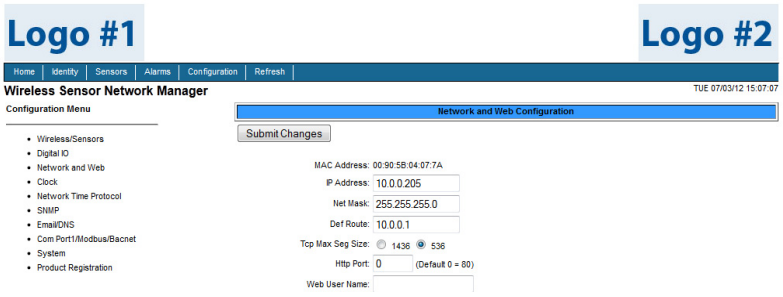
Option	Description
TFTP Server Enable	Decide whether the TFTP server capabilities are enabled or not. Default: Yes (Udp port 69)
Web Page Logo Images	The Wi-MGR web interface can be customized - you can choose which images are displayed in the upper left and right corners of the screen.  Use the drop down menu to determine whether you'd like to use the Factory/RLE settings or Custom images. Click the Submit Changes button to lock in your selection before you upload any images. While the logos don't have a maximum dimension, we recommend using images that fit the Wi-MGR's standard logo image size - 163 x 89 pixels. While you can use larger images, this may distort the web interface, and images that are greater than 89 pixels high may cause the web interface to fill more than one monitor screen - you'll have to scroll to see all of your sensor information on the home page. Images do have a maximum file size. Use images that are 64KB or smaller. Ideal Image Size: 89 pixels high, .jpg image, less than 64KB Default: Factory/RLE
User Image JPG Logo #1 File	An uneditable field, this tells you the name of the image that is currently being used as the logo in the upper left corner of the web interface.
Delete Image Logo 1 Button	Click this button to delete the image currently loaded as image logo 1.
Logo Image #1 Image	Click the Choose File button to find, on your computer, the .jpg you'd like to use for Image #1 on the web interface. Once you've located the image, click the Upload button to upload the image to the Wi-MGR. You'll see the following message: File has been uploaded and verified File will now be copied to flash If your browser does not automatically redirect you, please click here after waiting. Once the file has uploaded, you'll be returned to the Network and Web Configuration page, and you'll see the logo in its place.

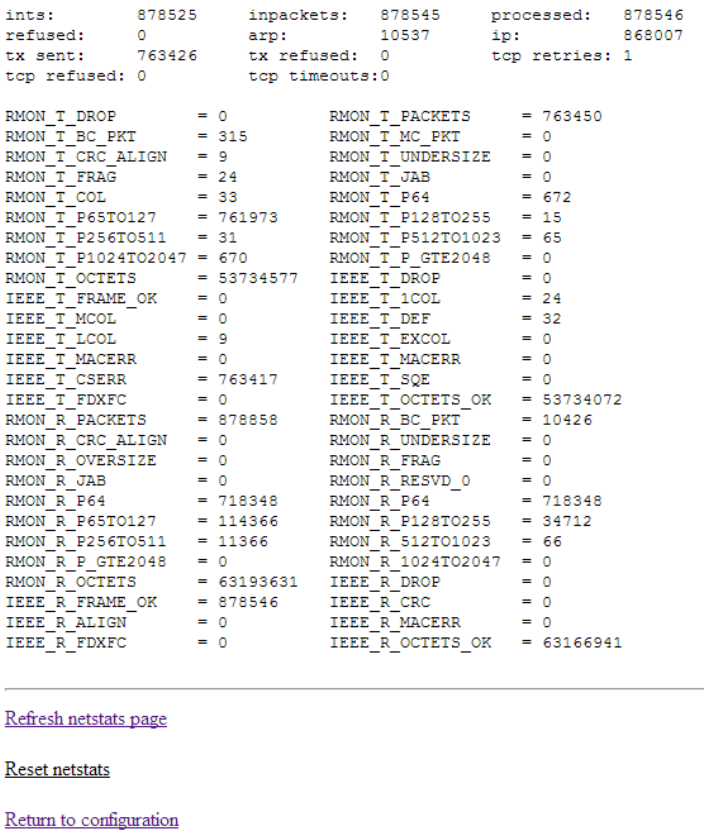
Table 3.6 Network and Web Configuration Options

Option	Description
User Image JPG Logo #2 File	An uneditable field, this tells you the name of the image that is currently being used as the logo in the upper right corner of the web interface.
Delete Image Logo 2 Button	Click this button to delete the image currently loaded as image logo 2.
Logo Image #2 Image	Click the Choose File button to find, on your computer, the .jpg you'd like to use for Image #2 on the web interface. Once you've located the image, click the Upload button to upload the image to the Wi-MGR. You'll see the following message: File has been uploaded and verified File will now be copied to flash If your browser does not automatically redirect you, please click here after waiting. Once the file has uploaded, you'll be returned to the Network and Web Configuration page, and you'll see the logo in its place.

Table 3.6 Network and Web Configuration Options

3.5.4 Network Statistics

This option provides a view of the Wi-MGR's network statistics. This data is provided for informational purposes only - none of this information is editable from this screen.



```
ints:        878525     inpackets:   878545     processed:   878546
refused:     0          arp:         10537      ip:          868007
tx sent:     763426     tx refused:  0          tcp retries: 1
tcp refused: 0          tcp timeouts:0

RMON_T_DROP         = 0          RMON_T_PACKETS     = 763450
RMON_T_BC_PKT       = 315        RMON_T_MC_PKT      = 0
RMON_T_CRC_ALIGN    = 9          RMON_T_UNDERSIZE   = 0
RMON_T_FRAG         = 24         RMON_T_JAB         = 0
RMON_T_COL          = 33         RMON_T_P64         = 672
RMON_T_P65TO127     = 761973     RMON_T_P128TO255   = 15
RMON_T_P256TO511    = 31         RMON_T_P512TO1023  = 65
RMON_T_P1024TO2047  = 670        RMON_T_P_GTE2048   = 0
RMON_T_OCTETS       = 53734577   IEEE_T_DROP        = 0
IEEE_T_FRAME_OK     = 0          IEEE_T_1COL        = 24
IEEE_T_MCOL         = 0          IEEE_T_DEF         = 32
IEEE_T_LCOL         = 9          IEEE_T_EXCOL       = 0
IEEE_T_MACERR       = 0          IEEE_T_MACERR      = 0
IEEE_T_CSERR        = 763417     IEEE_T_SQE         = 0
IEEE_T_FDXFC        = 0          IEEE_T_OCTETS_OK   = 53734072
RMON_R_PACKETS      = 878858     RMON_R_BC_PKT      = 10426
RMON_R_CRC_ALIGN    = 0          RMON_R_UNDERSIZE   = 0
RMON_R_OVERSIZE     = 0          RMON_R_FRAG        = 0
RMON_R_JAB          = 0          RMON_R_RESVD_0     = 0
RMON_R_P64          = 718348     RMON_R_P64         = 718348
RMON_R_P65TO127     = 114366     RMON_R_P128TO255   = 34712
RMON_R_P256TO511    = 11366      RMON_R_512TO1023   = 66
RMON_R_P_GTE2048    = 0          RMON_R_1024TO2047  = 0
RMON_R_OCTETS       = 63193631   IEEE_R_DROP        = 0
IEEE_R_FRAME_OK     = 878546     IEEE_R_CRC         = 0
IEEE_R_ALIGN        = 0          IEEE_R_MACERR      = 0
IEEE_R_FDXFC        = 0          IEEE_R_OCTETS_OK   = 63166941

Refresh netstats page

Reset netstats

Return to configuration
```

