

# MeshGuard Gamma



## User's Guide



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## WARNINGS

### Read Before Operating

This manual must be carefully read by all individuals who have or will have the responsibility of using, maintaining, or servicing this product. The product will perform as designed only if it is used, maintained, and serviced in accordance with the manufacturer's instructions.

### FCC Part 15 statement and CE

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

### Warning

Use only the Lithium battery or external rechargeable battery provided by RAE Systems. This instrument has not been tested in an explosive gas/air atmosphere. Replace batteries only in non-hazardous locations.

**STATIC HAZARD:** Clean only with a damp cloth.

For safety reasons this equipment must be operated and serviced by qualified personnel only. Read and understand instruction manual completely before operating or servicing.



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## 1 Product Kits

### 1.1 Standard Kit

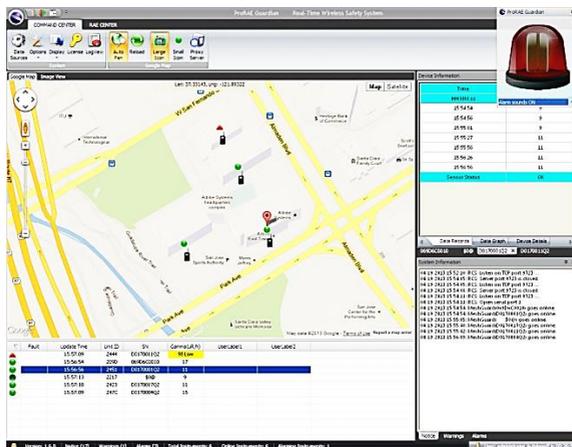
- Gamma detector with antenna
- Lantern mantel source for bump test
- User's Guide adapter
- CD with resources
- Battery tools
- Calibration certificate

### 1.2 Optional Accessories

- Stainless mounting bracket
- Cable adapter

## 2 General Information

MeshGuard Gamma (FTD-4000) is a rapid detector of X gamma radiation integrated with a wireless mesh network-enabled transmission radio module. It can work as a fixed device or as a portable device. The detector has the option of relaying the wireless signal to other MeshGuard Gammas detectors as needed, to bypass obstacles. The MeshGuard Gamma's built-in radio operates on a frequency of 2.4GHz and complies with IEEE 802.15.4 standard. The FTD-4000 works with the FMC-2000 wireless controller on a flexible, robust wireless network to provide reliable, low-cost operation. It also works in a ProRAE Guardian network with a PC, and it supports point-to-point and point-to-multi-point networks.



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## Key Features

- High sensitivity for environmental X-ray and gamma radiation monitoring
- with a wireless system of gamma detection with FMC2000 Controller and ProRAE Guardian Software via RAEMesh Reader
- Support internal D size lithium battery
- Radiological designed to comply with ANSI N42.42-2012
- Up to 1,500 hours operation
- IEEE 802.15.4 Mesh network functionality with 64-bit encryption
- Robust wireless mesh network with auto network forming and configuration
- Operating distance: up to 300 m (1,000'), line of sight
- Minimal cost for installation or relocation
- Large area coverage with multi-hop mesh network
- Field-replaceable battery and sensor
- Loud audio alarm, 90 dB at 30cm (12")
- Bright red flashing alarm
- Highly resistant to RFI interference
- Large, easy-to-read continuous display of dose rate or
- User-adjustable high and low alarms

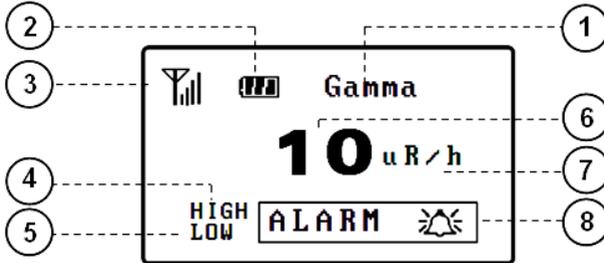
## 3 Physical Description



1	LED alarm
2	LCD
3	Buzzer alarm
4	Sensor cover
5	Battery cover (on bottom)
6	[Y/+], [MODE], and [N/-] keys
7	Antenna
Not visible	Optional magnetic mount on rear

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## 3.1 LCD Display



1	Operation mode indicator (shown as Gamma in Detection Mode, PROGRAMMING in Programming Mode, Diagnostic Programming Mode, and DIAGNOSTIC in Diagnostic Mode)
2	Battery Status Indicator
3	Wireless Communication
4, 8	Dose rate alarm - high
5, 8	Dose rate alarm - low
6	Reading value
7	Dose rate unit ( $\mu\text{R/h}$ , $\text{mR/h}$ , $\mu\text{Gy/h}$ , $\mu\text{Sv/h}$ )

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## 3.2 Specifications

<b>Gamma Sensor</b>	1cc CsI(Tl)/Photodiode
<b>Dose Rate Range</b>	1μR/h to 20mR/h/1 μR/h to 20 mR/h (0.01 μSv/h to 200 μSv/h, or 0.01 μGy/h to 200 μGy/h)
<b>Dose Rate Accuracy</b>	±20% (from 100 μR/h to 20mR/20 mR/h) ±30% or 5 μR/h (from 2 μR/h to 100 μR/h)
<b>Energy Response</b>	60keV to 3.0MeV (X-ray, gamma)
<b>Angular response</b>	0° to 360°, ≤ ±10% ( <sup>137</sup> Cs) horizontal rotation with respect to center line of the gamma sensor
<b>Dose Rate Response</b>	T90 < 5 sec (dose rate > 1 mR/h)
<b>Display</b>	2" graphic LCD
<b>Audible alarm</b>	90dB at 30cm
<b>Visual alarm</b>	2 LEDs
<b>Alarm Response</b>	2 seconds without communication delay (alarm threshold >100μR > 100 μR/h)
<b>Calibration</b>	Annual calibration check is recommended.
<b>Power Supply</b>	1 D-size lithium battery (> 1,500 hours)
<b>User Interface</b>	3 keys (Y/+, MODE, N/-)
<b>RF Certifications</b>	FCC Part 15 CE EN 300328 SRRC
<b>RF</b>	IEEE 802.15.4/Zigbee with mesh stack
<b>Operating Range</b>	Up to 300 meters, line of sight
<b>Transmission Power</b>	Up to 18dBm (63mW)18 dBm (63 mW EIRP)
<b>Receiver Sensitivity</b>	Minimum -95dBm at 2.4GHz

