Parameter

WiNG System
User Guide

WiNG-MGR v2
WiNG-RXT

User Guide Version 11.25
Documented Using Firmware Version 1.2.0

www.parameter-tech.com   Parameter, LLC   800-518-1519

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Revision History

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Manufacturer's Notes

This product is manufactured by Parameter LLC, 4557 Denrose Court, 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.

This product complies with the general cybersecurity requirements for radio equipment as specified in EN 18031-1:2024. Your device is only secure when physical access is restricted to authorized personnel through locked enclosures, badge-restricted access, or monitored environments. Unauthorized physical access may compromise security assets and invalidate compliance with EN 18031-1 Clause AUM-1. This product supports the SUM-2 signed firmware update mechanism in bootloader and application versions v2.0.0 and later. The bootloader is not field-upgradeable. Devices shipped with earlier bootloader versions do not support SUM-2 signed firmware.

Product Warranty

Warranty information for Parameter products can be found at www.rletech.com.

Product Registration

Product registration helps Parameter inform owners of:
• Product upgrades
• Firmware enhancements
• New products and technologies
• Special offers available only to registered users

Any information provided to Parameter through the registration form will be regarded as confidential. Parameter will not sell or distribute any of the information to third parties. To read our Privacy Policy, please visit our website: rletech.com.

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 WiNG-MGR unit. Please have this information available whenever a technical support call is placed:

Product Model Number _____

Product Serial Number _____

Product Manufacture Date _____

The WiNG-MGR is not a field-serviceable item and must be sent back to Parameter for mechanical repair. Only Parameter certified service personnel is allowed to access the interior of this equipment, and power must be disconnected (unplugged) from the WiNG-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 WiNG-MGR.

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

WiNG-MGR v2 User Guide

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C H A P T E R

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SYSTEM OVERVIEW

1.1. Product Description

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

1.2. Indicators

The LEDs on the WiNG-MGR indicate the status of a variety of actions.
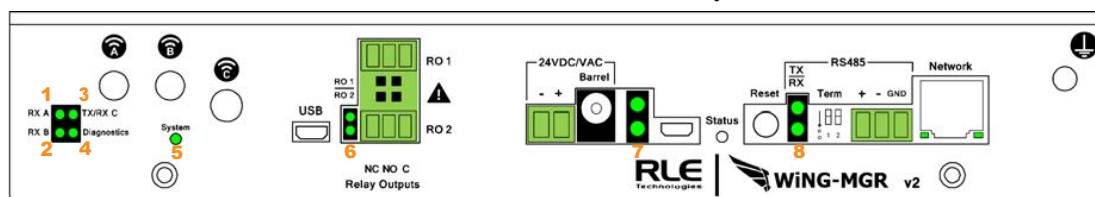
LED	Label	Description
1	RX A	The WiNG-MGR is receiving information over antenna A.
2	RX B	The WiNG-MGR is receiving information over antenna B.
3	TX /RX C	The WiNG-MGR is either receiving or transmitting information over antenna C
4	Diagnostic	Used for customer support and troubleshooting

Table 1.1 WiNG-MGR LED Indicators

LED	Label	Description
5	System 900MHz WiNG-MGR 868MHz WiNG-MGR	Indicates on which radio communications channel set the manager is operating: • Blue blink pattern - WiNG-MGR is operating on the primary 900MHz channel set. • Green blink pattern - WiNG-MGR is operating on the alternate 900MHz channel set. • Purple blink pattern - WiNG-MGR is operating on the primary 868MHz channel set. • Yellow blink pattern - WiNG-MGR is operating on the alternate 868MHz channel set.
6	RO1 | RO2	The relay output is activated
7	USB RX TX	USB Receive/Transmit status LED
8	Status	System status LED
9	RS485 RX TX	RS485 Receive/Transmit status LED

Table 1.1 WiNG-MGR LED Indicators

1.3.   Physical Connections
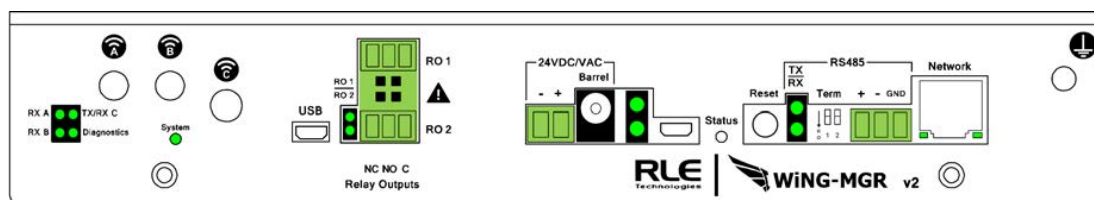
Figure 1.1 WiNG-MGR Physical Connections

Item	Description
Antenna A	RP-SMA connector
Antenna B	RP-SMA connector
Antenna C	RP-SMA connector
USB	USB mini B connector
RO 1	Relay output 1 (NC/NO/C)
RO 2	Relay output 2 (NC/NO/C)
⚠	Caution! Potential high voltage connection
24 VDC/VAC	Power terminal block
Barrel	Wall adapter connector
USB	USB mini B connector
RS485 Port	RS485 circuit connector (+ - GND)
Network	10/100 BASE-T connector Ethernet port
⏚	Earth ground connection

Table 1.2 WiNG-MGR Physical Connection Descriptions

1.4.   Reset Button

The reset button functions as follows:

Action	Indicator	Function
Push and hold button	Solid blue	Confirms button is being pushed correctly
Hold button 15 seconds	Yellow	Once light turns yellow, release button to reset the Username and password
Hold button 30 seconds	Red	Once light turns red, release button to reset the Username, password, and IP address
Hold button 45 seconds	Off	Once light turns off, release button to perform a full factory reset of the unit.

Table 1.3   Reset Button Functions

1.5.   SW1 Switch Settings

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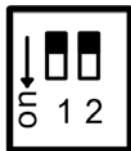
Status	Indicator	Figure
SW1-1	Not used	
SW1-2	EIA-485 Termination (On=100 ohm termination)	

Table 1.4   SW1 Switch Settings

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GETTING STARTED

2.1. Installation

The WiNG-MGR can be rack, wall, or DIN rail mounted or left free standing. Rack mount tabs ship with the WiNG-MGR. Wall mount tabs and a 35mm DIN rail mount bracket are sold separately.

♦ Mount the WiNG-MGR in either the front or the back of a 19-inch rack - You will need two of RLE's L-shaped rack mount tabs (included with the WiNG-MGR). Remove the screws from the sides of the WiNG-MGR, put the tabs in place, and reapply the screws. Mount the device in the front or the back of your rack. Use the preferred anchoring method as suggested by the rack manufacturer to mount the unit securely.

♦ If you would prefer to mount the WiNG-MGR on a wall, wall mount tabs (sold separately) provide a secure solution. Remove the screws from the sides of the WiNG-MGR, put the wall mount tabs in place, and reapply the screws. Mount the device securely in the desired location.

♦ If you would prefer to mount the WiNG-MGR on a 35mm DIN rail, a WiNG-MGR DRM bracket is also available (sold separately). Remove the screws from the sides of the WiNG-MGR, slide the unit into the bracket, and reapply the screws. Snap the device securely onto the DIN rail. You will hear the bracket click into place.

2.2. Wiring

2.2.1 Power Supply and Ground Connections

RLE Technologies recommends powering the WiNG-MGR from a UPS supply so the device can send alarm notifications during a power outage. The device can be powered through either the barrel or the power supply terminal block, but you must use only one of these power options at a time - you cannot connect to both power sources simultaneously or damage will occur. Power must be supplied from a Class I or Class II limited energy circuit, 24V with a maximum available current of 6A or a Class 2 circuit. 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 barrel 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.
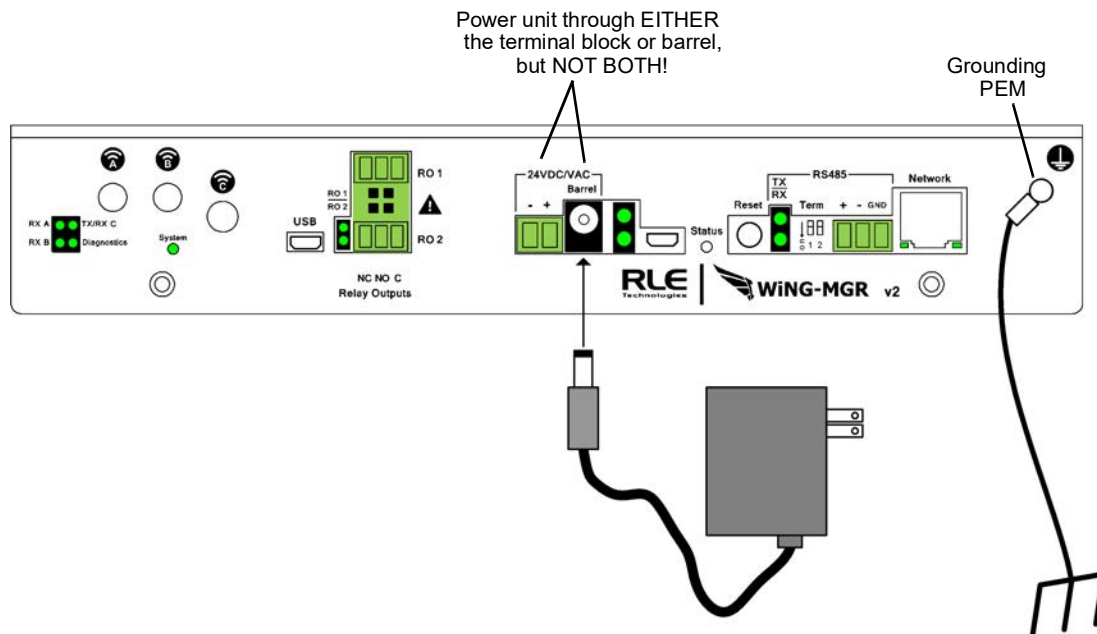
Figure 2.1 Power Supply and Grounding Connections

2.2.2 Wired Relay Outputs

The WiNG-MGR 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:
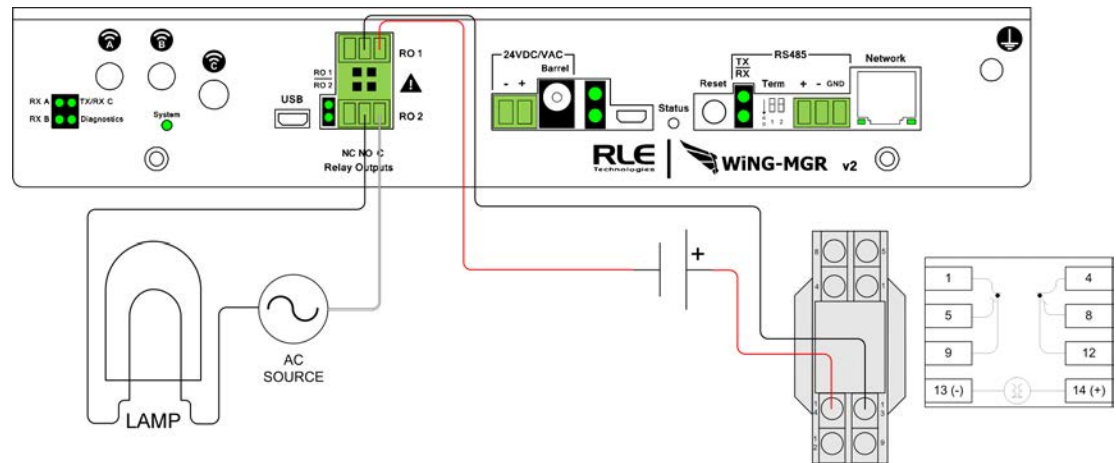
Figure 2.2   Wired Relay Output Connection

2.3. Connectivity

2.3.1 RJ45 Ethernet Connection

The WiNG-MGR has an internal 10/100BASE-T Ethernet port that is used for configuration. The Ethernet port supports Web browser access, email (SMTP), BACnet secondary, Modbus server, and SNMP. Use an Ethernet cable to connect the device directly to a PC or to a hub or switch.
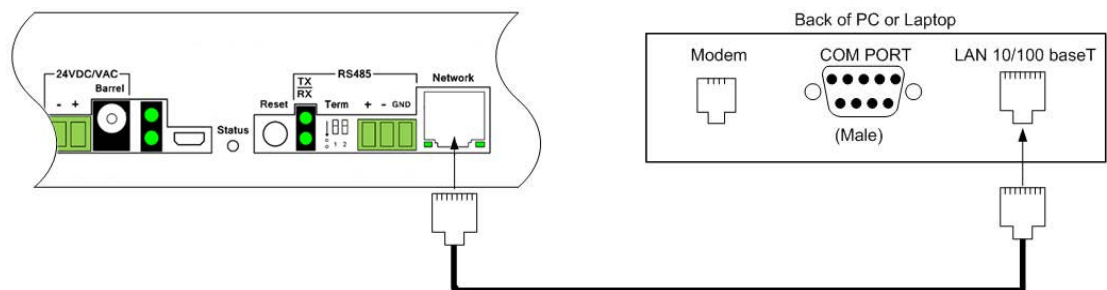
Figure 2.3   Ethernet Connection to a PC Using an Ethernet Cable
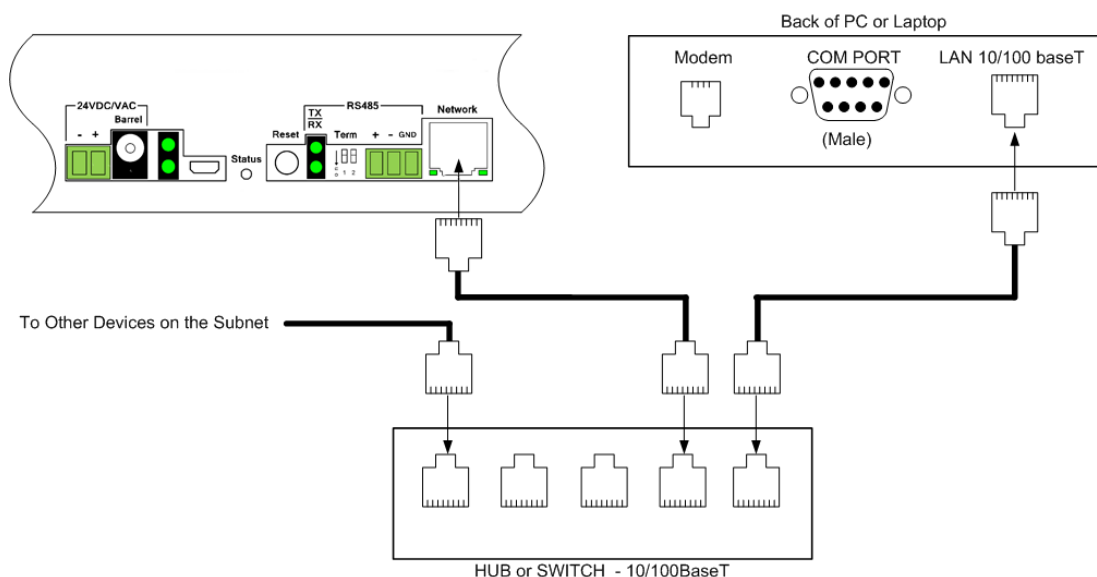
Figure 2.4 Ethernet Connection to a PC on a Subnet, Using a Hub/Switch

2.3.2 Modbus EIA-485 Connections

The WiNG-MGR can function as a Modbus server over an EIA-485, 2-wire hardware connection, as shown in Figure 2.5.

When using the EIA-485 port 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.
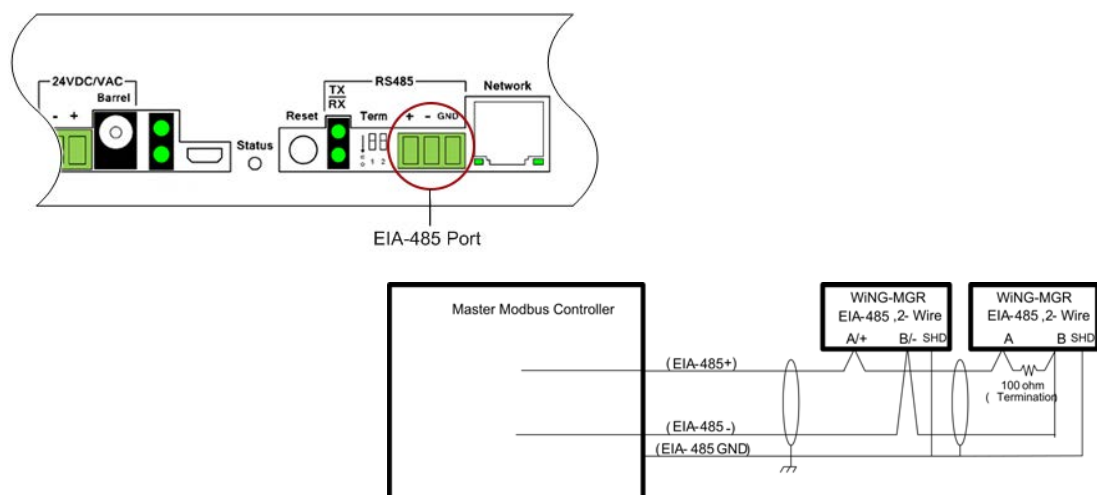
Figure 2.5 EIA-485 Connection

2.3.3 Antenna

The WiNG-MGR is shipped with three 900 MHz antennas. Plug each antenna into its appropriate jack on the back of the WiNG-MGR and tighten the connections firmly.

