DIRECT READING DOSIMETER

Typical Graduated Scale (Enlarged view)

Photon Energy Response

The Direct Reading Dosimeter is a pocket-size, carbon fiber electroscope with an ion chamber for detecting and indication of integrated exposure to gamma and x-ray radiation. It has a thin wall which permits the penetration and detection of radiation. A yearly calibration of the Direct Reading Dosimeter is recommended, and is generally consistent with good health physics practices. More frequent calibration may be necessary should the user's license require a shorter calibration interval.

The way to read a dosimeter is to point it at a light source so that you can look through it and see the scale. The conductive fiber moves across a very clear, well-marked scale that produces the reading. Because the dosimeter scale is linear, it is possible to determine the total amount of radiation exposure for any selected period of time by merely subtracting the reading taken at the end of the selected period. It is not necessary to recharge the dosimeter after each reading unless the instrument reads close to full scale.

These dosimeters use an extremely sensitive fiber electrometer type voltmeter and a small volume of air to measure the total amount of radiation to which the instrument has been exposed. A reading may be made at any time by looking at the light source through the eyepiece end of the instrument.

Dosimeters are extremely sensitive instruments. Although they are constructed for rugged use and have a protective sapphire window, they should receive the same care as a wristwatch. Since dosimeters are hermetically sealed at the factory, they cannot be repaired or adjusted in the field. Therefore, if the instrument malfunctions in any way it should be returned to the dealer.

Dosimeters may be maintained in operating condition simply by cleaning the eye piece lens and the charging switch insulator with water and a lint-free cloth that is free of grit.

Do not use any alcohol-based products to clean the dosimeter. Make sure the charging switch insulator is free of lint and moisture at all times.

Caution: Do not insert any sharp objects into the charging switch recess or tamper with its parts in any way.

Specifications

Radiation Detected: Gamma and X-ray from 16 keV to 2 MeV
Ranges: 0-200 mR to 0-500 R
Detector: Fiber electrometer mounted in an electrically conductive plastic ion chamber
Detector Housing: Very low permeability plastics - hermetically sealed
Accuracy: Within ± 10% of true exposure
Rate Response: Dose rate independent for gamma and X-ray
Electrical Leakage: Less than 1% of full scale for 24 hours at 50°C
Temperature Range: -20°C to + 50°C
Relative Humidity: Up to 90%
Dimensions: 0.6" Dia. x 4.5" (1.5 x 12.4 cm)
Weight: 1.0 oz (28.4 g)
Finish: Barrel and end caps are natural matte black with metal clips
Shelf Life: 20 years
Warranty: 2 year limited warranty
Specifications: ANSI N13.5 and ANSI N322-1997

Item	Description	Range
343-490	Direct Reading Dosimeter	0 - 200 mR
343-495	Direct Reading Dosimeter	0 - 2 mSv
343-500	Direct Reading Dosimeter	0 - 500 mR
343-505	Direct Reading Dosimeter	0 - 5 mSv
343-750	Battery Powered Dosimeter Charger	

909B DOSIMETER CHARGER

The charger's LED reading light reduces re-zeroing time and effort by eliminating the need to remove the dosimeter from the charger for reading. Simply view the scale while the dosimeter is resting lightly on the charger contact after re-zeroing. Reading in the same orientation as charging also minimizes the effect that gravitational induced fiber movement has on dosimeter accuracy and precision. The 909B Dosimeter Charger charging contact is spring-loaded and has a positive mechanical stop. This design feature makes it virtually impossible to damage dosimeters through excessive charging force.

The patented "kick" feature found on the 909B Dosimeter Charger automatically has the ability to remove all residual-static charge from dosimeters properly for improved accuracy. This prevents spurious upscale fiber movement.

- **Capable of charging any direct-reading dosimeter**
- **Conforms to ANSI N42.6-1980**
- **Operates on two 1.5 V "AA" batteries**
- **Has the ability to "kick" or remove all residual charge from dosimeters properly, preventing spurious upscale fiber movement**
- **LED Reading light to allow for easy charging/viewing**
- **Residual static charge removed for improved accuracy**

Easier charging, viewing, dosimeter protection and improved accuracy are the biggest reasons the battery operated 909B Dosimeter Charger is the best value on the market today.

Specifications

Weight: 10.6 oz (302 g)
Size: 4" L x 4" W x 3.5" H (10.2 x 10.2 x 8.9 cm)
Case: ABS Plastic
Controls: One turn potentiometer
Reading: Spring-loaded push rod
Power: 1.5V "AA" Batteries
Charging Voltage: 40 V to 220 V
Operating Temperature: 0° to 120°F (-18° to 49°C)
Lamp: LED

Item #	Description
343-750	909B Dosimeter Charger

PEN DOSIMETER CHARGER

The patented, handheld Dosimeter Charger works with a variety of direct-reading pen dosimeters by simply squeezing the lever of a generator. The Charger requires no batteries. By pulling a trigger, a dosimeter is easily placed in or removed from the clamping action that holds it snugly in the cradle. A discharge button above the clamp easily discharges any charge beyond zero on the meter of your Pen Dosimeter. All you need is a light source and a few seconds to zero your radiation dosimeters and get them back in the field.

Specifications

Power: 15,000 volt piezoelectric generator.
Discharge Bulb: Flashes to indicate the instrument is operational.
Clamping Mechanism: Spring loaded, adjustable and self locking. All metal parts are stainless steel.
Temperature Range: Operating: -20°C to +50°C (-4°F to +122°F).
Humidity Range: 0 to 60% Relative Humidity.
Weight: 8.6 oz (245 g)
Size: 6" x 4.2" (at its widest point) x .87" (15.24 x 10.79 x 2.22 cm)

Item #	Description
343-760	Pen Dosimeter Charger

I - 2

DOSE-i ELECTRONIC PERSONAL DOSIMETERS

343-100

343-102

Dose Management Software

Functions
- Personal Management
- Access Control
- RWP Management
- System Management

PC and Infrared Communication Device

Personal Management Screen

Entry Exit

Access Control Screen

343-105

Easily Track and Monitor Radiation Dose
- Small and Lightweight
- Easy to read display
- Simple Operation
- Excellent for healthcare diagnostic imaging where ionizing radiation is present, visual and audible dose and dose-rate alarms
- Ideal for x-ray and nuclear medicine environments
- Measures cumulative dose and dose rate of gamma radiation exposure
- Precision engineered for safety and reliability to the highest standard
- Measurement range: 0.001-999.9mSv (0.1-99.99mrem)
- Dose measurement: 0.001-999.9mSv/h (0.1-99.99mrem/h)
- Energy range: 35keV to 3MeV
- Dosimeters are nonreturnable
- Battery lasts for up to 720 hours (one CR2450 battery included)

Specifications
Radiation Measured: Gamma (X) rays
Detector: Silicon semiconductor
Measurement Range:
  0.001mSv to 999.9mSv (0.1mrem to 99.99mrem)
  0.001mSv/h to 999.9mSv/h (0.1mrem/h to 99.99mrem/h)
  for dose measurement
Display Range:
  Accumulated Dose: 0.001mSv to 999.9mSv (0.1mrem to 99.99mrem)
  Dose Rate*: 0.001mSv/h to 999.9mSv/h (0.1mrem/h to 99.99mrem/h)
Accuracy: $\leq$ ±10% (0.01mSv to 999.9mSv (1mrem to 99.99rem), ^{137}Cs)
Energy Range: 35keV to 3MeV
Energy Response: $\leq$ ±20% (60keV to 1.5MeV, ^{137}Cs reference)
Angular Response: $\leq$ ±20% (Up to ± 60 degree vertical and horizontal, ^{137}Cs)
Dose Rate Linearity: $\leq$ ±10% (^{137}Cs)
Display: 4-digit OLED (0.001 to 999.9)
Indication Data: Dose, Dose rate, Operating time, Alarm
Alarm Volume: 60dB (at 20cm)

Data Storage: Trend data (Up to 600 data)
Power Supply: Primary Battery (CR2450) x 1
Battery Lifetime: 720 hours or more (without alarm / communication)
Communication: Infrared communication (Option: communication cable and software)
Operating Temperature: 14°F to 104°F (-10° to 40° C)
Operating Humidity: Up to 90%RH
Dimensions: 1.2" W x 4.3" H x 0.5" D approx (3 x 11 x 1.2 cm approx.)
Weight: 0.13 lb approx (60g approx.)
*Note: Dose-i indicates rough value for dose rate measurement in low radiation field such as less than 1mSv/h (100mrem/h), so it should be used just for reference.

343-105 Dose-i Reader /Configuration Software
- Personal Management
- Access Control
- RWP Management
- System Management
- PC and Infrared Communication Device

343-105 Dose-i Reader /Configuration Software Includes:
 PC software (supplied as CD)
 Infrared communication cable
 Instruction manual

Specifications
General:
(1) Basic functions:
 a. Reading out operation parameters and measurement data from dosimeters
 b. Displaying trend data as data table or graph on the screen and downloading as EXCEL sheet
 c. Writing operation parameters to dosimeters
(2) Communicate with Electronic Personal Dosimeter Dose-i
(3) Temperatures: 0 to 40°C
(4) Humidity: 30 to 85%
(5) Power supply: DC4.5 to 6.0 V (supplied from connected computer)
Required Environment
The following requirements are applied to (1) hardware and (2) software, respectively.
(1) Hardware - Personal Computer that meet the following specifications
 ·CPU: 2GHz, or more
 ·Memory: 1GB, or more
 ·Hard Drive: Free disc space of 20 MB, or more
 ·Display: Resolutions 800 x 600, or more
·Communications Interface: USB x 1ch
·Others: Mouse and keyboard
(2) Software - The PC mentioned in (1) should have the following software installed.
 ·Operating system: Windows® XP/7/8/8.1 operating system
 ·Others: Microsoft® Office (EXCEL)
* Microsoft®, Windows®, Windows logo®, Windows Start logo® are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

Item	Description
343-100	Dose-i Electronic Personal Dosimeter, mrem
343-102	Dose-i Electronic Personal Dosimeter, mSv
343-105	Dose-i Reader/Configuration Software f/ 343-100 & 343-102

I - 3

ELECTRONIC PERSONAL DOSIMETER
Model 23, mrem and Model 23-1, mSv

Optional: Item 343-210 the Model 23 Series Dosimeter Setting Device and Software Kit includes an infrared reader and software that connects to the Model 23 and Model 23-1 dosimeters to a PC in order to adjust the configuration and to transfer logged dose readings. The device uses an infrared communication interface to connect to the Model 23 dosimeters and the software allows the user to change the dosimeter configuration and to view the logged dose data points. Dose data is logged at user determined time intervals (e.g. every 10 minutes), and the device records the total accumulated dose and the dose accumulated during each time interval. Up to 600 data points can be stored in the dosimeter. Note that all collected data is erased when the dosimeter is turned off, so the data must be transferred before the dosimeter is turned off in order to be recorded.