Figure 3.11 Network Statistics Page

Option	Description
Refresh netstats page	Click this text to refresh your screen with the newest data.
Reset netstats	Click this option to clear all the network statistics data from the Wi-MGR's memory. It will reset and begin to accrue data again.
Return to configuration	Click this option to return to the Configuration menu.

Table 3.7 Network Statistics Options

3.5.5 Clock

Use this link to adjust the date and time, as needed. Click the **Submit Changes** button to save all modifications.

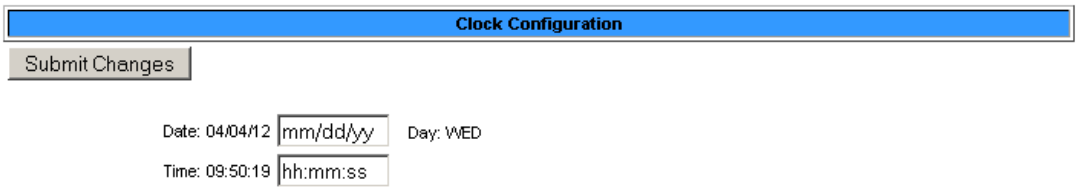


Figure 3.12 Clock Configuration Page

Option	Description
Date	Enter the current date in mm/dd/yy format.
Time	Entered the current time in hh:mm:ss format, where the hour is a two digit number between 01 and 24.

Table 3.8 Clock Configuration Options

3.5.6 Network Time Protocol

NTP, or Network Time Protocol, is used to synchronize clocks of computer systems. NTP synchronizes the time of a computer or device (the Wi-MGR) with another computer or referenced time source. NTP maintains a high level or accuracy and reliability in time stamped events.

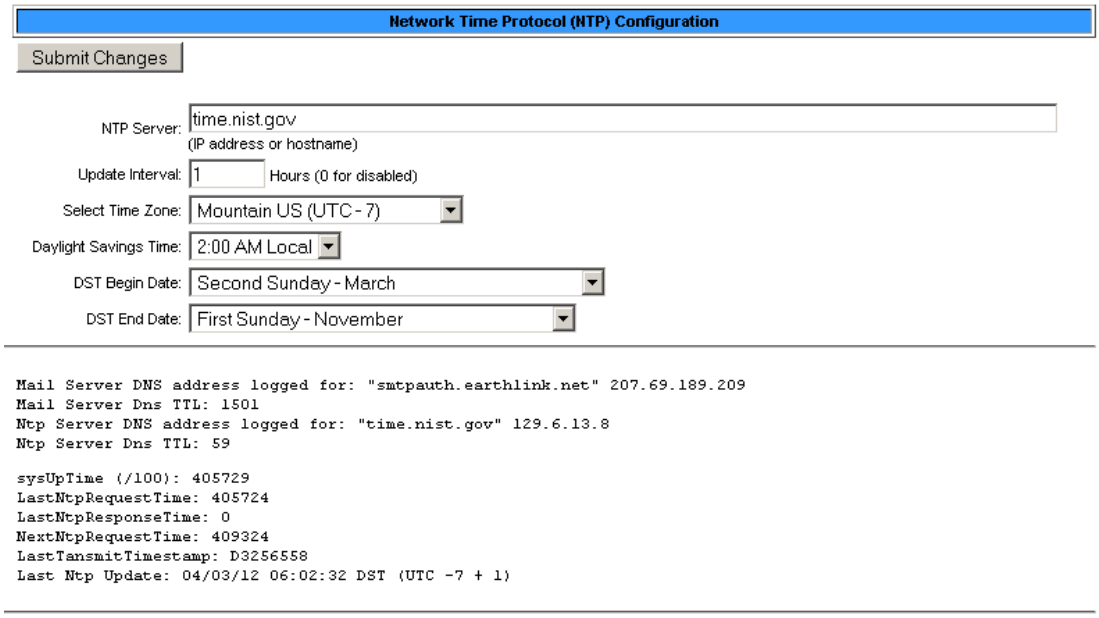


Figure 3.13 NTP Configuration Page

Option	Description
NTP Server	The IP address or hostname of the NTP server with which your Wi-MGR will synchronize. Public NTP servers include us.pool.ntp.org and time.nist.gov Default setting: blank
Update Interval	Designate how often you'd like the Wi-MGR to access and synchronize with the NTP server. Enter a 0 to disable this feature. Default setting: 0 (disabled)
Select Time Zone	Select the time zone in which this particular Wi-MGR resides. Default setting: Western European (UTC + 0)
Daylight Savings Time	Enable or disable Daylight Savings Time, and designate at which time DST goes into effect in your time zone. Default setting: Disabled

Table 3.9 NTP Configuration Options

Option	Description
DST Begin Date	Set the day DST begins at your location. Default setting: Second Sunday - March
DST End Date	Set the day DST ends at your location. Default setting: First Sunday - November

Table 3.9 NTP Configuration Options

3.5.7 SNMP

Use this page to configure the Wi-MGR for SNMP communications.