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<b>Operation Time</b>	Internal Battery: For STD* Mode: up to 60 days For RTR** Mode: up to 7 days *STD is standard-function device **RTR is router-function device
<b>Temperature</b>	Operating: -20° C to +50° C (-4° F to 122° F) Storage: -30° C to +70° C (-22° F to 158° F)
<b>Humidity</b>	Up to 95% relative humidity, non-condensing
<b>Dimensions</b>	17.5cm x 9.5cm x 5.5cm (6.9" L x 3.7" W x 2.1" H) excluding an antenna
<b>Weight</b>	600 g (1.3 lbs)
<b>Ingress Protection</b>	IP-54
<b>Mounting</b>	Optional stainless-steel bracket mount or magnetic

## Brazil Radio Specifications

**Radio model:** RM2400A

**Frequency range:** 2.400-2.4835GHz

**Modulation:** 802.15.4 DSSS BPSK

**RF power(Tx):** 20dBm

**Data rate:** 250kbps

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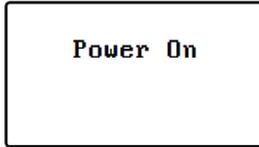
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## 4. Operating MeshGuard Gamma

Make sure the battery is installed before operating the MeshGuard Gamma. Refer to page 27 for information on battery installation and replacement.

### 4.1 Turning MeshGuard Gamma On

Hold down the [MODE] key and release it when the MeshGuard Gamma detector beeps and/or the LCD lights flash. The monitor is now powered on, as indicated by the display:



Power On

The MeshGuard Gamma performs a self-test by sequentially displaying information of the unit (including firmware version, build date and time, serial number, the date when the latest calibration was performed and the date when the next calibration is recommended), followed by warm-up lasting for 30 seconds.

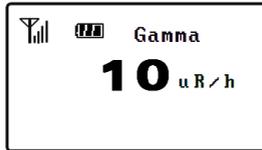
Firmware V1.00	Build Date March 26 2013
Build Time 16:20:52	Serial Number d0170017q2
Last Calibration Apr 2 2013	Calibration Due Jun 26 2014
Warm Up 27	

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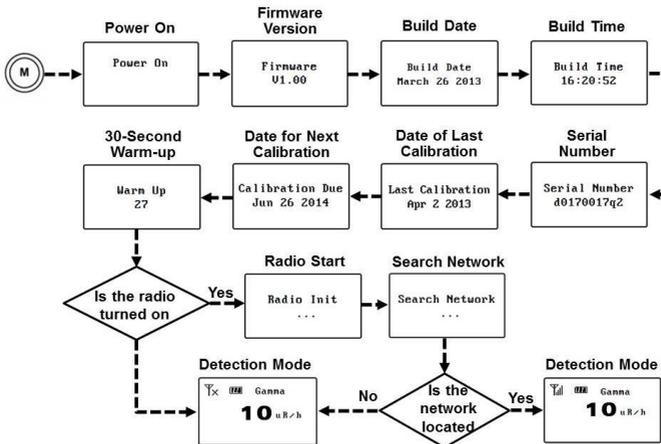
Then, if the MeshGuard Gamma is set to operate in the STD or RTR mode (that is, with the radio on), it attempts to initialize the wireless network and sequentially displays this information:



Next, the instrument starts to operate in the Detection Mode (see page 15) and the current dose rate reading is displayed, regardless of whether a network can be located.



**Note:** If the MeshGuard Gamma has succeeded in being connected to a wireless network, an antenna icon with vertical lines on its right side (shown as the above figure) appears. Otherwise, an antenna icon with a cross symbol on its right side ( $\Upsilon\times$ ) appears.

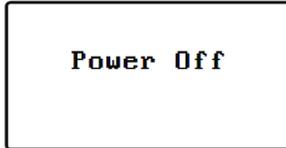


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## 4.2 Turning MeshGuard Gamma Off

Hold down the [MODE] key until the 5-second countdown is over and the display becomes blank. Release the [MODE] key.



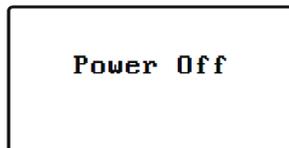
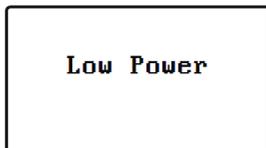
The MeshGuard Gamma is now off.

## 4.3 Low Battery Indicator & Action

The MeshGuard Gamma's battery is designed for up to more than 60 days' life in STD mode (in RTR mode, including the MeshGuard Router's normal operation, battery life is up to 7 days). When the battery gets low (that is, the battery icon appears empty, as shown in the following figure), the LED lights flash once per minute. It is recommended that the battery be changed immediately, to minimize disruption.



When the battery is completely depleted, the LCD sequentially displays “Low Power” and “Power Off,” and the MeshGuard Gamma shuts down automatically soon after that.



