FLUKE®
Biomedical

Nuclear Associates 05-433

Primalert™ 10 Teletherapy Radiation Monitor

Operators Manual

February 2005
Manual No. 105012 Rev. 5

Fluke Biomedical
Radiation Management Services

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Section 1
Introduction

1.1 Introduction

The Primalert 10 is a compact monitor providing a dependable, continuous means of monitoring radiation levels and alerting personnel to hazardous conditions. If a therapy system malfunctions, it's controls may falsely indicate a safe condition even though the source/beam is on, posing a threat of excessive radiation exposure to the therapist and technician.

The Primalert 10 monitor is activated when the radiation level exceeds a preset value. The alarm level (2.5 mR/h or 20 mR/h) is selected by means of a slide switch on the front panel. A pair of bright red lamps on the face of the instrument flash a warning and continue to flash until safe conditions are reestablished. Since the system can be activated by scattered radiation, it may be mounted anywhere in the radiation therapy room. A flashing green OPERATION INDICATOR light continuously monitors the background radiation and provides visible proof that the instrument is functioning. In high radiation fields (over 100 R/h), the unit will not jam and will continue to alarm.

The Primalert 10 also has a jack for attaching an optional remote Primalarm™ (Model 05-434) at a location up to 100 feet from the main unit. The Primalarm provides audible and visual warnings of an alarm condition.

Figure 1-1 Primalert 10

Section 2
Specifications

2.1 Specifications

Detector	Energy compensated GM tube
Energy Dependence	-10%, +40% from 50 keV to 2 Me, as referenced to ^{137}Cs
Selectable Alarm Level	2.5 mR/h or 20 mR/h (See Section 5, Range Switch Modification)
Visual Alarm	Two flashing red lamps. 18 (field of view)
Alarm Reset	Automatic (when radiation level drops below preset value)
External Alarm	Jack on bottom of case permits
Feature	Attachment of external audible visual alarm (Primalarm) at remote location from the main unit
Response Time for Alarm	2 to 3 seconds
Power	Part 14-314 (United States, Canada) Input 117 VAC, 60 Hz 12 W Output 12 VDC, 500 mA Part 14-400 (Europe) Input 230 VAC 50 Hz Output 12 VDC, 500 mA Part 14-417 (United Kingdom) Input 230 VAC 50 Hz Output 12 VDC, 580 mA Part 14-417, Part 14-416 (Australia)
Dimensions (H x W x D)	6 in. x 3.5 in. x 1.5 in. 15.2 cm x 8.9 cm x 3.8 cm
Operating Conditions	10° C to 40° C (50° F to 104°F) Maximum of 90% relative humidity (non-condensing)
Accessories Supplied	• Appropriate 115 V (230V) CE approved converter • Wall mounting bracket P/N 102007 • Spare #74 lamp. P/N 680010 • T-1¾ bulb, 14 V C 0.1 A, #74 Midget
Accessories Available	• Primalarm Remote Alarm Unit P/N 05-434 • 10 uCi, ^{137}Cs license exempt check source P/N 62-103 • Primapak™ P/N 05-441 Backup battery Pack

Section 3
Installation

3.1 Mounting

The mounting bracket supplied may be attached to any convenient vertical mounting surface. Before mounting the bracket to the wall, however, make sure that the six-foot converter power cord will reach the nearest power outlet.

The wall-mounting bracket comes supplied with double-sided foam tape already attached. Just peel off the protective paper covering and firmly apply to the mounting surface.

CAUTION

Once in place, the bracket cannot be moved or removed without destroying the tape. Make sure of your installation site before applying. If you wish to attach the bracket with screws, mounting holes are also provided.

3.2 Power

The plug on the end of the converter power cord should first be inserted into the jack on the bottom of the Primalert. The converter should then be plugged into the wall outlet.

3.3 Optional Power

The Primapak Backup battery pack (P/N 05-441) provideds a sourced of 12 to 16 VDC power.

NOTE

The converter plug supplies this voltage.

The plug is a Switchcraft S760, or equivalent, with the sleeve negative and pin positive. The current drain at background radiation levels is about 25 mA and about 250 mA at full alarm levels.

3.4 Grounding

If it is desired to ground the instrument with a separate ground wire, as may be required under certain codes, Figure 3-1 shows how to accomplish this. Simply remove the back cover by loosening the single screw in the center of the cover. Note the position of the ground terminal in Figure 3-1. Attach the wire by running it up through the small hole between the jacks. At least a #16 gauge wire should be used for this purpose.

