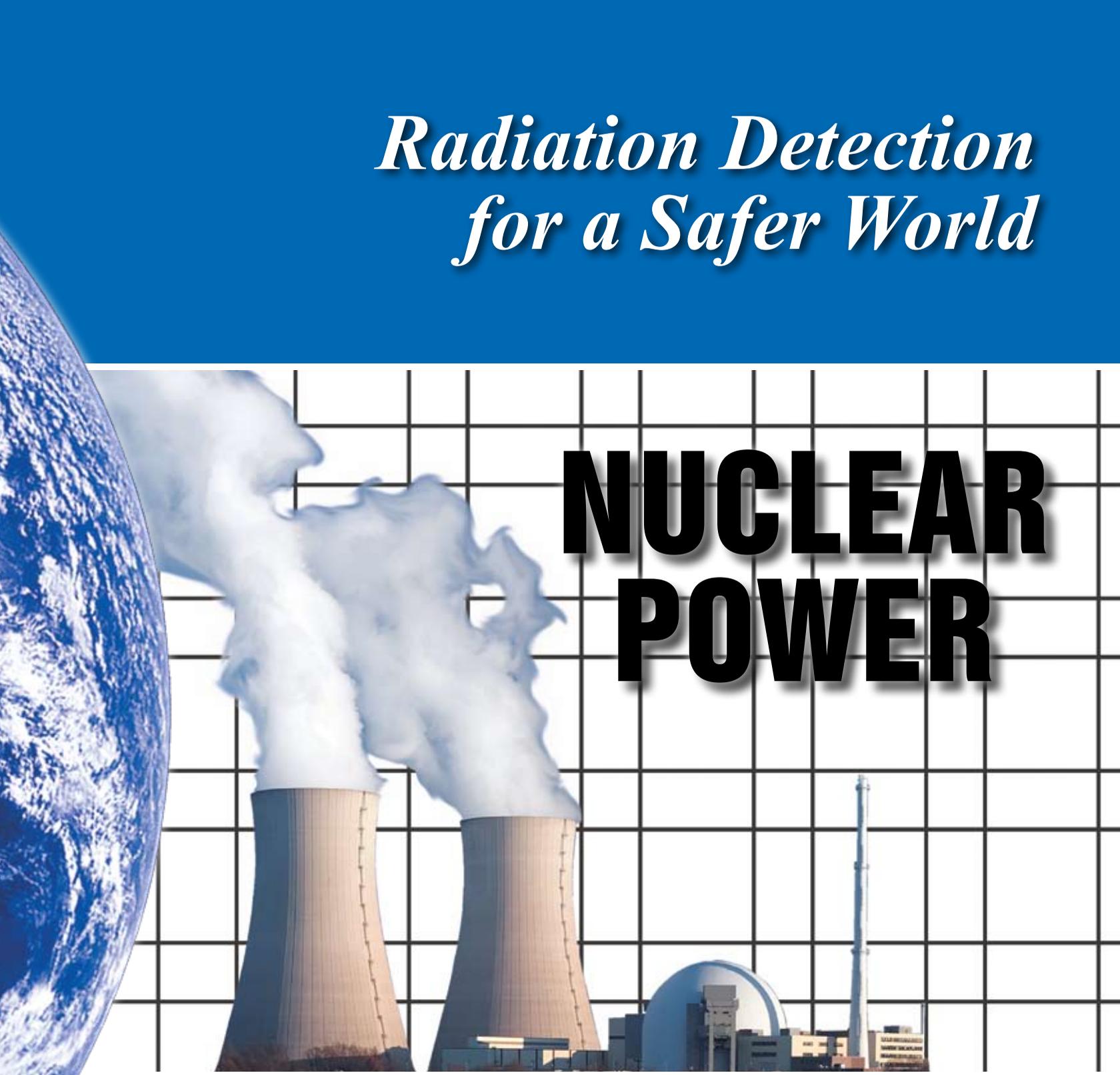


*Radiation Detection  
for a Safer World*

A composite image featuring a blue and white grid background. On the left, a portion of the Earth is visible. In the center, two large cooling towers emit white steam. To the right, a nuclear reactor building with a dome and a tall chimney are visible.

# NUCLEAR POWER

 **Ludlum**  
Measurements, Inc.

[www.ludlums.com](http://www.ludlums.com)

# Ludlum Measurements, Inc.

## *Radiation Detection for a Safer World*

### **Introduction**

Ludlum Measurements, Inc. (LMI) has been designing, manufacturing, and supplying radiation detection and measurement equipment in response to the world's need for greater safety since 1962. Throughout its nearly five-decade history, it has developed radiation detection technologies and instruments in support of enhancing the safety of personnel and the environment. It offers one of the largest lines of radiation detection instrumentation available from any one company.



### **Longevity and Commitment**

LMI's earned reputation for affordability, high quality, reliability, durability, and long-term support are well known and highly respected within each of the markets it currently serves. The core values established by its founder and president, Mr. Don Ludlum, continue in full force, without interruption or alteration by outside investors or buyers. Mr. Ludlum and his son, Larry, remain at the helm of the company, which has grown into a full scale enterprise operated by a staff of highly experienced professionals.

### **Totally Integrated**

LMI has invested heavily into becoming a vertically integrated radiation detection company in order to better control costs, quality, and delivery times. Over the years Ludlum has implemented a very comprehensive machine shop, welding capabilities, environmentally-controlled painting facilities and numerous assembly lines. Recent additions of in-house, automated PC board assembly, plastic injection molding capability, photomultiplier tube and plastic scintillation detector design and manufacturing all contribute to this succeeding philosophy.

