

**COLD  
GUARD™**  
by **BMIL®**



# BMIL ColdGuard

## User's Guide

### For Use With ColdGuard Online Software

- Create a user account with assigned wireless gateways and sensors.
- Attach the antenna to the antenna connector on the back panel of the Ethernet gateway (make sure the connection is snug, but do not overtighten).
- Plug an Ethernet cable with internet connectivity into the gateway.
- Plug the power supply into a power outlet then connect to the gateway.
- Once all three lights turn green, your network is ready to bring sensors online.


# 1. Create a User Account and Setup Sensor Network


If this is your first time using the ColdGuard online system site, you will need to create a new account. If you have already created an account you can skip to the “Logging into the Online System” section. The following instructions will guide you through the account creation process.

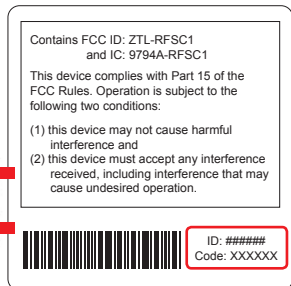
1. In a web browser, navigate to <http://cg.bmil.com>
2. Click the “Get Started Here” button to create an account.
3. Follow the on-screen instructions to enter your account and contact information.
4. After entering your account and contact information, you will be prompted to create your first sensor network. Simply enter a name for this network.

## 5. Add the information from your ColdGuard™


gateway then click the “Assign Gateway” button.


Gateway ID 

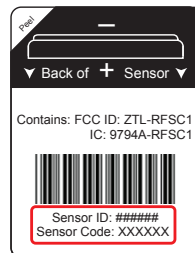
Gateway Code 



## 6a. Add the information from your first ColdGuard wireless sensor then click the “Assign Sensor” button.

Sensor ID 

Sensor Code 



6b. On the next screen, enter a name for the wireless sensor and use the drop down to tell us how you are going to be using the wireless sensor. (This allows us to suggest settings for your sensor.) When finished, click the “Continue” button.

7.

When you have finished adding the sensor, you will see a confirmation screen. At this point you can assign notifications to the sensor (see *Using The ColdGuard™ Online Wire-less Sensor System*), assign additional sensors to your account or click “Done” to go to your sensors overview page.

## 2. Using the Ethernet Gateway

### 1. Understanding the Ethernet Gateway Lights

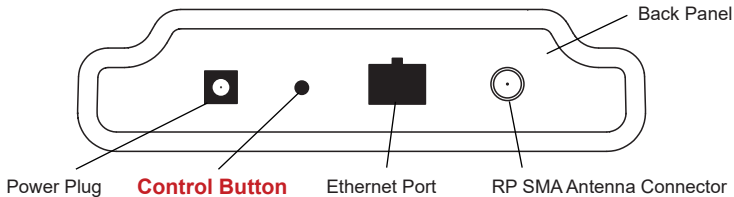


Light 1 - Indicates the Ethernet cable is plugged in. A green light indicates ready and working, a red light indicates there is a problem.

Light 2 - Indicates the Ethernet has internet connectivity and can reach the online monitoring system. A green light indicates ready and working, a red light indicates there is a problem. A flashing green light indicates network traffic to the internet.

Light 3 - Indicates sensor network activity. A green light indicates ready and working, a red light indicates there is a problem. A flashing green light indicates radio traffic from the sensors.

### 2. Ethernet Gateway Controls



#### Using the Control Button:

1) A short press will trigger the gateway to immediately send all stored sensor messages to the online system and download any pending system messages to deliver to the sensors. (The default heartbeat for the Ethernet gateway is 5 minutes.)

2) Press and hold to reset the gateway to factory settings. Factory settings will be reset to defaults, including the heartbeat setting of 5 minutes on both the gateway and in the online system. DHCP, server addressing and port are all restored to default settings, for example. You will need to login to the online system after resetting the gateway to reconfigure the gateway to your desired settings.

**Note:** If your gateway powers up with the lights scrolling from left to right, it has entered into boot loader mode accidentally. Make sure the button is free from obstruction and reboot the gateway by removing the power plug, waiting for 10 seconds then reinserting the power plug.

### 3.

The Ethernet Gateway collects data from all sensors within range and is preconfigured to batch deliver the sensor messages to the online system every 5 minutes.

The Ethernet Gateway uses DHCP (Dynamic Host Configuration Protocol) to automatically acquire a network address from the LAN (Local Area Network). In the event that it needs to have an address manually assigned to it, you can assign an IP address as well as a gateway mask and default DNS through the online interface. For more information on configuring the ColdGuard Ethernet Gateway please view the support documentation at [www.bmil.com](http://www.bmil.com)

**Note:** This advanced configuration is NOT required in most instances. In the event that it is required, you can initialize the gateway on a network that uses the default DHCP settings, or you can follow the instructions for changing the configuration settings on a PC, which are included later in this User's Guide.

Upon logging into the online system as an administrator, select "My Account" then choose the edit icon next to your sensor network. From there you can alter the heartbeat of the Ethernet Gateway as well as edit any other configurations available. There is also a quick link to reset all gateway settings to factory defaults.

## 3. Using Your ColdGuard Wireless Sensors

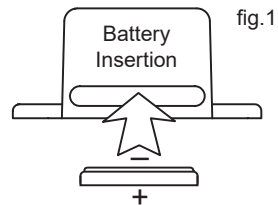
### Insert Batteries Into Wireless Sensors

**Important:** Make sure your sensors are at least 3ft. away from Ethernet Gateway.

Peel back the black sticker cover of the battery slot and slide the coin cell battery into the sensor as shown in fig.1. It will power on within 10-20 seconds. Once online, your sensor is ready to be deployed. If you wish to change a sensor configuration, change the parameter in the software. The new parameters will be transmitted to the sensor on the next heartbeat. If you need a more immediate response from the sensor, power cycle the sensor by removing, then re-inserting the battery.

#### Notes:

- If the sensor status indicator does not change, reset the sensor by removing the battery.
- Wait 60 seconds then re-insert the battery.
- When inserting the battery, make sure to push the battery all the way back using a paper clip.
- Note the proper orientation of battery in fig.1



**Warning:** Your sensors ship with a 2 hour heartbeat.

It is recommended that unless you are using the AA battery solution, you should set the heartbeat to no faster than one hour to preserve battery life. When changing a sensor's heartbeat, the new configuration information will be sent to the sensor on it's next heartbeat. If you want to update the sensors immediately you can reset them manually.

#### Manual Sensor Reset Process:

- 1 - Using the end of a paper clip, push the batteries out of the sensors through the small hole in the top of the sensor
- 2 - Change the sensor heartbeat through the online system
- 3 - Re-insert the batteries into the sensors

## 4. Using The ColdGuard™ Online Wireless Sensor System

### 1. Understanding The Online Interface

When you log into the online system, the default view shows all of your sensors last recorded data.

The screenshot displays the BMIL online wireless sensor system interface. The top navigation bar includes a 'Menu System' with options: Overview, Notifications, Manage, Reports, Sensor Maps, and Support. The 'View / Sort Features' section includes a search bar for 'All Networks' and a 'View Gateways' button. The main content area is split into two views:

- Sensors Overview:** A table showing sensor data. The visible row is:

Type	Sensor Name	Data	Last Check In	Signal	Battery
	Temperature	80.2°F	7/30/2014 10:09 AM		
- Sensor Details View:** A line chart titled 'Sensor Readings' showing temperature data for 7/30/2014. The chart includes a 'Date Range Selector' set to 7/30/2014. The y-axis ranges from 78 to 82, and the x-axis shows time intervals from 07:51 AM to 10:35 AM. The chart shows a fluctuating temperature trend.

#### Menu System

- Overview** - Shows all sensors in the account and their last readings.
- Notifications** - Manage sensor notifications and show all sent notifications.
- Manage** - Manage networks, sensors and gateways.
- Reports** - Printable account and sensor network reports.
- Sensor Maps** - Visual maps to help you track sensor placement.
- Support** - Support information for using sensors and software.





#### View / Sort Features

This section allows you to sort the sensors being viewed and search for sensors on your account.

#### Sensor Overview

Displays sensors on your account with their last reading and status information. Clicking on a sensor row expands the "Sensor Detail View" allowing you to view detailed information for the selected sensor.

To the left side of each sensor row is an indicator to help you understand the current status of the sensor.

-  Sensor is checking in and within user defined safe parameters.
-  Sensor has met or exceeded a user defined threshold or triggered event.
-  Sensor has not checked in (inactivity alert sent).
-  No sensor readings will be recorded (Inactive)

### Sensor Details View

Clicking on a sensor row on the “Overview” page expands the row to include a detailed sensor view for the selected sensor.

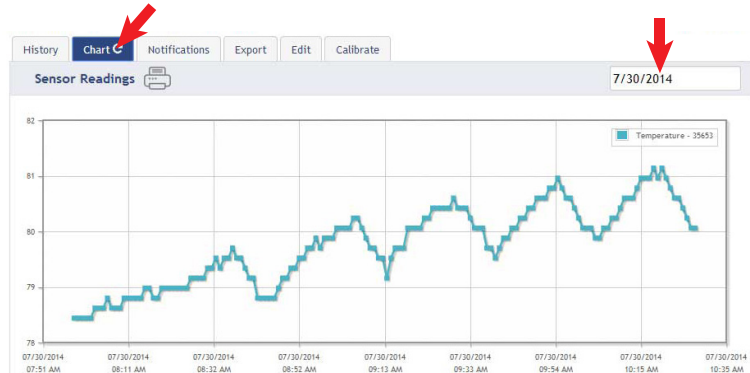
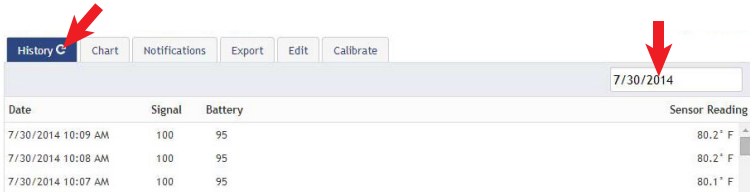
Select a tab to change between:

- History* - Displays a history of the selected sensor's data.
- Chart* - Displays a graphical view of the selected sensor's data.
- Notifications* - Allows you to manage notifications for the sensor.
- Export* - Allows you to archive data by exporting as a .csv file.
- Edit* - Allows you to manage sensor settings.
- Calibrate* - Available on certain sensor types to provide more accurate data.

**Note:** The data shown on the chart, notification, history and export tabs is based on the date range indicated on the upper right side of the sensor detail information. To change the date range, click inside the date box.

## 2. History and Chart Views.

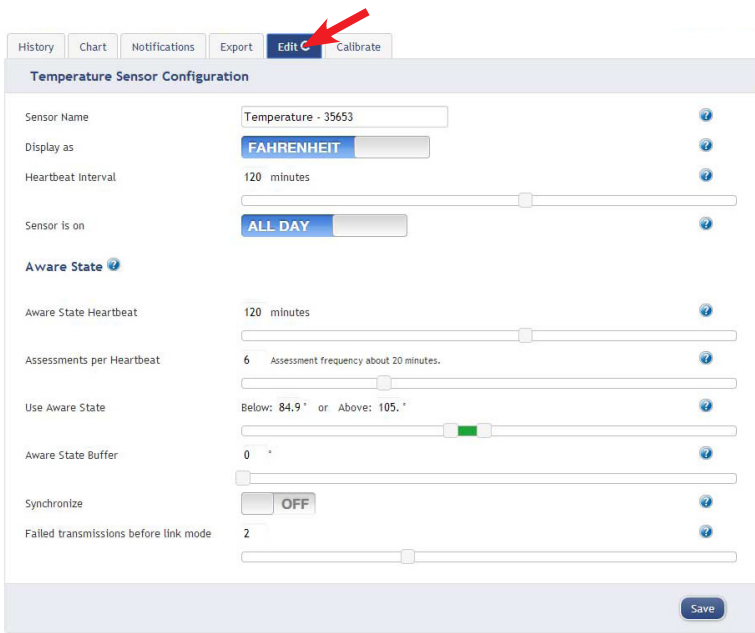
Clicking on the “History” or “Chart” tabs within the sensor detail panel allows you to view the sensor's data history as time stamped data or in a graphical chart format.