Antenna Connections
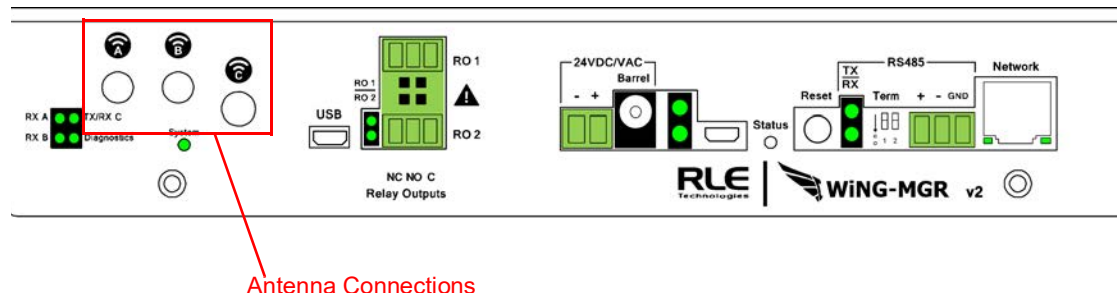
Figure 2.6   Antenna Connections

Once the antennas are secure, you'll need to ensure proper antenna position. Antennas A and B can be close together, but to avoid signal interference they both need to be as far away from antenna C as possible. Extend the leader cables on the antennas to their fullest lengths and secure the antennas as far away from the WiNG-MGR - and as high off the ground - as possible.

2.4.   Communication: Set the IP Address

The WiNG-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 WiNG-MGR can communicate over the network. There are two ways to set the WiNG-MGR's IP address: via the web browser or 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 WiNG-MGR is `10.0.0.188`**

The default Subnet Mask is `255.255.255.0`

There is no default user name or password.

1   Contact your IT Department to obtain an available IP address, Subnet Mask, and default Gateway.

2   Plug an Ethernet cable into the laptop or workstation that will be used to configure the WiNG-MGR.

3   You'll need to change the IP address and Subnet Mask of your computer so it can communicate with the WiNG-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 WiNG-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 WiNG-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 WiNG-MGR's IP address (`10.0.0.188`).

5   Connect the other end of the Ethernet cable to the Ethernet port on the back of the WiNG-MGR.

6   Access the WiNG-MGR through a Web browser — type the WiNG-MGR's IP address (`10.0.0.188`) into the location bar.

7   From the WiNG-MGR's Dashboard, select the **System Configuration** link on the left side of the page. Then click the **IP** link to access the IP configuration tab. Change the IP address, Subnet Mask, and default Gateway to the one provided by your IT Department, or change it to 0.0.0.0 to enable DHCP. Press the **Save Changes** button. The WiNG-MGR will save the new IP address, Subnet Mask and default Gateway and then reboot itself.

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 WiNG-MGR are now both configured to communicate on the network. Both should be accessible via the network. Connect the PC and the WiNG-MGR to the network. From the PC web browser, type in the new IP address of the WiNG-MGR. Enter the user name and password as stated above to verify network access to the device.

2.4.2   Set the IP Address via USB Connection

To use the USB interface:

1   Contact your IT Department to obtain an available IP address, Subnet Mask, and default Gateway.

2   Use a USB Mini cable to connect the WiNG-MGR to a terminal or PC running terminal emulation software (HyperTerminal, Terra Term, PuTTY, etc.).

3   Set the appropriate communication port to **115200 baud**, **NO parity**, **8 data bits**, **1 stop bit**, **(115200/N/8/1)**, and **no software or hardware flow command**.

4   Once the terminal emulation software starts, press **Enter** on the keyboard and the WiNG-MGR boot prompt should appear, (mgr> or boot>). 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. If you'd like to enable DHCP, type 0.0.0.0 as the IP address. Press the enter key. For example, `IP 192.168.103.211` The WiNG-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 WiNG-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`

8   Type `REBOOT` and press the enter key to reset the WiNG-MGR and apply the changes.

9 The IP address is now set and the WiNG-MGR can be accessed through a Web browser using the new IP address.

2.5.   Deploy Your Sensors

Once all wiring is complete and the WiNG-MGR is communicating on your network, you are ready to deploy your sensors. There are two different ways to configure sensors to communicate with a WiNG-MGR:

2.5.1   Use the Sensor Discovery Wizard

The sensor discovery wizard is the recommended method to use when associating sensors with a WiNG-MGR. It has a variety of benefits, including the ability to pick and choose which specific sensors are added to a particular WiNG-MGR installation. Since sensor discovery turns off automatically once the wizard is closed, using the wizard eliminates the possibility that sensor discovery will accidentally be left on once you have finished adding sensors to this install.

Complete instructions for using the sensor discovery wizard are found in section 3.1.3, "Sensor Discovery Wizard" on page 25.

2.5.2   Manually Launch Sensor Auto Discovery

You can also add sensors to a system if you manually toggle on and off sensor auto discovery. Sensor auto discovery differs from the sensor discovery wizard in a few ways. First and foremost, you have to manually turn sensor auto discovery on and off. Under normal operating conditions, sensor auto discovery should be turned OFF. If you do not turn sensor auto discovery off, the WiNG-MGR will continue to attempt to locate new sensors - this can contaminate your list of active sensors with sensors that do not actually exist. If you choose to use sensor auto discovery, it is on by default when a WiNG-MGR ships from the factory. Make sure you toggle it off when you are done and click the Save Changes button to effect the change.

Sensor auto discovery does not allow you to choose which sensors are added to your system. It will automatically add all sensors transmitting within the WiNG-MGR's range. This can be an inconvenience if you have multiple WiNG-MGRs operating in the same environment. If you use sensor auto discovery, you run the risk of displaying the same sensors on multiple managers.

Complete instructions for using the Sensor Auto Discovery are found in section 3.8.3, "Sensors" on page 58.

2.6.   Set Notification Parameters For Your Sensors

WiNG sensors can be configured to trigger alarm and warning messages when their reading surpass set notification thresholds. Alarm and warning parameters can be set per individual sensor or across all sensors at once.

2.6.1 Global Sensor Settings

Global sensor settings are configured in a couple places in the user interface. Logged sensor data and battery alarm are set in the Admin screens - directions can be found in section 3.8.3, "Sensors" on page 58.

Global alarm and warning parameters can be set by following the directions in section 3.8.5, "Alarms" on page 62. If you choose to use this option, note that the settings will be applied ONLY to the fields for which you check the checkboxes. They will be applied across all the sensors, and will overwrite any settings you have previously configured. Don't forget to click the Save Changes button to apply the setting across your system.

2.6.2 Individual Sensor Configuration

If you'd prefer not to use the global settings, you can configure your sensors one at a time. Use the directions found in section 3.2.1, "Individual Sensor Pages" on page 29 and configure the parameters sensor by sensor. Remember to click the Save Changes button on each page to apply the settings.

2.7. Sensor Mounting Tips

♦ The electronics in WiNG sensors are not waterproof. WiNG sensors need to be mounted in a safe location where they will not come into contact with water or condensation.

♦ Sensors can be secured with magnets (included), screws, zip ties, or on a 15mm DIN rail.

♦ Each sensor's serial number is unique, and you will need to refer to this number throughout the life span of the sensor. When you mount the sensor, ensure that the sensor's serial number is accessible.

♦ Although each sensor has a unique serial number, the WiNG-MGR will also assign each sensor an index number. This is listed as the ID # in the upper right corner of each sensor's individual configuration page. If you'd like, place a label or other marking on the sensor case to show its index number.
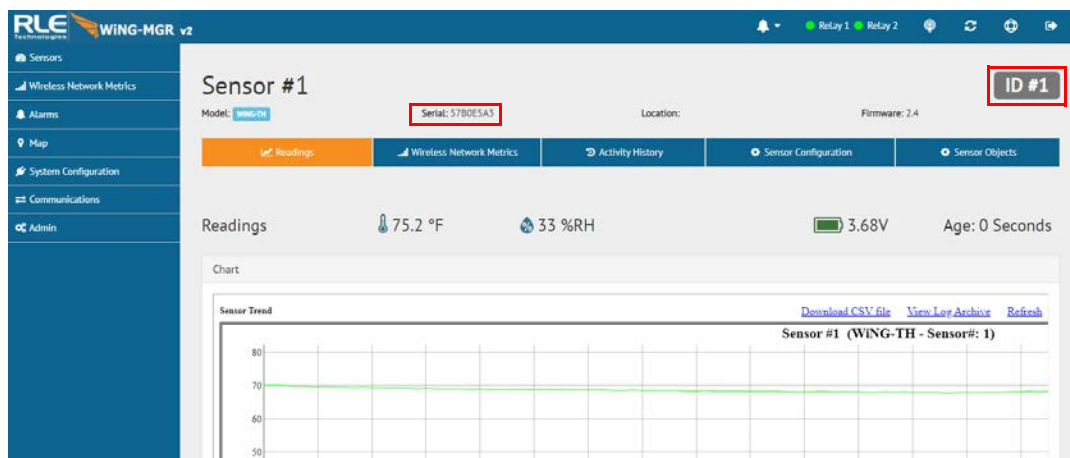
Figure 2.7 Sensor Serial Number and Index Number

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WEB INTERFACE

Use the WiNG-MGR web interface to monitor and configure your WiNG network. To access the Web interface, you must first configure the WiNG-MGR to communicate via the Internet. To set the IP address, see section 2.4., "Communication: Set the IP Address" on page 19.

Use the Dashboard to access and view the data collected and managed by the WiNG-MGR.
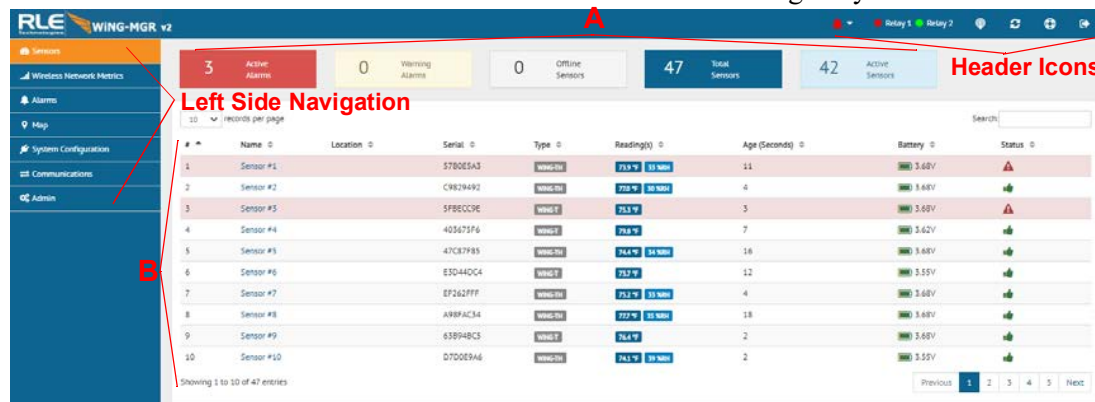
Figure 3.1   Dashboard Navigation

Option	Description
Header Icons	Detailed in "Header Icons" on page 25
Left Side Navigation	Left Side Navigation items each have their own documented section within this chapter.

Table 3.1   Dashboard Navigation Options

Option	Description
Section A	These blocks reflect the current status of the sensors connected to the WiNG-MGR.
Section B	This is your view of the sensors associated with this WiNG-MGR. A drop down lets you choose how many sensors display per page. Select 10, 25, 50, or 100, depending on your preference. Use the Search field to display only the sensors whose data contains the term for which you are searching. The sensors name is a shortcut to that specific sensor's data and configuration information. When you look at the table of sensors in this section, note that each heading has a set of arrows next to it. These arrows allow you to sort the data in this table by that column, in either ascending or descending order. For instance, if you click on the arrows next to the Serial Number heading, the arrow pointing up gets much darker, and all the data in the table is sorted by the Serial Number field from lowest to highest. If you click that arrow again, the arrow pointing down gets much darker, and the data in the table is sorted by the Serial Number filled in ascending order, from highest to lowest. Page numbers also appear in the lower right side of this section. Click the appropriate number to move among the pages.

Table 3.1   Dashboard Navigation Options

3.1.   Header Icons

There are a series of icons on the upper right side of the dashboard. Use the icons to quickly access a variety of information and activities.

3.1.1   🔔▾ Alarm Bell

No matter where you are within the user interface, the alarm bell is a quick and easy way to know if you have any active alarms on your unit. It will be red if you have an active alarm, and will be white when there are no active alarms. It is also a shortcut to the Alarms Page, where you can dig deeper into any alarms on this WiNG-MGR.

3.1.2   ● Relay 1 ● Relay 2   Relay Output Status

Click on this link to access a modal window that provides a quick way to view the status of the WiNG-MGR's relay outputs. Click the X in the upper right corner of the box to close the modal window.

Relay Status   X

Relay 1   Active
Relay 2   Inactive
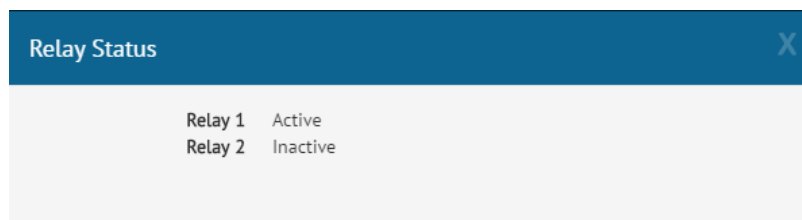
Figure 3.2   Relay Output Status

3.1.3   🛜 Sensor Discovery Wizard

The WiNG-MGR is equipped with a Sensor Discovery Wizard. Run the wizard when you need to install or locate new sensors. The wizard will discover available sensors and enter them into the Sensors page of the website.

1   Install all your sensors in the desired locations. Be sure to pull the tabs to activate the batteries in the sensors.

2   Click on the icon to launch the Sensor Discovery Wizard. Click the Begin Discovery button.

Q Sensor Discovery Wizard   X

Welcome!
This wizard will discover your wireless sensors.

Cancel ✖   Begin Discovery ➜
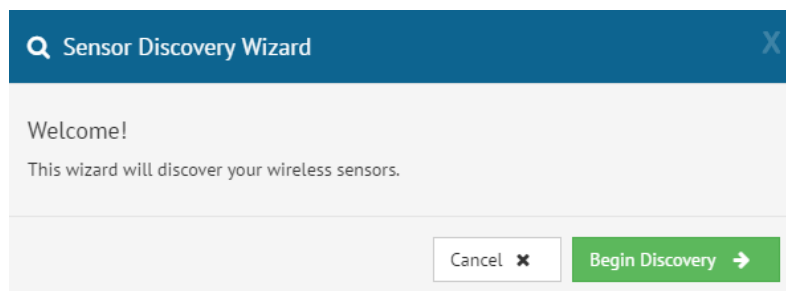
Figure 3.3   Sensor Discovery Wizard Modal

3   The wizard will locate all sensors within the range of the WiNG-MGR that are not already associated with this unit. They will all list in the modal window. Each sensor has a

checkbox in front of it. If you would like the sensor to be associated with this WiNG-MGR, leave the checkbox checked. Uncheck the boxes next to the sensors that should NOT be configured within this WiNG-MGR at this time. Verify the serial numbers of the sensors to ensure you're adding the correct sensors.

The animated ball image will continue as long as the modal window is open, so you don't have to wait for it to stop before you make your selections.

Once you've selected the appropriate sensors, click the Save Selected link.
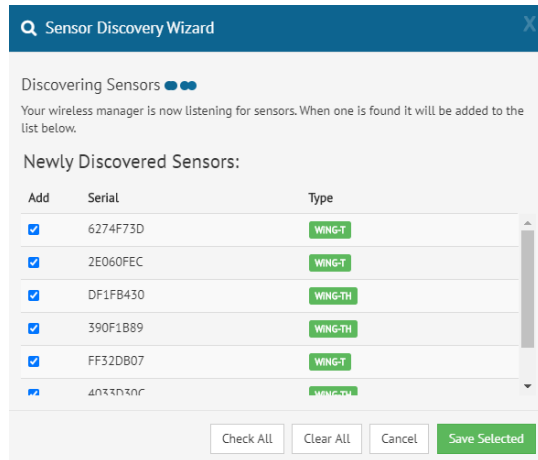
Figure 3.4 Sensor Discovery Wizard - Select the Sensors for This WiNG-MGR

4 Click the Close button to close the modal and return to the Sensors page of the website.
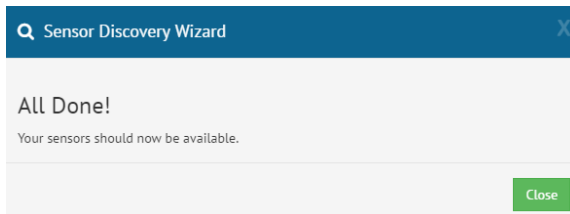
Figure 3.5 Close the Sensor Discovery Wizard

The selected sensors will be added to the system and will appear at the end of the list of sensors on the dashboard. Confirm the placement of all the new sensors in the sensor list.