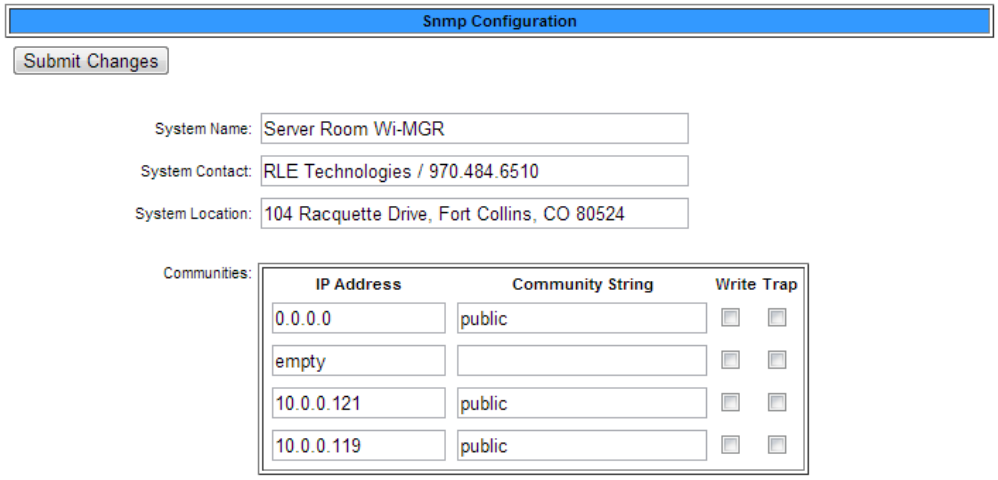


Figure 3.14 SNMP Page

Option	Description
System Name	Name assigned to the Wi-MGR for SNMP system configuration. Default setting: Wireless Gateway
System Contact	System contact responsible for the Wi-MGR.
System Location	Enter the address of the Wi-MGR's physical location.
Communities Identify devices that receive Traps and/or Syslog messages from the Wi-MGR and communicate with the Wi-MGR over the network.	
IP Address	IP address used by the SNMP server to poll data from the Wi-MGR.
Community String	Name or type of password used by the SNMP server for communications.
Write	Allows the SNMP server to write back to the Wi-MGR.
Trap	Allows the Wi-MGR to send a message to the SNMP Management Server, telling the system to initiate an alarm.

Table 3.10 SNMP Options

3.5.8 Email/DNS

Configure email and DNS settings through this page.

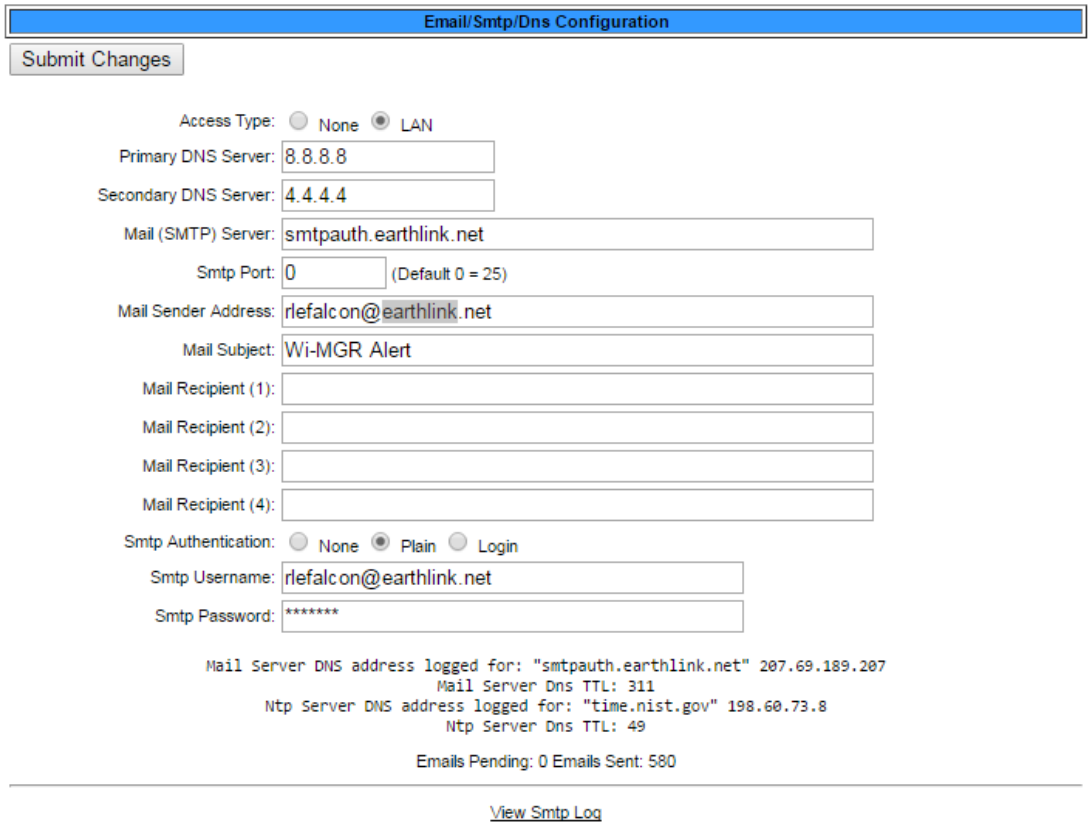


Figure 3.15 Email/SMTP/DNS Configuration Page

Option	Description
Access Type	Select LAN to send alerts through a local network connection. Select None to disable the email feature. Default setting: LAN
Primary DNS Server	Enter the IP address for the primary DNS server, as provided by your internet service provider. Default setting: 0.0.0.0
Secondary DNS Server	Enter the IP address for the secondary DNS server, as provided by your internet service provider. Default setting: 0.0.0.0
Mail (SMTP) Server	Enter the URL of your SMTP server.
Smtp Port	Enter the appropriate SMTP port here.
Mail Sender Address	This is email sender address assigned to the Wi-MGR.

Table 3.11 Email/SMTP/DNS Configuration Options

Option	Description
Mail Subject	The text that appears in the subject line of the email message.
Mail Recipient (1), (2), (3), (4)	Alerts can be sent to four recipients. Enter up to four unique email addresses
Smtp Authentication	Used for ESMTP. Use the default setting, unless otherwise directed by your IT department. Default setting: None
Smtp Username	Used for ESMTP. Use the default setting, unless otherwise directed by your IT department. Default setting: Blank
Smtp Password	Used for ESMTP. Use the default setting, unless otherwise directed by your IT department. Default setting: Blank
View Smtp Log	Click this link to view all logged email messages.

Table 3.11 Email/SMTP/DNS Configuration Options

3.5.9 Com Port1/Modbus/Bacnet

If the Wi-MGR will communicate via the EIA-485 port, configure the necessary options here.