**Note:** To change the date range of the viewable information, click on the date range box at the top right of the sensor detail panel.

3.

To edit a sensors operation settings, click on the sensor overview row to display the details view. Click on the “Edit” tab to access the sensor configuration panel.



The sensor edit panel allows you to set the primary configurations for the sensor. Mousing over the question mark icon by each setting will provide an explanation of that setting. When you have finished making changes, press the “Save” button at the bottom of this section.

**Note:** Be sure to click the “Save” button anytime you make a change to any of the sensor parameters. *All changes made to the sensor settings will be downloaded to the sensor on the next sensor heartbeat (check-in). Once a change has been made and “Saved,” you will not be able to edit that sensor’s configurations again until the sensor has downloaded the new setting.*





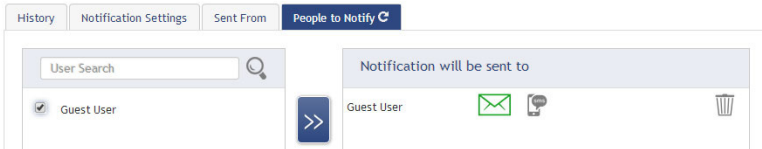
- \_\_\_\_\_ - Allows the user to set notifications based on advanced rules, such as comparing past data points with the current one to determine if a notification should be sent.
- \_\_\_\_\_ - Use notifications that have already been created on your account with the selected sensor.

This area allows the user to set notification parameters such as naming the notification, customizing the notification message and setting sensor conditions that will trigger the notification.



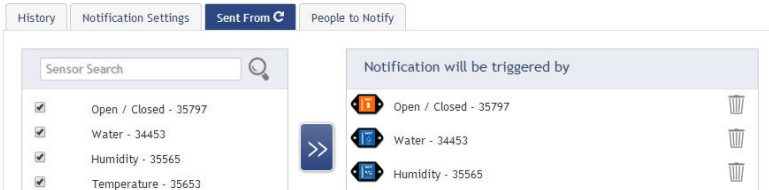
### People to Notify

The list on the left shows all available users on the account. You can type into the search box to filter large lists of users. Select the user(s) to receive the notification and click the arrow button to add them to the recipient list. By default, email notifications are activated. Clicking the notification delivery method icon toggles them on and off (green is on, grey is off). If the user should receive text message notifications, click on the phone icon to turn it green.



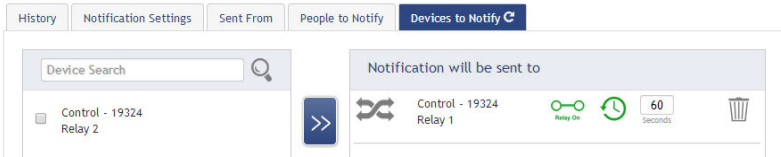
### Sent From

Allows you to assign devices (sensors and gateways) that will cause the notification to be sent. When a notification is sent from the system, it will automatically include the device name and the data that caused the notification to be sent. A single notification can be assigned to multiple sensors or gateways. Sensor reading notifications can only be assigned to sensors of the same type. General notifications such as “battery status”, can be assigned to any or all sensors.



## Devices to Notify

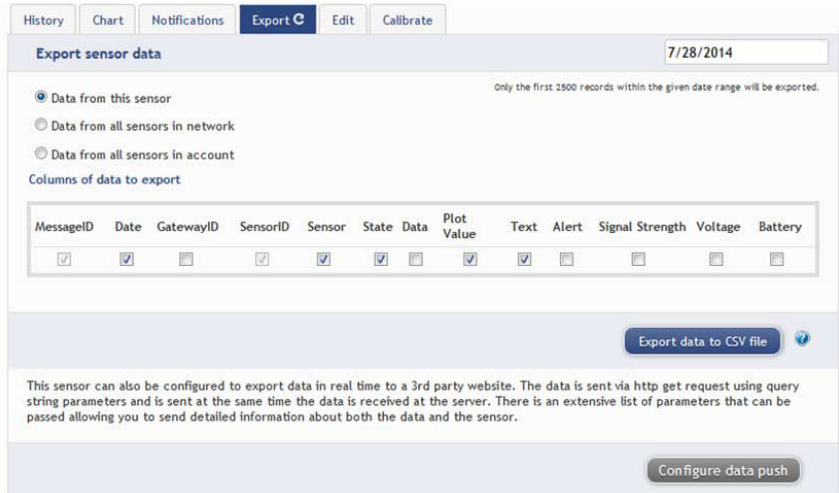
If you have a ColdGuard Control or Notifier A/V device on your network, you will also see a “Devices to Notify” tab. This will allow the notification to interact with these types of devices. Select a device from the list on the left and click the arrow button to add it to the recipient list. Clicking the control icon toggles their setting.



**Note:** Control devices have two relays per device that are controlled separately. You can turn a relay on, off or toggle the state. You can also set a duration by clicking on the timer icon. This will perform the selected toggle (on/off/toggle) for a set duration, then change back.

## 5. Exporting Sensor Data

Clicking on the “Export” tab within the sensor data window allows you to export sensor data to a comma separated value (.csv) file or send the sensor data to an external web source.



To export sensor data you must first select the date range for the data you want to export. Once the date range is selected, determine whether you want sensor data from the selected sensor only, from all sensors in the network or all sensors assigned to the account. When you are finished, click on “Export Data” at the bottom of this window. The data will be exported to a comma separated value (.csv) file format. **Note:** Only the first 2,500 records within the selected date range will be exported.

You can alternately send your sensors' incoming data to a 3rd party by clicking on the “Configure data push” button at the bottom of the window. From this area you can pass data from your wireless sensor network devices to another service in real time. This is done by coding the data into a url query then sending the data via http get request at the time data is received. There is an extensive list of parameters that can be passed, as listed in the viewed window, that allow you to send detailed information about both the data and the sensor.

## 6. Calibrating Sensor Data

Certain wireless sensors can be calibrated for more accurate readings (ex. temperature sensors). If calibration is possible for a sensor, the "Calibrate" tab will be visible in the detail view. To calibrate a sensor, replace the last reading with the more accurate reading and click "Calibrate". All future readings from the sensor will be based off the new calibration setting.

History Chart Notifications Export Edit **Calibrate**

**Calibrate Sensor**

Actual reading is  degrees Fahrenheit

Calibrate Default

## 7. Manage Sensor Networks

To view or edit information about your wireless sensor network(s), click on "Manage" in the main navigation. This area allows you to edit network details, create new sensor networks, and manage wireless gateways and sensors for your network(s).

Click to Manage

Overview Notifications **Manage** Reports Sensor Maps Support

**Demonstration Network** Add Network Demonstration Network

Network ID 1680  
Name Demonstration Network  
Count of Gateways/Sensors on this Network 1/3  
Send notifications for this Network True

Edit Network Details Edit network information

Create a new network

Select which network to view

**Gateway List** Add Gateway

Name	Gateway ID	Gateway Type	Band	Status
USB - 3849	3849	USB	9/5/2012 11:00	✓ ✗

Add a device to the network

**Sensor List** Add Sensor

Sensor Name	Sensor ID	Sensor Type	Firmware	Band	Active	Status
Temperature	402	Temperature	2.0.1	900 MHz	✓	✗
Open / Closed	13348	Open / Closed	2.0.0.0	900 MHz	✓	✗
Activity	21188	Activity			✓	✗

Remove device from network

Clear sensor history and data Clear Data

Move device to another network

**Note:** Some buttons and features are only visible if there is more than one sensor network setup on the account, such as the network selection box in the upper right corner.

If more than one sensor network is setup on the account, you can easily move gateways and sensors from one network to another by clicking on the "Move Device" button at the far right of the device's "Status" section.

If you clear a sensor's data, the data history is deleted from the entire system and can not be recovered. We recommend exporting a sensor's data history using the export function in the sensor details view ("Overview" page) before clearing the sensor's data if you want to have a record of the data.

## 5. Advanced Settings and Interfacing with the ColdGuard Ethernet Gateway.

### 1. Ethernet Gateway Edit Screen

When you log into the online system, the default view shows all of your sensors last recorded data.

The screenshot shows the 'Edit' tab of the 'Sensor List' interface. The form fields and their values are as follows:

Field	Value	Instruction
Name	TEST O/S	
Gateway Type	Ethernet_Gateway_3.0	
MAC Address	00:50:C2:E3:E8:13	
Heartbeat Minutes (default: 5)	5	Interval for sensor message delivery to the server.
Enterprise Server Host Address (default: t1.sensorsgateway.com)	t1.sensorsgateway.com	Edits the server the gateway is pointed to.
Enterprise Server Communication Port (default: 3000)	3000	Edits the port for communication.
Use DHCP	<input checked="" type="checkbox"/>	Uncheck to set a Static IP.
Force Transmit on Aware	<input checked="" type="checkbox"/>	Urgent messages are sent immediately instead of being queued.
Configure External Interfaces	<a href="#">Configure</a>	Set up for Enterprise Interfacing options.
Reform Network	<a href="#">Reform</a>	Resets the wireless network and sensor list.
Reset Gateway to Factory Defaults	<a href="#">Reset</a>	Configure all settings to factory defaults.

Buttons: Save, Cancel

The name can be edited to whatever you prefer.

The gateway type should NOT be edited, unless you are directed to do so by a ColdGuard Support Representative.

The unit's MAC Address is viewable here, should you need to access it.

The heartbeat dictates how often the gateway communicates with the server. This is both for communication passed up to the server from the gateway and the communication passed to the gateway from the server. Exceptions to this interval include Aware messages from sensors.

The Enterprise Server Host address and Communication Port will always be one of Monnit's servers and ports by default, but should you require that the gateway be pointed to your private servers, the gateway can be configured to do so. Make sure to set the appropriate port as well, if port 3000 will not be used.

To set the Static IP, uncheck the Use DHCP box and fill in the settings:

Use DHCP	<input type="checkbox"/>
Static IP (Use DHCP: 0.0.0.0)	<input type="text" value="0.0.0.0"/>
Network Mask	<input type="text" value="255.255.255.0"/>
Default Gateway	<input type="text" value="0.0.0.0"/>
Default DNS Server	<input type="text" value="0.0.0.0"/>

The force transmit on Aware box tells the gateway to deliver immediately the messages marked as Aware from the sensors. If this box is unchecked and the setting is saved, then the gateway only dumps the sensor messages it has been collecting on the Heart-beat Interval. This allows for controlled communication when sporadic communication from the gateway is either unacceptable or not ideal.

## 2. External Interfaces:

Data collected by the Ethernet Gateway from the sensors in the network can be accessed when these interfaces are turned on. Multiple interfaces can be active at the same time. All interfaces require that the Ethernet gateway be set to a Static IP address. (By default, the unit uses DHCP).

### Real Time TCP Interface

Poll on the gateway's assigned port to retrieve gateway and sensor data.

Configure Interfaces on Gateway: TEST O/S

Real Time TCP Link Configuration    Modbus TCP Configuration    SNMP Configuration

Interface Active

TCP Timeout Seconds (default: 70 seconds)

Port (default: 3500)

Save    Cancel

Mark the interface active and Save. The default port is 3500, but can be edited.

## MODBUS TCP Interface

Use MODBUS TCP software to pull in gateway and sensor data. ColdGuard provides a register map. Check the box to make the interface Active and Save.

