

Area Monitor/Frisker Count Rate Meter

Victoreen® Model 190F



Radiation Safety



Model 190F shown with optional GM Pancake Probe (Model 489-110D)

- Adjustable Alarm
- Backlit analog/digital display
- Interchangeable probe adapter module
- Multiple probe use
- Redundant power supply
- Available in SI units

Introduction

The Model 190F Area Monitor/Frisker Count Rate Meter is compatible with GM detectors, neutron probes, proportional counters, and scintillation probes operating from 300 to 1300 volts. Depending on probe selection, the Model 190F detects alpha, beta, gamma, neutron, or x-ray radiation within an operating range of 1 μ R/h to 1 R/h or 1 CPM to 1,000,000 CPM. The unit is available with either an MHV or a BNC connector, to provide the user with versatility in probe selection.

Visual indication of selected parameters, as well as measured values, are displayed on the analog/digital display.

The Model 190F Area Monitor/Frisker Count Rate Meter, with purchased probe, is shipped calibrated and ready-to-use.

Applications

The Model 190F Area Monitor/Frisker Count Rate Meter is an easy to use instrument with error-free visual indication and auto-ranging. This instrument is designed to meet the high technology requirements of Health Physics, Medical Physics, and Non-Destructive Testing applications.

Features

LCD display readout

- 2.6 in wide (6.6 cm) x 2.0 in high (5.1 cm)
- Analog scale has fifty-one elements arranged in a radius arc. Each element represents 2% of full scale. Scale markings are 0, 2, 4, 6, 8, and 10. Scale length is 2.2 in (5.6 cm)
- Scale multiplier is 0.0001 to 1 million, dependent on probe selection and the activated units
- 16-character alphanumeric display shows digitized average of the bar graph value. It displays operational units such as radiation unit changes, response time changes, data and labels

Features *(continued)*

Pushbutton controls

- **Light** Activates a background light for a preset or indefinite amount of time
- **Mode** Rolls through and displays the available units for the selected mode of operation
- **Log** Enters and sequentially labels the displayed data into a data log
- **Rate/Integ** Allows the user to select the mode of display
- **Resp Time** Rolls through and displays available response times (3, 6, 12, and 24 seconds) for user selection
- **Audio** Allows the user to turn the audio indicator on or off

Specifications

Operating ranges (dependent on selected probe)

Toggles and selects rate units:

μR/hr	mR/hr	R/hr
CPM	CPS	
μSv/h	mSv/hr	
DPM	Bq/cm ²	μCi/cm ²

and the complementary units in the integrate mode:

μR	mR	R
CTS	D	
μSv	mSv	
Bq	μCi	

with the integrated time value in seconds

Accuracy Within 10% of reading between 10% to 100% of full scale indication on any range, exclusive of energy dependence. Accuracy is probe dependent

Detector Accepts GM detectors, neutron probes, scintillation probes, and proportional counters operating at high voltages between 300 and 1300 volts

Adapter module Contains calibration data and high voltage settings for a specified probe. The module is available with an MHV or a BNC connector. Specify the type of connector with order

Note: Additional adapter modules can be purchased for use with multiple probes:

Specify Model 190060 for MHV adapter module

Specify Model 190070 for BNC adapter module

By using multiple replaceable probe adaptor modules, each module can be assigned to a specific probe. The module's EEPROM stores the calibration factors for a specific probe. When plugged into a Model 190F Area Monitor and Count Rate Meter, it automatically sets the high voltage and activates the calibration data set for the specific probe. By using modules married to specific probes, the user has the convenience of using only one Model 190F with multiple probes for survey work

Log Logs 211 data points and sequentially labels data points. (Data retrieval requires the Model 190-1A Infrared Communicator). With the communicator, alphanumerics up to 16 characters can be programmed into the Model 190F to name the locations of individual data points to be collected. The location name is displayed when the Log button is pressed. Press the Log button again, and the data point is stored

Power requirements 9 VDC regulated power converter

Batteries Three 9 V batteries, 150 hours operation, automatically indicates when battery is low

Warm up time 15 second diagnostic check

Check source Natural uranium, mounted on the case

Environmental

Temperature range 14° to 140°F (- 10° to + 60°C)

Relative humidity 0 to 95%, non-condensing

Construction Molded ABS plastic, splash-proof case

Probe fits into side-mounted ABS plastic probe holder with Velcro® straps

Dimensions 3.75 (w) x 9.2 (d) x 2.1 in (h) (9.2 x 23.4 x 5 cm)

Weight (without probe) 1.56 lb (0.70 kg)

Optional accessories

Infrared Communicator (Model 190-1A), additional features can be activated, such as Log Mode, Alarm Setpoint, Energy Specific Calibrations, and default setting changes. Features and pushbuttons can also be locked-out to set up the Model 190F in a user defined mode of operation

Note: The Model 190F Area Monitor and Count Rate Meter, with the customer selected probe is calibrated to NIST standards. The 190F and probe is calibrated in mR/h or μSv/h units as a standard. The end user may calibrate in additional radiation units using the 190-1A Infrared Communicator

Available model(s)

190F Area Monitor/Frisker Count Rate Meter

For additional information, please contact Cardinal Health, Radiation Management Services customer service at 440.248.9300, 800.850.4608, or fax: 440.349.2307; located at 6045 Cochran Road, Cleveland, Ohio 44139-3303, USA.