From this point you have two options:

a Use the sensor's serial number to locate it in the list and configure it per the instruction in "Individual Sensor Pages" on page 29. Be sure to click the Save Changes button on every page.

b Configure global alarm and warning settings for all the sensors, following the directions in "Alarms" on page 62.

5 Once you have configured all you alarm parameters, your sensor discovery is complete. Be sure to save a copy of the system configuration. Reference "Sensors" on page 58 to download the sensors CSV file for safekeeping.

3.1.4 ⟳ Refresh

Click this icon to force a refresh of the status page.

3.1.5 ⊕ System Information

This pop up window displays a variety of information specific to your device in a singular location. Direct links to the system log, BMS packet log, network and wireless metrics, and the register list are also available from this modal.

There is also a button in this modal that allows the unit to be rebooted. The reboot button is available only to users with System Administrator access to the unit.

If you need to contact RLE's technical support team, you'll be asked for the information found in the system information modal window.

System Information   X

Serial Number	000026
Model Number	WiNG-MGR v2
Firmware Version	1.0.17
Firmware Size	580334
GUI Version	1.8 (Expected: 1.8)
Bootloader	wds-boot V1.0.2
sysUpTime	1 days 22 hrs 49 mins 41 secs
MAC Address	00:90:5B:FE:44:44
Netbios Host Name	RLE00905BFE4444
IPv4 Address	23.24.146.60
IPv4 Subnet Mask	255.255.255.240
IPv4 Default Gateway	23.24.146.62
System Data	

System Log | BMS Packet Log | Register CSV

Statistics   Network Statistics | Wireless Statistics

Reboot

Figure 3.6 System Information

3.1.6 ↦ Sign In/Out

Use this option to sign into and out of the WiNG-MGR user interface.

3.2.   Sensors

The Sensors page allows users to view all the sensors accessible through the WiNG-MGR and also serves at the unit's dashboard view.

The drop down menu allows you to decide how many sensors will be displayed per page.

The search field allows you to display only the sensors that meet your specific search criteria.

The page displays a sensor number, the sensor's name - which is also a link to that sensor's individual configuration and data page, the sensor's location, the sensor's serial number, the sensor type (model description), current value reading, the age - the amount of time that's passed since the last reading was transmitted, battery life, and an icon that denotes the sensor's current status. Arrows next to each column heading allow the data to be sorted, in ascending or descending order, by that column.
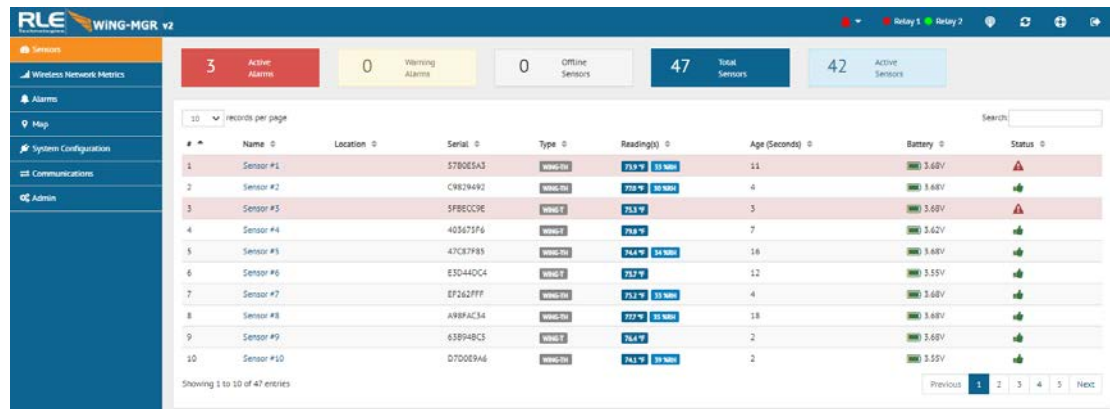
Figure 3.7   Sensors Page

Attribute	Description
#	The sensor's specific number. This number is uneditable, and is assigned by the WiNG-MGR.
Name	A unique name, configurable for each sensor. The sensor's name a is link. Click on the sensor's name to go to the that sensor's configuration and data page.
Location	A label used to note the sensor's physical location, or any other necessary descriptive information.
Type	The sensor's model and type.
Reading(s)	Displays the current sensor reading.
Age	Amount of time that has passed, in seconds, since the WiNG-MGR has received a broadcast signal from this sensor.
Battery	The amount of battery life left in the 3.6V AA Lithium battery in this sensor.
Status	An icon that tells, at a glance, the status of the sensor.

Table 3.2   Sensor Page Field Descriptions

3.2.1   Individual Sensor Pages

Whether you're viewing the sensors through the Sensor page or the Alarm page, each sensor's name is a clickable link. Click this link to access the sensor's individual data and configuration page.

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. Each individual sensor page has five tabs. Editable options are as follows:

3.2.1.1 Readings

This page tells you the current reading of the sensor and its battery life. There is a trend chart on this page and links that allow you to download the trended data and view the sensor's log archive. Sensor logging is configured in the Admin > Sensors menu and is detailed in section 3.7.3, "Sensors" on page 58.

Figure 3.8   Individual Sensor Page - Readings Tab

3.2.1.2 Wireless Network Metrics

This page shows the wireless network metrics for this individual sensor. RSSI metrics for the manager and range extender system components can be found under the Wireless Network Metrics link in the left side navigation. These sensor metrics are provided for advanced users

with a strong knowledge of RF. You may also need to provide them to your technician if you engage in a technical support call.
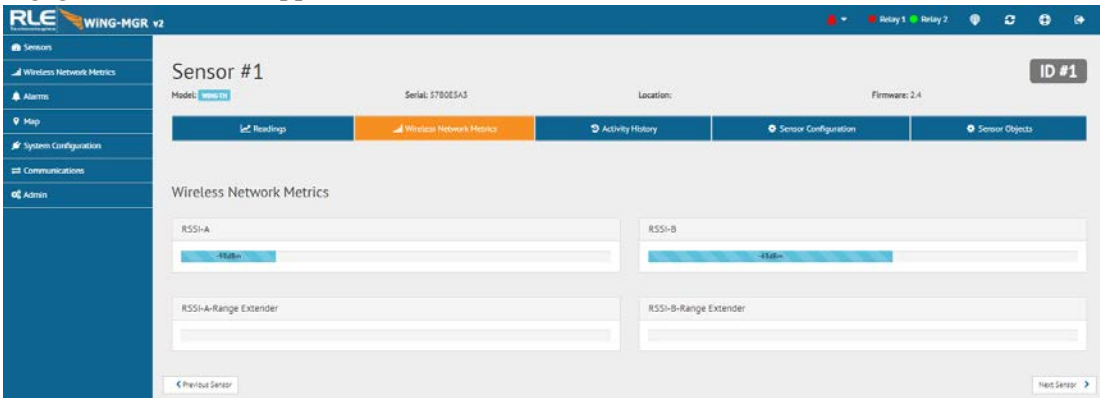
Figure 3.9 Individual Sensor Page - Wireless Network Metrics Tab

Attribute	Description
RSSI	This is the Received Signal Strength Indicator. It represents the received power of the signal. This number will always be a negative value and is provided for both channels used by each sensor. If there is a range extender in use it will also report the received signal strength from the sensor to the range extender. To maximize the performance of this system, get the RSSI value as close to zero as you can. RSSI range correlates to signal strength as follows: ♦ -30 to -70 = Excellent signal strength ♦ -70 to -80 = Good signal strength, minimal packet loss ♦ -80 to -90 = Fair signal strength, occasional packet loss expected ♦ -90 and beyond = Poor signal strength, frequent packet loss and loss of sensor connection is expected

Table 3.3 Wireless Network Metrics Field Descriptions

3.2.1.3 Activity History

This page shows the activity history for this sensor.
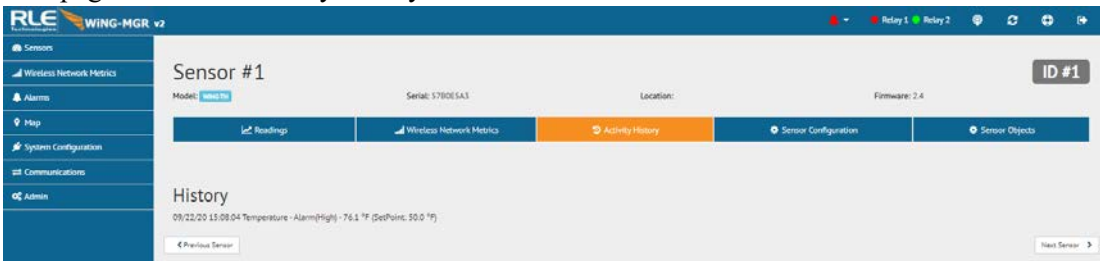
Figure 3.10 Individual Sensor Page - Activity History Tab

3.2.1.4 Sensor Configuration

Use this page to configure your sensor. 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.

If you wish to configure settings globally for your sensors, that option is available on the Admin > Alarms page and is detailed in section 3.7.5, "Alarms" on page 62.

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

Figure 3.11 Individual Sensor Page - Sensor Configuration Tab

Option	Description
General Info	
Sensor Name	Enter a name for this sensor.
Location	Enter the sensor's physical location.
Alarm Notifications	
Temp Over	Enter a high temperature alarm threshold - if the temperature rises above this value, a high temperature alarm is generated.
Temp Under	Enter a low temperature alarm threshold - if the temperature drops below this value, a low temperature alarm is generated.
Humidity Over	Enter a high humidity alarm threshold - if the humidity rises above this value, a high humidity alarm is generated.
Humidity Under	Enter a low humidity alarm threshold - if the humidity drops below this value, a low humidity alarm is generated.

Table 3.4   Individual Sensor Page - Sensor Configuration Tab Options

Option	Description
Leak Threshold	This number represents the uA of current that must be present on the leak detection sensing cable in order to trigger an alarm. If you are seeing a large number of false alarms, even after cleaning the cable, our tech support staff may work with you to adjust this threshold. Default = 4
Alarm Delay	The number of seconds that pass between the time the system goes into alarm and the time that alarm is annunciated.
Relay Upon Alarm	If the sensor goes into alarm, will it activate a relay? If so, designate which relay or relays it will activate, and check the appropriate boxes for which conditions the relay should be activated. Default = None
Settings	
Offline Alarm Delay	If the sensor goes offline, how much time should pass before an alert is generated? 0 = Offline alarms are disabled.
Dewpoint Display	If you have a temperature/humidity sensor, a calculated dew point can be displayed. Select Yes to activate this option.
Thermistor Type	Use a 10k-2 thermistor with our WiNG-THRM sensor.
Warning Notifications	
Temp Over	Enter a high temperature warning threshold - if the temperature rises above this value, a high temperature warning is generated.
Temp Under	Enter a low temperature warning threshold - if the temperature drops below this value, a low temperature warning is generated.
Humidity Over	Enter a high humidity warning threshold - if the humidity rises above this value, a high humidity warning is generated.
Humidity Under	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.
Adjustment Settings - Using the formulas below, adjust the gain and offset values appropriately to fine tune your sensor's accuracy.	
Temperature Offset	To fine tune the accuracy of the temperature reading, enter an offset value here. The offset value is a degree amount in 0.1° increments. Use - for negative offsets.
Humidity Offset	To fine tune the accuracy of the humidity reading, enter an offset value here. The offset value is a percent humidity amount in 1% increments. Use - for negative offsets.

Table 3.4   Individual Sensor Page - Sensor Configuration Tab Options

Option	Description
Gain	**WiNG-ANLG Sensors** - Using the formulas below, adjust the gain value appropriately to fine tune your WiNG-ANLG sensor's accuracy. **For 4-20mA sensors:** Gain = (Sensor high range value – sensor low range value) ÷ 3085 *Example*: Temperature sensor with a sensing range of 5-120°F Gain = (120 - 5) ÷ 3085 = 0.0373 **For 0-5V and 0-10V sensors:** Gain = (Sensor high range value – sensor low range value) ÷ 3856 *Example*: Temperature sensor with a sensing range of 5-120°F Gain = (120 - 5) ÷ 3856 = 0.0298
Offset	**WiNG-ANLG Sensors** - Using the formulas below, adjust the offset values appropriately to fine tune your WiNG-ANLG sensor's accuracy. **For 4-20mA sensors:** Offset = Sensor low range – ((Sensor high range value – sensor low range value) ÷ 4) *Example:* Temperature sensor with a sensing range of 5-120°F Offset = 5 - ((120-5) ÷ 4) = -23.75 **For 0-5V and 0-10V sensors:** Offset = Sensor low range *Example:* Temperature sensor with a sensing range of 5-120°F Offset = 5

Footer Buttons - Remember to click the **Submit Changes** button for the sensor you're currently configuring before you move to another sensor's configuration page.

<Previous Sensor	Configure the previous sensor in the list.
Next Sensor>	Configure the next sensor in the list.

Table 3.4   Individual Sensor Page - Sensor Configuration Tab Options

3.2.1.5 Sensor Objects

This page denotes the individual Modbus, BACnet, and SNMP objects provided for this particular sensor.
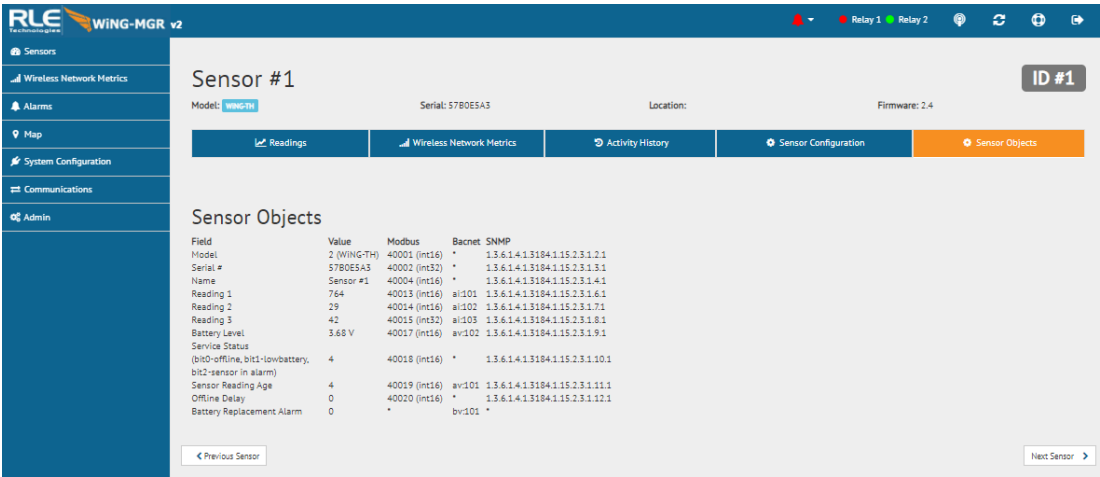
Figure 3.12 Individual Sensor Page - Sensor Objects Tab

3.3. Wireless Network Metrics

This page shows the wireless network metrics for your sensors. RSSI metrics for the system components can be found under the Wireless Network Metrics link in the left side navigation.

These metrics are provided for advanced users with a strong knowledge of RF. You may also need to provide them to your technician if you engage in a technical support call.

Figure 3.13 Wireless Network Metrics Page

Attribute	Description
RSSI	This is the Received Signal Strength Indicator. It represents the received power of the signal. This number will always be a negative value and is provided for both channels used by each sensor. If there is a range extender in use it will also report the received signal strength from the sensor to the range extender. To maximize the performance of this system, get the RSSI value as close to zero as you can. RSSI range correlates to signal strength as follows: ♦ -30 to -70 = Excellent signal strength ♦ -70 to -80 = Good signal strength, minimal packet loss ♦ -80 to -90 = Fair signal strength, occasional packet loss expected ♦ -90 and beyond = Poor signal strength, frequent packet loss and loss of sensor connection is expected

Table 3.5   Wireless Network Metrics Field Descriptions

3.4.   Alarms

The Alarms page shows all active alarms and warnings reported by sensors monitored by this WiNG-MGR. If the sensors has returned to normal since the alarm or warning was reported, this will be noted in the table as well.

Each sensor's name is a link. Click this link to visit the individual sensor's status and configuration page. Here you can view the sensor's logged data, as well as edit and configure the sensor's settings and alarm and warning thresholds.

Figure 3.14 Alarms Page

3.5.   Map

The map page shows a user uploaded map image and sensor values that have been placed on the map. The values will be color coded to indicate normal, warning or alarm. Mouse over the reading on the map to see which sensor is providing the specific reading.

Click the icon [⤢] next to the Sensor Map text to pop the map out into a new browser tab.

