

Advanced Survey Meter (ASM)

Victoreen® ASM-990 Series

RS

Radiation Safety



The ASM-990 is shown with optional GM Pancake Probe (Model 489-110D)

Introduction

The ASM-990 series are easy-to-use instruments that detect alpha, beta, gamma, neutron, or x-ray radiation within an operating range of 1 μ R/hr to 1 R/hr or 1 to 5,000,000 CPM, depending on the probe selection. Visual indication of measured values, as well as selectable parameters, are displayed on the analog/digital display.

The units are compatible with Geiger-Mueller (GM) detectors, neutron probes, proportional counters, and scintillation probes operating from 500 to 1300 volts.

Applications

The ASM-990 series are designed to meet the high technology requirements of health physics, medical physics, and nondestructive testing applications. Radiation safety officers (RSO), nuclear medicine laboratories, diagnostic x-ray and hospital emergency room technicians, and environmental health physicists will appreciate this intelligent survey meter with its cell phone-like multi-function key for easy menu navigation.

The units, with purchased probe, are shipped calibrated and ready-to-use.

With the proper probe combination, this meter can be used as a general survey meter, an area monitor, a wipe test counter, and a contamination monitor.

The unit is supplied with a MHV connector to ensure compatibility with all Victoreen probes. A Model 992 is available that includes a fully calibrated internal energy compensated 1 R/hr GM detector.

The Model 993 features a fully calibrated internal pancake detector as well as an internal energy compensated 1 R/hr GM detector.

- Advanced survey meter for multiple hospital and environmental applications
- Cell phone-like multi-function key for easy menu navigation
- Backlit analog/digital display
- Integrated handle
- Error-free visual indication
- Auto-ranging
- Multiple probe use
- Full-range audio output capability
- Survey Mode data logging feature
- Timed Peak Hold feature
- Built-in scaler functions
- Barcode scanner (optional)
- Auto Power-Down feature extends battery life

Features

- Survey Mode feature allows user to store up to 5 separate survey sequences
- Infrared Data (IrDA) port

LCD readout

- 160 x 160 graphical LCD display shows digitized average of the bar graph value
- Analog scale has fifty-one elements arranged in a linear bargraph. Each element represents 2% of full scale. Scale markings are 0, 2, 4, 6, 8, and 10. Scale length is 2.2 inches (5.6 cm)
- Scale multiplier is 0.0001 to 1 million, depending on the probe selected and the units activated
- LCD also displays selected measurement units, status icons, and real time clock

Pushbutton controls

- **Light** activates a background light for a preset or indefinite amount of time
- **Start/Stop/Rst/Save** saves current data; starts and stops recording of data; resets internal counter in scaler mode
- **Sel** activates the menu systems; allows user to choose particular settings, etc.
- **Up/Dn arrows** enables user to navigate between various menus/selections
- **Esc** returns to the normal operating mode
- **Audio** allows the user to turn on/off the audio indicator

Specifications for ASM-990 and ASM-992

Operating modes

- Rate
- Integrate
- Scaler (dual option): “Based On Measurement” or “Based On Time”
- Timed Peak Hold
- Data Logging

Operating rate ranges (dependent on selected probe)

μR/hr	mR/hr	R/hr
μrem/hr	mrem/hr	rem/hr
μSv/hr	mSv/hr	Sv/hr
CPM	CPS	
DPM ^{99m} Tc	DPS ¹³¹ I	
Bq ¹²⁵ I	kBq ¹²³ I	MBq ²⁰¹ Tl
μCi ⁶⁷ Ga	mCi ¹⁸ F	Ci ⁵⁷ Co

μR	mR	R
μrem	mrem	rem
μSv	mSv	Sv
C (counts)	kC	MC
D (disintegrations)	kD ^{99m} Tc	MC ¹³¹ I

Complementary units in the integrate mode 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 typical energy dependence.

Accuracy is probe dependent

Detector Accepts GM detectors and scintillation probes operating at high voltages between 500 and 1300 volts

Environmental

Temperature range 14° to 122°F (- 10° to + 50°C)

Relative humidity 0 to 95%, non-condensing

Warm up time 5 second diagnostic check

Check source Natural uranium, mounted on the case

Power requirements Two “D” cells, 150 hours operation, automatically indicates when battery is low

Housing material Proprietary polycarbonate, splash-proof case

Display Liquid crystal display, 2.2 x 2.2 in (5.6 x 5.6 cm)

Data logging modes

The ASM-990 series’ Log Data feature can easily be accessed via the Setup Sub-menu

The unit can log/save a maximum of 500 data points in any of three separate modes (Manual and Survey modes can utilize the optional barcode scanner)

Manual Individual rate data

points can be saved by pressing the

Start/Stop/Rst/Save button

Timed

A data point will automatically be saved at user selectable time intervals in the range of 1 to 255 seconds

Survey Programmed sequences

can be accessed via the menu system. Pressing the

Start/Stop/Rst/Save button

saves the current reading and

displays the next survey

location

Programming of survey

sequences, as well as retrieval of

logged data, is accomplished

via the built-in IrDA port

Label names up to 20 characters

can be programmed into the

unit to identify the individual

survey locations

Weight (without probe)

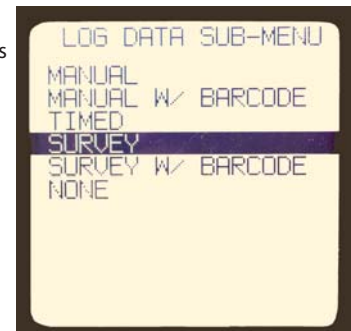
ASM 990, 992 2.1 lb (0.95 kg)

ASM 993 2.4 lb (1.09 kg)

Dimensions 4.125 (w) x 10.91 (d) x 2.5 in (h) (10.47 x 27.71 x 6.35 cm)

Probe connector The unit is available with a MHV connector

The unit can be used with multiple probes (5 total) by selecting the appropriate probe from the main menu. All calibration data for each probe is stored in the unit’s EEPROM



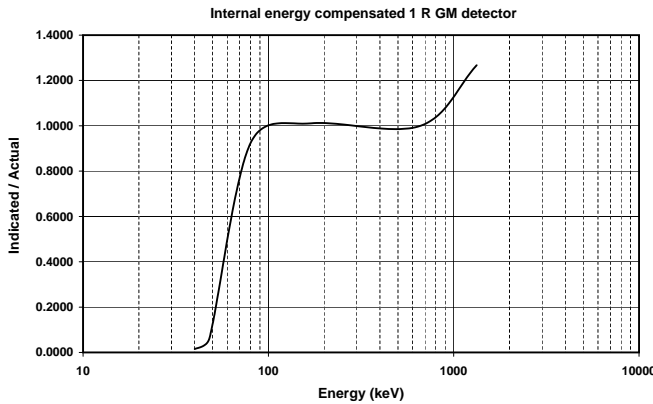
Specifications for ASM-992 and ASM-993 internal energy compensated 1 R/hr GM detector