CE Tested. Meets applicable standards.

Specifications are subject to change without notice.

Victoreen is a registered trademark of Cardinal Health, Inc. or one of its subsidiaries.

Velcro is a registered trademark of Velcro Industries B.V.

© Copyright 2003 Cardinal Health, Inc. or one of its subsidiaries. All rights reserved.

190F-ds rev 2 27 mar 03

VAMP™ Area Monitor

Victoreen® Model 808E-100



Radiation Safety

- Reliable, sensitive, and continuous monitoring of uncontrolled areas
- Self-contained visual and audible alarms are internally adjustable to full scale

Features

- Jam-proof circuitry prevents erroneous readings at high levels
- Halogen-quenched Geiger-Mueller (GM) detector detects gamma and x-rays above 80 keV
- Operating range of 0.1 to 100 mR/hr or 1 to 1000 μ Sv/hr

Introduction

The Victoreen Model 808E-100 Area Monitor (VAMP), is ideal for a wide range of area monitoring applications. This self contained unit has one external control: a manual reset button. To activate (use) the VAMP, simply plug it in and set the internal trip level. The VAMP functions automatically. Operational status is continually apparent by means of a failure light. Redundant alarm lighting provides assured notification of hazardous conditions. Solid-state jam-proof circuitry prevents erroneous low readings in high radiation fields that drive the meter beyond full scale. The alarm trip control is internally mounted to prevent inadvertent resetting or tampering with the alarm level, which can be set anywhere from background to full scale with either a manual or automatic reset. The Model 808E-100 VAMP can either be wall/ceiling mounted or used as a free standing instrument.

Specifications

Radiation detected Gamma and x-rays, above 80 keV

Operating range Display: 3 decade logarithmic. 0.1 to 100 mR/hr or 1 to 1000 μ Sv/hr

Accuracy Within 15% of reading between 10% and 100% of full scale indications on any range, exclusive of typical energy dependence

Standard calibration ^{137}Cs

Response time Alarms in less than 1 second for intensity which is twice the alarm setting

Typical energy dependence Within 20% from 80 keV to 2 MeV

Temperature range - 22° to + 122°F (- 30° to + 50°C)

Relative humidity 0 to 99%, non-condensing temperature dependence within 15%/°C

Current compensation

120 VAC operation/normal status 135 mA

120 VAC operation/normal status 270 mA

12 VDC operation/normal status 300 mA

12 VDC operation/normal status 470 mA

Detector Halogen-quenched GM tube

Display 4.33 in (11.4 cm)

Alarms Loud, continuous pulsed tone, large area red alarm light and SPDT relay for connecting a remote alarm

Alarm trip point Internally adjustable anywhere on scale

Alarm reset Manual or automatic

Exposure rate limitations Jam-proof circuitry prevents erroneous readings at high levels

Fail-safe indicator Large white panel light indicates normal operation

Remote alarm SPDT contacts rated 5 amperes at 115 VAC of 2.5 amperes at 220 VAC for "FAIL" and "HIGH"

Remote meter/recorder output Two 4-20 mA outputs available

Mounting Wall/Ceiling mount or freestanding "Swivel Lock" bracket for easy installation

Power requirements 120 VAC/60 Hz or 12 VDC; 220 VAC/50 Hz

Controls External manual reset pushbutton. Internal alarm point set potentiometer

Construction Rugged case, heavy duty mounting bracket, hinged front panel

Dimensions 13.75 (w) x 4.25 (d) x 9.25 in (h) (35 x 10.8 x 23.5 cm)

Weight

Net 11.25 lb (5.2 kg)

Shipping 20 lb (9.04 kg)

Shipping volume 0.071 m³ (2.5 cu ft)

Available model(s)

808E-100 VAMP Area Monitor

For additional information, please contact Cardinal Health, Radiation Management Services customer service at 440.248.9300, 800.850.4608, or fax: 440.349.2307; located at 6045 Cochran Road, Cleveland, Ohio 44139-3303, USA.

Specifications are subject to change without notice. VAMP and Victoreen are trademarks and/or registered trademarks of Cardinal Health, Inc. or one of its subsidiaries.