Specifications

Radiation Detected: gamma and X-ray (35 keV to 3 MeV)
Detector: silicon semiconductor
Measurement Display Range:
Accumulated Dose: 0.1 mrem to 99.99 rem (0.001 mSv to 999.9 mSv)
Dose Rate*: 0.1 mrem/hr to 99.99 rem/hr (0.001 mSv/h to 999.9 mSv/h)
Accumulated dose data is automatically deleted when the dosimeter is switched 'On'.
Display: 4-digit OLED with indicators for dose, dose rate, operating time, and alarm
Accuracy: $\leq \pm$ 10% (1.0 mrem to 99.99 rem (0.01 to 999.9 mSv) ^{137}Cs)
Energy Response: $\leq \pm$20% (60 keV to 1.5 MeV, ^{137}Cs)
Angular Response: $\leq \pm$20% (Up to $\pm$ 60 degree vertical and horizontal, ^{137}Cs)
Dose Rate Linearity*: $\leq \pm$10% (^{137}Cs)
Alarm Volume: approximately 60 dB (at 20 cm)
Data Logging: Up to 600 records (optional IR reader required for data transmission to PC)
Environment: 14 to 104 °F (-10 to 40 °C)
 $\leq$ 90% relative humidity (non-condensing)
Power: one each coin-type lithium battery (CR2450)
Battery Life: 720 hours (without alarm / communication)
Size: 1.8" W x 4.3" H x 0.5" D (3.0 x 11.0 x 1.2 cm) without clip
Weight: 2 oz (60 g)

*Note: The instrument indicates rough value for dose rate measurements in low radiation fields, such as less than 1 mSv/h (100 mrem/h), so it should only be used for reference.

- **Low Weight and Slim Design**
- **X-ray and Gamma Radiation Monitoring**
- **Audible Alarm**
- **600 Record Data Logging Option Available**

The Ludlum Model 23 mrem and Model 23-1 mSV Electronic Personal Dosimeter are compact and lightweight pen-type personal dosimeters. Both are ideal for the measurement and general monitoring of gamma and X-ray radiation in medical and laboratory environments, as well as any controlled or restricted area where personal radiation monitoring is required or desired. The units are sensitive to a wide range of energies from 35 keV to 3 MeV. Dose, Dose Equivalent Rate, and alarm values are easily seen on the four-digit LCD screen. An audible alarm is activated if the dose or dose rate exceeds the preset value of the dosimeter. The alarm set points are adjustable from the face of the unit.

For users with multiple EPD units the optional Reader/Software Kit can be used to quickly take data directly from the dosimeter via infrared communication to the user's PC. The software also allows the user to set or change alarm set points quickly.

Warning: this dosimeter may not measure pulsed radiation accurately

Item	Description
343-200	Electronic Personal Dosimeter, mrem - Model 23
343-205	Electronic Personal Dosimeter, mSv - Model 23-1
343-210	Dosimeter Setting Device and Software for 343-200 and 343-205

DMC 3000 ELECTRONIC PERSONAL DOSIMETER
X-ray & Gamma

- **Loud alarm, 85 dB (A) typical, (> 90 dB (C) peak)**
- **Vibrating alarm**
- **Highly visible backlit display**
- **Optional beta, neutron or telemetry module**
- **Factory upgradeable firmware**
- **Simple 2-button navigation**
- **Extended dose rate alarms**
- **Dual ultrabright LED alarm**
- **Superior X-ray and gamma energy response**
- **Meets or exceeds applicable IEC and ANSI standards**
- **Designed for ruggedness and durability**

The DMC 3000 Personal Electronic Dosimeter has a rugged, high impact polycarbonate-ABS case, is small, lightweight, and is a cost effective personal radiation monitoring device. They are designed to be worn on the body and keep a live record of both dose and dose rate. The DMC 3000 Personal Electronic Dosimeter is simple to use with 2 push buttons for an easy customized data and parameters display. The DMC 3000 has a LDC display with high-quality white backlighting.

The DMC 3000 covers a wide range of X-Ray and Gamma radiation detection field from 15keV to 7Mev and linear response to dose rate fields from natural background up to more than 10 Sv/h. The pass-by data exchange feature gives unequal operational flexibility. In-motion reading allows dose management by sub-zone as well as real-time location tracking of personnel.

The unique, high contrast and backlit LCD display provides a clear indication of wearer's dose and ambient dose rate for deep dose equivalent. More importantly, multiple methods (audible, visual, and tactile) are utilized to alert the wearer of alarm conditions.

Specifications

Radiological Characteristics
Compliant with IEC 61526Ed. 3, ANSI 42.20(*) (*) isotropy 241Am and 137Cs with ± 75° angle
Measurement and display:
 X and gamma energy range: 15keV to 7 MeV
 Energy response: Better than ± 20% (typically ± 10%) from 16keV to 7 MeV
Accuracy Hp(10): ≤ ± 10%* (137Cs, ~ 24 mSv/h); ≤ ± 15%*, (241Am, ~ 23 mSv/h); ≤ ± 19%** X-ray 16keV (*including ± 5% extended uncertainty k=2); (** including ± 9% extended uncertainty k=2)
Display units: mSv, µSv or mrem
Display dose: 1 µSv to 10 Sv (0.1 mrem to 1000 rem)
Display rate: 10 µSv/h to 10 Sv/h (1 mrem/h to 1000 rem/h) or 1 µSv/h to 10 Sv/h (0.1 mrem/h to 1000 rem/h) extended option.
Dose Rate Linearity: < ± 20% up to 10 Sv/h (1000 rem/h) (Co and X H30 20 keV); < ± 20% up to 6 Sv/h (600 rem/h) (Pulsed X-rays 20 ms width, 1, 10 & 20 pps)

Electrical Characteristics
- Standard AAA (LR03) 1.5 V Alkaline battery
- 9 calendar month battery life (typical, 8 h per day, 5 days per week in run mode, without excessive alarms)*
- 2500 h battery life in continuous run, without excessive alarm

Mechanical Characteristics
Rugged, high impact polycarbonate-ABS case
Dimensions: 3.4" x 2.2" x 0.8" (86 x 56 x 21 mm) without clip
Weight with alkaline battery and clip: < 88 g (3.1 oz)
Worn by a replaceable clips (2 different style back clips or one front-facing clip for DMC worn inside the pocket)

Environmental Characteristics
Temperature Range: 14°F to 122°F(-10°C to 50°C): deviation in response less than ± 5%
Relative Humidity: < 90% at 108°F (42°C)
Storage: -4°F to 160°F (-20°C to 71°C)
Shock, vibration and drop resistant (1.5 meter on concrete)
Waterproof IP67: 39" (1m) during 1 hour
EMC: Complies and exceeds standards by a large margin (CE compliant, certificate number: 153720)
MIL STD 461F RS103 (pulsed electric field): Exceeds 200 V/m from 30 kHz to 5 GHz
MIL STD 461F RS101 (magnetic field 30 Hz - 100 kHz)
Factory calibration approved under ISO/IEC 17025, COFRAC accreditation Nber 2-1663

Item #	Description
343-300	Personal Electronic Dosimeter - DMC 3000

LDM 320D DOSIMETER READER

Description
- Two-color electroluminescent diode used as ON/OFF and data exchange indication
- Two-color electroluminescent diode for READY/BUSY indication
- Two-color electroluminescent diode for ACCESS/ NO ACCESS indication
- 1 female connector, 2 x 13-pins, 1.27 mm pitch, for accessory options (4 digital inputs, 4 digital outputs, power supply)
- Upgradeable Firmware • Multi antennas (x3) for better (adaptative) communication with dosimeters
- Multi antennas (x3) for better (adaptive) communication with dosimeters

Communication with Dosimeters
- Short range high frequency bidirectional data exchange at 125 kHz
- Nominal range: LDM 320D
  - DMC 3000: 1.9" (5 cm) maximum

Specifications

Operating Temperature: 32°F to 122°F (0°C to +50°C)
Storage Temperature: +14°F to 140°F (-10°C to +60°C)
Humidity: 90% HR (without condensation)
IP LDM 320D: IP52
Electrical Characteristics:
Self powered through USB port
EMC: complies with and exceeds standards
CE compliant (CE certificate: 151508)

Dimensions: 3.9" W x 4.3" L x 1.1" D (10.0 x 10.9 x 2.9 cm)
Weight: 5.3 oz (150 g)

- **Dosimeter reader is compact and low-cost.**
- **Hands-free communication with dosimeters**
- **No directional alignment required**
- **3 Indicator LEDs for operation and access control**
- **Manageable digital inputs/outputs**
- **DSP based digital process**
- **Compatible with the DMC 3000 dosimeter**
- **Compatible with software packages: DOSICARE, DOSIFAST, DMCUser and LDM 3000SW**
- **Wall-mounted or desk versions**

The LDM 320D reader operates using software packages installed on computer (PC) and communicate with DMC 3000 dosimeter in hands-free data exchange mode.