Range 0.1 mR/hr to 1 R/hr

Radiation detected gamma above 60 keV

Accuracy ± 10% of reading between 10% and 100% of full scale on any range, exclusive of energy dependence

Typical energy dependence



Specifications for ASM-993 internal pancake detector

Radiation detected Alpha above 3.5 MeV, beta above 35 keV, and gamma above 6 keV

Range Background to 80 mR/hr

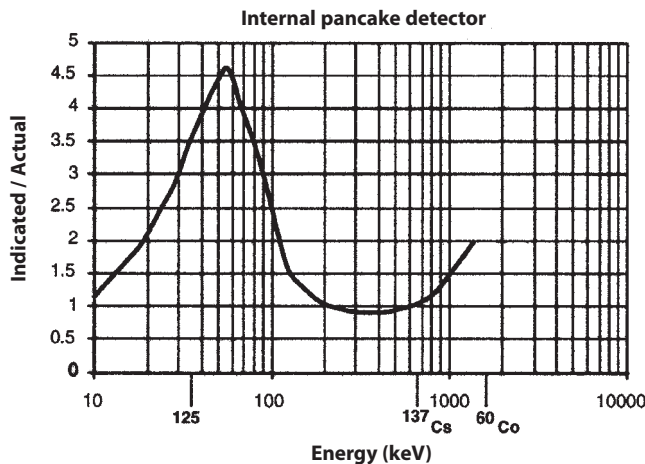
Window 15 cm² (1.75 in Ø) mica, 1.4 to 2.0 mg/cm²

Typical background 30 CPM

Protective screen Stainless steel, hexagonal pattern providing 86% open area

Accuracy ± 10% of reading between 10% and 100% of full scale on any range, exclusive of energy dependence (protective cover open)

Typical energy dependence



Efficiency The internal pancake detector efficiency is shown below. In

a recent performance check, the numbers shown represent typical results obtained

Isotope	%Efficiency
¹⁴ C	5
⁹⁹ Tc	12
¹³⁷ Cs	24
⁹⁰ Sr	59
³⁶ Cl	26
²⁴¹ Am	8
¹²⁹ I	2
²³⁰ Th	15
²³⁹ Pu	12

Note: The efficiency formula used to calculate the % Efficiency is:

$$\text{Eff. \%} = (\text{CPM/DPM} \times 100) / (\mu\text{Ci} \times 3.7 \times 10^4 \times 60 / 2)$$

Optional accessories

USB IrDA Adapter (Model 990-IR-USB)

Serial Port IrDA Adapter (Model 990-IR-SER)

Carrying Case (Model 990CC)

Wall Mounting Bracket (Model 990WM)

Probe Holder for Model 489-110D (Model 1100035000)

Universal Probe Holder (Model 1100039000)

Note: The ASM-990 series, with the customer selected probe is calibrated to NIST standards. The ASM-990 series with GM probe standard calibration is in R, Sv, and rems. Scintillation detectors are calibrated in counts. Radionuclide specific efficiency calibrations are available upon request. For probe selection and calibration services, see next page

Available model(s)

ASM-990 series	Advanced survey meter	Barcode reader	Internal energy compensated 1 R/hr GM detector	Internal pancake detector
990	X			
990BC	X	X		
992	X		X	
992BC	X	X	X	
993	X		X	X
993BC	X	X	X	X

For probe selection and calibration services, see next page.

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

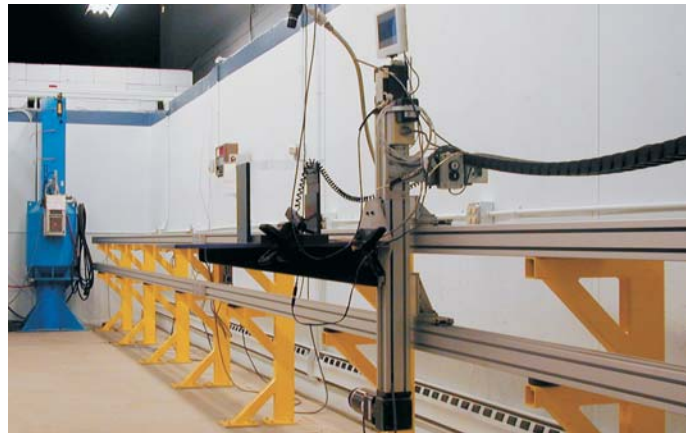
CE Tested. Meets applicable standards.

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Victoreen® Geiger-Mueller and Scintillation Probe Selection Guide

<p>Pancake GM Probe Model 489-110D</p> <ul style="list-style-type: none"> • Alpha above 3.5 MeV • Beta above 35 keV • Gamma and x-ray > 6 keV • To 80 mR/hr (800 µSv/hr) 	<p>Energy Compensated GM Probe Model 90-12</p> <ul style="list-style-type: none"> • Beta above 200 keV • Gamma and x-ray > 12 keV • Up to 1 R/hr (10 mSv/hr) 	<p>Thin End Window GM Probe Model 489-35</p> <ul style="list-style-type: none"> • Alpha above 4 MeV • Beta above 70 keV • Gamma and x-ray > 6 keV • Up to 80 mR/hr (800 µSv/hr) 	<p>Utility 1 R/hr GM Probe Model 491-40</p> <ul style="list-style-type: none"> • Beta above 200 keV • Gamma and x-ray > 12 keV • Up to 1 R/hr (10 mSv/hr) 
<p>Gamma Scintillation Probe Model 489-50</p> <ul style="list-style-type: none"> • Gamma and x-ray > 60 keV • 1 in x 1 in NaI (TI) • 1.5 in x 1.5 in and 2 in x 2 in detectors available 	<p>Alpha Scintillation Probe Model 489-60</p> <ul style="list-style-type: none"> • Alpha above 4 MeV • 1.5 in Ø ZnS (Ag) 	<p>Alpha/Beta Scintillation Probe Model 425-200</p> <ul style="list-style-type: none"> • Alpha above 350 keV • Beta above 14 keV • Plastic scintillator 	
<p>Scintillation Pancake Probe Model 489-200</p> <ul style="list-style-type: none"> • Beta above 100 keV • Gamma and x-ray > 25 keV • NaI (TI) rectangular 	<p>Low Energy Gamma Scintillation Probe Model 425-110</p> <ul style="list-style-type: none"> • Gamma and x-ray > 10 keV • NaI (TI) 1 mm thick 	<p>100 cm² Beta/Gamma Scintillation Probe Model 190-100BGS</p> <ul style="list-style-type: none"> • Beta ⁹⁰Sr efficiency 65.0% • 126 cm² active area • Plastic scintillator 	