© Copyright 2003 Cardinal Health, Inc. or one of its subsidiaries. All rights reserved.

808E-100-ds rev 2 12 mar 03

VAMP™ Remote Alarm/Meter

Victoreen® Model 808R-100

- Remote Alarm/Meter for use with Model 808E-100 VAMP™ Monitor
- Three decade logarithmic meter
- Fail-safe indication
- Loud audible and red visual indications



Applications

The Model 808R-100 Remote Alarm/Meter when used with the Model 808E-100 VAMP Monitor provides remote information for exposure monitored near a source.

Specifications

Operating range 3-decade logarithmic scale; 0.1 to 100 mR/hr or 1 to 1000 μ Sv/hr

Operating temperature - 30° to + 50°C; temperature dependence within 15%/°C

Relative humidity 0 to 99%, non-condensing

Power requirements 120 VAC, 50/60 Hz, supplied with 25 ft three prong power cord

Dimensions 3.75 (w) x 4.25 (d) x 9.25 in (h) (35 x 11 x 23.5 cm)

Weight 8.0 lb (3.6 kg)

Available model(s)

808R-100 VAMP Remote Alarm/Meter

Introduction

The Victoreen Model 808R-100 Remote Alarm/Meter is designed to be used with the Victoreen Area Monitor (VAMP) Model 808E-100. The Remote Alarm/Meter features a three decade logarithmic scale meter, fail-safe indication, and a visual/audible high alarm state indication.

The analog meter is driven by a 4-20 mA DC current, provided by the Model 808E-100 4-20 mA DC analog output. During normal operation, the meter indicates radiation in units of mR/hr.

The white panel in the upper left quadrant of the front cover is the fail-safe indicator. The panel is illuminated during normal operating conditions and turned off in the event that the fail-safe circuit stops receiving pulses from the detector in the Area Monitor 808E-100. When the fail-safe panel is not illuminated, the monitor is not operational.

The red panel in the upper right quadrant of the front cover provides a visual alarm indication. The panel illuminates when the radiation level exceeds the high radiation level alarm set point. At the same time that the red panel illuminates, the audible alarm sounds.

The Model 808R-100 is supplied with a universal mounting bracket, designed to be used as a tilt bail for desktop operation, or as a permanent mounting bracket.

For additional information, please contact Cardinal Health, Radiation Management Services customer service at 440.248.9300, 800.850.4608, or fax: 440.349.2307; located at 6045 Cochran Road, Cleveland, Ohio 44139-3303, USA.

Specifications are subject to change without notice.

VAMP and Victoreen are trademarks and/or registered trademarks of Cardinal Health, Inc. or one of its subsidiaries.

© Copyright 2003 Cardinal Health, Inc. or one of its subsidiaries. All rights reserved.

808R-100-ds rev 2 12 mar 03

Digital Smart Detector Area Monitor

Victoreen® Model 1060AM



Radiation Safety



- Self contained, reliable, continuous area monitors
- Wide range of applications in NEMA 4 Enclosure
- RS-485 interface for multi-drop applications
- Optional WIN 1060 Windows® Applications Software monitors up to 30 channels
- Custom configurations available
- 16-bit embedded controller
- Optional remote display with alarm indicator

Introduction

The Model 1060AM is a versatile smart radiation detector designed for reliable, continuous area monitoring applications. The unit collects, interprets, analyzes, and communicates radiation measurement data. It is available in low, medium, and high range versions employing internal Geiger-Mueller (GM) detectors. The MHV version accommodates a wide variety of external GM probes. Circuitry that detects pulse pileup conditions in a high radiation field is employed to prevent erroneous readings.

The Model 1060AM is suitable for stand-alone operation or in a network environment employing multiple channels, communicating via an RS-485 interface to a main computer system. WIN1060 PC applications program provides the ability to display multiple channels, to maintain both alarm and measurement history, and to access to system configuration options. An optional remote display, consisting of a visual alarm indicator and a logarithmic meter corresponding to the detector range, is available.

Applications

The Model 1060AM is available in multiple versions supporting a wide range of monitoring applications found in medical facilities and facilities with radioisotope sources. In addition, the Model 1060AM provides an EMI shielded watertight National Electrical Manufacturers' Association (NEMA®) enclosure that is CE marked. The Model 1060AM provides two RS-485 connectors to simplify connections between multiple units. A remote display with alarm lamp is available for each version.