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## 4.4 Wireless Communication Indicator

When wireless communication is turned on, the LCD displays the wireless link status in the upper left corner. If it finds and joins a wireless network, the LCD displays an antenna icon with vertical lines on its right side:



If no link or a weak link is established, the LCD displays an antenna icon with a cross symbol on its right side:



## 5 Operation Modes

The MeshGuard Gamma can operate as a standard (STD) or a router-mode (RTR) device. In STD mode, the MeshGuard Gamma transmits data to the host at a set interval (the default is 30 seconds) or anytime an alarm occurs. In RTR mode, the MeshGuard Gamma receives data in real time, and it can also work as a router as needed to relay data from STD devices back to the host.

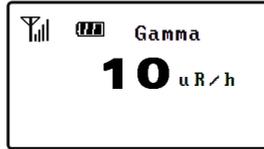
**Note:** Operating the MeshGuard Gamma in RTR mode reduces battery life. The interval can be changed in Programming Mode. See page 19 for details.

In addition, there is a Detection Mode for standard operation, Programming Mode for making changes to values (such as the High Dose Rate Alarm, etc.), Diagnostic Mode (for servicing and checking the sensor, etc.), and Diagnostic Programming Mode for selecting between STD and RTR modes, etc.

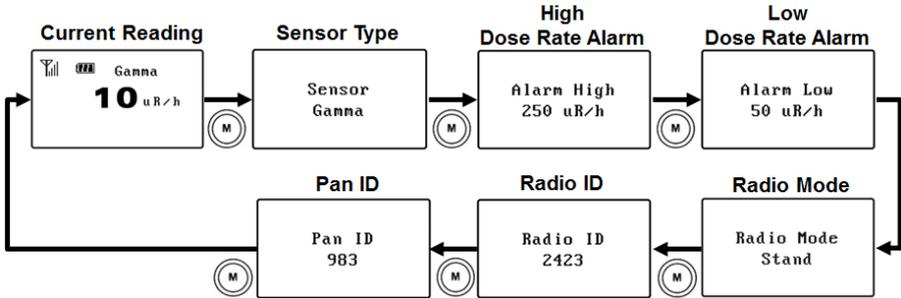
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## 5.1 Detection Mode

After the MeshGuard Gamma is turned on, it enters the Detection Mode and displays the current reading:



Pressing [MODE] steps through the Detection Mode screens:



### 5.1.1 Manually Sending Data

While the MeshGuard Gamma typically sends data to the network on a fixed interval, you can send the data anytime.

Press the [Y/+] key. The screen shows “Send Data ...”, and it attempts to send the current sensor data. If it succeeds, the screen displays “Sending Data Successful” and otherwise displays “Sending Data Failed”, and returns to the detector reading.



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## 5.1.2 Selecting Dose Rate Unit for Current Reading

The MeshGuard Gamma can display dose rate in three unit systems, Roentgen (R), Sievert (Sv) and Gray (Gy). Press the [N/-] key to select a unit system in which the current reading is preferred to be displayed. Once a unit system is selected, the current reading is always displayed until another unit system is selected.



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## 5.2 Programming Mode

Programming Mode allows you to perform any of the following actions (listed in order of appearance):

- Changing preset dose rate alarm thresholds
- Setting parameters for wireless connection
- Adjusting LCD contrast
- Performing a bump test

### 5.2.1 Entering Programming Mode

To enter the Programming Mode, press [MODE] and [N/-] for 3 seconds. This mode provides a menu that includes the following options:

- Alarm Set
- Radio Set
- LCD Contrast
- Bump Test
- Quit

The currently selected option is highlighted by the black bar behind the text. Press [Y/+] to enter a submenu subject to the highlighted option. Press [MODE] to advance to the next option.

When the option “Quit” is highlighted, press [Y/+] to exit and return to the Detection Mode.

### 5.2.2 Alarm Set

This submenu allows you to change the high and low dose rate alarm thresholds. It includes following options:

- Alarm High
- Alarm Low
- Quit

The currently selected option is highlighted by the black bar behind the text. Press [MODE] to advance to the next option. Press [Y/+] to enter and change the setting. When “Quit” is highlighted, pressing [Y/+] navigates you to exit the submenu and return to the main menu.

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To change the high dose rate alarm threshold, press [Y/+] when the option “Alarm High” is highlighted. The following screen is displayed:

```
PROGRAMMING
Alarm High
0250 uR/h
Save Quit
```

The LCD has seven active fields, four digits of the current setting value, the dose rate unit section, the “Save” section, and the “Quit” section. Press [MODE] to highlight the next active field, or to highlight the first active field if the last active field is currently highlighted. When “Quit” is highlighted, press [Y/+] to exit to the upper menu at any time.

To change the current setting value:

1. Press [Y/+] to increase the number of the highlighted digit and [N/-] to decrease it.
2. Press [MODE] to advance to the next digit.
3. After moving to the last digit and making changes, press [MODE] to highlight the dose rate unit section.

```
PROGRAMMING
Alarm High
0250 uR/h
Save Quit
```

4. Press [Y/+] to switch the current unit to the next one of the options  $\mu\text{R/h}$ ,  $\mu\text{Sv/h}$ ,  $\mu\text{Gy/h}$  and  $\text{mR/h}$  in the order. Select the desired unit option by making it displayed.

Press [MODE] to highlight the “Save” section and then press [Y/+] to save the changes. It exits the current screen and returns to the upper menu.

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The low dose rate alarm threshold can be changed in a similar way, except that pressing [Y/+] when the option “Alarm Low” is highlighted makes the following screen display:



**Note:** The valid range for both the high and low alarm thresholds are 1 to 9999, if you set a number outside this range (for example, 0), it cannot be successfully saved and an error warning message appears at the bottom of the screen.