### **Engineering Excellence**

LMI has a significant investment in engineering to ensure it sustains a high level of competency and excellence within the organization. The width and breadth of the engineering organization affords it to rapidly develop many new designs each year including custom designed solutions while simultaneously supporting its large product line. Many of the time-tested and field-proven designs are credited to LMI's engineering expertise in developing reliable instruments capable of withstanding rough handling and harsh environments.

### **Legendary Support**

LMI is also legendary for its repair, calibrations and training support. It still supports instruments shipped several decades previously, well past what most traditional instrument companies would deem reasonable. LMI additionally supports calibration and repair on many radiation detection instruments manufactured by others.

# Catalog Info

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## PLACING AN ORDER

**Phone:** 800-622-0828 325-235-5494  
**Fax:** 325-235-4672  
**Email:** ludlum@ludlums.com  
**Address:** 501 Oak Street, P.O. Box 810, Sweetwater, Texas, USA 79556

## WARRANTY

Ludlum Measurements, Inc. warrants the products covered in this website to be free of defects due to workmanship, material, and design for a period of twelve months from the date of delivery. The calibration of a product is warranted to be within its specified accuracy limits at the time of shipment. In the event of instrument failure, notify Ludlum Measurements, Inc. to determine if repair, recalibration, or replacement is required. This warranty excludes replacement of photomultiplier tubes, GM and proportional tubes, and scintillation crystals, which are broken due to excessive physical abuse or used for purposes other than intended. There are no warranties, express or implied, including without limitation and implied warranty or merchantability or fitness, which extend beyond the description of the face thereof. If the product does not perform as warranted herein, purchaser's sole remedy shall be repair or replacement, at the option of Ludlum Measurements, Inc. In no event will Ludlum Measurements be liable for damages, lost revenue, lost wages, or any other incidental or consequential damages arising from the purchase, use, or inability to use product.

[www.ludlums.com](http://www.ludlums.com)

# Survey Meters



**9DP**

*Pressurized Ion Chamber*

Part Number: 48-3742

## Gamma Field Measurements: 0-50 mSv/hr

The Ludlum Model 9DP, pressurized ion chamber meter, provides highly sensitive measurements of exposure and exposure rate over a range of 0-50 mSv/hr (0-5 R/hr). It can simultaneously display the exposure rate, integrated value, and highest rate seen by the instrument. The integrated value can be reset (if desired and allowed) using one of the four convenient front panel mounted buttons. The stunning 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. All logged data are written in csv format to a plugged-in industry 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 accompanying audio output, which can be acknowledged.



**9-3**

*Air Ion Chamber*

Part Number: 48-3689

## Gamma Field/Beta Measurements: 0-500 mSv/hr

The Ludlum 9-3 is a rugged air ionization chamber for performing beta-gamma dose rate measurements over a five-decade span ranging from background to 500 mSv/hr (50 R/hr). The ion chamber automatically compensates for changes in temperature. The chamber wall, including the instrument case, is 1000 mg/cm<sup>2</sup>. A 1000 mg/cm<sup>2</sup> retractable beta shield allows beta measurement with a 7 mg/cm<sup>2</sup> window.

The six position selector switch selects Off, x10K, x1K, x100, x10 and x1. Other controls include an on/off switch for a meter light, reset and battery test buttons, and a zero adjustment knob. Means are also provided to zero the electrometer leakage current.



**9-7 Series**

*High Range Ion Chamber*

## Gamma Field/Beta Measurements: 0-199.9 Sv/hr

The Ludlum Model 9-7 Series Ion Chamber Display Unit is a digital readout and control unit that can be attached to any compatible ion chamber (sold separately, see table below). This instrument is a direct replacement for the discontinued Eberline Model RO-7 and will work with any of the existing Eberline RO-7 series detectors, extensions, and cables.

Two versions of this instrument are available; one with readout in Sv/hr, the other in R/hr.

- Model 9-7-1    0.01 mSv/hr-199.9 Sv/hr    Part Number: 48-3756
- Model 9-7     0.001-19.99 kR/h                Part Number: 48-3633

Detector Model	Detector Range	Part Number
9-7LD	0.01-19.9 mSv/hr    (0.001-1.99 R/hr)	47-3693
9-7BM	0.001-1.99 Sv/hr    (0.1-199.9 R/hr)	47-3694
9-7BH	0.1-199 Sv/hr        (0.01-19.99 kR/hr)	47-3695

# Survey Meters



**14C & 44-38**  
Geiger Counter

Part Numbers: 48-1611, 47-1588

## Gamma Field Measurements: 0-20 mSv/hr

This “Geiger Counter” instrument offers a wide dynamic range, 0-20 mSv/hr (0-2000 mR/hr), by employing two energy compensated GM tubes. The external Model 44-38 detector, connected via a 99 cm (39 in.) cable, accommodates the first four selection ranges (x0.1, x1, x10, x100). The top most range (x1000) is read from the detector located inside the instrument enclosure. The Model 14C is equipped with audio output and an accompanying on/off switch, a fast/slow response time selector and a reset display button. The meter face is dual scale, with one for cpm and another for exposure. As a safety feature, the internal detector will drive the meter full scale, warning the user of a radiation overload situation regardless of the selected range.