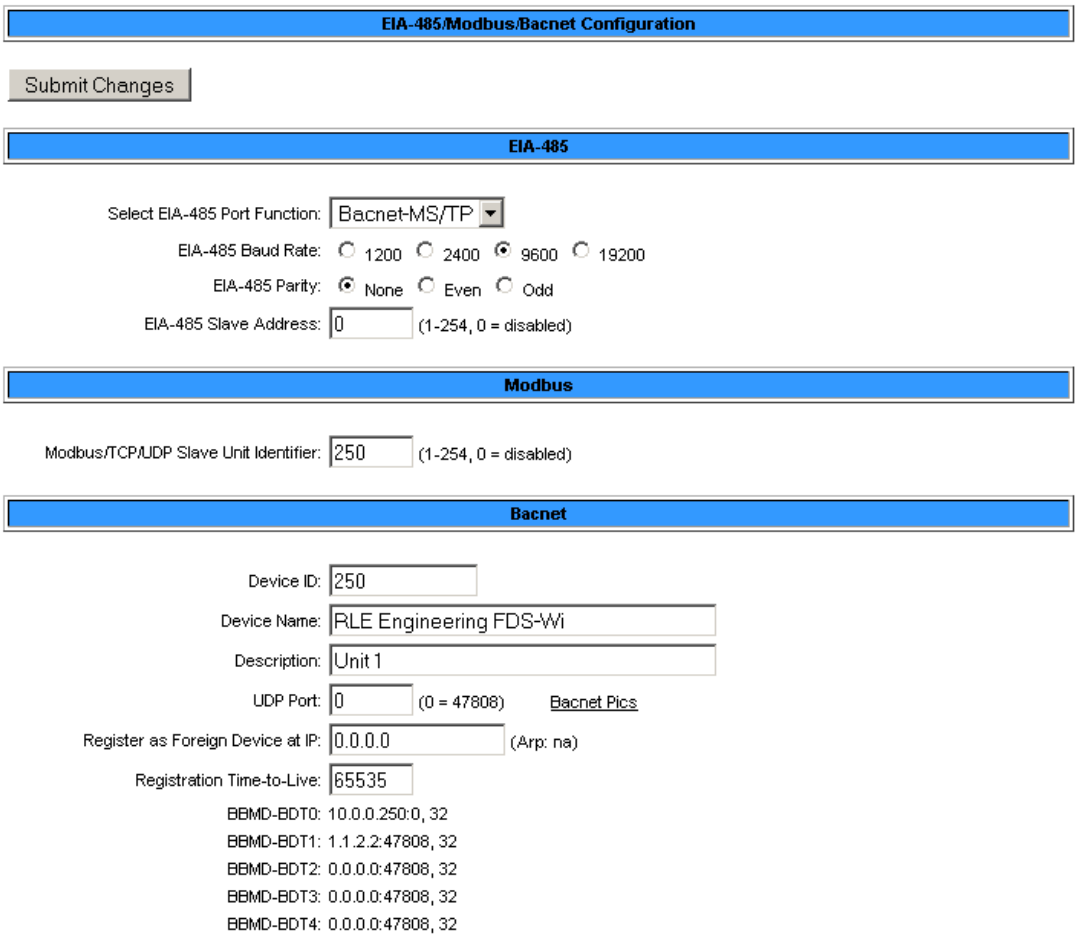


Figure 3.16 Com Port1/Modbus/Bacnet Configuration Page

Option	Description
EIA-485	
Select EIA-485 Port Function	Set the output type for the EIA-485 port to either Modbus-Slave or Bacnet-MS/TP.
EIA-485 Baud Rate	Selectable: 1200, 2400, 9600, 19200 Default: 9600
EIA-485 Parity	Selectable: None, Even, Odd Default: None

Table 3.12 Com Port1/Modbus/Bacnet Options

Option	Description
EIA-485 Slave Address	Set a RTU address from 1-254. If the field is left at 0, there is no transmission on the EIA-485 port. Default: 0 (disabled)
Modbus	
Modbus/TCP/UDP Slave Unit Identifier	This designator is used for Modbus RTU over an Ethernet connection. The default slave unit identifier is 0, which disables this feature. To enable this option, enter a TCP/UDP slave address from 1-254 in this field. In most instances, the identifier is typically set at 1. Default: 0 (disabled)
Bacnet	
Device ID	Assign a name to uniquely identify each BACnet device on the network, up to 30 characters. 0 = disabled
Device Name	Assign a name - up to 38 characters - to the unit for BACnet discovery/integration.
Description	Add any additional details about the device, up to 38 characters.
UDP Port	Enter a 0 to specify port 47808 (0xBAC0) as the UDP port. If another port is specified by your application, enter that value here. Default setting: 0
Bacnet Pics	Click this link to view the Bacnet identifiers and objects supported by the Wi-MGR
Register as Foreign Device at IP	IP address of the master device with which you're trying to communicate. Requires a BBMD for foreign device discovery.
Registration Time-to-Live	Time, in seconds, for foreign device discovery.
BBMD Data	The values in the broadcast distribution table represent IP addresses and masks. Shown here for reference, the values are editable via BACnet.

Table 3.12 Com Port1/Modbus/Bacnet Options

The **Bacnet Pics** link displays general BACnet capabilities of the device (e.g., what LAN options are available).

```
BACnet interoperability building blocks supported (Annex K):
Data Sharing - ReadProperty-B ReadPropertyMultiple-B DS-RP-B WriteProperty-B

Bacnet Objects:
Analog Input
 AI:101 Sensor #1 Data #1
 AI:102 Sensor #1 Data #2
 AI:103 Sensor #1 Data #3
 ..
 AI:15001 Sensor #150 Data #1
 AI:15002 Sensor #150 Data #2
 AI:15003 Sensor #150 Data #3

Property Identifers Supported:
BACnet_Present_Value         BACnet_Object_Identifier   BACnet_Object_Name            BACnet_Object_Type
BACnet_Out_Of_Service        BACnet_Units               BACnet_Status_Flags           BACnet_Event_State
BACnet_Update_Interval       BACnet_Time_Delay(write)

Bacnet Device Objects:
BACnet_Object_Identifier     BACnet_Object_Name         BACnet_Object_Type            BACnet_System_Status
BACnet_Vendor_Name           BACnet_Vendor_Id           BACnet_Model_Name             BACnet_Firmware_Revision
BACnet_App_Software_Revision BACnet_Location            BACnet_Description            BACnet_Protcol_Version
BACnet_Conformance_Class     BACnet_Services_Supported  BACnet_Object_Types_Supported BACnet_Object_List
BACnet_Max_APDU              BACnet_Segment_Supported   BACnet_Segment_Timeout        BACnet_APDU_Timeout
BACnet_APDU_Retries          BACnet_Bindings

Data Link Layer options:
BACnet IP, (Annex J)         MS/TP slave, baud rate up to 19200 bps

Character sets supported:
ANSI X3.4
```

Figure 3.17 General BACnet Capabilities of the Wi-MGR

3.5.10 System

Use this page to update the Wi-MGR's firmware, to delete all sensors associated with the Wi-MGR, to clear all current alarms and/or log data, and to backup the Wi-MGR's configuration and sensor CSV files. Refer to Appendix A, "Update Firmware" on page 65 for complete firmware update instructions.