Global Calibration Laboratory



- Expert 24 x 7 same day emergency service
- Multi-unit contract pricing available
- Multi-vendor calibration available
- Radionuclide dependent calibrations

Calibration programs

ISO 17025, ANSI Z540, Mammography MQSA, CNSC, NIST & PTB Traceable

Quality programs



ISO 9001:2000, ISO 13485, EN 46001, FDA/QSR, NRC/Part 50, Appendix B/Part 21

For the scope of accreditation under NVLAP Lab Code 200566-0

Survey and Count Rate Meter

Victoreen® Model 190



Radiation Safety



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

- Backlit analog/digital display
- Interchangeable probe adapter module
- Error-free visual indication
- Auto-ranging
- Multiple probe use
- Available in SI units

Introduction

The Victoreen Model 190 is compatible with Geiger-Mueller (GM) detectors, neutron probes, proportional counters, and scintillation probes operating from 300 to 1300 volts. Depending on probe selection, the Model 190 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 190 Survey and Count Rate Meter, with purchased probe, is shipped calibrated and ready-to-use.

Applications

The Model 190 Survey and Count Rate Meter is an easy-to-use instrument designed to meet the high technology requirements of Health Physics, Medical Physics, and Non-Destructive Testing applications.

Features

LCD display readout

- 2.6 inches (6.6 cm) x 2.0 inches (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 inches (5.6 cm)
- Scale multiplier is 0.0001 to 1 million, depending on the probe selected and the units activated
- 16-character alphanumeric display shows digitized average of the bar graph value. 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 on/off the audio indicator

Specifications

Radiation detected Gamma and x-ray above 20 keV

Energy range $\pm 20\%$ from 45 to 1000 keV

Operating ranges (dependent on selected probe)

Toggles and selects rate units:

$\mu\text{R/hr}$	mR/hr	R/hr
CPM	CPS	
$\mu\text{Sv/hr}$	mSv/hr	
DPM	Bq/cm ²	$\mu\text{Ci/cm}^2$

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 typical 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 adapter 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 190 Survey 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 190 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, alphanumeric up to 16 characters can be programmed into the Model 190 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 Four 9 V batteries, 200 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

Single Unit Carrying Case (Model 190HPS)

Multiple Unit Carrying Case (Model 190HPC)

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 190 in a user defined mode of operation

Note: The Model 190 Survey and Count Rate Meter, with the customer selected probe is calibrated to NIST standards. The 190 and probe is calibrated in mR/h or $\mu\text{Sv/h}$ units as a standard. The end user may calibrate in additional radiation units using the 190-1A Infrared Communicator

Available model(s)

190 Survey and 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.

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Survey Meter

Victoreen® Model 190I



Radiation Safety

- Direct reading numerical display
- Analog/digital display
- Data logging
- Rate/integrate
- Time integrator
- Backlighted display
- Response time selection
- Auto dose accumulation

Introduction

The Victoreen Model 190I is a Geiger-Mueller (GM) based survey meter operating with an internal detector. The Model 190I is calibrated in mR/h or $\mu\text{Sv/h}$. It also accumulates dose and time in the integrate mode.

The Model 190I features several user-selectable parameters entered via the top panel push buttons or via computer through an optional Model 190-1A Infrared Communicator.

Applications

The Model 190I Survey Meter is an easy-to-use instrument designed to meet the high technology requirements of Health Physics, Medical Physics, and Non-Destructive Testing applications.

Features

Readout

- Visual indication of selected parameters, as well as measured values, are displayed on the analog/digital display
- The Model 190I is shipped calibrated and ready-to-use

Features *(continued)*

Pushbutton controls

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

Specifications

LCD display readout

Dimensions 2.6 (w) x 2.0 in (h) (6.6 x 5.1 cm)

Analog scale (bar graph) 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 0.0001 to 1 million (dependent on the activated units)

Alphanumeric display 16 character display shows digitized average on the bar graph value

It displays operational units such as radiation unit changes, response time changes, data, and labels

Pushbutton controls

Mode Toggles and selects rate units:

μ R/hr	mR/hr
R/h	CPM
CPS	μ Sv/h
mSv/h	

and the complementary units in the integrate mode:

μ R	mR
R	CTS
μ Sv	mSv

with the integrated time value in seconds

Log Logs 211 data points and sequentially labels data points. (Data retrieval requires the Model 190-1A Infrared Communicator)

Rate/Integrate Toggles between rate and integrate

Response time Toggles and selects: 24 seconds, 12 seconds, 6 seconds, or 3 seconds response time during operation

Audio Turns audio on and off. Acknowledges alarm

Light Turns back light "ON" for a preset time

Note: Using the Infrared Communicator, default settings can be programmed into the Model 190I. Features and push buttons can also be locked out to set up the Model 190I in a user-defined mode of operation

Range 10 μ R/h to 1000 mR/h; 0.1 μ Sv/h to 10 mSv/h

Detector Internal energy compensated GM detector

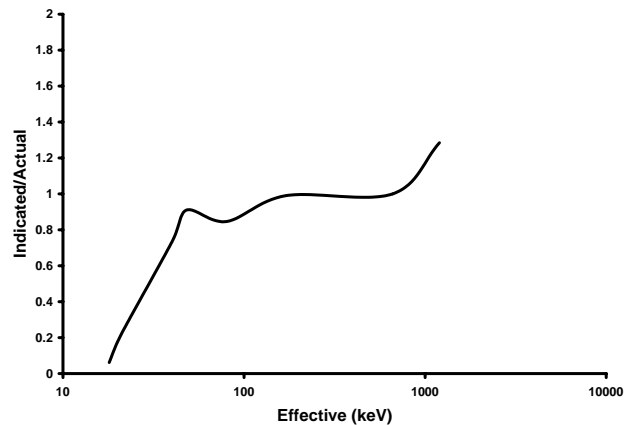
Accuracy Within 10% of reading between 10% and 100% of full scale indication on any range, exclusive of typical energy dependence

Nominal sensitivity 475 CPM/mR/hr*

* Calibration to ¹³⁷Cs.