**19**  
*uR Meter*

Part Number: 48-1615

## Gamma Field Measurements: 0-50 $\mu$ Sv/hr

The Model 19 is a high-sensitivity gamma  $\mu$ R meter employing an internally housed 2.5 cm dia x 2.5 cm thick (1.0 x 1.0 in.) NaI detector and covering a range of 0-50  $\mu$ Sv/hr (0-5000  $\mu$ R/hr). The aluminum cast 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 five-decade range and instrument shut-off, an audio on/off switch, a fast/slow response switch, and push buttons for activating the meter lamp, count reset, high voltage display, and battery test. An alarm light is mounted to the front panel and is accompanied by an audio signal. The Model 19 is a complete turn-key system and includes two “D” cell batteries.



**78 - Series**  
*Stretch Scope*

## Gamma Field Measurements: 1 $\mu$ Sv/hr-10 Sv/hr

The Model 78 “Stretch Scope” telescoping gamma survey meter keeps the user at a safe distance from high radiation areas or for reaching areas otherwise difficult to normally access. The wide detection range of 1  $\mu$ Sv/hr-10 Sv/hr (0.1 mR/hr-1000 R/hr) is accomplished using dual energy compensated GM detectors. The backlit digital LCD delivers precise three-digit measurement values, which can be purchased with a display of units of Sv/hr or R/hr and is accompanied by icons and messages for operational status of the instrument. Rate changes are conveniently viewed on the accompanying analog meter. The front panel controls include separate switches for On/Off, Audio, range selection, Fast/Slow response, and LCD backlight.

Model	Units of Measurement	Part Number
78	R/hr	48-2832
78-1	Sv/hr	48-3743

# Survey Meters

## Alarming Gamma Dose Rate & Dose: 100 nSv/hr-10 Sv/hr



**25 Series**  
*Personal Radiation Monitor*

The Model 25 Series is a conveniently small-sized device designed to warn users anytime they are in a potentially harmful radiation environment. The unit will automatically alarm any time either the dose rate or accumulated dose (0-19.99 Sv) setpoints are exceeded with a loud audible signal and bright, blinking red light. Another convenient feature is that it will also display the time remaining before acquiring the does limit at the current dose rate. This small device can be worn on a belt, a lanyard, or an armband and is very simple to use and operate. This instrument can be purchased with either R or Sv units and certification to USA intrinsic safety standards.

Model	Display Range	Intrinsic Safety	Part Number
25	0.01 mR/hr-1,000 R/hr		48-3584
25-1	100 nSv/hr-10 Sv/hr		48-3629
25-IS	0.01 mR/hr-1,000 R/hr	Yes	48-3661
25-IS-1	100 nSv/hr-10 Sv/hr	Yes	48-3686



**12-4**  
*Neutron Survey Meter*

Part Number: 48-1200

## Neutron Measurements: 0-100 mSv/hr

The Model 12-4 is an industry standard neutron dose rate instrument with a measuring range of 0-100 mSv/hr (0-10,000 mrem/hr) from thermal to 12 MeV. The detector is a 22.9 cm (9.0 in.) moderated <sup>3</sup>He tube with gamma background rejection of less than 10 cpm up to 100 mSv/hr (10 R/hr). The ratemeter is a four-decade, analog meter designed with an aluminum cast instrument housing incorporating a separate battery compartment and accompanying metal handle. This design delivers industrial robustness and quality, promoting long lasting protection and instrument life.

The front panel controls include a rotary switch for selecting the four decade range, instrument shut-off and battery test, an audio on/off switch, a fast/slow response switch, a count reset and high-voltage test push-button. The Model 12-4 is a complete turn-key system and includes two "D" cell batteries



**702**  
*Isotopic Identifier*

Part Number: 48-3643

## Portable Gamma Spectroscopy

The portable Model 702 isotopic measurement system was developed to give end users a simple tool to quickly locate any abnormal levels of radioactivity and accurately identify the isotopes present. The instrument is coupled to a 5.1 x 5.1 cm (2.0 x 2.0 in.) NaI detector whose signal is gain stabilized using the embedded <sup>40</sup>K source. The model 702 additionally offers several advanced features for well-trained experts seeking to perform more detailed analysis either in the field or in a laboratory. Spectrums can be captured to a removable compact flash disk or sent to a PC via an ethernet connection. Quantum PC software to analyze the spectra more thoroughly is included along with a battery charger. In an emergency the instrument may alternately be powered using readily available alkaline batteries.

# Survey Meters



**3 & 44-9**  
*Geiger Counter*

Part Numbers: 48-1605, 47-1539

## **Alpha/Beta/Gamma Measurement: 0-500 kcpm**

Ludlum's best-selling Model 3 analog ratemeter, in combination with the industry-standard Model 44-9 GM pancake detector, delivers a universal and very robust radiation counting system. The meter and probe body are constructed from cast and formed metal that withstand rugged daily use. A separate, front accessible compartment facilitates changing batteries after 2000 hours of operation. The front panel controls include a rotary switch for selecting the four-decade range, instrument shut-off and battery test, an audio on/off switch, a fast/slow response switch, and a count reset button. The GM pancake is halogen quenched with a 15 cm<sup>2</sup> active window and protective screen. Typical efficiencies are: 5% - <sup>14</sup>C; 22% - <sup>90</sup>Sr/<sup>90</sup>Y; 19% - <sup>99</sup>Tc; < 1% - <sup>99m</sup>Tc, 32% - <sup>32</sup>P; and 15% - <sup>239</sup>Pu.