Configure Interfaces on Gateway: TEST O/S

Real Time TCP Link Configuration    **Modbus TCP Configuration**    SNMP Configuration

Interface Active

Queue Expiration (default: 720 minutes)

TCP Timeout Minutes (default: 5 Minutes)

Port (default: 502)

Save    Cancel

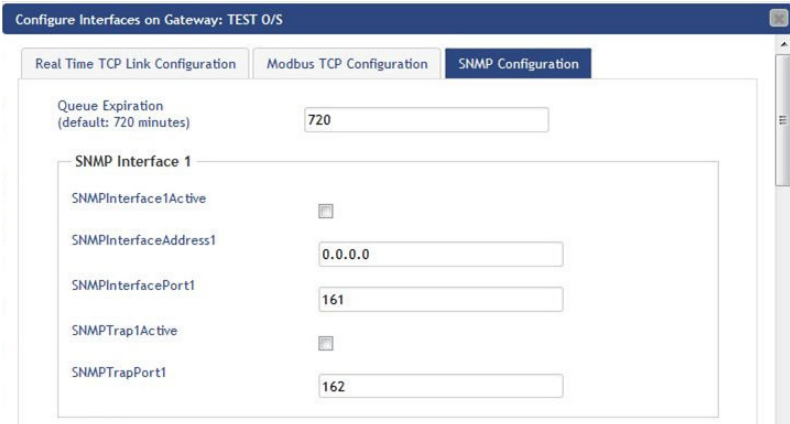
The MODBUS TCP Interface will store all data values in 16-bit registers. The registers and their data fields are mapped below:

	Field	Description	Register	Data Address
GATEWAY	Gateway ID_High	The first 16 bytes of a 32 byte serial ID number	40001	0
REGISTERS	Gateway ID_Low	The last 16 bytes of a 32 bytes serial ID number	40002	1
	Gateway Version	The version of gateway firmware on the device	40003	2
	Gateway Device Count	The number of devices (sensors & gateways) in its network	40004	3
SENSOR	Sensor ID_High	The first 16 bytes of a 32 byte serial ID number	40101	100
REGISTERS	Sensor ID_Low	The last 16 bytes of a 32 bytes serial ID number	40102	101
	Device Type	The unique type identifier for the sensor profile	40103	102
	Data Age	The number of seconds that have elapsed since the last data was retrieved	40104	103
	Is Device Active	0 indicates no data for this slot	40105	104
	Is Aware	Becomes aware when a sensor threshold has been breached	40106	105
	Voltage	Battery voltage	40107	106
	RSSI	Signal Strength indicator 0-100%	40108	107

	Data 1	Sensor Data Field 1	40109	108
	Data 2	Sensor Data Field 2	40110	109
	Data 3	Sensor Data Field 3	40111	110
	Data 4	Sensor Data Field 4	40112	111
	Data 5	Sensor Data Field 5	40113	112
	Data 6	Sensor Data Field 6	40114	113
	Data 7	Sensor Data Field 7	40115	114
	Data 8	Sensor Data Field 8	40116	115

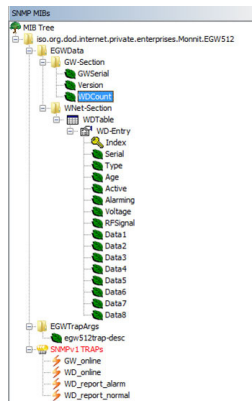
### SNMP Poll and Trap Interface

Use SNMP software to pull in gateway and sensor data. ColdGuard provides a .MIB file. There are four available interfaces. Set the SNMP Interface Address for each one (the address of the device sending the SNMP request). Mark the interface Active and Save.



The MIB file is available through here:  
[resources.monnit.com/content/downloads/MonnitEGW-MIB\\_v1](https://resources.monnit.com/content/downloads/MonnitEGW-MIB_v1)

The MIB Tree looks like this:



Ethernet Gateway MIB tree with a short description of each field:

EGW Data		Description
	*GW Section	Gateway Section
	*GW Serial	Gateway Serial ID
	*Version	Gateway Firmware Version
	*WD Count	Wireless Device Count
	*WNetSection	Wireless Network Section
	*WD Entry	Wireless Device Entry
	*Index	Index Number
	*Serial	Wireless Device Serial ID
	*Type	Device Type (eg temp, water, motion sensor, etc)
	*Age	Number of seconds since last data recording
	*Active	Indicates if the wireless device is reporting in as expected
	*Alarming	Indicates if the wireless device has detected data that is urgent or breaches a threshold
	*Voltage	Battery voltage recorded at the time of data reading
	*RFSignal	Signal Strength recorded on data reading delivery
	*Data1	Data recorded by wireless device (eg temperature, water detected, motion detected, etc)
	*Data2	Data recorded by wireless device (eg temperature, water detected, motion detected, etc)
	*Data3	Data recorded by wireless device (eg temperature, water detected, motion detected, etc)
	*Data4	Data recorded by wireless device (eg temperature, water detected, motion detected, etc)
	*Data5	Data recorded by wireless device (eg temperature, water detected, motion detected, etc)
	*Data6	Data recorded by wireless device (eg temperature, water detected, motion detected, etc)
	*Data7	Data recorded by wireless device (eg temperature, water detected, motion detected, etc)
	*Data8	Data recorded by wireless device (eg temperature, water detected, motion detected, etc)



## Error Reporting, Troubleshooting and Support

For technical support and troubleshooting tips please visit our support library online at <http://www.bmil.com> If you are unable to solve your issue using our online support, email ColdGuard support at [bmil@bmil.com](mailto:bmil@bmil.com) with your contact information and a description of the problem, and a support representative will call you within one business day.

## Warranty Information

(a) Monnit warrants that Monnit-branded products will be free from defects in materials and workmanship for a period of one (1) year from the date of delivery with respect to hardware and will materially conform to their published specifications for a period of one (1) year with respect to software. Monnit may resell sensors manufactured by other entities and are subject to their individual warranties; Monnit will not enhance or extend those warranties. Monnit does not warrant that the software or any portion thereof is error free. Monnit will have no warranty obligation with respect to Products subjected to abuse, misuse, negligence or accident. If any software or firmware incorporated in any Product fails to conform to the warranty set forth in this Section, Monnit shall provide a bug fix or software patch correcting such non-conformance within a reasonable period after Monnit receives from Customer (i) notice of such non-conformance, and (ii) sufficient information regarding such non-conformance so as to permit Monnit to create such bug fix or software patch. If any hardware component of any Product fails to conform to the warranty in this Section, Monnit shall, at its option, refund the purchase price less any discounts, or repair or replace non-conforming Products with conforming Products or Products having substantially identical form, fit, and function and deliver the repaired or replacement Product to a carrier for land shipment to customer within a reasonable period after Monnit receives from Customer (i) notice of such non-conformance, and (ii) the non-conforming Product provided; however, if, in its opinion, Monnit cannot repair or replace on commercially reasonable terms it may choose to refund the purchase price. Repair parts and replacement products may be reconditioned or new. All replacement products and parts become the property of Monnit. Repaired or replacement products shall be subject to the warranty, if any remains, originally applicable to the product repaired or replaced. Customer must obtain from Monnit a Return Material Authorization Number (RMA) prior to returning any Products to Monnit. Products returned under this Warranty must be unmodified.

Customer may return all Products for repair or replacement due to defects in original materials and workmanship if Monnit is notified within ninety (90) days of customer's receipt of the product. Monnit reserves the right to repair or replace products at its own and complete discretion. Customer must obtain from Monnit a Return Material Authorization Number (RMA) prior to returning any products to Monnit. Products returned under this Warranty must be unmodified and in original packaging. Monnit reserves the right to refuse warranty repairs or replacements for any products that are damaged or not in original form. For products outside the ninety-day warranty period repair services are available at Monnit at standard labor rates for a period of one year from the Customer's original date of receipt.

(b) As a condition to Monnit's obligations under the immediately preceding paragraphs, Customer shall return Products to be examined and replaced to Monnit's facilities, in shipping cartons which clearly display a valid RMA number provided by Monnit. Customer acknowledges that replacement products may be repaired, refurbished or tested and found to be complying. Customer shall bear the risk of loss for such return shipment and shall bear all shipping costs. Monnit shall deliver replacements for Products determined by Monnit to be properly returned, shall bear the risk of loss and such costs of shipment of repaired products or replacements, and shall credit Customer's reasonable costs of shipping such returned Products against future purchases.

(c) Monnit's sole obligation under the warranty described or set forth here shall be to repair or replace non-conforming products as set forth in the immediately preceding paragraph, or to refund the documented purchase price for non-conforming Products to Customer. Monnit's warranty obligations shall run solely to Customer, and Monnit shall have no obligation to customers of Customer or other users of the Products.

#### Limitation of Warranty and Remedies.

THE WARRANTY SET FORTH HEREIN IS THE ONLY WARRANTY APPLICABLE TO PRODUCTS PURCHASED BY CUSTOMER. ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY DISCLAIMED. MONNIT'S LIABILITY WHETHER IN CONTRACT, IN TORT, UNDER ANY WARRANTY, IN NEGLIGENCE OR OTHERWISE SHALL NOT EXCEED THE PURCHASE PRICE PAID BY CUSTOMER FOR THE PRODUCT. UNDER NO CIRCUMSTANCES SHALL MONNIT BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES. THE PRICE STATED FOR THE PRODUCTS IS A CONSIDERATION IN LIMITING MONNIT'S LIABILITY. NO ACTION, REGARDLESS OF FORM, ARISING OUT OF THIS AGREEMENT MAY BE BROUGHT BY CUSTOMER MORE THAN ONE YEAR AFTER THE CAUSE OF ACTION HAS ACCRUED.

IN ADDITION TO THE WARRANTIES DISCLAIMED ABOVE, MONNIT SPECIFICALLY DISCLAIMS ANY AND ALL LIABILITY AND WARRANTIES, IMPLIED OR EXPRESSED, FOR USES REQUIRING FAIL-SAFE PERFORMANCE IN WHICH FAILURE OF A PRODUCT COULD LEAD TO DEATH, SERIOUS PERSONAL INJURY, OR SEVERE PHYSICAL OR ENVIRONMENTAL DAMAGE SUCH AS, BUT NOT LIMITED TO, LIFE SUPPORT OR MEDICAL DEVICES OR NUCLEAR APPLICATIONS. PRODUCTS ARE NOT DESIGNED FOR AND SHOULD NOT BE USED IN ANY OF THESE APPLICATIONS.

*This equipment has been tested and found to comply with the limits for a Class B digital devices, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of more of the following measures:*

- *Reorient or relocate the receiving antenna*
- *Increase the separation between the equipment and receiver*
- *Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
- *Consult the dealer or an experienced radio/TV technician for help.*

**Warning:** *Changes or modifications not expressly approved by Monnit could void the user's authority to operate the equipment.*

## RF Exposure



**WARNING:** To satisfy FCC RF exposure requirements for mobile transmitting devices, the antenna used for this transmitter must not be co-located in conjunction with any other antenna or transmitter.

## **Monnit Wireless Sensors and Ethernet Gateway Contain: FCC ID: ZTL-RFSC1**

*This device has been designed to operate with an approved antenna listed below, and having a maximum gain of 5.1 dBi. Antennas not included in this list or having a gain greater than 5.1 dBi are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.*

*To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that required for successful communication.*

### **Approved Antennas**

The following antennas are approved for use with Monnit devices.