## 5.2.3 Radio Set

This submenu allows you to set the Pan ID for a wireless network, join the network, and change the interval for regular communications between the MeshGuard Gamma and the network. The submenu includes the following options:

- Pan ID (valid range: 1 to 999)
- Interval (valid range: 10 to 255)
- Join Network
- Quit

The currently selected option is highlighted by the black bar behind the text. Press [MODE] to advance to the next option. Press [Y/+] to enter and change the setting. When “Quit” is highlighted, pressing [Y/+] navigates you to exit this submenu and return to the main menu.

To set the Pan ID, press [Y/+] when the option “Pan ID” is highlighted. The following screen is displayed:



The display has six active fields, four digits of the current setting value, the “Save” section, and the “Quit” section. Press [MODE] to highlight the next

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active field, or to highlight the first active field if the last active field is currently highlighted.. When “Quit” is highlighted, press [Y/+] to exit to the upper menu at any time.

To change the current setting value:

1. Press [Y/+] to increase the number of the highlighted digit and [N/-] to decrease it.
2. Press [MODE] to advance to the next digit.
3. After moving to the last digit and making changes, press [MODE] to highlight the “Save” section.

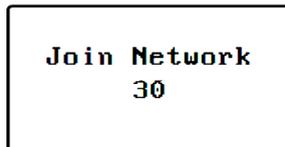
Press [Y/+] to save the changes. It exits to the upper menu.

The data communication interval can be changed in a similar way, except this screen is displayed if you press [Y/+] when the option “Interval” is highlighted:



**Note:** The valid ranges for the Pan ID and interval are 1 to 999 and 10 to 255, respectively. If a number is set outside these ranges (for example, 0), it cannot be successfully saved and an error message appears at the bottom of the screen.

To join the wireless network associated with the preset Pan ID, press [Y/-] when the option “Join Network” is highlighted. A 30-second countdown proceeds while it searches.



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After the countdown has finished, if it succeeds, “Yes” is displayed. If it fails, “No” is displayed. Refer to Section 9, Troubleshooting, if the detector fails to connect to a network.



## 5.2.4 LCD Contrast

This submenu allows you to change LCD contrast. Press [Y/+] when the option “LCD Contrast” is highlighted. The following screen is displayed:



The LCD has six active fields, four digits of the current setting value, the “Save” section and the “Quit” section. Press [MODE] to highlight the next active field, or to highlight the first active field if the last active field is currently highlighted. When “Quit” is highlighted, press [Y/+] to exit to the upper menu at any time.

To change the current setting value:

1. Press [Y/+] to increase the number of the highlighted digit and [N/-] to decrease it.
2. Press [MODE] to advance to the next digit.
3. After moving to the last digit and making changes, press [MODE] to highlight the “Save” section.
4. Press [Y/+] to save the changes. It exits and returns to the upper menu.

**Note:** The valid range for the LCD contrast is 1 to 100. If a number is set outside this range, it cannot be successfully saved and an error message appears at the bottom of the screen.

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## 5.2.5 Bump Test

This submenu allows you to perform a bump test to verify whether the MeshGuard Gamma detector normally alarms when ambient dose rate level is higher than the preset low threshold. Press [Y/+] when the option “Bump Test” is highlighted, and the following screen is displayed:

```
PROGRAMMING
  Bump Test
    0 uR/h
  Start Quit
```

The display has two active fields, “Start” and “Quit.” Press [MODE] to select between them. When “Quit” is highlighted, press [Y/+] to exit to the upper menu at any time.

To start the bump test:

1. Press [MODE] to highlight “Start.”
2. Bring a gamma check source (such as a lantern mantel; the maximum dose rate it can provide is about  $100\mu\text{R/h}$ ) into close proximity with the MeshGuard Gamma sensor located on the bottom of the detector (Reference the diagram on page 9).
3. Press [Y/+] to start a 30-second measurement of ambient the dose rate level. During the measurement, the countdown and dose rate are displayed:

```
Bump Test
  Time:28s
  90 uR/h
  Quit
```

**Note:** During measurement, “Quit” is always highlighted. Press [Y/+] to stop the bump test at any time.

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4. After the measurement, a test report screen shows the maximum measurement value and the test result:

**Bump Test**  
**95 uR/h**  
**Pass**

**Bump Test**  
**30 uR/h**  
**Fail**

**Note:** In normal operation, if the maximum value exceeds the preset low threshold value, the test result is “Pass.” Otherwise, it is “Fail.”

## 6 Diagnostic Mode

Diagnostic Mode provides raw data from the gamma sensor and other information useful to technicians when troubleshooting or repairing the instrument.

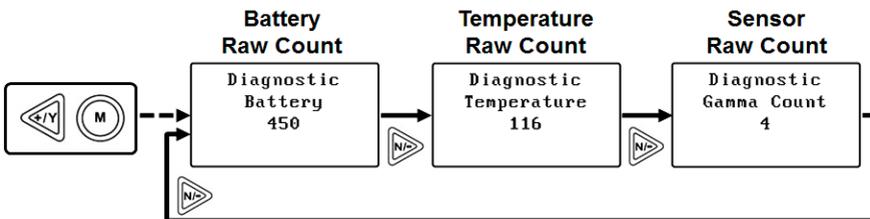
### 6.1 Entering Diagnostic Mode

**Note:** To enter Diagnostic Mode, you must begin with the MeshGuard Gamma turned off.

Press and hold [Y/+] and [MODE] until the MeshGuard Gamma starts.

The instrument displays “Diagnostic Mode” and goes through a 30-second warm-up. It then switches to showing raw data for the battery.