**2401-P**  
*Pocket Size GM Meter*

Part Number: 48-2875

## **Pocket-Size Integrated GM Meter**

The Model 2401-P instrument is a general purpose, pocket-size radiation detection meter designed around the venerable 5.1 cm (2.0 in.) diameter GM pancake detector. The detector is conveniently packaged inside the instrument with a protective screen window. The meter presents two readout scales; cpm for contamination measurements 0-50 kcpm (full range), and your choice of exposure scales for either 0-150 uSv/hr or 0-15 mR/hr (full range).

The instrument is equipped with two multi-positioned switches; one for activating the instrument with or without audible clicking; and a second for selecting the appropriate detector range.



**177 & 44-9**  
*Frisking Station*

Part Number: 48-1632, 47-1539

## **Alpha/Beta/Gamma Frisker Station: 0-500 kcpm**

The Model 177 is a rugged benchtop ratemeter with alarming capability. These units are very popular for frisking operations at stations where line power is available but can also be used in portable applications for up to 50 hours using the internal rechargeable battery. The Model 177 supports the Model 44-9 GM pancake detector and displays the results on a linear readout analog meter. The audio alarm is adjustable from 0 through 150% of full scale and is factory set to latching. Re-configuration to non-latching can be accommodated via a minor internal change. Front panel controls include a four-position rotary switch for selecting each detector decade, alarm set control, audio volume adjust, fast/slow response switch, power on/off switch, and push-buttons for count reset, battery test, high voltage test and alarm test.

# Survey Meters



**2360 & 43-93**  
*Alpha/Beta Survey Meter*

Part Number: 48-2872, 47-2556

## Alpha/Beta Contamination Surveying

This system combines the Model 2360 survey meter with the Model 43-93, 100 cm<sup>2</sup> alpha/beta detector. This instrument will simultaneously measure alpha and beta as separate counts and also data log the results. The 2360 meter is an analog/digital unit with ratemeter, scaler, and data logging functionality and is equipped with the overload indicator, which typically signals a light leak in the detector mylar window. The detector has ZnS(Ag) adhered to a 0.254 mm (0.010 in.) thick plastic scintillator. The 1.2 mg/cm<sup>2</sup> mylar window has a protective screen cover that results in 89 cm<sup>2</sup> open area. The alpha-to-beta cross talk is less than 10% with the beta cross-over to alpha at less than 1%. The backgrounds are typically < 3 cpm alpha and < 300 cpm beta. Efficiencies (4 $\pi$ ) are 20% - <sup>239</sup>Pu; 15% - <sup>99</sup>Tc; 20% - <sup>90</sup>Sr/Y.



**3 & 43-92**  
*Alpha Survey Meter*

Part Number: 48-1605, 47-2555, 4464-130

## Alpha Smear & Air Sample Measurements

The Model 3 analog survey meter combined with the Model 43-92, 100 cm<sup>2</sup> alpha detector, offer a great way to measure alpha radiation. The meter is equipped with the overload option, which typically indicates a light leak in the detector mylar window. The detector is a ZnS(Ag) scintillator with a protective screen resulting in 89 cm<sup>2</sup> open area. The background is 3 cpm or less with a 24% efficiency (4 $\pi$ ) to <sup>239</sup>Pu.



**3 & 44-142**  
*Beta Survey Meter*

Part Number: 48-1605, 47-3161, 4464-130

## Beta Contamination Survey Measurements

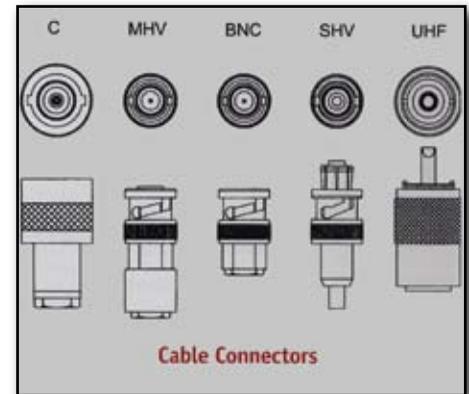
The Model 3 analog survey meter combined with the Model 44-142, 100 cm<sup>2</sup> beta detector, offer a great way to measure beta radiation. The meter is equipped with the overload option, which typically indicates a light leak in the detector mylar window. The detector is a 0.254 mm (0.010 in.) thick plastic scintillator. The window is 1.2 mg/cm<sup>2</sup> mylar with a protective screen resulting in 89 cm<sup>2</sup> open area. In a 100 nSv/hr (10 uR/hr) field, background count rates are typically in the 300 to 350 cpm range. Efficiencies (4 $\pi$ ) are typically 4% - <sup>14</sup>C, 30% - <sup>90</sup>Sr/Y, and 20% - <sup>99</sup>Tc.

# Survey Meter Accessories

## Detector Cables

Unless specified otherwise, Ludlum survey meters and detectors come equipped with “C” type connectors. When a meter and accompanying probe are ordered as a matched set, Ludlum automatically includes a 99 cm (39 in.) “C” straight cable at no additional charge. Other cable types and lengths are available as indicated below:

CABLE TYPE	LENGTH	PART NUMBER
C Straight	99 or 152 cm	40-1004
C Coiled	46 to 122 cm	40-1005
BNC Straight	99 or 152 cm	40-1008
BNC Coiled	46 to 122 cm	40-1006
SHV Straight	99 or 152 cm	8303-134
SHV Coiled	46 to 122 cm	8303-521
MHV Straight	99 or 152 cm	40-1011
MHV Coiled	46 to 122 cm	8303-132
UHF Straight	99 or 152 cm	8303-263
UHF Coiled	46 to 122 cm	8303-520



Length Conversions: 46 cm: 18 in. 99 cm: 39 in. 122 cm: 4 ft 152 cm: 5 ft

## Connectors & Adapters

ITEM	PART NUMBER
Series C Tee Connector	13-7788
Series BNC Tee Connector	13-7769
Series C-BNC Adapter	13-7759
Series BNC - C Adapter	13-7768

## Shoulder Strap

Lighten your burden and free up your hands with a shoulder harness that easily attaches to the meter.