Typical energy dependence

Model 190I typical energy dependence



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

Dimensions 3.75 (w) x 2.1 (d) x 9.2 in (h) (9.2 x 5.4 x 23.4 cm)

Weight 1.56 lb (0.70 kg)

Power requirements Four 9 V batteries, 200 hours operation

Warm up time 15 second diagnostic check

Optional accessories

Single Unit Carrying Case (Model 190HPS)

Multiple Unit Carrying Case (Model 190HPC)

Infrared Communicator (Model 190-1A), additional features can be activated such as log mode, alarm setpoint, and energy specific calibrations

NOTE: The Model 190I is calibrated to NIST standards. The Model 190I is calibrated in mR/h or μ Sv/h as a standard. The end-user may calibrate in additional radiation units using the 190-1A Infrared Communicator

Available model(s)

190I Survey 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.

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Portable Neutron Survey Meter

Victoreen® Model 190N



Radiation Safety



Model 190N shown with Model 190 Readout and Model RP-N Detector Assembly

- Wider (lower & higher) rate range
- Improved operator interface
- Useful for area monitoring and surveys
- Adjustable shoulder strap and padded grip
- True Rem readings
- Available in SI units

Introduction

Victoreen's Model 190N Portable Neutron Survey Meter is designed to measure mRem in accordance with the classical Anderson and Braun design. The neutron probe can be attached to either a Model 190 Survey Meter or a Model 190F Frisker for continuous area monitoring. It is truly portable and is ergonomically designed for ease of carrying with a shoulder strap.

This product has all the salient features of an intelligent digital survey meter including data logging. Using the Model 190-1A Infrared Communicator, manual data logging or automatic preset time data logging is accessible for data handling. The instantaneous rate and continual integration of dose and time can be logged. Refer to the Model 190 Survey Meter data sheet for a complete listing of all salient features.

Applications

The Model 190N can be used for neutron surveys and area monitoring. The unit is self-contained and does not need to be connected to any other system or product to operate.

Features

- The Model 190 display:
 - Direct reading digital display
 - Simulated analog scale with auto ranging
 - Rate display mode
 - Integrate display mode: dose accumulation and time accumulation
- Programmable in English or SI units
- Data logging with the Model 190-1A Infrared Communicator to a personal computer
- Portable:
 - Adjustable shoulder strap
 - Rugged handle with padded grip
 - Smaller overall dimensions than previous designs
- Flexible detector assembly, Model 190 can be removed for remote readings
- Neutron Probe, Model RP-N, can be interfaced to the Model 190F Frisker, with AC power for continuous monitoring

Specifications

Readout Programmable features of a standard Model 190 Survey Meter. Refer to the Model 190 data sheet for complete details

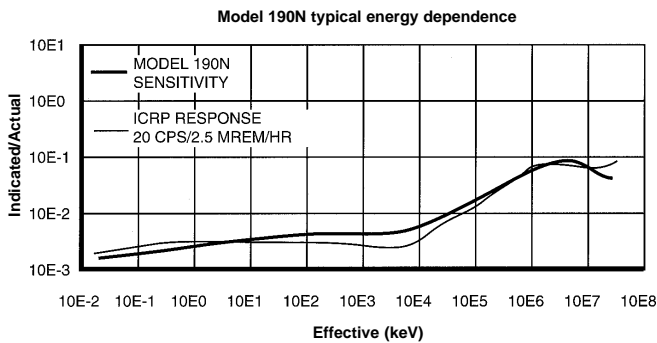
Alarm Audio and visual setpoint can be programmed into the Model 190N via the Model 190-1A Infrared Communicator

Logging of data The 190-1A Infrared Communicator interfaced to a personal computer can be used to set up data logging

Detector assembly, Model RP-N The detector assembly is a polyethylene cylinder, 9.5 inches long by 8.5 inches in diameter, containing a BF₃ proportional counter and neutron energy compensating materials. It is based upon the standard reliable Anderson and Braun design for neutron energy response. The handle is padded for ease of gripping. An adjustable shoulder strap is provided

BF₃ operating characteristics The BF₃ proportional counter operates at 1150 V. Active length is 2 inches (5.08 cm). Fill gas is enriched BF₃, 96% Boron 10. Gas pressure is 20 cm Hg. Resolving time is 1 microsecond, plateau slope is 2% per 100 V and tube life expectancy is greater than 10¹⁰ counts

Typical energy dependence



Typical neutron sensitivity Nominal 2000 counts per mRem

Range

Rate 0 μ Rem/h to 75 Rem/h

0 μ Sv/R to 0.75 Sv/h

0 CPM to 2.5 x 10⁶ CPM

0 CPS to 41,660 CPS

Integrate 0 μ Rem to 1000 Rem

0 μ Sv to 10 Sv

0 to 10⁹ counts

Gamma sensitivity/rejection No response in ¹³⁷Cs gamma radiation in fields up to 500 R/h

Accuracy 10% of theoretical ICRP dose rate

Dimensions 12.50 \varnothing x 10.25 in (d) (31.75 x 26 cm)

Flexibility The Model 190 is detachable from the detector assembly for remote readings. The Model 190 can be held or can be mounted on either side of the cylinder for convenient carrying

Miscellaneous Detector assembly cable length: 4.5 ft (1.37 m)

An optional 30 ft (9.14 m) cable is available

Weight 21 lb (9.52 kg) (total Model 190 + detector assembly)

Directionality Less than 20% in three orthogonal directions

Temperature range The Model 190's operating range is 14° to 104°F (- 10° to + 40°C). The detector assembly operating range is - 112° to 176°F (- 80° to + 80°C)

Power requirements Four 9 V alkaline batteries supplied, 100 hours operation

Calibration The Model 190N is calibrated against a NIST traceable "Tissue Equivalent Proportional Counter" and uses Radium/Beryllium neutrons at a distance of 100 cm

Available model(s)

190N Portable Neutron Survey 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.

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190 Meter with GM Pancake Probe on Telescoping Assembly

Victoreen® Model 190EX



Introduction

The Model 190EX combines the technology of the Model 190 Survey and Count Rate Meter and the Victoreen Model 489-110D GM Pancake Probe on a 10 foot telescoping assembly. A rugged webbed harness is provided with the 190EX in order to stabilize the probe during remote surveys.

The GM Pancake Probe (Model 489-110D) is easy to decontaminate and provides high detection efficiency for alpha, beta, and gammas as illustrated in the probe specification efficiency table. A digital/analog bar graph display on the Model 190 Meter provides realtime dose rate information to the end user. An immediate audio alarm also alerts the surveyor of unwanted radiation.

Applications

The Model 190EX may be used for many applications where suspected radiation is in remote locations. It is ideal for surveying the tops of trucks, railroad cars, for surveying abandoned wells and in decommissioning surveys. The all purpose alpha, beta, gamma detector on the end of a telescoping assembly is also ideal where the user wishes to use the distance rule as protection against unwanted exposure.