- *Hyperlink HG905RD-RSP (5.1 dBi Rubber Duck)*
- *Pulse W1063 (3.0 dBi Rubber Duck)*
- *ChangHong GSM-09 (2.0 dBi Rubber Duck)*
- *Specialized Manufacturing MC-ANT-20/4.0C (4" whip)*

## Canada (IC)

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### English

*Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.*

*The radio transmitter (IC: 9794A-RFSC1) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.*

*This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.*

### French

*Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.*

*Le présent émetteur radio (IC: 9794A-RFSC1) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.*

*Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.*

## Japan (ARIB)

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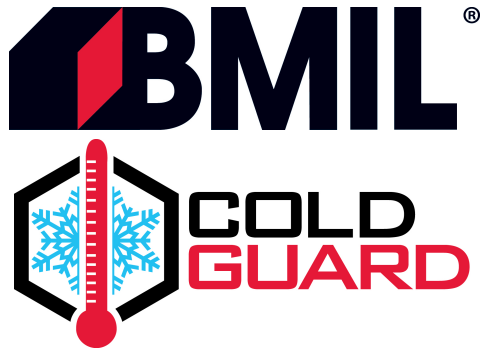
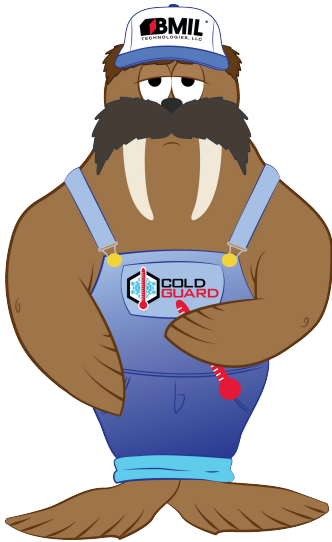
*All Monnit 920 MHz products have been tested and found to comply with ARIB STD-T108 standards.*



210-103733

## Additional Information and Support

For additional information or more detailed instructions on how to use your Wireless Sensors, please visit us on the web at [www.bmil.com](http://www.bmil.com)



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## ColdGuard™ Ethernet Gateway

Quick Start Guide for Use With ColdGuard Online Software



### Ethernet Gateway Quick Start Overview

1. Create and setup your ColdGuard™ account.
2. Connect and power on the gateway.

**Important:** When setting up your sensing network, please make sure your sensors are at least 3-5 feet away from the gateway, and the sensors are at least 1 foot apart from each other.

### Create and Setup Your Account

- Visit <http://cg.bmil.com> to create an online sensor monitoring account.
- Follow the on-screen instructions to enter your account and contact information.
- You will be prompted to create your first sensor network. Simply enter a name for your network.
- Next you will be prompted to add a wireless gateway and wireless sensors to your network.
- Enter the information from your gateway then click the “Assign Gateway” button.

Gateway ID  ed, including interference that may undesired operation.

Gateway Code  ID: #####  
Code: XXXXXX

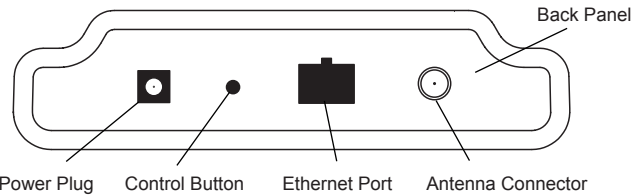
- Enter the information from your first wireless sensor then click the “Assign Sensor” button.

Sensor ID

Sensor Code  Sensor ID: #####  
Sensor Code: XXXXXX

- On the next screen, enter a name for the wireless sensor and use the drop down to tell us how you are going to be using the wireless sensor. (This allows us to suggest settings for your sensor.) When finished, click the “Continue” button.
- Repeat these steps to add any additional wireless sensors to your network.

### Ethernet Gateway Setup



- Attach the included antenna to the connector.
- Plug an Ethernet cable with internet connectivity into the gateway.
- Plug the power supply into a power outlet then connect to the gateway.
- Check that the three LED lights on the front of the gateway change to green. Once all three lights turn green, your network is ready to use.

### Using Your Wireless Sensors

- From the Overview Page of ColdGuard™, click “View Gateways” and check that your gateway status has changed to active in ColdGuard.



- From the Overview Page of ColdGuard, click “View sensors” to return to the sensors overview page.
- Click on a sensor’s information to access detailed information for that sensor.

Type	Sensor Name	Signal	Battery	Data	Last Check In
ID	Button			Detected	8/1/2013 11:28 AM
ID	Temperature			75.9° F	8/1/2013 11:28 AM

- Click the “Edit” tab from a sensor’s detail view, to change sensor settings.

Chart   Notifications   History   Export   **Edit**   Calibrate

#### Temperature Sensor Configuration

Sensor Name:

Display as:

Heartbeat Interval:  minutes

Sensor is on:

- Insert batteries into the wireless sensors.
- Check that the sensors change to active as batteries are inserted. (You may need to click the refresh button at the top, right side of overview.)

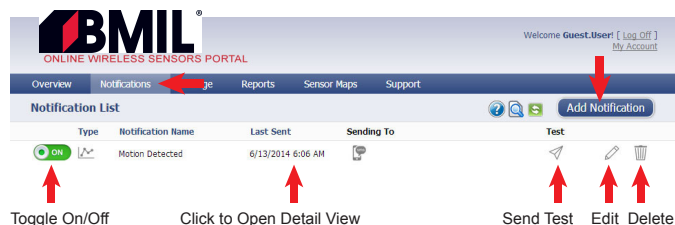


- The ColdGuard™ online software is now collecting your sensor data.

**Note:** Any change made to a sensor's settings will be downloaded to the sensor on the next sensor heartbeat (check-in). Once a change has been made and "Saved," you will not be able to edit that sensor's configurations again until the sensor has downloaded the new setting. If you want to force a sensor to download new settings, you can power cycle the sensor by removing the battery, waiting 30 seconds, then reinsert the battery.

### Setting Up Sensor Notifications

- Notifications can be created, deleted or edited for any sensor or group of sensors by clicking on "Notifications" in the main menu.

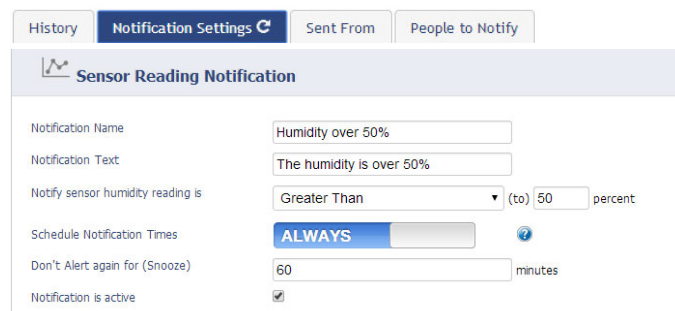


- When creating a notification, you will need to select the type of notification to create.

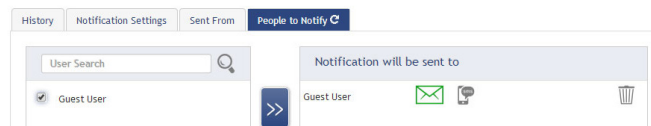


- Sensor Reading Notification - Alert based on sensor reading or sensing activity.
- Battery Notification - Alert based on battery power remaining.
- Inactivity Notification - Alert when a sensor has not checked in.
- Advanced Notifications - Alerts based on advanced rules, such as comparing past data points with current ones.
- Existing Notifications - Use notifications that have already been created on your account with the selected sensor.

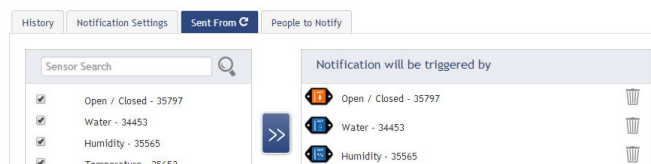
- Notification Settings - Set notification parameters such as name, message and sensor conditions that will cause the notification to be sent.



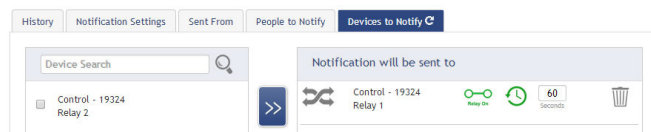
- People to Notify - Select the user(s) to receive the notification and click the arrow button to add them to the recipient list. By default, email notifications are activated. Clicking the notification delivery method icon toggles them on and off (green is on, grey is off).



- Sent From - Assign devices (sensors and gateways) that will cause the notification to be sent. When a notification is sent from the system, it will automatically include the device name and the data that caused the notification to be sent. A single notification can be assigned to multiple sensors or gateways.



- Devices to Notify - If you have a ColdGuard Control or Notifier A/V on your network, you will see a "Devices to Notify" tab. This allows the notification to interact with these devices. Add a device and click the control icons to toggle their settings.



**Note:** Control devices have two relays per device that are controlled separately. You can turn a relay on, off or toggle the state. You can also set a duration by clicking on the timer icon. This will perform the selected toggle (on/off/toggle) for a set duration, then change back.

For more detailed instructions, documentation, and "how-to" guide, visit our support page at [www.bmil.com](http://www.bmil.com).



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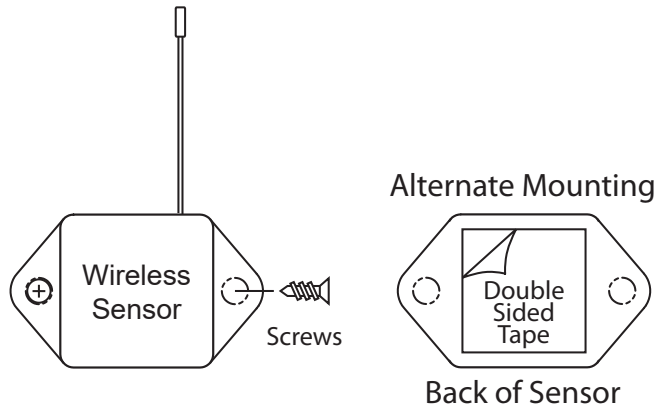
# ColdGuard Remote Monitoring



## Sensor Installation - Quick Start Guide

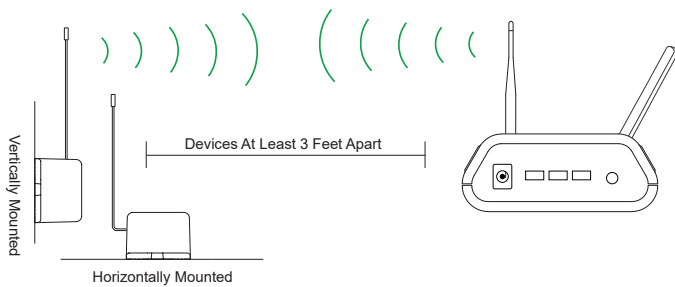
### General Wireless Sensor Mounting

Wireless sensors feature mounting flanges and can be attached to most surfaces using the included mounting screws or double sided tape.

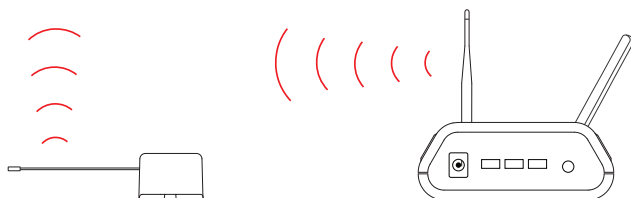


In order for your wireless sensors to work optimally, you should orient all antennas for your sensors and gateway(s) the same direction (typically vertical). Also sensors must be at least 3 ft. away from other sensors and the wireless gateway in order to function properly.