When used with the DOSICARE, DOSIFAST, or compatible access control software, the LDM 320 reader is used as an interface to activate a dosimeter (to switch into counting mode) or to deactivate it (to switch into pause mode).

When used with the DMCUser software, it functions as an interface to read and write the internal data of the DMC 3000.

Item #	Description
343-320	LDM 320D USB Dosimeter Reader

RAD-60 PERSONAL ELECTRONIC DOSIMETER

The RAD-60 Personal Alarming Dosimeter is a precise radiation monitoring instrument for reliable detection and tracking of radiation exposure in order to ensure the personal safety of the user. It is suitable for a broad range of everyday radiation monitoring purposes in stand alone conditions.

- Individual Personal Alarming Dosimeter
- Enhanced EMI immunity
- Rugged Clip Fixing
- Improved wear-out and decontamination properties
- Increased buzzer volume
- Compact and lightweight
- Digital display for integrated dose or alternatively dose rate
- User selectable alarm levels for both dose and dose rate
- Detector system utilizes high quality energy compensated Si-diode and advanced mathematical dose rate linearization
- Splash-proof mechanical construction, high impact plastic with strong pocket clip

Applications
- Civil Defence, Rescue Operations
- Customs Operations, Military Forces
- Industrial radiography, Nuclear Medicine

Specifications

Radiation Detected: Gamma and X-rays
Detectors: Energy-Compensated Si-Diode
Measurement Range
  Dose: 1 µSv - 9.99 Sv or 0.1 mrem-999 rem
  Dose Rate: 5 µSv/h - 3 Sv/h or 0.5 mrem/h - 300 rem/h
Calibration Accuracy: Better than ±5 % (Cs-137, 662 keV at 2 mSv/h), Hp(10)
Energy Response: Hp(10), 55 keV - 3 MeV, better than ±25%, up to 6 MeV, better than ±35%
Dose Rate Linearity: Better than ±15%, up to 3 Sv/h (300 rem/h)
Alarm Thresholds: Six preset values each for integrated dose and dose rate, manually selectable by push button.
Font Panel Push-Button functions:
  Toggle between dose and dose rate display
  Switch ON/OFF
  Chirp ON/OFF
  Reset Integrated Dose
  Change Alarm Thresholds
  Activate Battery Test
Audible Alarms: Seven separate alarms, sound level typically better than 85 dBa at 30 cm
  Integrated dose
  Dose rate
  Dose overflow
  Dose rate overflow at 3 Sv/h or 300 rem/h
  Low battery 1 and 2
  Defect
Power Supply: One AAA alkaline cell, typical life is 1800 hrs in background field (dose mode)
Reader Communication: By infrared through bottom part; by using ADR-1 Reader Head in combination with RADOS PC Software
Temperature Range: -4° - 122° F (-20 to +50°C) operational, humidity up to 90% RH, non-condensed;
Dimensions: 3.07" x 2.63" x 0.86" (78 x 67 x 22 mm)
Weight: 2.82 oz (80 g) including battery

Item #	Description
343-600	RAD-60 Personal Electronic Dosimeter, Rem Display
343-602	RAD-60 Personal Electronic Dosimeter, Sievert Display

ADR-1 READER FOR RAD-60 DOSIMETERS

ADR-1 Dosimeter Reader Head

The ADR-1 Reader Head is designed to read and manage RAD-60 electronic dosimeters in modern PC environment. The ADR-1 Reader Head connects to any PC with a serial port using Windows 95™ or greater.

Features
- Compatible with all RAD-60 electronic dosimeter
- Indicator LED for dosimeter communication
- Desktop and wall mounting as standard
- Compatible with ADR-1 Reader, RDC-1, ADR-1/50 software
- Delivered with Rs-232 cable and universal input voltage DC power adapter

The Configuration Window displays the configuration information of the dosimeter. You can change the configuration to meet the users requirements by choosing the options you want to include in the dosimeter. Wtih the ADR-! Configuration Kit, a user can:
 Change Dosimeter Settings
  Perform Calibration (with Applicable source)
  Assign a User ID and Name

ADR-1 Reader for RAD-60 Dosimeters Includes:
- ADR-1 Reader
- Configuration Software
- Manual

Specifications

Power Supply: +12 VDC, max. 200mA, Complies CE standards
Operating Temperature: 32°F to 104°F (0°C to 40°C)
Storage Temperature: 14°F to 140°F (-10°C to 60°C)
Operating Humidity: 90% RH (non-condensing)
Dimensions: 11" W x 9" H x 4" D (29.7 x 23.5 x 9.7 cm)
Weight: 8 lb (3.7 kg)
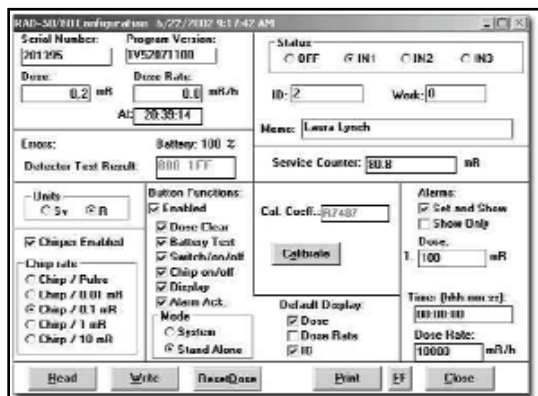
| Item #	Description
343-605	ADR-1 Reader for RAD-60 Dosimeters

RADIATION ALERT® SENTRY EC DOSIMETER AND RATE METER

The Radiation Alert® Sentry EC is a Personal Alarming Dosimeter and Rate Meter designed to ensure the safety of personnel that work in occupations with potential x-ray or gamma exposure.

The Sentry EC Dosimeter and Rate Meter measures gamma and X-ray radiation and provides dose rate monitoring in a small rugged package. It can work as a stand alone unit or in conjuction with the SentryCom Software. The Sentry EC employs two bright pulsating LEDs, an Audio Alert, and/or a Vibration Alert for the selectable alert levels. Coupled with the SentryCom Software, the Sentry EC can provide dose measurement, dose rate measurement, and dose history as well as enables you to easily set the alert to your desired levels for dose and rate.

The pocket sized unit has an energy compensated tube for a linear response to gamma and built in memory for recording data points for tracking accumulated exposure. The free SentryCom Software enables you to generate incident reconstruction for analysis. The software also permits you to easily set the vibrating and audio alert to your desired levels for dose (>1.0 mR/10 μSv) and dose rate (>1.0 mR/hr/10 μSv/hr).

Use the audio switch to choose between audible clicks with each count recieved or a discreet silent mode.
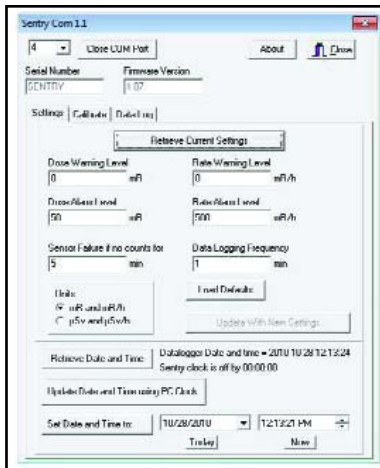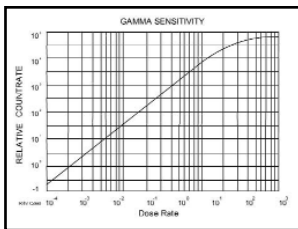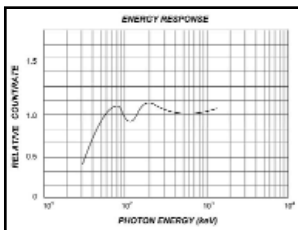
Specifications

Detector: Energy Compensated GM Tube
Dose Rate Linearity: Better than ±15% up to 15 R
Energy Response: Down to 20 KeV
Accuracy: Typically ±15% of reading (Cs^{137})
Gamma Sensitivity: 1.5 cps/mR/hr (Co^{60})
Operating Range:
 Dose Rate: 0.1 - 15 R/hr (1 μSv/hr - .15 Sv/hr)
 Accumulated Dose: 0.1 - 65 R (1 μSv - .65 Sv)
Audible Alarms: Accumulated Dose & Dose Rate, 90db @ 1 ft.
Alarm Thresholds:
 Default: Dose 500 mR / Rate 50 mR/hr
 Sievert Option: Dose 5000 μSv / Rate 500 μSv/hr
 Alarm and warning levels are user selectable with the Free SentryCom Software.
Switch Functions: Power, Vibrate & Audible Alert, Silent Vibrating Only Alert, and Audio Clicks On/Off.
Power Requirements: 9-Volt Alkaline Battery(Included) Approx. 1500 hrs at normal background.
Enclosure: Anodized Aluminum Housing w/ Metal Belt Clip
**Outputs:** Mini-USB
Temperature Range: 14° - +122°F (-10° - + 50°C)
Weight: 8.6 oz (243 g)
Size: 4.2" X 2.7" X 1.1" (10.6 x 6.7 x 2.8 cm)

SentryCom Software

The Windows™ based SentryCom Software enables you to set the values for dose and dose rate alarms and warnings, set the Cal Factor on your unit, and set how often the unit records. Downloading the accumulated exposure data, which includes time and date stamp, exposure, and power cycle identifiers for analysis. The data is stored in a convenient delimited text file for use with a spreadsheet program.
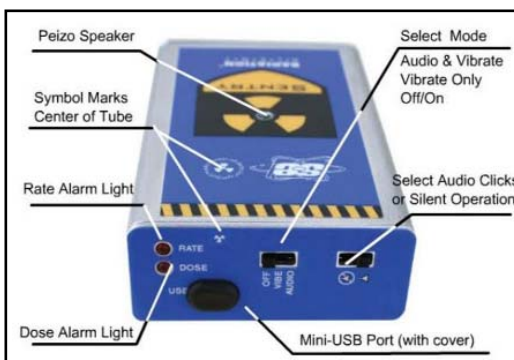
Item #	Description
343-270	Radiation Alert® Sentry EC Dosimeter & Rate Meter