190EX product package includes:

- Model 190 Survey and Count Rate Meter with Model 190060 Calibration Module
- GM Pancake Probe with cable mounted on 10 foot telescoping assembly (probe is not weatherproof)
- 0.064 μCi ^{238}U Check Source
- Carrying harness including webbed shoulder harness with weight bearing cup
- Lockable foam lined polypropylene carrying case (4.6 x 10.25 x 53.50 in) (12 x 26 x 136 cm)

Total package weight: approximately 13 lb (5.9 kg)



- High detection efficiency
- Ergonomic design
- Lightweight
- Model 190 meter detaches for other applications
- Easy to decontaminate detector
- Digital/analog bar graph display
- Meter offers settable audio alarms and data logging



Model 190EX used for remote survey

Features

- GM Pancake Probe, Model 489-110D on 10 foot telescoping assembly provides remote alpha, beta, gamma, and x-ray detection
- Detector extends on telescoping assembly up to 10 feet as needed
- Model 190EX-KT is available to retrofit an existing Model 190 Meter with the probe, telescoping assembly, cable, calibration module, harness, check source, and carrying case

Specifications

Survey and Count Rate Meter (Model 190)

Operating ranges (dependent on selected probe)

Toggles and selects rate units:

μR/hr	mR/hr	R/hr
CPM	CPS	
μSv/hr	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 typical energy dependence. Accuracy is probe dependent

Detector GM Pancake Probe (see probe specifications to follow)

Adapter module Contains calibration data and high voltage settings for a specified probe. The module is available with an MHV connector

Note: Additional adapter modules can be purchased for use with multiple probes: Specify Model 190060 for MHV 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 190 Survey 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 190 with multiple probes for survey work

Log Logs 211 data points and sequentially labels data points. (Data retrieval requires the Infrared Communicator, Model 190-1A). With the communicator, alphanumeric up to 16 characters can be programmed into the Model 190 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

Battery condition Automatically indicates when battery is low

Power requirements Four 9 V batteries, 200 hours operation

Warm up time 15 second diagnostic check

Check source Model 450UCS ²³⁸U, 0.064 μCi check source, 2 x 2 yellow card

Environmental

Relative humidity 0 to 95%, non-condensing

Temperature range - 10° to + 60°C

Housing material Molded ABS plastic, splash-proof case

Dimensions (survey meter only) 3.75 (w) x 2.1 (d) x 9.2 in (h)

(9.2 x 5 x 23.4 cm)

Weight (survey meter only) 1.56 lb (0.7 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 190 in a user defined mode of operation

Note: The Model 190EX Survey and Count Rate Meter with pancake probe is calibrated to NIST standards. The 190 and probe are calibrated in mR/h or μSv/h units as a standard. The Model 190EX unit pancake probe is not weatherproof. The end user may calibrate in additional radiation units using the Infrared Communicator, Model 190-1A

GM Pancake Probe (Model 489-110D)

Detector Halogen-quenched "Pancake" GM tube

Radiation detected Alpha above 3.5 MeV, beta above 35 keV, and gamma above 6 keV

Operating voltage 900 V; compatible with all GM survey meters

Window 15 cm² (1.75 in Ø) mica, 1.4 to 2.0 mg/cm² thick

Typical background 30 CPM

Sensitivity 3500 CPM/mR/hr

Protective screen Stainless steel, hexagonal pattern providing 86% open area

Housing material ABS plastic

Cable Shielded cord; approximately 9.50 ft long MHV coaxial connector

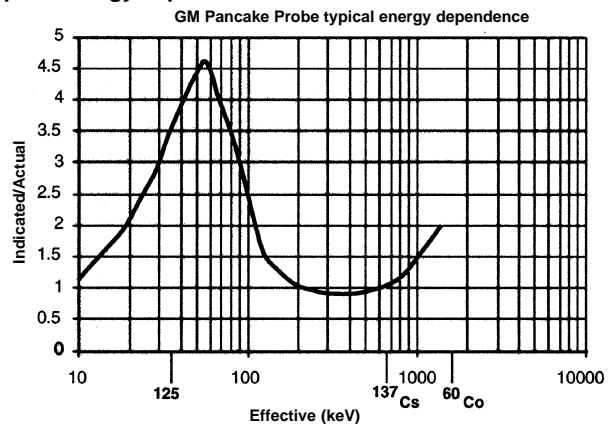
Dimensions

Detector housing 2.50 (w) x 0.875 (d) x 4.25 in (h)
(6.36 x 2.2 x 10.8 cm)

Handle 1 in Ø x 6.25 in (d) (2.5 x 16.5 cm) (excluding connector)

Weight (pancake probe only) 0.625 lb (0.28 kg)

Typical energy dependence



Efficiency The GM Pancake Probe, Model 489-110D efficiency is shown below. In a recent performance check, the numbers shown represent typical results obtained:

Isotope	%Efficiency
¹⁴ C	5
⁹⁹ Tc	12
¹³⁷ Cs	24
⁹⁰ Sr	59
³⁶ Cl	26
²⁴¹ Am	8
¹²⁹ I	2
²³⁰ Th	15
²³⁹ Pu	12

NOTE: The efficiency formula used to calculate the % Efficiency is:

$$\text{Eff. \%} = (\text{CPM} \times 100) / (\mu\text{Ci} \times 3.7 \times 10^4 \times 60 / 2)$$

Available model(s)

190EX 190 Meter with GM Pancake Probe on Telescoping Assembly

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.

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190EX-ds rev 3 12 mar 03

Thyac IV Survey Meter

Victoreen® Model 290



Radiation Safety



- High sensitivity contamination surveys with GM or scintillation probes
- Combines both count and count rate measurement capability
- Reads all Victoreen probes directly in mR/h with no correction factors at ¹³⁷Cs energy
- Five decade response from 0.1 mR/h to 1 R/h
- Meets requirement of NUREG 1556

Introduction

The Victoreen Model 290 is a general purpose count rate meter that utilizes all Victoreen scintillation and Geiger-Mueller (GM) probes.

Besides the range selection switch there are three other switches on the face of the instrument which permit the user to select between having the meter read in mR or counts (mR/h or counts/min if in dose rate), dose or dose rate, and speaker on or off. The instrument is programmed to remember dose even though the instrument is being used in the dose rate mode.

At any time during the operation of the instrument, the switch can be placed in the dose position and the accumulated dose from the time of the last dose reset is shown in either counts or mR as selected by the proper switch. The data is not lost if the range selection switch is on the wrong range. The dose reset function is one of the positions on the range selection switch.