The following chart shows how to navigate Diagnostic Mode (pressing [N/-] repeatedly steps through the screens):



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## 6.2 Exiting Diagnostic Mode

**Note:** You can exit Diagnostic Mode and enter Programming Mode and configure settings of the MeshGuard Gamma as usual by pressing both [MODE] and [N/-] for three seconds.

**Note:** You can exit Diagnostic Mode and enter Detection Mode by pressing [MODE] and [Y/+] together for three seconds, or by turning it off and on again.

## 6.3 Diagnostic Mode Readings

In Diagnostic mode, you can step through readings by pressing [N/-].

### 6.3.1 Sensor Raw Count

Sensor Raw Count is indicated by “Gamma Count” followed by a number.

- Press [N/-] to advance to the next reading.
- Press [MODE] and [Y/+] together for three seconds to exit Diagnostic Mode and enter Detection Mode.

### 6.3.2 Battery Raw Count

Battery Raw Count is indicated by “Battery” followed by a number.

- Press [N/-] to advance to the next reading.
- Press [MODE] and [Y/+] together for three seconds to exit Diagnostic Mode and enter Detection Mode.

### 6.3.3 Temperature Raw Count

Temperature Raw Count is indicated by “Temperature” followed by a number.

- Press [N/-] to advance to the next reading.
- Press [MODE] and [Y/+] together for three seconds to exit Diagnostic Mode and enter Detection Mode.

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## 6.4 Diagnostic Programming Mode

You can enter a special programming mode from Diagnostic Mode in order to perform advanced programming functions. These include:

- Enable/disable audible and visible alarms
- Enable Radio
- Enable STD or RTR
- Return MeshGuard Gamma to original factory settings

**Important!** After you make changes in Diagnostic Mode, it is recommended that you turn off the MeshGuard Gamma and turn it on again before using it.

Enter this programming mode by first entering Diagnostic Mode. This requires starting the MeshGuard Gamma while holding [Y/+] and [MODE]. When you see the Battery Raw Count screen, hold [MODE] and [N/-] until you see the “PROGRAMMING” menu in the display, indicating that you are in Diagnostic Programming Mode.

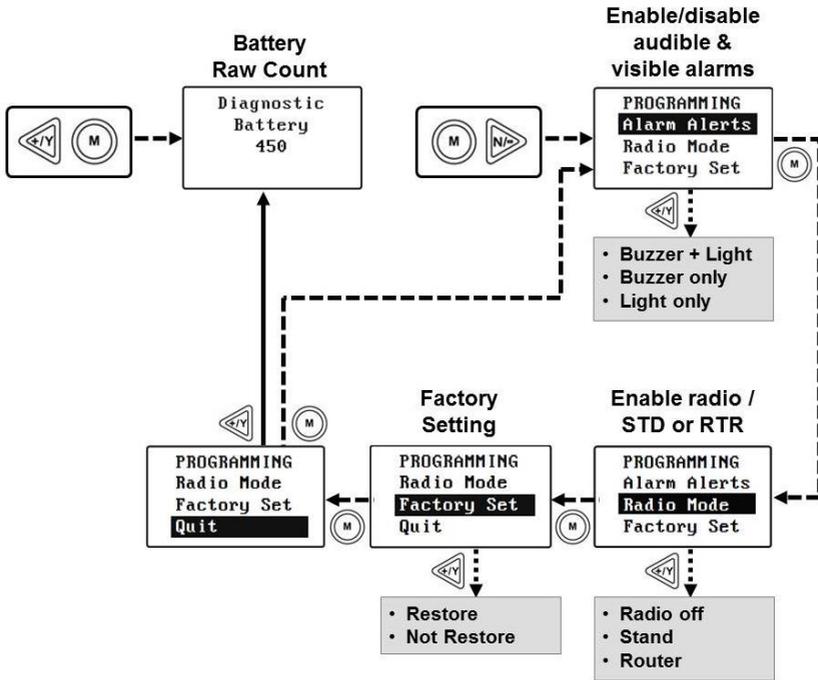
The menu includes the following options:

- Alarm Alerts
- Radio Mode
- Factory Set
- Quit

The currently selected option is highlighted by the black bar behind the text. Press [Y/+] to enter a submenu subject to the highlighted option. Press [MODE] to advance to the next option.

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When the option “Quit” is highlighted, press [Y/+] to exit and return to the Diagnostic Mode.



## 6.4.1 Alarm Alerts

This submenu allows you to enable/disable audible and visible alarms. It includes following options:

- Buzzer plus light
- Buzzer only
- Light only

The currently selected option is highlighted by the black bar behind the text. Press [MODE] to advance to the next option. Press [Y/+] to select an option and exit the submenu.

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## 6.4.2 Radio Mode

This submenu allows you to turn off the radio or set the instrument to operate in the STD or RTR mode. It includes following options:

- Radio off
- Stand
- Router

The currently selected option is highlighted by the black bar behind the text. Press [MODE] to advance to the next option. Press [Y/+] when one of the options is highlighted to enable the corresponding setting as shown in the following table and exit the submenu.