Part Number: 4363-413



## Headset

Great for noisy areas, this comfortable headset plugs into any Ludlum survey meter equipped with an audio output jack.

Part Number: 47-3708



# Survey Meter Accessories

## Carrying Cases



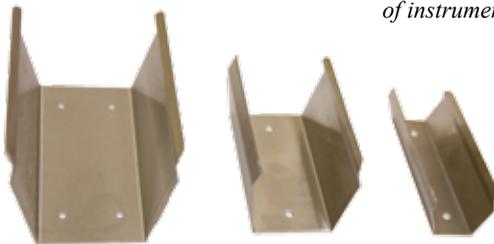
**Airmold**  
Good low cost case.

Type	Size	Dimension (H x W x L)	Part No.
Airmold	Small	35.6 x 27.2 x 14.5 cm (14.0 x 10.7 x 5.7 in.)	2310278
Airmold	Medium	43.2 x 33.0 x 19.1 cm (17.0 x 13.0 x 7.5 in.)	2310330
Airmold	Large	62.2 x 33.0 x 19.1 cm (24.5 x 13.0 x 7.5 in.)	2310327
Storm	Small	33.0 x 23.4 x 15.2 cm (13 x 9.2 x 6.0 in.)	2311062
Storm	Medium	43.2 x 29.7 x 15.7 cm (17.0 x 11.7 x 6.2 in.)	2311063
Storm	Large	55.9 x 43.2 x 20.3 cm (22.0 x 17.0 x 8 in.)	2311064



**Storm**  
Air and water tight, rugged design. Great for shipping GM pancake style probes and instruments to protect against pressure changes.

## Probe Clips



*Allows one-handed carrying of instrument and probe(s).*



for Probe Model No.	Clip Part Number
43-92	4002-026-01
43-93	4002-026-01
44-9	4010-008-01
44-10	4002-020-08
44-38	4010-008-01
44-142	4002-026-01

*Note: These clips may be mounted to either the instrument handle or side of the case.*

## Lighted Handle



Part Number: 4464-154

Replace the standard survey meter handle with this self-contained illuminating handle that shines a white light across the meter face when encountering dark ambient conditions. A three position rocker switch enables turning the light on and off plus a momentary position. The LED light is powered by a single "AA" battery housed inside the handle and will power the light for up to 500 hours.

# Sample Counting



**3030P**  
*Alpha/Beta Sample Counter*

Part Number: 48-3509

## Alpha/Beta Sample Counting with Ultra-Low Backgrounds

The 3030P's solid state PIPS® detector facilitates efficient and cost-effective simultaneous alpha and beta sample counting for air filters, smears, and swipes. This instrument meets the newer EPRI guideline for detecting a few dpm of alpha amidst a several hundred thousand dpm beta background. All data are automatically logged and easily retrievable via a USB connection. The light weight and battery operability afford convenient use out in the field. With the optional detector shield, the Model 3030P can be used virtually anywhere.

The instrument comes with a PC control software that allows the user to set all parameters, view QC check settings, change alpha and beta window and threshold values, perform MDA (Minimum Detectable Activity), and retrieve the sample data saved to the logging memory.

PIPS® is a registered trademark of Canberra Industries



**3030**  
*Alpha/Beta Sample Counter*

Part Number: 48-3204

## Alpha/Beta Sample Counting

The Model 3030 Alpha Beta Sample Counter incorporates an internally housed ZnS(Ag) plastic scintillator detector with shielded 5.1 cm (2.0 in) diameter stainless steel sample tray and scaler/counting electronics into a self-contained, portable system. This instrument supplies independent backlit LCD readouts to support discriminated alpha and beta sample counting. Key features include background subtraction, crosstalk correction, separate alpha/beta alarms, CPM/DPM operating modes, and a pre-scripted QC function with automatic reminder timer. The instrument supports both 110 and 220 Vac operation and includes a trickle-charged, gel-cell battery for portable offsite use up to eight hours.



**2000 & 43-10**  
*Alpha Sample Counter*

Part Number: 48-1648, 47-1526

## Alpha Sample Counter

The Model 2000 Scaler Counter electronics in combination with the Model 43-10 Detector creates a versatile and simple-to-use alpha counting system. The scaler reading is presented on a digital, six-digit readout LED that can be set to count from 0.1-999 minutes (or seconds). An RS-232 port facilitates connection to a PC for recording and control or a printer for direct output of the count results.

The Model 43-10 sample head accommodates up to 5.1 cm (2.0 in.) diameter samples and features a ZnS(Ag) detector detecting a background of 3 cpm or less and a  $4\pi$  efficiency of 37% to  $^{239}\text{Pu}$ .

# Sample Counting



**2000/44-88/180-24**  
*Beta Sample Counter*

Part Numbers: 48-1648, 47-2356, 47-2631

## Alpha-Beta-Gamma Sample Counter

The Model 2000 Scaler Counter electronics in combination with the Model 44-88 GM Pancake Detector and Model 180-24 Sample Tray produce an excellent general purpose, low-cost sample counting system. The scaler reading is presented on a digital, six-digit readout LED that can be set to count from 0.1-999 minutes (or seconds). An RS-232 port facilitates connection to a PC for recording and control or a printer for direct output of the count results.