The speaker can be turned ON so that an audible beep is heard with a rate proportional to the scale position for the range selected. In the Off position, the speaker will only sound when the scale rating is at full scale for whatever range the operator has selected.

An internal switch is used to tell the instrument which probe is being used. This permits the instrument to display the proper mR or mR/h value and to correct the display for the deadtime of the probe. The internal switch also permits entering a calibration factor for each probe when that probe is in use, thereby increasing the overall accuracy of the mR or mR/h readings. Other positions of the switch are used for diagnostics and troubleshooting.

Applications

The capability to integrate either counts or mR gives the user many operating modes from which to choose. Counting wipes becomes easier because the user can have a time constant as long as necessary to reach the accuracy required.

High sensitivity to detect surface contamination on spills and the high range of 1 R/hr makes it ideal for the nuclear medicine or radiopharmaceutical laboratory.

Features

- Internal probe selection switch with 16 positions
- Calibration potentiometer for setting count rate to dose rate conversion for each probe
- The latest in microprocessor technology, while still presenting to the user the traditional range selection switch and taut-band analog meter
- Available in SI units

Specifications

Radiation detected Alpha, beta, gamma, or x-ray depending on the detector probe used

Operating range Count or count rate ranges 0 to 100, 0 to 1,000, 0 to 10,000, 0 to 100,000, and 0 to 1,000,000 counts or counts/min. Exposure or exposure ranges 0 to 0.1, 0 to 1, 0 to 10, 0 to 100, and 0 to 1,000 mR or mR/h; exposure rate ranges 0 to 1, 0 to 10, 0 to 100 μ Sv/h, 0 to 1, 0 to 10 mSv/h. Maximum usable range is dependent upon probe selection

Response time 10 to 90%

Count rate mode

Range	Response
100	4.1 sec
1000	7.3 sec
10,000	3.9 sec
100,000	2.2 sec
1,000,000	0.7 sec

Dose rate mode The response time is dependent on the probe sensitivity but is similar to the above response times for similar count rate values

Environmental

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

Relative humidity 0 to 95%, non-condensing

Temperature dependence Less than 5% of full scale change from reading at 20°C over operating temperature range

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

Detector Accepts all Victoreen scintillation and GM probes

Warm up time Negligible

Power requirements Six "C" cells, 150 hours operation

Controls

External range selection positions:

Off
Battery Check
X1,000
X100
X10
X1
X.1
Dose Reset
Audio

Front panel toggle switches

mR/C: selects units of analog meter display

Rate/Dose: selects the dose rate/count rate mode versus the dose/count mode

Audio ON/OFF: selects audible indication of rate

Check source Natural uranium mounted on case side

Connector External MHV connector for detector probe

Readout Meter 3.5 inch taut-band with scale markings of 0 to 1,000 CPM and 0 to 1 mR/h

Construction Strong, all metal, splash-proof case. Probes fit into handle mounted clip

Dimensions 4.5 (w) x 8.9 (d) x 6.4 in (h) (11.4 x 22.6 x 16.3 cm)

Weight 3.25 lb (1.5 kg)

Available model(s)

290 Thyac IV Survey 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.

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290-ds rev 2 12 mar 03

THE *IDENTIFIER* Multi-Channel Analyzer by Exploranium

Model 07-109 Series



Radiation Safety



- First level response...complete radiation safety protection:
 - Gamma/Neutron
 - Search
 - Dose rate
 - Nuclide identificationCombined in one handheld
- Grab and go handling...one hand, one button, “joystick” operation
- Fully automatic
- Up to 4 detectors integrated into one instrument
- Integrated neutron detection capability
- “Dock to PC” IdentiVIEW software
- Free software upgrades

Introduction

The *IDENTIFIER* is outfitted for situations where ease of use and simplicity rank most important for field operations. Whether it is climbing up a ladder, navigating through dense smoke, inspecting incoming containers, or for complete concealment, the *IDENTIFIER*'s single button provides maximum ease of use. The *IDENTIFIER* is designed for easy in the hand one-thumb operation. Equally weighted front to back and side to side, the *IDENTIFIER* provides a well-balanced “in-the-hands” natural feel. The *IDENTIFIER* is compact, rugged, and lightweight.

Applications

Operating as a search tool, a dose meter, and a multi-channel analyzer (MCA), the *IDENTIFIER* can fulfill all gamma/neutron radiation detection requirements for the following industries:

- Emergency response teams
- Customs security organizations
- First responders, fire brigades, & police
- Military forces
- Health care institutions
- Federal and state regulators
- Nuclear power facilities
- Scrap metal recyclers
- Radiation safety officers
- Waste management
- Universities/Research facilities
- Decommissioning - characterization



Features

- Easy-to-use, highest operator usability
- One-hand (left or right)
- Unsurpassed nuclide identification
- Docking station for immediate system readiness: for battery charging, auto stabilization, and IdentiVIEW software access
- Displays are large, clear, simple, and intuitive
- Automatic operator advisor: instructions, procedures, and warnings
- “Eyes-free” audio warning system
- Multiple on board detectors: NaI, GM, Neutron, CZT, with automatic optimum detector selection
- Lightweight, rugged, balanced “in-the-hand” natural feel
- Selectable, customizable nuclide libraries

Ready

Docking station System ready



In the docking station

The *IDENTIFIER* comes equipped with a docking station. While resting in the docking station, continuous automatic system stabilization (internal 0.25 μCi ^{137}Cs sources) and internal battery recharging takes place.

A LED display, at the base of the station, keeps the user informed of the *IDENTIFIER*'s status:

- **Green** - ready to use
- **Yellow** - charging
- **Red** - requires attention

Housed in the docking station is an internal RS-232 communication support for automatic download of stored dose, survey, and sample spectrum to PC *IdentiVIEW* software. (See Reporting.)



Step 1

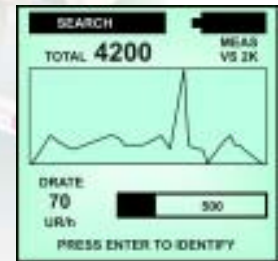
Grab & go! Search and dose rate



Point: search and dose rate

Out of the docking station, the *IDENTIFIER* is in Search/Dose mode, which displays survey and dose rate simultaneously.

In Search mode, the *IDENTIFIER* displays a histogram graphical display with counts per second (CPS) and energy corrected dose in "real-time." Dose rate is displayed in numerical units and as a Progress Bar that can be set to match the response of radiation pagers and user defined alarm levels.



Eyes Free Audio Warning System



The *IDENTIFIER* has built-in audio output scales to increase as the *IDENTIFIER* is moved closer to the source and the radiation becomes more intense. This aids in quickly directing the operator to the exact location of the source.