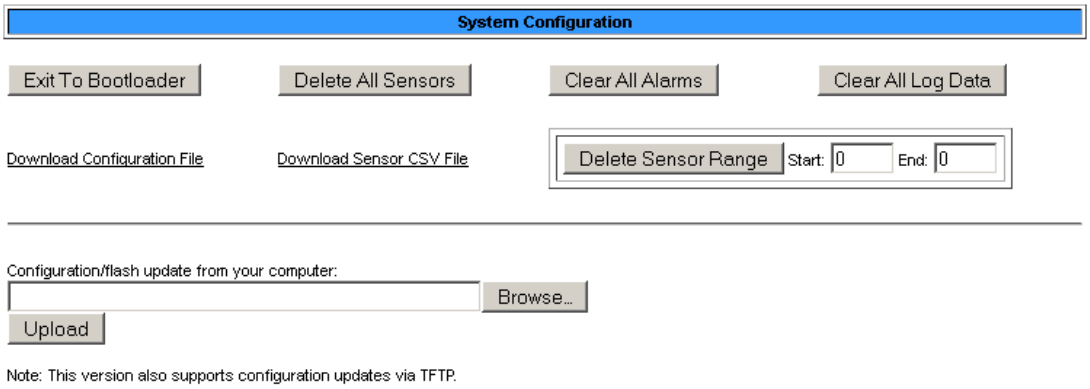


Figure 3.18 System Configuration Page

Option	Description
Exit to Bootloader	Access the bootloader.
Delete All Sensors	This command erases all the information about the sensors the Wi-MGR is currently monitoring. Users will have to reinstall sensor information after the button is clicked, or rediscover sensors already deployed.
Clear All Alarms	Clear all alarms recorded on the Alarms page.
Clear All Log Data	Erase all logged data stored on the Wi-MGR.
Download Configuration File (.cfg)	Save a copy of the Wi-MGR's configuration file to a local computer. Always save a copy of the .cfg file before you update the firmware on the Wi-MGR.
Download Sensor CSV File	Download a CSV file that shows all sensors configured in the Wi-MGR.
Delete Sensor Range	If you wish to delete some sensors monitored by the Wi-MGR without deleting all the sensors, use this option. Enter the range of sensors you wish to delete, and click the Delete Sensor Range button. If you wish to delete one specific sensor, enter that sensor's number as both the start and end points for the sensor range.
Configuration/flash update from your computer	Use this field to update the firmware on the Wi-MGR. Refer to Appendix A, "Update Firmware" on page 103 for complete firmware update instructions.

Table 3.13 System Configuration Options

3.5.11 Product Registration

The Product Registration link routes users to the product registration form at rletech.com. Complete this form to receive product and firmware updates and support.

3.6. Refresh

Click the Refresh link to manually check for status updates. The Wi-MGR will refresh all its data, and poll all connected devices for their most recent data. The Refresh link is especially helpful if the system's refresh rate is set at a long interval, or when new equipment is connected to the system. Instead of waiting for the Wi-MGR to refresh on its own, click the link to force a system refresh.

To adjust the automatic refresh rate, refer to "Network and Web" on page 45.

CHAPTER

4

MODBUS COMMUNICATIONS

4.1. Implementation Basics

The Wi-MGR is capable of communicating via the half-duplex EIA-485 serial communication standard. The Wi-MGR is configured to act as a slave device on a common network. The EIA-485 medium allows for multiple devices on a multi-drop network. The Wi-MGR is a slave only device and will never initiate a communications sequence.

4.1.1 Modes of Transmission

The Modbus protocol uses ASCII and RTU modes of transmission. The Wi-MGR supports only the RTU mode of transmission, with 8 data bits, no parity and one stop bit. Every Modbus packet consists of four fields:

- Slave Address Field
- Function Field
- Data Field
- Error Check Field (Checksum)

4.1.1.1 Slave Address Field

The slave address field is one byte in length and identifies the slave device involved in the transaction. A valid address range is between 1 and 254. The slave address is set from the **Com Port1/Modbus/Bacnet Configuration** webpage.

4.1.1.2 Function Field

The function field is one byte in length and tells the Wi-MGR which function to perform. The supported functions are 03 (Read 4xxxx output registers), 04 (Read 3xxxx input registers), 06 (Preset single register), 16 (Preset multiple registers).

4.1.1.3 Data Field

The data field of the request is a variable length depending on the function. The data fields for the Wi-MGR are 16-bit registers, transmitted high order byte first (big-endian)

4.1.1.4 Error Check (Checksum) Field

The checksum field lets the receiving device determine if the packet has transmission errors. The Wi-MGR's RTU mode uses a 16-bit cyclic redundancy check (CRC-16).

4.1.2 Exception Responses

If a Modbus master sends an invalid command to the Wi-MGR or attempts to read an invalid register, an exception response is generated. The response packet will have the high order bit of the function code set to one. The data field of the exception response contains the exception error code.

Code	Name	Description
01	Illegal Function	The function code is not supported
02	Illegal Data Address	Attempt to access an invalid address
03	Illegal Data Value	Attempt to set a variable to an invalid value

Table 4.1 Exception Codes

4.2. Packet Communications for the Wi-MGR

This section outlines the registers with the name and a brief description of each.

4.2.1 Function 03: Read Output Registers

To read the Wi-MGR's parameter values, the master must send a Read Output Registers request packet.

The Read Output Registers request packet specifies a start register and the number of registers to read. The start register is numbered from zero (40001 = zero, 40002 = one, etc.).