The Model 44-88 GM pancake has a 15 cm<sup>2</sup> active area, a background of approximately 60 cpm, and 4π efficiencies of: 5% - <sup>14</sup>C; 22% - <sup>90</sup>Sr/<sup>90</sup>Y; 19% - <sup>99</sup>Tc; 32% - <sup>32</sup>P; 15% - <sup>239</sup>Pu. The Model 180-24 tray accommodates samples up to 5.1 cm (2 in.) in diameter and is designed with slots for setting the tray at 0.32, 0.64, 1.3, 2.5, and 5.1 cm (0.13, 0.25, 0.5, 1.0, and 2.0 in.) from the detector.



**2000/44-10/180-9**  
*Gamma Sample Counter*

Part Numbers: 48-1648, 47-1540, 47-1591

## Shielded Gamma Sample Counter

The Model 2000 Scaler Counter electronics with the Model 44-10 Scintillator and Model 180-9 Shielded Sampler creates a low-cost, gamma-sample counting system with high sensitivity. The scaler reading is presented on a digital, six-digit readout LED that can be set to count from 0.1-999 minutes (or seconds). An RS-232 port facilitates connection to a PC for recording and control or a printer for direct output of the count results.

The Model 44-10 detector is a 5.1 x 5.1 cm (2.0 x 2.0 in.) NaI scintillator with a typical sensitivity of 9 cpm/μSv/hr (900 cpm/μR/hr) (<sup>137</sup>Cs). The shielded sampler surrounds the sample tray with 3.8 cm (1.5 in.) of lead and weighs 117.9 kg (260 lb). The sample tray accommodates samples up to 5.1 cm (2 in.) in diameter and is designed with slots for setting the tray at 0.32, 0.64, 1.3, 2.5, and 5.1 cm (0.13, 0.25, 0.5, 1.0, and 2.0 in.) from the detector.



*Sample Planchets*

## Stainless & Aluminum Planchets

Ludlum now manufactures its own sample planchets. They have a diameter of 5.1 cm (2.0 in.) and can be purchased in either aluminum or stainless steel. The minimum order quantity is 500.

Material	Part Number
Aluminum	7525-371
Stainless Steel	7525-371-01

# Emergency Response



**2241-3RK**  
*Emergency Response Kit*

Part Number: 48-3189

## Emergency Response Kit

The 2241-3RK Emergency Kit packages all the basic radiation measurement tools you're likely to need for a radiological emergency into a convenient carrying case to facilitate a quick response when required. The kit includes Ludlum's digital, auto-ranging and versatile Model 2241-3 Ratemeter/Scaler with a built-in energy compensated GM tube to perform exposure rate measurements up to 100 mSv/hr (10 R/hr). Responders can either plug in the external alpha beta gamma GM pancake probe (Model 44-9) for contamination measurements or the highly sensitive gamma scintillator (Model 44-2) for locating sources. A convenient rotary switch located on the front panel permits the responder to select the appropriate detector in use. The carrying case supplied with the kit is air and water tight with cutouts for each item and includes a  $^{137}\text{Cs}$  check source to verify proper operation of the equipment.



**18 & 44-10**  
 *$^{131}\text{I}$  Survey Meter*

Part Number: 48-1613 & 47-1540

## Gross Gamma & $^{131}\text{I}$ Measurement

The Model 18 analog ratemeter/analyzer supports selecting between either gross gamma or  $^{131}\text{I}$  measurements. The front panel controls include a rotary switch for selecting the four-decade range, instrument shut-off, and battery test, another for selecting between three detector setups, two-position switches for audio on/off, fast/slow response and counting window in/out, plus buttons for displaying the high voltage and resetting the counts. The Model 44-10 detector is a 5.1 x 5.1 cm (2 x 2 in.) NaI scintillator with a sensitivity typically measuring 9 cpm/ $\mu\text{Sv/hr}$  (900 cpm/ $\mu\text{R/hr}$ ) ( $^{137}\text{Cs}$ ) and covering an energy range of 50 KeV-3 MeV.



**52-1-1**  
*Portable Portal Monitor*

Part Number: 48-3258

## Quick Set-up Portable Portal Monitor

The Model 52-1-1 Portal Monitor is used for beta/gamma personnel contamination monitoring and meets the FEMA standard for Emergency Response Portal Monitoring (FEMA-REP-21). It is designed to be disassembled for ease of transportation and storage, and can be set up in under five minutes or less without any tools. The non-volatile parameters are preset at the factory to detect a 1.0  $\mu\text{Ci}$   $^{137}\text{Cs}$  source in a 100 nSv/hr (10  $\mu\text{R/hr}$ ) background field. The electronics are microprocessor-based for ease of setup and reliability. Status LEDs indicate count cycle status. Audible signals accompany the LEDs for additional indication. Detector counts, background, and all parameters may be viewed on the Liquid Crystal Display (LCD). All setup is accomplished by way of push-buttons located below the LCD. These portal monitors can be operated in a walk-through basis with a quick scan occurring while a person is positioned within the portal.