Automatically advises operator...



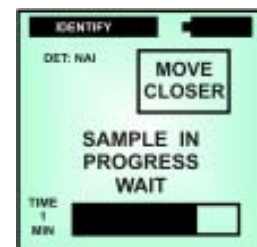
Warning



Instruction



Warning



System in progress

Step 2

“Click” Nuclide identification



“Click” - automatic nuclide identification

In most situations, there is little time between surveying a suspicious package or individual and making the determination to detain or release. The primary responsibility of the *IDENTIFIER* is to provide fast, accurate, and reliable analysis for a field agent without requiring advanced spectrum analysis or nuclide knowledge.

NUCLIDE IDENT		
TYPE	ISOTOPE	SIZE
IND	CESIUM-137	1234
MED	IODINE-131	123
SNM	DEP-U	25
NEUTRONS		22 nSVH

ENTER TO CONTINUE

Unsurpassed nuclide identification and classification

The *IDENTIFIER* utilizes state-of-the-art nuclide identification techniques to accurately report nuclides found.

- Automatic nuclide identification
- Identification optimized for shielding sources and special nuclear material
- Full text nuclide classification: type, nuclide name, and size
- Pre-defined nuclide libraries, no additional setup required

Sample re-count

In situations where the initial sample was insufficient to positively identify nuclides, the *IDENTIFIER* allows the user to automatically extend the measurement time with one button simplicity.

- One button operation, pop-up user instruction
- Automatic count time selection
- Combines initial and recount data for positive nuclide identification

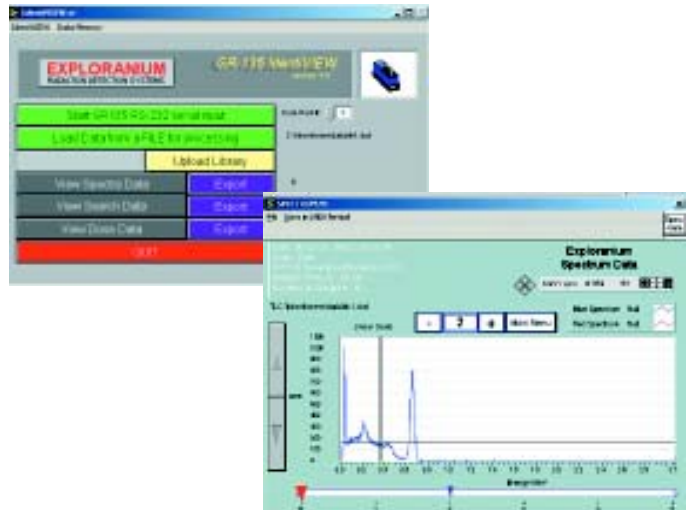
Reporting

“Dock to PC” IdentiVIEW software



Dock, click, and download

Downloading spectra and saved data is only a click away. When stored data must be transmitted to an expert for review, the *IDENTIFIER* is returned to its docking station and IdentiVIEW software automatically downloads stored data and spectrum to your PC.



Advanced features

For the more sophisticated user, the *IDENTIFIER* has advanced features that offer unsurpassed usability in a single system.

Dual mode operation In the **Automatic mode**, the *IDENTIFIER* performs all the advanced features automatically and is generally the preferred mode of operation. In this mode, the operator cannot inadvertently change any parameter settings, alarm levels, etc. These settings are fixed and secure in the Automatic mode.

The **Manual mode** allows the qualified user the opportunity to change parameters, alarm levels, etc. for both the Automatic and Manual Modes, as well as perform advanced spectrum analysis and other advanced functions. For security, the Manual mode is selected by using a hidden slider switch.

Advanced spectrum analysis Using a full complement of on-board analysis tools and system pop-up menus, the *IDENTIFIER* provides the advanced user everything needed to manipulate and analyze the spectrum.

- Adjust scaling, zoom, and expand peaks of interest
- Customize system settings
- Define multiple regions of interest (ROI)
- Re-play, allows the re-analysis of selected stored spectra

Neutron detection The *IDENTIFIER* utilizes a high efficiency moderated solid-state detection system that has maximum neutron sensitivity with minimum gamma interference.

When neutrons are detected, the *IDENTIFIER* alarms with a distinct audio alarm and displays a neutron-warning message with dose rate.

Customized nuclide library The *IDENTIFIER* supports up to 5

different pre-defined nuclide libraries. The desired library is activated through menu selection. Each library is factory optimized to ensure positive nuclide identification. We will work with users to optimize custom libraries for special applications. The current software version has one main nuclide library as a default that utilizes 19 of the most common nuclides. Nuclides are listed and identified by full text name and type: medical (MED), industrial (IND), and special nuclear material (SNM).

#	LABEL	NAME
1	IND	U-238
2	IND	Ra-226
3	IND	Th-232
4	IND	K-40
5	IND	Ga-67
6	IND	I-131
7	IND	Cs-137
8	IND	Co-60
9	IND	Ba-133
10	MED	In-111
11	MED	Tl-201
12	MED	Tc-99m
13	MED	Co-57
14	MED	Am-241
15	MED	Xe-133
16	MED	Np-237
17	SNM	SNM
18		(Pu-239, U-233, U-235)
19		

IND = Industrial Isotopes
MED = Medical Isotopes
SNM = Special Nuclear Material

System data storage For practical field use, the *IDENTIFIER* provides on-board data storage for dose, survey, and sample spectrum. The on-board non-volatile memory secures all saved data indefinitely, even if the batteries wear down. Data storage capabilities:

- 40,000 dose and survey measurements
- 187 spectra x 1024 channel (0 to 3 MeV)

Special nuclear materials (SNM) The detection of SNM does not always refer to weapons grade material, which tend to present a relatively clean spectrum. In counter terrorism applications, the presence of U235, U233, and Pu239 is complicated by camouflage techniques and other “dirty” nuclides. No system is fool proof; however, the *IDENTIFIER* utilizes a combination of the high resolution at low energies of CZT* to qualify SNM.

Optimized for shielded sources The *IDENTIFIER*’s nuclide identification system has been optimized to identify buried and shielded sources. Using sophisticated peak analysis and ratio techniques, the *IDENTIFIER* surpasses first generation systems to locate and identify shielded nuclides.

* CZT is an optional detector. SNM analysis is enhanced using CZT, but performs well with only NaI.

Digital multi-channel analyzer (MCA) A powerful 1024 channel MCA provides maximum capability throughout the 0.02 to 3 MeV energy spectrum. Automatic pulse pileup rejection is an advanced feature of the *IDENTIFIER* that removes erroneous peaks caused by high count rate conditions.