Complete instructions for creating this map are found in section 3.6.5, "Mapping" on page 44.
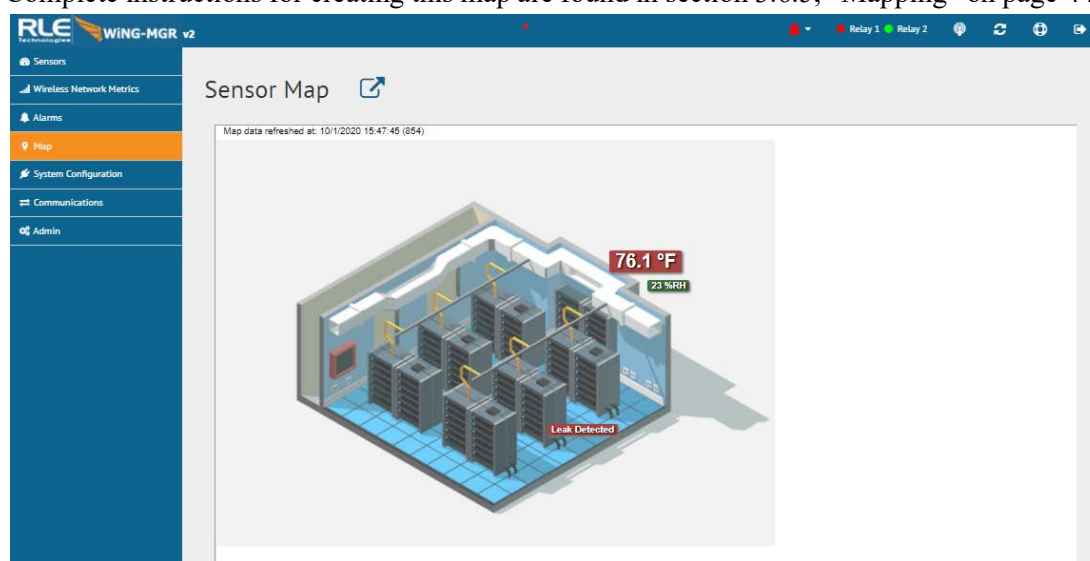
Figure 3.15 Map Page

3.6. System Configuration

Configure your WiNG-MGR through this series of menus.

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

3.6.1 Identity

The Identity page allows you to customize the name of the WiNG-MGR and the contact and location information for this particular WiNG-MGR. You can also look here to find the unit's serial number, model number, MAC address, and the version of firmware currently running on the unit.
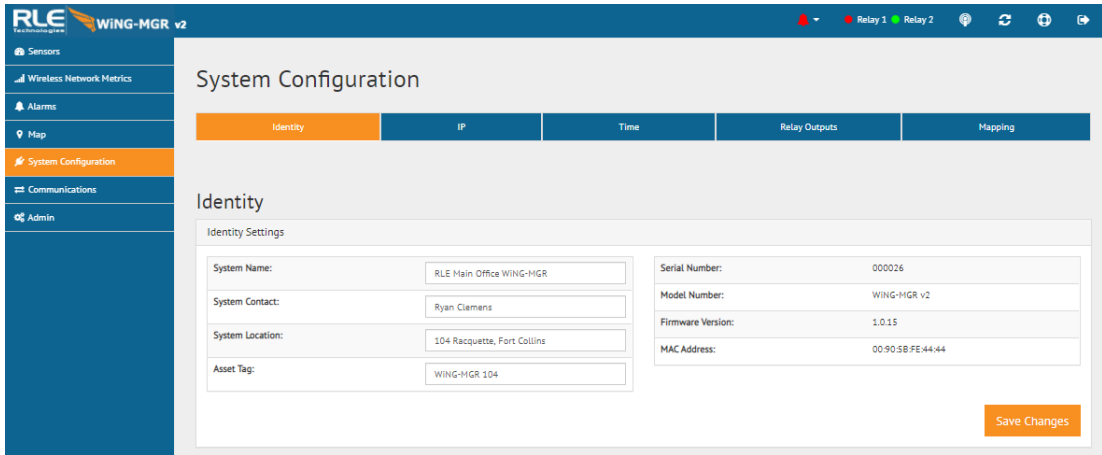
Figure 3.16 Identity Page

Option	Description
System Name	Enter a name unique to this particular WiNG-MGR.
System Contact	Designate a technical contact for this unit.
System Location	Specify the physical location of this particular WiNG-MGR.
Asset Tag	If your facility uses asset tagging, log the code for this WiNG-MGR.

Table 3.6   Identity Configuration Options

3.6.2 IP

The WiNG-MGR can communicate via IPv4, IPv6, or both IPv4 and IPv6. Select the option that is most appropriate for your network, and configure the fields as necessary.

Figure 3.17 IP Page

Option	Description
IP Settings- This section provides information about the WiNG-MGR's configured settings.	
Network Statistics	Click this link to view advanced network statistics for this device.
IP Version	Designate whether the WiNG-MGR will communicate via IPv4, IPv6, or both.
IPv4 Settings- Configure these fields if the WiNG-MGR is communicating via IPv4.	
Static Address	The WiNG-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. If you would prefer to use DHCP, set this field to 0.0.0.0 to enable DHCPv4. Default IP address: 10.0.0.188
Net Mask	The WiNG-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

Table 3.7 IP Configuration Options

Option	Description
Default Route	The WiNG-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
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
DHCPv4 Status	Indicates whether DHCPv4 is enabled or disabled.
IPv6 Settings- Configure these fields if the WiNG-MGR is communicating via IPv6. You do have the option in this section to use DHCP. If you do choose to enable DHCP, DHCP will override any static options you configure.	
IPv6	Click the Enable button to enable IPv6.
IPv6 Mode	Choose the appropriate IPv6 mode: Auto – Obtains the IP address using SLAAC (Stateless Address Autoconfiguration) Static – Allows you to manually enter a static IPv6 Address Link Local Only – Uses the Link Local IP address and does not enable a Global IPv6 Address. Packets will not be forwarded by routers. Note: Enabling Auto will override any static address information saved in the IPv6 fields.
Static Address	If you choose not to use DHCP, Enter a static IPv6 address in this field.
Static Router	Enter static router information here.
Prefix Length	If the static address has a prefix, enter the bit length of the prefix here.

Table 3.7 IP Configuration Options

3.6.3   Time

The WiNG-MGR has an onboard clock that timestamps alarms and other logged events. If you'd like, you can set the onboard clock manually. If you configure the Network Time Protocol (NTP) settings, the NTP server will automatically adjust the time of the onboard clock and keep it in synch with the time reported by the NTP server. NTP maintains a high level or accuracy and reliability in time stamped events.

Figure 3.18 Time Configuration

Option	Description
Onboard Clock	
If you wish to set the onboard clock manually, do so here. Click the Save Changes button to save all modifications.	
Date	Enter the current date in mm/dd/yy format.
Time	Entered the current time in hh:mm:ss format. The clock is in 24 hour format - not 12 hour format - so ensure the hour is a two digit number between 01 and 24.
NTP	
If you configure NTP settings, they will override anything you have manually configured for the Onboard Clock.	
NTP Server	The IP address or hostname of the NTP server with which your Wi-MGR will synchronize. Commonly used public NTP servers include us.pool.ntp.org and time.nist.gov Default setting: blank
Time Zone	Select the time zone in which this particular WiNG-MGR resides. Default setting: Western European (UTC + 0)

Table 3.8   Time Configuration Options

Option	Description
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
DST Beginning 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
Update Interval	This interval tells the WiNG-MGR how often it should access the NTP server you designated and synchronize its time with the NTP server. If you enter a 0 in this field it disables this feature, which also disables NTP. Default setting: 0 (disabled)

Table 3.8   Time Configuration Options

3.6.4   Relay Outputs

The WiNG-MGR has two hard-wired relay outputs labeled K1 and K2. Use this tab to individually configure the relay outputs. Use the individual sensor pages to designate when a sensor alarm activates a relay output.
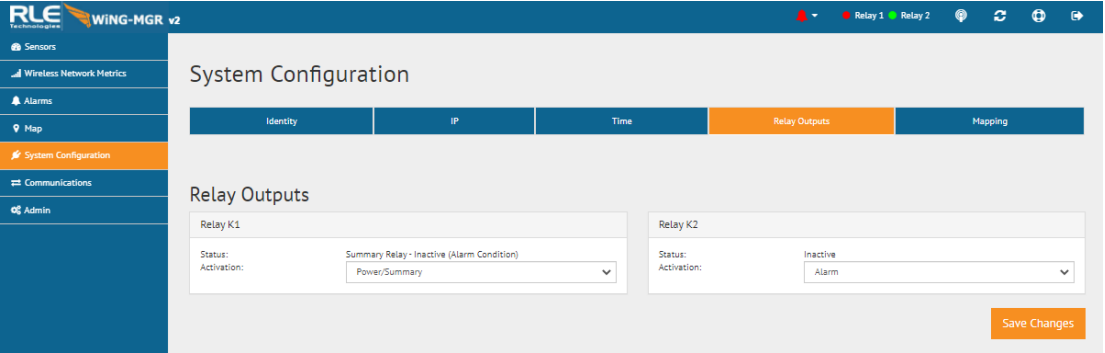
Figure 3.19 Relay Output Configuration

Option	Description
Activation	Each relay can be configured as an alarm relay, a latching alarm relay, or a power/summary relay. The power/summary option can be used to indicate basic status for the WiNG-MGR: • Relay will ACTIVATE when the unit has powered on and no sensors are in alarm • Relay will DE-ACTIVATE on a power loss or any alarm condition (sensor value in alarm, low battery alarm or sensor offline alarm) Modbus support is provided for the relay outputs: • Read the relay status with the 0x01 (Read Coil) command • Reset LATCHED relays only with the 0x05 (Write single coil) or the 0x15 (Write multiple coils) command Default: Alarm

Table 3.9   Relay Output Configuration Options

3.6.5   Mapping

The WiNG-MGR allows you to upload a map of your facility and populate it with sensor data. This provides a real-time view of the facility, including the physical location and status of mapped sensors, and a visual indication of any active alarms.

Through the mapping process, the WiNG-MGR creates an overlay for an uploaded map image. You can draw a map image yourself or RLE can create maps from sketches or mechanical drawings you provide. Once uploaded and populated, the map is accessible through the Map link on the left side of the WiNG-MGR web interface.
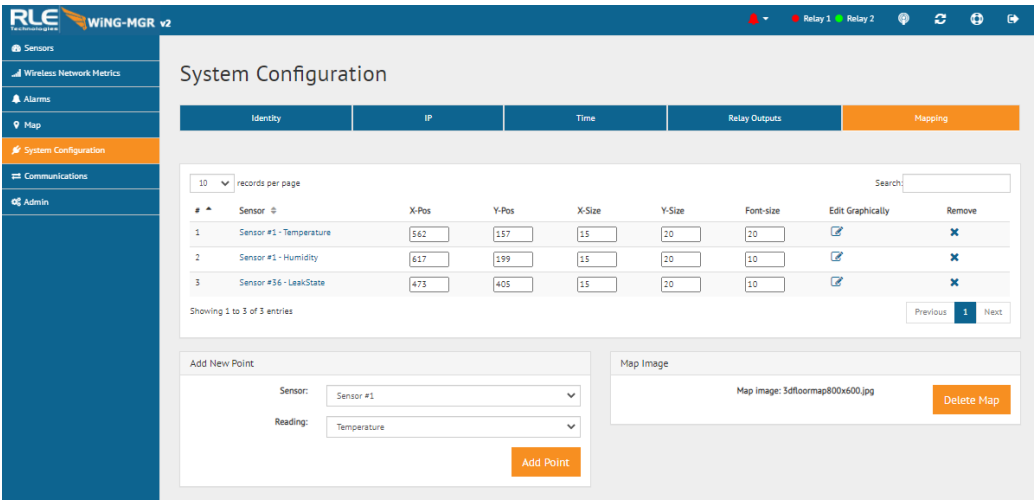
Figure 3.20 Mapping Configuration

Option	Description
Mapped Points Table	This table shows all the sensors currently included on the map. • Sensor: The name of the sensor is a link that takes you directly to that individual sensor's page data and configuration page within the web interface. • X-Pos and Y-Pos: Use these fields to fine tune the location of the sensor on the map. X-Pos adjusts the point horizontally; Y-Pos adjusts the point vertically. • X-Size and Y-Size: Use these fields to adjust the size of the box used to represent the sensors. X-Size adjusts the height; Y-Size adjusts the width. • Font-size: Adjust the size of the font that displays the sensor's data reading. • Edit Graphically: Click the icon to adjust the sensor's location directly on the map.This is the easiest way to edit the map. • Remove: Click the "x" to remove the sensor from the map.

Table 3.10 Mapping Configuration Options

Option	Description
Add New Point	Use this field to add a new sensor to the map and choose which value that mapped point will display. Each point on the map can only hold one data reading. If you're adding a sensor that provides more than one reading, like a WiNG-TH sensor, you can add it multiple times with a different sensor reading or calculated dew point value for each entry on the map.
Map Image	Use this field to upload or delete your map image. Map images must meet the following criteria: • 500kb or less in size • 4000x4000 pixels or less • .jpg, .jpeg, .bmp, .gif, or .png file

Table 3.10 Mapping Configuration Options

To create an interactive facility map within the WiNG-MGR:

1 Upload the image you've created for your facility using the Map Image field.

2 Add each sensor one at a time by selecting the appropriate sensor in the Add New Point field and choosing the reading you'd like to see on the map. Each point can only display one piece of data, so if you have a sensor that reports more than one value you'll need to add a separate point for each value you'd like to see on the map from that sensor.

Once you click the Add Point button, you'll see a confirmation message in green and the sensor will appear at the bottom of the list in the Mapped Sensors table.

Figure 3.21 Mapped Point Confirmation Message

3 All new sensors appear in the upper left corner of the map. Adjust the sensor's location so it appears on the map in the desired location. You can either do this manually by adjusting the numbers in the Mapped Sensors table or click the Edit Graphically icon for each sensors and move them on the map. If you choose the Edit Graphically option:

a The map will launch in a new tab. The point you have chosen to edit is detailed in the fields at the top of the map and is also represented in a blue box with a red highlight on the map.
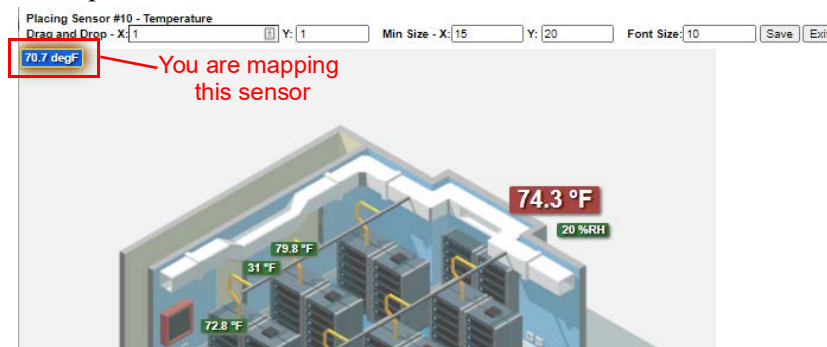
b Click on the blue square and drag and drop it wherever you'd like it to be on the map. You'll notice the X and Y coordinates at the top left change in sych with your cursor as you move the square.

c Use the Font Size box to change the size of the font used to display the data as needed for your map and application.

d If you would like the box around the sensor's data to be a different size, adjust the Min Size X and Y values. The square will not resize itself to be smaller than the font you've selected.

4 If you've added multiple sensors, they will all stack up in the upper left corner of the map. Repeat step 3, clicking on each one to turn it blue/highlighted and then place it appropriately on the map.

5 Once all of your points are positioned and sized correctly, click the Save button on the top right side of the screen.

6 Click the Exit button to return to the Mapping page of the web interface.

3.7. Communications

The communications options allow you to configure how the WiNG-MGR conveys its information to individuals and other devices.

3.7.1 EIA-485

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

Figure 3.22 EIA-485 Configuration

Option	Description
Port Function	Select an output type for the EIA-485 port - either Modbus-Server or BACnet-MSTP. Default: Modbus-Server
Unit/Station ID	Set a unit/station ID, from 1-254. Set the unit/station ID to 0 disable EIA-485 port communications. Default: 0 (disabled)
Baud Rate	The baud rate is selectable: 9600, 19200, or 38400. Choose the appropriate baud rate. Default: 9600

Table 3.11 EIA-485 Configuration Options

3.7.2   Modbus

If you're using Modbus RTU over an ethernet connection, you'll need to designate a unit identifier. Configure that identifier here.
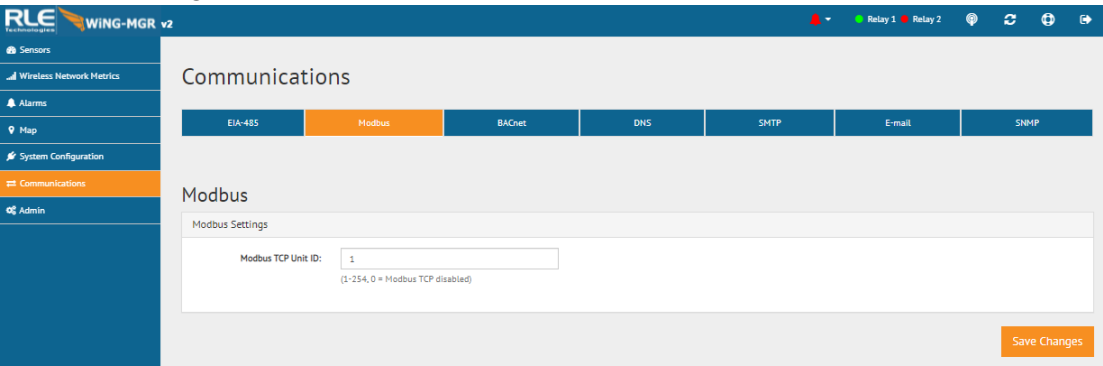
Figure 3.23 Modbus Configuration

Option	Description
Modbus TCP Unit ID	This designator is used for Modbus RTU over an Ethernet connection. The default unit identifier is 0, which disables this feature. To enable this option, enter a TCP address from 1-254 in this field. In most instances, the identifier is typically set at 1. Default: 0 (disabled)

Table 3.12 Modbus Configuration Options

3.7.3   BACnet

If the WiNG-MGR will communicate via the BACnet, configure the necessary options here.