Read Registers Request Packet	Read Registers Response Packet
Slave Address (1 byte)	Slave Address (1 byte)
03 (Function code) (1 byte)	03 (Function code) (1 byte)
Start Register (2 bytes)	Byte count (1 byte)
# of registers to read (2 bytes)	First register (2 bytes)
Crc Checksum (2 bytes)	Second register (2 bytes)
	…
	Crc Checksum (2 bytes)

Table 4.2 Read Output Registers Packet Structure

Register	Name	Description	Units	Range
40001	Id	Sensor Identification number	uint16	0-65535
40002	Out Of Service	Shows when the sensor is in maintenance mode or offline	uint16	0-65535
40003	Serial #	Wireless sensor serial number	uint16x4	0-65535
40007	Raw Data #1	First data value displayed by sensor	Unsigned 32 bit integer	0-4294967295
40009	Raw Data #2	Second data value displayed by sensor	Unsigned 32 bit integer	0-4294967295
40011	Raw Data #3	Third data value displayed by sensor	Unsigned 32 bit integer	0-4294967295
40013	Converted Data #1	First data value converted by the Wi-MGR	Unsigned 32 bit integer	0-4294967295
40015	Converted Data #2	Second data value converted by the Wi-MGR	Unsigned 32 bit integer	0-4294967295
40017	Converted Data #3	Third data value converted by the Wi-MGR	Unsigned 32 bit integer	0-4294967295
40019	Age	Time since last transmission received	Unsigned 32 bit integer	0-4294967295
48001	Offline Delay	Time till the sensor reads offline	uint16	0-65535

Table 4.3 Read Output Registers

4.2.2 Function 04: Read Input Registers

To read the Wi-MGR's input values, the master must send a Read Input Registers request packet.

The Read Intput Registers request packet specifies a start register and the number of registers to read. The start register is numbered from zero (30001 = zero, 30002 = one, etc.).

Read Registers Request Packet	Read Registers Response Packet
Slave Address (1 byte)	Slave Address (1 byte)
04 (Function code) (1 byte)	04 (Function code) (1 byte)
Start Register (2 bytes)	Byte count (1 byte)
# of registers to read (2 bytes)	First register (2 bytes)
Crc Checksum (2 bytes)	Second register (2 bytes)
	…
	Crc Checksum (2 bytes)

Table 4.4 Read Input Registers Packet Structure

Register	Name	Description	Units	Range
30001	Digital Input 1	Digital Input 1: 1=0, 0=off	uint16	0-1
30002	Digital Input 2	Digital Input 2: 1=0, 0=off	uint16	0-1
30003	Digital Input 3	Digital Input 3: 1=0, 0=off	uint16	0-1
30004	Digital Input 4	Digital Input 4: 1=0, 0=off	uint16	0-1

Table 4.5 Read Input Registers

4.2.3 Function 06: Preset Single Register & Function 16: Preset Multiple Registers

To set the relay outputs over Modbus, first set the relay activation mode must be set to Modbus only. Do this in the web interface, at the bottom of the Digital IO Configuration page - Chapter 3, “Digital IO Configuration Page” on page 42. The master must then send a Preset Single or Preset Multiple Register request packet.

Register	Name	Description	Units	Range
49001	Relay K1	Relay 1 Activation: 1=active, 0=inactive	uint16	0-1
49002	Relay K2	Relay 2 Activation: 1=active, 0=inactive	uint16	0-1

Table 4.6 Preset Single and Multiple Registers

4.3. RTU Framing

The example below shows a typical Query/Response from a Wi-MGR.

Slave Address	Function Code	Count Bytes of Data	Register Data Msb	Lsb	Register Data Msb	Lsb	Register Data Msb	Lsb	CRC 16 “Lsb”	CRC 16 “Msb”
02	04	06	00	00	00	00	00	01	B5	A3

Table 4.7 Response Sample

Slave address 2 responds to Function Code 4 with six bytes of hexadecimal data and ends with CRC16 checksum.

Register Values:

40001 = 0000 (hex)
40002 = 0000 (hex)
40003 = 0001 (hex)

APPENDIX

A

UPDATE FIRMWARE

Firmware updates are available on the RLE website at rletech.com. Locate the correct firmware and download it to an accessible location.

Before updating any firmware, access the System page on the Configuration menu in the web interface. Download the Wi-MGR's configuration file and save it in a safe location.

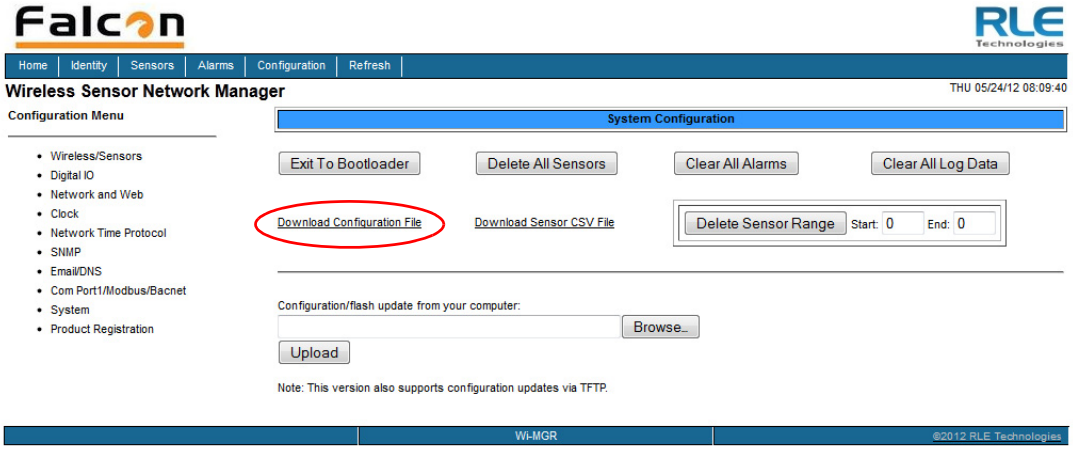


Figure A.1 Configuration Menu, System Page - .cfg File Download

Once firmware is updated, the Wi-MGR should return to its normal functionality. In very rare instances, the Wi-MGR's configuration data - all the system configuration and sensor information loaded onto the unit - may become corrupted during the firmware update. If the configuration files do become corrupted, the downloaded configuration files serves as a backup, and can be uploaded to the system to restore the lost data. Use the MIME feature to upload the configuration file.

A.1. Load the Application Firmware Using MIME

The Wi-MGR has a MIME (Multipurpose Internet Mail Extensions) built into the web interface. Once the Wi-MGR's configuration file and the latest version of firmware have been downloaded to a local drive, locate the MIME feature on the System page within the Configuration menu in the web interface.

