

# Victoreen® 948A-40 and 948A-50

Remote Alarm and Alarm/Meter

Instruction Manual



**CardinalHealth**

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# Introduction

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## 1.1 General Description

### Remote Alarm and Alarm/Meter (948A-40 & 948A-50)

The 948A-50 Remote Alarm/Meter continuously indicates the level of radiation at the detector site and provides a visual and audible indication of a high radiation level on an analog meter, light, and Sonalert. The meter of the Remote Alarm/Meter is an analog meter scale that indicates in the range of 0.1 to 10<sup>7</sup> mR/h. The light and Sonalert are actuated when the radiation level exceeds the high alarm set point of the Universal Digital Ratemeter. Both models have a momentary pushbutton to silence the Sonalert. The 948A-40 and 948A-50 enclosures are Steel. The 948A-40 is identical with the exception that it has no analog meter. Refer to Appendix A for drawings.

## 1.2 Application

The remote alarm/meter is an actual component of the 945 and 945A Wide Range Area Monitoring System. A typical Wide Range Area Monitoring System consists of the following VICTOREEN instruments: a 977-series Ion Chamber Detector, a 946A-200 Universal Digital Ratemeter (UDR), and a 948A-50 Remote Alarm/Meter or 948A-40 Remote Alarm. When used with 977-201 detectors, refer to Loop Diagram 945-3 for interconnection information. When used with 977-210 detectors, refer to Loop Diagram 945A-3 for interconnection information.

## 1.3 Specifications

Specifications for the 948A-40 Remote Alarm and the 948A-50 Remote Alarm/Meter are shown below.

<b>Power Requirement</b>	12 VDC for the Sonalert, relay, and light 0 to 10 VDC for the meter of the 948A-50 (supplied by the detector)
<b>Recommended Cable</b>	P/N 50-150
<b>Cable Length</b>	1500 ft (457 m)
<b>Operating Temperature</b>	32° to 122°F (0° to 50°C)
<b>Storage Temperature</b>	32° to 122°F (0° to 50°C)
<b>Relative Humidity</b>	0 to 95%, non-condensing
<b>Housing Material</b>	Steel
<b>Dimensions, Enclosure</b>	8 (w) x 4 (d) x 10.25 in (h) (20.3 x 10.2 x 26 cm)
<b>Dimensions, Overall</b>	8.94 (w) x 4.62 (d) x 11.5 (h) (22.7 x 11.7 x 29.2 cm)
<b>Weight</b>	8 lb (3.6 kg)

## 1.4 Receiving Inspection

Upon receipt of the unit:

1. Inspect the carton(s) and contents for damage. If damage is evident, file a claim with the carrier and notify Cardinal Health at 440.248.9300.
2. Remove the contents from the packing material.
3. Verify that all items listed on the packing list have been received and are in good condition.

### CAUTION

If any of the listed items are missing or damaged, notify Cardinal Health at 440.248.9300.

## 1.5 Storage

Storage of Victoreen instruments must comply with Level B storage requirements as outlined in ANSI N45.2.2 (1972) Section 6.1.2.(2). The storage area shall comply with ANSI N45.2.2 (1972) Section 6.2 Storage Area, Paragraphs 6.2.1 through 6.2.5. Housekeeping shall conform to ANSI N45.2.3 (1972).

Level B components shall be stored within a fire resistant, tear resistant, weather tight enclosure, in a well-ventilated building.

Storage of Victoreen instruments must comply with the following:

1. Inspection and examination of items in storage must be in accordance with ANSI N45.2.2 (1972) Section 6.4.1.
2. Requirements for proper storage must be documented and written procedures or instructions must be established.
3. In the event of fire, post-fire evaluation must be in accordance with ANSI N45.2.2 (1972), Section 6.4.3.
4. Removal of items from storage must be in accordance with ANSI N45.2.2 (1972), Sections 6.5 and 6.6.

## 1.6 Procedures, Warnings, and Cautions

The equipment described in this manual is intended to be used for the detection and measurement of ionizing radiation. It should be used only by persons who have been trained in the proper interpretation of its readings and the appropriate safety procedures to be followed in the presence of radiation.