### Correct

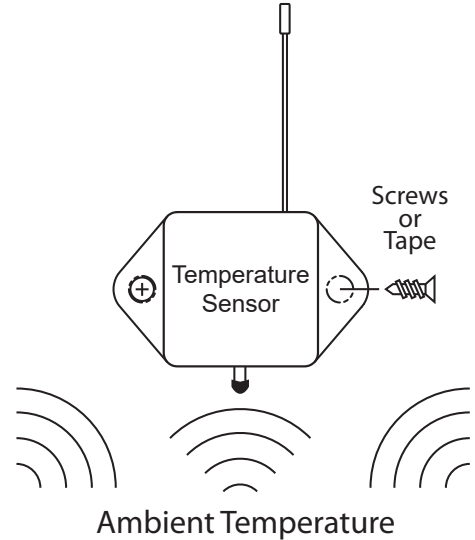


### Incorrect



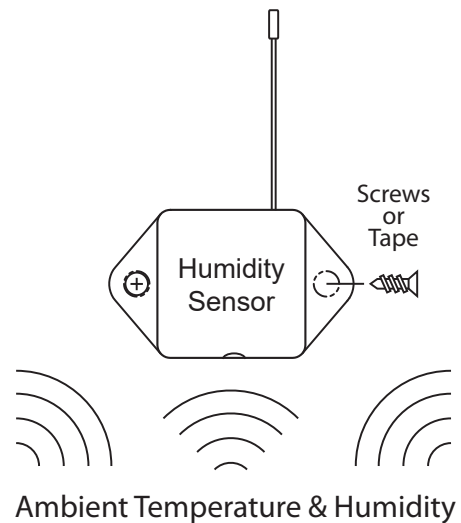
### Wireless Temperature Sensors

Wireless temperature sensors monitor the ambient temperature around the sensor, and can be mounted using the general mounting procedure.



### Wireless Humidity Sensors

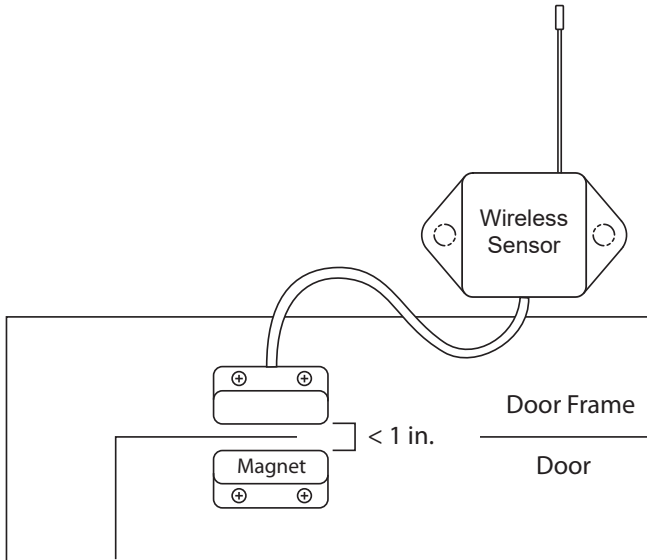
Wireless humidity sensors monitor the ambient temperature and relative humidity around the sensor, and can be mounted using the general mounting procedure.





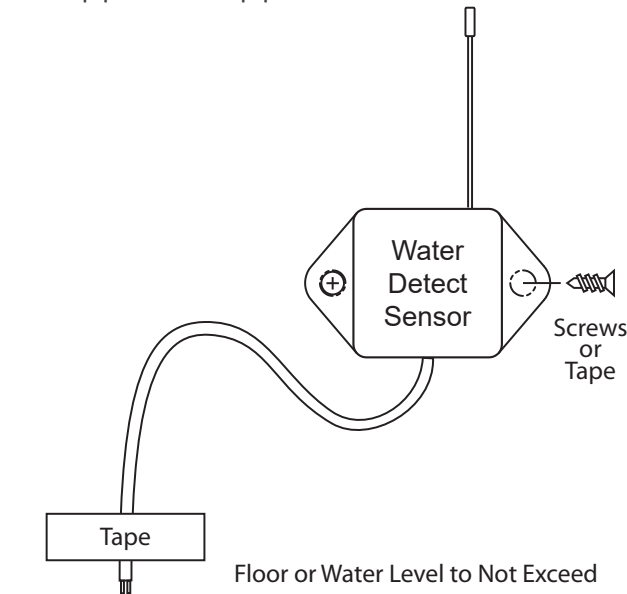
## Wireless Open/Closed Sensors

Wireless open/closed sensors detect when a door or window is open or closed. For the sensor to work properly, the magnet will need to be within 1 inch of the magnet sensor. The magnet and sensor have double sided sticky tape which allow them to be affixed to the door and the door frame. The magnet should be attached to the door, and the sensor should be attached to the door frame. Ensure that the magnet and sensor are mounted where they will not interfere with the door motion when opening and closing.



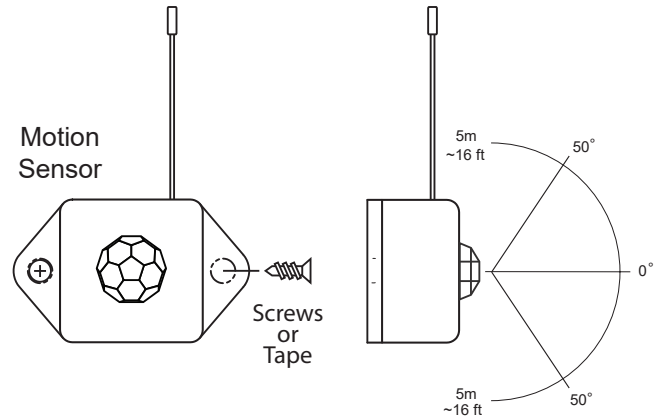
## Wireless Water Detect Sensors

Wireless water detect sensors detect the presence of water at the end of the water probe. The end of the water detection probe should be attached where it should detect water. This can be a wall, the side of a container or even a pipe in a sump pit.



## Wireless Motion Sensors

Wireless motion sensors use passive infrared technology to detect human movement in front of the sensor. The sensor has a detection range of approximately 16 feet (5 meters) with a detection field slightly larger than 50 degrees from straight center.



For more detailed instructions, visit our support page at [www.bmil.com](http://www.bmil.com)



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## ColdGuard Ethernet Gateway

The ColdGuard Ethernet gateway allows your ColdGuard Wireless Sensors to communicate with the ColdGuard App without the need for a PC. Simply plug this device into any open network port with internet connection and it will automatically connect with our online servers. This is the perfect solution for commercial locations where there is an active internet connection.

With the graphical ColdGuard software, you can easily configure your network, view collected sensor data and set alarms through SMS or e-mail, all from any web enabled browser. The system allows for complete configuration and customization at a sensor, local network, or client wide level.

The ColdGuard Ethernet gateway is specifically designed to respond to the increasing market need for global technology that accommodates a variety of vertical M2M application segments and remote wireless sensor management solutions.

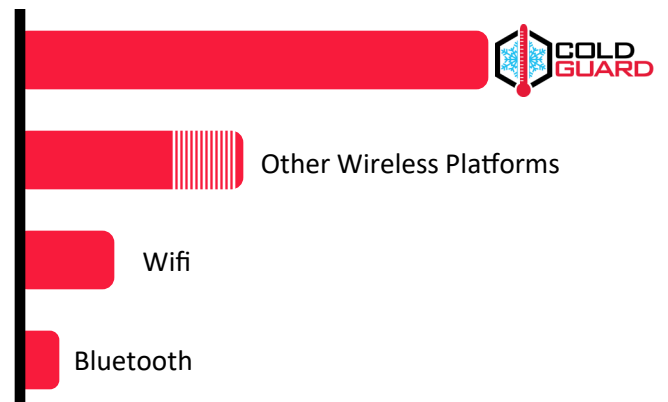
Enjoy reliable, low cost, wireless monitoring of your facilities or specific applications, with ColdGuard wireless sensor networks.



- Wireless range of 1,000+ feet through 12-14 walls \*
- Frequency Hopping Spread Spectrum (FHSS)
- Improved interference immunity
- Encrypt-RF™ Security (Diffie-Hellman Key Exchange+ AES-128 CBC for sensor data messages)
- 16,000 sensor message memory
- Over the air updates (future proof)
- Plug & Sense, no hassle set-up
- No PC required for operation
- Local status LEDs with transmission and online status indicators
- On-line heart-beat control
- Power outage notification

\*Actual range may vary depending on environment.

### Wireless Range Comparison





## ColdGuard Ethernet Gateway Specifications

<b>Ethernet</b>	
Ethernet Types	Standard, POE
Antenna	Connector: SMA Gain: 5.0 dBi (900MHz Product) 3.0 dBi (868 and 433 MHz Product)
Hardware	10/100 Ethernet Controller
IEEE Standard Compliance	802.3-2002
Operation:	Full- and Half-Duplex
Cross-Over Correction	Automatic MDI/MDI-X
Addressing	Pre-programmed MAC Address
Host Address	T1.sensorgateway.com
Default Port	3000
Protocols Supported	UDP, DHCP, TCP, SNMP, MODBUS
Cable Connector	Cat 5
Device Memory	16,000 sensor messages (Sensor messages will be stored in the event of Internet outage and transferred when connection is restored)
<b>Power</b>	
Power Supply *	5.5 V AC adapter or Power-Over-Ethernet option requires standard PoE (802.3AF) Class 1 capable power injector (not included)
<b>Mechanical</b>	
LEDs	H/W status, ColdGuard connection status, sensor data activity
Enclosure	ABS plastic
Dimensions	4.005 in. x 5.505 in. x 1.375 in. (139.85 mm x 101.75 mm x 34.95 mm)
Weight	12.6 ounces
<b>Environmental</b>	
Operating Temperature	-10°C to +70°C (14°F to 158°F) **
Storage Temperature	-20°C to +85°C (-4°F to 185°F)
<b>Wireless</b>	
Wireless Range	1,000+ ft. non-line -of-sight ***
Security	Encrypt-RF tm (256-bit key exchange and AES-128 CTR)
Certifications	900 MHz Product: FCC ID: ZTL-G2SC1 and IC: 9794A-G2SC1
	*Hardware cannot withstand negative voltage. Please take care when connecting a power device.
	**At temperatures above 100°C, it is possible for the board circuitry to lose programmed memory.
	***Actual range may vary depending on environment.





## ColdGuard Temperature Sensor

The ColdGuard Wireless Temperature Sensor uses a type NTC thermistor to measure temperature.

- Accurate to  $\pm 1^\circ \text{C}$  ( $\pm 1.8^\circ \text{F}$ )
- Increased accuracy by user calibration to  $\pm 0.25^\circ \text{C}$  ( $\pm 0.45^\circ \text{F}$ )

The ColdGuard Wireless Temperature Sensor outputs the ambient temperature in degrees Fahrenheit. It is programmed to sleep for a user-given time interval (heartbeat) and then wakeup, send power to the NTC Thermistor and wait for it to stabilize, and convert the analog data, mathematically compute the temperature and transmit the data to the gateway. To stay within the abilities of the processor, the temperature is computed off a data table provided by the manufacturer. To reduce error, a variable resistor configuration is implemented over specified temperature ranges.

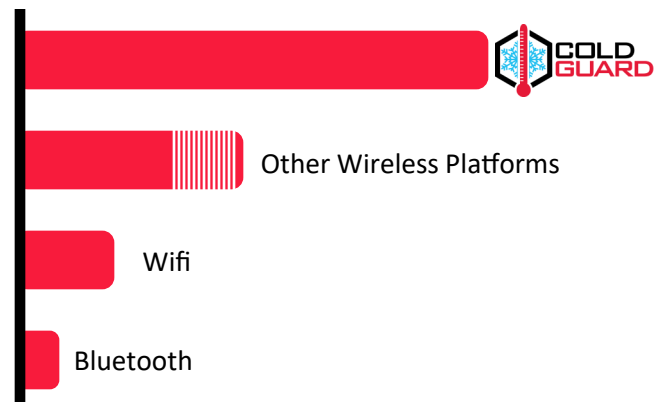
ColdGuard sensors are enclosed in reliable, weather-proof NEMA rated enclosures. Our NEMA rated enclosures are constructed for both indoor or outdoor use and protect the sensor circuitry against the ingress of solid foreign objects like dust as well as the damaging effects of water (rain, sleet, snow, splashing water, and hose directed water).