# Area Monitoring



**375-Series**  
Area Monitoring System

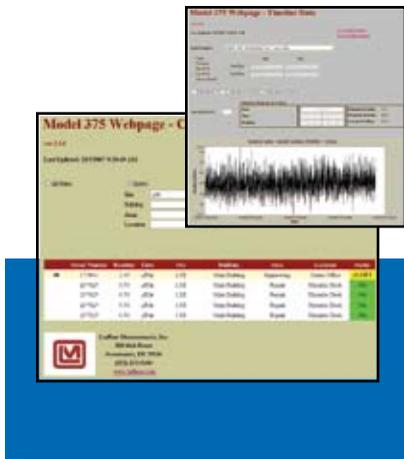
## Gamma Area Monitoring Systems

The Model 375 is a versatile, compact and very affordable digital electronic controller designed for monitoring radiation in areas. Its simple design accommodates many different detectors suiting a wide variety of applications and is equipped with a local readout and alarms. These versatile units may also be connected to an optional remote indicator/annunciator for alerting personnel at other locations. The user-friendly, digital design enhances setup and operation. These units may also be networked to a central PC-based station where data are logged and alarms posted.

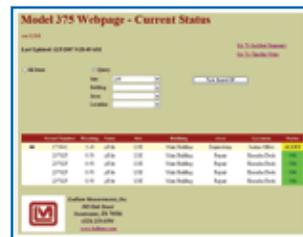
Detector Range	Detector	Model	Part Number
1 $\mu$ Sv/hr-10 mSv/hr (0.1 mR/hr-1.0 R/hr)	Energy compensated GM	375/2	48-2410
10 $\mu$ Sv/hr-100 mSv/hr (1.0 mR/hr-10 R/hr)	Energy compensated GM	375/4	48-2411
Any 5 consecutive decades between 1 $\mu$ Sv/hr-10 Sv/hr (0.1 mR/hr-1.0 kR/hr)	Ion chamber	375/9	48-3036 & 47-3324
1 $\mu$ Sv/hr-20 mSv/hr (100 uR/hr-2.0 R/hr)	5.1 x 5.1 cm (2.0 x 2.0 in.) NaI Scintillator with removable shield	375-10	48-3443
	Any external GM, scintillator or proportional detector	375	48-2230 (375 electronics only)

## Ethernet Connectivity with a WebPage Interface

Model 375s equipped with the ethernet option can be connected to a radiation network that collects and displays radiation levels and alarm status in real time from up to 50 area monitors. A standard webpage browser with appropriate authorization can view all data across the network and audibly annunciate any alarms. The system can also be setup to send intelligent email alerts to responsible personnel and capture a picture of whatever triggered an alarm anywhere optional ethernet cameras are employed.



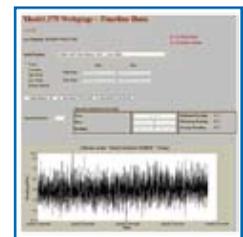
Part Number: 1370-077



Current Status



Incident Summary



Timeline Data

## Optional Remote Indicators/Annunciators



**271**  
Indicators

Part Number: 48-2475



**272**  
Indicators/Meter

Part Number: 48-2656



**272D**  
Digital Display

Part Number: 48-3575

# Contamination Control



**239-1F** with Model 12  
Floor Monitor

Part Number: 48-1702

## Beta Gamma Floor Monitoring

The Model 239-1F Floor Monitor is a gas proportional floor monitor detector mounted on a roll-around cart. The instrument features a flow system, quick-connects, a gas bottle mount, and a means to adjust the height of the detector from the floor for optimum performance. The detector is a 584 cm<sup>2</sup> gas proportional detector utilizing P-10 counting gas and measures 2.0 x 16.0 x 46.5 cm (0.8 x 6.3 x 18.3 in.) (H x W x L). A counting-gas bottle and gas regulator are not included. The basic system as shown here is equipped with the Model 12 analog ratemeter. For those desiring ratemeter plus scaler functionality, Ludlum offers the Model 2221-based system, Part Number: 48-2085.



**4404-16**  
Large Area Gamma Monitor

Part Number: 48-3664

## Highly Sensitive Detection System with GPS/Data Logging

The Ludlum Model 4404-16 system provides radiation surface measurements to cover large areas either inside or surrounding the plant site. This system is comprised of a large 5.1 x 10.2 x 40.6 cm (2.0 x 4.0 x 16.0 in.) NaI scintillation detector, multichannel electronics, a waterproof enclosure, a ruggedized laptop, and a GPS (Global Positioning System). The software will display the radiation data just like a chart recorder and log the radiation data along with its corresponding GPS coordinates into a comma delimited file. The accompanying software program converts the data files into files suitable for viewing in Google Earth™ or any other 3D earth browser implementing the KML\* encoding.

Google Earth™ is a trademark of Google Inc.

\* KML (Keyhole Markup Language) is an open standard officially named the OpenGIS® KML Encoding Standard (OGC KML). It is maintained by the Open Geospatial Consortium, Inc. (OGC).



**4525-7000**  
Gate Monitoring System

Part Number: 48-3605

## Gate Monitoring System with Ethernet Connectivity

This system employs two large 3500 in<sup>3</sup> plastic scintillator detectors, each employing dual PM tubes to monitor vehicles entering or exiting the facility. Data from all the system sensors are acquired and analyzed by powerful, field-tested and time-proven algorithms designed to check each load vigorously in a multi-dimensional, multi-layered manner before declaring them clean.

Any abnormality is immediately alarmed and annunciated both locally and remotely. An optional camera system can capture the image of the offending vehicle and identify to the operator the location of the radioactivity on the image to facilitate a more immediate investigation. The image is included in the logged data for permanent record keeping. Alarms can also be configured to automatically notify shift supervisors by email if desired. Ludlum's gate monitoring system can be configured to accept up to six detectors per lane with up to four lane systems (24 detectors total) all connected to a central computing station.