Features

- Available in 4 operating ranges
- MHV version for external probe
- All versions available in SI units
- Simple installation and setup

Specifications

Radiation detected Gamma rays

Typical energy dependence $\pm 15\%$ from 100 keV to 1.5 MeV

Operating range

Environmental range	1 μ R/hr to 1000 μ R/hr (0.01 μ Sv/hr to 10 μ Sv/hr)
Low range	0.01 mR/hr to 1 R/hr (0.1 μ Sv/hr to 10 mSv/hr)
Medium range	0.1 mR/hr to 10 R/hr (1 μ Sv/hr to 100 mSv/hr)
High range	1 mR/hr to 100 R/hr (10 μ Sv/hr to 1 Sv/hr)

High voltage Regulated 500 to 2500 VDC, < 1 mV ripple, digitally controlled with 1 V resolution, 500 microamperes at 1400 V

Input circuitry High and low discriminator setpoints

Jam detection (anti-jam)

Power requirements 12 VDC @ 500 mA power converter

Enclosures A plastic rectangular housing, NEMA 4 type for outdoor or indoor applications:

Outside dimensions	Mounting hole pattern
3.8 x 11.125 x 4.0 in (9.65 x 28.26 x 10.16 cm)	2.9375 x 9.375 in (7.46 x 23.81 cm)

User interface RS-485 supporting multi-drop applications for communications with IBM® compatible personal computer running WIN1060 applications software

Environmental

Temperature range 32° to 122°F (0° to 50°C)

Relative humidity 5 to 95%, non-condensing

Shock and vibration Mechanical shock and vibration specifications are per ANSI N42.17A, Section 8.4 and 8.5

Operating system Real-time, interrupt driven, embedded system

Optional accessories

WIN 1060 Applications Software (Model 941060WN)

RS-485 to RS-232 Converter (Consult Factory)

External Probes (Consult Factory)

Custom configurations available

Available model(s) and optional display

Range	NEMA enclosure	Remote display (add -SI for SI units)
Environmental range: 1 μ R/hr to 1000 μ R/hr (0.01 μ Sv/hr to 10 μ Sv/hr)	1060AM-NM-ER	1060DS-ER (-SI)
Low range: 0.01 mR/hr to 1 R/hr (0.1 μ Sv/hr to 10 mSv/hr)	1060AM-NM-LR	1060DS-LR (-SI)
Medium range: 0.1 mR/hr to 10 R/hr (1 μ Sv/hr to 100 mSv/hr)	1060AM-NM-MR	1060DS-MR (-SI)
High range: 1 mR/hr to 100 R/hr (10 μ Sv/hr to 1 Sv/hr)	1060AM-NM-HR	1060DS-HR (-SI)
External probe ¹	1060MHV-NM	NA

¹Consult factory for external probe options.

For additional information, please contact Cardinal Health, Radiation Management Services customer service at 440.248.9300, 800.850.4608, or fax: 440.349.2307; located at 6045 Cochran Road, Cleveland, Ohio 44139-3303, USA.

Specifications are subject to change without notice.

IBM is a registered trademark of International Business Machines. Windows is a registered trademark of Microsoft Corporation.

NEMA is a registered trademark of the National Electrical Manufacturers Association for its publication of voluntary standards and guidelines. NEMA is not a certification mark.

© Copyright 2003 Cardinal Health, Inc. or one of its subsidiaries. All rights reserved.


1060AM-ds rev 4 12 mar 03

PRIMALERT®

Digital Area Monitors

Model 05-443 and 05-444



- LED digital display
- Low and High alarm indicators
- Programmable alarm indicator
- Optional remote
- Detector Fail indicator
- Battery backup
- Data output/RS-232
- Two configurations available with internal energy compensated GM detectors:
 - 0.1 mR/hr to 1 R/hr (Model 05-443)
 - 1 mR/hr to 4 R/hr (Model 05-444)
-  tested. Meets applicable standards

Introduction

The PRIMALERT Digital Area Monitors are designed for a wide range of radiation area monitoring applications. They are completely self-contained units with energy compensated GM detectors, AC powered with internal battery backup and have user settable low and high alarms. An optional remote alarm is available for added security.

Applications

The PRIMALERT Digital Area Monitors can be used wherever there is a need to detect and warn personnel of increasing radiation levels and to control the exposure of personnel to gamma radiation. The versatility of the PRIMALERT allows it to be used from industrial applications to medical settings.

Features

- Simple installation and setup
- Anti-jam circuitry prevents erroneous readings at tube saturation
- Calibration controls easily accessed through front panel

Specifications

Detector

Indicated use Radiation area monitoring

Internal GM detector range

Model 05-443 0.1 mR/hr to 1 R/hr

Model 05-444 1 mR/hr to 4 R/hr

Display 4 digit LED display with 0.8 in (2 cm) character height

Display range 000.0 to 9999

Display units Can be made to display in $\mu\text{R/hr}$, mR/hr, R/h, $\mu\text{Sv/h}$, mSv/h, Sv/h, cpm, cps and others