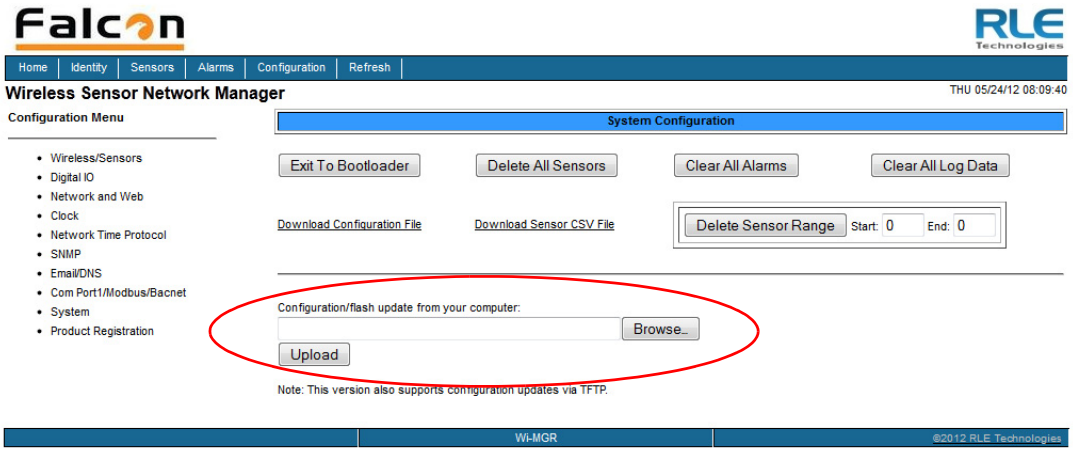


Figure A.2 Configuration Menu, System Page - MIME Upload

Navigate to the file using the browse button, and then click on upload for the unit to take the file. This process takes about 60 seconds to complete. The MIME feature can also be used to upload the unit configuration file.

A.2. Load the Flash Firmware Using TFTP

Before updating the firmware through TFTP, the firmware flash application must be exited and then erased. To do this, navigate to the Wi-MGR's configuration menu. Once here, click on the "Exit to Bootloader" button. Once exited, you will get a bootloader web page at the IP address of the unit. Next, click on the "Erase Flash" button. The Flash application will be erased.

Note To erase the flash, a special username and password are required. The username is **fds** (all lowercase), and the password is **rle2tech** (all lowercase).

1. Uploading firmware via TFTP requires a TFTP Client. It may be possible to download a free license TFTP Client from the internet. Consult your IT department to determine a compatible client program.
2. Verify that your PC and the Wi-MGR are on the same subnet (LAN).
3. Open your TFTP client. Configure the client as follows.
   a. **Host** = Wi-MGR's IP Address
   b. **Port** = 69
   c. **Block Size** = 64, 128, 256, 512, or 1024

Note The file must be sent in BINARY (not ASCII).

4. Send or PUT the firmware file to the Wi-MGR. It may take ~10 seconds for the firmware upload to begin. This will put the new firmware into effect.
5. After one minute, refresh the Wi-MGR's web page. Notice that the Flash field now contains the latest firmware. Click the "Start Application" button to reboot the unit.

APPENDIX

B

TROUBLESHOOTING

Below you'll find troubleshooting tips for a variety of situations you may encounter with the Wi-MGR. Please use these suggestions to troubleshoot your appliance.

If these troubleshooting tips do not resolve your issues, RLE Technologies offers personalized support for all our products. If you require customer support for your Wi-MGR, please contact RLE Technologies directly:

- Email: support@rletech.com
- Phone: 800.518.1519

B.1. Wi-MGR Troubleshooting

The Wi-MGR will not power up.

1. Use a digital volt meter (DVM) to check for AC or DC input power on the lower left hand terminal block on the Wi-MGR. If no voltage is present at terminal block, check the circuit breaker or power supply that powers the Wi-MGR. If voltage is present at the power supply, continue to step 2.
2. Contact RLE Technologies for further troubleshooting.

You cannot view the Wi-MGR's home page.

1. Verify that the Wi-MGR is powered up and running. You will see lights on the RJ45 (Ethernet) port illuminated and flashing. If no lights are illuminated on the unit, the unit may not be powered. If lights are illuminated and flashing, continue to step 2.
2. Connect a computer to the Wi-MGR via a serial cable and the console port. Once connected with a terminal emulation program running on the PC:
   a. Type **`ip`** and press enter. This displays the current IP address set to the Wi-MGR. Verify it is the correct IP address.
   b. Type **`nm`** and press enter. This displays the Net Mask. Verify it is the correct Net Mask.

c Type **dg** and press enter. This displays the Default Gateway. Verify it is the correct Default Gateway.

d Correct any information that is wrong. If the information is correct, go to step 3.

3 With the serial cable connected and your terminal emulation program running, you can enter an address to have the Wi-MGR ping to.

a Obtain a known good IP address.

b In the terminal emulation program, type **ping <one space> ip address** and then press enter. *Example: ping 192.168.1.1*

c If a ping response is not established, contact your IT department and make sure the patch cord your using is not faulty. Have the network switch port checked to make sure it is activated.

♦ If a ping response is established, contact your local sales representative or RLE Technologies.

Sensors do not automatically display on the Wi-MGR's home page.

By default, the Wi-MGR is shipped with the automatic sensor discovery feature turned OFF. In order for the auto-discovery to work, access the Configuration menu within the web interface, click Wireless/Sensors link, and click the radio button to ENABLE Sensor Discovery. Click the Submit Changes button to save the modification. Be sure to turn the Sensor Discovery feature OFF once all your sensors have registered.

If the Sensor Discovery feature is enabled and the sensors still do not appear, work your way through the following steps:

1 If the sensor is not visible on the Wi-MGR's home page, remove the cover from the sensor and see if the red "heartbeat" LED is flashing once every ten seconds. If you do not see a flash, check the sensor's batteries and refer to "Wireless Sensor Troubleshooting" on page 72. If you do see it flash, continue to step 2.

2 Verify the sensor's serial number. Make sure you're looking for the correct sensor at that location.

3 The transmission range of a wireless sensor depends on the distance between the sensor and the Wi-MGR, and the number of obstacles between the two. The more obstructions between the devices, the weaker the signal becomes. Do not install a wireless sensor inside a solid metal cabinet. This can interfere with its transmission.

4 Bring the sensor closer to the Wi-MGR and push the reset button on the top of the unit. If the sensor does not show on the home page when it is close to the Wi-MGR, contact your local sales representative or RLE Technologies. If the sensor does show on the home page, move the sensor back to its original location.