Although the equipment described in this manual is designed and manufactured in compliance with all applicable safety standards, certain hazards are inherent in the use of electronic and radiometric equipment.

**WARNINGS** and **CAUTIONS** are presented throughout this document to alert the user to potentially hazardous situations. A **WARNING** is a precautionary message preceding an operation that has the potential to cause personal injury or death. A **CAUTION** is a precautionary message preceding an operation that has the potential to cause permanent damage to the equipment and/or loss of data. Failure to comply with **WARNINGS** and **CAUTIONS** is at the user's own risk and is sufficient cause to terminate the warranty agreement between Cardinal Health, Radiation Management Services and the customer.

Adequate warnings are included in this manual and on the product itself to cover hazards that may be encountered in normal use and servicing of this equipment. No other procedures are warranted by Cardinal Health. It shall be the owner's or user's responsibility to see to it that the procedures described here are meticulously followed, and especially that **WARNINGS** and **CAUTIONS** are heeded. Failure on the part of the owner or user in any way to follow the prescribed procedures shall absolve Cardinal Health and its agents from any resulting liability.

Indicated battery and other operational tests must be performed prior to each use to assure that the instrument is functioning properly. If applicable, failure to conduct periodic performance tests in accordance with ANSI N323-1978 (R1983) Radiation Protection Instrumentation Test and Calibration, paragraphs 4.6 and 5.4, and to keep records thereof in accordance with paragraph 4.5 of the same standard, could result in erroneous readings or potential danger. ANSI N323-1978 becomes, by this reference, a part of this operating procedure.

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# Installation

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## 2.1 Installation

**CAUTION**

Ensure all power is removed prior to installing the 948A-40 or 948A-50 Remote Alarm, Alarm/Meter.

Installation of the 948A-50 Remote Alarm/Meter consists of finding a suitable location for mounting, such as a wall or post, and providing an electrical interface. Both the 948A-40 and 948A-50 Remote Alarm, Remote Alarm/Meter can be mounted up to 1500 feet from the detector and UDR.

There are two possible wiring configurations (reference loop diagram 945-3 or 945A-3 in Appendix A). In the first configuration, terminal block TB2 is used as a junction for the VICTOREEN communications loop between the preamplifier and ratemeter. The signals that drive the meter, Sonalert, and light originate at the preamplifier and are connected to TB1.

In the second configuration, the VICTOREEN communications loop wiring runs directly from the ratemeter to the preamplifier, eliminating the need for TB2. The signals that drive the meter, Sonalert, and light are connected to TB1 as in the previous case.

Use the following procedure to install the remote alarm, alarm/meter:

1. Select a suitable location for the 948A-40 Remote Alarm or the 948A-50 Remote Alarm/Meter.
  - a. The length of the cable must not exceed 1500 feet (450 meters).
  - b. The access holes for the cables are located in the bottom panel of the remote alarm, alarm/meter housing.
2. Mount the remote alarm, remote alarm/meter to the supporting structure. Refer to drawing GEL948A-50, located in Appendix A, for mounting dimensions.
3. Route the cable (P/Number 50-150 or equivalent) between the rate meter and the remote alarm, remote alarm/meter or between the rate meter and preamplifier (refer to loop diagram 945-3 or 945A-3 in Appendix A).

**NOTE**

When using the first configuration, connect the wires of the cable to the terminal block located inside the remote alarm, remote alarm/meter housing.

4. Verify that all electrical connections are correct and secure.
5. This concludes the installation procedure for the 948A-40 Remote Alarm and the 948A-50 Remote Alarm/Meter.

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# Operation

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## 3.1 Operation

Since the operation and theory for the 948A-40 is identical to the 948A-50 with the exception that the 948A-40 has no meter, only the 948A-50 will be discussed.

Once installation has been completed, operation of the VICTOREEN 948A-50 Remote Alarm/Meter is automatic and does not require operator attention.

The analog meter continuously indicates the level of radioactivity measured at the detector site from 0.1 to  $10^7$  mR/h. The light and Sonalert are actuated only when the radiation level at the detector site exceeds the high alarm set point established at the ratemeter.