DIGITAL WALL-MOUNT AREA MONITOR MODEL 375/2

337-100

337-105

- **Affordable Area Monitor**
- **Easy Setup and Use**
- **Internally Mounted, Energy Compensated GM Detector**
- **Operating Range: 1µSv/h-10 mS/h (0.1 mR/hr-1 R/hr)**
- **User-Programmable Alarms**
- **User-Programmable Units of Measurement**
- **Integrated Design**
- **Battery Backup**
- **Networkable (Requires Ethernet or Webpage Interface Option)**
- **Audio & Visual Alarms**
- **48-Hour Battery Backup**

The Model 375/2 Digital Wall-Mount Area Monitor is designed for visibility and ease of use. This monitor incorporates an internally-housed energy compensated GM detector with a range from 1 µSv/h to 10 mS/h (0.1 mR/hr to 1 R/hr). It features a wall-mount chassis and a four-digit LED display that is readable from 9 meters (30 feet) away. Backlit indicators warn of low radiation (yellow), high radiation (red), instrument failure (red), and low battery (yellow), along with an alarm. A green status light indicates the instrument is functioning properly. Audible tones provide additional alerts.

Parameters are protected under a calibration cover. Calibration is easily accomplished by moving the cal dipswitch to the right, and using the pushbuttons to increment or decrement the calibration constant, dead time correction, and alarm point parameters. Parameters are stored in non-volatile memory (retained even with power disconnected). A five-decade logarithmic analog output is provided. A battery backup provides 48 hours of additional use after the primary power is removed.

With the addition of the optional Remote Display/Annunciator, Item 337-105 or 337-106, the Model 375/2 can be used to provide continuous monitoring of (normal) background radiation in radioactive material preparation and work areas (ie. Nuclear Medicine Hot Labs). The system can also be used for monitoring of Teletherapy (Cobalt) Treatment rooms, notifying personnel that the source is exposed and in-use.

Remote Display/Annunciator (Item 337-105 or 337-106)
The optional Remote Display/Annunciator unit duplicates the alarm indication functions of the main unit at a remote location up to 1000 feet. It features a green status light, a red light for high alarm, and Sonalert for audible alarm with a disable switch. The remote unit is powered by the monitor and available with either a 20 ft or 50 ft cable.

Specifications

Item 337-100 Digital Wall-Mount Area Monitor, Model 375/2
Indicated Use: gamma monitoring
Display: 4-digit LED, 0.8" H (2 cm) character height
Display Range: 000.0 to 9999
Operating Range: 1 µSv/h to 10 mSv/h (0.1 mR/hr to 1 R/hr)
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: readings within 10% of true value with detector connected
Response: typically 3 seconds from 10% to 90% of final reading

Specifications
Indicators:
• **Status:** (green light) instrument functioning properly
• **Low Alarm:** (yellow light and slow [1 per second] beep) can be set at any point from 0.0 to 9999
• **High Alarm:** (red light and fast [4 per second] beep) can be set at any point from 0.0 to 9999
• **Det Fail:** (red light and audible tone) for conditions of detector overload, no count from detector, or instrument failure
• **Low Bat:** (yellow light) indicates less than 2 hours of battery power remaining
• **Overload:** display reading of -OL- and audible FAIL alarm indicate detector saturation
• **Over-Range:** display reading of "----" and activated low and high alarms indicate that the radiation field being measured has exceeded the counting range of the instrument (or when dead time correction accounts for more than 75% of the displayed reading)
Remote (optional): allows for connection of Ludlum Model 271 remote unit
Calibration Controls: accessible from the front of instrument (protective cover provided)
High Voltage: user-adjustable from 450 to 2500 volts
Dead Time: user-adjustable to compensate for dead time of the detector and electronics (can be read off the display)
Audio: can vary from approximately 68 dB to 100 dB through operation of the external rotary baffle and the internal voltage connection
RS-232 Output: a 2-second dump for computer data logging
Power: 9 Vdc wall-mount adapter with four sets of prongs for almost any style wall receptacle
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 ivory powder-coat finish
Temperature Range: -15 to 50 °C (5 to 122 °F); may be certified for operation from -40 to 65 °C (-40 to 150 °F)
Size: 7.4" H x 9.7" W x 2.5" D (18.7 x 24.6 x 6.4 cm)
Weight: 4.7 lb (2.1 kg)

Item 337-105 and 337-106 Remote Display/Annunciator   Indicated
Indicated Use: Remote display/annunciator for the Model 375 Area Monitors
Audio: Sonalert-type speaker with enable/disable switch (greater than 68 dB at 0.61 m [2 ft])
Radiation Readout Display: None
Status Indicators:
   Status OK: Green LED
   High Alarm: Red LED
   Det Fail: Red LED
Controls:
   Audio: ON/OFF
   Remote Alarm Relay: Enable/Disable
Power Supplied By: Model 375/2 instrument, 20' (6.1 m) or 50' (15.2 m) cable provided
Connector: 9-pin "D" connector
Construction: Aluminum with ivory powder coat finish
Temperature Range: -4 to 122°F (-20 to 50°C), may be certified to operate from -40 to 150°F (-40 to 65°C)
Size: 7" H x 2" W x 2"D (17.8 x 5.1 x 5.1 cm)
Weight: 1.5 lb (0.7 kg)

Item #	Description
337-100	Digital Wall-Mount Area Monitor, Model 375/2
337-105	Remote Display/Annunciator, Model 271 w/ 20' Cable
337-106	Remote Display/Annunciator, Model 271 w/ 50' Cable

RADIATION AREA MONITOR SYSTEM, MODEL 7008RT

337-110 and 337-112

- **Built-in rechargeable back-up battery**
- **Radiation rate indicated on an 8-digit LCD display**
- **Alarm level may be preset in 0.1 mR/h increments**
- **Visual and audible alarm indication**
- **Audible alarm may be disabled**

Item 337-109 and 337-110
Radiation Area Monitor - Internal Solid State Detector

The Radiation Area Monitor, Model 7008RT is a wall-mounted radiation monitor designed to meet the specifc needs of radiation therapy. It is designed to operate continuously from an AC power line. In the event of power failure, the built-in, continuously trickle charged NiMH battery automatically switches in to begin supplying power immediately, assuring interruption-free operation at all times.

The monitor features a digital display of radiation rate, audible and visual alarms, and alarm indicator, alarm setpoint adjustability over the entire range, and self diagnostic functions such as low battery, overrange, detector saturation and detector failure conditions. A green status light is a positive indication of normal instrument operation.

A flashing red light with 180° visibility and a red LED indicator below the digital display provide the visual alarm. The audible alarm (which may be disabled with a switch) consists of a single short beep at the beginning of the alarm mode.

Item 337-111 and 337-112 Remote Alarm

The optional Remote Alarm unit duplicates the alarm indication functions of the main unit. It features a green status light, a red light for high alarm, and Sonalert for audible alarm with a disable switch. Item 337-111 is supplied with a 100' (30.5 m) cable and Item 337-112 is supplied with a 50' (15.25 m) cable. An optional 100' (30.5 m) cable is available if additional cable length is needed.

Specifications

Radiation Area Monitor - Internal Solid State Detector
Detector: Internal solid state detector
Display: 8 digit, 12 mm high (0.5 in) LCD
Range: 0.1 to 999.9 mR/h (1 to 9999 µSv)
Alarm: May be preset in 0.1 mR/h (1 µSv) increments
Visual: Red light
Audio: Sonalert, single beep, may be disabled
Battery: Built-in rechargeable NiMH battery supplies 48 hours of non-alarm use under line power failure conditions. Low battery yellow LED on front panel
Power: 95 – 230 VAC, 50/60 Hz
Dimensions: 7.6" x 4.5" x 2.7" (19.4 x 11.5 x 6.8 cm)
Weight: 1.5 lb (0.7 kg)

Item 337-111 and 337-112 Remote Alarm
Alarm: Red lamp indicates, Sonalert provides audio for alarm and failure, toggle switch disables audio
Status OK: Green light indicates correct monitor operation
Power: 12 VDC from main unit
Cable: 50' (15.25 m) or 100' (30.5 m) length cable
Dimensions: 7.6" x 4.5" x 2.7" (19.4 x 11.5 x 6.8 cm)
Weight: 1.0 lb (0.5 kg)

Item #	Description
337-109	Radiation Area Monitor, Model 7008 RT, µSvhr
337-110	Radiation Area Monitor, Model 7008 RT, mR/hr
337-111	Remote Alarm Unit with 100' (30.5 m) Cable
337-112	Remote Alarm Unit with 50' (15.25 m) Cable
337-113	100' (30.5 m) Cable for 337-111 or 337-112

CHECK SOURCE

338-122

338-120

Specifications

Item 337-141 and 338-120
Isotope: 137Cs
Size: 1" Dia. x 0.1" T (2.5 x 0.3 cm (1 x 0.1 in.)