Figure 3.24 BACnet Configuration

Option	Description
Pics	Click this link to view the Bacnet identifiers and objects supported by the WiNG-MGR.
Device ID	To enable BACnet, assign a unique number between 1 and 4194302 to identify this BACnet device on the network. If you enter a 0 in this field BACnet will be disabled. Default: 0 (Disabled)
Device Name	Assign a name - up to 38 characters - to the unit for BACnet discovery and integration.
Description	Add any additional details about the device, up to 38 characters.
Location	Designate the physical location of the unit.
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: 0 (47808)
Register as Foreign Device at IPv4	IP address of the master device with which you're trying to communicate. Requires a BBMD for foreign device discovery.
Registration TTL	Time, in seconds, for foreign device discovery.
MS/TP Max Master	Only for EIA-485 Bacnet MS/TP mode; the Max Master is the highest BACnet station ID the WiNG manager will attempt to discover. This should match the highest station ID in the MS/TP ring. All devices in the ring should have the same Max Master value configured.

Table 3.13 BACnet Configuration Options

3.7.4 DNS

Configure DNS settings through this page.
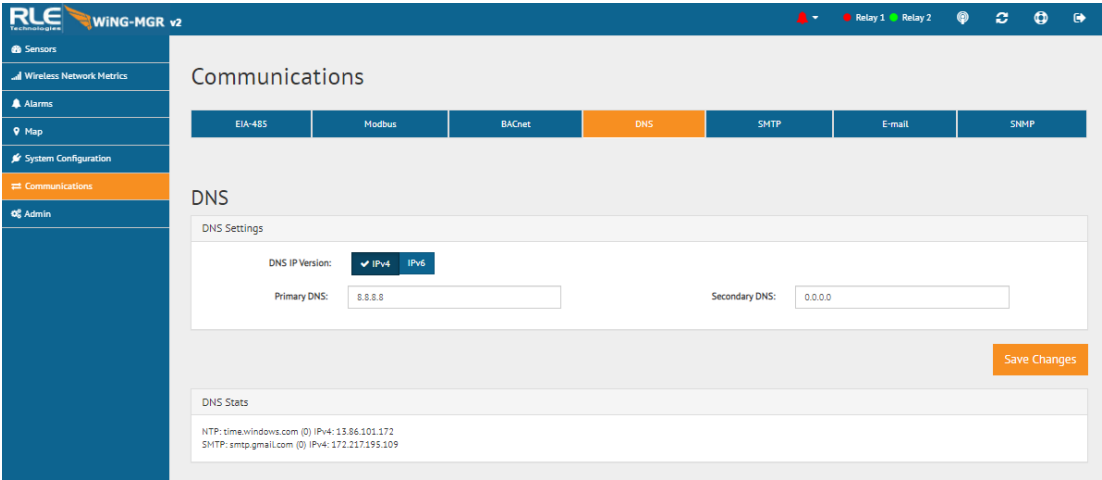
Figure 3.25 DNS Configuration

Option	Description
DNS IP Version	Use the toggle switch to designate whether you want to use an IPv4 or IPv6 DNS server. Default setting: IPv4
Primary DNS	Enter the IP address for the primary DNS server, as provided by your internet service provider. Default setting: 0.0.0.0
Secondary DNS	Enter the IP address for the secondary DNS server, as provided by your internet service provider. Default setting: 0.0.0.0

Table 3.14 DNS Configuration Options

3.7.5   SMTP

Configure SMTP settings through this page.

Figure 3.26 SMTP Configuration

Option	Description
SMTP Settings - Contact your IT department for the correct SMTP configuration settings for each of these fields.	
View SMTP Log	Click this link to view all logged email messages.
Send Test E-Mail	Click this link to send a test e-mail from your configured address.
Mail Server (SMTP)	Enter the URL of your SMTP server.
Username	Default setting: Blank
Password	Default setting: Blank
Access Type	Default setting: Disabled
Authentication	Default setting: None
SMTP Port	The default of 0 will automatically change based on the Access Type to either 25 (unencrypted), 587(STARTTLS) or 465(TLS). Default setting: 0 = Port 25
Email Stats	Refer to this field to see how many email messages are pending and how many have been sent by the WiNG-MGR. This is a quick way to check if email notifications are being sent by the WiNG-MGR.

Table 3.15 SMTP Configuration Options

3.7.6 E-mail

Configure e-mail settings through this page.
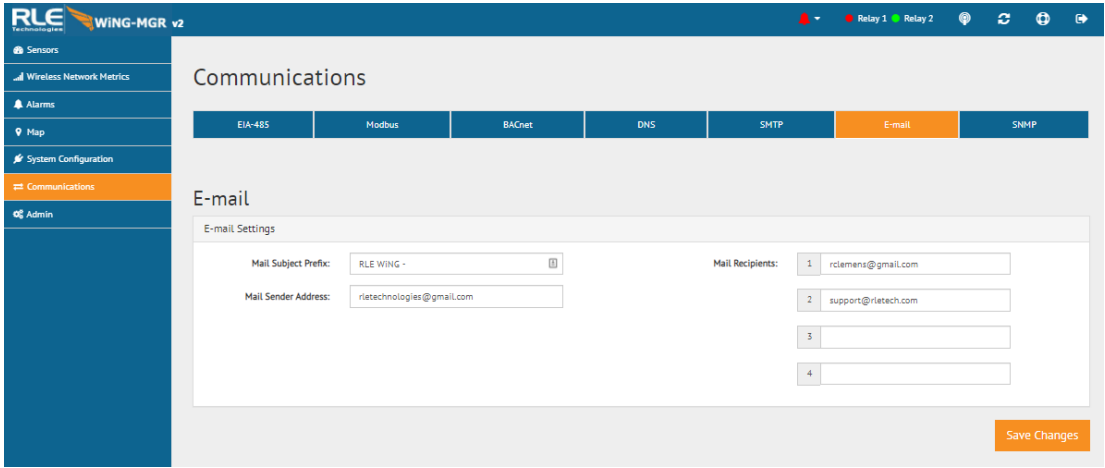
Figure 3.27 Email Configuration

Option	Description
Mail Subject Prefix	Enter the text that will appear before the system generated text in the subject line of any outgoing email messages.
Mail Sender Address	Any email messages sent by the WiNG-MGR will come from this valid email address.
Mail Recipients	Email alerts can be sent to four recipients. Enter up to four unique email addresses here. If you would like a message to be sent to a distribution group, you can use the email address of the distribution group in one of these fields.

Table 3.16 Email Configuration Options

3.7.7   SNMP

Use this page to configure the WiNG-MGR's SNMP communications.

Figure 3.28 SNMP Configuration

Option	Description
MIB-2 System	
System Name	Assign a name to the WiNG-MGR for SNMP system configuration.
System Contact	Designate a system contact who is responsible for the WiNG-MGR.
System Location	Enter the address of the WiNG-MGR's physical location.
V1/V2C Community Names	
When communicating via SNMP V1/V2, identify devices that receive Traps and/or Syslog messages from the WiNG-MGR and communicate with the WiNG-MGR over the network.	
Get / Read	Enter the appropriate community name.
Set / Write	Enter the appropriate community name.

Table 3.17 SNMP Configuration Options

Option	Description
Trap	Enter the appropriate community name.
Traps	
Trap Type	Select the SNMP version that best suits your needs: V1 - Trap, V2C - Trap, V2C - Inform, V3 - Trap, or V3 - Inform.
IP Version	Designate whether traps will be sent via IPv4 or IPv6.
Trap Destinations	
Trap Enabled	Check the box to allow a trap to be sent to the device defined in this row.
IP Address	This is the IP address of the device that the trap will be sent to.
SNMPv3 EngineID	If this device uses SNMPv3, data will populate in this field.
SNMPv3	
User Name	Enter a unique name for each SNMPv3 user.
Access Mode	Choose from the following: No-Auth Auth-MD5, No-Priv Auth-MD5, Priv-DES Auth-MD5, Priv-AES Auth-SHA, No-Priv Auth-SHA, Priv-DES Auth-SHA, Priv-AES A user name is needed for No Authentication, and a user name and password are required for Authentication and Privacy Authentication access.
Auth. Password (8-24 chars)	Enter the authentication password - the password must be between 8 and 24 characters long.
Priv. Password (8-24 chars)	Enter the privacy (encryption) password - the password must be between 8 and 24 characters long.

Table 3.17 SNMP Configuration Options

3.8. Admin

Administrator-exclusive options and capabilities are located in the Admin section.

3.8.1 XML

The WiNG-MGR collects quite a bit of data. Right click the *Download File* button on this page and select *Save Link As* or *Save Target As* to download this data as an XML file. You can then take that file and import it into a spreadsheet for viewing, logging, and analyzing.
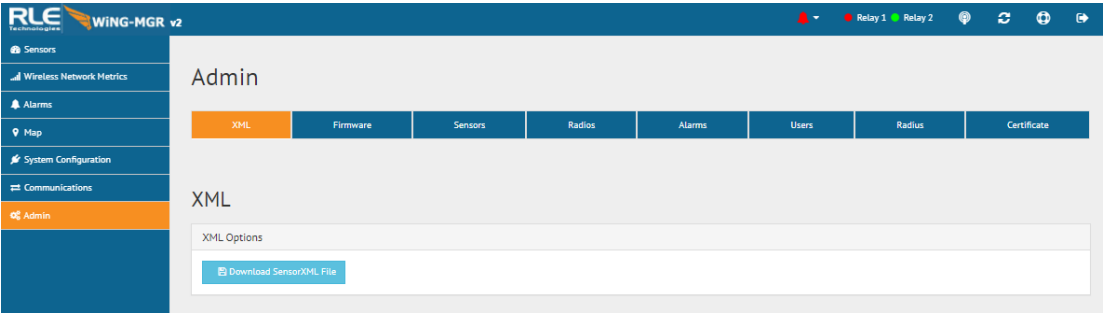
Figure 3.29 XML Page

Option	Description
XML Options	
Download Sensor XML File	Click this link to download sensor information as an .xml file.

Table 3.18 XML Configuration Options

3.8.2　Firmware

RLE releases firmware upgrades that add new features and functionality to the WiNG-MGR. Firmware updates are free of charge. Download firmware updates from the RLE website and load them onto your system here.
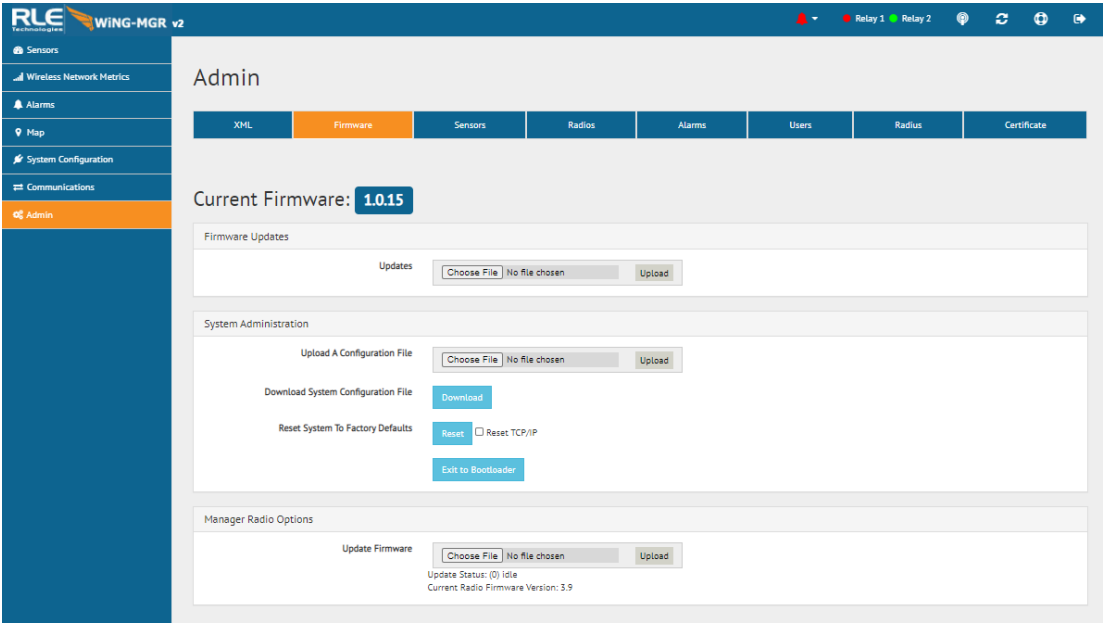
Figure 3.30 Firmware Page

Attribute	Description
Firmware Updates	
Update Firmware	Firmware updates are available, free of charge, on the RLE Technologies website. When new firmware is available, download the file from the website and upload the WiNG-MGR main firmware file here. Make sure you are using v2 firmware on a WiNG-MGR v2. Firmware designed for a WiNG-MGR v1 is not compatible with a WiNG-MGR v2, and WiNG-MGR v2 firmware CANNOT be loaded onto a WiNG-MGR v1.
System Administration	
Upload A Configuration File	Use this menu option to upload a system configuration file to the WiNG-MGR. This is a particularly useful option if you're configuring more than one WiNG-MGR and would like them to have the same settings, or if you've updated the firmware on your unit and need to re-upload your current system configuration file. It is important to note that you CANNOT upload a configuration file from a WiNG-MGR v1 into a WiNG-MGR v2. As an alternative, you can download the sensor CSV file from a WiNG-MGR v1 and upload it to a WiNG-MGR v2 via the Admin > Sensors page. Not all the configuration settings will transfer, but the sensor names and their locations will upload.

Table 3.19 Firmware Configuration Options

Attribute	Description
Download System Configuration File	If you are going to update the firmware on a WiNG-MGR, you should always download the configuration file first. This provides you with a backup of your current configuration, just in case something happens during the update process. If you're configuring more than one WiNG-MGR and would like them to have the same settings, you can configure one unit, download the configuration file, and then upload it to another WiNG-MGR. Use this button to download this unit's configuration file.
Reset to Factory Defaults	If you should need to restore your WiNG-MGR to its factory default settings, click this button. Check the Reset TCP/IP checkbox to reset the IP address to the default of 10.0.0.188, otherwise your network configuration settings will not be reset. **NOTE** - Clicking the Reset Factory Default button will overwrite all system and sensor settings you have established within the WiNG-MGR, and will erase all logged data within the unit.
Exit to Bootloader	Click this link to access the WiNG-MGR's bootloader. This feature should be reserved for system updates and troubleshooting, and should only be accessed by individuals with the technical knowledge to use this feature.
Manager Radio Options	
Update Firmware	The WiNG-MGR requires multiple firmware files. When new firmware is available for the WiNG-MGR radio, download the file from the website and upload the WiNG-MGR radio file here.