Manual/Auto detection Selection In the Automatic mode, the *IDENTIFIER* automatically uses all available detectors for optimized analysis based on identified peaks, presence of interfering peaks, and intensities. For special applications, the use through menu selection can select the detector to use for nuclide identification (CZT or NaI).

Nuclide “ID-on-the-run” Using advanced technology, the *IDENTIFIER* can perform nuclide identification in real-time. Given sufficient area peak counts above the statistical background during a sample acquisition, the *IDENTIFIER* displays possible nuclides as this count time progresses.

Specifications

Physical

Dimensions 6.75 x 9 x 4 in (17.15 x 22.86 x 10.16 cm)

Weight 4.5 lb (2 kg) including batteries and all detectors

Housing material Weatherproof, water resistant aluminum case

Communications 19,200 baud, RS-232 serial port

Battery power 2 “D” cell alkaline or rechargeable batteries

Battery life (Backlight use reduces battery life by 50%)

Rechargeable 8 hours continuous

Alkaline 12 hours continuous

Drop test 2.5 ft (0.75 m) onto concrete (with detectors)

Display 2.5 x 2.5 in (6.35 x 6.35 cm)

Detector/spectrometer

Sodium iodide (NaI) Sodium Iodide (NaI) 4 cu in (65 cu cm) volume detector. 1.5 Ø x 2.2 in (3.81 x 5.58 cm)

Cadmium zinc telluride (CZT) 500 mm³

Neutron Solid state lithium glass

Geiger-mueller (GM) 10 R/h (100 mSv/h)

Analyzer 1024 channel MCA

Environmental

Operating temperature 15° to 145°F (- 10° to + 50°C)

RFI/EMF shielding Complies with FCC (47 CFR part 15) for Class A

Available model(s) and configuration

Configuration	Model 07-109-XXXX			
	1000	2000	3000	4000
Model 07-109-XXXX	X	X	X	X
NaI detector	X	X	X	X
CZT detector				X
Neutron detector			X	X
Extended GM detector	X	X	X	X
Carrying case* (hard-sided)	X	X	X	X
Battery charger (separate)	X			
¹³⁷ Cs Check source	X			
Docking station		X	X	X

* Carrying case includes operating manual, batteries, computer cable, *IdentiVIEW* software, soft-sided carrying bag, and rubber protective boot.

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.

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MiniMonitor® III Multipurpose X and Gamma Ray Survey Meter

Nuclear Associates Model 05-575



Introduction

This hand-held instrument is used to monitor areas for unsuspected radiation or to search for a lost radiation source (¹²⁵I seeds) or contamination. It is simply constructed, rugged, portable and highly sensitive.

The MiniMonitor III is a perfect instrument to keep a constant surveillance over the working environment and to detect the quantity and extent of contamination.

Applications

MiniMonitor III, with its internal Geiger-Mueller (GM) tube is the ideal survey meter for detecting radiation levels from radioactive sources, radiation areas, ^{99m}Tc generators and x-ray machines. Its wide energy response offers versatility for use in a multitude of nuclear medicine and radiology applications.

The optional external Pancake Detector is required when using the MiniMonitor III as a "seed finder." It is designed to detect alpha, beta, and gamma radioactive contaminations as low as 0.002 µCi.

Its optional large area GM Pancake Detector with a thin window permits direct contact measurements on surfaces, as well as on hands, clothing, shoes, etc. Its wide energy response (50 keV to 6 MeV), offers versatility for use in a multitude of applications. Detects contamination levels as low as 0.002 µCi.



The 3-in-1 system

- Ideal for use with technetium generators where 1 R range is necessary
- Ideal for locating dropped or lost ¹²⁵I seeds and also serves as a general-purpose survey meter (when used with the optional Pancake Detector)
- Measures low-level ¹²⁵I surface contamination, quickly and accurately (when used with the optional Pancake Detector)
- Portable-easy-to-use
- Sensitive
- Eliminates the need and inconvenience of multiple products for different applications
- Versatile—ideal for use in a wide range of nuclear medicine, health physics, radiology, and radiation oncology applications
- All controls are conveniently located

Specifications

Survey meter

Radiation detected Gamma and x-ray

Detector Internal energy compensated GM tube

Ranges 0 to 10, 0 to 100, 0 to 1000 mR/h

Accuracy ± 10% of full scale when calibrated with ¹³⁷Cs

Typical energy dependence 50 keV to 6 MeV, ± 30%

Operating controls OFF, BAT CHK, x100, x10, x1 on one rotary switch indicator: Yellow LED (indicator) flashes once for each detector pulse. The audio system will sound once for each detected pulse. Both will continue to function when detector ceases to operate in pulse mode (fields up to 500 R/h)

Time constants 10 sec (x1), 2 sec (x10), 0.8 sec (x100)

Power requirements 4 AA alkaline batteries, 500 hours operation

Operating temperature - 4° to + 130°F (- 20° to + 55°C)

Readout 2.50 inch analog meter, marked 0 to 10 mR/h

Temperature dependence ± 15% over noted temperature range

Construction Solid state electronics encased in a high impact plastic case

Overall dimensions 3.75 (w) x 1.25 (d) x 5.50 in (h) (0.95 x 0.32 x 1.4 cm)

Weight 0.94 lb (0.43 kg)

Optional GM Pancake Detector

Detector GM Tube, thin window 1.5 to 2 mg/cm², window diameter 46.0 mm (1.812 in), window area 16.6 cm² (2.58 in²), protective grille, 93% open

Readout 2.50 in (6.4 cm) meter, 0 to 500 CPM

Ranges 0 to 500, 0 to 5,000, 0 to 50,000 CPM depending on range switch setting

Accuracy ± 10% of full scale

Operating controls Off, Battery Test, x100, x10, and x1

Optional accessories

Optional GM Pancake Detector (Model 05-575-2000)

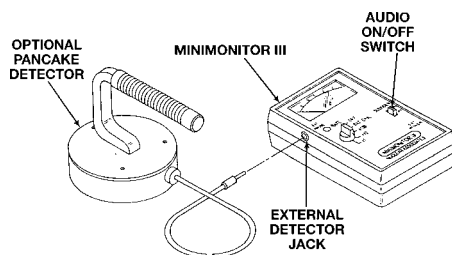
Check Source, ¹³⁷Cs, 10 µCi. Flat disc, 1 inch diameter (Model 62-103)

Adapter (Model 87-575), 120 VAC, 6 VDC output

Available model(s)

05-575 MiniMonitor III Multipurpose X and Gamma Ray Survey Meter

05-575-5555 MiniMonitor III System, includes GM Pancake Detector



Optional Pancake Detector Hook-up to MiniMonitor III

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.

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