Item 338-122
• Typically Mounted to Side of Instrument with four (4) screws
• Hinged swing-away door clicks closed to protect and secure the source
• Holds 1" Dia. (2.5 cm) Check Sources
• Made of aluminum with a beige powder coat
Size: 1.8" x 1.8" x 0.5" (4.4 x 4.4 x 1.3 cm)

Item #	Description
337-141	Check Source, Cs-137, 10uCi
338-120	Check Source, Cs-137, 1uCi
338-122	Holder for Check Source

LEAD CASE FOR CS-137 CHECK SOURCE

Specifications

Item 994-078 Lead Case for Cs137 Check Source
Lead Wall: 10 mm Thick
Inside Dimensions: 1.22" Dia x 0.3" D (31 x 8 mm)
Overall Size: 2.16" Dia. x 1.22" H (55 x 31 mm)
Weight: 1.5 lb (0.7 kg)

Item 994-079 Lead Case for Cs137 Check Source
Lead Wall: 1.0" Thick (25.5 mm)
Inside Dimensions: 1.25" Dia. x 0.5" D (31.9 x 13 mm)
Overall Size: 3.25" dia. x 2.5" H (85.4 x 63.7 mm)
Weight: 8.5 lb (3.9 kg)

Item #	Description	Lead Thickness
994-078	Lead Case for Cs137 Check Source	10 mm
994-079	Lead Case for Cs137 Check Source	1" (25.5 mm)

INTEGRATED FRISKER, MODEL 26

- **Integrated, Lightweight Design Simplifies Frisking**
- **Protective Rubber Covering Enhances Ruggedness, Water Resistance, and Non-Slip Comfort**
- **Employs Standard 15.51 cm² GM Pancake Detector**
- **Ratemeter, Peak, and Scaler Operating Modes**
- **Simple Two-Button Operation**
- **Count Rate and Scaler Alarms**
- **Automatic LCD Backlight Activation**
- **Wrist Cuff and Lanyard Included**

Frisking people and objects for alpha and beta contamination has always been a little awkward because manipulation of the cable, detector, and electronics required the use of both hands. The new cable-less Model 26 consolidates the electronics and the detector into one ergonomic housing. This optimized configuration incorporates a standard 15.51 cm² GM pancake probe, loud audio "click" output, and large auto-ranging LCD display with automatic backlighting into one convenient package, making it easier than ever to detect contamination.

Operation is simple requiring the use of just two buttons. A useful feature in the design is the MAX mode, which captures the highest or peak count rate. It is particularly convenient whenever the display is not directly visible. The scaler mode, with a preset count time, allows the user to take a discrete measurement. This system also incorporates low power circuitry, delivering hundreds of hours of use with two standard "AA" size batteries. The calibrator can protect parameters (cps/cpm, response time, alarm points, & scaler time) or allow the user to adjust them.

Specifications

Detector: Pancake GM (Geiger-Mueller) detector, stainless steel screen (79% open)

Window Area:
Active: 15.51 cm² (2.4 in²)
Open: 12.26 cm² (1.9 in²)

Efficiency (4pi) (surface plane):

Alpha: 11% for ^{239}Pu

Beta: 18% for ^{99}Tc; 32% for ^{32}P; 2% for ^{14}C; 22% for ^{90}Sr/^{90}Y; 0.2% for ^{125}I

Gamma: 3300 cpm/mR/hr or 5.5 cps/µSv/hr (^{137}Cs); $\leq$ 1% for ^{99m}Tc

Resolving Time: Approximately 110 microseconds as defined by IEC 60325

Linearity: ± 10%

Alarms: Count rate and scaler alarm setpoints adjustable over the display range

Overload: High count rate saturation protection prevents false display of lower count rates

Zero Protection: After 60 seconds of no pulses from detector, unit will flash a zero reading and the alarm audio will be triggered

LCD Display: 3½ digit LCD with 12.7 mm (0.5 in.) digits, (k)cpm, (k)cps, low battery indicator, MAX, ALARM

Range: 0.1 cps to 1.99 kcps, or 1 cpm to 99.9 kcpm

Backlight: Built-in ambient light sensor automatically activates low-power LED backlight, or may be configured for 'Continuous On' operations (will reduce battery life)

Controls: Two pushbuttons

OFF/ON/QUIET: Press to turn ON, tap to alternate between 'click' audio and QUIET, hold for OFF

MODE: Alternates between NORMAL (count rate) and MAX (captures peak rate), and SCALER (user-selectable preset count time from 0 to 20 minutes). Each mode is separately programmable so it can be active or turned off.

Response Time: user-selectable from 1 to 60 seconds, or Auto-Response Rate FAST or SLOW

Click Audio: Greater than 60 dB at 0.6 m (2 ft)

Power: Two "AA" batteries

Battery Life: Approximately 1000 hours of operations (as low as 500 hours with backlight configured for 'Continuous On'), 16-hour low battery warning

Construction: High-impact polycarbonate plastic with water-resistant rubber seals, separate battery compartment and rubber overmold

Environmental Rating: NEMA 3 / IP 53
Temperature Range: -4° to 122 °F (-20 to 50 °C)

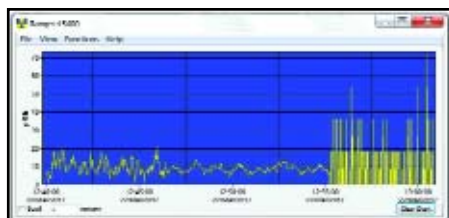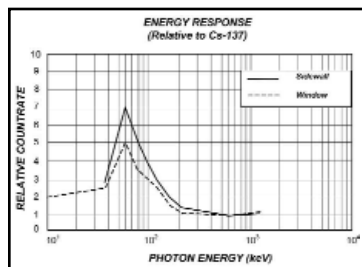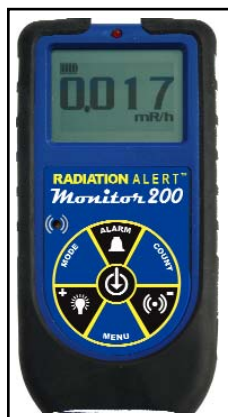**Distance from Surface Plane to Screen:** 0.32 cm (0.125")

Size: 2.7" W x 10.7" L x 1.8" H (6.9 x 27.2 x 4.6 cm)

Weight: 1.0 lb (0.45 kg)

Item #	Description
339-026	Integrated Frisker, Model 26

RADIATION ALERT™ MONITOR 200 RADIATION DETECTOR

Observer USB Software collects data stored in the internal memory of the Monitor 200

Lanyard and stand included
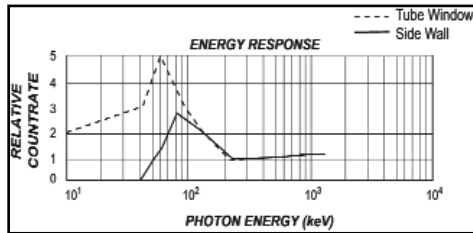

Xtreme boot included

The Radiation Alert™ Monitor 200 measures alpha, beta, gamma, and x-rays. Its digital display shows readings in your choice of CPM, CPS, µSv/hr, mR/hr, or in accumulated counts. It has a digital display, easy to read backlit display, a red count light, and a beeper that sounds with each count detected. Other features include an adjustable timer, and a loud customizable alert.

The free Observer USB Software (Windows® only) reads in Total Counts, CPM, µR/hr, mR/hr, CPS, µSv/hr, and has the ability to collect and log data, set alarms, set timed counts, set the calibration date and settings, and generate reports.

With the Bluetooth and Free Observer BLE app from the Google App Store, you can display the readings from your detector, label sample readings and descriptions, take timed counts, append GPS data and send your saved survey file. Alarms set on the instrument will also activate on your Android device.

Specifications

Detector: Halogen-quenched GM tube with thin mica end window. Mica window density 1.5-2.0 mg/cm^2. Effective window diameter is .360". Side wall is .012" thick.

Operating Range:
 mR/hr - .001 (1µR) to 200 mR/hr
 µSv/hr - .01 to 2000
 CPM - 0 to 235,400
 CPS - 0 to 3923
Timed Counts - 1 to 9,999,000 counts

Accuracy: Typically ±15% of reading. ±10% with NIST Source Calibration (NIST Calibration Additional)

Energy Sensitivity:
 1070 CPM/mR/hr referenced to Cs^{137}
 Detects alpha down to 2.5 MeV; typical detection efficiency at 3.6 MeV is greater than 80%.
 Detects beta at 50 keV with typical 35% detection efficiency.
 Detects beta at 150 keV with typical 75% detection efficiency.
 Detects gamma and x-rays down to 10 keV typical through the tube window, 40 keV minimum through the case.

Anti-Saturation: Readout will OVERRANGE in radiation fields as high as 100 times the maximum reading.

Selectable Alert Set Range: mR/hr .001 - 100 and CPM 1 - 350,000. Internally mounted beeper,70db @ 1m. Pulsating beeper sounds the alert. Adjustable alert levels are used for mR/hr / CPM, and µSv/hr / CPS. Alarm will sound when in Timer Mode when set alarm threshold is reached.

Display: Graphic LCD with Backlight

Count Light: Red LED flashes with each count.

Audio Indicator: Sounds with each count (can be switched off for silent operation)

Outputs: USB for use with Observer USB Software for PCs and Bluetooth 4.1 for use with the Observer BLE app for Android OS

Power Requirements: 2 AA alkaline batteries(included). Approx. 800 hrs @ background.

Temperature Range: 14° to 122°F (-10° to 50°C)

Humidity Range: 10% to 70% Non-Condensing

Size: 5.5" X 2.7" X 1.3" (14.0 X 6.8 X 3.3 cm)

Weight: 6.4 oz (0.19 kg)

Includes: Carrying Case, Xtreme Boot, Lanyard, Stand, Batteries, Mini-USB Cable, Observer USB Software Download, Observer BLE App, Certificate of Conformance

Options: NIST Calibration

Item #	Description
339-100	Radiation Alert™ Monitor 200 Radiation Detector
339-105	NIST Calibration for Monitor 200

RADIATION ALERT® RANGER RADIATION SURVEY METER- a ß γ x

Observer USB Software collects data stored in the internal memory of the Radiation Alert Ranger

Lanyard and stand included

Shown with Optional Wipe Test Plate

Specifications

Detector: Internal Halogen-quenched, uncompensated GM tube with thin mica window, 1.4-2.0 mg/cm^2 areal density. Effective diameter of window is 45 mm (1.77 in.).