Linearity Reading within $\pm 10\%$ of true value with detector connected

Response Typically 3 seconds from 10% to 90% of final reading

Status (*green light*) Indicates the instrument is functioning properly

Low alarm Indicated by a yellow light and slow beep (1 per sec) audible tone (can be set at any point from 0.0 to 9999)

High alarm Indicated by a red light and fast beep (4 per sec) audible tone (can be set at any point from 0.0 to 9999)

Note: *audible indicators can be configured as a single beep if desired*

Detector fail (*red light and audible tone; > 68 dB at 2 ft*) Indicates detector overload, no count from detector, or instrument failure

Low battery (*yellow*) Indicates < 2 hours of battery power remaining

Calibration controls Accessible from front of instrument (protective cover provided)

High voltage Adjustable from 200 to 2500 V

Threshold Adjustable from 2 to 100 mV

Dead time Adjustable to compensate for dead time of the detector and electronics (can be read on the display)

Overload Senses detector saturation (indicated by display reading “-OL”)

Overrange Indicates the radiation field being measured has exceeded the counting range of the instrument (indicated by display reading “----”)

Data output 9 pin connector providing 5 decade log output, RS-232 output, signal ground connection, FAIL and Alarm signals (current sink), and direct connection to battery and ground

Power requirements 95 to 135 VAC (178 to 240 VAC available), 50 to 60 Hz single phase (< 100 mA), 6 V sealed lead acid rechargeable battery (built-in)

Battery life Typically 48 hours in non-alarm condition, 12 hours in alarm condition

Battery charger Battery is continuously trickle charged when instrument is connected to line power and turned on

Construction Aluminum housing with white polyurethane enamel paint

Temperature range - 4° to 122°F (- 20° to 50°C). May be certified for operation from - 40° to 150°F (- 40° to 65°C)

Size 9.7 (w) x 2.5 (d) x 7.4 in (h) (24.6 x 6.4 x 18.7 cm)

Weight 6.5 lb (2.3 kg)

Optional remote display (Model 05-446)

Indicated use Remote display for PRIMALERT Area Monitors Models 05-443 and 05-444

Status (*green light*) Indicates the instrument is functioning properly

High alarm (*red LED*) Indicates the radiation level exceeds the high alarm point

Detector fail (*red LED*) Indicates detector overload, no count from detector, or instrument failure

Audio Unimorph type with ON/OFF switch (> 68 dB at 2 ft)

Power requirements Provided by PRIMALERT (20 ft cable included)

Construction Aluminum housing with ivory polyurethane enamel paint

Temperature range - 4° to 122°F (- 20° to 50°C). May be certified for operation from - 40° to 150°F (- 40° to 65°C)

Size 6 (w) x 2 (d) x 7 in (h) (15.2 x 5.1 x 17.8 cm)

Weight 1.5 lb (0.7 kg)

Optional accessories

Remote Display (Model 05-446)

Available model(s)

05-443 PRIMALERT Digital Area Monitor with internal energy compensated 0.1 mR/hr to 1 R/hr GM detector

05-444 PRIMALERT Digital Area Monitor with internal energy compensated 1 mR/hr to 4 R/hr GM detector

CE tested. Meets applicable standards.

For additional information, please contact the Radiation Management Services business of Cardinal Health at 440.248.9300, fax 440.349.2307 or e-mail rmsinfo@cardinal.com; located at 6045 Cochran Road, Cleveland, Ohio 44139-3303, USA.

Specifications are subject to change without notice.
PRIMALERT is a registered trademark of Cardinal Health, Inc. or one of its subsidiaries.

© Copyright 2004 Cardinal Health, Inc. or one of its subsidiaries.
All rights reserved.
05-443-ds rev 1 09 aug 04



PRIMALERT®

Digital Doorway Monitor

Model 05-450



Radiation Safety

- **Highly sensitive lead shielded NaI (TI) scintillators**
- **LED digital display**
- **Battery backup**
- **CE tested. Meets applicable standards**

Introduction

The Model 05-450 Digital Doorway Monitor is a highly sensitive gamma radiation detection system designed to detect low levels of gamma radiation. The system consists of a digital monitor, 2 shielded NaI (TI) scintillation detectors with NEMA enclosures, associated cabling and a 10 μCi ^{137}Cs check source. The system is AC powered with internal battery backup and user selectable alarm settings.

Applications

The highly sensitive shielded scintillation detectors of the Model 05-450 Digital Doorway Monitor make this an ideal system to detect and alarm when low levels of gamma radiation pass through a doorway. Your Radiation Safety Officer (RSO) will find it ideal as a monitor mounted on the doorway for hospital entrances, emergency rooms, laundry rooms, waste disposal chutes, nuclear medicine labs and procedure rooms and any other area of the hospital where radiation contamination could be a concern.