- Wireless range of 1,000+ feet through 12-14 walls \*
- Frequency Hopping Spread Spectrum (FHSS)
- Improved interference immunity
- Encrypt-RF™ Security (Diffie-Hellman Key Exchange+ AES-128 CBC for sensor data messages)
- 16,000 sensor message memory
- Over the air updates (future proof)
- Plug & Sense, no hassle set-up
- No PC required for operation
- Local status LEDs with transmission and online status indicators
- On-line heart-beat control
- Power outage notification

\*Actual range may vary depending on environment.

### Wireless Range Comparison





## ColdGuard Temperature Sensor Specifications

Supply Voltage	2.0 - 3.8 VDC (3.0 - 3.8 VDC Using Power Supply) *
Current Consumption	0.2 $\mu$ A (Sleep Mode)    0.7 $\mu$ A (RTC Sleep)    570 $\mu$ A (MCU Idle) 2.5 mA (MCU Active)    5.5 mA (Radio RX Mode)    22.6 mA (Radio TX Mode)
Operating Temperature Range (Board Circuitry and Battery)	-40°C to +85°C ( -40°F to +185°F ) **
Included Battery	Max Temperature Range: -40° to +85°C ( -40° to +185°F )    Capacity: 1800 mAh
Thermistor Temperature Range (Thermistor Only)	-40°C to +125°C ( -40°F to +257°F ) ( Limited to Main Unit Circuitry, -40°C to +85°C )
Accuracy @ 25°C	+/- 1% (1° C or 1.8° F)
User Calibrated Accuracy	+/- 0.25° C (± 0.45° F)
Time Constant @ 25°C	30 sec
Integrated Memory	Up to 512 sensor messages
Wireless Range	1,000+ ft. non-line-of-sight ***
Security	Encrypt-RF tm (256-bit key exchange and AES-128 CTR)
Weight	4.7 Ounces
Enclosure Rating	NEMA 1, 2, 4, 4x, 12 and 13 rated, sealed and weather proof
UL Rating	UL Listed to UL508-4x specifications (File E194432)
Certifications	900 MHz Product: FCC ID: ZTL-G2SC1 and IC: 9794A-G2SC1
	*Hardware cannot withstand negative voltage. Please take care when connecting a power device.
	**At temperatures above 100°C, it is possible for the board circuitry to lose programmed memory.
	***Actual range may vary depending on environment.



## ColdGuard Thermocouple Sensor

The ColdGuard Wireless Thermocouple Sensor is available with a K-type connector to support various thermocouple types and ranges.

The ColdGuard Wireless Thermocouple is available with a K-Type connector (for supporting various thermocouple types and ranges) to measure high temperature applications. It is programmed to sleep for a user-given time interval (heartbeat) and then wakeup, send power to the thermocouple and wait for it to stabilize, and convert the analog data, mathematically compute the temperature and transmit the data to the gateway. To stay within the abilities of the processor, the temperature is computed off a data table provided by the manufacturer.

ColdGuard sensors are enclosed in reliable, weather-proof NEMA rated enclosures. Our NEMA rated enclosures are constructed for both indoor or outdoor use and protect the sensor circuitry against the ingress of solid foreign objects like dust as well as the damaging effects of water (rain, sleet, snow, splashing water, and hose directed water).

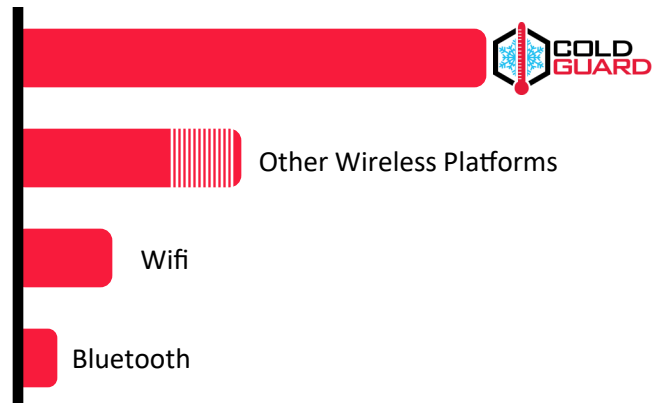


- Wireless range of

- 1,000+ feet through 12-14 walls \*
- Frequency Hopping Spread Spectrum (FHSS)
- Improved interference immunity
- Encrypt-RF™ Security (Diffie-Hellman Key Exchange+ AES-128 CBC for sensor data messages)
- 16,000 sensor message memory
- Over the air updates (future proof)
- Plug & Sense, no hassle set-up
- No PC required for operation
- Local status LEDs with transmission and online status indicators
- On-line heart-beat control
- Power outage notification

\*Actual range may vary depending on environment.

### Wireless Range Comparison





## ColdGuard Thermocouple Sensor Specifications

Supply Voltage	2.0 - 3.6 VDC *
Current Consumption	0.7 $\mu$ A (sleep mode) 2 mA (radio idle/off mode) 2 mA (measurement mode) 25 mA (radio RX mode) 35 mA (radio TX mode)
Operating Temperature Range (Board Circuitry and Battery)	-40°C to +85°C ( -40°F to +185°F ) **
Included Battery	Max Temperature Range: -40° to +85°C ( -40° to +185°F ) Capacity: 1800 mAh
Accuracy	$\pm$ 3.0°F(1.1°C) or $\pm$ 0.4% rdg above 212°F(100°C); $\pm$ 3.6°F(2.2°C) or 2% of rdg between -58 to 211°F (-50 to 99°C); $\pm$ 7.2°F(4°C) or $\pm$ 4% of rdg between -60 to -238 (-51 to -150°C)
Probe Temperature Range	-250 to 900°F (-150 to 482°C)
Probe Insulation type	Fiberglass
Integrated Memory	Up to 512 sensor messages
Wireless Range	1,000+ ft. non-line-of-sight ***
Security	Encrypt-RF tm (256-bit key exchange and AES-128 CTR)
Weight	4.7 Ounces
Enclosure Rating	NEMA 1, 2, 4, 4x, 12 and 13 rated, sealed and weather proof
UL Rating	UL Listed to UL508-4x specifications (File E194432)
Certifications	900 MHz Product: FCC ID: ZTL-G2SC1 and IC: 9794A-G2SC1
	*Hardware cannot withstand negative voltage. Please take care when connecting a power device.
	**At temperatures above 100°C, it is possible for the board circuitry to lose programmed memory.
	***Actual range may vary depending on environment.



## ColdGuard Humidity Sensor

The ColdGuard Wireless Humidity Sensor allows you to accurately monitor the relative humidity of the air within a room or enclosure.

The ColdGuard Wireless Humidity Sensor measures the relative humidity at the device. The sensor returns RH and temperature values to the ColdGuard Online Sensor Monitoring and Notification System. The system calculates dew point from the data and stores all three data points in the online system where the data can be reviewed and exported as a data sheet or graph. Notifications can be set up through the online system to alert the user when defined thresholds have been met or exceeded.

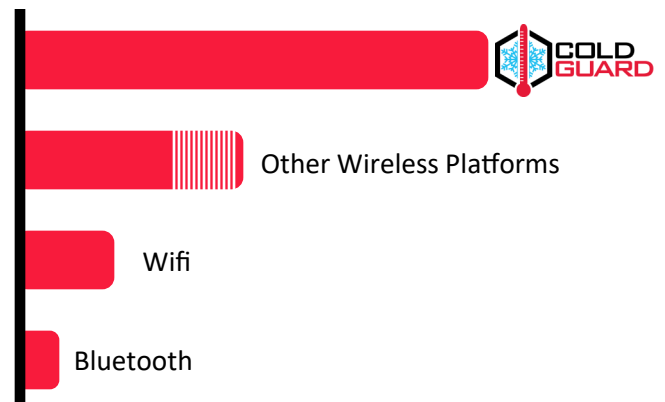
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- Wireless range of 1,000+ feet through 12-14 walls \*
- Frequency Hopping Spread Spectrum (FHSS)
- Improved interference immunity
- Encrypt-RF™ Security (Diffie-Hellman Key Exchange+ AES-128 CBC for sensor data messages)
- 16,000 sensor message memory
- Over the air updates (future proof)
- Plug & Sense, no hassle set-up
- No PC required for operation
- Local status LEDs with transmission and online status indicators
- On-line heart-beat control
- Power outage notification

\*Actual range may vary depending on environment.

### Wireless Range Comparison







## ColdGuard Humidity Sensor Specifications

Supply Voltage	2.0 - 3.8 VDC (3.0 - 3.8 VDC Using Power Supply) *
Current Consumption	0.7 $\mu$ A (sleep mode) 2 mA (radio idle/off mode) 2 mA (measurement mode) 25 mA (radio RX mode) 35 mA (radio TX mode)
Operating Temperature Range (Board Circuitry and Battery)	-40°C to +85°C ( -40°F to +185°F) **
Included Battery	Max Temperature Range: -40° to +85°C ( -40° to +185°F ) Capacity: 1800 mAh
Accuracy	$\pm$ 3% under normal conditions (10% - 90% RH)
RH Operating Range	0—100% RH
RH Response Time	8 sec (tau 63%)
Integrated Memory	Up to 512 sensor messages
Wireless Range	1,000+ ft. non-line-of-sight ***
Security	Encrypt-RF tm (256-bit key exchange and AES-128 CTR)
Weight	4.7 Ounces
Enclosure Rating	NEMA 1, 2, 4, 4x, 12 and 13 rated, sealed and weather proof
UL Rating	UL Listed to UL508-4x specifications (File E194432)
Certifications	900 MHz Product: FCC ID: ZTL-G2SC1 and IC: 9794A-G2SC1
	*Hardware cannot withstand negative voltage. Please take care when connecting a power device.
	**At temperatures above 100°C, it is possible for the board circuitry to lose programmed memory.
	***Actual range may vary depending on environment.

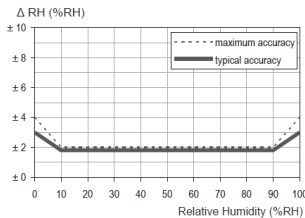


Figure 1. Typical and maximal tolerance at 25°C.

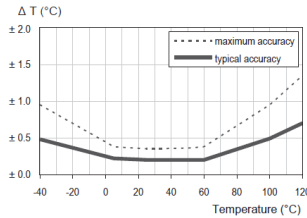


Figure 2. Maximal tolerance for temperature sensor in °C.

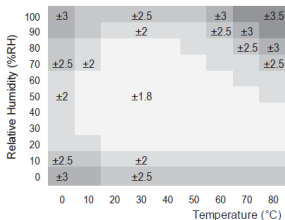


Figure 3. Typical accuracy of relative humidity measurements given in %RH for temperatures between 0 – 80°C.

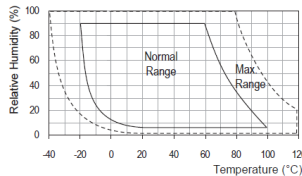


Figure 4. Operating Conditions





## ColdGuard Open / Closed Sensor

The ColdGuard Wireless Open / Closed Sensor can be used to detect when a door or window is opened and closed using a magnetic switch.

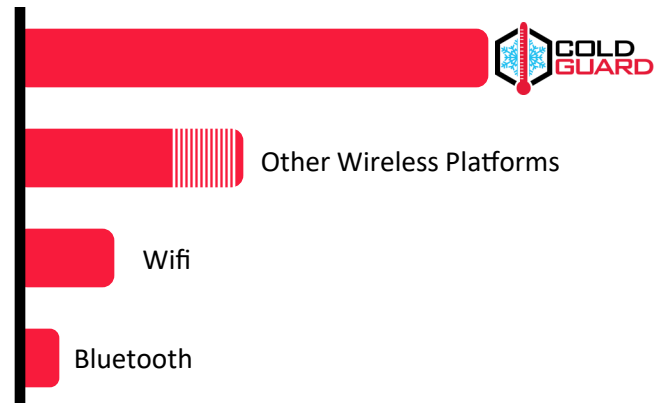
The ColdGuard Wireless Open / Closed Sensor uses an external magnetic switch to detect the presence or removal of a trigger magnet. When the sensor detects that the magnet is removed or returned it sends the information to the ColdGuard Online Sensor Monitoring and Notification System. The data is stored in the online system and can be reviewed and exported as a data sheet or graph. Notifications can be set up through the online system to alert the user when a magnetic source is present or not with the ability to only notify within time of day parameters.