Operating Range:
 mR/hr - .001 (1μR) to 100
 CPM - 0 to 350,000
 μSv/hr - .01 to 1000
 CPS - 0 to 5000
 Total Counts - 1 to 9,999,000 counts

Accuracy: (Referenced to Cs137) Typically ±15% from factory, ±10% with NIST Source Calibration

Energy Sensitivity:
3340 CPM/mR/hr (Cs^{137})
• Detects Alpha down to 2 MeV.
• Detects Beta down to .16 MeV; typical detection efficiency at 1 MeV is approx. 25%.
• Detects Gamma down to 10 KeV through the detector window. Smallest detectable level for I^{125} is .02 μCi at contact.

Built-In Efficiencies: Sulfur (^{35}S), Strontium (^{90}Sr/y), Cesium (Cs^{137}), Phosphorus (^{32}P), Carbon (^{14}C), Iodine (^{131}I), Cobalt (^{60}Co), and Alpha

Selectable Alert Set Range: mR/hr .001 - 100 and CPM 1 - 350,000. Pulsating beeper sounds the alert. Adjustable alert levels are used for mR/hr / CPM, and μSv/hr / CPS. 70db @ 1m. Alarm will sound when in Timer Mode when set alarm threshold is reached.

Anti-Saturation: Meter will hold at OVER RANGE in fields as high as 100 times the maximum reading

Averaging Periods: Display updates every 3 seconds. At low background levels, the update is the average for the past 30-second time period. The timed period for the average decreases as the radiation level increases.

Display: Graphic LCD with Backlight

Count Light: Red LED flashes with each radiation event

Alarm Indicator: Internal beeper. 70db @ 1m. (can be switched off for silent operation)

Outputs: USB for use with Observer USB Software for PCs, Bluetooth for use with the Observer BLE app for Android OS

Power Requirements: USB or two AA alkaline batteries. Approx. 800 hrs @ background.

Temperature Range: 14° to 122°F (-10° to 50°C)

Humidity: 10% to 70% Non-Condensing

Size: 5.5" X 2.7" X 1.3" (14.0 X 6.8 X 3.3 cm)

Weight: 10.3 oz (0.64 lbs.)

Item 339-150 Includes: Carrying Case, Xtreme Boot, Stand, Lanyard, Batteries, Mini-USB Cable, Observer USB Software, Observer BLE Software, Certificate of Conformance

Options:
339-155 Wipe Test Plate
339-158 Swipes
339-160 NIST Calibration

The Ranger offers maximum performance in a lightweight, rugged nuclear radiation detector for surveying at the facility or in the field. The Ranger is designed for industrial environments, but it still has all of the features you've come to love in the lab. The Ranger is a small, handheld, digital survery meter that offers excellent sensitivity to low levels of alpha, beta, gamma, and x-rays.

It has built in efficiencies for common isotopes to calculate activity in Bq and DPM. It has a backlit digital display, a red count light, and a beeper that sounds with each count detected. Other features include selectable alert levels, an adjustable timer, and an optional wipe test plate for swipes. Internal memory and the free Observer USB Software allow you to download your data, set computer alarms, and calibrate your instrument. The Bluetooth and Observer BLE app from the Google App Store, allows you to display the readings from your detectoron to your android device, label sample readings and descriptions, take timed counts, append GPS data and send your saved survey file. Alarms set on the instrument will also activate on your android device.

The Free Observer USB software (Windows® only) reads in Total Counts, CPM, μR/hr, mR/hr, CPS, μSv/hr, and has the ability to collect and log data, set alarms, set timed counts, set the calibration date and settings, and generate reports.

Item #	Description
339-150	Radiation Alert® Ranger Radiation Survey Meter
339-155	Wipe Test Plate for Ranger Survey Meter, 339-150
339-158	Swipes for Wipe Test Plate, 339-155
339-160	NIST Calibration for Ranger Survery Meter

RO-20 AA ION CHAMBER SURVEY METER

- **Measures gamma or x-ray exposure rate**
- **Temperature compensated measurements**
- **Sliding shield for beta measurements**
- **Large, backlit display**
- **5 ranges up to 50 R/h**

The Model RO-20 AA is a portable air ionization chamber instrument, used to detect beta, gamma, and x-radiation. It features five linear ranges of operation to measure exposure from background to 50 R/h full scale.

The ionization chamber is vented to atmospheric pressure and is specifically designed to have a flat energy response into the x-ray region. The detector is fully temperature compensated, eliminating any need for temperature correction. Each instrument is factory calibrated to gamma radiation.

A single rotary switch turns the instrument off, checks the batteries, checks the zero setting, and selects the range of operation. An ergonomically located switch illuminates the meter. Internal switching of ranges is accomplished with reed relays, eliminating the mechanical swing arms typically used with portable ion chamber survey instruments.

Compared to the previous model RO-20, only standard batteries are used and the exchange of all batteries can be accomplished very quickly and easily. The total weight of the instrument is reduced by 10 % and the angular response is improved in the horizontal plane by up to 20 % under 180°.

Detector

The RO-20 AA detector is an air-filled ionization chamber. It has a diameter of 7.32 cm and a volume of 220 cm^3. The detector has 640 mg/cm^2 phenolic walls inside a 1.6 mm aluminum wall case for a total thickness of approximately 1,000 mg/cm^2. A 7.9 mm thick phenolic sliding beta shield with a positive friction lock is mounted on the bottom of the chamber. The shield thickness is approximately 1,000 mg/cm^2. The chamber window is comprised of two layers (one on the chamber, one on the can) 25 micron (0.001") mylar, approximately 7 mg/cm^2 total.

Energy Response

Photon Response: Reference to ^{137}Cs measured through the bottom with the slide closed, the energy response is:
- ± 30% from 8 keV to 1.3 MeV with the open slide facing the source.
- ± 15% from 33 keV to 1.3 MeV with the closed slide facing the source.
- ± 15% from 55 keV to 1.3 MeV through the side of the instrument

Beta Response: Uranium Slab: 30% of true mrad/h field behind 7 mg/cm^2 window with RO-20 AA resting on slab, slide open. $^{90}Sr^{90}Y$: Approximately 93% of true mrad/h field at 30 cm with slide open.

Fast Neutron Response (PuBe): Reads approximately 8% in mR/h of true neutron field in mrem/h.

Radiation Detected: Beta, gamma, and x-ray.

Ranges: Five linear ranges: 0-5, 0-50, 0-500 mR/h and 0-5, 0-50 R/h

Meter: Scale length, approx. 7.6 cm (3"), 2% accuracy. Linear markings from 0 to 5 in 50 minor increments. The meter is back-lit

Response Time: 90% of final reading within 5 seconds,

Linearity: Within ± 5% of full scale

External Controls: Range switch, including Off, Zero, and Battery checking positions. Zero knob used to set meter to zero when Zero position of range switch is selected. Light switch, for meter light.

Internal Controls: Five calibration controls- one for each range.

Batteries: Main Power: Five "AA" cells

Chamber Bias: Three 12 volt standard "23A" alkaline cells, 36 volts.

Battery Life: "AA" cells, widely variable according to RO-20 AA usage. Typical Alkaline: mR/h ranges, 2500 hrs. All other positions, 125 hrs. Frequent or continuous use of the light will reduce battery life significantly. 36 volt chamber bias battery life: Totally dependent upon the usage of "Battery 2" position of the range switch. The battery capacity should allow for at least 50,000 five second battery checks. The battery drain is negligible on all other positions of the range switch.

Temperature: Operable from -40 °C to 60 °C (40 °F to 140 °F)

Temperature Compensation: The detector is fully compensated over the operational temperature range for output accuracy within 10% ± 0.5 mR/h

Moisture: Seals used at openings for dust and water resistance. Detector is protected by a silica-gel dryer.

Humidity: Operable from 0 to 95%, non-condensing

Weight: Approximately 3.6 lb (1.63 kg) with alkaline AA cells

Size: 4.2" W x 7.9" L x 7.7" H (including handle)

Testing: The RO-20 AA has been successfully tested to ANSI N42.17A and is CE Certified to European standard EN50082-1 (EN61000-4-2 & EN61000-4-3)
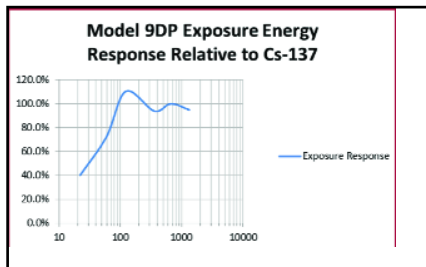
CE

Item #	Description
343-150	RO-20 AA Survey Meter
343-155	5 Micro Curie Cs-137 Check Source

MODEL 9DP, PRESSURIZED ION CHAMBER SURVEY METER

Function Buttons

Model 9DP Exposure Energy Response Relative to Cs-137

- 0-50 mSv/h (0-5 R/hr) Range with μR/hr Sensitivity
- Simultaneous Rate and Integrate or Peak Hold Readouts
- Sunlight Readable Color Display
- Auto Zeroing & Ranging
- Rechargeable Batteries
- Alarming Capability
- Data Logging
- USB Connectivity
- Free Firmware Updates through Internet

The Model 9DP, pressurized ion chamber meter, provides highly sensitive measurements of exposure or dose. It can simultaneously display the rate and either integrated value or highest rate (peak) seen by the instrument. The integrated value or peakrate can be reset using one of the four convenient front-panel mounted buttons.

The stunning 256K color, bit-mapped display provides an optimized presentation of the data and is accompanied with icons informing the user of the active functions and instrument status. All logged data can be written in csv format to a standard USB thumb drive for convenient retrieval by a PC spreadsheet or database program. Alarms are manifested using color changes on the display and an acknowledgable audio output.