Table 3.19 Firmware Configuration Options

3.8.3 Sensors

There are some global configuration options that are applicable to all sensors in the system. Those options are configurable on the Sensors page. The Sensors page also holds the link for the Sensor Auto Discovery, which is used to add new sensors to the WiNG-MGR's sensor network.
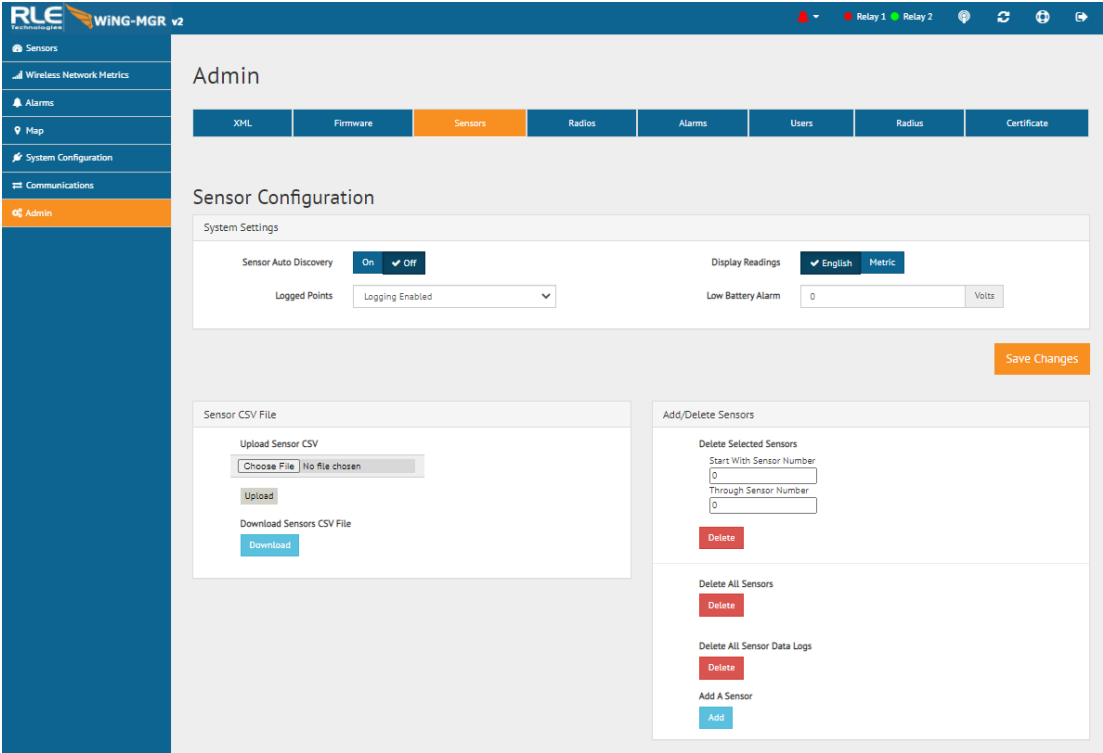
Figure 3.31 Sensors Page

Attribute	Description
System Settings	
Sensor Auto Discovery	Click the toggle button to turn sensor auto discovery on. Click the Save Changes button to activate sensor auto discovery. Through sensor discovery, the WiNG-MGR discovers new sensors transmitting within its range. The WiNG-MGR loads the newly detected sensors the next available sensor position in the table on the Sensors tab of the web interface. Once you have located all your sensors, return to this page and turn sensor auto discovery off. If you do not turn off the sensor discovery feature, the WiNG-MGR will continue to try to find new sensors. This can contaminate your list of active sensors with additional sensors that do not actually exist.

Table 3.20 Sensor Configuration Options

Attribute	Description
Display Readings	Select whether readings display in English (°F, feet, inches of water) or Metric (°C, meters, Pascals) values. Default: English
Logged Points	Data logging can be seen on each sensor's individual sensor page. Both temperature and humidity will be logged every 5 minutes with temperature to 0.1 degree. Default: Off
Low Battery Alarm	The low battery alarm alerts you to a drop in battery voltage so you can change the batteries while the sensor is still active. To ensure monitoring continuity, set this alarm to 3.1 Volts and change the battery once the threshold is reached. Default: 0 (disabled)
Sensor CSV File	
Upload Sensor CSV	Upload a CSV file to configure sensors in mass on this unit. This feature is particularly helpful if you are configuring multiple identical WiNG-MGR systems simultaneously. Note: You can upload a CSV file downloaded from a WiNG-MGR v1 into a WiNG-MGR v2. Not all of the configuration settings will transfer, but the sensor names and locations will upload.
Download Sensor CSV File	Download a CSV file that shows all sensors configured in the WiNG-MGR.
Delete Sensors	
Delete Selected Sensors	If you wish to delete some sensors monitored by the WiNG-MGR without deleting all the sensors, use this option. Enter the range of sensors you wish to delete, and click the Delete 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.
Delete All Sensors	This command erases all the information about the sensors the WiNG-MGR is currently monitoring. Users will have to reinstall sensor information after the button is clicked, or rediscover sensors already deployed.
Delete All Sensor Data Logs	Click this button to delete all logged data for all the sensors associated with this system.
Add A Sensor	Click this button to add a sensor to the system. You will be asked to enter the serial number of the sensor you're adding, so be sure to have the sensor's serial number on hand. Click the Save Changes button to add the sensor.

Table 3.20 Sensor Configuration Options

3.8.4 Radios

Alternate communications channel pairs and radio communications can be edited on this page.

If you need to change the channel pair settings for your WiNG system, refer to Appendix C, "Alternate Channel Pair Communications" on page 83. While it's not a difficult process, there are quite a few steps involved because you do need to make sure all the components of your system - the manager, sensors, and range extenders - are all operating on the correct channel pairs.
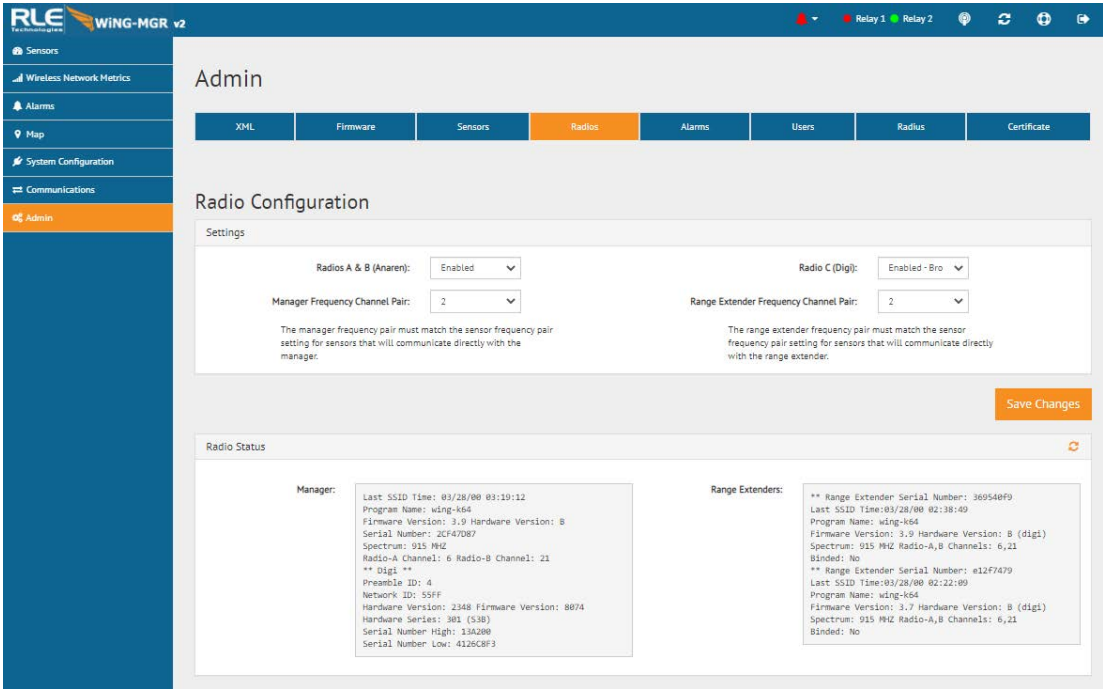
Figure 3.32 Radios Page

Attribute	Description
Settings	
Radios A & B (Anaren)	Radios A and B communicate with the WiNG sensors. Default: On

Table 3.21 Radio Configuration Options

Attribute	Description
Radio C (Digi)	If your system uses a WiNG-RXT range extender, make sure radio C is on and select the appropriate type of connection: Enabled - Broadcast: Choose this option if you have one WiNG-MGR and one or more WiNG-RXTs. The WiNG-MGR will receive incoming transmissions from all unbound WiNG-RXTs and all unbound WiNG-RXTs will be configured for the channel pair specified. Enabled - Binding: Choose this option if you have multiple WiNG-MGRs and WiNG-RXTs in a single space. You can select specific range extenders by serial number to bind them to the WiNG-MGR. This setting reduces radio conflict and allows multiple systems on different channel pairs to exist in the same space. The WiNG-MGR will only receive packets from the WiNG-RXTs it is bound to and the WiNG-RXT's channel pair can only be configured by the WiNG-MGR that it is bound to. Default: Enabled - Broadcast
Manager Frequency Channel Pair	If you wish to change the channel pair on which your system is communicating, refer to Appendix C, "Alternate Channel Pair Communications" on page 83. Default: Channel pair 1
Range Extender Frequency Channel Pair	If you wish to change the channel pair on which your system is communicating, refer to Appendix C, "Alternate Channel Pair Communications" on page 83. Default: Channel pair 1

Radio Status - These fields provide detailed information about the status and operation of the WiNG-MGR's radios. The Spectrum field tells you if this unit operates on the 900MHz or 868MHz frequency. If you need to make a call to RLE tech support, they may request information found in these fields.

Table 3.21 Radio Configuration Options

3.8.5 Alarms

There are a set of global configuration settings that can be applied to all sensors associated with this WiNG-MGR. Any global settings configured on this page will apply to all the sensors associated with this WiNG-MGR. If you already have parameters set up for your sensors, they will be overwritten when you apply these global alarm settings.

Once you apply the global settings, that value will be present on each sensor's individual configuration page. The global settings will not be recorded on this page - when you click to go to another page of the user interface and then return to this global settings page, all the values in the alarm fields will have reverted back to zeros.
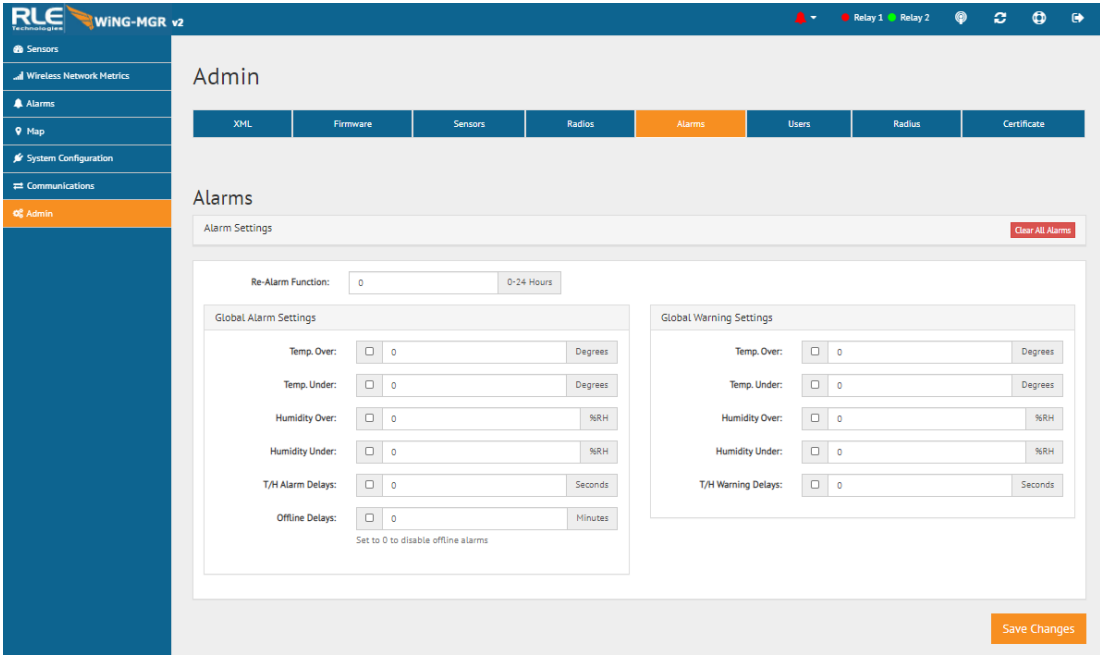
Figure 3.33 Alarms Page

Option	Description
Clear All Alarms	Click this button to clear all active alarms on this WiNG-MGR.
Re-Alarm Function	The WiNG-MGR 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)

Global Alarm Settings - There is a checkbox next to each individual alarm setting. Check this box to apply that particular setting to each sensor in the system. If you do not check the checkbox next to the alarm parameter, that value will not be applied to the sensors in your system.

Table 3.22 Alarms Configuration Options

Option	Description
Temp. Over	Enter a high temperature alarm threshold - if the temperature rises above this value, a high temperature alarm is generated. Check the box to activate the option and enter a temperature value.
Temp. Under	Enter a low temperature alarm threshold - if the temperature drops below this value, a low temperature alarm is generated. Check the box to activate the option and enter a temperature value.
Humidity Over	Enter a high humidity alarm threshold - if the humidity rises above this value, a high humidity alarm is generated. Check the box to activate the option and enter a humidity value.
Humidity Under	Enter a low humidity alarm threshold - if the humidity drops below this value, a low humidity alarm is generated. Check the box to activate the option and enter a humidity value.
T/H Alarm Delays	The number of seconds that pass between the time a temperature or humidity reading goes into alarm and the time that alarm is announced. Check the box to activate the option and enter a time interval.
Offline Delays	Users can designate how many minutes must pass before the WiNG-MGR considers the sensor offline. Check the box to activate the option and enter a time interval.

Global Warning Settings - There is a checkbox next to each individual alarm setting. Check this box to apply that particular setting to each sensor in the system. If you do not check the checkbox next to the alarm parameter, that value will not be applied to the sensors in your system.

Option	Description
Temp. Over	Enter a high temperature warning threshold - if the temperature rises above this value, a high temperature warning is generated. Check the box to activate the option, and enter a temperature value.
Temp. Under	Enter a low temperature warning threshold - if the temperature drops below this value, a low temperature warning is generated. Check the box to activate the option, and enter a temperature value.
Humidity Over	Enter a high humidity warning threshold - if the humidity rises above this value, a high humidity warning is generated. Check the box to activate the option, and enter a humidity value.

Table 3.22 Alarms Configuration Options

Option	Description
Humidity Under	Enter a low humidity warning threshold - if the humidity drops below this value, a low humidity warning is generated. Check the box to activate the option and enter a humidity value.
Warning Delays	The number of seconds that pass between the time a temperature or humidity reading goes into a warning state and the time that warning is announced. Check the box to activate the option and enter a time interval.

Table 3.22 Alarms Configuration Options

3.8.6 Users

The WiNG-MGR allows you to configure user privileges for up to four unique users. User 1 is always the Administrator's slot. Use users 2 - 4 to either configure users with read only access, or to configure additional Admin accounts.
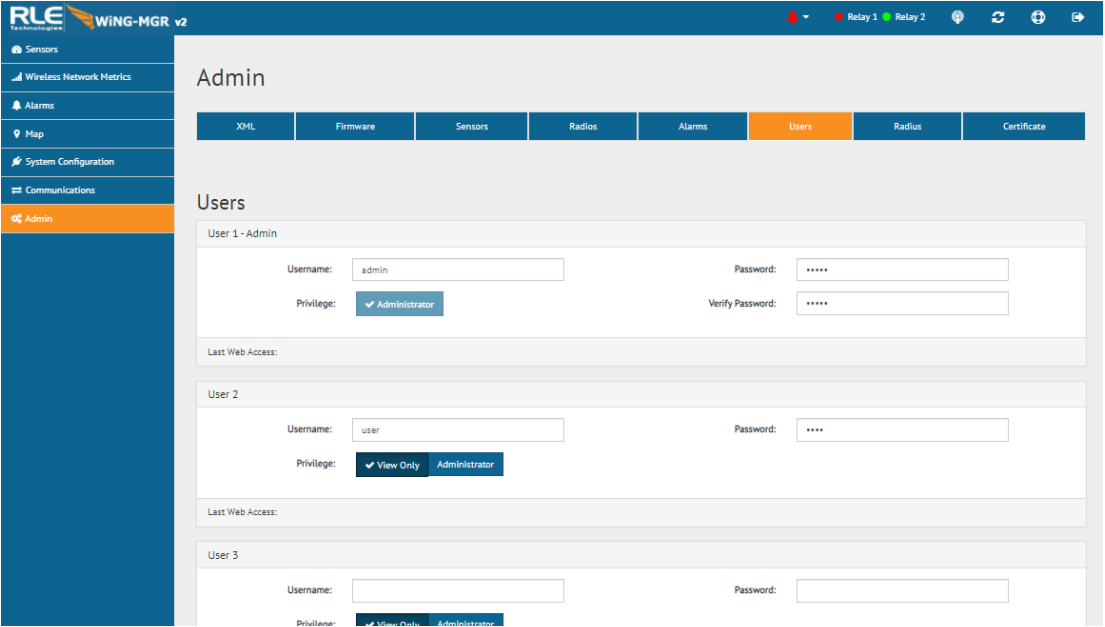
Figure 3.34 Users Page

Option	Description
User Configuration	
Username	Each user that will log into the WiNG-MGR needs their own unique username. Enter a username in this field.
Password	Assign a password for this username. If you're configuring User 1 - Admin, you'll also have to verify the password.
Privilege	Select which level of access this user will have: • View Only - This user can view pages within the web interface but cannot make any changes to settings or configuration. • Administrator - This user can view data and make changes to settings and configuration options.