Features

- Dual detector
- Configuration with NEMA enclosures
- Fast response time
- Audio and visual alarms

Specifications

Indicated use

Detectors Two 3 in Ø x 1 in thick (7.6 x 2.5 cm) shielded NaI (TI) scintillation detectors with up to 200 ft cables (NEMA 4x enclosures included)

Connectors BNC (others available on request)

Sensitivity Will detect an unshielded 40 µCi ¹³⁷Cs source at 10 ft from the detector and an unshielded 10 µCi ¹³⁷Cs source at 5 ft from the detector

Functional check source 0.875 in Ø 10 µCi ¹³⁷Cs check source

Display 4 digit LED display with 0.8 in (2 cm) character height

Display units Can be made to display in µR/hr, mR/hr, R/hr, µSv/h, mSv/h, Sv/h, µrem/hr, mrem/hr, rem/hr, cpm, cps and others

Linearity Reading within ± 10% of true value with detector connected

Response Typically 3 seconds from 10% to 90% of final reading

Status (*green light*) Indicates the instrument is functioning properly

Low alarm Indicated by a yellow light and slow beep (1 per sec) audible tone (can be set at any point from 0.0 to 9999)

High alarm Indicated by a red light and fast beep (4 per sec) audible tone (can be set at any point from 0.0 to 9999)

Note: *audible indicators can be configured as a single beep if desired*

Detector fail (*red light and audible tone; > 68 dB at 2 ft*)

Indicates detector overload, no count from detector, or instrument failure

Low battery (*yellow*) Indicates < 2 hours of battery power remaining

High voltage Adjustable from 200 to 2500 V

Threshold Adjustable from 2 to 100 mV

Dead time Adjustable to compensate for dead time of the detector and electronics (can be read on the display)

Overload Senses detector saturation (indicated by display reading “-OL”)

Overrange Indicates the radiation field being measured has exceeded the counting range of the instrument (indicated by display reading “----”)

Data output 9 pin connector providing 5 decade log output, RS-232 output, signal ground connection, FAIL and Alarm signals (current sink), and direct connection to battery and ground

Power requirements 95 to 135 VAC (178 to 240 VAC available), 50 to 60 Hz single phase (< 100 mA), 6 V sealed lead acid rechargeable battery (built-in)

Battery life Typically 48 hours in non-alarm condition, 12 hours in alarm condition

Battery charger Battery is continuously trickle charged when instrument is connected to line power and turned on

Battery dependence < 3% change in readings to battery endpoint

Temperature range - 4° to 122°F (- 20° to 50°C). May be certified for operation from - 40° to 150°F (- 40° to 65°C)

Size

Electronics 9.7 (w) x 2.5 (d) x 7.4 in (h) (24.6 x 6.4 x 18.7 cm)

Detectors 17 (w) x 8.5 (d) x 13 in (h) (43.2 x 21.6 x 33 cm)

Weight

Electronics 6.5 lb (2.3 kg)

Detectors 32 lb (14.5 kg)

Available model(s)

05-450 PRIMALERT Digital Doorway Monitor

CE tested. Meets applicable standards.

For additional information, please contact the Radiation Management Services business of Cardinal Health at 440.248.9300, fax 440.349.2307 or e-mail rmsinfo@cardinal.com; located at 6045 Cochran Road, Cleveland, Ohio 44139-3303, USA.

Specifications are subject to change without notice.
PRIMALERT is a registered trademark of Cardinal Health, Inc. or one of its subsidiaries.

© Copyright 2004 Cardinal Health, Inc. or one of its subsidiaries.
All rights reserved.
05-450-ds rev 1 09 aug 04

Primalert® 35

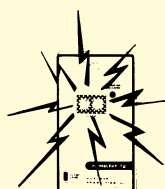
Area Radiation Monitor

Victoreen Model 05-437



Radiation Safety

Flashing
red
lamps



LED
color-coded
ranges



- Provides continuous visual indication of radiation levels and produces audible and/or visual alarms at any of six presettable radiation levels
- Assures reliable, continuous monitoring wherever radioactive materials are present
- Displays the radiation level in bright color-coded lights
- Emits audible and/or visible signals whenever the gamma radiation exceeds a user-preset alarm level

Introduction

Six range indicators (1, 2, 4, 8, 16, and 32 mR/hr) clearly display an increase or decrease in radiation levels. The alarm can be set at any of the six levels by a front-panel, screwdriver-adjustable control. Both the visible and audible alarms, or just the visible alarm, can also be set from this panel. The light for each level goes on when the radiation intensity reaches that level, and goes out when the rate drops below the level. This permits instant radiation-level recognition not readily distinguishable on meter-type instruments.

When the preset level is exceeded, personnel are alerted by bright flashing red lights (visible over a 180° field) and a loud intermittent audio signal. The alarms stop automatically when the radiation level falls below the preset value. A front-panel switch permits the selection of both the visible and audible alarms or just the visible alarm.