This meter is part of the new Dimension series of meters employing state-of-the-art technologies that deliver tremendous capability, user-friendliness, and convenient PC connectivity. The built-in USB port facilitates password-protected access to parameter settings via direct connection to a USB keyboard (with no additional USB ports, and no integrated mouse or trackpad) thus foregoing any need to install PC application software or dealing with operating system compatibility issues. An optional Dimension PC Windows™ Interface Package is available that enables total control over the instrument and performs calibration.

Specifications

Radiation Detected: Beta above 1 MeV; gamma & X-rays above 25 keV

Operating Ranges:
Sv/h units: 0-5 μSv/h, 0-50 μSv/h, 0-500 μSv/h, 0-5 mSv/h, 0-50 mSv/h;
R/h units: 0-500 μR/h, 0-5 mR/h, 0-50 mR/h, 0-500 mR/h, 0-5 R/h
Gy/h units: 0–5 μGy/h, 0–50 μGy/h, 0–500 μGy/h, 0–5 mGy/h, 0–50 mGy/h

Chamber Volume: 230 cm^3 (14 in^3) volume pressurized to 9 atm (122 psig)

Chamber Density: chamber wall density is 601.7 mg/cm^2; can wall density is 332.5 mg/cm^2. Total density of chamber + can is 934.2 mg/cm^2

Accuracy: ±10%

Energy Response: ± 25% from 60 keV to 1.25 MeV

Response Time: Ranges from 5 seconds in lowest range to under 2 seconds highest range when measuring from 10% to 90% of final value

Geotropism: < 1%

Measurement Readouts: Simultaneous display of rate and either the integrated reading or highest rate (peak)

Minimum Readout: .01 μSv/h (0.1 μR/h, 0.01 μGy/h)

LCD Display: 3.5" (8.9 cm) diagonal, 240 H x 320 W pixels, TFT active matrix, >256k colors, 220 cd/m^2, automatic sensor-controlled backlighting

User Controls: 4 push buttons : Instrument on/off, Function (for peak rate/integrate modes), Audio on/off, and Asterisk (for alarm acknowledge/meter reset/clearing integrated dose or peak rate)

Automatic Functions: Auto ranging, auto zeroing, auto LCD backlighting

Data Streaming: Data is stored to detachable USB thumb drive in CSV format for easy retrieval by PC spreadsheet/database programs. Data points include date and time, rate, integrated reading and instrument status. Logging time intervals are set by PC interface program.

Audio Outputs: Built-in unimorph speaker, > 60 dB at 2' (0.6 m) An option consisting of an audio jack and stereo/mono headphones may be ordered at time of purchase.

Alarms: Two available user-programmable levels of radiation alarms, each is user programmable throughout entire readout range

USB Interface: single USB port, connects directly to a USB keyboard (with no additional USB ports, and no integrated mouse or trackpad or audio controls) to facilitate password-protected parameter changes, accepts USB thumbdrive for storing logged data or to an optional Dimension Interface Package that facilitates connection to a PC paramater editing and calibration

Temperature Range: -20 to 40°C (-4 to 104°F)

Warm Up Time: <1 minute when the instrument is in temperature equilibrium with the surrounding envirnment

Drift: < 0.3 μSv/h (0.03 mR/h; 0.3 μGy/h)

Humidity: 0 - 95% non-condensing

Power: Eight rechargeable AA NiMH batteries, supplied with wall charger for direct connection to instrument

Battery Life: Approximately 12 to 30 hours between charges depending primarily upon use of backlighting and USB usage

Construction: Durable plastic accompanied by internal metal frame support

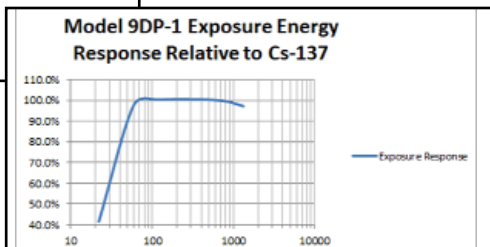**Size:** 8.6" H x 4.6" W x 9.6" L (21.9 x 11.6 x 24.5 cm)

Weight: 3.3 lb (1.5kg) including batteries

CE

Item #	Description
343-350	Model 9DP, Pressurized Ion Chamber Meter

MODEL 9DP-1 ION CHAMBER SURVEY METER

Function Buttons

Model 9DP-1 Exposure Energy Response Relative to Cs-137

- **Special Design for Measuring Pulsed Fields**
- **Low Pressure Chamber is Non Hazmat**
- **2 µSv/h to 500 mSv/h (200 µR/h to 50 R/hr) Operating Range**
- **Sunlight Readable Color Display**
- **Auto Zeroing & Ranging**
- **Rechargeable Batteries**
- **Alarming Capability**
- **Rate, Integrate & Peak Hold Readouts**
- **Data Logging**
- **USB Connectivity**
- **Free Firmware Updates through Internet**

The Model 9DP-1 ion chamber meter is specially designed for radiography work where pulsed fields are being measured. This instrument correctly integrates 50 nanosecond pulses (and wider) that other systems typically miss or measure inaccurately. This instrument measures both exposure and exposure rate and can simultaneously display the exposure rate with either the integrated value or highest rate seen by the instrument. The integrated value can be reset (if desired) using one of the four convenient front-panel mounted buttons. The buttons also control instrument power, function selection, speaker volume and alarm acknowledgment.

The detector chamber is only pressurized to 2.5 atm (22 psig), thus avoiding all (USA) HAZMAT concerns for shipping and handling. However, this reduced pressure also reduces sensitivity, so the minimum "good" measurement point is 2 µSv/h (200 µR/hr). The 256-color, bit-mapped display provides an optimized presentation of the data and is accompanied with icons informing the user of the active functions and instrument status. Alarms are manifested using color changes on the display and an audio output. The water resistant housing allows a broader range of work environments for the user.

The instrument is powered using NiMH type rechargeable batteries that deliver up to 30 hours operation between charges. Measurements can be logged to an industry standard USB thumb drive plugged into the instrument USB port. Data is written in CVS format for convenient retrieval by a PC spreadsheet or database program.

The Model 9DP-1 is part of the Dimension series of meters employing state-of-the-art technologies that deliver tremendous capability, user friendliness, and convenient PC connectivity. The built-in USB port facilitates password-protected access to parameter settings via direct connection to a USB keyboard (with no additional USB ports, and no integrated mouse or trackpad) thus foregoing any need to install PC application software or dealing with operating system compatibility issues. An optional Dimension PC Windows™ interface program that enables total control over the instrument and performs calibration is also available.

Specifications

Radiation Detected: gamma & X-rays above 25 keV; beta above 1 MeV, correctly integrates pulsed fields with 50 nanosecond pulse widths

Operating Ranges:
R/h units: 0.2–5 mR/h, 0.2–50 mR/h, 0–500 mR/h, 0–5 R/h, 0–50 R/h
Sv/h units: 2–50 µSv/h, 2–500 µSv/h, 0–5 mSv/h, 0–50 mSv/h, 0–500 mSv/h
Gy/h units: 2 - 50 µGy/h, 2 - 500 µGy/h, 0 - 500 mGy/h, 0 - 50 mGy/h, 0 - 500 mGy/h

Chamber Volume: 220 cm³ (13.4 in³) volume pressurized to 2.5 atm (22 psig)

Accuracy: ±10%

Energy Response: ± 25% from 60 keV to 1.25 MeV

Response Time: Ranges from 5 seconds in lowest range to 2 seconds in highest range when measuring from 10% to 90% of final value

Measurement Readouts: simultaneous display of rate and either the integrated reading or highest rate (peak hold), or pulsed mode status

Included Functions: integrated reading, peak reading, range lock (0-50 R/h) for reading pulsed fields

Data Logging: Data is stored to detachable USB thumb drive in CSV format for easy retrieval by PC spreadsheet/database programs. Data points include real-time clock generated date and time with rate, integrated reading, and instrument status. Logging time intervals are set by PC interface program or standard USB keyboard.

LCD Display: 3.5" (8.9 cm) diagonal, 240 H x 320 W pixels, TFT active matrix, 262,144 colors, 220 cd/m² , automatic backlighting

User Controls: 4 pushbuttons: Instrument on/off, peak rate/integrate mode, audio on/off, alarm acknowledge / meter reset / clearing integrated dose or peak rate

Automatic Functions: auto ranging, auto zeroing, auto LCD backlighting

Audio Outputs: built-in unimorph speaker, > 60 dB at 2' (0.6 meters) An optional audio jack can be installed for connecting to an external headset

Alarms: Two levels of radiation alarms available, each is user programmable throughout entire readout range and set through a PC interface program. Other alarms include low battery and various detector failures.