Table 3.23 Users Configuration Options

3.8.7   Radius

If you would like to configure Radius settings for your WiNG-MGR, do so here.
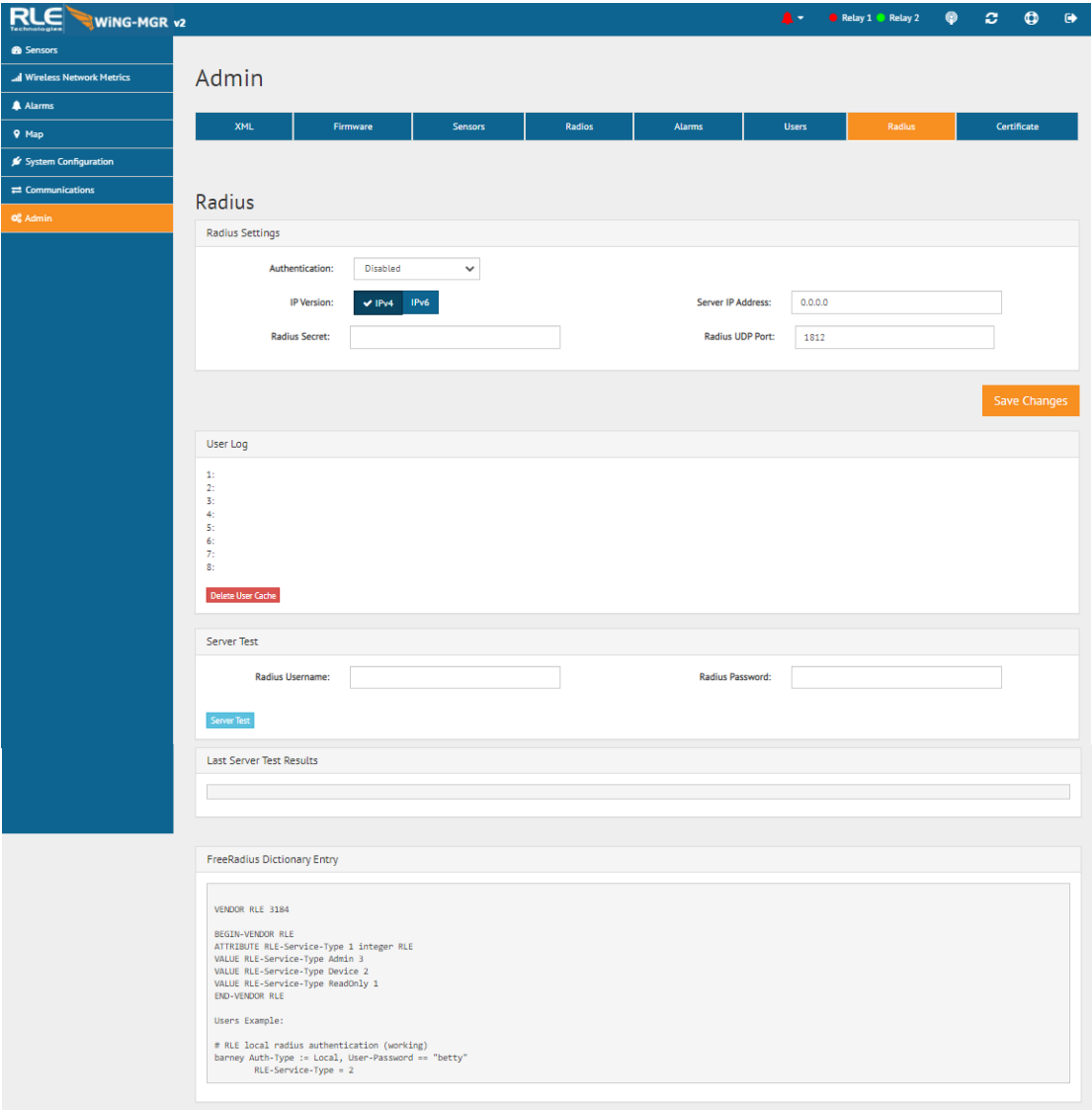
Figure 3.35 Radius Page

Option	Description
Radius Settings	
Authentication	Use the drop down menu to enable or disable RADIUS authentication.
IP Version	Designate the IP version for communications.
Server IP Address	Enter the IP address of the RADIUS or LDAP server.
Radius Secret	Enter the RADIUS secret. The secret is used between the RADIUS client and the RADIUS server to encrypt passwords. The secret is administered by the server and must be known to the client.

Table 3.24 Radius Configuration Options

Option	Description
Radius UPD Port	Enter the correct RADIUS port.
User Log - The user log displays the last eight logins. Each user password is cached for one hour	
Delete User Cache	Click the button to delete the cached data.
Server Test - Enter your data and click the button to test the usernames and passwords	
Radius Username	Enter a username to test
Radius Password	Enter a password to test
Last Server Test Results - The results from the server and the authorization level will be displayed.	

Table 3.24 Radius Configuration Options

3.8.8   Certificate

The WiNG-MGR has a default HTTPS certificate pre-installed. It will use this certificate for HTTPS communications, but it is strongly recommended that you configure your own certificate and private key to ensure secure communications.

Once your own certificate and private key have been configured, the unit can be rebooted using the red button in the System Information menu to apply the changes.
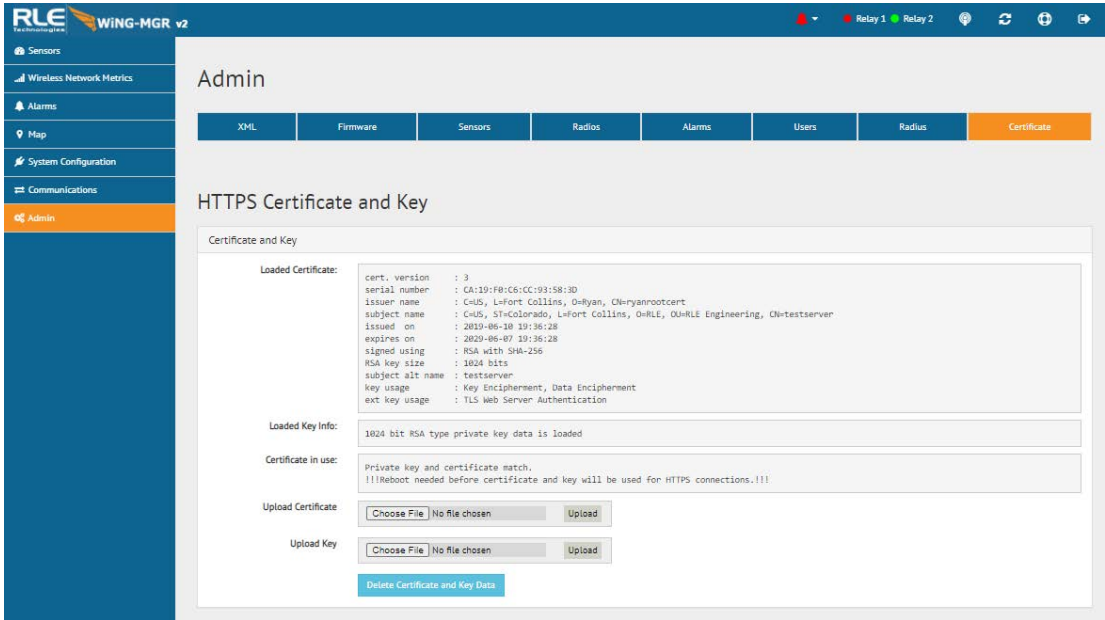
Figure 3.36 Certificate Page

Option	Description
HTTPS Certificate and Key Settings- This section allows you to activate HTTPS for the WiNG-MGR. You will need an HTTPS certificate and key to do this. Contact your IT department for more information about your HTTPS certificate and key.	
Loaded Certificate	This section provides details about the certificate currently loaded into the WiNG-MGR.
Loaded Key Info	This section provides details about the data key currently loaded into the WiNG-MGR.
Certificate in Use	If a certificate is in use, it will be indicated here. If you see the !!Reboot!! message, a certificate and key have been uploaded, but the WiNG-MGR needs to be rebooted in order for HTTPS to be activated.
Upload Certificate	Use this field to upload the HTTPS certificate.
Upload Key	Use this field to upload the HTTPS key.
Delete Certificate and Key Data	Click this button to delete the uploaded certificate and key from the WiNG-MGR.

Table 3.25 Certificate Configuration Options

C H A P T E R

4

MODBUS COMMUNICATIONS

4.1. Implementation Basics

The WiNG-MGR is capable of communicating via the half-duplex EIA-485 serial communication standard. The WiNG-MGR is configured to act as a server device on a common network. The EIA-485 medium allows for multiple devices on a multi-drop network. The WiNG-MGR is a server 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 WiNG-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:

♦ Unit ID Field

♦ Function Field

♦ Data Field

♦ Error Check Field (Checksum)

4.1.1.1 Unit ID Address Field

The unit ID address field is one byte in length and identifies the device involved in the transaction. A valid address range is between 1 and 254. The unit ID address is set from the **Communications > EIA-485** web page.

4.1.1.2 Function Field

The function field is one byte in length and tells the WiNG-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 WiNG-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 WiNG-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 WiNG-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 WiNG-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 WiNG-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
Unit ID (1 byte)	Unit ID (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

The register settings illustrated here are representative of only ONE sensor. Each sensor has a unique register ID that can be found on that sensor's Sensor Objects page ("Sensor Objects" on page 34).

Register	Name	Description	Units
40001	Id	Sensor Identification number	uint16
40002-40003	Serial Number	WiNG sensor serial number	uint32 (Hex-ASCII)
40004-40012	Sensor Name	Descriptive text sensor name	uint16 (Hex-ASCII)
40013	Converted Data #1	First data value converted by the WiNG-MGR	int12
40014	Converted Data #2	Second data value converted by the WiNG-MGR	int16
40015-40016	Converted Data #3	Third data value converted by the WiNG-MGR	int32
40017	Battery Level	Battery voltage (in centivolts) or percentage remaining	int16
40018	Service Status	Bits8-4 = unused; bit3 = alarm; bit2 = battery low; bit1 = offline	uint16 (Binary)
40019	Sensor Age	Time since last transmission received	uint16
40020	Offline Delay	Time till the sensor reads offline	uint16

Table 4.3   Read Output Registers

4.2.2   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, "Relay Outputs" on page 43. 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 4.4   Preset Single and Multiple Registers

4.3. RTU Framing

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

Unit ID	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 4.5 Response Sample

Unit ID 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)

5

WiNG-RXT

5.1. Add A WiNG-RXT Range Extender To Your System

WiNG sensor and manager systems have an unprecedented transmission range: up to 100 feet through multiple walls, up to 270 feet through one wall, and up to 600 feet indoor, direct line of sight. While this range is more than ample for most situations, sometimes applications require signals to be pushed through more complex physical or noisy RF environments. The WiNG range extender is designed to provide the extra signal strength the WiNG system needs to thrive in these environments.

To add a WiNG-RXT to your application, connect the antennas (magnetic base antennas into ports A and B, and swivel antenna into port C) and apply power to the device. Ensure the most effective antenna placement - antennas A and B can be close together, but to avoid signal interference they need to be as far away from antenna C as your installation will allow. Extend the leader cables on the antennas to their fullest lengths and secure the antennas as far away from the WiNG-MGR - and has high off the ground - as possible. Access the WiNG-MGR's web interface and navigate to the Admin > Radio Configuration page. Radio C needs to be on in order for the WiNG-MGR to communicate with the WiNG-RXT.

The WiNG-RXT can communicate on alternate channel pairs in order to maximize the efficiency of the system. If you'd like to use an alternate channel configuration, refer to Appendix C, "Alternate Channel Pair Communications" on page 83.

5.2. Safety Precautions

The WiNG-RXT is not a grounded device. External circuits (USB port and power supply) are required to be double or reinforced insulated (Class II circuits).

The power to the WiNG-RXT must be supplied from a limited energy circuit: 5VDC with a maximum available current of 10A or a Class 2 circuit.

A

COMMUNICATIONS OBJECTS

The WiNG-MGR can communicate via Modbus, BACnet, and SNMP. Each sensor has its own Modbus Registers, BACnet Instances, and SNMP Object Identifiers (OIDs). This table is provided for reference. Please note that the values presented in Reading #2 and Reading #3 will vary depending on the type of sensor with which you are working.

The table presents specific communications objects for sensor 1. Looking at the table, we have **bolded** the numerical changes to help you see there is a pattern to the Register, Instance, and OID assignments and a direct connection between the sensor number and the communications objects.

A formula at the end of the table will help you calculate BACnet Instances and SNMP OIDs.

Sensor	Value	Modbus Register	BACnet Instance	SNMP OID
1	ID	40**01** (int16)	n/a	1.3.6.1.4.1.3184.1.15.2.2.1.2.**1**
	Serial Number	40**02** (uint32)	n/a	1.3.6.1.4.1.3184.1.15.2.2.1.3.**1**
	Name	40**04** (int16)	n/a	1.3.6.1.4.1.3184.1.15.2.2.1.4.**1**
	Reading #1 Temp (deg x 10)	40**13** (int16)	ai: **101**	1.3.6.1.4.1.3184.1.15.2.2.1.6.**1**
	Reading #2 Humidity (%RH) *or* Digital Input	40**14** (uint16)	ai: **102**	1.3.6.1.4.1.3184.1.15.2.2.1.7.**1**
	Reading #3 Counter	40**15** (uint32)	ai: **103**	1.3.6.1.4.1.3184.1.15.2.2.1.8.**1**
	Battery Level	40**17** (uint16)	av: **104**	1.3.6.1.4.1.3184.1.15.2.2.1.9.**1**
	Service Status b8-b4 - not used b3 - Alarm b2 - Low battery b1 - Offline	40**18** (uint16)	n/a	1.3.6.1.4.1.3184.1.15.2.2.1.10.**1**
	Age of Sensor Data (seconds)	40**19** (int16)	av: **101**	1.3.6.1.4.1.3184.1.15.2.2.1.11.**1**
	Offline Delay	40**20** (uint16)	n/a	1.3.6.1.4.1.3184.1.15.2.2.1.12.**1**

Table A.1 Modbus Registers, BACnet Instances, and SNMP OIDs

♦ As you can see from the above table, each sensor occupies 20 modbus registers. Sensor 1 occupies registers 40001 - 40020, sensor 2 data occupies registers 40021 - 40040; sensor 3 data occupies registers 40041 - 40060, sensor 4 data occupies registers 40061 - 40080, etc. Use the range of your sensor's modbus registers and the table above to determine the register information for each of your sensors.

♦ BACnet Instances are as follows, where the **n** is replaced with the sensor's sensor number. If you were determining communications objects for sensor number **28**:

   – ai: **n**01 = ai: **28**01

   – ai: **n**02 = ai: **28**02

   – ai: **n**03 = ai: **28**03

   – av: **n**01 = av: **28**01

   – av: **n**02 = av: **28**02

♦ SNMP Object Identifiers are as follows, where the last digit, **n**, is replaced with the sensor's sensor number

– 1.3.6.1.4.1.3184.1.15.2.2.1.2.**n** = 1.3.6.1.4.1.3184.1.15.2.2.1.2.**28**

– 1.3.6.1.4.1.3184.1.15.2.2.1.3.**n** = 1.3.6.1.4.1.3184.1.15.2.2.1.3.**28**

– 1.3.6.1.4.1.3184.1.15.2.2.1.4.**n** = 1.3.6.1.4.1.3184.1.15.2.2.1.4.**28**

– 1.3.6.1.4.1.3184.1.15.2.2.1.6.**n** = 1.3.6.1.4.1.3184.1.15.2.2.1.6.**28**

– 1.3.6.1.4.1.3184.1.15.2.2.1.7.**n** = 1.3.6.1.4.1.3184.1.15.2.2.1.7.**28**

– 1.3.6.1.4.1.3184.1.15.2.2.1.8.**n** = 1.3.6.1.4.1.3184.1.15.2.2.1.8.**28**

– 1.3.6.1.4.1.3184.1.15.2.2.1.9.**n** = 1.3.6.1.4.1.3184.1.15.2.2.1.9.**28**

– 1.3.6.1.4.1.3184.1.15.2.2.1.10.**n** = 1.3.6.1.4.1.3184.1.15.2.2.1.10.**28**

– 1.3.6.1.4.1.3184.1.15.2.2.1.11.**n** = 1.3.6.1.4.1.3184.1.15.2.2.1.11.**28**

– 1.3.6.1.4.1.3184.1.15.2.2.1.12.**n** = 1.3.6.1.4.1.3184.1.15.2.2.1.12.**28**

B

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, go to the web interface and access the Admin menu, and then the Firmware tab. Download the WiNG-MGR's system configuration file and save it in a safe location.
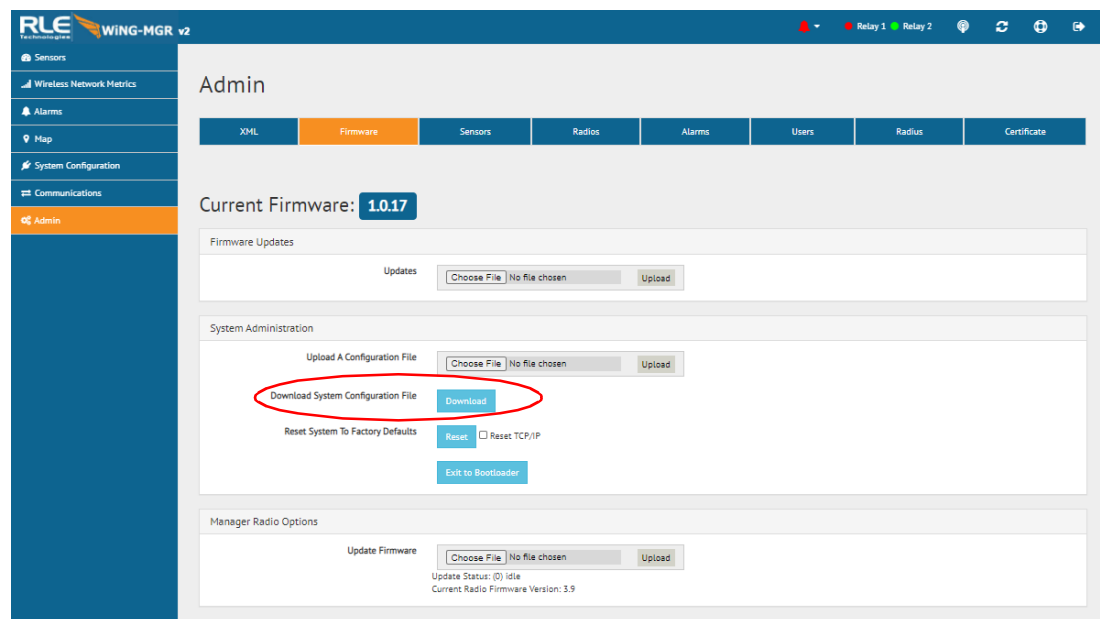
Figure B.1 Admin Menu, Firmware Tab - Configuration File Download

Once firmware is updated, the WiNG-MGR should return to its normal functionality. In very rare instances, the WiNG-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.