ColdGuard sensors are enclosed in reliable, weather-proof NEMA rated enclosures. Our NEMA rated enclosures are constructed for both indoor or outdoor use and protect the sensor circuitry against the ingress of solid foreign objects like dust as well as the damaging effects of water (rain, sleet, snow, splashing water, and hose directed water).

- Wireless range of 1,000+ feet through 12-14 walls \*
- Frequency Hopping Spread Spectrum (FHSS)
- Improved interference immunity
- Encrypt-RF™ Security (Diffie-Hellman Key Exchange+ AES-128 CBC for sensor data messages)
- 16,000 sensor message memory
- Over the air updates (future proof)
- Plug & Sense, no hassle set-up
- No PC required for operation
- Local status LEDs with transmission and online status indicators
- On-line heart-beat control
- Power outage notification

\*Actual range may vary depending on environment.

### Wireless Range Comparison





## ColdGuard Open / Closed Sensor Specifications

Supply Voltage	2.0 - 3.6 VDC *
Current Consumption	0.7 $\mu$ A (sleep mode) 2 mA (radio idle/off mode) 2 mA (measurement mode) 25 mA (radio RX mode) 35 mA (radio TX mode)
Operating Temperature Range (Board Circuitry and Battery)	-40°C to +85°C ( -40°F to +185°F ) **
Included Battery	Max Temperature Range: -40° to +85°C ( -40° to +185°F ) Capacity: 1800 mAh
Integrated Memory	Up to 512 sensor messages
Wireless Range	1,000+ ft. non-line-of-sight ***
Security	Encrypt-RF tm (256-bit key exchange and AES-128 CTR)
Weight	4.7 Ounces
Enclosure Rating	NEMA 1, 2, 4, 4x, 12 and 13 rated, sealed and weather proof
UL Rating	UL Listed to UL508-4x specifications (File E194432)
Certifications	900 MHz Product: FCC ID: ZTL-G2SC1 and IC: 9794A-G2SC1
	*Hardware cannot withstand negative voltage. Please take care when connecting a power device.
	**At temperatures above 100°C, it is possible for the board circuitry to lose programmed memory.
	***Actual range may vary depending on environment.



## ColdGuard Dry Contact Sensor

The ColdGuard Wireless Dry Contact Sensor can be used to detect contact between two wired contact points, an external mechanical switch or a contact plate.

The ColdGuard Wireless Dry Contact Sensor detects when there is contact between the two wired end points. It can easily be integrated into existing switches or contact plates. When the sensor detects contact between the two end points, it will immediately turn on the RF radio and transmit the data to the wireless gateway and ColdGuard Online Sensor Monitoring and Notification System, allowing the user to immediately receive an SMS text or email alert. The sensor can be configured to detect both closed and open loops alerting if contact is made or broken.

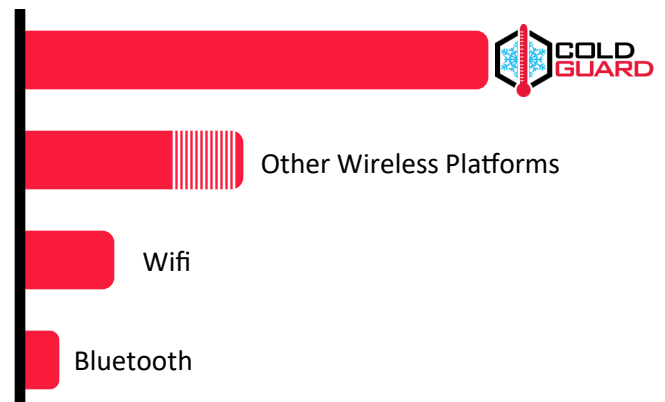
ColdGuard sensors are enclosed in reliable, weather-proof NEMA rated enclosures. Our NEMA rated enclosures are constructed for both indoor or outdoor use and protect the sensor circuitry against the ingress of solid foreign objects like dust as well as the damaging effects of water (rain, sleet, snow, splashing water, and hose directed water).



- Wireless range of 1,000+ feet through 12-14 walls \*
- Frequency Hopping Spread Spectrum (FHSS)
- Improved interference immunity
- Encrypt-RF™ Security (Diffie-Hellman Key Exchange+ AES-128 CBC for sensor data messages)
- 16,000 sensor message memory
- Over the air updates (future proof)
- Plug & Sense, no hassle set-up
- No PC required for operation
- Local status LEDs with transmission and online status indicators
- On-line heart-beat control
- Power outage notification

\*Actual range may vary depending on environment.

### Wireless Range Comparison





## ColdGuard Dry Contact Sensor Specifications

Supply Voltage	2.0 - 3.6 VDC *
Current Consumption	0.7 $\mu$ A (sleep mode) 2 mA (radio idle/off mode) 2 mA (measurement mode) 25 mA (radio RX mode) 35 mA (radio TX mode)
Operating Temperature Range (Board Circuitry and Battery)	-40°C to +85°C ( -40°F to +185°F ) **
Included Battery	Max Temperature Range: -40° to +85°C ( -40° to +185°F ) Capacity: 1800 mAh
Lead Wire Length	1 ft. (12 in.)
Detection Wires	High Impedance
Integrated Memory	Up to 512 sensor messages
Wireless Range	1,000+ ft. non-line-of-sight ***
Security	Encrypt-RF tm (256-bit key exchange and AES-128 CTR)
Weight	4.7 Ounces
Enclosure Rating	NEMA 1, 2, 4, 4x, 12 and 13 rated, sealed and weather proof
UL Rating	UL Listed to UL508-4x specifications (File E194432)
Certifications	900 MHz Product: FCC ID: ZTL-G2SC1 and IC: 9794A-G2SC1
	*Hardware cannot withstand negative voltage. Please take care when connecting a power device.
	**At temperatures above 100°C, it is possible for the board circuitry to lose programmed memory.
	***Actual range may vary depending on environment.





## ColdGuard AC Current Sensor

The ColdGuard Wireless AC Current Sensor measures the RMS current of an alternating current (AC) system using a current transformer (CT) that wraps around the “hot” wire of a two wire (hot, common, ground (optional)) power system. The sensor reports Minimum RMS current, maximum RMS current, average RMS current, and amp hours to the ColdGuard system. The ColdGuard system is capable of generating watt hour or kilowatt hour readings as well.

To measure current, clip the CT around only a single wire of the AC system (clipping around a hot and neutral wire at the same time will result in 0 current readings). After the sensor powers on and connects to the gateway it will begin taking measurements based on the averaging interval (5 seconds default). The sensor reports amp hours, max RMS current, min RMS current, and average RMS current.

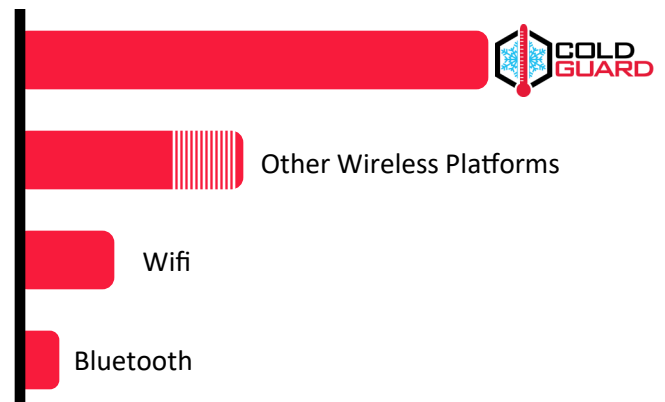
ColdGuard sensors are enclosed in reliable, weather-proof NEMA rated enclosures. Our NEMA rated enclosures are constructed for both indoor or outdoor use and protect the sensor circuitry against the ingress of solid foreign objects like dust as well as the damaging effects of water (rain, sleet, snow, splashing water, and hose directed water).



- Wireless range of 1,000+ feet through 12-14 walls \*
- Frequency Hopping Spread Spectrum (FHSS)
- Improved interference immunity
- Encrypt-RF™ Security (Diffie-Hellman Key Exchange+ AES-128 CBC for sensor data messages)
- 16,000 sensor message memory
- Over the air updates (future proof)
- Plug & Sense, no hassle set-up
- No PC required for operation
- Local status LEDs with transmission and online status indicators
- On-line heart-beat control
- Power outage notification

\*Actual range may vary depending on environment.

### Wireless Range Comparison





## ColdGuard AC Current Sensor Specifications

Supply Voltage	2.0 - 3.6 VDC *
Current Consumption	0.7 $\mu$ A (sleep mode) 2 mA (radio idle/off mode) 2 mA (measurement mode) 25 mA (radio RX mode) 35 mA (radio TX mode)
Operating Temperature Range (Board Circuitry and Battery)	-40°C to +85°C ( -40°F to +185°F) **
Included Battery	Max Temperature Range: -40° to +85°C ( -40° to +185°F ) Capacity: 1800 mAh
Absolute Max CT Current	200 Amps RMS (Arms)
Maximum Accurate CT Current	150 Arms
Frequency Range	50 – 100 Hz
Accuracy	+/- 2% @ 2 to 150 Arms, +/- .4 Arms @ <15 Arms ****
Calibrated Accuracy with Appropriate Offset	+/- 1% @ 2 to 150 Arms, +/- .2 Arms @ <2 Arms ****
Offset Limits	-1.27 to + 1.27 Arms (default set to +.3 Arms) *****
Measurement Resolution	~.1 Arms
Current Transducer Dimensions	67mm x 49mm x 42mm (24mm inner diameter)
Integrated Memory	Up to 512 sensor messages
Wireless Range	1,000+ ft. non-line-of-sight ***
Security	Encrypt-RF tm (256-bit key exchange and AES-128 CTR)
Weight	5.0 Ounces
Enclosure Rating	NEMA 1, 2, 4, 4x, 12 and 13 rated, sealed and weather proof
UL Rating	UL Listed to UL508-4x specifications (File E194432)
Certifications	900 MHz Product: FCC ID: ZTL-G2SC1 and IC: 9794A-G2SC1
	*Hardware cannot withstand negative voltage. Please take care when connecting a power device.
	**At temperatures above 100°C, it is possible for the board circuitry to lose programmed memory.
	***Actual range may vary depending on environment.
	****CTs are inherently less accurate at or below 10% of max range. For best results; calibrate at a current between 30% and 90% of max accurate range.
	*****Offset is used to overcome a diode voltage drop inherent to the hardware. To accurately account for this drop a default offset is used. To best identify the optimal value of this offset; make a series of measurements at .2 to 2 Arms and find the current (Arms) difference between your measurement standard and the ColdGuard sensor.





## ColdGuard Voltage Sensor

The ColdGuard Wireless Voltage Sensor is an analog measuring device that reports the measured voltage on user specified intervals. The sensor has three operating modes, in which you can obtain the voltage measurement in VACrms (root mean squared), the peak voltage, or the DC voltage. The modes can be set by the user; the default mode measures VACrms.

By connecting the leads on the ColdGuard Wireless Voltage Sensor to the positive and ground terminals of another device, battery or sensor, it can measure the voltage and send data to the ColdGuard Online Sensor Monitoring and Notification System. The data is stored in the online system and can be reviewed and exported as a data sheet or graph. Notifications can be set up through the online system to alert the user when certain thresholds have been met or exceeded.