Temperature Range: -20 to 40 °C (-4 to 104 °F)

Power: Eight rechargeable AA NiMH batteries, supplied with wall charger for direct connection to instrument

Battery Life: 12 to 30 hours between charges, depending upon use of backlighting

USB Interface: Single USB port, may be connected directly to a USB keyboard to facilitate password-protected parameter changes, connect a USB thumbdrive for storing logged data, optional interface kit facilitates connection to a PC for paramater editing and calibration

Construction: Durable molded plastic with internal metal support

Size: 4.6" W x 9.6" L x 8.6" H (11.6 x 24.5 x 21.9 cm)

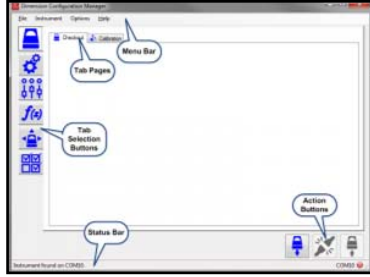**Weight:** 3.3 lb (1.5 kg), including batteries

CE

Item #	Description
343-352	Model 9DP-1, Ion Chamber Survey Meter

ACCESSORIES OPTIONS FOR THE MODEL 9DP ION CHAMBER SURVEY METERS
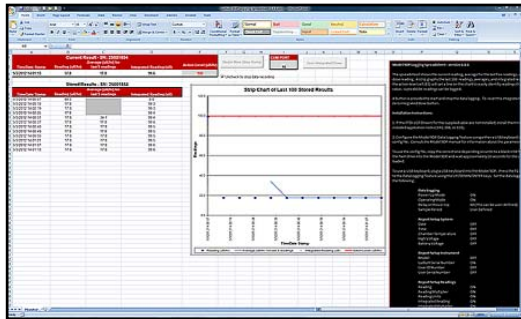

343-353

343-355

343-356

343-358

343-359

This transport and storage "satchel-type" case is ruggedly built with steel pin hinges, heavy duty latches, and comfortable, fold-down handles. The case is resistant to impact and chemical damage. The case is lined with dense foam padding providing further protection against impact during movement or storage. The case may be padlocked through the provided hasps for additional security for the instruments. Tongue and groove construction and an O-ring provide a dust and waterproof (up to 0.9 m [3']) design. This case has a manual bi-directional pressure equalization valve to give added protection to sensitive detectors during ambient air pressure changes encountered during air transport. This case is designed to meet or exceed TSA and ATA standards.

Specifications

Case Type: hard side, satchel type
Construction: rugged case with stainless steel pins and spring-loaded latches, padded handle, tongue and groove O-ring seal for dust- and waterproof (up to 3 feet) protection, manual bi-directional pressure equalization valve, includes dense foam padding
Interior Dimensions: 17.5" H x 11.9" W x 6.3" L (44.4 x 30.1 x 15.9 cm)
Exterior Dimensions: 18.3" H x 13.8" W x 7" L (46.5 x 35 x 17.8 cm)
Weight, empty: 6 lb (2.7 kg)

Item 343-358 Headphones and Audio Jack Output
This option for the Dimension 9DP series of instruments includes an Audio Jack Output and Stereo/Mono Headphones. The Audio Jack Output provides a standard socket for a headset jack. This option allows the instrument to be used in noisy or crowded environments with minimum distraction, or where the built-in audio output of the instrument might be disruptive to others such as in office or medical environments. The modification is factory-installed with all necessary electronics and modifications. This option can only be ordered with an order for a 9DP Survey Meter.

The Stereo/Mono Headphones
• Separate Volume Control for Each Ear Cup
• Rugged ABS Plastic Headstrap
• Snap-On Adapter with Dual Plug Sizes
• Mono/Stereo Switch
• Padded Ear Cups with Replaceable Cushions

Item 343-353 Alkaline Battery Pack
Battery pack of 8 non-rechargeable "AA" batteries, permitting quick battery change in the field.
• Convenient
• Reduces Chance of Losing Batteries in the Environment
• Stores Neatly

Item 343-355 Dimension Interface
The Dimension Configuration Manager software enables calibration and setup of any of the Dimension product line of instruments. (9DP - Series) This package includes the Dimension Configuration Manager software and the required special USB cable for communications between the PC and instrument.

tem 343-356 Transport and Storage Case
• Heavy-Duty Spring-Release Latches
• Large Easy-Grip Handles
• Stainless Steel Pin Hinges
• High-Density Foam Pads Included
• Non-Slip Finger Grip on Sides
• Accommodates Padlocks for Extra Security
• Waterproof (up to 3 feet) and Dustproof Design
• Manual Ambient Pressure Equalization Valve Helps Protect Detectors from Pressurization Damage During Air Transport
• Resistant to UV, Solvents, Corrosion, Fungus
• Resistant to Impact Damage

343-359 Logging Spreadsheet Software Package
The Model 9DP Logging Spreadsheet allows the user to log real-time data from the instrument directly to an Excel spreashseet. The software comes with configuration (.cfg) files that can be loaded into a USB thumbdrive and inserted into the Model 9DP to easily configure the instrument to log data. A USB keyboard can also be used to configure the instrument to download. The spreadsheet then has controls to start/stop the download and to reset or zero the integrated dose. The default data shows up in columns: TimeDate Stamp, Reading (µR/hr or µSv/h), Average for the last 5 readings, and Integrated Reading (µR or µSv). The software has a single-user license. A special USB cable is needed and is supplied with the package.

Item #	Description
343-353	Alkaline Battery Pack
343-355	Dimension Interface Kit
343-356	Transport and Storage Case
343-358	Headphones and Audio Jack Output
343-359	Logging Spreadsheet Software Package
337-141	Check Source, ^{137}Cs, 10µCi

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GENERAL PURPOSE SURVEY RATEMETER AND GAMMA DETECTOR
MODEL 3 AND MODEL 44-2

338-001 and 338-076

338-123

The Model 3 General Purpose Survey Ratemeter, Model 44-2 Gamma Detector and Check Source with Stick-on Holder is everything needed to do radiation survey checks of X-ray security scanners. The Model 3 General Purpose Survey Ratemeter has a uSv/h meter face with a range of 0 to 0.5 µSv/h.

Item 338-000 General Purpose Survey Ratemeter and Gamma Detector Includes:
(1) Model 3 General Purpose Survey Ratemeter
(1) Model 44-2 Gamma Detector
(1) Check Source and Stick-on Holder, Cs-137, 1.0 µCi

Using the Model 3 General Purpose Survey Ratemeter with the Model 44-2 Gamma Detector creates a very sensitive micro-R-meter. The advantage this instrument has over those with the detector housed inside the instrument enclosure is its ability to manipulate the detector into tight or difficult places. It has the additional benefit of keeping the meter conveniently in full view while performing an investigation.

The stick-on holder uses an industrial-strength adhesive to attach the very thin plastic laminate type 1.0 µCi Check Source to the Ratemeter. This provides for easy calibration of the Ratemeter and helps prevent losing the Check Source. The plastic laminate source with accompanying stick-on source holder is the only type of source and holder approved for use with any of Ludlum's Intrinsically Safe type instruments.

Item 338-001 Model 3 General Purpose Survey Ratemeter with µSV/h Meter Face
• Rugged
• 4-Range Analog Ratemeter
• Supports GM & Scintillation Type Detectors
• Greater than 2000 Hour Battery Life

The Model 3 General Purpose Survey Ratemeter is a handheld analog ratemeter known for accuracy and long-lasting dependability. The cast aluminum instrument housing with its separate battery compartment and accompanying metal handle offer an industrial robustness and quality that promote long lasting protection and instrument life. The front-panel controls include a rotary switch for selecting the four-decade range, instrument shut-off, battery test, an audio on/off switch, a fast/slow response switch, and a count reset button.

A one meter (39") straight type detector cable with "C" style connector is included with the Ratemeter and connects the Ratemeter to the Gamma Detector.

Specifications

338-001 Model 3 General Purpose Survey Ratemeter with µSV/h Meter Face
Application: Gamma surveying
Linearity: reading within 10% of true value with detector connected
High Voltage: adjustable from 400-1500 Vdc
Threshold: fixed at -30 mV ± 10 mV
Meter Dial: 0 - 0.5 µSv/h; BAT TEST
Meter: 2.5" (6.4 cm) arc, 1 mA analog type
Controls:
  Rotary Selector Switch: Switches between: Instrument off; Battery check; Ranges: x0.1, x1, x10, x100
  Response Switch: Toggles between FAST (4 seconds) or SLOW (22 seconds) from 10% to 90% of final reading
  Reset Pushbutton: To zero meter
  Audio Switch: For audio on/off, built-in unimorph speaker, greater than 60 dB at 2' (0.6 m)
  Calibration Controls: Accessible from front of instrument (protective cover provided)
Temperature Range: -4 to 122°F (-20 to 50°C), may be certified for operation from -40 to 150°F (-40 to 65°C)
Power: Two each "D" cell batteries (housed in externally accessible sealed compartment)
Battery Life: Typically greater than 2000 hours with alkaline batteries (battery condition can be checked on meter)
Connector: Series "C"
Construction: Cast and drawn aluminum with beige powder coat
Size: 6.5" H x 3.5" W x 8.5" L (16.5 x 8.9 x 21.6 cm), including handle
Weight: 3.5 lb (1.6 kg), including batteries

Item 338-076 Model 44-2 Gamma Detector
Indicated Use: low-level, wide-energy gamma survey
Detector Type: NaI(Tl) Scintillator, 1" Dia x 1" T (2.5 x 2.5 cm)
Sensitivity: typically 175 cpm/µR/hr (^{137}Cs gamma)
Efficiency: ^{125}I - 7%; ^{57}Co - 10%; ^{137}Cs - 3%; ^{60}Co - 3%
Background: 1800 cpm
Recommended Energy Range: 20 KeV-1.5 MeV
Energy Response: Energy dependent
Photomultiplier Tube: 1.1" (2.9 cm) diameter, magnetically shielded
Operating Voltage: typically 500-1200 volts
Connector: Series "C"
Temperature Range: 5 to 122°F (-15 to 50°C), may be certified for - to operate from -40 to 150°F (-40 to 65°C)
Construction: aluminum housing with beige powder coat finish
Size: 2" Dia x 7.3" L (5.1 x 18.5 cm)
Weight: 1 lb (0.5 kg)

Item 338-123 Check Source and Stick-On Holder
Isotope: Cesium-137
Activity: 1.0 µCi
Size: 1" Dia x 0.006" T (2.5 cm x 0.15 mm)

CE

Item #	Description
338-000	General Purpose Survey Ratemeter & Gamma Detector
338-001	Model 3 General Purpose Survey Ratemeter
338-076	Model 44-2 Gamma Detector
338-123	Check Source and Stick-On Holder, Cs-137, 1µCi