Radio off	Turn off the radio
Stand	Set the instrument to operate in STD mode
Router	Set the instrument to operate in RTR mode
Quit	Maintain the current operating mode

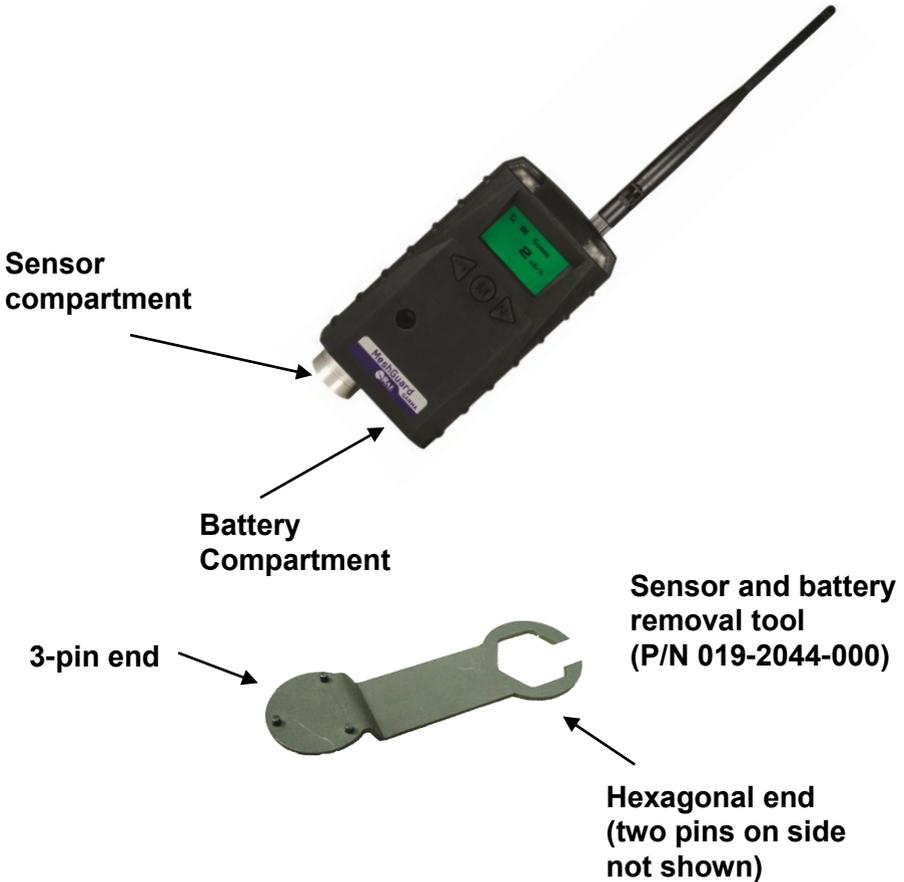
## 6.4.3 Factory Set

This submenu allows you to return the MeshGuard Gamma to its original factory settings. It includes following options:

- Restore
- Not restore

The currently selected option is highlighted by the black bar behind the text. Press [MODE] to advance to the next option. Press [Y/+] to select an option and exit the submenu.

## 7 Sensor and Battery Replacement



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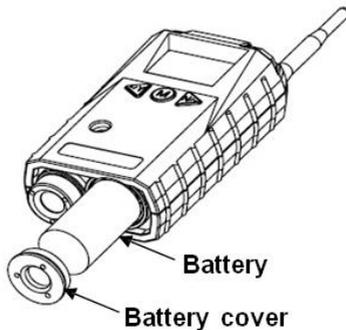
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## 7.1 Battery replacement

1. Use the 3-pin end of the tool to unscrew and open the battery cover by turning it counterclockwise.
2. Remove the battery.
3. Insert the new battery with its positive (“+”) pole towards inside of the unit.
4. Replace the battery cover by turning it clockwise with the 3-pin end of the tool.

**Note:** Only change internal battery in a safe location and use the battery RAE Systems provided (P/N: 500-0111-000), model ER34615 or XL-205F.

After changing the battery, wait at least 60 seconds before turning the MeshGuard Gamma on.



## 7.2 Proper Battery Disposal

This product may contain one or more sealed lead-acid, nickel- cadmium (NiCd), nickel-metal hydride (NiMH), lithium (Li), or lithium-ion batteries. Specific battery information is given in this user guide. Batteries must be recycled or disposed of properly.



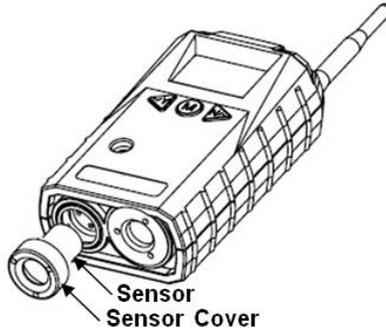
This symbol (crossed-out wheeled bin) indicates separate collection of waste electrical and electronic equipment in the EU countries. Please do not throw the equipment into the domestic refuse. Please use the return and collection systems available in your country for the disposal of this product.

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## 7.3 Sensor Replacement

1. Unscrew and open the sensor cover at the bottom of the monitor by turning it counterclockwise.



2. Pull the old sensor out.
3. Gently push a new sensor into the compartment.

**Important!** Ensure that the RAE Systems part number matches the sensor that was removed.

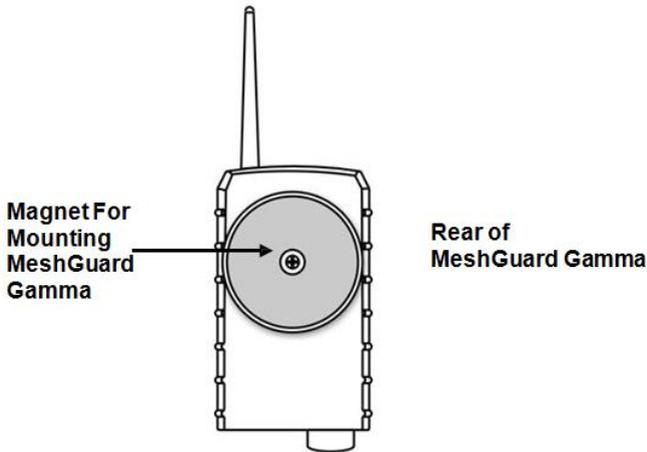
**WARNING!** Use only the same sensor model as the one installed when the monitor was purchased.