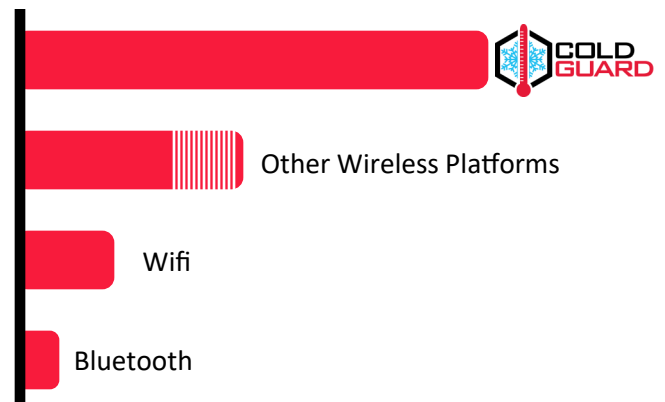
ColdGuard sensors are enclosed in reliable, weather-proof NEMA rated enclosures. Our NEMA rated enclosures are constructed for both indoor or outdoor use and protect the sensor circuitry against the ingress of solid foreign objects like dust as well as the damaging effects of water (rain, sleet, snow, splashing water, and hose directed water).



- Wireless range of 1,000+ feet through 12-14 walls \*
- Frequency Hopping Spread Spectrum (FHSS)
- Improved interference immunity
- Encrypt-RF™ Security (Diffie-Hellman Key Exchange+ AES-128 CBC for sensor data messages)
- 16,000 sensor message memory
- Over the air updates (future proof)
- Plug & Sense, no hassle set-up
- No PC required for operation
- Local status LEDs with transmission and online status indicators
- On-line heart-beat control
- Power outage notification

\*Actual range may vary depending on environment.

### Wireless Range Comparison







## ColdGuard Voltage Sensor Specifications

Supply Voltage	2.0 - 3.6 VDC *
Current Consumption	0.7 $\mu$ A (sleep mode) 2 mA (radio idle/off mode) 2 mA (measurement mode) 25 mA (radio RX mode) 35 mA (radio TX mode)
Operating Temperature Range (Board Circuitry and Battery)	-40°C to +85°C ( -40°F to +185°F ) **
Included Battery	Max Temperature Range: -40° to +85°C ( -40° to +185°F ) Capacity: 1800 mAh
Sensor Resolution	11 bit (single ended)
Conversion Time	228 $\mu$ s
Supported Operation Modes ****	VACrms (root mean squared), Peak Voltage, DC Voltage
Full Scale Voltage	0—500 VAC/VDC*****
Maximum Input Voltage	600 VAC/VDC *****
Accuracy	+/- 3% FS (User calibrated: +/- 1% FS)
Integrated Memory	Up to 512 sensor messages
Wireless Range	1,000+ ft. non-line-of-sight ***
Security	Encrypt-RF tm (256-bit key exchange and AES-128 CTR)
Weight	4.7 Ounces
Enclosure Rating	NEMA 1, 2, 4, 4x, 12 and 13 rated, sealed and weather proof
UL Rating	UL Listed to UL508-4x specifications (File E194432)
Certifications	900 MHz Product: FCC ID: ZTL-G2SC1 and IC: 9794A-G2SC1
	*Hardware cannot withstand negative voltage. Please take care when connecting a power device.
	**At temperatures above 100°C, it is possible for the board circuitry to lose programmed memory.
	***Actual range may vary depending on environment.
	****Operation mode must be specified at the time of purchase.
	*****If application exceeds 500 VAC/VDC the sensor will return a maximum reading of 500V.



## ColdGuard Pressure Sensor

The ColdGuard Wireless pressure sensor measures pressure from a 5 volt pressure transducer and transmits the pressure measurement to the ColdGuard system. This solution combines a standard pressure transducer interfaced to a wireless radio.

By connecting the ColdGuard wireless pressure sensor to a pressurized gas, liquid or vapor supply line, it can measure the pressure within the line and send data to the ColdGuard Online Sensor Monitoring and Notification System. The data is stored in the online system and can be reviewed and exported as a data sheet or graph. User customization allows you to set notifications and alerts from the system so you can know immediately if pressure is above or below an optimal range.

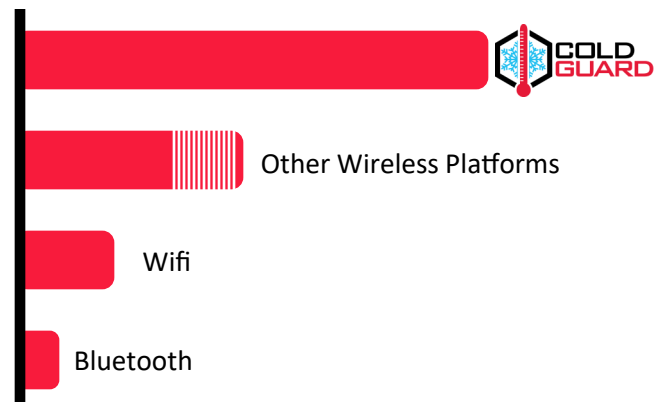
ColdGuard sensors are enclosed in reliable, weather-proof NEMA rated enclosures. Our NEMA rated enclosures are constructed for both indoor or outdoor use and protect the sensor circuitry against the ingress of solid foreign objects like dust as well as the damaging effects of water (rain, sleet, snow, splashing water, and hose directed water).



- Wireless range of 1,000+ feet through 12-14 walls \*
- Frequency Hopping Spread Spectrum (FHSS)
- Improved interference immunity
- Encrypt-RF™ Security (Diffie-Hellman Key Exchange+ AES-128 CBC for sensor data messages)
- 16,000 sensor message memory
- Over the air updates (future proof)
- Plug & Sense, no hassle set-up
- No PC required for operation
- Local status LEDs with transmission and online status indicators
- On-line heart-beat control
- Power outage notification

\*Actual range may vary depending on environment.

### Wireless Range Comparison





## ColdGuard Pressure Sensor Specifications

Supply Voltage	2.0 - 3.6 VDC *
Current Consumption	0.7 $\mu$ A (sleep mode) 2 mA (radio idle/off mode) 2 mA (measurement mode) 25 mA (radio RX mode) 35 mA (radio TX mode)
Operating Temperature Range (Board Circuitry and Battery)	-40°C to +85°C ( -40°F to +185°F ) **
Included Battery	Max Temperature Range: -40° to +85°C ( -40° to +185°F ) Capacity: 1800 mAh
Operating Temperature	-18°C to 79°C (0°F to 175°F)
Thermal Effect on Reading	$\pm$ 0.02% FS/°F. (includes zero and span)
Media	Gas, Liquid or Vapor
Response Time	50 msec
Stability	1.0% FS/year (Typical)
Wire Length	1 Meter shielded cable (between gauge and wireless unit)
Accuracy	0.25% FS; 0.20% RSS; Absolute Ranges: 0.5% FS; 0.35% RSS. (Includes linearity, hysteresis, and repeatability)
Max Voltage Input	5.5 V
Voltage Measurement Range	0—5.2 V ****
Voltage Measurement Resolution	$\sim$ 3 mV
Voltage Measurement Accuracy	$\pm$ 3% FS
Pressure Measurement Accuracy	$\pm$ 3% FS
User Calibrated Pressure Accuracy	$\pm$ 1% FS *****
Process Connection	1/4" NPT-Male Standard
Pressure Transducer	300 PSIG
Integrated Memory	Up to 512 sensor messages
Wireless Range	1,000+ ft. non-line-of-sight ***
Security	Encrypt-RF tm (256-bit key exchange and AES-128 CTR)
Weight	13.3 Ounces
Enclosure Rating	NEMA 1, 2, 4, 4x, 12 and 13 rated, sealed and weather proof
UL Rating	UL Listed to UL508-4x specifications (File E194432)
Certifications	900 MHz Product: FCC ID: ZTL-RFSC1 and IC: 9794A-RFSC1
	*Hardware cannot withstand negative voltage. Please take care when connecting a power device.
	**At temperatures above 100°C, it is possible for the board circuitry to lose programmed memory.
	***Actual range may vary depending on environment.
	****The sensor is capable of measuring above 5 volts but may not meet the specified accuracy above this value.
	*****For best results first zero the sensor then calibrate at greater than 20% maximum pressure of the transducer.





## ColdGuard Water Detection Sensor

The ColdGuard Wireless Water Detection Sensor detects the presence or non-presence of water.

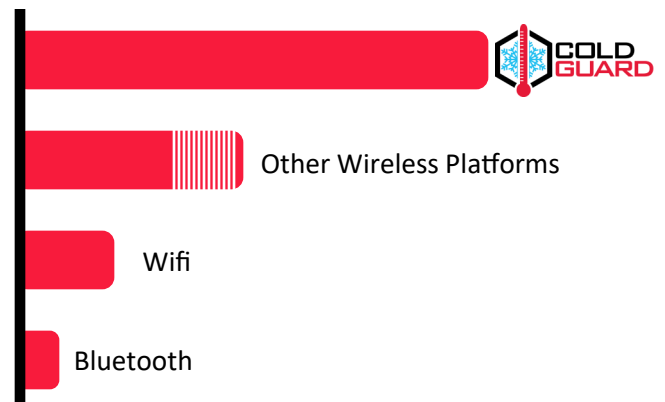
The ColdGuard Wireless Water Detection Sensor detects when water is present by completing the circuit between the two leaded wires. When water is present the sensor will immediately turn on the RF radio and transmit the data to the wireless gateway and iMonnit Online Sensor Monitoring and Notification System, allowing the user to immediately receive an SMS text or email alert. The sensor can be configured to detect both the presence and non-presence of water.

ColdGuard sensors are enclosed in reliable, weather-proof NEMA rated enclosures. Our NEMA rated enclosures are constructed for both indoor or outdoor use and protect the sensor circuitry against the ingress of solid foreign objects like dust as well as the damaging effects of water (rain, sleet, snow, splashing water, and hose directed water).

- Wireless range of 1,000+ feet through 12-14 walls \*
- Frequency Hopping Spread Spectrum (FHSS)
- Improved interference immunity
- Encrypt-RF™ Security (Diffie-Hellman Key Exchange+ AES-128 CBC for sensor data messages)
- 16,000 sensor message memory
- Over the air updates (future proof)
- Plug & Sense, no hassle set-up
- No PC required for operation
- Local status LEDs with transmission and online status indicators
- On-line heart-beat control
- Power outage notification

\*Actual range may vary depending on environment.

### Wireless Range Comparison





## ColdGuard Water Detection Sensor Specifications

Supply Voltage	2.0 - 3.6 VDC *
Current Consumption	0.7 $\mu$ A (sleep mode) 2 mA (radio idle/off mode) 2 mA (measurement mode) 25 mA (radio RX mode) 35 mA (radio TX mode)
Operating Temperature Range (Board Circuitry and Battery)	-40°C to +85°C ( -40°F to +185°F ) **
Included Battery	Max Temperature Range: -40° to +85°C ( -40° to +185°F ) Capacity: 1800 mAh
Thermistor Temperature Range (Thermistor Only)	-40°C to +125°C ( -40°F to +257°F ) ( Limited to Main Unit Circuitry, -40°C to +85°C )
Lead Length	3 ft. (36 in.)
Detection Wires	High Impedance
Integrated Memory	Up to 512 sensor messages
Wireless Range	1,000+ ft. non-line-of-sight ***
Security	Encrypt-RF tm (256-bit key exchange and AES-128 CTR)
Weight	4.7 Ounces
Enclosure Rating	NEMA 1, 2, 4, 4x, 12 and 13 rated, sealed and weather proof
UL Rating	UL Listed to UL508-4x specifications (File E194432)
Certifications	900 MHz Product: FCC ID: ZTL-G2SC1 and IC: 9794A-G2SC1
	*Hardware cannot withstand negative voltage. Please take care when connecting a power device.
	**At temperatures above 100°C, it is possible for the board circuitry to lose programmed memory.
	***Actual range may vary depending on environment.