Fail-safe operation is assured by a light which continuously indicates background radiation and provides visual proof that the unit is functioning. The monitor will not jam or show false readings in high radiation fields.

The Primalert 35 contains an energy-compensated GM detector, and features a convenient, automatic alarm reset. A mounting bracket and a 110 volt AC adapter/power converter are also included.

The optional Primalarm Remote Alarm provides the same audible and visible signals as the Primalert 35, up to 100 feet from the monitor.

Specifications

Power requirements 105 to 125 V/60 Hz/8 W

Dimensions 3.5 (w) x 6 (h) x 1.5 in (t)
(9 x 15 x 4 cm)

Weight 2 lb (0.9 kg)

Optional accessories

Check Source, ¹³⁷Cs, 10 µCi. Flat disc, 1 inch diameter (Model 62-103)

Available model(s)

05-437 Primalert 35 Area Radiation Monitor

Available AC adapters (specify with order)

Model	Description	Typical geo. region
14-314	110 VAC 12 VDC 500 mA	USA, Japan
14-400	230 VAC 12 VDC 500 mA	Europe
14-417	230 VAC 12 VDC 580 mA	UK
14-436	230 VAC 12 VDC 580 mA	Australia

For additional information, please contact Cardinal Health, Radiation Management Services customer service at 440.248.9300, 800.850.4608, or fax: 440.349.2307; located at 6045 Cochran Road, Cleveland, Ohio 44139-3303, USA.

Specifications are subject to change without notice. Primalert is a registered trademark of Cardinal Health, Inc. or one of its subsidiaries.

© Copyright 2003 Cardinal Health, Inc. or one of its subsidiaries. All rights reserved.

05-437-ds rev 1 12 mar 03

Prima® 7 Transport Index Radiation Monitor

Victoreen® Model 05-582

- Eliminates the potential for misreading a meter or scale factor
- Fast, accurate, easy to use
- Two-digit illuminated display with “over-range” and “read” indicators
- Wide Range: 0 to 99 mR/h

Specifications

Range 0 to 99 mR/h, in 1 mR increments, with round-off

Display Two-digit LED, 0.3 inch high

Indicators

“Read” indicator lights up after 4-second measurement cycle is completed

Display: blanks over 99 mR/h

Low-Battery indicator flashes when battery needs to be replaced

Count indicator is on or off for each detector pulse

Energy response +40%, -12% from 50 keV to 1.2 MeV

Accuracy $\pm 10\%$ or ± 1 digit, whichever is greater. Calibrated for ^{137}Cs

Detector Compensated halogen-quenched GM tube

Control Press to measure (4 seconds); hold to read

Response time 4 seconds

Operating environment 10° to 120°F (-12° to +50°C), with alkaline cells

Batteries Four “AA” 1.5 V alkaline batteries

Dimensions 3.5 (w) x 6 (h) x 1.5 in (t) (9 x 15 x 4 cm)

Weight 0.75 lb (0.34 kg)

Optional accessories

Check Source, ^{137}Cs , 10 μCi . Flat disc, 1 inch diameter (Model 62-103)

Available model(s)

05-582 Prima 7 Transport Index Radiation Monitor

Introduction

This easy-to-use, pocket-size monitor measures and displays the transport index of packages containing radioactive materials. It provides an accurate digital readout, thus eliminating the possibility of a misreading, which is common with conventional meter-type instruments. The transport index is the exposure rate in mR/h, at one meter from the external surface of a package.

Applications

This handy monitor eliminates the need to carry a tape measure, because it includes a telescoping measuring rod. With the rod fully extended, the detector is automatically one meter from the package. With the rod retracted, the instrument can be placed directly against the package, and the surface radiation is measured directly in mR/h (up to 99 mR/h). When the field exceeds 99 mR/h, the display blanks. To read the transport index, simply extend the telescopic rod to its full 1 meter length, touch the tip to the package, and press the “Measurement” button. This automatically starts a four-second count cycle, after which the illuminated digits present the value of the transport index. When the “Measurement” button is released, the monitor turns itself off.

Battery replacement is minimized because power is on only when taking measurements. Four standard “AA” batteries provide more than 10,000 readings. A belt clip is included. Monitor operation can be checked with the optional check source (Model 62-103).



For additional information, please contact Cardinal Health, Radiation Management Services customer service at 440.248.9300, 800.850.4608, or fax: 440.349.2307; located at 6045 Cochran Road, Cleveland, Ohio 44139-3303, USA.

Specifications are subject to change without notice.

Prima and Victoreen are registered trademarks of Cardinal Health, Inc. or one of its subsidiaries.