5 418 MHz sensors have a limited range and may loose signal quality due to distance or physical obstructions. If moving the sensor to its original location causes the signal to be lost again, you have several options.

a Move the sensor to another acceptable location, where it can be "seen" by the Wi-MGR.

b Switch out the 418 MHz sensor for a 900MHz sensor. The 900 MHz sensor will have a greater range.

c Use a point repeater to improve the signal quality.

Sensors that you have NOT installed appear on the Wi-MGR's home page.

This issue may occur when wireless sensors are used in conjunction with an Wi-MGR. When you installed your sensors, the automatic Sensor Discovery feature on the Wi-MGR was enabled. Initially everything configured correctly, but when you check the Wi-MGR several days later, it reports far more sensors than you have installed, and some of the reported data is very old.

When you configured your system, you left the Sensor Discovery feature on the Wi-MGR enabled. The sensors sometimes transmit messages with garbled data packets, and the Wi-MGR has interpreted the garbled data as new sensors. The "new" sensors have been added to the interface.

To avoid this problem, you must disable the Sensor Discovery feature in the Wi-MGR once the initial configuration is complete and the Wi-MGR has discovered all the sensors.

To fix this issue once it's occurred:

1. Turn OFF the Sensor Discovery feature in the Wi-MGR.
2. Use the Wi-MGR interface to delete the "ghost" sensors. There are two ways to delete sensors

   Option 1:

   a. Click the Configuration link at the top of the page.
   b. Click the System link on the left side of the page. You'll see a box with a Delete Sensor Range button on the right side of the page.
   c. Enter the start and end sensor numbers for the range of sensors you'd like to delete. If you'd like to delete just one sensor, enter that sensor's number as both the start and end points of the sensor range.
   d. Click the Delete Sensor Range button.

   Option 2:

   a. Click the Sensors link at the top of the page. You'll see a list of all the sensors the Wi-MGR is monitoring.
   b. Click on the number of the sensor you wish to delete. You'll be taken to the configuration page for that sensor.
   c. Delete the information in the Sensor Type ID field, the Description field, and the Serial Number field. Click the Submit Changes button.
3. Repeat the preferred process for each sensor you need to delete.
4. Once the "ghost" sensors are all deleted, there may be gaps in your list of sensors - if you needed to delete the sensors in spots 4, 7, and 9, these sensor numbers are now blank. You can renumber the existing sensors to fill in these gaps.
5. To renumber your sensors, return to the Sensors page. Click the number of the sensor you wish to renumber.
6. Scroll to the bottom of the page, and type the new number in the Move sensor position to: box. Click the Submit Changes button. You'll be returned to the Sensors page, and the sensor will appear in its new location in the list. Repeat this process for each sensor you wish to renumber.

B.2. Wireless Sensor Troubleshooting

The Wi-MGR is designed to work with a wide variety of wireless sensors. Sometimes, problems may occur with the sensors that affect the way they interact with the Wi-MGR. Use the following guidelines to troubleshoot wireless sensors.

The sensor does not seem to be working. It may have a battery problem.

When the protective tab is pulled to activate the battery, the metal terminal clip on the PC board can bend slightly - not enough to see, but enough to cause intermittent connection with the battery. If this happens, the sensor will either operate erratically or not work at all. To fix this problem:

1. Remove the battery.
2. Gently squeeze the battery clips toward each other, bending them slightly.
3. Insert the battery.
4. Replace the cover. Press the button in the center of the sensor to reset it.

The small red sitcker near the positive terminal of the battery may release some residue on either the battery terminal or the battery clips. This residue may affect the function of the battery. To fix this problem:

1. Remove the battery.
2. Clean the end of the battery and the battery clips with an alcohol swab. The rubbing alcohol should dissolve the adhesive and the residue should be removed. Keep cleaning the clips and battery until you can no longer see or feel any sticky residue.
3. Insert the battery.
4. Replace the cover. Press the button in the center of the sensor to reset it.

Check the battery's voltage if the sensor begins to show inconsistent or unreliable results. As battery power degrades, the sensor may report data outside the bounds of reasonable readings. If this occurs, replace the battery.

When you replace the battery, replace it with a 3.6V lithium battery, NOT a standard alkaline AA cell. Also make sure you replace it with the terminals facing the correct direction. The sensor will not function with an alkaline cell or if the battery is inserted backwards.

APPENDIX

C

TECHNICAL SPECIFICATIONS

Power		
	Voltage Rating	24VAC, 50/60Hz; 24VDC
	Current Rating	600mA max.
Wired Inputs		
	Digital	Two (2) 24V, 10mA max. per channel
Wired Outputs		
	Relay	Four (4) Dry Contact, Form C, 1A @ 24VDC resistive, 0.5A @ 120VC
Communications Ports		
	Ethernet	10/100 BASE-T, RJ45 connector; 500VAC RMS isolation
	EIA-232	DB9 female connector; 9600 baud; No parity, 8 data bits, 1 stop bit
	EIA-485	1200, 2400, 9600 or 19200 baud (selectable); Parity: none, even or odd, 8 data bits, 1 stop bit
Protocols		
	TCP/IP, HTML, TFTP, SNMP	V1: V2C MIB-2 compliant; NMS Manageable with Get
	Modbus (EIA-485)	Modbus Slave; RTU mode; Supports function codes 03
	Modus TCP/IP UDP/IP	Modbus Slave; TCP/IP transmission protocol
	BACnet/IP	ASHRAE STD 135-2004 Annex J
	BACnet MS/TP	EIA-485
	Terminal Emulation	VT100 compatible
Login Security		
	Web Browser Access (Ethernet)	1 Web password Read Only; 1 Web password Read/Write
	Terminal Emulation Access	None

Table C.1 Technical Specifications

Maximum Number of Wireless Points		400 - point repeaters may be required
Wireless Interface		Appropriate receivers for configuration (418MHz and 900MHz, or 418MHZ and 2.4GHZ). RP/SMA connectors for Antenna
Indicators		
	Network	2 Green Active & Speed
	Status	1 Red LED
	EIA-485 Status	2 Green Transmit & Receive
Operating Environment		
	Temperature	32ºF to 122ºF (0ºC to 50ºC)
	Humidity	5% to 95% RH (non-condensing)
	Altitude	15,000ft (4572m) max.
Storage Temperature		–4ºF to 185ºF (–20ºC to 85ºC)
Mounting		19" Rack Mount (48.26cm)
Dimensions (without optional rack ears)		9.7"W x 4.8”D x 1.6"H (24.6cmW x 12.2cmD x 4.1cmH)
Weight (without optional rack ears)		2.3lb (1.04kg)

Table C.1 Technical Specifications (continued)