4. Replace the sensor cover by turning it clockwise.

## 8 Appendix A: Installation

Two methods for mounting the MeshGuard Gamma make it easy to install. The first method uses a magnet that screws onto the rear of the MeshGuard Gamma, making ideal for moving from one location to another. The second method uses a specially designed stainless-steel enclosure that is permanently mounted. It protects the MeshGuard Gamma from damage in industrial settings.

### 8.1 Magnet-Mount Installation



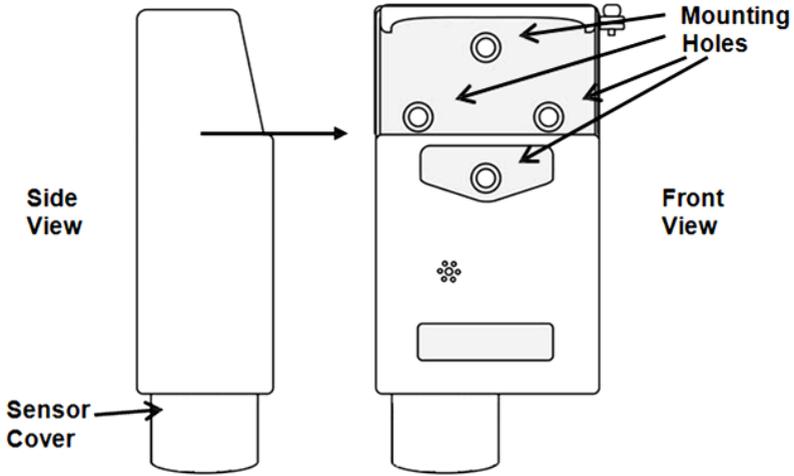
This magnet is powerful enough to support the MeshGuard Gamma when it is placed against a flat steel or iron surface.

**Important!** Keep the magnet away from computer hard drives. The strong magnet can corrupt or erase data on these.

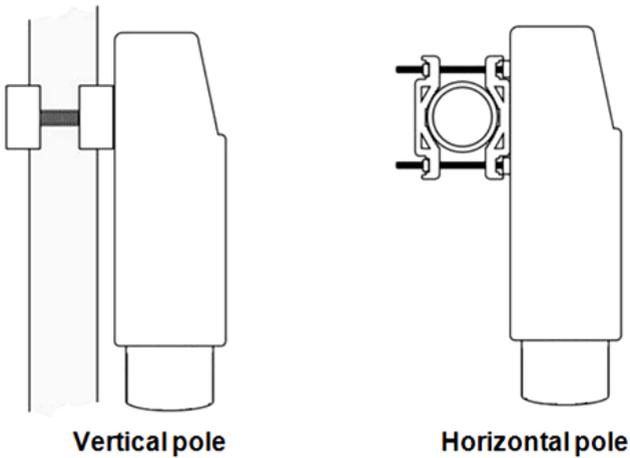
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## 8.2 Fixed Installation

Four reinforced holes in the rear of the enclosure allow for a screw to pass through to the mounting brackets.



The enclosure can be mounted to a vertical or horizontal pole.

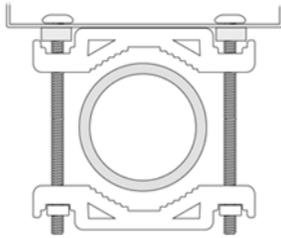


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Slip the screws through the two holes that are side by side in order to mount the enclosure to a vertical pole. Otherwise slip the screws through the two vertically aligned holes to attach the enclosure to a horizontal pole.

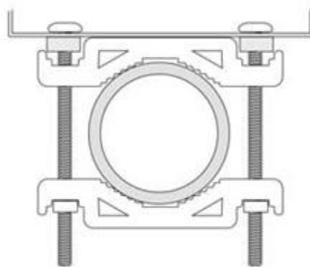
Loosely assemble the clamp parts around the pole. Note that the screws have nuts that fit into the clamp parts. The clamp parts are designed to hold the nut so that you do not need to use a wrench. Hand-tighten the parts until snug.



Tighten the hex screws from the front of the enclosure:



Once the clamp parts and the enclosure are securely held against the pole, stop tightening.



**Note:** The pole must be between 25mm (1") and 63mm (2.5") in diameter.

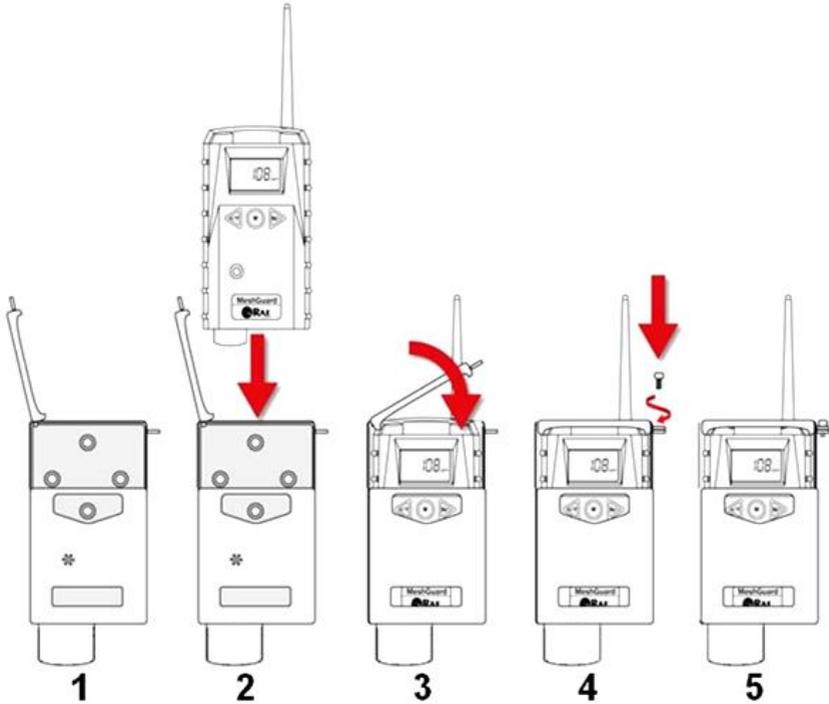
Next, place the MeshGuard Gamma into the enclosure:

1. Lift up the hinged cover of the enclosure.

## MeshGuard Gamma User's Guide

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2. Slide the MeshGuard Gamma into the enclosure from the top.
3. Close the cover of the enclosure.
4. Insert the hex screw into the cover's locking portion, and tighten it.
5. The MeshGuard Gamma is now ready to use.