© Copyright 2003 Cardinal Health, Inc. or one of its subsidiaries. All rights reserved.

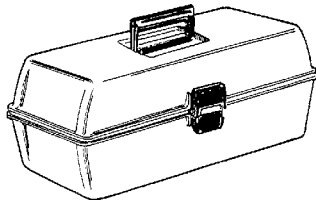
05-582-ds rev 1 12 mar 03

Professional Continuous Radon Monitor

Model 05-427



Radiation Safety



Radon Monitor Carrying Case
(Model 89-427-1000)



- For applications where highly-accurate measurements of a duration of 48 hours or more are desired
- Easy-to-use
- Rugged

The Professional Continuous Radon Monitor samples radon gas concentrations using a passive radon chamber design. A special filter in the chamber wall allows for the free movement of radon gas, but prevents the entry of radon decay products. Based on principles of gas diffusion, the concentration of gas in the chamber will be equivalent to the concentration of radon gas in the air around the monitor.

As the radon gas decays inside the chamber, alpha radiation is released. When this alpha radiation comes in contact with a silicon chip inside the chamber, an electric pulse is generated.

The radon concentration in picocuries per liter (pCi/l) is computed by a microprocessor, on the basis of the number of pulses that occur over time. An internal memory stores long-term data for later printout.

Specifications

Monitor

Sensitivity 2.5 counts per hour, per picocurie per liter (pCi/l)

Measurement range 0.1 to 999 picocuries/liter (pCi/l)

Operating range 45° to 95°F (7° to 35°C)

Accuracy ± 25% or 1 pCi/l, whichever is greater after 24 hours

Detector Diffused-junction photodiode

Measurement intervals 1, 4, 8, and 24 hours

Data port RS-232 9-pin D connector allows printer data to be sent to a PC

Power supply Transformer converts 120 VAC to 12 VDC

Battery backup One 9 V alkaline battery supplies 24-hour operation. LED indicates low battery

Display Three-digit LED

Tilt switch Mercury jitter switch

EPA evaluation Accepted by the US. Environmental Protection Agency

Dimensions 4.7 (w) x 8 (d) x 2.5 in (h)
(12 x 20.3 x 6.4 cm)

Weight 2 lb (0.91 kg)

Printer

Printer ribbon Epson HX-20 cartridges

Printer paper Standard adding-machine paper; 2.25 in wide, 2.75 in OD, 0.44 in ID

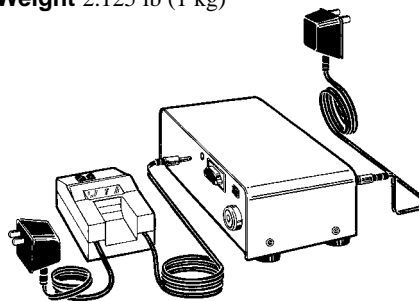
Character matrix 6 x 8 dot matrix

Print speed 38 lines/minute

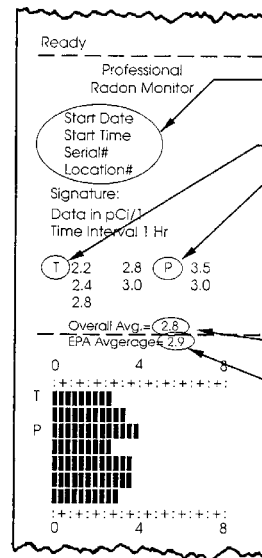
Power requirements Transformer converts 120 VAC to 12 VDC

Dimensions 4 (w) x 4.5 (d) x 2 in (h) (10.2 x 11.4 x 5 cm)

Weight 2.125 lb (1 kg)



Radon Monitor Printer (Model 05-427-1000).
Shown with power supply



Information to be written in by testing professional

"T" indicates movement

"P" indicates power interrupt

Tabular Data. Average radon gas concentration for each measurement interval is printed in sequential order; reading in rows from left to right

Long-term average since last reset

Long-term average less the first 4 hours of data

Profile Data. Each concentration value is graphically represented in the same order as the tabular printout. Scale is automatically adjusted to maximum value in pCi/l

Optional accessories

Radon Monitor Carrying Case (Model 89-427)

Radon Monitor Printer (Model 05-427-1000)

Printer Carrying Case (Model 89-427-1000)

Power Supply, 220 V (Model 87-427)

Available model(s)

05-427 Professional Continuous Radon Monitor

For additional information, please contact Cardinal Health, Radiation Management Services customer service at 440.248.9300, 800.850.4608, or fax: 440.349.2307; located at 6045 Cochran Road, Cleveland, Ohio 44139-3303, USA.

Specifications are subject to change without notice.
© Copyright 2003 Cardinal Health, Inc. or one of its subsidiaries.
All rights reserved.
05-427-ds rev 1 12 mar 03