B.1. Load the Application Firmware

Once the WiNG-MGR's configuration file and the latest version of firmware files have been downloaded to a local drive, navigate to the Firmware tab within the Admin menu in the web interface.
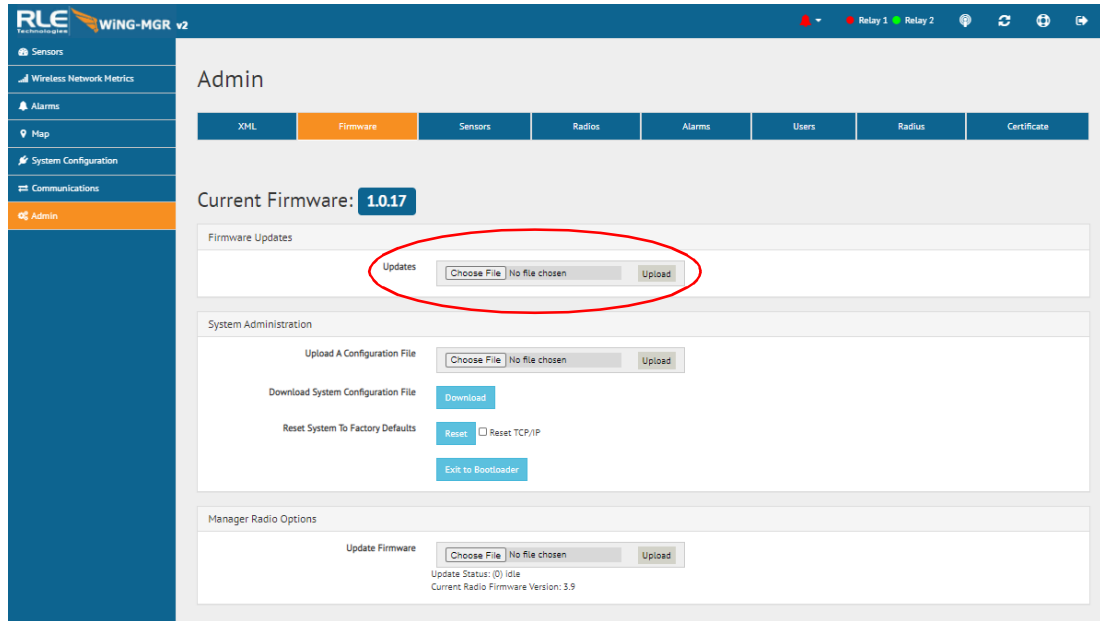
Figure B.2 Admin Menu, Firmware Page - Firmware File Upload

Navigate to the first 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.

B.2. Load the Firmware Using TFTP

You can also use TFTP to update the firmware file. Before updating the firmware through TFTP, the firmware flash application must be exited and then erased. To do this, navigate to the WiNG-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 WiNG-MGR are on the same subnet (LAN).

3 Open your TFTP client. Configure the client as follows.

   a **Host** = WiNG-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 first firmware file to the WiNG-MGR. It may take ~10 seconds for the firmware upload to begin. Do the same with the second firmware file.

5 After one minute, refresh the WiNG-MGR's web page. Notice that the Flash field now contains the latest firmware. Click the "Start Application" button to reboot the unit.

WiNG-MGR v2 User Guide

A P P E N D I X

C

ALTERNATE CHANNEL PAIR COMMUNICATIONS

Most WiNG system deployments operate well with the out-of-the-box default settings. There are, however, instances where excess RF energy in a facility crowds the default channels. For this reason, the WiNG system was designed with a set of alternative communications channels. While it is not difficult to switch the channels on which your system is communicating, it is outside the basic WiNG configuration scope. For this reason, we are providing a specialized set of instructions and encourage you to contact our technical support staff if you have any problems configuring alternate channel communications.

C.1. WiNG Sensor Communications

By default, WiNG sensors communicate via channel pair 1. You can determine on which channel pair your sensor(s) are communicating by looking at the status LED on the front of the sensor enclosure. This LED blinks randomly once every 10 - 20 seconds. If the LED blinks blue, the sensor is communicating on channel pair 1. If the LED blinks green, the sensor is communicating on channel pair 2.

C.1.1 Change the Sensor's Channel Pair

1 Hold the sensor in your hand and locate the LED on the top of the enclosure. Make sure the LED on the board is blinking blue to indicate it's currently communicating via channel pair 1. Now look down the side of the enclosure past the LED (the left side of the enclosure) and find the small hole in the middle of the bottom left side of the enclosure - right where the lid meets the base. If you look inside this hole you will see a small black button. You will use this button to change the channel pair of this sensor.
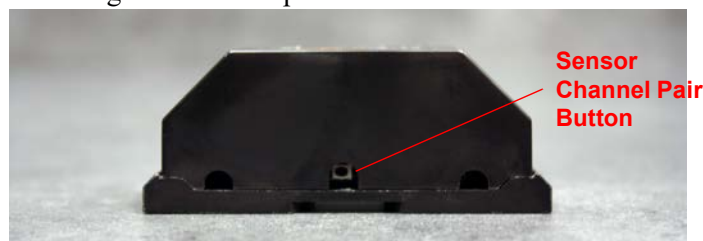

Sensor Channel Pair Button

Figure C.1 Sensor Channel Pair Button

2   Insert a small non-conductive tool - like a toothpick - inside the hole and push the black button three times consecutively. The LED on the sensor board blinks blue with the first push, blue with the second push, and green with the third push. It will then blink green three times in a row to indicate the sensor has switched to channel pair 2 for its communications.

3   Pause a minute and watch the sensor LED. Once the transition pattern of blinks are complete, it blinks randomly, once every 10 - 20 seconds. Wait until it blinks green once to ensure channel pair 2 communications are active.

4   You can change the sensor back to channel 1 communications in the same way. If the sensor is operating on channel pair 2 (LED is blinking green), push the black button three times consecutively. The LED blinks green with the first push, green with the second push, and blue with the third push. Then it blinks blue three times in a row to indicate it's communicating on channel pair 1. Pause a minute to watch the LED and ensure it's blinking blue in its random blink cycle.

5   If you remove or change the sensor's battery, it will revert to the default channel pair 1 (blue blinking light).

C.2.   Manager Communications

By default, the WiNG-MGR communicates via channel pair 1. If you change the channel pair on which your sensors are communicating, you also need to change the channel pair on which your manager is communicating.

The System LED on the front of the WiNG-MGR serves as an indicator in the same manners as LED on the front of the sensors. You can determine on which channel pair your WiNG-MGR is communicating by looking at the System LED on the front of the enclosure. This LED blinks randomly once every 10 - 20 seconds. If the LED blinks blue, the WiNG-MGR is communicating on channel pair 1. If the LED blinks green, the WiNG-MGR is communicating on channel pair 2.

You can also access the WiNG-MGR's web interface to determine on which channel pair the unit is communicating. Click the Admin link in the left navigation bar and then click the Radios link to access the Radio Configuration page. The channel pair number indicated by a check mark and darker shading in the Manager Frequency Channel Pair field is the active communication channel pair.

C.2.1   Change the Manager's Channel Pair

Access the WiNG-MGR's web interface. Click the Admin link in the left navigation bar and then click the Radios link to go to the Radio Configuration tab. Click the toggle button to select Manager Channel Frequency Pair 2. Click the Save Changes button to execute the channel pair change.

Once the changes have been saved, look at the LED on the front of the WiNG-MGR. It blinks green to indicate it is operating on channel pair 2.

If you should need to change the WiNG-MGR back to channel pair 1, return to this web page, click the toggle button to select channel pair 1, and click the Save Changes button. Then verify the WiNG-MGR is communicating on channel pair 1 by checking the System LED and ensuring it blinks blue.

C.3.   Add a Range Extender to A WiNG System

While WiNG systems have more than an ample transmission range for most situations, sometimes applications require signals to be pushed through more complex physical or noisy RF environments. The WiNG-RXT range extender can be implemented in these situations to add up to 1,000 feet direct line of sight transmission distance per range extender to the application.

To add a WiNG-RXT to your application, connect the antennas (magnetic base antennas into ports A and B, and swivel antenna into port C) and apply power to the device. Ensure the most effective antenna placement - antennas A and B can be close together, but to avoid signal interference they need to be as far away from antenna C as your installation will allow. Extend the leader cables on the antennas to their fullest lengths and secure the antennas as far away from the WiNG-MGR - and has high off the ground - as possible.

Access the WiNG-MGR's web interface and navigate to the Admin > Radio Configuration page. Radio C needs to be on in order for the WiNG-MGR to communicate with the WiNG-RXT.

Just like WiNG-MGRs and WiNG sensors, the WiNG-RXT can communicate on different channel pairs. By default, it is set to communicate on channel pair 1. The System LED on the front of the unit indicates on which channel pair it is communicating. If it blinks blue, it's communicating on channel pair 1. If it blinks green, it's communicating on channel pair 2.

Most importantly, the WiNG-RXT needs to be communicating on the same channel pair as the sensors it is trying to pick up. If the sensors are on channel pair 1, the WiNG-RXT needs to be on channel pair 1. And likewise, if the sensors are on channel pair 2, the WiNG-RXT needs to be on channel pair 2 as well. You may have a specialized installation that has the WiNG-MGR on channel pair 1 picking up one set of sensors, and the associated WiNG-RXT is on channel pair 2 picking up an entirely different set of sensors. This too is fine. Just remember the sensors you're trying to pick up must be on the same channel pair at the device that should be receiving their signal.

APPENDIX

D

TROUBLESHOOTING

Below you'll find troubleshooting tips for a variety of situations you may encounter with the WiNG-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 WiNG-MGR, please contact RLE Technologies directly:

♦ Email: support@rletech.com

♦ Phone: 800.518.1519

D.1.   WiNG-MGR Troubleshooting

The WiNG-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 WiNG-MGR. If no voltage is present at terminal block, check the circuit breaker or power supply that powers the WiNG-MGR. If voltage is present at the power supply, continue to step 2.

2 Contact RLE Technologies for further troubleshooting.

You need to reset login credentials for the WiNG-MGR.

The administrator login can be reset by these two equivalent methods:

1 Hold the reset button on the back of the unit for 15 seconds until the LED turns yellow then release the button *or...*

2 Connect a computer to the WiNG-MGR via USB/EIA-232 and use the **pwreset** command in the console

After either password reset procedure, the WiNG-MGR will prompt for new login credentials in the web interface. If not set, the default username and password are blank (not set).

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

1 Verify that the WiNG-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 WiNG-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 WiNG-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 WiNG-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.

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

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

By default, the WiNG-MGR is shipped with the sensor discovery feature turned OFF. In order for the discovery to work, click the Sensor Discovery icon in the web page header. Follow the directions as outlined in "Sensor Discovery Wizard" on page 25.

If the Sensor Discovery Wizard has run sensors still do not appear, work your way through the following steps:

1 If the sensor is not visible on the WiNG-MGR's home page, look at the top of the sensor and see if the LED is blinking. If you do not see a blink, check the sensor's batteries. If you do see it blink, 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 WiNG sensor depends on the distance between the sensor and the WiNG-MGR, and the number of obstacles between the two. The more obstructions between the devices, the weaker the signal becomes. Do not install a sensor inside a solid metal cabinet. This can interfere with its transmission.

D.2.   Sensor Troubleshooting

The WiNG-MGR is designed to work with a RLE Technologies' WiNG sensors. Sometimes, problems may occur with the sensors that affect the way they interact with the WiNG-MGR. Use the following guidelines to troubleshoot WiNG sensors.

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

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.

E

TECHNICAL SPECIFICATIONS

WiNG-MGR v2

Power		
	Voltage Rating	24VAC, 50/60Hz; 24VDC, 600mA
	Current Rating	600mA max
Wired Relay Outputs		Two (2) Dry Contact, Form C, 1A @ 24VDC resistive, 0.5A @ 120VAC
Communications Ports		
	Ethernet	10/100 BASE-T, RJ-45 connector; 500VAC RMS isolation
	EIA-485	9600, 19200, or 38400 baud; no parity; 8 data bits; 1 stop bit
	USB	Serial port emulation for diagnostics; 115200 baud; no parity; 8 data bits; 1 stop bit
Protocols		
	TCP/IP, HTML, SNMP	IPv4. IPv6; HTTP/HTTPS (TLS1.2); V1, V2C, V3
	Modbus (EIA-485)	Modbus Server
	Modus TCP/IP	Modbus Server; TCP/IP transmission protocol
	BACnet/IP	ASHRAE STD 135-2004 Annex J
	BACnet MS/TP	EIA-485
Wireless Communications		
	Frequency Range	868-870MHz / 902-928MHz
	Max Number of Wireless Sensors Per Manager	RLE recommends not exceeding 250 sensors per WiNG-MGR; 400 sensors per WiNG-MGR may be accomplished with range extenders, but signal conflict will increase.
	Antenna	Three (3) 868-928MHz with RP/SMA connectors
Login Security		Web browser access (Ethernet); Four (4) users and passwords can be configured

Table E.1 WiNG-MGR Technical Specifications

Indicators

	RX A	1 green LED
	RX B	1 green LED
	TX/RX C	1 green LED
	Diagnostics	1 green LED
	System	1 multicolor LED
	RO1 | RO2	1 green LED per relay output
	USB RX/TX	1 green LED for transmit, 1 Green LED for receive
	Device Status	2 multicolor LED
	RS485 Network Status	1 green LED for transmit, 1 Green LED for receive

Operating Environment

	Temperature	32ºF to 140ºF (0ºC to 60ºC)
	Humidity	5% to 95% RH non-condensing
	Altitude	15,000ft (4572m) max. 9,842ft (3000m) max. if applying more than 150V, 50/60Hz to the relays from overvoltage category II circuit.
Storage Temperature		–4ºF to 185ºF (–20ºC to 85ºC)
Mounting		19" Rack Mount or Wall Mount
Dimensions		9.7"W x 4.8"D x 1.8"H (24.6cmW x 12.2cmD x 4.6cmH)
Weight		2.7lb (1.23kg)
Certifications		ETL listed; CE; conforms to UL 61010-1, EN 18031-1:2024 EN 61010, EN 61000-3-2, EN61000-3-3; ETSI EN 301 489-1, ETSI EN 301 489-3; IEC61326-1; certified to CSA C22.2 #61010; FCC X7J-A11072401, MCQ-XB900HP, and 47CFR 15B; IC 8975A-A11072401, 1846A-XB900HP, and ICES-003; RoHS compliant

Table E.1   WiNG-MGR Technical Specifications (continued)

WiNG-RXT

Power	5VDC @ 400mA max.
USB Communications Port	Serial port emulation for firmware upgrades and diagnostics
Range	Up to 1,000 ft (305m) indoors, direct line of sight to WiNG-MGR or another WiNG-RXT. Up to 600 ft (183m) direct line of sight to WiNG sensors. Up to 270 ft (82.3m) through one wall to WiNG sensors. Up to 100 ft (30.5m) through multiple walls to WiNG sensors.

Indicators

Table E.2   WiNG-RXT Technical Specifications

RX A	1 green LED
RX B	1 green LED
TX/RX C	1 green LED
Diagnostics	1 green LED
System	1 multicolor LED
Operating Environment		
	Temperature	32ºF to 140ºF (0ºC to 60ºC)
	Humidity	5% to 95% RH non-condensing
	Altitude	15,000ft (4572m) max.
Storage Temperature	–4ºF to 185ºF (–20ºC to 85ºC)
Mounting	Freestanding, wall mount (included)
Dimensions	4.5"W x 4.8"D x 1.6"H (11.4cmW x 12.2cmD x 4.1cmH)
Weight	1.2lb (0.534kg)
Certifications	ETL listed; CE; conforms to UL 61010-1, EN 61010; EN 61326-1; EN 301489-1; certified to CSA C22.2 NO, 61010.1; RoHS compliant; FCC ID X7J-A11072401 and MCQ-XB900HP; IC 8975A-A11072401 and 1846A-XB900HP

Table E.2 WiNG-RXT Technical Specifications (continued)