**Note:** The sensor cover on the bottom of the enclosure can be removed so that the sensor can be inspected without removing the MeshGuard Gamma from the enclosure. Simply pull off the cover and follow the maintenance procedures in this guide.

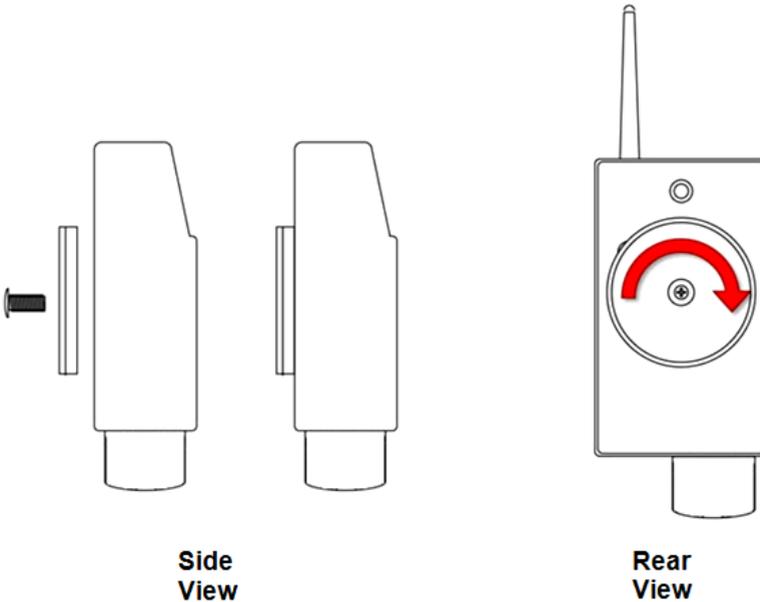
# MeshGuard Gamma User's Guide

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## 8.3 Magnetic Mount Alternative Installation

The magnet-mount disc can be attached to the steel enclosure instead of the clamps. This approach provides the protection of the enclosure with the ease of installation afforded by the magnetic mounting.

1. Insert screw through magnetic disc.
2. Place the magnetic disc over the bottom hole on the rear of the enclosure.
3. Tighten the screw until the disc is snug.



# MeshGuard Gamma User's Guide

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**Ordering Replacement Parts:** If you need replacement parts, a list is available online: <http://www.raesystems.com>

## Year of Manufacture

To identify the year of manufacture, refer to the serial number of the instrument.

The second to last digit in the serial number indicates the year of manufacture. For example, “Q” indicates the manufacturing year is 2013.

<b>First digit</b>	<b>Year</b>
Q	2013
R	2014
S	2015
T	2016
U	2017
V	2018
W	2019

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## 9 Troubleshooting

Failure Symptom	Cause	Solution
Cannot turn on	Battery charge too low	Replace battery
	Battery has been changed	Wait at least 60 seconds to turn on MeshGuard
	New battery needs to be discharged before use	Check RAE Systems web site for information on batteries
Abnormally high reading	Incorrect radiation calibration	Recalibrate
	Sensor malfunction	Replace the sensor
Always displays zero	Sensor failure	Replace the sensor
Controller cannot receive the MeshGuard Gamma's signal	Too much distance between the MeshGuard Gamma and the controller.	The distance should be 300 m, line of sight.
	There is an obstruction between the MeshGuard Gamma and the controller.	Deploy RTR MeshGuard Gamma or MeshGuard Router(s). Relocate the MeshGuard Gamma or deploy RTR MeshGuard Gamma or MeshGuard Router(s).
	Controller does not receive completed data packet	Press [Y/+] on the detector to force it to send data packets

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	<p>Battery is low</p> <p>MeshGuard Gamma and controller have different Pan ID numbers</p>	<p>Replace battery</p> <p>Set both units to have the same Pan ID number</p>
<p>Always displays  when MeshGuard Gamma is set ready for wireless communications</p>	<p>There is no reader or controller nearby.</p> <p>The controller or reader's network has changed.</p> <p>The MeshGuard Gamma is out of its RF range.</p> <p>Battery is low</p>	<p>Move the MeshGuard Gamma closer to a working controller or reader.</p> <p>Perform the network searching function in diagnostic mode.</p> <p>Move the MeshGuard Gamma close to a working controller or reader and Press [Y/+]</p> <p>Replace battery</p>
<p>Occurrence of false alarming</p>	<p>EMI interference</p> <p>Low battery</p> <p>Sensor failure</p>	<p>Check whether there is a strong EMI source nearby</p> <p>Replace the battery</p> <p>Replace the sensor</p>
<p>Others</p>		<p>Turn MeshGuard Gamma off and on again.</p> <p>Consult RAE Systems Customer Service.</p>

contém o módulo wireless: RM2400A



2783-14-6496



(01)07898911288388

Este equipamento opera em caráter secundário, isto é, não tem direito a proteção contra interferência prejudicial, mesmo de estações do mesmo tipo, e não pode causar interferência a sistemas operando em caráter primário.



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