# Contamination Control



**4906AB**  
*Hand & Foot Monitor*

Part Number: 48-3688

## Hand & Feet Contamination Monitoring

The Model 4906AB is a low-cost, industrial duty, alpha/beta contamination monitoring system for checking personnel hands and feet. A large color, touch-screen LCD presents users with the system status and points out any potential contamination. The system employs six gas-flow proportional detectors with counting activated by optical switches. Alarms are annunciated locally and can be augmented with optional relays and/or a light stack. The built-in ethernet interface supports connection to a network for gathering all count cycles and remote monitoring of the status. All maintenance can be performed from the front of the instrument. Detector access for quick replacement or repair is facilitated by hinged top covers.



**53**  
*Personnel Portal Monitor*

Part Number: 48-3151

## Large Area Beta/Gamma Personnel Portal Monitor

The Model 53 Scintillation Portal Monitor is used for beta/gamma personnel radiation monitoring. The portal frame incorporates an array of six plastic scintillation detectors positioned around the frame and base. There is a detector above the portal opening, one detector beneath the base, and two detectors positioned on each side. To facilitate repair, all detectors are the same size. The electronics are microprocessor-based for ease of setup and reliability. The electronics are located in a key-locked, swing-down chassis. Parameters are protected from inadvertent or unauthorized change. Individual LEDs (Light Emitting Diodes) mounted in the frame indicate the specific alarm location. Status LEDs above the portal opening indicate count cycle status. Audible signals accompany the LEDs for additional indication.



**54**  
*Small Article Monitor*

## Small Article Contamination Checking

The Model 54 is an all new design incorporating best practices employed over the past couple of decades. This monitor features true  $4\pi$  counting to provide a more uniform response throughout the large 130.3 L (4.6 ft<sup>3</sup>) volume, lined in stainless steel. The user-interface is through a large 30.5 cm (12 in.) touch-screen LCD. Ludlum's QPASS counting technology delivers consistent and accurate results in the shortest time. This system is available with either four or six detectors and 2.5 or 5.1 cm (1.0 or 2.0 in.) lead shielding. Options include a second LCD for two-sided operation, a light stack alarm tower and a weight scale that enables specific activity measurements.

Number of Detectors	Shielding	Part Number
4	2.5 cm (1.0 in.)	48-3728
4	5.1 cm (2.0 in.)	48-3727
6	2.5 cm (1.0 in.)	48-3726
6	5.1 cm (2.0 in.)	48-3263

# Testing



**500-2**  
*Pulse Generator*

Part Number: 48-1340

## Pulse Generator with Digital Readouts

The Ludlum Model 500-2 Pulse Generator (Pulser) provides the functions necessary for use in calibrating Ludlum instruments, as well as many other scaler/ratemeter instruments. The adjustable output pulse rate is displayed on a three-digit LED readout. Potentiometers (both coarse and fine controls) and a multiplier switch provide rates from  $10$ - $9.9 \times 10^6$  cpm. Pulse amplitude is controlled by a multiplier switch and a LO/HI potentiometer, while pulse polarity is chosen by a selector switch. Amplitude may be varied between 0 and a negative or positive 5 volts; displayed on a four-digit LED readout. The high voltage of the instrument under test is displayed on a four-digit LED readout.



*Check Sources*

## Check Sources

Source	Size (diameter x thickness)	Part Number
0.25 uCi <sup>137</sup> Cs	2.5 cm x 3.2 mm (1.0 x 0.125 in.)	01-5723
1.0 uCi <sup>137</sup> Cs	2.5 cm x 3.2 mm (1.0 x 0.125 in.)	01-5196
5.0 uCi <sup>137</sup> Cs	2.5 cm x 3.2 mm (1.0 x 0.125 in.)	01-5186
10 uCi <sup>137</sup> Cs	2.5 cm x 3.2 mm (1.0 x 0.125 in.)	01-5231
1.0 uCi <sup>133</sup> Ba	2.5 cm x 3.2 mm (1.0 x 0.125 in.)	01-5818



*Check Source Holder*

Part Number: 4062-166

## Check Source Attachment for Survey Meters

The small holder typically mounts directly to the side of the survey meter. It will hold any 2.5 cm (1.0 in.) diameter check source offered above.

# Support Services



## Repair

Our facility offers a full-service repair and calibration department. We not only repair and calibrate our own instruments but most other manufacturers instruments as well. Repair estimates are offered at no cost and repair and modification charges are based on material cost plus labor. Labor rates are billed for actual time at the currently published rates.



## Calibration

Ludlum performs NIST traceable calibrations with compliance to ANSI N323. Standard instrument calibrations supply as found readings and two points per range calibration for a single detector setup. Most special multi-detector and multi-source calibrations can also be performed on Ludlum designed instrumentation as well as many instruments manufactured by others.

Visit our website to view the current rates.



## Training

Ludlum offers an intensive two-day training course that involves calibration, repair, and maintenance on Ludlum manufactured instruments. LMI offers this training at no charge at our facility in Sweetwater, Texas. Accommodations and meals must be provided by the attendees. Training is usually scheduled around mid-month, but other times can be accommodated especially for groups of four or more. Training is also offered at locations around the country in the spring and fall (see list of scheduled classes on our website). If you are interested in signing up for this training, please contact Randy Smith or Carlos Chapa at Ludlum Measurements, Inc. at 800-622-0828 toll free or 325-235-5494.

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