When an alarm condition occurs, the 12 VDC output from the detector preamplifier energizes causing the Sonalert audible alarm to sound and the alarm lamp to illuminate STEADY ON.

The audible alarm can be silenced by pressing the "silence" pushbutton on the front panel, causing the Sonalert to de-activate and the light to remain illuminated. An alarm condition cannot be canceled locally. The Sonalert and light are automatically de-actuated when the alarm is acknowledged from the digital ratemeter.

## 3.2 Theory of Operation

This section contains the theory of operation for the 948A-50.

During a high alarm condition, the light will illuminate and the Sonalert will sound. A silence button, located on the front of the local/alarm meter, is provided to enable the operator to silence the Sonalert.

When a high alarm condition occurs, a 12 VDC input is introduced to the alarm circuit. This signal will cause the light to illuminate. This 12 VDC input is also applied, via a normally closed contact of relay K1, to the Sonalert, energizing it. To turn off the Sonalert, the silence pushbutton on the front panel may be depressed. This will cause the normally closed contacts of relay K1 to open, which in turn de-energizes the Sonalert.

When the system returns to a normal operating level of radiation, the remote alarm/meter will return the relay to the normal operating position.

When the alarm is powered from the preamplifier 12 VDC output, acknowledging the alarm from the digital ratemeter, will turn the 12 VDC input off, turning the audible alarm and the visual alarm off.

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# Maintenance, Calibration, and Troubleshooting

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## 4.1 Maintenance

The 948A-40 Remote Alarm and 948A-50 Remote Alarm/Meter require no routine maintenance other than periodic calibration for the 948A-50. Refer to calibration for further information.

## 4.2 Calibration

The 948A-50 requires calibration before it is initially placed into service. In addition, it should be recalibrated at regular intervals during routine service. The length of time between calibration intervals should be determined by the customer. Use the following procedure to perform the calibration:

1. Using radios, field telephones, or other suitable communication devices, establish communications between a technician at the ratemeter location and another at the remote alarm/meter location.
2. To gain access to the meter adjustment potentiometer, open the front panel of the remote alarm/meter. The potentiometer is mounted on the rear of the panel meter.
3. Adjust the potentiometer until the reading shown on the panel meter agrees with the reading shown on the ratemeter within  $\pm 5\%$ .
4. This concludes the calibration procedure for the 948A-50 Remote Alarm/Meter.

## 4.3 Troubleshooting

### WARNING

Extreme care must be used when troubleshooting a system that has power applied. All standard troubleshooting precautions apply.

### WARNING

Once a problem has been located, remove all power before continuing with the repair.

### CAUTION

Personnel performing the following procedure must be familiar with the operation of the system and the location of each piece of equipment used.

Troubleshooting consists of checking the field wiring; refer to loop drawing 945-3 in Appendix A. If a problem develops with the remote alarm/meter, refer to the applicable drawings located in Appendix A and to TP948A for the factory test procedure.

Should it be necessary to return the remote alarm/meter during the warranty period, contact Cardinal Health at 440.248.9300.

**NOTE**

If a problem cannot be resolved by applying the troubleshooting procedures described above, contact Cardinal Health at 440.248.9300 for assistance.

# Applicable Drawings and Bill of Materials

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## A.1 Drawings

<u>Drawing Number</u>	<u>Description</u>
GEL948A-50	Dimensional Outline
948A-40-5	Assembly Drawing w/o Meter
948A-50-5	948A-40/948A-50 Assembly Drawing
948A-50-3	Schematic Diagram
945-3	Loop Diagram
945A-3	Loop Diagram
WL948A-40-5	Wire List
WL948A-50-5	Wire List
TP948A	Test Procedure

## A.2 Bill of Materials

<u>Drawing Number</u>	<u>Description</u>
948A-40	Remote Alarm
948A-50	Remote Alarm/Meter
948A-40-5	Remote Alarm
948A-50-5	Remote Alarm/Meter

# Radiation Management Services

For additional information, please contact  
Radiation Management Services business  
of Cardinal Health at 440.248.9300.



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