3.5 Routing Cleaning

Do not immerse the Model 05-433 Primalert 10. The unit is not waterproof. Liquid could damage the circuits. The unit should be kept clean and free from dirt and contamination. The unit may be cleaned by wiping with a damp cloth using any commercially available cleaning or decontaminating agent.

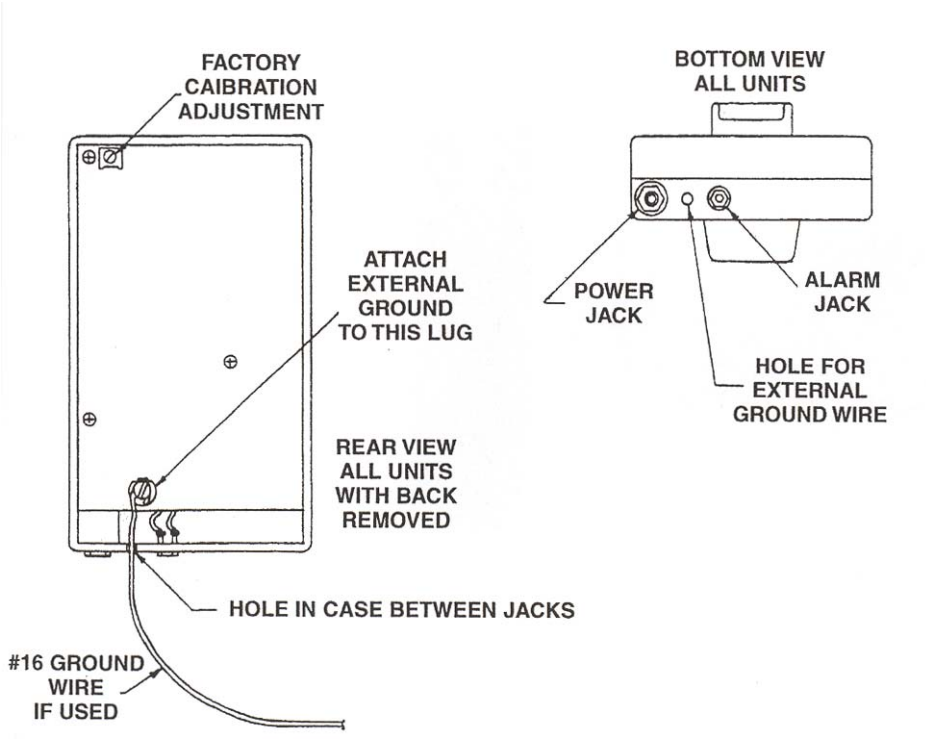

Figure 3-1 Instrument Grounding Diagram

Section 4
Operation

4.1 Setup

Attach the power cord (converter) into the Primalert and plug converter unit into the wall receptacle as noted in Section 3. The unit should alarm for 2 to 3 seconds before the automatic reset extinguishes the indicators.

The unit should now be operational with the OPERATION INDICATOR flashing on or off with each background pulse received.

4.2 Testing

Test the unit for proper operation by placing a check source (10 uCi, ^{137}Cs, P/N 05103) on the top of the front panel in the position indicated with the label down. The alarm should activate in the low (2.5 mR/h) setting.

4.3 Lamp Replacement

1. Remove the power cord plug.
2. Loosen screw in back of unit and remove back cover.
3. Remove the three Phillips head screws holding the board.
4. Pull out defective lamp. DO NOT TWIST.
5. Push in replacement lamp (type #74) and replace the printed circuit board and back cover.

Section 5
Range Switch Modification

5.1 Range Switch Modification

It is possible to modify the range of the Primalert to be other than the 2.5/20 mR/h, which is standard for the range switch LOW and HIGH positions. The modification may be easily made by the customer to provide any of the following two range positions: 2.5, 5, 10, 20 or 40 mR/h.

If it is desired to change the range on the Primalert 10, simply remove the back cover by removing the center screw. The back of the printed circuit board will then be exposed showing clearly two jumpers attached to the 2.5 and 20 mR/h solder points. The 2.5 mR/h jumper corresponds to the range switch HIGH position. Simply unsolder the upper end of the jumper wire and insert it in the position(s) desired. Be sure to observe the warning notice in regard to soldering.

Section 6
Warning

6.1 Warning

This instrument contains CMOS integrated circuits. No service should ever be attempted unless by a competent technician thoroughly familiar with these devices. Static charges normally present in a dry atmosphere or leakage current in soldering irons or other non-grounded tools can instantly destroy CMOS integrated devices. If this device has I.C. sockets, do not even attempt to remove or replace them without observing anti-static and leakage current precautions.

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